2027 Interim Meeting Agenda
Specifications and Tolerances (S&T) Committee

Mark Lovisa, Committee Chair
Louisiana

INTRODUCTION

This is the agenda of the Specifications and Tolerances Committee (hereinafter referred to as the "Committee") for the 111th Annual Meeting of the National Council on Weights and Measures (NCWM). This report is based on the Interim Report offered in the NCWM Publication 16, testimony heard at public hearings, comments received from the regional weights and measures associations and other parties, the addendum sheets issued at the Annual Meeting, and actions taken by the membership at the voting session of the Annual Meeting. The Informational items presented below were adopted as presented when the Board's report was approved.

Table A identifies the agenda and appendix items. Agenda items are identified in the Report by Reference Key Number, Item Title, and Page Number. Item numbers are those assigned in the Interim Meeting agenda. A Voting item is indicated with a "**V**" after the item number. An item marked with an "**I**" after the reference key number is an Informational item. An item marked with a "**D**" after the reference key number is a Developing item. The developing designation indicates an item has merit; however, the item was returned to the submitter for further development before any action can be taken at the national level. An agenda "Item Under Consideration" is a statement of proposal and not necessarily a recommendation of the BOD. Suggested revisions are shown in **bold** face print by **striking out** information to be deleted and **underlining** information to be added. Table B lists the results of any Voting Items.

Items may be grouped into "Blocks" if they are:

- **Opposing Items:** Items in direct conflict with each other, and only one may be adopted,
- **Interdependent Items:** Items addressing a similar topic where, if one is adopted, all need to be adopted, and
- **Related Items:** Items addressing a similar topic across multiple codes or regulations.

Some Voting Items are considered individually; others may be grouped in a consent calendar. Consent calendar items are Voting Items that the Board has assembled as a single Voting Item during their deliberation after the Open Hearings, assuming that the items are without opposition and will not require discussion. The Voting Items that have been grouped into consent calendar items will be listed on the addendum sheets. Prior to adoption of the consent calendar, the Board will remove specific items from the consent calendar upon request to be discussed and voted upon individually.

The Board may change the status designation of agenda items (Developing, Informational, Assigned, Voting and Withdrawn) up until the report is adopted, except those items which are marked Developing, Informational, Assigned or Withdrawn cannot be changed to Voting Status. Any change from the Board Interim Report (as contained in this publication) or from what appears on the addendum sheets will be explained to the attendees prior to a motion and will be acted upon by the active members of NCWM prior to calling for the vote.

An "Item under Consideration" is a statement of proposal and not necessarily a recommendation of the Board. Suggested revisions are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in ***bold faced italics***. Additional letters, presentation and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-16 to review these documents.

All sessions are open to registered meeting attendees. If the Board must discuss any issue that involves proprietary information or other confidential material; that portion of the session dealing with the special issue may be closed if (1) the Chairman or, in his absence, the Chairman-Elect approves; (2) the Executive Director is notified; and (3) an announcement of the closed meeting is posted on or near the door to the meeting session and at the registration desk. If possible, the posting will be made at least a day before the planned closed session.

Subject Series List

Handbook 44 – General Code ..... GEN Series

Scales ..... SCL Series
Belt-Conveyor Scale Systems ..... BCS Series
Automatic Bulk Weighing Systems ..... ABW Series
Weights ..... WTS Series
Automatic Weighing Systems ..... AWS Series
Weigh-In-Motion Systems used for Vehicle Enforcement Screening ..... WIM Series

Liquid-Measuring Devices ..... LMD Series
Vehicle-Tank Meters ..... VTM Series
Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices ..... LPG Series
Hydrocarbon Gas Vapor-Measuring Devices ..... HGV Series
Cryogenic Liquid-Measuring Devices ..... CLM Series
Milk Meters ..... MLK Series
Water Meters ..... WTR Series
Mass Flow Meters ..... MFM Series
Carbon Dioxide Liquid-Measuring Devices ..... CDL Series
Hydrogen Gas-Metering Devices ..... HGM Series
Electric Vehicle Supply Equipment ..... EVS Series
Non-Utility Electricity-Measuring Systems ..... EMS Series

Vehicle Tanks Used as Measures ..... VTU Series
Liquid Measures ..... LQM Series
Farm Milk Tanks ..... FMT Series
Measure-Containers ..... MRC Series
Graduates ..... GDT Series
Dry Measures ..... DRY Series
Berry Baskets and Boxes ..... BBB Series

Fabric-Measuring Devices ..... FAB Series
Wire-and Cordage-Measuring Devices ..... WAC Series
Linear Measures ..... LIN Series
Odometers ..... ODO Series
Taximeters ..... TXI Series
Timing Devices ..... TIM Series
Grain Moisture Meters (a) ..... GMA Series
Grain Moisture Meters (b) ..... GMB Series
Near-Infrared Grain Analyzers ..... NIR Series
Multiple Dimension Measuring Devices ..... MDM Series
Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices ..... LVS Series
Transportation Network Measuring Systems ..... TNS Series

Other Items ..... OTH Series

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Table B
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
ABWS	Automatic Bulk Weighing System	NEWMA	Northeastern Weights and Measures Association
AAR	Association of American Railroads	NIST	National Institute of Standards and Technology
API	American Petroleum Institute	NUEMS	Non-Utility Electricity-Measuring System
CNG	Compressed Natural Gas	NTEP	National Type Evaluation Program
CWMA	Central Weights and Measures Association	OIML	International Organization of Legal Metrology
EPO	Examination Procedure Outline	OWM	Office of Weights and Measures
EVSE	Electric Vehicle Supply Equipment	RMFD	Retail Motor Fuel Dispenser
FHWA	Federal Highway Administration	S&T	Specifications and Tolerances
GMM	Grain Moisture Meter	SD	Secure Digital
GPS	Global Positioning System	SI	International System of Units
HB	Handbook	SMA	Scale Manufactures Association
LMD	Liquid Measuring Devices	SWMA	Southern Weights and Measures Association
LNG	Liquefied Natural Gas	TC	Technical Committee
LPG	Liquefied Petroleum Gas	USNWG	U.S. National Work Group
MMA	Meter Manufacturers Association	VTM	Vehicle Tank Meter
MDMD	Multiple Dimension Measuring Device	WIM	Weigh-in-Motion
NCWM	National Council on Weights and Measures	WWMA	Western Weights and Measures Association

Details of All Items
(In order by Reference Key)

GEN – GENERAL CODE

GEN-27.1 G-S.1.1. Location of Marking Information for Not-Built-For-Purpose, Software-Based Devices.

Source:
NTEP Weighing and Software Sectors

Purpose:
Make G-S.1. identification markings displayed electronically on not-built-for-purpose, software-based devices easier to locate.

Item under Consideration:
Amend NIST Handbook 44 General Code as follows:

G-S.1.1. Location of Marking Information for Not-Built-For-Purpose, Software-Based Devices. *– For not-built-for-purpose, software-based devices either:*

(a) The required information in G-S.1. Identification. (a), (b), (d), and (e) shall be permanently marked or continuously displayed on the device; or

(b) The Certificate of Conformance (CC) Number shall be:

(1) permanently marked on the device;

*(2) continuously displayed***; ~~or~~ when ~~the not-built-for-purpose~~, software-based device is active ~~and~~ provides access to the information required in G-S.1. Identification, (a), (b), and (d) when not provided in accordance with G-S.1.1.(a).~~:~~ or*

*(3) ~~for not-built-for-purpose~~, software-based devices manufactured before January 1, 20XX**, accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."*

Note: *For (b), clear instructions for accessing the information required in G-S.1. Identification, (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.**

*[*Nonretroactive as of January 1, 2004]*

[**Nonretroactive as of January 1, 20XX]
(Added 2003) (Amended 2006 **and 20XX**)

Previous Status:
2027: New Proposal

Original Justification:
Having to navigate through multiple icons and levels of displays to access marking information creates unnecessary burden to regulators conducting market surveillance and Registered Service Agents needing to locate required information found on the NTEP certificate of conformance.

Opposition may be that this would require screen space needed for other items on mobile apps, tablets, and computer displays. Having an NTEP Certificate of Conformance number displayed on the display could cause consumer confusion.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
2027 New Proposal

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

Not applicable.

WWMA 2026 Annual Meeting:

Not applicable.

NEWMA 2026 Interim Meeting:

Not applicable.

SWMA 2026 Annual Meeting:

Not applicable.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

GEN-26.1 I G-S.5.6. Recorded Representations.

Item was improperly identified **in NCWM Publication 15, January 2026, as GEN-26.5**

Source:
NCWM National Type Evaluation Program Committee

Purpose:
Remove the examples from G-S.5.6. Recorder representations and add a definition to HB 44 for Electronic Receipts to assist in clarification for regulatory, manufacturers and NTEP as to what an electronic receipt is.

Item under Consideration:
Amend NIST Handbook 44 General Code

G-S.5.6. Recorded Representations. – Insofar as they are appropriate, the requirements for indicating and recording elements shall also apply to recorded representations. All recorded values shall be presented digitally. In applications where recorded representations are required by a specific code, the customer may be given the option of not receiving the recorded representation. Recorded representations referenced in specific codes shall be made available to the customer in hard copy form, unless otherwise specified by the customer. For systems equipped with the capability of issuing an electronic receipt, ticket, or other recorded representation, the customer may be given the option to receive any required information electronically ~~**(e.g., via cell phone, computer, etc.)**~~ in lieu of or in addition to a hard copy.
(Amended 1975, 2014, 2023 and **20XX**)

Previous Status:
2026: New Proposal

Original Justification:
Having a definition for an electronic receipt will benefit industry, the regulatory community and NTEP and promote uniformity.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Vermont Agency of Agriculture Food & Markets supports the item.
- 2026 Annual: A Representative from Iowa Department of Agriculture/Weights & Measures and NEW Jersey Weights & Measures support this item as presented but would also support the partitioning of the item.
- 2026 Annual: A Representative from New York Department of Agriculture & Markets would support the NIST edits with the removal of the final sentence allowing the consumer to request a receipt by phone.
-
- 2026 Interim: A regulator from California supports this as a Developing item with consideration that the developed term is being placed in the General Code and as such would apply to all device types. They believe that specification and user requirements would be necessary for a QR code to be used to facilitate access to recorded representations. This regulator would also support this as a Voting item if the QR code is removed from the suggested General Code location and the NIST OWM recommended definition change is adopted. In separate comments, this regulator spoke on potential issues such as not being able to scan the QR code, questioning if there is a requirement on how long the code needs to be displayed, and stating that this is different than entering information to receive a receipt.
- 2026 Interim: A regulator from Vermont spoke in support of this item as it will help define what an acceptable method of recorded representation is. This regulator supports the NIST OWM proposed definition change and supports this item as a Voting item.
- 2026 Interim: A regulator from New Jersey spoke in support of the NIST OWM analysis and supports this item as a Voting item.
- 2026 Interim: A regulator from Iowa spoke in support of this item as a Voting item.

Industry:

- 2026 Annual: A Representative from the Meter Manufacturers Association, Gilbarco Inc, and ChargePoint support this item with edits.
- 2026 Annual: A Representative from Tesla stated that this proposal provides clear definition of electronic receipt and is an important clarification for Type Evaluation and manufactures.
- 2026 Annual: A Representative from the Scale Manufacturers Association supports the item.
- 2026 Interim: A representative of NEMA spoke in support of this item as a Voting item.

- 2026 Interim: A representative from Tesla spoke in support of this item as a Voting item and notes that this item brings much needed clarity on the nature of electronic receipts.
- 2026 Interim: A representative from Electrify America spoke in support of this item as it gives clarity to existing ambiguity of the handbook requirements. It was noted that a QR code is not a receipt, but a means to deliver the receipt to a consumer.
- 2026 Interim: A representative from Endress + Hauser Flow USA Inc. echoed comments heard from the MMA and Gilbarco Inc with support to comments heard from the Arkansas regulator. It was stated that this item could reside in the definition section with perpetuity and without much attention. A Developing status was recommended.
- 2026 Interim: A representative from ChargePoint commented that this type of receipt is happening whether we like it or not and that this can continue to be worked while being given a Voting status this cycle.

Advisory:

- 2026 Annual: A Representative from NIST supports this item with NIST edits and recommends striking examples in the definition.
- 2026 Interim: A representative from NIST OWM supports this as a Developing item and voiced appreciation to the NTEP Committee for the work that has been done to address this issue. NIST OWM also provided a suggested modification to the definition of **recorded representation**. If this modification is accepted, NIST OWM would support this as a voting item.

Comments Against:

Regulatory:

- 2026 Annual: A Representative from Arkansas Bureau of Standards recommends the two parts of this item be separated into two individual items (recorded representation and electronic receipt). Arkansas does not support the definition of electronic receipt.
- 2026 Annual: A Representative from Colorado Department of Agriculture asked a question about changes and recommends downgrading to address previous comments.
- 2026 Annual: A Representative from California Division of Measurement Standards supports the intention of the proposal but states no code sections are listed at the end of this item. They are supportive of the NIST recommended edits, but more work is needed to the definition of electronic receipt, so it applies to the correct code.
- 2026 Annual: A Representative from Delaware Department of Agriculture stated opposition to the electronic receipt definition but supports the rest of the proposal.
- 2026 Annual: A Representative from Maryland Department of Agriculture agrees with Arkansas about the definition.
- 2026 Interim: A regulator from Arkansas spoke in opposition to this item and recommended that it remains Developing. The main concern voiced was that having secondary methods of delivering a recorded representation to consumers in the same code and paragraph of the primary method has given industry the impression that the primary method is optional or can be replaced by secondary means. It was conveyed that secondary options are in addition to the primary and that secondary options, if listed, should be in device specific codes. In separate comments, this regulator recommended that this should be placed in device specific codes and not the definitions.
- 2026 Interim: A regulator from Washington spoke in support of comments heard from Arkansas and wants to recognize and emphasize that the default method of receipt delivery should be in printed form.
- 2026 Interim: A regulator from Maryland spoke in agreement with the representatives from Arkansas, California, and the MMA and recommends a Developing status.

Industry:

- 2026 Interim: A representative of MMA spoke in support of this item in principle as a Developing item. It was stated that an exhaustive list should be based on requirements and not a list of technologies of the time.
- 2026 Interim: A representative from Gilbarco Inc. supports the position of the MMA in that this list of recorded representations could be taken as restrictive and that the language could be more generic to allow for different types of technologies.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: After the Annual Meeting, the Committee revised and divided this item into three separate items GEN-26.1, OTH-26.5, OTH-26.6, based on the comments heard during open hearing. The body voted to assign an Informational status to this item at the Annual Meeting. NCWM 2026 Interim Meeting: Hearing comments on this item, the Committee has assigned a voting status to the item, incorporated the definition of **recorded representation** as provided by NIST OWM, and removed the electronic form example list from the proposed **electronic receipt** definition.

The Committee noted that the item was incorrectly identified in Publication 15 at the NCWM 2026 Interim Meeting. The item was corrected from GEN-26.5 to GEN-26.1

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufacturers Association): Supports this item and recommends adoption.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports a voting status.

Mr. Steve Harrington (Oregon Weights & Measures): He believes that the list is not helpful and supports voting.

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): Supports a voting status.

Mr. Khoa Lam (County of Los Angeles, California): Supports a voting status.

The 2026 S&T Committee recommends a Voting status, based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representative from New Jersey Weights & Measures, NYS Weights & Measures, New Hampshire Division of Weights and Measures, and PA Dept. of Agriculture Bureau of Weights and Measures recommended a voting status.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

Representatives from Arkansas, Maryland and Louisiana believe the item is fully developed and recommend Voting.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL – SCALES

SCL-24.2 D Multiple Sections Regarding Tare

Source:
Ross Andersen, New York, Retired

Purpose:
Reduce confusion regarding net weight and tare issues by defining terms and adds specific requirements for tare operations and for marking and printing of net, gross and tare weight values.

Item under Consideration:
Amend Handbook 44, Section 2.20. Scales Code and Appendix D, Definitions as follows:

NOTE: This proposal and justification were modified by the submitter before the fall 2025 regional association meetings.

Based on comments received and extensive discussion with OWM staff, I submit this revised proposal as part of the continuing development of this item. This revision replaces the original item.

The proposal consists of three sections. Part 1. establishes the terminology that is important to understand the meaning of key terms. Part 2. addresses the question of proper testing of weighing instruments, both gross and net indications. Part 3. addresses identification of indicated weight, recorded weight values, and externally calculated weight values. Part 3 also includes the subject of mathematical agreement.

Part 1. Preliminaries: Terminology of Weighing

The language surrounding "weight" is highly nuanced. This reflects thousands of years of evolution in commercial activity and even radical changes that occurred within my lifetime with the invention of digital weighing instruments. The important issue is that a weighing instrument provides weight indications reacting to whatever load it senses. It is the operator that operates the instrument and converts these weight indications into weight values that are used in the commercial transaction based on knowledge of the specific load or loads involved in the weighing operation. The applicable rules for weight indications and weight values are:

- Weighing instruments produce **weight indications** reacting to changes in applied load in real time. Analog indications are unrounded, but Digital indications are rounded per G-S.5.2.2.(c).

- Weighing instruments may record **weight values** from weight indications. Analog must comply with G-S.5.2.2.(b) and digital must comply with G-S.5.2.2.(a)&(d). *Recorded values don't change with applied load.*

- Weighing instruments may externally calculate **weight values** from two measured weight values using the formula: Gross – Tare = Net (and variations).

Analog instruments have a single scale of weight indication beginning at no load zero balance. All digital instruments have a scale of indication beginning at no-load zero parallel to the analog instruments. Some digital instruments have a tare mechanism and will have two scales, one beginning at no-load zero and the other beginning at tare load zero after operation of a tare mechanism.

The loads used by the operator in the weighing process are as follows:

- Dead load – meaning the load receiver and support structure.
  - No load – meaning the dead load plus any additional load that is not part of the transaction, e.g., the scoop used with a computing scale in a candy store, or dirt and debris that accumulates on a vehicle scale.
  - Service load – meaning the item(s) subject to a charge for service based on weight. The terms gross, tare and net have no relevance to a service load.
  - Tare load – meaning the tare materials delivered with the commodity.
  - Net load – meaning the commodity.
  - Gross load – meaning the net load plus the tare load.

The term weight in common usage has the following variants.

- Weight, or gross weight – meaning (a) the indication of an instrument on the measurement scale beginning at no load zero, (b) the weight value derived from weight or gross weight indications for any load, or (c) the weight value derived from weight indications for the gross load.
- Net weight – meaning (a) the indication of an instrument on the measurement scale beginning at tare load zero, (b) the weight value derived from net weight indications for any load, or (c) the weight value derived from net weight indications for the gross load.

The key is that weight values must be derived from indications and require the operator to identify the associated load. Another important takeaway is that multiple meanings for the same term results in always being forced to consider the context to understand the requirement.

Part 2. Testing Procedures for Weighing

Amend section S.1.1. . and add a new section S.1.1.3. as follows:

S.1.1.1. Digital Indicating Elements.

(a) A digital zero indication shall represent a balance condition that is within ± ½ the value of the scale division d. **This does not apply to weight classifiers or to the counting feature on prescription scales.**

(b) After zero-setting (gross zero or net zero after a tare operation) the effect of zero deviation on the result of the weighing shall be not more than ***~~± 0.25 e.~~:***

(i) ± 0.5 e for Class IIIL scales and Class IIII highway weight enforcement scales with values of n = 400 or greater, or

(ii) ± 0.25 e for all other scales. On a multi-interval scale, e shall be replaced by e_1.

(Amended 202X)

[Nonretroactive as of January 1, 2025]

(c) A digital indicating device shall have a "center-of-zero" indicator that indicates a zero-balance condition when the deviation from zero is not more than ***~~± 0.25 e~~ the corresponding values in S.1.1.1.(b)****. A "center-of-zero" indicator may operate when zero is indicated for gross and/or net mode(s). The "center-of-zero" indicator is not mandatory on a device equipped with an auxiliary indication or equipped with an enabled zero tracking mechanism that maintains a "center-of-zero" condition* ***~~to ± 0.25 e~~ compliant with S.1.1.1.(b).***

(Amended 202X)

[Nonretroactive as of January 1, 1993]

(d) For electronic cash registers (ECRs) and point-of-sale systems (POS systems) the display of measurement units shall be a minimum of 9.5 mm ($^3/_8$ inch) in height.

[Nonretroactive as of January 1, 2021]

(Added 2019)

(Amended 1992, 2008, 2019, and 2024)

S.1.1.3. Analog Indicating Elements. – After zero-setting the effect of zero deviation on the result of the weighing shall be not more than:

(a) ± 0.5 e for Class IIIL scales and Class IIII highway weight enforcement scales with values of n = 400 or greater, or

(b) ***± 0.25 e for all other scales****.*

[Nonretroactive as of January 1, 202X]

(Added 202X)

Add a new Note N.1.13., and amend T.N.2.1. and T.N.3.3. as follows:

N.1.13. Testing Requirements. – When measuring errors for compliance with Table 6., the following shall apply.

(a) For Class IIIL scales and Class IIII highway weight enforcement scales with values of n = 400 or greater, the test load shall be applied at a zero/reference value accurate to ± 0.5 e, and the error calculation shall resolve the error to the nearest 1 e.

(b) For all other scales, the test load shall be applied at a zero/reference value accurate to ± 0.25 e, and the error calculation shall resolve the error to the nearest 0.2 e.

(Added 202X)

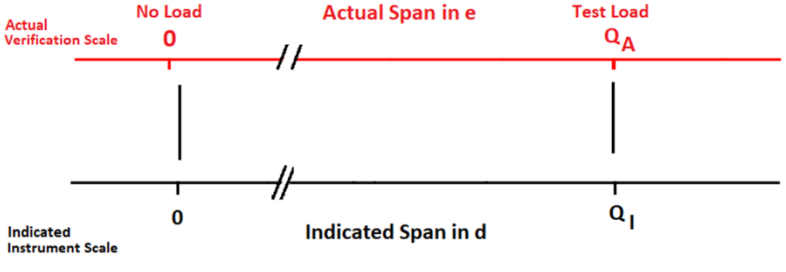
T.N.2.1. General. – The tolerance values ~~**are positive (+) and negative (–)**~~ **herein prescribed shall be applied to errors of overregistration and underregistration.** ~~**with the weighing device adjusted to zero at no load. When tare is in use, the tolerance values are applied from the tare zero reference (zero net weight indication); the tolerance values apply to the net weight indication for any possible tare load using certified test loads.**~~ **The tolerances apply to errors in gross indications when no tare mechanism is in use, and they apply to errors in net indications when a semi-automatic tare mechanism is in use. (See N.1.13.)**

T.N.3.3. Wheel-Load Weighers and Portable Axle-Load Weighers of Class IIII. – The tolerance values are two times the values specified in T.N.3.1. Maintenance Tolerance Values and T.N.3.2. Acceptance Tolerance Values **for scales with n of 400 or greater.**

(Amended 1986 **and 202X**)

Justification: The current S.1.1.1.(a) was written for normal rounding scales. The +/- 0.5 division is an absolute requirement meaning zero must extend from -0.5 d to + 0.5 d and must be 1 d wide. The new exemption in part (a) for weight classifiers is necessary because classifiers round mostly up instead of half up/half down. The width of the zero division is typically much smaller than 1 d for these instruments to provide for rounding up. The exemption in part (a) for pill counters is necessary because counting scales round mostly down. The zero pill indication could extend from no load to just under 1 pill (both plus and minus) making the zero division almost 2 d wide. Both of these types of scales are covered by the accuracy of zero requirements in part (b) ensuring center of zero is accurate.

The error in the Scales Code is calculated from the indication on the instrument scale (in d) and a test load on the verification scale (in e). See figure below. After aligning the zeros of the two measurement scales, you calculate error of under/overregistration as indicated quantity Q_I minus actual quantity Q_A with quantity in weight units. For this to work effectively, the zeros must be accurately aligned and the rounding error in the error calculation must be minimized. Note the small offset between the zeros.



The current zero accuracy requirement in S.1.1.1.(b) of +/- 0.25 e was clarified in amendments made 2024. However, the tolerance structure of class IIIL and IIII highway weight enforcement scales is very different from the other classes with many more e's of tolerance (up to 20 for IIIL and up to 10 for IIII). The 0.25 e accuracy of zero error becomes excessively small for these devices, for example, +/- 5 lb on a 200,000 lb x 20 lb IIIL vehicle scale. This is almost at the limit of detection. After the change, any zero indication within +/-10 lb (+/-0.5 d) is sufficiently accurate. More on this subject follows below. This is reflected in the new test note as well.

The n = 400 or greater limitation for weight enforcement scales is similar to the 2,000 minimum n for class IIIL. Permitting twice the tolerance when n is less than 400 can increase the relative tolerance to 4 %, e.g., 2 e at 50 e load. A search of NTEP approve weight enforcement scales did not reveal any instruments currently with n values less than 400. It is not necessary to update the nonretroactive dates in S.1.1.1.(b) or (c) as the new requirement is less stringent for the class IIIL and highway

weight enforcement scales. Note, the accuracy of zero also applies to a strain-load reference value in a strain-load test which will be a non-zero value.

The new paragraph S.1.1.3. is necessary to apply the accuracy of zero requirements equally to analog instruments. This recognizes that analog zero adjustments may have finite variability.

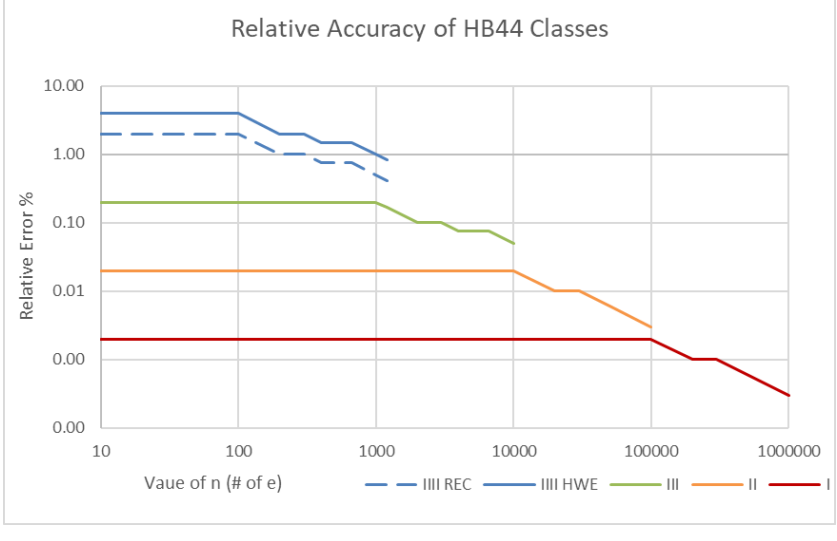
The new test note N.1.13. sets both zero accuracy requirements and resolution requirement for testing the scale. More information of the tolerance structures in the Scales Code and the issue of resolving errors is added below.

The changes to T.N.2.1 clarify that tolerances apply to errors of under/overregistration. The current plus or minus could also be errors in excess/in deficiency. The deleted language is clarified to explain how to conduct the tests to apply the tolerances to both gross and net indications. The limitation to semi-automatic tare reflects the fact that net zero is not normally seen at any time in the transaction and that accurate zero to S.1.1.1.(b) cannot be assumed with these tare methods. Semi-automatic tare must comply with S.1.1.1.(b).

Understanding Scales Code Tolerances

With the step tolerances in the Scales Code, the increased tolerances with increased test loads give us a false sense that tolerances increase as test loads increase. Yet the tolerances are actually decreasing when you look at them relatively rather than absolutely. In addition, we expect weighing instruments to be close to linear in performance. This is why we test at the maximum load in each tolerance step. The result, as the capacity moves into the second, third, or fourth step, is decreased probability of failing at lower steps.

The relative accuracy of the HB44 weight classes in the Scales Code (other than IIIL) are presented in the graph below. The scale tolerances based on relative error can be thought of as tolerance at capacity divided by the capacity, or e's of tolerance divided by n. The basic principle is that more e's generally reflects more accuracy (smaller tolerance) both within a class and between classes.



- Class IIII for highway weight enforcement ranges from 2 e per 50 e or 4% to 10 e per 1,200 e or 0.8%.
- Class IIII for recycling ranges from 1 e per 50 e or 2% to 5 e per 1,200 e or 0.4%.
- Class III ranges from 1 e per 500 e or 0.2% to 5 e per 10,000 e or 0.05%.
- Class II ranges from 1 e per 5,000 e or 0.02% to 3 e per 100,000 e or 0.003%.
- Class I ranges from 1 e per 50,000 e or 0.002% to 3 e per 1,000,000 e or 0.0003%.

Class IIIL is an anomaly, since it does not follow the principle of increasing accuracy with larger n. This class is a constant 0.2% tolerance over the entire class range from n = 2,000 to n = 10,000. The connection to class III is that class IIIL shares the same relative tolerance (0.2%) as Class III up to 1,000 e. The key is to see that the e and d of IIIL are significantly smaller than the equivalent class III for n up to 1,000. If you make a 0.2% accurate class III instrument with 200,000 lb capacity, you get a d of 200 lb. Yet the equivalent class IIIL has 20 lb d. In many respects class IIIL is like having auxiliary indication for class III. Consider the comparison table below for a 200,000 lb scale.

Consideration	III	III	IIIL
Scale Division d/n	20 lb/10,000	200 lb/1,000	20 lb/10,000
Tolerance @ 100 k/200 k	100 lb/100 lb	200 lb/400 lb	200 lb/400 lb
Suitable Test Load	80,000 lb	100,000 lb	30,000 lb
Accuracy of Zero	5 lb	50 lb	10 lb
AZT Window	10 lb	100 lb	60 lb
Print Stability	20 lb	200 lb	60 lb
Minimum Load	400 lb	4,000 lb	1,000 lb

If we tried to fit a 200,000 lb x 20 lb scale (column 2) into class III, not only do the tolerances get far too small but you also are faced with stringent requirements (shaded areas) such as:

- testing at a minimum of 80,000 lb to test at 4,000 e with its 60 lb (3 e) tolerance.
- trying to enforce 0.25 e accuracy at zero which is at the limit of detection.
- the scale would have to return to zero within 10 lb in order to get into the AZT window of ½ d.
- indication stability would have to be within 20 lb (+/-1 d) to print with wind.
- the 20 d minimum load would permit weighing down to 400 lb.

Increasing the d to 200 lb (column 3) returns the tolerances to the current 0.2% but some of those values that were too small at 20 lb d now are too large, like the 200 lb print motion and 4,000 lb minimum load. Class IIIL with its smaller 20 lb divisions (column 4) solved many problems (and required a good number of compromises).

Class IIII weight enforcement scales in contrast to class IIII follow a similar pattern to the IIIL vs III. The doubling of the tolerance along with the n = 400 minimum solved many problems.

Consideration	IIII	IIII	IIII(2xT)
Scale Division d/n	50 lb/400	200 lb/100	50 lb/400
Tolerance @ 10 k/20 k	100 lb/150 lb	200 lb/400 lb	200 lb/300 lb
Accuracy of Zero	12.5 lb	50 lb	12.5 lb
AZT Window	25 lb	100 lb	25 lb
Print Stability	50 lb	200 lb	50 lb
Minimum Load	500 lb	2,000 lb	500 lb

Resolving Errors

NTEP specifies that error calculations be resolved to 0.2 e or finer parallel to R76, reducing rounding error to a maximum of 0.1 e. The resolution of the error to 0.2 e is important because the value of d may be smaller than e with auxiliary indication, larger than e for most weight classifiers, greater than 3 e for counting scales, and equal to e for other scales. When computing error ($Q_I - Q_{A)}$ the different resolution of the indication results in very different resolution in the error.

This means rounding errors in calculating the error may be 0.05 e with e = 10 d auxiliary indication, ~10 e with e = 0.1 d weight classifiers, ~3 e with e = 0.33 d counting, and 0.5 e for other scales. R76 stipulated 0.2 e or finer to standardize the measurement of error. The principle is that once error resolution is reduced to 0.2 e or less, rounding error is considered insignificant.

The codification of these parameters formally authorizes the NTEP practices and clarifies that the rounding error is not included in the tolerances in Table 6. This does not prevent field tests from resolving errors to 1 e, when considering enforcement discretion. Just as many tests are not normally performed in field tests, this test may be modified for convenience with the full understanding that the practice can significantly increase the tolerances above the intended values.

To resolve error calculations to 0.2 e you can use one of three test methods:

1. Test at a whole number of e and resolve the indication to 0.2 e of finer. For example, for class II at the first tolerance step apply a load of 5000 e and resolve the indication to 0.2 e by (a) interpolating the analog indication to 0.2 e or finer, (b) by using indications with auxiliary indication to 0.2 e or finer, or (c) using extended display mode with temporary d = 0.2 e or finer.

2. Test at a whole number of d and apply test load in increments of 0.2 e or finer. For analog the test begins at the zero graduation and ends at a load graduation by adjusting the test load. For digital, the break points between divisions is used beginning at 0.5 d and ending at the test indication +0.5 d. For the first step in class III this could mean a final indication of 500.5 d. The span from 0.5 d to 500.5 d is precisely 500 d.
3. Test at a random point (as with the dynamic monorail). The instrument records values with auxiliary indication to 0.2 e or finer and the actual value is found on a reference scale with verified scale divisions = 0.2 e or finer.

The proposed resolution of the error for classes IIIL and IIII weight enforcement is to the nearest 1 e. This means error weights are not require ever to test these scales. The important issue is how rounding error in the indication impacts the pass/fail threshold. Remember, in field tests the instrument has to fail in order to take action. You find the fail threshold by adding the rounding error to the tolerance.

Consider a class III scale when testing at 500 e where the tolerance is 1 e or 0.2%, If you resolve error to 1 d, the rounding error is 0.5 d or e. This means you will not fail the scale until the error exceeds 1.5 e or 0.3%. That's 50 % more than the Table 6. tolerance. If you resolve the error to 0.2 e as described above, the rounding error is reduced to 0.1 e and you will not fail until the error exceeds 0.22%. This explains why HB44 directs that tests be performed at the tolerance break points which represent the tightest tolerance in each tolerance step. It also partially explains why class IIIL was created.

With large capacity scales of class III it would be a hardship to test at the first tolerance break point at 500 e. Consider a IIIL of 200,000 lb with d/e = 200 lb. That requires 100,000 lb of test weights to get to the tolerance break point. Bringing 4 weight trucks to test a single scale is not an acceptable solution. Often you can only muster 150 e (30,000 lb) of test weights where the fail threshold is 1%. That's not a meaningful test.

For large capacity Class III with error resolution 1 d

@ 500 e load – (1 e tolerance + 0.5 e rounding error) / 500 e * 100 = 0.30 % fail threshold

@ 150 e load – (1 e tolerance + 0.5 e rounding error) / 150 e * 100 = 1.0 % fail threshold

Now follow R76 rule of resolving error to 0.2 e. The fail threshold is better, 0.22 % at 500 e, but it is still 0.73% at 150 e. Again this cannot hold the scale to 0.2% error.

For large capacity Class III with error resolution 0.2 d

@ 500 e load – (1 e tolerance + 0.1 e rounding error) / 500 e * 100 = 0.30 % fail threshold

@ 150 e load – (1 e tolerance + 0.1 e rounding error) / 150 e * 100 = 0.73 % fail threshold

This rounding issue s is one reason class IIIL was created. Consider a class IIIL with e = 20 lb resolving error to 1 e. The values below show the fail threshold at the first four steps. Even at only 30 k test load the effective tolerance is very close to the 0.2% desired. Also, this test is repeated upscale with the strain-load test evaluating the 0.23 accuracy over another part of the weighing range.

For Class IIIL error resolution 1 e (direct reading to nearest d means 0.5 e rounding error)

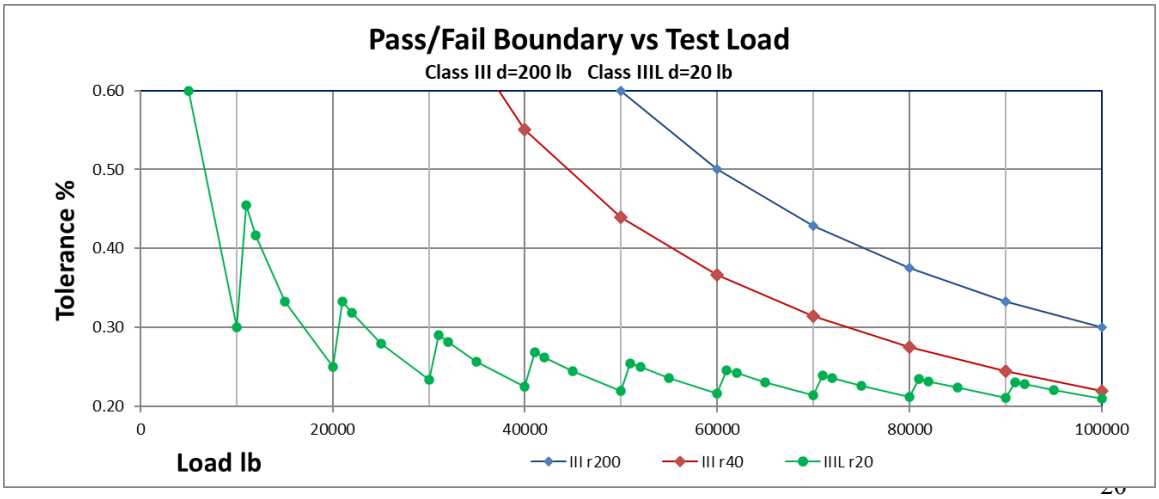
@ 500 e load – (1 e tolerance + 0.5 e rounding error) / 500 e * 100 = 0.3 % fail threshold

@ 1,000 e load – (2e tolerance + 0.5 e rounding error) / 1,000 e * 100 = 0.25 % fail threshold

@ 1,500 e load – (3 e tolerance + 0.5 e rounding error) / 1,500 e * 100 = 0.23 % fail threshold

@ 2,000 e load – (4 e tolerance + 0.5 e rounding error) / 2,000 e * 100 = 0.23 % fail threshold

In the graphic below, the fail thresholds are shown for class III with d = 200 lb and class IIIL with d = 20 lb. The blue line for class III depicts rounding to nearest d (200 lb) while the red line for class II depicts rounding to the nearest 0.2 d (40 lb) as proposed. The green line for class IIIL depicts rounding to nearest 1 d (20 lb). This means rounding error to 1 e is sufficient to evaluate the 0.2 % tolerance for class IIIL.



Note that NTEP presently uses the 0.2 e resolution for class IIIL. Consider that in tests close to CLC you are using 4 lb error weights to evaluate a tolerance of maybe 160 lb.

Part 3. Identification of Weight Indications and Recorded and Calculated Weight Values
Add a new S.1.15. and S.1.16. as follows:
S.1.15. Identification of Weight Indications.

(a) Gross indications need not be identified, but may be identified by the symbol "G" to the right of the weight value, e.g., 4.48 kg G.

(b) Net indications shall be identified by the symbol "N" to the right of the weight value, e.g., 4.48 kg N.

(c) ***However, it is permitted to replace the symbols "N" or "G" with the terms "net" or "net weight", or "gross" or "gross weight" respectively adjacent to the weight display.***

(Added 20XX)
(Nonretroactive as of January 1, 202X)

S.1.16. Identification of Recorded and Calculated Weighing Results.

(a) Recorded values shall match associated indicated values, including any gross or net identification of the corresponding indication using the symbols "G" or "N" to the right of the weight value, e.g., 4.48 kg G.

(b) If only net weight values are recorded without corresponding gross or tare values, they may be recorded without any identification. This applies also where semi-automatic zero setting and semi-automatic tare are initiated by the same key.

(c) Recorded values may include additional gross, net, and/or tare identification based on operator knowledge of the applied. If gross, tare, and net weight values are all recorded together, the net and tare values shall at least be identified by the corresponding symbols "N" and "T."

(d) However, it is permitted to replace the symbols "G", "N" and "T" by corresponding text, e.g., "gross" or "gross weight," "net", or "tare" respectively either before or after the weight value, e.g., 10 kg N or Net 10 kg.

(e) When gross, net and tare values are recorded together, one of these values may be calculated from two recorded weight values based on the formula Gross – Tare = Net. The calculation shall be mathematically correct. See Note. In the case of a multi-interval or multiple range scale the calculated weight value may be presented with a smaller scale division. Example:

455 kg Gross Weight (WR2 d = 5 kg)

- 14 kg Tare Weight (WR1 d = 2 kg)

= 441 kg Net Weight (mathematically correct but d is 1 kg)

Note: when gross, net, and tare values are recorded together and all three values are independently measured, it is not possible to ensure mathematical agreement due to rounding errors.
(Nonretroactive as of January 1, 202X)
(Added 20XX)

Justification: These new sections provide clear specifications for identifying net weight and the use of tare mechanisms. Because these changes may be significant, they are proposed as nonretroactive. There is nothing in the Scales Code to specify how to identify weight indications and recorded values. Without these sections, any decisions regarding appropriate identifications are arbitrary. Note that NTEP relies heavily on G-S.5.2.4. Values, but general rules are not sufficient in this case. Also, Pub 14 has no legal standing and HB44 must be clear on its own.

The new S.1.15. recognizes that indications can only be gross or net. Not identifying gross indications is a long-standing practice, and this requires an explicit exemption from G.S.5.2.4. However, these indications may be identified as gross. Net weight indications, when a tare mechanism is in use, must be identified as net. A tare weight display is a recoded value covered in the proposed S.1.16. The OWM has suggested this could be accomplished through examples of acceptable indications or by combining indications and recorded requirements. However, legal requirements cannot be expressed through examples. Examples are only used to further clarify stated requirements and could be valuable in a comprehensive training program for weight indications.

In S.1.16. the specifications governing recorded and calculated weight values are added. This section comes largely from R76 section 4.6.11. This is presented separate from indications in S.1.1.5., since it adds multiple layers of options that are not suitable for indications.

In (a) the General Code principle (G-S.5.2.2.) that recorded values should mirror the associated indications is reinforced. If the indication has gross or net identification, then the recorded values must include it as well.

In (b) Net values presented alone (no gross or tare weights) are exempt from identification consistent with the UWML definition of Net Weight. This includes weighing the net load with gross indications as well as gross load with net indications. In the latter case, the indication is required to identified “net” but the recorded value is exempt.

In (c) the option for the operator to add information that is not available from the indication is recognized. The scale can only indicate gross or net weight and cannot know what load is on the load receiver. The operator knows that the gross indication of the tare load is Tare Weight, the gross indication of the gross load is Gross Weight, the gross indication of the net load is Net Weight, and the gross indication of the service load is weight.

It is the operator that adds this information through controls on the instrument. This section also exempts Gross Weight from being identified when gross, tare and net are presented. Gross is exempted since there is a long standing trade practice to not require identification of gross indications, also from R76.

In (e) the calculation of weight values is permitted, based on using two recorded weight values and calculating the third using the formula gross – tare = net. In this sense, calculation is external to the weighing capability of the instrument. A good example is the weigh-in/weigh-out system. The net weight is calculated by subtracting the tare weight from the gross weight. This is unlike internal calculations for keyboard or programmed tare performed internally. The example shows that the calculated value has a 1 kg d that is smaller than either the 2 kg or 5 kg d of the instrument indications. The note is vital to explain that if gross, tare, and net values are each measured independently with semi-automatic tare, 25 % of the time the results will not be in mathematical agreement due to rounding errors. For example, with d = 1 lb and gross = 23.7 lb, tare = 3.4 lb and net = 20.3 lb, the corresponding measured values indicated and recorded will be 24 lb G, 3 lb T and 20 lb N (no mathematical agreement). This particularly impacts multiple range and multi-interval scales. If all three values are measured, the agreement of digital values in G-S.5.2.2. requires that digital values indicated and recorded agree exactly. If gross, net and tare values are all measured they may be in different weighing ranges it is likely that they will not be in mathematical agreement.

The Office of Weights and Measures has suggested that the calculated value part of S.1.16. be put in a separate section. The proposal keeps it with recorded values because the scale is using recorded values to perform the calculations. The proposal followed R76 as these were all in the same section.

Comments in Favor:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Comments Against:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: A representative from the Scale Manufactures Association made comments in opposition to this item and recommended a Withdrawn status due to not being enough confusion to warrant a change.

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: A representative from NIST OWM stated that this item should remain Developing because the submitter has continued to make changes to the item each cycle.

Item Development:
NCWM 2026 Annual Meeting: The Committee chose to retain the Developing status to allow the submitter to further develop the item, however the item may be withdrawn if the submitter fails to further develop the item.

NCWM 2026 Interim Meeting: After hearing comments from the floor, the Committee assigned a Developing status to allow the submitter to further develop the item.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item is withdrawn.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufacturers Association): Reiterates comments from the April meeting and recommends withdrawal. He believes that there is not enough confusion to warrant the changes and it is not needed.

Mr. John McGuire (NIST OWM): Recommends voting with amended changes. This item has been on the agenda for two years without significant progress towards its adoption. The language of the proposal has not been updated in more than a year, nor has the submitter provided any testimony at any of the regional or national meetings in the last year. NIST OWM is of the opinion that this amendment addresses the core problem with minimal change to the Handbook and is therefore easier to understand. The implementation of the mathematical agreement of gross, net, and tare values as described in S.1.2.1. causes an offset in the net zero value, which leads to multiple problems.

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): Recommends that the item be withdrawn. Issues have not been addressed and no progress has been made.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports developing with NIST recommended changes.

The 2026 WWMA S&T Committee recommends that this item be assigned a Withdrawal status, based on testimony heard on the floor during open hearings and noting printed comments from the 2026 NCWM Annual meeting S&T Committee. No further development has been submitted.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representative from New Jersey Weights & Measures, NYS Weights & Measures, New Hampshire Division of Weights and Measures, and PA Dept. of Agriculture Bureau of Weights and Measures recommended a voting status.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

Representatives from Arkansas and Maryland recommend Withdrawn due to lack of development.

A representative from Scales Manufacturing Association opposes this item.

The committee recommends Withdrawn on this item.

Additional letters, presentations, and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL-27.4 S.2.3. Tare

Source:
NCWM

Purpose:
Devices such as POS shopping carts with NCWM NTEP CCs that collect multiple items/weighments on or in the load receiving element. These devices return to zero between weighments. The NTEP evaluation treats proceeding weighments as "tare." This proposal will allow for multiple tare weights on the same platform and the platform returning to net zero between weighments.

Item under Consideration:
Amend NIST Handbook 44 Scales Code as follows:

S.2.3. Tare. – *On any scale (except a monorail scale equipped with digital indications and multi-interval scales or multiple range scales when the value of tare is determined in a lower weighing range or weighing segment), the value of the tare division shall be equal to the value of the scale division.** The tare mechanism shall operate only in a backward direction (that is, in a direction of under registration) with respect to the zero-load balance condition of the scale. *A device*

*designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.** ***The tare value shall reduce the scale's capacity proportionally.*****
*[*Nonretroactive as of January 1, 1983]*

A tare mechanism can be used progressively or regressively, where multiple gross loads are applied to (or removed from) the scale and weighments are performed to return the scale to net zero, without returning to gross zero between weighments. Examples of progressive / regressive use of a tare mechanism include, but are not limited to, POS shopping carts and hopper scales. **

[**Nonretroactive as of January 1, 20XX]

(Amended 1985 and 2008)

Previous Status:
2027: New Proposal

Original Justification:
The current tare section is not applicable to technology entering the marketplace. The NIST Handbook 44 definition of tare mechanism follows:

tare mechanism. – A mechanism (including a tare bar) designed for determining or balancing out the weight of packaging material, containers, vehicles, or other materials that are not intended to be included in net weight determinations. [2.20]

Possible opposing arguments include:

- Implications on point-of-sale systems recorded representations.
- The current definition may already encompass the new application based on interpretation.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Iowa Department of Agriculture/Weights & Measures was not opposed to this item but had concerns about durability of the device and questions how the environment will impact accuracy.

A representative from Richard Suiter Consulting reported manufacturers are doing testing and the concerns raised by the representative from Iowa are being addressed.

A representative from Missouri Department of Agriculture reported that an inspector had removed all devices from service in his area after testing.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Richard Suiter (Richard Suiter Consulting): Problems came up after POS shopping carts received NTEP CoCs. Amazon and Instacart have these devices and they don't meet Handbook 44 requirements for either zero or tare, these changes address those issues. Mr. Suiter has videos available for view. Requests voting status.

Mr. Steve Harrington (Oregon Weights & Measures): Requests voting status.

The 2026 S&T Committee recommends a Voting status, based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures questions the need for the sentence "The tare value shall reduce the scale's capacity proportionally". They are unaware of any scale that will increase its marked capacity based on the addition of tare within the POS system. Additionally, the progressive/regressive tare should be limited to specific device applications; we should not give examples but name them explicitly. If additional device applications appear in the future, they can be added.

2026 NEWMA: A representative from NYS Weights & Measures disagrees with adding examples to the main body of the handbook. They believe the examples could be added to a definition.

2026 NEWMA: A representative from Richard Suiter Consulting stated that the Weighing Sector Task Group thought it useful to include the examples. The current definition for tare does not account for how these scales operate.

2026 NEWMA: A representative from Instacart gave a presentation on the Capercart.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Richard Suiter Consulting gave a presentation on behalf of the weighing sector.

A representative from Arkansas Department of Agriculture supports the item, but question progressive tare abilities.

A representative from weighing sector specifically states POS carts.

A representative from Maryland Department of Agriculture supports this item.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL-27.1 UR.1. Selection Requirements

Source:
NIST Office of Weights and Measures

Purpose:
Correct terms in UR.1. Selection Requirements to align with the changes made to the Scales Code in 2024 by SCL-23.3.

Item under Consideration:
Amend NIST Handbook 44 Scales Code as follows:

> **UR.1. Selection Requirements.** – Equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to, its capacity, number of **verification** scale ~~**divisions**~~**intervals (n)**, value of the **verification scale interval (e) or** scale division **(d)** ~~**or verification scale division**~~, minimum capacity, and computing capability.[3]
> **(Amended 20XX)**

Previous Status:
2027: New Proposal

Original Justification:
At the 2024 NCWM Annual Meeting, item SCL-23.3 was adopted, which amended the term "verification scale division", replacing it with "verification scale interval", and in some instances replacing the term "scale division" with "verification scale interval" throughout Section 2.20. Scales. This paragraph was overlooked during the development and eventual adoption of SCL-23.3. Subsequently, the terminology in UR.1. is outdated regarding references to the number of verification scale intervals (n) and the verification scale interval (e), and is inconsistent with the other paragraphs in the Scales Code and with terms in Appendix D, Definitions. This proposal also reorders the terms "verification scale interval" and "scale division" to emphasize the significance of e relative to d, because e determines the accuracy class (along with n) and the tolerance applicable to the device, which is a key part of the selection process.

Through the adoption of SCL-23.3 in 2024, the weights and measures community has agreed that these are the correct terms, so there should be no opposition to this item.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
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Industry:
•

Advisory:
•

Comments Against:

Regulatory:
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Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports voting.

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): Supports voting.

The 2026 S&T Committee recommends a Voting status, based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representative from New Jersey Weights & Measures and NYS Weights & Measures recommended a voting status.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NIST add clarification to the item and recommended Voting.

A representative from Arkansas Department of Agriculture supports this item and recommends Voting.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL-22.2 A UR.3.1.X. Required Minimum for Cannabis Products.

Source:
NCWM Cannabis Task Group

NOTE: The Scales Focus Group of the NCWM Cannabis Task Group modified the proposal in the fall of 2024 as represented below.

Purpose:
Establish uniform scale suitability requirements among the states for sales of cannabis.

Item Under Consideration:
Amend Handbook 44, Section 2.20. Scales Code as follows:

The passing of SCL 25.1 at the July 2026 Annual Meeting and the update to Table 8 have provided new guidance for the scale suitability for cannabis. Since cannabis often sells in quantities less than 0.5 g and the new guidance indicates that any values less than 0.5 g should be weighed on a 0.01 e device, we propose the following:

UR.3. Use Requirements.

UR.3.1. Recommended Minimum Load. – A recommended minimum load is specified in Table 8. Recommended Minimum Load since the use of a device to weigh light loads is likely to result in relatively large errors.

Table 8.
Recommended Minimum Load

Class	Value of Verification Scale Interval (e*)	Recommended Minimum Load (d)
I	equal to or greater than 0.001 g	100
II	0.001 g to 0.05 g, inclusive	20
	equal to or greater than 0.1 g	50
III	All**	20
III L	All	50
IIII	All	10

*The value of "e" is specified by the manufacturer as marked on the device (see Table S.6.3.a). For Class I and II devices equipped with auxiliary reading means (i.e., a rider, a vernier, or a least significant decimal differentiated by size, shape or color), the value of the verification scale interval "e" is the value of the scale division immediately preceding the auxiliary means. For Class III and IIII devices "e" must be equal to "d."

**A minimum load of 10 d is recommended for a weight classifier marked in accordance with a statement identifying its use for special applications.

(Amended 1990 and 2027)

UR.3.1.1. Minimum Load, Grain Dockage Determination. – When determining the quantity of foreign material (dockage) in grain, the weight of the sample shall be equal to or greater than 500 scale divisions. (Added 1985)

UR.3.1.2. *Cannabis* and *Cannabis* Products. - A scale used to determine the net weight of *cannabis* or *cannabis* products in quantities not exceeding 4 oz (113 g) shall have a verification scale interval (e) not greater than 0.01 g.
(Added 20XX)

Previous Action:
2025: Assigned to the Cannabis Task Group
2024: Assigned to the Cannabis Task Group
2023: Assigned to the Cannabis Task Group
2022: Assigned to the Cannabis Task Group

Original Justification:
As states legalize sales of cannabis in its various forms, the need has arisen for uniform standards for scale suitability. Uniform requirements from one state to the next, will strengthen each jurisdiction's ability to effectively regulate the industry in a fair and equitable manner. Uniform standards also provide industry with expectations regardless of the jurisdiction, reducing potential conflict or confusion.

Some states may already have scale suitability requirements differing for those proposed here. The task group is hopeful that differences can be resolved so that the standards are the same in every jurisdiction:

The proposed suitability requirements are based on existing standards as set forth by the California Division of Standards, Division of Measurement Standards.

The submitter requested that this item be a Developing Item.

Comments in Favor:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: A representative from the Scale Manufacturers Association did not review the newly submitted verbiage for this item but spoke in favor of the item as posted in the agenda as a Voting item.

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Comments Against:

Regulatory:
- 2026 Annual: None
- 2026 Interim: A regulator from California commented that this item has changed significantly. It was noted that there was a version of this item that was ready for a vote, but not this version.
- 2026 Interim: A regulator from Delaware commented that this item has been repeatedly pushed back waiting for an update for Table 8. This regulator was in favor of the previous version of this item but is not in favor of the current version of the item. The current version received a recommendation of Developing while the previous version received a recommendation of Voting from this regulator.

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- Annual 2026: A Representative from the Cannabis Task Group reported the task group has been meeting and should have a proposal available to the body this fall.
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: A representative from NIST OWM noted that there is a new chair of the Cannabis Task Group and that there is new language for this item that was submitted late in the fall of 2025.

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Item Development:
NCWM 2026 Annual Meeting: The Committee has chosen to retain the Assigned status to allow the task group to continue developing the item.

NCWM 2026 Interim Meeting: After receiving comments during open hearings on this item with several concerns regarding the updated language, the Committee assigned it a Developing status.

Evan Foisy, Chair
NCWM Cannabis Task Group
EFoisy@andonline.com

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remains assigned.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufacturers Association): Supports the intent of this item and recommends a developing status.

Mr. Steve Harrington (Oregon Weights & Measures): Expressed concern with product specific suitability, and Handbook 130 requirement for method of sale but also noted that there are many good points to other products. He recommends an assigned status.

Mr. John Beall (Ventura County, California): Expressed concern that having a specific regulation for a type of scale specific to a type of product is not a good idea and recommends an assigned status.

The 2026 S&T Committee recommends that the item remain Assigned to allow for continued development, based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures believes this should be a retroactive requirement. Scales currently in use with a smaller resolution could be in service for years to come. Having two types of scale applications weighing the same product, sometimes in the same business, will be problematic. They recommend a voting status with retroactive change.

2026 NEWMA: A representative from NYS Weights & Measures questions the use of "total weight" in UR3.1.5. The proposal needs to clarify whether total weight is Gross or Net Weight.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Scales Manufacturing Association supports the intent but wants further developing and recommends Assigned.

A representative from NIST believes the item is fully developed but careful consideration should be taken regarding the average weight of a cannabis transaction and recommended Assigned.

A representative from Florida Department of Agriculture supports informational status and would like the group to provide additional information.

A representative from Delaware Department of Agriculture doesn't believe the current proposal was submitted from the task group.

The committee recommends Assigned on this item.

Additional letters, presentations, and data may have been submitted for consideration with this item. Please refer to www.ncwm.com/publication-15 to review these documents.

SCL-27.2 UR.1.1. General., Table 7a. Typical Class or Type of Devices for Weighing Applications.

Source:
Volvo Construction Equipment

Purpose:
Amend table 7a to recognize On-Board Weighing systems (built-in scales) on front-end loaders (wheel loaders) for legal-for-trade applications.

Item under Consideration:

Amend NIST Handbook 44 Scales Code as follows:

Table 7a. Typical Class or Type of Device for Weighing Applications	
Class	**Weighing Application or Scale Type**
I	Precision laboratory weighing
II	Laboratory weighing, precious metals and gem weighing, grain test scales
III	All commercial weighing not otherwise specified, grain test scales, retail precious metals and semi-precious gem weighing, grain-hopper scales, animal scales, postal scales, vehicle on-board weighing systems with a capacity less than or equal to 30 000 lb, and scales used to determine laundry charges
III L	Vehicle scales, vehicle on-board weighing systems with a capacity greater than 30 000 lb, axle-load scales, livestock scales, railway track scales, crane scales, and hopper (other than grain hopper) scales
IIII	Wheel-load weighers and portable axle-load weighers used for highway weight enforcement **Wheel loader On-board Weighing System for construction material.**
Note: A scale with a higher accuracy class than that specified as "typical" may be used.	

(Amended 1985, 1986, 1987, 1988, 1992, 1995, 2012, ~~and~~ 2021**, and** 20XX)

Previous Status:

2027: New Proposal

Original Justification:

Business benefits for US operations (quarries, mines, construction and others)

- Reduced need for weighbridge at **temporary and remote sites**.
- Reduced risk of overloading trucks leading to **heavy fines** for trucking companies (or quarries). While loader systems can be used for this purpose, a certification would lead to more trust in the system to by-pass the weighbridge.
- Often-times loader operators will favor overloading slightly to ensure customers are not shorted → Resulting in **systemic product loss** over time.
- Certified weighing systems allow a more **streamlined and efficient** load out process.
- Less re-work, reduced bottle necks, possibility to digitalize workflow by invoicing on data created directly by the loader

Efficiency:

- Overloaded trucks are detected upon exiting a quarry at the weighbridge/scale house. The truck will need to return into the quarry and dump the complete load and get re-loaded at the pile → Fuel is wasted by both truck and loader
- Reduced idle time for trucks waiting in line to enter or exit the quarry waiting in line to be weighed → Fuel wasted

Safety

- Reduced need for truck drivers to step in and out of the cab to retrieve load tickets from the scale house.
- The Bureau of Labor Statistics (BLS) reports that truck drivers experience tens of thousands of injuries every year that require medical leave from work. Many of them are due to falls when mounting and dismounting the truck cab.
    - Journal of Economics: https://www.longdom.org/open-access/fall-risk-factors-for-commercial-truck-drivers-21187.html
    - Monthly Labor Review: https://www.bls.gov/opub/mlr/2015/article/workplace-hazards-of-truck-drivers.htm

Environmental Sustainability

- Reduced idle time of trucks queuing to be weighed at scale house → Less fuel used
- Less re-work for overloaded trucks that need to be re-loaded → Less fuel used
- The scale house is bottle neck for trucks both entering and leaving the sites

Future-proofing the industry

- High need for automation and digitalization with the current labor shortage (mainly due to massive retirement wave)

Certified On-Board weighing (legal for trade) is an excellent fit with digital tools for automatic invoicing

The submitter requests that this be a Retroactive requirement and given Developing status in 2027.

Comments in Favor:

Regulatory:
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Industry:
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Advisory:
•

Comments Against:

Regulatory:
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Industry:
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Advisory:
•

Neutral Comments:

Regulatory:
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Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Missouri Department of Agriculture asked about how much data the submitter has collected and what percentage of tests failed. The representative also asked if tire pressure would impact accuracy and noted that this device should not be a Class IV device but should be a Class IIIL device.

A representative from Dick Suiter Consulting stated that data was limited at this point and that tire pressure issues would be

dealt with at NTEP. It was also stated that there were issues with Class IIIL tolerances relating to this item and that the device would be better suited for Class IV according to Canada and OMIL. This representative also reported that this device would be suitable for construction equipment and that suitability would be a factor when selling commodities. Recommends a developing status.

A representative from Kansas Department of Agriculture opposes this item and feels it should be withdrawn and started over. It was commented that making this a Class IV device is a mistake because Class IV is reserved for law enforcement only and that maybe this device should have its own section.

A representative from Nebraska FCSP-Weights and Measures said item does not belong in Class IV. It was stated that if this device is used in direct sales, then it would be a Class III device. A comment was also made that this would be great for approximation and that we need more data for prolonged usage.

A representative from Iowa Department of Agriculture/Weights & Measures supports the item in theory but needs more information and the material being used.

The committee recommends this item is assigned a developing status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

An industry member from Volvo gave a presentation on this item during open hearings.

Mr. Steve Harrington (Oregon Weights & Measures): States that there are many good business use cases but believes that class IIII is not a good case for these scales. He presumes that class IIII was chosen because it cannot meet tolerances in class III and IIIL. He also noted that wheel weighers are only for law enforcement. He recommends a developing status.

Mr. Richard Suiter (Richard Suiter Consulting): States that NIST Handbook 44 only has four classes. He recommended class IIII because the devices will not meet class IIIL consistently and noted that Class IIII is very similar to Canada and OMIL tolerances. He provided an example showing that the error in dollar value is very low compared to other devices. He recommends a developing status.

Mr. Cory Hainy (Avery Weigh-Tronix): Agrees with the comments from the representative from Oregon but does not believe class IIII is appropriate and supported class III or IIIL. He recommends a developing status.

Mr. John Sorfleet (Santa Clara County, California): States that the proposed equipment is not for highway enforcement and does not support it being class IIII. These systems are not weighing trucks and cargo and they are not preventing overweight. He recommends a developing status.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Agrees with previous commenters and stated that the current language and table already addresses onboarding scales. He recommends a developing status.

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): Provided comments on behalf of Mr. Aaron Yanker (Colorado Department of Agriculture, Weights and Measures) and stated that it is worth noting that the proposal lists the device under Class IIII accuracy category in Table 7a. of the scale code. In the justification by the submitter this application would be considered a commercial device and thus should be classified as a class III/IIIL. For the regulatory official to properly apply tolerances to a commercial device per Table 6, the tolerances would be much tighter than what the proposal is suggesting by listing this as a class IIII device. By simply lumping this device into the class IIII designation, the regulatory official does not have clear guidelines on whether they are to apply T.N.3.3. or other requirements for commercial devices. Potential impact to NIST Handbook 130 Section IV. Uniform Regulations under the Method of Sale of Commodities should be considered for the term “construction materials” in the proposal. The submitter needs to confirm if “construction materials” applies to commonly known commodities that are generally used in construction as outlined in the following sections of NIST Handbook 130 Method of Sale of Commodities which clearly define how the products can be sold (weight or volume): 2.29, 2.18, 2.7, 2.10, 2.11, 2.12. If the implementation of an on-board weighing system is approved for front end loaders, the possibility of incorrect weight tickets exponentially increases due to the difference of loader operator, stable weight, balance zero condition if the loader is moving, and the implementation of remote printed record requirements. Due to the item not being fully developed, not meeting its purpose, and not having merit, the Colorado Department of Agriculture, Weights and Measures is recommending the item be assigned a withdrawn status.

The 2026 S&T Committee recommends a Developing status, based on testimony heard during open hearings. The Committee recommends that the submitter address comments heard and continue to refine the item.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from Volvo Construction Equipment gave a presentation on this item.

2026 NEWMA: A representative from NYS Weights & Measures appreciates the presentation and agrees that these devices should be added to the handbook but not as shown in this proposal. These items should not be added as a class IIII item.

2026 NEWMA: A representative from New Jersey Weights & Measures stated that class IIII tolerances are too large for commercial applications. This Class is for law enforcement devices. Class III already lists on-board weighing systems.

2026 NEWMA: A representative from Richard Suiter Consulting responded to class IIII designation comments. Scale classes were introduced based on OIML in the 1980's. These devices will not meet class IIIL tolerances consistently. The value of error is suitable for only construction materials.

2026 NEWMA: A representative from PA Dept of Agriculture Bureau of Weights and Measures asked a question about general wear and tear of part of this equipment. The representative from Volvo Constructions Equipment answered that the scale must return to zero before it can measure a new load.

2026 NEWMA: A representative from New Hampshire Division of Weights and Measures asked if the purchases are itemized by the bucket load. The representative from Volvo Constructions Equipment answered that the invoice does not show the individual bucket weights.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture asked if the system has the capacity of showing the customer the zero value and the net weight.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Volvo gave a presentation.

A representative from Arkansas Department of Agriculture does not support the item and does not agree that it should go into the scales due to hardware, environmental conditions, and recommends its own code.

A representative from Richard Suiter Consulting representing Volvo stated Class IIII is not just for law enforcement; there was a problem with them fitting into Class IIIL. Wheel load weighers were always in Class IIII due to the tolerances needed. The largest load would have a minimal economic error. Devices can be very accurate.

A representative from West Virginia Department of Agriculture questioned type approval and how long they hold calibration.

A representative from Richard Suiter Consulting responded stated they are verified daily.

A representative from Avery is opposed to Class IIII, the truck scales would be held at Class IIIL.

A representative from NIST stated the term “wheel load” used in the code is not defined and suggests that a wheel loader on board weighing system needs a definition or term should be changed to vehicle on board weighing systems.

A representative from Richard Suiter Consulting Industry term would like to verify with OWM the correct verbiage and supports the change.

A representative from North Carolina Department of Agriculture wondered how this aligns with zero balance and customer display.

A representative from Richard Suiter Consulting responded there is an ability to have a remote display; the truck driver is only onsite. This depends on whether or not it is a direct or indirect sale.

A representative from Delaware Department of Agriculture stated they do have issues with repeatability.

A representative from Maryland Department of Agriculture believes it is placed in the incorrect class. It should be in IIIL instead of IIII. The accuracy shouldn’t be changed because a device can’t meet tolerances.

A representative from North Carolina Department of Agriculture recommends Developing.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

SCL-27.3 UR.3.15. Separate Main Elements, $n_{max.}$

Source:
NCWM Professional Certification Program Coordinator

Purpose:
Place a clear requirement in the scales code that addresses the limiting factor for the nmax of separate elements that are interfaced.

Item under Consideration:
Amend the NIST Handbook 44 Scales Code as follows:

UR.3.15. Separate Main Elements, n_{max}. – The maximum number of verification scale intervals permitted for an installation is limited to the lowest n_{max} marked on the scale indicating element, weighing element, or load cell.

Previous Status:
2027: New Proposal

Original Justification:
Enforceable code language for addressing scale installations made up of separate weighing elements, indicating elements, and load cells of different capabilities does not exist in the Scales Code. It is not uncommon to have a system made up of different components installed to fit a specific weighing application. Currently, regulatory officials and the industry rely on the last sentence of the definitions below. These definitions are published in NIST Handbook 44, Appendix D.

nmax (maximum number of scale divisions). – The maximum number of scale divisions for which a main element or load cell complies with the applicable requirements. The maximum number of scale divisions permitted for an installation is limited to the lowest nmax marked on the scale indicating element, weighing element, or load cell.

nmax (maximum number of verification scale intervals). – The maximum number of verification scale intervals for which a main element or load cell complies with the applicable requirements. The maximum number of verification scale intervals permitted for an installation is limited to the lowest nmax marked on the scale indicating element, weighing element, or load cell.

While these definitions are clear, definitions alone are not enforceable. Definitions inform or control how the rules and restrictions within the code are interpreted, applied, and enforced.

Manufacturers and service providers apply the codes from the appropriate sections of NIST Handbook 44

in designing products to meet marketplace needs. Regulatory officials carefully study and train enforcement staff on the contents and application of NIST Handbook 44. Officials cite appropriate code sections when taking regulatory enforcement actions that may be challenged through legal appeal processes. Manufacturers, service providers, and officials rely on the definitions in Appendix D to provide clarity when a technical definition is needed or when a common dictionary definition is insufficient.

Some may argue that the definitions are sufficient for addressing these types of scale installations.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
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Industry:
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Advisory:
•

Comments Against:

Regulatory:
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Industry:
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Advisory:
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Neutral Comments:

Regulatory:
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Industry:
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Advisory:
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Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Believes that this should remain on the agenda as developing at minimum. He would like to hear from NIST. Is the language necessary in the Handbook?

Mr. Steve Harrington (Oregon Weights & Measures): States that he has no issues with the language as written and recommends a voting status.

Mr. Richard Suiter (Richard Suiter Consulting): States that in previous NTEP training programs this was one of the items. This was historically done and he recommends a voting status.

The 2026 S&T Committee recommends a Developing status, and would like input from NIST OWM.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from NYS Weights & Measures supports this with a voting status.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

Representatives from Arkansas and Florida support this item and recommend Voting.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

LMD – LIQUID MEASURING DEVICES

LMD-26.1 I S.2. Measuring Elements, S.4. Marking Requirements, N.4. Testing Procedures, U.R.6. ~~Temperature~~ Volume Compensation and Correction Wholesale, and T.5. Density Correction Systems.

Source:
American Petroleum Institute

Purpose:
Clarify the acceptable use of specific density correction methods that allow for the accurate determination of volume growth that occurs when gasoline is blended with ethanol to make a finished motor fuel.

Item under Consideration:
Amend NIST Handbook 44 Liquid Measuring Devices Code as follows:

S.2. Measuring Elements

...

S.2.9. Wholesale Devices Equipped with Automatic Density-Correction Systems.

S.2.9.1. Automatic Density Correction. – A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to correct for the additional volume when separately metered components are combined to create a gasoline-ethanol blend.

When equipped with an automatic density-correction system, the device shall also be equipped with:

(a) A means to:
- **i. measure the density of the individual gasoline and ethanol base components or,**
- **ii. accept the manual entry of a measured density of the individual gasoline and ethanol base components**

(b) An Automatic Temperature-Compensating System.

(Added 20XX)

S.2.9.2. Provision for Deactivating. – On a device equipped with an automatic density-correction system, provision shall be made for deactivating the automatic density-correction system so that the meter can indicate and record in terms of the uncorrected volume.
(Added 202X)

...

S.4 Marking Requirements

...

S.4.3. Wholesale Devices.

...

S.4.3.3. Automatic Density Correction – If a device is equipped with automatic density-correction, the primary indicating elements, recording elements, and recorded representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

(Added 202X)

N.4. Testing Procedures

...

N.4.1.2. Wholesale Devices Equipped with Automatic Density Correction. – On wholesale devices equipped with automatic density-correction, for changes in product composition normal tests shall be conducted

(a) by comparing the density corrected volume indicated by the device to the actual delivered volume corrected to 15 °C (60 °F) using the latest version of ASTM D1250, Standard Guide for the Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1.

(b) with the density correction system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume. The test shall be performed with the automatic density-correction system operating.

On devices that indicate or record the density-corrected volume and uncompensated volume for each delivery, the tests in N.4.1.1.(a), N.4.1.1.(b), and N.4.1.2., may be performed as a single test.

(Added 202X)

...

T. Tolerances

T.5. Automatic Density Correction Systems. - The difference between the density-corrected volume on the bill of lading, calculated using ASTM D1250, Standard Guide for the Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1, and the temperature-corrected volume in the test standard shall not exceed 0.1% of the total delivered volume.

(Added 202X)

UR.3.6. Temperature Compensation and Density Correction, Wholesale

UR.3.6.1. Automatic.

UR.3.6.1.1. When to be Used. – If a device is equipped with a mechanical automatic temperature compensator, it shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature-compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

Note: This requirement does not specify the method of sale for product measured through a meter.

(Amended 1989)

UR.3.6.1.2. Density Determination. – If the volume of the product delivered is adjusted using a density-correction system, then the product density before blending the gasoline and ethanol shall be determined either through the use of a densitometer or by manual entry in accordance with the procedures in the current version of API MPMS Chapter 8.1 "*Manual Sampling of Petroleum Products,*" and API MPMS Chapter 11.3.3. *Miscellaneous Hydrocarbon Properties—Denatured Ethanol Density and Volume Correction Factors* and applied in the calculation via analysis of each of the base components.

(Added 202X)

UR.3.6.1.3. Invoices.

(a) A written invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).

(b) The invoice issued from an electronic wholesale device equipped with an automatic temperature-compensating system shall also indicate **for each metered component or the finished product:**

(1) the API gravity, specific gravity, or coefficient of expansion ~~**for the product**~~;

(2) ~~**product**~~ temperature**(s)**; and

(3) gross reading.

(Amended 1987 **and 20XX**)

(c) For gasoline-ethanol blends, the invoice issued from a wholesale device equipped with an automatic density-correction system, in addition to the requirements in (b) above, shall indicate:

(1) the additional volume due to density correction for the finished product; and

(2) the temperature compensated volume inclusive of the additional volume due to density correction.

Note: Shall include the statement, "Volume delivered has been adjusted to the volume at 15 °C (60 °F) and for changes in density."

(Added 202X)

UR.3.6.2. Nonautomatic.

...

UR.3.6.2.2. Density Determination. – If the volume of the product delivered is adjusted using a density-correction system, then the product density before blending the gasoline and ethanol components shall be determined either through the use of a densitometer or in accordance with the procedures in the current version of API MPMS Chapter 8.1 *Manual Sampling of Petroleum Products, or a densitometer and API MPMS Chapter 11.3.3. Miscellaneous Hydrocarbon Properties—Denatured Ethanol Density and Volume Correction Factors* and applied in the calculation via analysis of each of the base components.

UR.3.6.2.3. Invoices. The accompanying invoice for a nonautomatic density-corrected finished product shall show that the density-corrected volume of the blended product delivered has been adjusted to a volume at 15 °C (60 °F), and the invoice shall also indicate for each metered component or the finished product:

(1) the API gravity, specific gravity, or coefficient of expansion;

(2) temperature(s);

(3) gross reading;

(4) additional volume due to density correction for the finished product; and

(5) the temperature-compensated volume inclusive of the additional volume due to density correction.

Note: Shall include the statement, "Volume delivered has been adjusted to the volume at 15 °C (60 °F) and for changes in density".

[Nonretroactive as of January 1, 20XX]

(Added 20XX)

Previous Status:
New Proposal

Original Justification:
The volume of gasoline and ethanol when blended is more than the volume of the two liquids measured separately. Due to the way terminal load racks are configured, some measure the blended product using the custody meter and therefore capture the volume gain at the custody transfer meter (side stream blending), while others use multiple custody transfer meters to measure the gasoline and ethanol components separately (ratio blending) and do not capture the volume gain. The proposed changes will codify that a calculation can be applied at the Ratio-Blend terminal such that the two terminals have a comparable PTD.

The difference in terminal operations can cause inequity between the two types of terminals. The solution is for terminals that don't directly measure the volume growth in the final blended product to apply an industry standard (API Chapter 11.3.4) that calculates that volume expansion. Correcting the volume for this growth is known as Density Correction. The calculation used for density correction would use the same API gravities used by the automatic temperature compensation system to calculate the net volume of the gasoline-ethanol blend at 60OF.

Variable	Temperature Compensation (GST)	Density Correction (Net Volume)
Reference Density of Gasoline (BOB) in API gravity units	✓ (API MPMS 11.1)	✓ (API MPMS 11.1)
Reference Density of Ethanol in API gravity units	✓ (API MPMS 11.3.3)	✓ (API MPMS 11.3.3)
Gross Meter Readings	✓ (API MPMS 12.2)	✓ (API MPMS 12.2)
Product Temperature (load average)	✓ (API MPMS 7.4)	✓ (API MPMS 7.4)
Net Meter Readings for ethanol and BOB	*(output from Temp Comp)*	
Ideal Fraction Ethanol (i.e., ethanol blend percentage)		✓ (API MPMS 11.3.4)

The proposed changes to Handbook 44 identify the sections that should be updated to codify the use of the API standard without replumbing the terminal. [Note there is also a separate but related proposal to change Handbook 130, Method of Sale.]

The proposed changes to HB 44 are the result of nine task force meetings where the group reviewed the science of the expanded volume, raised and discussed concerns, and discussed the proposed language incorporated in this proposal. The task force was

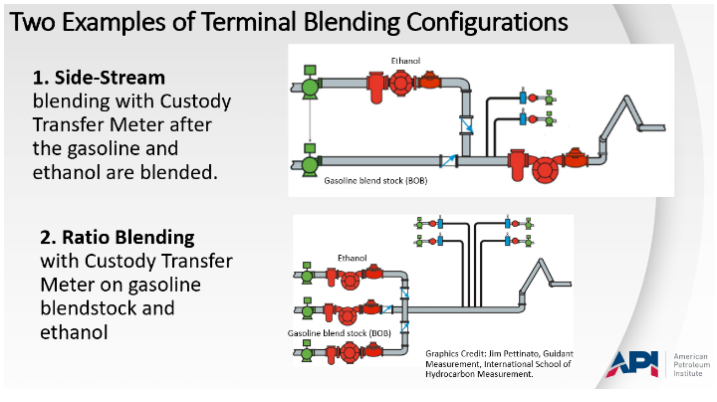
led by API with participation from five states, NIST staff, retailer representatives, meter manufacturers, terminal operators, ethanol representatives, and consultants.

Background:

When gasoline and ethanol are blended the volume of the finished fuel increases by about 0.2% (range 0.08% to 0.4%) that is dependent on the density of the gasoline blend stock and the percentage of ethanol blended into the finished gasoline-ethanol fuel.

Some terminal configurations capture the volume expansion in the overall net calculation, while others do not, resulting in an inequity between the two configurations. To understand the inequity at the terminals, it is helpful to consider two of the terminal configurations that blend gasoline and ethanol (e.g., 10% ethanol, 15% ethanol, 85% ethanol). For simplicity, when we refer to a fuel it will be E10 as that fuel is more than 95% of the consumed gasoline in the U.S.

The first configuration is a **Side-Stream terminal.** It measures the ethanol which is then added to the gasoline blend stock ahead of the custody transfer meter. This configuration captures the volume growth that takes place when the net volume of the blended product is calculated.



The second is a **Ratio-Blending terminal.** The ethanol is measured through a custody transfer meter and the gasoline blend stock is measured through a separate custody transfer meter. The two components are blended in the terminal piping or in the tank truck where the volume growth takes place. Since the component net volumes are calculated separately, the volume growth of the blended product is not captured.

In a Ratio-Blending terminal a calculation can be applied using the process identified in API MPMS Ch. 11.3.4. that corrects for the change in the density of the combined products and the additional volume gain that will occur.

Additional questions and answers:

Q1. If the API standard is used at a Ratio-Blending Terminal, how does an inspector prove that the density correction has been appropriately applied?

A1. An inspector would use a process similar to proving a terminal with an automatic temperature compensation system. The EPO No. 25, Loading Rack Meters, would be updated.

Q2. What are the Density Correction System requirements?

A2. API believes that HB 44 allows for a system to correct for a density shift in a gasoline-ethanol blend and recognizes that some NTEP devices are currently approved for that use. However, to ensure that the use of this correction is clearly permissible, we identify language in Handbook 44 that would be clarifying for devices that provide density correction algorithms per API standards.

A metering system uses the same data to determine the excess volume as it uses for the correction for temperature (the reference density, the meter gross volume reading and the live temperature measurement). The device then will apply the density of the finished product or of the base components (e.g., gasoline or ethanol) to determine the correction for excess volume. The BOB reference density is typically quite stable. Only the observed (live) density varies from batch to batch, depending on temperature. As such a density correction system can accept, calculate, or measure the density of the finished product or of each base component (i.e., gasoline or ethanol) using these inputs. This would apply to HB 44 Section 3.30 Liquid Measuring Devices paragraphs S.2.9., S.4., N.4., UR.3.6.1., and T.5.

Q3. How is the density of the gasoline blend stock measured?

A3. Terminals measure the density (as an API Gravity) of gasoline in the aboveground storage tank by using a handheld density meter, an in-tank densitometer, or sending it to the lab. The sample that is tested using the handheld device or the lab uses the

procedures identified in API MPMS Ch. 8 which details how to grab a sample from the bottom, middle, and top of tank. The API Gravity of the gasoline blend stock must be brought to a reference temperature of 60ºF or 15ºC.

The API gravity is entered into the terminal automation system either manually or through a connected system. The API Gravity, corrected to 60ºF of the individual products (i.e., BOB) does not change between the tank and the meter.

Q4. How is the API Gravity of ethanol determined?

A4. Ethanol is a single-molecule fuel that is denatured with 2-5% petroleum fuel. The small percentage of denaturant does not meaningfully affect the API Gravity of the ethanol between batches. Thus when calculating denatured ethanol net volumes, for any ethanol with 1 to 5% denaturant (regardless of whether the denaturant is natural gasoline or gasoline), the calculation should use API Table 6C with an alpha coefficient of 0.000603 ºF or use API Table 6B with 50.61 ºAPI.

API MPMS Chapter 11.3.3, paragraph 4.2 Denatured 95 % to 99 % Fuel Ethanol

> For volume or density correction from observed temperature to 60 °F, the implementation procedure given in API MPMS Ch. 11.1-2004 shall be used for ethanol denatured with 1 % to 5 % by volume of either natural gasoline or gasoline (Annex B). Such denatured ethanol is classified a "special application" (formerly known as Table 6C or Table 54C) with an alpha coefficient of 0.000603 °F or 0.001085 °C (Annex C). For more information on denaturant choice, see Annex B. For more information on the applicability of these alpha coefficients to other denaturants, see Annex C and Annex D.

Q5: With the possibility of the density of the BOB changing each time the terminal receives a batch from the pipeline, and given that the density impacts the calculated net temperature correction and the density correction, is the density traceable within the terminal metering system? If not when new density values are entered, should they be traceable and verifiable?

A5: The answer to both questions is, yes. Some, if not all systems have an audit log, and if it is properly configured, it will log the changes to the reference density. Each system will be different, but as an example, an inspector could look at the log to see the old densities that were entered. To determine if the system is properly configured, an inspector could perhaps change the reference density value temporarily to determine if it is properly logged in the system.

Q6. What is the relationship between specific gravity and API gravity of a fuel?

A6. According to Pennsylvania State University, "Density is defined as mass per unit volume of a fluid. The density of crude oil and liquid hydrocarbons is usually reported in terms of specific gravity (SG) or relative density, defined as the density of the liquid material at 60°F (15.6°C) divided by the density of liquid water at 60°F. At a reference temperature of 15.6°C, the density of liquid water is 0.999 g/cm^3 (999 kg/m^3), which is equivalent to 8.337 lb/gal (U.S.). Therefore, for a hydrocarbon or a petroleum fraction, the SG is defined as:

$$\text{SG } (60^{O}\text{F}/60^{O}\text{F}) = (\text{Density of liquid at } 60^{O}\text{F in g/cm3})/(0.999\text{g/cm3})\text{"}$$

In the early years of the petroleum industry, the American Petroleum Institute (API) adopted the API gravity (°API) as a measure of the crude oil density. The API gravity is calculated from the following equation:

$$API = 141.5/(SG15.6\,°C/15.6°C) - 131.5$$

Source: https://www.e-education.psu.edu/fsc432/content/api-gravity

Q7. At what temperature should API gravity be observed?

A. API gravity and specific gravity must always be observed at 60^{O}F or 15^{O}C.

Q8. How will an invoice or product transfer document (PTD) be affected?

A8. The major requirement would be that the invoice/PTD reflects either the metered components or the finished product. All the appropriate information to provide a transparent invoice would be included on the invoice/PTD for an Automatic Density Correction system and Nonautomatic system. Specifically, it would include API gravity, temperature, gross readings, excess

volume, and the net volume including the calculated growth. A statement would be required stating, “Volume delivered has been adjusted to the volume at 15 °C (60 °F) and for changes in density”.

Q9. What API standards are used in a terminal to ensure an accurate measurement?

A9. There are at least 12 different API Manual of Petroleum Measurement Standards (MPMS) that form the basis of an accurate measurement at a terminal.[1]

- Ch. 8.1 Manual Sampling of Petroleum Products (ASTM D4057)
- Ch. 5.x Metering (5.1 General Considerations for Measurement by Meters, with specific chapters that address for displacement meters, turbine meters, Coriolis meters, ultrasonic flow meters, Fidelity and Security of Flow Measurement Pulsed-Data Transmissions Systems)
- Ch. 6.x – Metering Systems (6.1 Metering Assemblies- General Considerations, with specific chapters for - Truck and Rail Loading and Unloading Measurement Systems; - Pipeline and Marine Loading/Unloading Measurement Systems; and Lease Automatic Custody Transfer Systems)
- Ch. 4.x Proving Systems (Displacement Provers, Master-Meter Provers, Field Standard Test Measures, Methods of Calibration for Displacement and Volumetric Tank Provers, Part 1—Introduction to the Determination of the Volume of Displacement and Tank Provers)
- Ch. 7.4 Dynamic Temperature Measurement
- Ch. 11 Physical Properties Data (ASTM D1250, Adjunct)
    - Chapter 11.1 - Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils
    - Ch. 11.3.3 Miscellaneous Hydrocarbon Product Properties—Denatured Ethanol Density and Volume Correction Factors
    - Ch. 11.3.4 Miscellaneous Hydrocarbon Properties - Denatured Ethanol and Gasoline Component Blend Densities and Volume Correction Factors
    - Ch. 11.4.1 Density of Water and Water Volumetric Correction Factors for Water Calibration of Volumetric Provers
- Ch. 12.2 Calculation of Petroleum Quantities using Dynamic Measurement Methods and Volumetric Correction Factors
- Ch. 21.2 Electronic Liquid Measurement Using Positive Displacement and Turbine Meters

Q10. How are API standards used in terminals today?

A10. Terminals require the implementation of multiple API standards including all the standards identified in A9 above to ensure there is an accurate and transparent measurement for the customer receiving the product into the tank and the customer receiving the product from the terminal into a tank truck for delivery to a retail gasoline station. Further, sales agreements may state that where temperature compensation is used, those calculations incorporate the methods and procedures specified in API MPMS Chapter 11.

[1] https://www.api.org/-/media/files/publications/2024-catalog/2024-publication-catalog.pdf.

Q11. How is an automatic temperature compensation system proven today?

A11. Regulators may use spreadsheets, lookup tables or commercial software to compare the calculated temperature compensated volume to the net volume that is printed on the Bill of Lading, Invoice or on the ticket from the terminal system.

Q12. How would an inspector prove the calculated volume expansion at a terminal?

A12. The volume expansion that occurs due to physical chemistry can be proven in the same manner as an automatic temperature compensation system that calculates the net volume of gasoline. The volume expansion that occurs when the components are blended can be demonstrated using a spreadsheet, look-up table or commercial software. Additionally, the Examination Procedure Outline (EPO) No. 25 for Loading Rack Meters would be updated to incorporate the appropriate procedures.

Q13. Is there a specific API standard that should be used to calculate the volume expansion?

A13. Yes. API MPMS Ch. 11.3.4 which is a subchapter of Ch. 11.1 should be used. The volume change calculated using Ch. 11.3.4 is needed to reconcile the fact that the volume of gasoline and ethanol when blended is slightly greater than the volume of the two liquids measured separately. In equation form,

$$\text{Gasoline BOB}_{\text{(net volume)}} + \text{Ethanol}_{\text{(net volume)}} \neq \text{Gasoline-Ethanol Blend}_{\text{(net volume)}}$$

Q14. In the context of NCWM, why should the API standards be accepted?

A.14. Handbook 130, Uniform Weights and Measures Law, Section 16, recognizes "firmly established trade custom and practice" that dictate how liquid fuels are sold. Specifically, it states,

> **Section 16. Method of Sale**
>
> Except as otherwise provided by the Director or by firmly established trade custom and practice,
>
> (a) commodities in liquid form shall be sold by liquid measure or by weight; and
>
> (b) commodities not in liquid form shall be sold by weight, by measure, or by count.
>
> The method of sale shall provide accurate and adequate quantity information that permits the buyer to make price and quantity comparisons.
>
> (Amended 1989)

In 2024, the U.S. customers consumed 137 billion gallons of gasoline (most of which was 10% ethanol) and 63 billion gallons of diesel fuel. Another 24 billion gallons of jet fuel were consumed in the U.S. At each stage of the process from producing the crude oil to selling the finished fuel to a retail gasoline station the product is measured. So, while there is over 224 billion gallons of finished product consumed in the U.S., those molecules have likely been measured many times over. These measurements are so important that the API Committee on Petroleum Measurement (COPM) meets twice a year, with over 700 people in attendance, at each meeting to review the standards that are used in the U.S. and around the world. By definition, the petroleum industry uses the API standards which are firmly established trade custom and practice.

- **Possible Opposing Arguments:** Demonstrate that you are aware and have considered possible opposition.

Some have suggested that the terminal should be replumbed to allow the finished fuel to flow through a custody meter. However, this is often not possible due to the footprint and design of the terminal. Regardless, it should not be required as there is accurate technology available and approved NTEP equipment already available.

Some have raised concerns that metering systems should not modify the volume of the product after it has gone through the custody meter. This concern appears to be premised on the belief that the gross volume **and** the net volume are measured. In practice, the only measured volume is the gross volume and that is measured by counting pulses from the meter in accordance with an API standard. The gross volume is then used by the custody transfer system or the automatic terminal management system to calculate the net volume using another set of API standards including Chapters 5.x, 6x, 7.4, 11.1, 11.3.3, 11.3.4, 12.2, and 21.2. Please see above for the names of these standards.

Some have shared concerns that only standards approved by NCWM or by NIST and referenced in the Handbooks or in Publications can be used to determine volumes. As stated in the previous paragraph, this is simply not possible. None of the API standards that are needed to calculate the temperature corrected volume of fuels is listed in the NIST/NCWM publications or Handbooks. With this logic, it would be impossible to determine the net volume of fuels and other chemicals.

The submitter requested Voting status in 2026.

Comments in Favor:

Regulatory:

- 2026 Annual: None
- 2026 Interim: None

Industry:

- 2026 Annual: None
- 2026 Interim: An associate member from American Petroleum Institute gave a presentation and handouts and recommends voting.
- 2026 Interim: An associate member from Guidant Measurement stated that the work was evaluated by independent lab and verified by OIML tests. The reason some data was removed was due to issues found in the process. Says that “estimate” was used in the standard which was a poor choice in words. It is not perfect but better than not accounting for the error.
- 2026 Interim: An associate member from Chevron aligning with API and Guidant Measurement recommends voting, as he wants everyone to work off the same calculations. Chevron would like to be part of the work group if it is formed.
- 2026 Interim: An associate member from Marathon states it has already been added to ASTM Standards in 2019 and has gone through a lot of scrutiny. Recommends this for voting.
- 2026 Interim: An associate member from Exxon Mobil recommends it as a voting item and states we can go to the field and prove it. They see the growth in the terminals and other companies can provide this information.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Comments Against:

Regulatory:

- 2026 Annual: None
- 2026 Interim: A regulator from Illinois gave a presentation against this item. Opposed to any adoption standard that substitutes modeled estimates for traceable measurements in commercial billing.
- 2026 Interim: A second regulator from Illinois stated they found this system used in 2019, and this was a hidden charge being applied at the loading rack. Recommends withdrawal.

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Annual: None
- 2026 Interim: A Regulator from Maryland recommend the item be assigned for additional development and amendments to the proposal to make the intent clear. They would recommend a work group (not FALS) and combining both L&R and S&T items together. Additional testing and data collection with W&M regulatory oversight and by subject matter experts are needed.
- 2026 Interim: A Regulator from California echoes Maryland and NIST OWM and recommends developing but will not be opposed to assigning it to a work group.
- 2026 Interim: A Regulator from Kansas echoes Maryland and NIST OWM and would not oppose assigning to a work group.
- 2026 Interim: A Regulator from Florida echoes comments from California, NTEP, and Maryland. Recommends developing status.

Industry:

- 2026 Annual: None
- 2026 Interim: An associate member from Murray Equipment, Inc recommends developing as there is not sufficient real-world data to justify this proposal.
- 2026 Interim: An associate member from Endress + Hauser Flow USA, Inc. recommends assigned status to a work group so testing can be done with regulatory agency involvement.

Advisory:

- Annual 2026: A Representative from Liquid Measuring Device Density Correction Task Group, reported the task group was given the following charge: "The Task Group will oversee further vetting and development of item MOS 26.3 of the Laws and Regulations Committee and item LMD 26.1 of the Specifications and Tolerances Committee, determine whether both are needed, and decide whether they should move forward contingent upon each other. In addition, if MOS 26.3 is determined to have merit, the task group will develop the final language and include it in the Uniform Fuels and Automotive Lubricants Regulation, section 3.2.5 to align both sections." The Task Group decided that indeed, if these proposals are to move forward, they are contingent upon one another, and that the FLR regulations would need to be updated to align. The language seen in the proposals sent back to the standing committees is reflective of the task group's work to get these proposals to a spot where the task group has removed as much uncertainty in the language used as possible. The task group wants to make clear that there are still concerns that will need to be addressed further with these proposals, the most notable are as follows.
  - The task group determined it was ultimately best left up to the S&T committee as to which standards should be referenced in the UR sections 3.6.1.2. and 3.6.2.2. of the LMD proposal. Currently everyone will find API MPMS Chapter 8.1 referenced, however there was discussion that it may be better suited to use ASTM D4057 as a reference in these sections.
  - The task group also believed that the S&T committee will need to collect data and analyze better the applicability of both temperature and density compensation tolerances as it relates to the overall tolerance of the device or system being utilized.
  - Provide jurisdictions with proper testing procedures and results for in field testing, as weights and measures officials will not be testing this application in a laboratory environment.

- 2026 Interim: A technical advisor from The National Institute of Standards and Technology recommends developing status due to formatting issues and concerns with how we properly identify the values.
- 2026 Interim: A technical advisor from National Type Evaluation Program stated that they had no position, but these changes would be viewed as metrological change, and any system would have to come back for recertifications.
- 2026 Interim: A technical advisor from The National Institute of Standards and Technology asked the industry how regulators can verify the accuracy of the system? An associate member from Exxon Mobile replied that you should be able to blend and measure in a prover. An associate member from American Petroleum Institute also replied that to get to a reference temperature is difficult at the rack the lab has a more controlled environment for the purpose of testing.

Item Development:

NCWM 2026 Annual Meeting: The Committee adopted the language as recommended by the Liquid Measuring Device Density Correction Task Group. The Committee assigned an Informational status for the item to receive comments on the item including whether the code should reference API MPMS Chapter 8.1, or ASTM D4057, or neither in UR sections 3.6.1.2. and 3.6.2.2.

NCWM 2026 Interim Meeting: The Committee recommends creating a new task group specifically tasked with developing the 2026 L&R item MOS-26.3 and the 2026 S&T item LMD-26.1. The Committee has removed the nonretroactive requirements.

The Committee formally requests the formation of a joint task group to concurrently develop item LMD-26.1 on the S&T Committee agenda and item MOS-26.3 on the L&R Committee agenda. Both Committees feel these items are dependent upon one another and should be developed in conjunction with one another.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Kansas Department of Agriculture recommended the item is sent back to the LMD Density Correction Task Group to address several concerns. The written concerns have been attached to this report.

A representative from Nebraska FCSP-Weights and Measures does not support this item and had concerns about accuracy of the study and stated that data has been withheld and cherry picked. It was stated that final product amounts should be measured and not estimated and recommends withdrawal.

A representative from Illinois Weights & Measures agreed with previous comments and noted that only measured gallons should be billed. It was stated that "About" should be a "dirty word" And recommends withdrawal.

A representative from Missouri Department of Agriculture agrees with counterparts that product should be measured and recommends withdrawal.

A representative from Marathon Petroleum Company said that when applied consistently and in accordance with the agreed commercial basis of sale, API MPMS Chapter 11.3.4 supports accurate, transparent and equitable custody transfer transactions and is consistent with the principles embodied in NIST Handbook 44. The written comments in support of this item are attached to this report.

A representative from Chuck Corr Consulting said that meter configuration at a terminal is a business decision and that terminals can choose to put meters in places to measure this expansion.. This person does not believe the estimating of the expansion of the mixture is accurate enough.

The committee recommends this item is assigned back to the LMD Density Correction Task Group to address concerns from the body.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

An industry member from the American Petroleum Institute gave a presentation on this item during open hearings.

Mr. Kenn Burt (San Luis Obispo County, California / WWMA S&T Committee): Had questions about the tolerance applied.

Mr. Matthew Sheehan (Chevron): Recommends a voting status. He clarified that the same calculation is used for everyone that is using this.

Mr. Stephen Benjamin (TSL Consulting, representing the American Petroleum Institute): States that this past summer, the NCWM Density Correction Task Group, which API participated in, completed its task to develop language for these items and return them back to the respective committees. The language is reflective of the task group's work to get the proposals to a point where it removed as much uncertainty in the language used as possible. Furthermore, API supports the Density Correction Task Group decision that the two proposals are contingent upon one another, and that the FLR regulations in section 3.2.5 would need to be updated to align with the MOS section (referencing this item as well as MOS-26.3 on the 2026 L&R Committee Agenda). The proposed changes to the regulations would occur as a wholesale business transaction at the petroleum terminal and do not include or impact retail transactions between seller and buyer. When two different liquids are mixed, there can be a change to density and volume. In the case of gasoline blended with ethanol, the density decreases and the volume increases. Therefore, an adjustment is necessary because the sum volume of the two individual components is less than what is physically present in the blended volume. The need for calculating volume expansion is driven by the fact that gasoline-ethanol blends exhibit non-linear volumetric behavior, which led to the development of the API standard Chapter 11.3.4 in the

Manual of Petroleum Measurement Standards (MPMS). Chapter 11.3.4 is the recognized industry methodology for determining VCFs for gasoline and denatured ethanol blends. Accordingly, use of Chapter 11.3.4 is not a departure from accepted petroleum measurement practice, but rather the implementation of the methodology identified within the industry's principal net volume correction standard. When applied consistently and in accordance with the agreed commercial basis of sale, Chapter 11.3.4 supports accurate, transparent, and equitable custody transfer transactions and is consistent with the principles embodied in NIST Handbook 44. API requests a voting status.

Mr. Steve Harrington (Oregon Weights & Measures): He is supportive of the work and the goal, and wants to see it in the Handbook, but he has some questions. He is confused about automatic density, is it a device like a temperature compensator? He also has questions and wants more information on testing and how to test.

Mr. Jim McDonell (Marathon Petroleum): Provided clarification on temperature compensation, blend ratio and density.

Mr. Russ Lewis (Marathon Petroleum): States that this has been through a lot of scrutiny and is ready for a vote. It would cost 3.4 billion dollars to convert all of the terminals in the U.S. to side stream blending.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports the above comments from Steve Harrington, but is not against the proposal. He recommends that this item be assigned or further developed.

The 2026 S&T Committee recommends a Voting status. The committee believes that the item has merit and is fully developed with the changes below.

The 2026 S&T Committee recommends changes to the title of the item to match the body of the item:

S.2. Measuring Elements, S.4. Marking Requirements, N.4. Testing Procedures, T.5. Automatic Density Correction Systems, and UR.3.6. Temperature Compensation and Density Correction, Wholesale.

Regarding the NCWM 2026 Annual meeting S&T Committee question, our committee recommends the use of the latest edition of ASTM D4057 in the Handbook UR.3.6.1.2. Density Determination.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee would like the task group to review the comments made by NYS to ensure the language is as intended.

2026 NEWMA: A representative from American Petroleum Institute gave a presentation on this item.

2026 NEWMA: A representative from NYS Weights & Measures believes the following change in UR.3.6.2.2 and UR.3.6.2.3 has unintentionally removed some devices from providing invoices correctly. The section (UR.3.6.2) is currently for non-automatic TC products, and the invoice requirements generated for them

1. Current HB44, LMD code, UR.3.6.2.2 Invoices is changed to UR.3.6.2.3 in the new proposal, and 3.6.2.2 is now "Non-automatic Density Determination".

2. However, the language change to the proposed "UR.3.6.2.3 Invoices" is now only for non-automatic density corrected finished products, and no longer includes Invoices for non-automatic Temperature corrected products (ex: all other distillates, neat gasoline, etc). These wholesale products are typically sold temperature corrected as well.

3. I am unsure if the author intended this removal of language? And, if so – shouldn't it be struck instead of overwritten?

4. If it was unintended then a suggested language change would be to renumber – but including the adopted language from HB44 (existing) UR.3.6.2.2 as well.

Ex: (change the existing HB44 language to instead read:)

UR.3.6.2.23.(a). Invoices. – The accompanying invoice for a temperature-corrected product shall indicate that the volume of the product has been adjusted for temperature variations to a volume at 15 °C (60 °F) and shall also state the product temperature used in making the adjustment.

UR.3.6.2.3.(b) Invoices. The accompanying invoice for a nonautomatic density-corrected finished product shall show that the density-corrected volume of the blended product delivered has been adjusted to a volume at 15 °C (60 °F), and the invoice shall also indicate for each metered component or the finished product:

2026 NEWMA: A representative from State of Vermont Agency of Agriculture opposes this item but would support an Assigned status to have a committee further develop the item.

2026 NEWMA: A representative from Marathon Petroleum supports voting status.

2026 NEWMA: A representative from the Task Group stated that the group wanted to see more data from the field with proper testing procedures.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from API gave a presentation on the item.

A representative from Maryland Department of Agriculture opposed the item and recommended Withdrawn.

A representative from Chevron considers the item fully developed and recommends Voting.

A representative from Marathon Petroleum Buyer and Sellers fully supports the item and considers it fully developed. Supports D 4057 reference and believes the science works. Voting status recommended.

A representative from API recommended an editorial change: U.R. 3.6 now, recommend that the committee match the title Temp Comp and Density Correction to 3.6.

A representative from West Virginia Department of Agriculture considers item fully developed and would like Voting status.

A representative from Marathon Petroleum stated the calculations are automated.

The committee recommends Voting on this item with the updated title to match wording in Section 3.6

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

LMD-27.1 S.4. Marking Requirements., N.3. Test Drafts. N.4. Testing Procedures, Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30., UR.2.2. Discharge Rate., and Liquid-Measuring Device Code Index

Source:
Wisconsin DATCP

Purpose:
Adopt the term discharge flow rate in accordance with N.4.1. Normal Tests. - throughout the code section to have one term replace the many terms currently used in the code that have the relatively same meaning (e.g. flow rate, discharge rate, designed discharge rate, flow rate of the installation, designed or marked flow rate, and rated discharge rate).

Item under Consideration:
Amend the NIST Handbook 44 Liquid Measuring Devices Code as follows:

S.4. Marking Requirements.

…

S.4.3. Wholesale Devices.

S.4.3.1. ~~Discharge Rates~~ Discharge Flow Rates. – A wholesale device shall be marked to show its designed maximum and minimum ~~**discharge rates**~~ **discharge flow rates**. However, the minimum ~~**discharge rate**~~ **discharge flow rate** shall not exceed 20 % of the maximum ~~**discharge rate**~~ **discharge flow rate**.

…

S.4.4. Retail Devices.

S.4.4.1. ~~Discharge Rates~~ Discharge Flow Rates. *– On a retail device with a designed maximum* ~~***discharge rate***~~ ***discharge flow rate*** *of 115 L (30 gal) per minute or greater, the maximum and minimum* ~~***discharge rates***~~ ***discharge flow rates*** *shall be marked in accordance with*

S.4.4.2. Location of Marking Information; Retail Dispensers. The marked minimum ~~***discharge rate***~~ ***discharge flow rate*** *shall not exceed 20 % of the marked maximum* ~~***discharge rate***~~ ***discharge flow rate****. [Nonretroactive as of January 1, 1985]*

(Added 1984) (Amended 2003 and 2019)

Example: With a marked maximum ~~**discharge rate**~~ **discharge flow rate** of 230 L/min (60 gpm), the marked minimum ~~**discharge rate**~~ **discharge flow rate** shall be 45 L/min (12 gpm) or less (e.g., 40 L/min [10 gpm] is acceptable). A marked minimum ~~**discharge rate**~~ **discharge flow rate** greater than 45 L/min (12 gpm) (e.g., 60 L/min [15 gpm]) is not acceptable.

…

N.3. Test Drafts.

…

N.3.4. Other Retail Devices. – On devices with a designed maximum ~~**discharge rate**~~ **discharge flow rate** of:

(a) less than 80 L (20 gal) per minute, tests shall include drafts of one or more amounts, including a draft of at least 19 L (5 gal).

(b) 80 L (20 gal) per minute or greater, tests shall include drafts of one or more amounts, including a draft of at least the amount delivered by the device in one minute at the maximum ~~**flow rate**~~ **discharge flow rate** of the installation. (Amended 1984)

N.3.5. Wholesale Devices.

N.3.5.1. Test Drafts. – The delivered quantity shall be equal to at least the amount delivered by the device in one minute at its maximum ~~**discharge rate**~~ **discharge flow rate**. (Amended 1987, 1996, and 2023)

N.3.5.2. Small Volume Prover Test. – The total delivered quantity for any required accuracy test shall be representative of at least the amount delivered by the device in one minute of continuous flow at its maximum ~~**discharge rate**~~ **discharge flow rate**.

(Added 2023)

N.3.5.3. Field Standard Meter Test. *– The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the* ~~***flow rate***~~ ***discharge flow rate*** *being tested. [Nonretroactive as of January 1, 2024]*

(Added 2023)

N.4. Testing Procedures.

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 installation. Any additional tests conducted at ~~**flow rates**~~ **discharge flow rates** down to and including one-half of the sum of the maximum discharge flow rate (MDRF) and the rated minimum discharge flow rate (RMDFR) shall be considered normal tests.

As a formula, this is stated as: MDFR + RMDFR / 2 = minimum discharge flow rate for additional tests

(Amended 1991 and 2023)

…

N.4.2.1. Slow-Flow Meters. – A "special" test shall be made at a ~~**flow rate**~~ **discharge flow rate**:

(a) not larger than twice the actual minimum ~~**flow rate**~~ **discharge flow rate**; and

(b) not smaller than the actual minimum ~~**flow rate**~~ **discharge flow rate** of the installation.

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

(a) Devices without a marked minimum ~~**flow rate**~~ **discharge 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**~~ **discharge flow 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**~~ **discharge flow rate** shall have a "special" test performed at or near the marked minimum ~~**flow rate**~~ **discharge flow rate**.

(Added 1984) (Amended 2005 and 2019)

N.4.2.3. Other Retail Devices. – "Special" tests of other retail devices shall be made at the slower of the following rates:

(a) 50 % of the maximum ~~**discharge rate**~~ **discharge flow rate** developed under the conditions of installation; or

(b) the minimum ~~**discharge rate**~~ **discharge flow rate** marked on the device.

N.4.2.4. Wholesale Devices. – "Special" tests shall be made to develop the operating characteristics of a measuring system and any special associated or attached elements and accessories. "Special" tests shall include a test at or slightly above the slower of the following rates:

(a) 20 % of the marked maximum ~~**discharge rate**~~ **discharge flow rate**; or

(b) the minimum ~~**discharge rate**~~ **discharge flow rate** marked on the device.

In no case shall the test be performed at a ~~**flow rate**~~ **discharge flow rate** less than the minimum ~~**discharge rate**~~ **discharge flow rate** marked on the device. (Amended 2014)

…

N.4.5. Verification of Linearization Factors**.** – All enabled linearization factors shall be verified. The verification of enabled linearization factors shall be done through physical testing, or a combination of physical testing and empirical analysis at the discretion of the official with statutory authority. (Added 2016)

N.4.6. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and ~~**flow rate**~~ **discharge flow rate** are reduced to the extent that they will not affect the results obtained. When conducting the tests, the ~~**flow rates**~~ **discharge flow rates** shall be within the minimum and maximum ~~**discharge rates**~~ **discharge flow rates** as marked by the manufacturer. For devices with no marked minimum and maximum ~~**flow rates**~~ **discharge flow rate**, the minimum ~~**discharge rates**~~ **discharge flow rates** shall be as specified in N.4.2.1. Slow-Flow Meters or N.4.2.2. Retail Motor-Fuel Devices and DEF Devices and the maximum ~~**discharge rates**~~ **discharge flow rates**

shall be the maximum ~~discharge rate~~ **discharge flow rates** developed under the conditions of the installation. For devices equipped with an automatic temperature compensator, the results shall be based on the uncompensated (gross) volume (e.g., with the temperature compensator deactivated). (Amended 2019)

…

Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30.

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance[1]
0.3	-Petroleum products delivered from large capacity (~~flow rates~~ **discharge flow rates** greater than 115 L/min or 30 gpm)**devices, including motor-fuel devices-Heated products (other than asphalt) at temperatures greater than 50 °C (122 °F)-Asphalt at temperatures equal to or below 50 °C(122 °F)-All other liquids not shown in the table where the typical delivery is over 200 L (50 gal)	0.2 %	0.3 %	0.5 %
0.3A	-Asphalt at temperatures greater than 50 °C (122 °F)	0.3 %	0.3 %	0.5 %
0.5*	-Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min or30 gpm)** motor-fuel devices-Agri-chemical liquids-All other applications not shown in the table where the typical delivery is ≤ 200 L (50 gal)	0.3 %	0.5 %	0.5 %
1.1	-Petroleum products and other normal liquids from devices with ~~flow rates**~~ **discharge flow rates**** less than 1 gpm. -Devices designed to deliver less than 1 gal	0.75 %	1.0 %	1.25 %

*For test drafts ≤ 40 L or 10 gal, the tolerances specified for Accuracy Class 0.5 in the table above do not apply.

For these test drafts, the following applies:

(a) Maintenance tolerances on normal and special tests shall be 20 mL plus 4 mL per indicated liter or 1 in^3 plus 1 in^3 per indicated gallon.
(b) Acceptance tolerances on normal and special tests shall be one-half the maintenance tolerance values.

[1] Special test tolerances are not applicable to retail motor fuel and retail Diesel Exhaust Fluid (DEF) dispensers.

** ~~Flow rate~~ **Discharge flow rate** refers to designed or marked maximum ~~flow rate~~ **discharge flow rate**.

…

UR.2.2. Discharge Rate. – A device shall be installed so that the actual maximum ~~**discharge rate**~~ **discharge flow rate** will not exceed the rated maximum ~~**discharge rate**~~ **discharge flow rate**. Automatic means for flow regulation shall be incorporated in the installation if necessary.

…

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Previous Status:
2027: New Proposal

Original Justification:
This would provide uniformity in terminology across the code.

The submitter also asks:

1. Could this proposed change be accomplished with a addition to Appendix D. Definitions
2. Is there confusion between discharge rate and flow rate?
3. What about other sections of Handbook 44 that have the same issue i.e. Section 3.31. Vehicle Tank Meters > should this be look at more comprehensively.
4. What does Industry say about this suggested proposal?

The submitter requests that this be a Developing Item in 2027.

Comments in Favor:

Regulatory:
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Industry:
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Advisory:
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Comments Against:

Regulatory:
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Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
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Industry:
•

Advisory:
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Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Wisconsin DATCP said that throughout the LMD section, “discharge rate” and “flow rate” appear to be used interchangeably. Written notes are attached.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): He believes this to be editorial in nature and supports a voting status.

Mr. Matt Douglas (State of California, Division of Measurement Standards): He supports the intent but believes that it needs to be developed further. He would like to hear more feedback on the item.

The 2026 S&T Committee initially recommended a Voting status. During the voting session the following comments were heard:

Mr. Matt Douglas (State of California, Division of Measurement Standards): States that at the 2026 NCWM Annual meeting this past July, item LMD-24.2. was voted upon amending the 3.30. Liquid Measuring Devices code section N.4.1. for the 2027 edition of NIST Handbook 44 (the voting record, S&T agenda, and NCWM S&T Committee addendum are available for review on the NCWM website). The language as it appears on the WWMA S&T agenda does not reflect the language the item intends to amend. In this particular case, the language in N.4.1. that this item (LMD-27.1) intends to amend has already been removed and replaced. It is also worth noting that the recently accepted language inserts the terms “minimum flow rate”, “maximum rate of flow”, and “minimum discharge rate” later in the paragraph; which would need to be addressed given the intention of the item under consideration.

He feels that it is imperative that the committee either strike N.4.1 in its entirety from the item, or replace N.4.1. with the recently voted upon language. Otherwise, this item should be de-escalated to a developing status with feedback which will assist the submitter in preparing the item so that it is fully developed ahead of the Interim meeting.

Mr. Kurt Floren (County of Los Angeles, California): Hearing this testimony, he is opposed to putting the item forward in its current form.

After considering the above testimony, the 2026 S&T Committee revised their recommended status from Voting to Developing. The Committee recommends that the submitter review the concerns above in finalizing the item.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures agrees with the proposal and recommends a voting status.

2026 NEWMA: A representative from NYS Weights & Measures recommends caution and that we should be conscious that this change could have unintended consequences.

2026 NEWMA: A representative from New Hampshire Division of Weights and Measures brought forth that other proposals are trying to standardize the language around normal test in all applicable codes and would like to see this apply to all those codes.

The committee recommends an informational status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NIST while not finished their analysis noted many different terms are used throughout and was concerned with the term flow rate.

A representative from Maryland Department of Agriculture supports the item, however it needs further development. She feels they are attempting to use one term for two different concepts. Care needs to be taken with the intent.

A representative from Gilbarco echoes Maryland’s comments. In addition, the term is in the title but not amended.

A representative from Arkansas Department of Agriculture supports item but recommends assigned to a committee at the national level for further development.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

LMD-27.2 N.3. Test Drafts., N.4. Testing Procedures., Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices. UR.2.2. Discharge Rate.

Source:
Wisconsin DATCP

Purpose:
Define and provide the method for testing and applying the correct tolerance to liquid measuring devices in accordance with Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices.

Item under Consideration:
Amend the NIST Handbook 44 Liquid Measuring Devices Code as follows:

N.3. Test Drafts.

…

N.3.4. Other Retail Devices. – On devices with a ~~**designed maximum discharge rate**~~ **maximum discharge flow rate measured at the time of testing** of:

(a) less than 80 L (20 gal) per minute, tests shall include drafts of one or more amounts, including a draft of at least 19 L (5 gal).

(b) 80 L (20 gal) per minute or greater, tests shall include drafts of one or more amounts, including a draft of at least the amount delivered by the device in one minute at the maximum-flow rate of the installation **measured at the time of testing.**
(Amended 1984)

…

N.4. Testing Procedures.

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 installation**~~ **measured at the time of testing.** Any additional tests conducted at flow rates down to and including one-half of the sum of the maximum discharge flow rate (MDFR) and the rated minimum discharge flow rate (RMDFR) shall be considered normal tests. As a formula, this is stated as:

MDFR + RMDFR / 2 = minimum discharge flow rate for additional tests

(Amended 1991 and 2023)

…

Table T.2.

Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in

NIST Handbook 44, Section 3.30.

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance[1]
0.3	- Petroleum products delivered from large capacity (flow rates greater than 115 L/min or 30 gpm)** devices, including motor-fuel devices - Heated products (other than asphalt) at temperatures greater than 50 °C (122 °F) - Asphalt at temperatures equal to or below 50 °C (122 °F) - All other liquids not shown in the table where the typical delivery is over 200 L (50 gal)	0.2 %	0.3 %	0.5 %
0.3A	- Asphalt at temperatures greater than 50 °C (122 °F)	0.3 %	0.3 %	0.5 %
0.5*	- Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min or 30 gpm)** motor-fuel devices - Agri-chemical liquids - All other applications not shown in the table where the typical delivery is ≤ 200 L (50 gal)	0.3 %	0.5 %	0.5 %
1.1	- Petroleum products and other normal liquids from devices with flow rates** less than 1 gpm. - Devices designed to deliver less than 1 gal	0.75 %	1.0 %	1.25 %

* For test drafts ≤ 40 L or 10 gal, the tolerances specified for Accuracy Class 0.5 in the table above do not apply. For these test drafts, the following applies:

(a) Maintenance tolerances on normal and special tests shall be 20 mL plus 4 mL per indicated liter or 1 in^3 plus 1 in^3 per indicated gallon.

(b) Acceptance tolerances on normal and special tests shall be one-half the maintenance tolerance values.

[1] Special test tolerances are not applicable to retail motor fuel and retail Diesel Exhaust Fluid (DEF) dispensers.

** Flow rate refers to ~~**designed or marked maximum flow rate**~~ **discharge flow rate measured at the time of testing.**

(Added 2002) (Amended 2006, 2013, and 2022)

…

UR.2. Installation Requirements.

…

UR.2.2. Discharge Rate. – A device shall be installed so that the ~~**actual**~~ maximum discharge rate **measured at the time of testing** will not exceed the ~~**rated**~~ **designed or marked** maximum discharge rate. Automatic means for flow regulation shall be incorporated in the installation if necessary.

Previous Status:
2027: New Proposal

Original Justification:
Regarding N.3.Test Drafts: The term "designed maximum discharge rate" is not a single value > meters are "designed" to cover a range of flow rates. The "maximum flow rate of the installation" is unknown because there is no Marking Requirement for Retail Devices (meters) with flow rates < 30 gpm, S.4.4 Retail Devices., S.4.4.1. Discharge Rates. The maximum flow rate less than (<) 30 gpm would have to be measured by the accepted method of a draft of at least the amount delivered in one minute at the maximum flow rate measured at the time of testing as required for wholesale devices <see below>.

This section requires that you measure the maximum discharge rate at the time of testing.

Regarding N.4. Testing Procedures: What is meant by "developed under the conditions of installation"? Is this a requirement of manufacturers, service companies, or both? What is the definition of "Installation"? It could mean meters installed at the factory or installed at Retail/Wholesale sites by a service company when placed into service. In either case, the maximum discharge flow rate would need to be measured at the time of testing.

Regarding Table T.2.:

EXAMPLE:

Retail High Speed Diesel meters are typically Marked with a maximum discharge flow rate of 60 gpm.

Table T.2.Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30. would have you refer to Accuracy Class 0.3 for meters with a Marked discharge flow rate of greater than 30 gpm and apply the maintenance tolerance of 0.3%. These retail high speed diesel meters commonly run at maximum discharge flow rates below 30 gpm which would allow for a larger tolerance of 0.5% maintenance tolerance.

Regarding UR.2.2. Discharge Rate: The distinction here between "designed" and "marked" being that retail meters below 30 gpm are not required to be Marked, so you would need to find what the designed maximum discharge flow rate is from the manufacturer or NTEP Certificate.

The submitter requests that this be a Developing Item in 2027.

Comments in Favor:

Regulatory:
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Industry:
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Advisory:
•

Comments Against:

Regulatory:
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Industry:
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Advisory:

-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Wisconsin DATCP said that the actual flow rate of the meters and the marked flow rate of the meters can differ significantly, to the point where a meter could fall under a different accuracy class in Tolerance table T.2. It was stated that the submitter believes the more reasonable position to take would be to measure the flow rate at the time of testing. Written notes are attached.

A representative from Kansas Department of Agriculture said clarification should be added to the EPO. It was stated that an inspector measures the flow rate at time of inspection and that this item does not account for clogged filters. This person recommended developing status.

The committee recommends this item is assigned a developing status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Scott Wagner (Colorado Division of Measurement, Oil and Public Safety): States that the item needs to be withdrawn since this is talking about the maximum discharge rate at the time of testing and should not be the maximum flow rate at the time of testing. Devices should be tested at maximum flow rate.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports Mr. Wagner's comments, as well as his request for withdrawal, and said that there were recent updates that would change the language.

The 2026 S&T Committee recommends that this item be assigned a Withdrawal status, based on testimony heard during open hearings. If not withdrawn, consider LMD-27.1, as both items amend language in the same code section.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures does not agree with proposed language as flow rates can be manipulated prior to testing, as through a PTO throttle or clogged filters.

2026 NEWMA: A representative from NYS Weights & Measures opposes the proposal since it may change the tolerances due to many factors affecting flow rates at the time of test.

The committee recommends this item be withdrawn.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture does not support and recommended Withdrawn.

A representative from Arkansas Department of Agriculture supports the idea but believes it needs more development and should be assigned to a national committee.

A representative from Gilbarco opposes this item and recommends Withdrawn.

The committee recommends Withdrawn on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

VTM – VEHICLE TANK METERS

VTM-27.1 N.4.1. Normal Test.

Source:
New Hampshire Division of Weights and Measures and the NCWM Professional Certification Program Coordinator

Purpose:
Provide clarity to N.4.1. Normal Tests.

Item under Consideration:
Amend the NIST Handbook 44 Vehicle-Tank Meter Code as follows:

N.4.1. Normal Tests. – The "normal" test of a **device**~~measuring system~~ shall be made at the maximum discharge **flow** rate ~~that may be anticipated~~**developed** under the conditions of ~~the~~ installation. **Any test conducted at the maximum discharge flow rate developed under the conditions of installation down to and including one-half of the sum of the maximum discharge flow rate developed under the conditions of installation and the rated minimum discharge flow rate shall be considered a normal test.** ~~**Any additional tests conducted at flow rates down to and including one-half of the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests.**~~

To determine the minimum flow rate at or above which a "normal" test is conducted, the following equation is provided:

$$\frac{(\text{maximum discharge flow rate} + \text{rated minimum discharge flow rate})}{2}$$

Where:

The maximum discharge flow rate is the maximum rate of flow developed under the conditions of installation.

The rated minimum discharge flow rate is the marked minimum discharge rate or the minimum flow rate specified by the manufacturer.

At a minimum, one "normal" test shall be conducted on each meter at the maximum discharge flow rate developed under the conditions of installation.

(Amended 1992 **and 20XX**)

Previous Status:
2027: New Proposal

Original Justification:
The existing code is wordy, ambiguous, and difficult to understand. This proposal adds a formula and conditions of application that will give clarity to N.4.1. Normal Tests.

A similar update was adopted for normal tests in the Liquid Measuring Devices (LMD) Code at the 2026 NCWM Annual Meeting. A proposal was made in 2024 and further developed in 2025. It was acknowledged during the development of the LMD code for normal tests that other sections of NIST Handbook 44 would need to be changed to be consistent.

Proposals to amend Sections 3.32 Liquefied Petroleum Gas and Anhydrous Ammonia and 3.39 Carbon Dioxide Liquid-Measuring Devices have been submitted at the same time as this proposal.

Some may believe the current code is satisfactory and there is no need to add a formula and clarifying language.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
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Industry:
•

Advisory:
•

Comments Against:

Regulatory:
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Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
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Advisory:
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Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Kansas Department of Agriculture asked if this item brought clarity or confusion.

The committee recommends this item is assigned a voting status and recommends this item is blocked with LPG-27.1 and CDL-27.1.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference no comments were received.

The 2026 S&T Committee recommends a Voting status. The committee believes the item has merit and is fully developed. The 2026 S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1. Additionally, the committee would like the submitter to review the use of "device" vs "measuring system" for each item.

2026 NEWMA: A representative from New Hampshire Division of Weights and Measures reiterates that there should be consistency in normal test language across all applicable code and wouldn't be opposed to blocking the items.

2026 NEWMA: A representative from New Jersey Weights & Measures supports this item and recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1 as they all accomplish the same goal.

2026 NEWMA: A representative from NYS Weights & Measures suggests maintaining this as a "measuring system" not just a "device". NYS would not support the item as a device but would support the item as a "measuring system".

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NIST stated they have not finished analysis but some verbiage in the item may not be the correct verbiage. They don't believe that the term "device" is correct because it's more of a system.

A representative from Arkansas Department of Agriculture does not support this item. She has concerns with line 34, the definition of what flow rate would be and is incorrectly implying the flow rate would not change. Recommended Assigned.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

LPG – LPG AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES

LPG-27.1 N.4.1. Normal Test.

Source:
New Hampshire Division of Weights and Measures and the NCWM Professional Certification Program Coordinator

Purpose:
Provide clarity to N.4.1. Normal Tests.

Item under Consideration:
Amend the NIST Handbook 44 LPG and Anhydrous Ammonia Liquid-Measuring Devices Code as follows:

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 **the maximum discharge flow rate developed under the conditions of installation down to and including one-half of the sum of the maximum discharge** flow rate~~**s**~~ **developed under the conditions of installation** ~~**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.

(Amended 1998)

To determine the minimum flow rate at or above which a "normal" test is conducted, the following equation is provided:

$$\frac{(\textbf{maximum discharge flow rate} + \textbf{rated minimum discharge flow rate})}{\mathbf{2}}$$

Where:

The maximum discharge flow rate is the maximum rate of flow developed under the conditions of installation.

The rated minimum discharge flow rate is the marked minimum discharge rate or the minimum flow rate specified by the manufacturer.

At a minimum, one "normal" test shall be conducted on each meter at the maximum discharge flow rate developed under the conditions of installation.

(Amended 1992 **and 20XX**)

Previous Status:

2027: New Proposal

Original Justification:

The existing code is wordy, ambiguous, and difficult to understand. This proposal adds a formula and conditions of application that will give clarity to N.4.1. Normal Tests.

A similar update was adopted for normal tests in the Liquid Measuring Devices (LMD) Code at the 2026 NCWM Annual Meeting. A proposal was made in 2024 and further developed in 2025. It was acknowledged during the development of the LMD code for normal tests that other sections of NIST Handbook 44 would need to be changed to be consistent.

Proposals to amend Sections 3.32 Liquefied Petroleum Gas and Anhydrous Ammonia and 3.39 Carbon Dioxide Liquid-Measuring Devices have been submitted at the same time as this proposal.

Some may believe the current code is satisfactory and there is no need to add a formula and clarifying language.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:

-

Industry:

-

Advisory:

-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Kansas Department of Agriculture asked if this item brought clarity or confusion.

The committee recommends this item is assigned a voting status and recommend this item is blocked with VTM-27.1 and CDL-27.1.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): States that this item seems to be a duplication of another item. This item as written is very lengthy and can accomplish the goal with less words, but he supports the intent.

The 2026 S&T Committee recommends a Voting status. The committee believes that the item has merit and is fully developed. The 2026 S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1. Additionally, the committee would like the submitter to review the use of "device" vs "measuring system" for each item.

2026 NEWMA: A representative from New Jersey Weights & Measures supports this item and recommends blocking VTM-21.1, LPG-27.1, and CDL-27.1 as they all accomplish the same goal.

2026 NEWMA: A representative from National Propane Gas Association supports this item.

2026 NEWMA: A representative from NYS Weights & Measures recommends blocking the 3 items together.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NIST stated the best way to describe would be not stating "at installation" and should say conditions "of installation." Conditions do impact the rate of flow and believes rephrasing it that so we can all agree. Not necessarily opposed but needs rewriting. In addition not replacing the word "measuring system".

A representative from Maryland Department of Agriculture explained that this item is attempting to identify what a "normal test" is. She supports this item for further development.

A representative from Richard Suiter Consulting has concerns with the wording time of test, the volume and amount of product being pulled depending on uncontrolled conditions such as number of other pumps operating at the time of test. He recommends Withdrawn.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

HGV – HYDROCARBON GAS VAPOR-MEASURING DEVICES

HGV-25.1 D S.1.1.4. Advancement of Indicating and Recording Elements., S.11.5. Proving Indicator., S.2.2. Provision for Sealing., S.4.3. Temperature Compensation., S.4.4. ~~Badge~~Identification., N.3. Test Drafts., N.4.1. Normal Tests., and Appendix D. Definitions register

Source:
California Department of Food and Agriculture – Division of Measurement Standards

Purpose:
The proposed changes are to recognize new technologies in hydrocarbon gas vapor-measuring devices.

Item under Consideration:
Amend the Handbook 44 Hydrocarbon Gas Vapor-Measuring Devices Code as follows:

S.1.1.4. Advancement of Indicating and Recording Elements. – Primary indicating and recording elements shall advance ~~digitally or continuously and be susceptible to advancement only by the mechanical operation of the device~~only by the designed operation of the device.

(Amended 20XX)

S.1.1.5. Proving Indicator. – **A device shall be equipped with a proving indicator or proving indication.**

S.1.1.5.1. Mechanical Proving Indicators.

(a) Devices rated less than 280 m^3/h (10 000 ft^3/h) gas capacity shall be equipped with a proving indicator measuring 0.025 m^3, 0.05 m^3, 0.1 m^3, 0.2 m^3, or 0.25 m^3 per revolution, (1 ft^3, 2 ft^3, 5 ft^3, or 10 ft^3 per revolution) for testing the meter. ~~Devices with larger capacities shall be equipped as follows:~~

(~~a~~b) Devices rated 280 m^3 (10 000 ft^3) up to but not including 1 700 m^3/h (60 000 ft^3/h) gas capacity shall be equipped with a proving indicator measuring not greater than 1 m^3 (100 ft^3) per revolution.

(~~b~~c) Devices rated 1 700 m^3/h (60 000 ft^3/h) gas capacity or more shall be equipped with a proving indicator measuring not more than 10 m^3 (1 000 ft^3) per revolution.

~~The t~~**T**est circle ~~of the~~ proving indicator**s** shall be divided into ten equal parts. Additional subdivisions of one or more of such equal parts may be made.

S.1.1.5.2. Electronic Proving Indication. – The smallest unit of volume displayed shall be no larger than 1/1000 of the value of the smallest unit of indicated delivery required in S.1.1.3. Value of Smallest Unit. The meter shall be capable of displaying the proving indication continuously while testing the meter.

(Amended 1973**, ~~and~~** 1988**, and 20XX**)

…

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. Devices and Systems Adjusted Using Removable Digital Storage Devices. 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**~~s~~** in such a manner that **~~no~~ requires the security seal to be broken before an** adjustment or interchange can be made of**~~: any measurement element.~~**

(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, 20XX]

(Amended 2019**, and 20XX**)

Table S.2.2. *Categories of Device and Methods of Sealing*	
Categories of Device	***Method of Sealing***
Category 1: No remote configuration capability.	***Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.***
Category 2: Remote configuration capability, but access is controlled by physical hardware. 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.	***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.***
Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password). 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.	***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. The event logger information shall be available at the time of inspection, as a printed copy or transmitted in an electronic format. 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.)***

[Nonretroactive as of January 1, 20XX]

(Table Added 20XX)

S.2.5. Adjustments and Corrections for Measuring Elements and Measuring Systems. – Other than devices with mechanical meters, a device shall be equipped with automatic means to determine and correct for changes in the product's properties or variations in other parameters having a significant metrological effect that results in a measured quantity in excess of allowable error limits when compared with the delivered quantity. The device shall provide a means to identify when these features are not operating properly.

[Nonretroactive as of January 1, 20XX]
(Added 202X)

…

S.4. Marking Requirements. - In addition to all the marking requirements of Section 1.10. General Code, paragraph G-S.1. Identification, each device shall have the following information conspicuously, legibly, and permanently marked:

(Amended 20XX)

S.4.1. Limitations of Use. – If a device is intended to measure accurately only products having particular properties, or to measure accurately only under specific installation or operating conditions, or to measure accurately only when used in conjunction with specific accessory equipment, these limitations shall be clearly and permanently stated on the device.

S.4.2. Discharge Rates. – A device shall be marked to show ~~**it's**~~ **the** rated gas capacity in cubic meters per hour or cubic feet per hour~~.~~ **for the particular products that the device was designed to meter as identified by the manufacturer.**

(Amended 20XX)

S.4.3. Temperature Compensation. – If a device is equipped with an automatic temperature compensator, this shall be **marked on the front of the** ~~**indicated on the badge or immediately adjacent to the badge of the**~~ device**. If the device is equipped with a removable indicating and/or recording element, the required automatic temperature compensation information shall also appear** ~~**and**~~ on the ~~**register**~~ **indicating/recording element**.

(Amended 20XX)

~~**S.4.4. Badge. – A badge affixed in a prominent position on the front of the device shall show the manufacturer's name, serial number and model number of the device, and capacity rate of the device for the particular products that it was designed to meter as recommended by the manufacturer.**~~

…

N.3. Test Drafts. – Except for low-flame tests, test drafts shall be at least equal to**:**

N.3.1. For meters equipped with a mechanical indicating and/or recording elements:

N.3.1.1 Meters equipped with test circles - O~~**o**~~ne complete revolution of the largest capacity proving indicator and shall in no case be less than 0.05 m^3 or 2 ft^3.

N.3.1.2. Meters not equipped with test circles - Ten times the smallest proving indicator division and shall in no case be less than 0.05 m^3 or 2 ft^3.

N.3.2. For meters equipped with an electronic indicating and/or recording elements - Ten times the smallest proving indicator division and in no case less than 0.05 m^3 or 2 ft^3.

All flow rates shall be controlled by suitable outlet orifices.

(Amended 1973**,** ~~**and**~~ 1991 **and 20XX**)

…

N.4.1. Normal Tests. – The normal test of a device shall be made at a rate not to exceed the capacity rate ~~**given on the badge**~~ **marked on**~~**of**~~ the meter.

(Amended 1988**, and 20XX**)

…

N.4.2.4. Leak Test. – The device shall be tested for leaks up to a pressure not to exceed the manufacturer's maximum rated pressure. The device shall not leak. Meters that are not intended to be leak tested by submersion under water are to be leak tested as described on the type approval certificate.

(Added 20XX)

…

UR.2.6. Customer Indicating Element, Accessibility. – For systems that utilize additional indicating elements for use by the customer, one of the following shall be provided.

(a) ***A console display that the customer has access to, can clearly identify, and then select the view device indications,***

(b) ***A remote display which is provided to the customer as part of the system, or***

(c) ***At the option of the customer, an application that provides indications in real time.***
[Nonretroactive as of January 1, 20XX]

(Added 20XX)

UR.2.7. Tenant Premise Identification. – Tenant premise identification shall be clearly and permanently shown on or at the device, and on all separate components of a device. Remote indications and all recorded representations shall be readily identifiable and readily associated with the customer's premises. Recorded representations shall also include the time and date.

[Nonretroactive as of January 1, 20XX]

(Added 20XX)

…

NIST HB 44 – Appendix D. Definitions

~~**badge. A metal plate affixed to the meter by the manufacturer showing the manufacturer's name, serial number and model number of the meter, and its rated capacity. [3.33]**~~

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from California Division of Measurement Standards stated that the item is collaborative process and requests a developing status to continue working on the item.
- 2026 Interim: None

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: A technical advisor from The National Institute of Technology, Office of Weights and Measures supports voting with corrected numbering but also supports the submitter requesting developing.

Comments Against:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- 2026 Annual: None
- 2026 Interim: A regulator from California, the submitter of the item, noted that some formatting issues exist in the current proposal. They recommend developing to correct these errors and receive feedback.

Industry:
- 2026 Annual: None
- 2026 Interim: An associate member from National Propane Gas Association supports the item for continued development.

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Item Development:
NCWM 2026 Annual Meeting: The Committee updated the language for this item based on feedback from the submitter and chose to retain a Developing status for this item based on the submitter's comment heard during Open Hearing.

NCWM 2026 Interim Meeting: The Committee assigned Developing status to this item based on the comments heard during Open Hearings. The Committee encourages the submitter to continue developing the item.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item is assigned a developing status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): States that this item is fully developed and ready for voting.

The 2026 S&T Committee recommends a Voting status. The committee believes that the item has merit and is fully developed.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from National Propane Gas Association recommends a developing as they are still waiting for information from the manufacturer.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from NPGA recommends this remains under development; forwarded suggested modifications to the item. Edits N.4.2.4. - Relate to leak detection and would allow this to continue, UR.2.6.- concerns about the wording "real time"

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

CDL - CARBON DIOXIDE LIQUID-MEASURING DEVICES

CDL-27.1 N.4.1. Normal Test.

Source:
New Hampshire Division of Weights and Measures and the NCWM Professional Certification Program Coordinator

Purpose:
Provide clarity to N.4.1. Normal Tests.

Item under Consideration:
Amend the NIST Handbook 44 Carbon Dioxide Liquid-Measuring Devices Code as follows:

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 installation. Any ~~**additional tests**~~ conducted at **the maximum discharge** flow rate~~s~~ **developed under the conditions of installation** down to and including one-half of the sum of the maximum discharge flow rate **developed under the conditions of installation** and the rated minimum discharge flow rate shall be considered normal tests.

To determine the minimum flow rate at or above which a "normal" test is conducted, the following equation is provided:

$$\frac{(\text{maximum discharge flow rate} + \text{rated minimum discharge flow rate})}{2}$$

Where:

The maximum discharge flow rate is the maximum rate of flow developed under the conditions of installation.

The rated minimum discharge flow rate is the marked minimum discharge rate or the minimum flow rate specified by the manufacturer.

At a minimum, one "normal" test shall be conducted on each meter at the maximum discharge flow rate developed under the conditions of installation.

(Amended 1992 **and 20XX**)

Previous Status:
2027: New Proposal

Original Justification:
The existing code is wordy, ambiguous, and difficult to understand. This proposal adds a formula and conditions of application that will give clarity to N.4.1. Normal Tests.

A similar update was adopted for normal tests in the Liquid Measuring Devices (LMD) Code at the 2026 NCWM Annual Meeting. A proposal was made in 2024 and further developed in 2025. It was acknowledged during the development of the LMD code for normal tests that other sections of NIST Handbook 44 would need to be changed to be consistent.

Proposals to amend Sections 3.32 Liquefied Petroleum Gas and Anhydrous Ammonia and 3.39 Carbon Dioxide Liquid-Measuring Devices have been submitted at the same time as this proposal.

Some may believe the current code is satisfactory and there is no need to add a formula and clarifying language.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from the Kansas Department of Agriculture said it provides less clarity without the word "test."

The committee recommends a voting status and recommends this item is blocked with VTM-27.1 and LPG-27.1.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): He supports the intent of the item and recommends a Developing Status with simplification (less words).

The 2026 S&T Committee recommends a Voting status, with an editorial change to N.4.1. Normal Tests. - keeping the word “tests”. The 2026 S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends blocking VTM-27.1, LPG-27.1, and CDL-27.1. Additionally, the committee would like the submitter to review the use of "device" vs "measuring system" for each item.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture believes that the word “test” is stricken unintentionally in line 4.

The committee recommends Developing on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

HGM – HYDROGEN GAS-METERING DEVICES

HGM-27.1 S.8. Minimum Measured Quantity, Table T.2. Accuracy Classes and Tolerances for Hydrogen gas Measuring Devices, and UR.1.3. Minimum Measured Quantity.

Source:
Toyota Motor North America

Purpose:
Amend NIST Handbook 44 Section 3.39 to recognize heavy-duty hydrogen fueling dispensers with maximum discharge rates up to 30 kg/min and a maximum Minimum Measured Quantity (MMQ) of 3.0 kg.

Item under Consideration:
Amend NIST Handbook 44 Hydrogen Gas-Metering Devices Code as follows:

S.1. Minimum Measured Quantity. - The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

(a) Measuring systems having a maximum flow rate less than or equal to 4 kg/min shall have a minimum measured quantity not exceeding 0.5 kg.

(b) Measuring systems having a maximum flow rate greater than 4 kg/min but not greater than 12 kg/min shall have a minimum measured quantity not exceeding 1.0 kg.

(c) **Measuring systems having a maximum flow rate greater than 12 kg/min but not greater than 30 kg/min shall have a minimum measured quantity not exceeding 3.0 kg.**

…

~~Table T.2.~~ ~~Accuracy Classes and Tolerances for Hydrogen Gas-Measuring Devices~~			
~~Accuracy Class~~	~~Application or Commodity Being Measured~~	~~Acceptance Tolerance~~	~~Maintenance Tolerance~~
~~7.0~~	~~Hydrogen gas as a vehicle fuel~~	~~5.0 %~~	~~7.0 %~~

Table T.2 **Accuracy Classes and Tolerances for Hydrogen Gas-Measuring Devices**			
Accuracy Class	**7.0**		
Application or Commodity Being measured		**Hydrogen gas as a vehicle fuel**	
Flow Rate	**MMQ**	**Acceptance Tolerance**	**Maintenance Tolerance**
≤ 4 kg/min	**0.5 kg**	**5.0%**	**7.0%**
>4 kg/min to ≤12 kg/min	**1.0 kg**	**5.0%**	**7.0%**
>12 kg/min to ≤30 kg/min	**3.0 kg**	**5.0%**	**7.0%**

…

UR.1.3. Minimum Measured Quantity.

(a) The minimum measured quantity shall be specified by the manufacturer.

(b) The minimum measured quantity appropriate for a transaction may be specified by the weights and measures authority. A device may have a declared minimum measured quantity smaller than that specified by the weights and measures authority; however, the device must perform within the performance requirements for the declared or specified minimum measured quantity up to deliveries at the maximum measurement range.

(c) The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

(1) measuring systems having a maximum flow rate less than or equal to 4 kg/min shall have a minimum measured quantity not exceeding 0.5 kg; **~~and~~**

(2) measuring systems having a maximum flow rate greater than 4 kg/min but not greater than 12 kg/min shall have a minimum measured quantity not exceeding 1.0 kg**~~.~~; and**

(3) **measuring systems having a maximum flow rate greater than 12 kg/min but not greater than 30 kg/min shall have a minimum measured quantity not exceeding 3.0 kg.**

Previous Status:

2027: New Proposal

Original Justification:

Introduction:

This proposal is supported by a supplemental technical package consisting of the Proposal to Amend NIST Handbook 44 Section 3.39 and Appendices A through D, which provide the detailed regulatory, technical, metrological, and implementation basis for recognizing heavy-duty (HD) hydrogen fueling applications. Collectively, these documents address the proposed Handbook 44 amendments, high-flow hydrogen mass flow meter performance, an appropriate accuracy classification for heavy-duty vehicle fueling, and the potential impact of the proposed HD application on

NCWM Publication 14 requirements. The supplemental information is provided to fully address the key technical and regulatory considerations associated with establishing a distinct heavy-duty hydrogen dispenser application.

This proposal recommends amending NIST Handbook 44 Section 3.39, Hydrogen Gas-Measuring Devices – Tentative Code, to recognize heavy-duty hydrogen dispensers and associated mass flow meters intended for the commercial fueling of heavy-duty fuel-cell vehicles. The proposal establishes a new dispenser category for maximum flow rates above 12 kg/min and up to 30 kg/min, with a maximum minimum measured quantity (MMQ) of 3.0 kg. The objective is to preserve legal-for-trade integrity while accommodating emerging high-capacity hydrogen fueling infrastructure.

The purpose of the proposal is to provide a clear regulatory framework for high-flow hydrogen dispensers that are not adequately addressed by the current Handbook 44 classifications, while maintaining consumer protection, measurement accuracy, and practical field verification.

Background and History:

Existing Handbook 44 hydrogen provisions were developed primarily around passenger-vehicle fueling systems and the flow rates and delivery quantities associated with those applications. Heavy-duty commercial fuel-cell vehicles present substantially different operating conditions. Commercial trucks may require approximately 40–80 kg of hydrogen per fueling event and increasingly rely on higher fueling rates to achieve operationally acceptable fueling times.

As dispenser flow rates increase, startup and shutdown transients become a larger contributor to measurement uncertainty when evaluating very small deliveries. Consequently, requirements developed around lower-flow passenger-vehicle fueling systems may not appropriately represent the metrological characteristics of high-flow heavy-duty dispensers.

Technical Justification:

A maximum MMQ of 3.0 kg represents approximately 4–7% of a typical 40–80 kg heavy-duty vehicle fill. At a flow rate of 18 kg/min, a 3.0 kg delivery occurs in approximately 10 seconds; at 30 kg/min, the same quantity is delivered in approximately 6 seconds. These delivery durations provide a practical balance between measurement uncertainty, testability, and commercial usability.

High-flow Coriolis mass flow meters are capable of excellent steady-state measurement accuracy. However, verification using very small delivery quantities becomes increasingly influenced by transient effects associated with dispenser operation, including meter stabilization, hose expansion and pressurization, valve timing, and startup and shutdown behavior. Establishing an MMQ appropriate to the heavy-duty application therefore allows the complete dispensing system to be evaluated under conditions that are more representative of its intended commercial use.

The supporting technical and regulatory basis for these recommendations is provided in the supplemental documents accompanying this Form 15:

Proposal to Amend NIST Handbook 44 Section 3.39 – Presents the overall proposed change and regulatory rationale for recognizing heavy-duty hydrogen fueling applications.

Appendix A – NCWM HB-44 Amendment Package – Provides the specific proposed Handbook 44 amendments and associated code language.

Appendix B – Hydrogen Mass Flow Meter Evaluation for Heavy-Duty Fueling – Provides the technical evaluation of high-flow hydrogen mass flow meter capabilities and their application to heavy-duty fueling rates.

Appendix C – Heavy-Duty Hydrogen Vehicle Fueling Accuracy Class – Evaluates the appropriate accuracy and tolerance framework for heavy-duty hydrogen dispensing applications.

Appendix D – Impact of Heavy-Duty Fueling on NCWM Publication 14 – Evaluates the effect of recognizing heavy-duty hydrogen fueling on applicable NCWM Publication 14 requirements, evaluation procedures, and device certification considerations.

Anticipated Questions and Technical Responses:

The following questions identify potential technical and implementation concerns associated with establishing a heavy-duty hydrogen dispenser category with a maximum declared MMQ of 3.0 kg. These issues are addressed to demonstrate that the proposed requirements can maintain appropriate legal-for-trade measurement performance while recognizing the significantly higher flow rates and delivery quantities associated with heavy-duty hydrogen vehicle fueling.

Point 1 – Could a Heavy-Duty Vehicle Receive a Delivery of Only 3.0 kg, Such as During a Topping-Off Transaction?

Although a typical heavy-duty vehicle fueling transaction is expected to involve substantially more than 3.0 kg of hydrogen, a smaller delivery could occur under certain operating conditions, including a topping-off transaction. Therefore, the proposed 3.0 kg MMQ should not be justified solely on the assumption that small commercial transactions will not occur.

The proposed MMQ instead recognizes the relationship between the intended application, dispenser flow rate, typical delivery quantity, and the ability of the complete dispensing system to maintain acceptable measurement performance during short-duration deliveries.

Representative high-flow Coriolis mass flow meter technology is capable of approximately ±0.5% measurement accuracy over a flow range of approximately 0.8 kg/min to 30 kg/min. Therefore, the meter itself is capable of measuring hydrogen during a 3.0 kg delivery. However, the MMQ applies to the performance of the complete commercial measuring system, not solely to the steady-state accuracy of the Coriolis meter.

At high flow rates, a 3.0 kg delivery represents a very short-duration transaction. For example:

At 18 kg/min, 3.0 kg is delivered in approximately 10 seconds.

At 30 kg/min, 3.0 kg is delivered in approximately 6 seconds.

During these short-duration deliveries, total system performance may be influenced by startup and shutdown transients, meter stabilization, valve timing, hose pressurization and expansion, and other dynamic effects.

Accordingly, the proposed 3.0 kg MMQ establishes a practical lower boundary for evaluating the complete heavy-duty dispensing system while still providing protection for a customer who may receive a relatively small or topping-off delivery.

During these short-duration deliveries, total system performance may be influenced by startup and shutdown transients, meter stabilization, valve timing, hose pressurization and expansion, and other dynamic effects.

Accordingly, the proposed 3.0 kg MMQ establishes a practical lower boundary for evaluating the complete heavy-duty dispensing system while still providing protection for a customer who may receive a relatively small or topping-off delivery.

Point 2 – Will Existing Field Test Equipment Have Sufficient Capacity to Test a Dispenser With a 3.0 kg MMQ?

Recognition of a heavy-duty hydrogen dispenser with a declared MMQ of 3.0 kg has implications for the capacity of field test standards and equipment used by weights and measures officials.

Based on the test draft requirements currently specified in NIST Handbook 44 Section 3.39, a 3.0 kg MMQ may result in the following nominal test quantities:

N.3. Test Drafts

Tests based on twice and five times the declared MMQ would require nominal test drafts of:

$2 \times \text{MMQ} = 6.0 \text{ kg}$

5 × MMQ = 15.0 kg

Master Meter (Transfer) Standard Test

Tests based on the declared MMQ and ten times the MMQ would require nominal test drafts of:

1 × MMQ = 3.0 kg

10 × MMQ = 30.0 kg

Gravimetric Tests and N.4.3. PVT Tests

Tests based on twice and five times the declared MMQ would require nominal test drafts of:

2 × MMQ = 6.0 kg

5 × MMQ = 15.0 kg

These quantities may exceed the capacity or practical operating range of some test equipment currently used for light-duty hydrogen dispenser verification.

Accordingly, implementation of a heavy-duty hydrogen dispenser category may require appropriately rated heavy-duty field test standards or test equipment capable of safely and accurately verifying deliveries at the required test quantities and flow rates.

This should be considered an implementation requirement associated with the new application rather than a reason to limit the commercial dispenser technology to the capabilities of test equipment originally developed for lower-flow, light-duty hydrogen fueling.

The development and recognition of suitable test equipment, test procedures, and applicable requirements should therefore accompany implementation of the proposed heavy-duty dispenser category, including consideration of any corresponding changes or guidance needed within NCWM Publication 14.

Point 3 – How Does the Proposed 3.0 kg MMQ Relate to the 1 kg Maximum MMQ in OIML R 139?

OIML R 139-1, Compressed Gaseous Fuel Measuring Systems for Vehicles – Part 1: Metrological and Technical Requirements, specifies a maximum MMQ of 1 kg for hydrogen compressed gaseous fuel measuring systems.

The proposed 3.0 kg maximum MMQ for the heavy-duty application therefore represents a deliberate difference from the current OIML requirement and should be clearly identified and technically justified.

NIST Handbook 44 provides the principal model requirements used by U.S. weights and measures jurisdictions for commercial measuring devices. The purpose of the proposed amendment is to establish requirements appropriate for an emerging class of high-flow hydrogen dispensers serving heavy-duty fuel-cell vehicles that operate at substantially higher flow rates and delivery quantities than the passenger-vehicle applications around which existing requirements were largely developed.

The proposed 3.0 kg MMQ is not intended to reduce measurement accuracy requirements or consumer protection. Rather, it recognizes the interaction between significantly increased dispenser flow rates and the transient effects that become increasingly important when very small test quantities are delivered over only a few seconds.

For a typical heavy-duty vehicle delivery of approximately 40–80 kg, a 3.0 kg MMQ represents approximately 4–7.5% of the total transaction. The proposal therefore seeks to establish an MMQ that remains small relative to the normal commercial delivery while allowing meaningful and repeatable verification of high-flow dispensing systems.

The difference between the proposed Handbook 44 requirement and OIML R 139 should also be communicated to the appropriate international standards organizations. As experience and technical data become available from commercial heavy-duty hydrogen fueling installations, the results may provide a basis for future consideration within OIML R 139 and other applicable standards.

Such coordination would support the long-term objective of maintaining appropriate international uniformity while allowing U.S. weights and measures requirements to address heavy-duty hydrogen fueling technology as it enters commercial service.

Point 4 – Why Was a Maximum MMQ of 3.0 kg Selected Rather Than 1.0 kg, 2.0 kg, or Another Value?

The proposed maximum MMQ of 3.0 kg was selected based on the operating characteristics of high-flow heavy-duty hydrogen dispensing systems, the typical quantity of hydrogen delivered to heavy-duty vehicles, the duration of very small deliveries at the proposed flow rates, and the need to provide a practical and repeatable basis for legal-for-trade verification.

Heavy-duty hydrogen dispensers operating at flow rates of approximately 18 kg/min to 30 kg/min deliver relatively large quantities of hydrogen in a short period of time. As a result, MMQ values developed for lower-flow passenger-vehicle applications can correspond to extremely short delivery durations when applied to heavy-duty dispensers.

For comparison, at a flow rate of 18 kg/min, an MMQ of 1.0 kg would be delivered in approximately 3.3 seconds, an MMQ of 2.0 kg in approximately 6.7 seconds, and an MMQ of 3.0 kg in approximately 10 seconds. At the proposed maximum flow rate of 30 kg/min, an MMQ of 1.0 kg would be delivered in approximately 2 seconds, an MMQ of 2.0 kg in approximately 4 seconds, and an MMQ of 3.0 kg in approximately 6 seconds.

At these high flow rates, particularly for 1.0 kg and 2.0 kg deliveries, startup and shutdown conditions may represent a substantial portion of the total transaction. Although the Coriolis mass flow meter itself may be capable of excellent steady-state measurement accuracy, the legal-for-trade performance of a hydrogen dispenser is determined by the complete measuring system. During a very short delivery, system-level effects such as meter stabilization, valve opening and closing sequences, hose pressurization and expansion, pressure and temperature changes, control timing, and other transient operating conditions can have a proportionally greater influence on the measured result.

A 3.0 kg MMQ increases the minimum delivery duration to approximately 6 seconds at 30 kg/min and 10 seconds at 18 kg/min, providing a more representative interval over which the complete dispensing system can be evaluated. The proposed value is therefore intended to provide a practical balance between meaningful system-level measurement verification and protection of the customer during smaller commercial transactions.

The proposed MMQ should also be considered in relation to the intended commercial application. A typical heavy-duty hydrogen vehicle may receive approximately 40–80 kg during a fueling transaction. A

3.0 kg MMQ therefore represents approximately 7.5% of a 40 kg delivery and approximately 3.75% of an 80 kg delivery. The MMQ remains small relative to the expected commercial transaction while recognizing the substantially higher flow rates associated with heavy-duty fueling.

The proposed 3.0 kg value represents a maximum allowable declared MMQ and does not require every heavy-duty hydrogen dispenser to have an MMQ of 3.0 kg. A dispenser capable of demonstrating compliance with the applicable requirements at a lower MMQ may declare a lower value. This approach allows improved measurement technology and dispenser performance to support lower MMQs where technically demonstrated while establishing a practical upper limit for the heavy-duty application.

The selection of a 3.0 kg MMQ is not intended to establish a permissible measurement error of 3.0 kg, nor does it reduce the applicable accuracy or tolerance requirements. The MMQ establishes the minimum quantity at or above which the dispensing system is required to satisfy the applicable metrological performance requirements.

For these reasons, a maximum MMQ of 3.0 kg is considered an appropriate application-specific value for heavy-duty hydrogen dispensers with maximum flow rates above 12 kg/min and up to 30 kg/min. It recognizes the physical and

operational characteristics of high-flow dispensing while maintaining legal-for-trade measurement integrity, consumer protection, and a practical basis for field verification.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends a voting status for this item.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

An industry member from Toyota gave a presentation on this item during open hearings.

Mr. Matthew Sheehan (Chevron): Asked if there was data on the tolerances?

Mr. Ken Loewenthal (Hycert Solutions): Stated that mass flow meters can run more accurately, it doesn't make sense to start at a tighter tolerance. There's no need to change the last 10 years of tolerance just because we're adding high flow.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports the intent of the item. He pointed out that on page 63, line 32 of the S&T Agenda "S.1." should be "S.8." as an editorial correction.

Mr. Robbie Parke (Washington Department of Agriculture): Brought up questions on the MMQ and asked if you could have a manufacturer that says 6 but the book says 3 kg?

Mr. Ken Loewenthal (Hycert Solutions): Clarified that they are only adding "c" (in the agenda). The spec plate will show you the tolerance.

The 2026 S&T Committee recommends a Developing status. The committee recommends that the submitter consider comments heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from NYS Weights & Measures stated that the author's proposal change shown as S.1 should be for "S.8.(c) Measuring systems having a maximum flow rate greater than 12 kg/min but not greater than 30 kg/min shall have a minimum measured quantity not exceeding 3.0 kg."

The values in the Table T.2 is the maximum value allowed, and not the "MMQ" (minimum measured quantity) in the EV world. This table is for the greatest value of the measured quantity. For example, T.2 for 4 kg/min flow rate, conflicts with S.1.(a). They recommend Table T.2 adding a ≤ or "up to" statement. The proposed change to the tolerance table T.2 duplicates information already provided in S.8. and UR.1.3., but having this information in all three places is causing confusion. They suggest the existing Table T.2 is left unchanged so there is no problem with S.8.(c).

Further, the way that the proposed Tolerance table reads, is inconsistent with the remainder of the Meter codes in HB44. They also question if the existing HB44, Section N.3 Test Drafts language should also be updated by the submitter – to reflect the new speed that the author is introducing "…and one test draft at approximately five times the minimum measured quantity, or 4kg, 12kg, whichever is greater…" with the updated flow rate speeds they propose.

The committee recommends a developing status for this item.

SWMA 2026 Annual Meeting:

No comments were given on this item.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

EVS – ELECTRIC VEHICLE SUPPLY EQUIPMENT

EVS-27.1 S.1. Primary Indicating and Recording Elements., and S.2.4. EVSE Indication of Unit Price and Equipment Capacity and Type of Voltage.

Source:
AMPECO

Purpose:
Address four regulatory gaps arising from the interaction between the NIST HB 44 Section 3.40 requirements, and the Open Charge Point Protocol (OCPP) communication framework used by the majority of deployed EVSE in the United States. The proposal seeks to: (1) recognize alternative indicating elements for EVSE without integrated displays, distinguishing between physically integrated external displays and operator-hosted digital interfaces rendered on the customer's personal device; (2) add a note directing type evaluators to verify that the metrological record achieving S.1.3.2 sub-watt-hour resolution is the record used for billing and receipts, where the OCPP 1.6 primary transaction fields are constrained to integer watt-hour values; (3) address the unit price display obligation in multi-party transactions where the retail price is set by a third-party service provider independently of the EVSE operator; and (4) clarify that time-based fees applied after the cessation of energy delivery constitute a time-based service under S.1.1(b) whose terms must be disclosed to the customer prior to delivery under S.2.4.3..

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Supply Equipment Code as follows:

S.1. Primary Indicating and Recording Elements.

S.1.1. Electric Vehicle Supply Equipment (EVSE). – An EVSE used to charge electric vehicles shall be of the computing type and shall indicate the electrical energy, the unit price, and the total price of each transaction.

(a) EVSEs capable of applying multiple unit prices over the course of a single transaction shall also be capable of indicating the start and stop time, the total quantity of energy delivered, the unit price, and the total price for the quantity of energy delivered during each discrete phase corresponding to one of the multiple unit prices.

(b) EVSEs capable of applying additional fees for time-based and other services shall also be capable of indicating the total time measured; the unit price(s) for the additional time-based service(s); the total computed price(s) for the time measured; and the total transaction price, including the total price for the energy and all additional fees.

(c) Where an EVSE is capable of applying time-based fees after the cessation of energy delivery (e.g., idle fees assessed while the vehicle remains connected), such fees constitute a time-based service under (b). The applicable unit price, the conditions under which the time-based fee becomes effective (e.g., upon cessation of energy flow, after a grace period), and any grace period duration shall be disclosed to the customer as part of the price structure prior to the commencement of delivery, consistent with S.2.4.3.

Note: Section 3.40 does not currently define when "delivery" ends for purposes of S.2.4.3. Where an EVSE applies time-based fees after energy flow has ceased but while the vehicle remains physically connected, the transaction may remain open for billing purposes beyond the cessation of energy delivery. The pre-session disclosure of the idle fee structure under this paragraph satisfies the customer approval requirement of S.2.4.3 for the time-based fee component. The receipt required by S.2.6 shall itemize the time-based fee separately, including the information required by S.2.6(e).

S.1.2. EVSE Indicating Elements. – An EVSE used to charge electric vehicles shall include an indicating element that accumulates continuously and displays, for a minimum of 15 seconds at the activation by the user and at the start and end of the transaction, the correct measurement results relative to quantity and total price. Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the device. All indications and representations of electricity sold shall be clearly identified and separate from other time-based fees indicated by an EVSE that is used for both the sale of electricity as vehicle fuel and the sale of other separate time-based services (e.g., vehicle parking).

S.1.2.1. Multiple EVSEs Associated with a Single Indicating Element. – A system with a single indicating element for two or more EVSEs shall be provided with means to display information from the individual EVSE(s) selected or displayed, and shall be provided with an automatic means to indicate clearly and definitely which EVSE is associated with the displayed information.

S.1.2.2. Alternative Indicating Elements. — Where an EVSE is not equipped with an integrated visual display, the indication requirements of S.1.2 may be satisfied through one of the following:

(a) An external indicating element that is physically integrated with or permanently attached to the EVSE system (e.g., a payment terminal display), provided that it displays the information required by S.1.2 and is continuously accessible to the customer throughout the transaction; or

(b) An operator-hosted digital interface accessible at the EVSE via a machine-readable link (e.g., QR code or NFC tag) displayed on the face of the EVSE, rendered on the customer's personal device, provided that:

(1) the digital interface displays the information required by S.1.2 without requiring account registration or login by the customer;

(2) the digital interface is continuously accessible to the customer throughout the transaction;

(3) the machine-readable link is clearly and conspicuously displayed on the face of the EVSE; and

(4) the authorization method used to initiate the transaction provides the customer with access to the digital interface prior to the commencement of delivery.

Note: The digital interface described in (b) is hosted and controlled by the EVSE operator, but is rendered on a device that is not part of the EVSE system. This is a distinct category from a physically integrated display under (a). Where the authorization method does not provide the customer with access to any indicating element or digital interface prior to delivery (e.g., RFID on an EVSE without a display, without a payment terminal, and without a linked digital interface), the EVSE does not satisfy S.1.2 for that authorization method.

S.1.3. EVSE Units.

S.1.3.1. EVSE Units of Measurement. – EVSE units used to charge electric vehicles shall be indicated and recorded in kilowatt-hours (kWh) and decimal subdivisions thereof.
(Amended 2022)

S.1.3.2. EVSE Value of Smallest Unit. – The value of the smallest unit of indicated delivery by an EVSE, and recorded delivery if the EVSE is equipped to record:

(a) for AC systems shall not exceed 0.000 1 kWh;

(b) for DC systems shall not exceed 0.001 kWh; and

(c) the value of the kWh shall be expressed only as a decimal submultiple of 1 that satisfy (a) and (b). (Amended 2022)

Note: Under OCPP 1.6, the meterStart and meterStop fields in StartTransaction and

StopTransaction messages are constrained to integer watt-hour values and do not, on their face, satisfy S.1.3.2(a) for AC systems. The OCA Application Note v3.0 (S.1.3.2 commentary) prescribes that sub-watt-hour precision values be provided through the transactionData field of StopTransaction.req. The type evaluation should verify that the metrological record used for billing, receipt generation, and regulatory audit is the record that achieves S.1.3.2 resolution — not solely the integer-typed primary transaction fields. This Note does not modify or reduce the resolution requirement of S.1.3.2. Where the communication protocol supports decimal meter values natively (e.g., OCPP 2.0.1 TransactionEventRequest), this Note does not apply.

S.1.3.3. Values Defined. – Indicated values shall be adequately defined by a sufficient number of figures, words, symbols, or combinations thereof. An indication of "zero" shall be a zero digit for all displayed digits to the right of the decimal mark and at least one to the left.

S.2. EVSE Operating Requirements.

…

S.2.4. EVSE Indication of Unit Price and Equipment Capacity and Type of Voltage.

S.2.4.1. Unit Price. – An EVSE shall be able to indicate on each face the unit price at which the EVSE is set to compute or to dispense at any point in time during a transaction.

S.2.4.1.1. Unit Price Where Retail Price Is Determined by a Third Party. — Where the customer obtains charging access through a third-party service provider that sets its own retail price independently of the EVSE operator, and the EVSE operator does not have access to the third party's retail price at the time of the transaction, the EVSE shall indicate the unit price established by the EVSE operator. The EVSE or its associated indicating element shall include a clear notice that the final price charged to the customer may differ from the displayed unit price where additional charges are applied by the customer's service provider.

Note: Section 3.40 does not currently define or recognize intermediary service providers in the EVSE billing chain. In practice, third-party providers that issue their own authentication tokens (e.g., RFID cards or mobile app accounts) and apply independent retail pricing are increasingly common in the U.S. market through bilateral network access agreements. The European Union's Alternative Fuels Infrastructure Regulation (AFIR, Regulation (EU) 2023/1804) addresses this through a defined "e-mobility service provider" role with corresponding price transparency obligations (Articles 5 and 7). No equivalent definition or framework exists in U.S. weights-and-measures regulation. This paragraph is intended as a first step toward addressing multi-party pricing structures within the existing HB 44 framework.

S.2.4.2. Equipment Capacity and Type of Voltage. – An EVSE shall be able to conspicuously indicate on each face the maximum rate of energy transfer (i.e., maximum power) and the type of current associated with each unit price offered (e.g., 7 kW AC, 25 kW DC, etc.).

S.2.4.3. Selection of Unit Price. – When electrical energy is offered for sale at more than one unit price through an EVSE, the selection of the unit price shall be made prior to delivery through a deliberate action of the purchaser to select the unit price for the fuel delivery. Except when the conditions for variable price structure have been approved by the customer prior to the sale, a system shall not permit a change to the unit price during delivery of electrical energy.

Note: When electrical energy is offered at more than one unit price, selection of the unit price may be through the deliberate action of the purchaser: 1) using controls on the EVSE; 2) through the purchaser's use of personal or vehicle-mounted electronic equipment communicating with the system; or 3) verbal instructions by the customer.

S.2.4.4. Agreement Between Indications. – All quantity, unit price, and total price indications within a measuring system shall agree for each transaction.

Previous Status:

2027: New Proposal

Original Justification:

This proposal addresses national-scale regulatory gaps affecting the growing U.S. EVSE installed base. (1) A significant share of deployed AC EVSE lack integrated screens, creating uncertainty on whether S.1.2 and S.2.4.1 display requirements can be met through external displays or operator-hosted digital interfaces. (2) OCPP 1.6, the dominant communication protocol in the U.S. market, constrains transaction meter value fields to integer watt-hours, which does not satisfy S.1.3.2(a) sub-watt-hour resolution for AC systems; evaluators need explicit guidance on which transaction record to verify. (3) Multi-party billing structures where a third-party service provider sets the retail price independently of the EVSE operator are increasingly common in the U.S. through bilateral roaming agreements, but HB 44 does not contemplate this structure or specify whose price satisfies the display obligation. (4) Post-delivery idle fees are widely applied but Section 3.40 does not address whether they require pre-session disclosure under S.2.4.3 or how they interact with the definition of "delivery."

Amendment 1 — Pre-Session Disclosure of Time-Based Fees After Energy Delivery

Idle fees after session end are an increasingly common operational tool at public EVSE, used to incentivize turnover of charging bays. Section 3.40 currently addresses time-based fees under S.1.1(b) and requires customer approval of variable price structures under S.2.4.3, but does not explicitly address the scenario where a time-based charge begins after energy delivery has ceased. This creates ambiguity on two points: whether an idle fee constitutes a permissible element of the pre-approved price structure, and whether its activation after energy flow stops constitutes a "change to the unit price during delivery" under S.2.4.3. The proposed amendment clarifies that idle fees are a time-based service under S.1.1(b) whose terms must be disclosed prior to delivery, and that pre-session disclosure satisfies the S.2.4.3 approval requirement. It does not address the on-device display of accumulated idle charges during the post-delivery period, which raises separate protocol-dependent considerations that vary across OCPP versions.

Amendment 2 — Screenless Chargers

A growing proportion of deployed AC EVSE — particularly Level 2 wall-mount and pedestal units — do not have an integrated screen. Section 3.40 was drafted with screen-equipped dispensers in mind, and the current text does not address how the display requirements of S.1.2 and S.2.4.1 apply to screenless hardware. This creates regulatory uncertainty for several authorization methods: RFID-initiated sessions provide no price indication; Plug & Charge and Autocharge sessions begin automatically without any display surface; and sessions initiated via a CPO mobile app can display the required data in the app but not on the device face. The proposed amendment provides a structured framework for recognizing external indicating elements while preserving the consumer protection intent of the display requirements.

Amendment 3 — Meter Precision

Under OCPP 1.6J, the meterStart and meterStop fields are integer watt-hours. For AC EVSE, S.1.3.2(a) requires 0.0001 kWh (0.1 Wh) resolution — a sub-integer value in Wh. The OCA Application Note v3.0 acknowledges this conflict and prescribes a workaround via the transactionData field, but its effectiveness depends on charge point firmware behavior that varies across models. OCPP 2.0.1 resolves the issue natively with decimal-typed meter values. The proposed Note provides evaluators with explicit guidance on verifying that the metrological record meets the required resolution regardless of the primary transaction field type.

Amendment 4 — Multi-Party Pricing

An increasing number of U.S. EV charging transactions involve a third-party service provider that issues its own authentication credential (RFID card, mobile app account) and bills the customer at a retail price that includes a markup over the EVSE operator's tariff. The EVSE operator and its CSMS do not have access to the third party's retail price — it is determined by the third party's own commercial terms and communicated to the customer through the third party's own platform. HB 44 Section 3.40 requires unit price display on the EVSE face (S.2.4.1; UR.3.1) but does not contemplate a billing structure where the seller at the point of sale and the party that invoices the customer are different entities. The EU has addressed this through AFIR, which defines the "e-mobility service provider" role and imposes corresponding price transparency obligations on both the CPO and the service provider. No equivalent framework exists in U.S. regulation. The proposed amendment clarifies that the EVSE operator's own tariff satisfies the display obligation, with a notice to the customer that additional charges may apply, as a practical interim measure until a more comprehensive multi-party framework is developed.

Possible Opposing Arguments

Amendment 1: Opponents may argue that classifying idle fees as a pre-approved element of the price structure effectively permits post-delivery charges without real-time cost visibility. The proposed amendment addresses consent (pre-session disclosure) but not indication (ongoing display of accumulating idle charges). This is intentional: the indication question is protocol-dependent and warrants separate treatment. The amendment does not reduce existing consumer protections — it establishes that idle fees must be disclosed upfront and itemized on the receipt under S.2.6(e), which is more prescriptive than the current silence on the topic.

Amendment 2: Opponents may argue that permitting external indicating elements weakens the consumer-facing visibility of pricing information, particularly for customers unfamiliar with QR codes or mobile web portals. The proposed conditions — no-login access, conspicuous identification on the EVSE face, and continuous availability throughout the transaction — are intended to address this concern while accommodating the physical reality of screenless hardware.

Amendment 3: Some may argue that the Note creates a perceived exception for OCPP 1.6 hardware. The Note does not reduce the S.1.3.2 resolution requirement; it clarifies the evaluation methodology for systems where the primary transaction field type differs from the metrological record used for compliance.

Amendment 4: It may be argued that displaying the EVSE operator's tariff when the customer will be billed at a different price by a third party is misleading. The proposed notice requirement addresses this directly. The alternative — requiring the EVSE to display the third party's retail price — is not technically feasible under current interoperability protocols. There is no standardized mechanism for the EVSE operator to retrieve the third party's retail tariff in real time. A longer-term solution may require defining the intermediary service provider role in U.S. regulation, as the EU has done through AFIR.

Supporting references:

OCA Application Note v3.0 (February 2024); OCPP 1.6J and 2.0.1 specifications;

EU Alternative Fuel Infrastructure Regulation 2023/1804

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:

New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Iowa Department of Agriculture/Weights & Measures supports this item and recommends a voting status.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Agrees with the Open Charge Point Protocol (OCPP). However, he strongly disagrees with the language in S.2.4.1.1. "the final price charged to the customer may differ from the displayed unit price where additional charges are applied by the customer's service provider." Additionally, formatting issues with S.1.2. He recommends an assigned status.

Mr. John Sorfleet (Santa Clara County, California): Noted formatting issues with the item and the price posted vs price charged as a significant issue with the item, additionally stated that the item should be further refined. He recommends the item be withdrawn.

Ms. Mal Skowron (Tesla): States that this element is being addressed by the NCWM EVSE task group. She recommends that the item be assigned.

The 2026 S&T Committee recommends a Developing status and that the item to be assigned to the NCWM EVSE task group. The committee further recommends that the submitter consider S.2.4.1.1. Unit Price Where Retail Price Is Determined by a Third Party, formatting of section S.1.2. EVSE Indicating Elements, and other testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures feels the notes throughout are not necessary or needs to be reworded. They do not contain specifications, but descriptions. S.2.4.1.1. suggests that an EVSE can display a notice that the final price charged to a consumer may differ from the display. NJ opposes this.

2026 NEWMA: A representative from ChargePoint, Inc. stated this proposal should be referred to the task group. The code already addresses many of these issues. S.2.4.1.1. does reflect real world situations for third-party pricing.

2026 NEWMA: A representative from NYS Weights & Measures stated that S.1.2.2. should not be using acronyms in the handbook, and questions how the consumer would access the information. There must be agreement between indications. S.2.4.1. NYS opposes this.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture opposes this proposal and recommends withdrawal. The change to S.2.4.1.1. would allow third parties to charge whatever they wanted. The unit price on the display needs to be the price. Third parties can't charge a different fee. Vermont would be ok assigning this proposal to the EVSE Task Group to develop any pieces that may be useful.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments.

Representatives from Maryland and Arkansas Departments of Agriculture oppose this item and recommend Withdrawn

A representative from Texas Department of License and Regulations shared concerns with verbiage in the item, no mention of the dynamic QR, this is very easily manipulated in fraud cases and recommended Developing.

The committee recommends Withdrawn on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

EVS-27.2 S.2.6. EVSE Recorded Representations. and UR.3.3. EVSE Recorded Representations.

Source:
Tesla and the Iowa Department of Agriculture

Purpose:
Establish a fleet sales exception for recorded representations applicable to EVSE, consistent with an existing exception for liquid fuels.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Supply Equipment Code as follows:

S.2.6. EVSE Recorded Representations. – **Except for fleet sales and other price contract sales and for transactions where a post-delivery discount is provided, a** ~~A~~ receipt, either printed or electronic, providing the following information shall be available at the completion of all transactions:

(a) the total quantity of the energy delivered with unit of measure;

(b) the total computed price of the energy sale;

(c) the unit price of the energy, and for systems capable of applying multiple unit prices for energy during a single transaction, the following additional information is required:

(1) the start and stop time of each phase during which one of the multiple unit prices was applied;

(2) the unit price applied during each phase;

(3) the total quantity of energy delivered during each phase;

(4) the total purchase price for the quantity of energy delivered during each phase;

(d) the maximum rate of energy transfer (i.e., maximum power) and type of current (e.g., 7 kW AC, 25 kW DC, etc.);

(e) any additional separate charges included in the transaction (e.g., charges for parking time) including:

(1) the time and date when the service begins and the time and date when the service ends; or the total time interval purchased, and the time and date that the service either begins or ends;

(2) the unit price applied for the time-based service;

(3) the total purchase price for the quantity of time measured during the complete transaction;

(f) the final total price of the complete transaction including all items;

(g) the unique EVSE identification number;

(h) the business name; and

(i) the business location.

(Amended 20XX)

UR.3.3. EVSE Recorded Representations. – **Except for fleet sales and other price contract sales where a post-delivery discount is provided, a** ~~A~~ receipt, either printed or electronic, providing the following information shall be available at the completion of all transactions:

(a) the total quantity of the energy delivered with unit of measure;

(b) the total computed price of the energy sale;

(c) the unit price of the energy, and for systems capable of applying multiple unit prices for energy during a single transaction, the following additional information is required:

(1) the start and stop time of each phase during which one of the multiple unit prices was applied;

(2) the unit price applied during each phase;

(3) the total quantity of energy delivered during each phase;

(4) the total purchase price for the quantity of energy delivered during each phase;

(d) the maximum rate of energy transfer (i.e., maximum power) and type of current (e.g., 7 kW AC, 25 kW DC, etc.);

(e) any additional separate charges included in the transaction (e.g., charges for parking time) including:

(1) the time and date when the service begins and the time and date when the service ends; or the total time interval purchased, and the time and date that the service either begins or ends;

(2) the unit price applied for the time-based service;

(3) the total purchase price for the quantity of time measured during the complete transaction;

(f) the final total price of the complete transaction including all items;

(g) the unique EVSE identification number;

(h) the business name; and

(i) the business location.

(Amended 20XX)

Previous Status:
2027: New Proposal

Original Justification:
Electric vehicles (EVs) are increasingly entering operation in commercial and private fleets, driving deployment of EV fueling stations that sell electricity as vehicle fuel under fleet sale or price contract sale arrangements. These arrangements involve business-to-business (B2B) or controlled commercial agreements between known parties. They may include terms for pre-negotiated pricing, monthly invoicing of fuel charges, and unit price discounts applied after fuel is delivered.

NIST Handbook 44 Section 3.30 (Liquid-Measuring Devices) waives the requirement for fleet sales or price contract sales of liquid fuels to provide a receipt at the end of the transaction. This exception is appropriate because, in dedicated fleet arrangements, employed drivers are not responsible for managing payment or receipt collection. Instead, billing and receipt delivery occur via pre-established monthly invoices sent directly to fleet administrative staff. Because the parties in a fleet or price contract sale already have an established commercial relationship and alternative method of record-

keeping for transactions, requiring a receipt be provided at the end of the transaction is unnecessary and creates avoidable administrative hassle.

For reference, NIST Handbook 44 Section 3.30, S.1.6.7 states:

"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 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:..."

The exception for recorded representations in a fleet sale context does not currently apply to electricity dispensed as vehicle fuel. This code change is necessary to promote consistency across fuel types and better reflect the operational reality of how receipts are transferred for commercial fleet fueling, regardless of the commodity dispensed.

Opponents may argue that the existing exception for liquid fuels is very narrow in its application, and they may have concerns about expanding an exception. However, this code change proposal adopts identical language applicable to liquid fuel dispensers in a fleet context, and so this exception will remain narrow and targeted to the fleet sale use case. The receipt requirements applicable to arms-length or retail fuel sales for fleets, in which there is no pre-existing B2B agreement, would remain unchanged.

Another potential concern is that the terms “fleet sale” and “price contract sale” are not defined in Handbook 44. This may raise the question of how this exception will be applied and understood if added to Section 3.40. However, existing code (Section 3.30) already uses these terms, so defining them is not necessary to consider this item..

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:

-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Iowa Department of Agriculture/Weights & Measures supports this item and recommends a voting status.

The committee recommends this item be assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Ms. Mal Skowron (Tesla): Gave the example of the LMD code allowance for fleet billing and that EVSE should be allowed to have similar business transactions as other devices in Handbook 44, allowing for equity in business practices among all fuel types. She recommends a voting status.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Stated that the LMD code has a definition for contract sales and asked that before this item moves forward that a definition for contract sales is developed and included. He additionally commented that LMD devices for fleet or contract sales must still have indication.

Mr. Robbie Parke (Washington Department of Agriculture): He supports the addition of fleet sales for EVSE and recommends a voting status.

Mr. Isaac Carrera (EV Test Solutions): Brought up the definition of fleet sales and asked, what about post discount after the transaction is completed? He recommends a developing status.

Mr. Mahesh Albuquerque (Colorado Division of Measurement, Oil and Public Safety): States that all other fuel sales have contract sales exemptions for receipt, EVSE should also be included. He recommends a voting status.

Mr. John Sorfleet (Santa Clara County, California): States that fleet sales are well established and supports a voting status.

The 2026 S&T Committee initially recommended a Voting status and noted that if passed, the contract sales definition would need to be updated to include EVSE reference. The following comment was then heard during the voting session:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Stated that he does not believe that the item is fully developed, further stating that the 3.30. LMD code for contract sale will not apply to the EVSE code. Additionally, he expressed concern for the item as written for not being specific enough to define Fleet/Contract sales. He recommended that the item be assigned to the NCWM EVSE task group.

The item status recommendation of Voting then went to a vote and did not pass with 10 yea and 12 nay votes.

NEWMA 2026 Interim Meeting:

NEWMA S&T recommends voting with the following language: "Except for fleet sales and for transactions where a post-delivery discount is provided, a ~~A~~"

2026 NEWMA: A representative from State of Vermont Agency of Agriculture supports this proposal with the removal of the words "and other contract sales". This would help make it clear that just because a customer has an account on any app that this exception does not apply to their sale. Additionally, a definition of fleet sales might be useful.

2026 NEWMA: A representative from NYS Weights & Measures agrees with Vermont. Voting with change.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture believes verbiage similar to LMD and suggested striking the wording "contract sales"

A representative from Tesla will take suggestions back to the team

Representatives from TDLR and Arkansas Department of Agriculture echo Maryland's suggestions.

The committee recommends Voting on this item with suggested edits.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

MDM – MULTIPLE DIMENSION MEASURING DEVICES

MDM-25.1 V Multiple Sections Regarding Adding Volumetric Measuring Devices to Section 5.58.

Source:
Multiple Dimension Measuring Devices Work Group

Purpose:
Rename and amend Section 5.58. Multiple Dimension Measuring Devices to incorporate devices that measure volume directly rather than measuring three dimensions to calculate a volume. These devices measure, either statically or in-motion, the volume of a commodity, such as sand, gravel, rock, and dirt, etc., which is transported in a truck or other conveyance. The proposal will amend the application paragraphs and add or amend the specifications, test notes, tolerances and user requirements in this section to ensure these devices are designed to operate correctly and to facilitate their proper operation and evaluation.

Item under Consideration:
Amend the Handbook 44, Section 5.58. Multiple Dimension Measuring Devices Code as follows:

Section 5.58. Multiple Dimension and Volumetric Measuring Devices

A. Application

A.1. General. – This code applies to**:** ~~**dimension and volume measuring devices used for determining the dimensions and/or volume of objects for the purpose of calculating freight, storage, or postal charges based on the dimensions and/or volume occupied by the object. A multiple dimension measuring device:**~~

(a) Multiple Dimension Measuring Devices used for determining the dimensions and/or dimensional volume of objects which are generally hexahedron-shaped but may be irregularly-shaped for the purpose of calculating freight, storage, or postal charges based on the dimensions and/or volume occupied by the object.~~is generally used to measure hexahedron-shaped objects; and~~

(Added 2008) **(Amended 20XX)**

(b) Volumetric Measuring Devices that make multiple measurements to determine the volume of a bulk commodity~~**may be used to measure irregularly-shaped objects.**~~

(Added 2008) **(Amended 20XX)**

(Amended 2008 **and 20XX**)

~~**A.2. Other Devices Designed to Make Multiple Measurements Automatically to Determine a Volume** – **Insofar as they are clearly applicable, the provisions of this code apply also to devices designed to make multiple**~~

~~measurements automatically to determine a volume for other applications as defined by Section 1.10. General Code Paragraph G-A.1. Commercial and Law Enforcement Equipment.~~

A.2~~3~~. Additional Code Requirements. – In addition to the requirements of this code, Multiple Dimension **and Volumetric** Measuring Devices shall meet the requirements of Section 1.10. General Code.

(Amended 20XX)

A.3~~4~~. Exceptions. – This code does not apply to:

(a) devices designed to indicate automatically (with or without value-computing capabilities) the length of fabric passed through the measuring elements (also see Section 5.50. for Fabric-Measuring Devices);

(b) devices designed to indicate automatically the length of cordage, rope, wire, cable, or similar flexible material passed through the measuring elements (also see Section 5.51. for Wire- and Cordage-Measuring Devices); or

(c) any linear measure, measure of length, or devices used to measure individual dimensions for the purpose of assessing a charge per unit of measurement of the individual dimension (also see Section 5.52. for Linear Measures).

~~A.5. Type Evaluation. The National Type Evaluation Program (NTEP) will accept for type evaluation only those devices that comply with all requirements of this code.~~

...

S.1.4. Dimensions Indication, Multiple Dimension Measuring Device. – If ~~in~~**during** normal operation the device indicates or records only volume, a testing mode shall be provided to indicate dimensions for all objects measured.

(Amended 20XX)

S.1.5. Value of ~~Dimension/Volume~~Measuring Division Units. – The value of a ~~**device**~~**measuring** division "d" expressed in a unit of dimension **or volume** shall be ~~**presented in a decimal format. The value of "d" for each measurement axis shall be in the same unit of measure and**~~ expressed as:

(a) 1, 2, or 5;

(b) a decimal multiple or submultiple of 1, 2, or 5; or

(c) a **decimal** binary submultiple of a specific U.S. customary unit of measure.

Examples: device divisions may be 0.01, 0.02, 0.05; 0.1, 0.2, or 0.5; 1, 2, or 5; 10, 20, 50, or 100; 0.5, 0.25, 0.125, 0.0625, etc.

(Amended 20XX)

S.1.5.1. Value of Measuring Division Units, Multiple Dimension Measuring Device.

(a) The value of "d" for each measurement axis shall be in the same unit of measure.

(Amended 20XX)

~~**S.1.5.1.**~~**(b)** For Indirect Sales~~. In~~ addition to the values specified in S.1.5. Value of ~~**Dimension/Volume**~~**Measuring** Division Units, the value of the division may be 0.3 inch and 0.4 inch.

(Amended 20XX)

~~**S.1.5.2. (c) Devices Capable of Measuring Irregularly Shaped Objects.**~~ For devices capable of measuring irregularly shaped objects, the value of the **measuring** division size (d) shall be the same for the length axis (x) and the width axis (y) and may be different for the height axis (z), provided that

electronic rotation of the object to determine the smallest hexahedron is calculated in only a two-dimension horizontal plane, retaining the stable side plane as the bottom of the hexahedron.

(Added 2008) **(Amended 20XX)**

S.1.6. Customer Indications and Recorded Representations.

S.1.6.1. Multiple Dimension Measuring Devices. – Multiple dimension measuring devices or systems must provide information as specified in Table S.1.6.**1.** Required Information to be Provided by Multiple Dimension Measuring Systems. As a minimum, all devices or systems must be able to meet either column I or column II in Table S.1.6.**1.** Required Information to be Provided by Multiple Dimension Measuring Systems.

(Amended 2004 **and 20XX**)

Table S.1.6.1.
Required Information to be Provided by Multiple Dimension Measuring Systems

Information	Column I[1]	Column II[1]		Column III
	Provided by device	Provided by invoice or other means		Provided by invoice or other means as specified in contractual agreement
		Customer present	Customer not present	
1. Device identification[2]	D or P	P	P	P or A
2. Error message (when applicable)	D or P	P	N/A	N/A
3. Hexahedron dimensions[3]	D or P	P	P	P or A
4. Hexahedron volume (if used)[3]	D or P	P	P	P or A
5. Actual weight (if used)[3]	D or P	P	P	P or A
6. Dimensional Offset (if used)[3]	D or P	N/A	N/A	N/A
7. Hexahedron measurement statement[4]	D or P or M	P	P	P or G

A = AVAILABLE UPON REQUEST BY CUSTOMER[5]
D = DISPLAYED
G = PUBLISHED GUIDELINES OR CONTRACTS
M = MARKED
N/A = NOT APPLICABLE
P = PRINTED or RECORDED IN A MEMORY DEVICE and AVAILABLE UPON REQUEST BY CUSTOMER[5]

Notes:
[1] As a minimum all devices or systems must be able to meet either column I or column II.

[2] This is only required in systems where more than one device or measuring element is being used.

[3] Some devices or systems may not utilize all of these values; however, as a minimum either hexahedron dimensions or hexahedron volume must be displayed or printed.

[4] This is an explanation that the dimensions and/or volume shown are those of the smallest hexahedron in which the object that was measured may be enclosed rather than those of the object itself.

[5] The information "available upon request by customer" shall be retained by the party having issued the invoice for at least 30 calendar days after the date of invoicing.

(Amended 2004**, ~~and~~** 2021**, and 20XX**)

S.1.6.2. Volumetric Measuring Devices. – Devices that determine the volume of a bulk commodity shall:

(a) indicate or record an error message as specified in S.1.8.2. Indications Below Minimum and Above Maximum, Volumetric Measuring Device.

(b) indicate and record the net volume of the commodity

(Added 20XX)

S.1.6.3. Recorded Representations, Volumetric Measuring Devices. – When interfaced with the elements that are necessary for a point-of-sale system, the recorded representation provided shall contain:

(a) the net volume of the commodity

(b) the identity of the commodity

(c) the unit price of the commodity

(d) the total price of the commodity

(Added 20XX)

S.1.7. Minimum Measurement.

S.1.7.1. Multiple Dimension Measuring Devices. – Except for entries of dimensional offset, the minimum measurement by a device is 12 d. The manufacturer may specify a longer minimum measurement. For multi-interval devices, this applies only to the first measuring range (or segment) of each measurement axis (length, width, and height).

(Amended 20XX)

S.1.7.2. Volumetric Measuring Devices. – The minimum measurement by a device is 12 d. The manufacturer may specify a larger minimum measurement. For multi-interval devices, this applies only to the first measuring range (or segment).

(Added 20XX)

(Amended 2017**, ~~and~~** 2021**, and 20XX**)

S.1.8. Indications Below Minimum and Above Maximum.

S.1.8.1. Multiple Dimension Measuring Device. – When objects are smaller than the minimum dimensions identified in paragraph S.1.7.**1. Multiple Dimension Measuring Devices** or larger than any of the **marked** maximum dimensions plus 9 d, and/or maximum volume marked on the device plus 9 d, or when a combination of dimensions, including dimensional offset, for the object being measured exceeds the measurement capability of the device, the indicating or recording element shall either:

(a) not indicate or record any usable values; or

(b) identify the indicated or recorded representation with an error indication.

(Amended 2004, 2017, **~~and~~** 2021**, and 20XX**)

S.1.8.2. Volumetric Measuring Device. – When the commodity being measured is smaller than the minimum measurement identified in paragraph S.1.7.2 Volumetric Measuring Devices or larger than the marked maximum volume plus 9 d, or when the commodity being measured exceeds the measurement capability of the device, the indicating or recording element shall either:

(a) not indicate or record any usable values; or

(b) identify the indicated or recorded representation with an error indication.

(Added 20XX)

…

S.4.1. Multiple Dimension and Volumetric Measuring Devices, Main Elements, and Components of Measuring Devices. – Multiple dimension **and volumetric** measuring devices, main elements of multiple dimension **and volumetric** measuring devices when not contained in a single enclosure for the entire dimension/volume measuring device, and other components shall be marked as specified in Table S.4.1.a. Marking Requirements for Multiple Dimension **and Volumetric** Measuring Systems and explained in the accompanying notes, Table S.4.1.b. Multiple Dimension **and Volumetric** Measuring Systems Notes for Table S.4.1.a.

Table S.4.1.a.
Marking Requirements for Multiple Dimension and Volumetric Measuring Systems

To Be Marked With ⇓	**Multiple Dimension and Volumetric Measuring Equipment**			
	Multiple Dimension or Volumetric Measuring Device and Indicating Element in Same Housing	**Indicating Element not Permanently Attached to Multiple Dimension or Volumetric Measuring Element**	**Multiple Dimension or Volumetric Measuring Element Not Permanently Attached to the Indicating Element**	**Other Equipment (1)**
Manufacturer's ID	x	x	x	x
Model Designation	x	x	x	x
Serial Number and Prefix	x	x	x	x (2)
Certificate of Conformance Number (8)	x	x	x	x (8)
Minimum and Maximum Dimensions **or Volume** ~~**for Each Axis for Each Range in Each Axis**~~ (3)(9)	x	x	x	
Value of Measuring Division, d ~~**(for each axis and range)**~~ (9)	x	x	x	
Temperature Limits (4)(9)	x	x	x	
Minimum and Maximum ~~**s**~~**S**peed (5)(9)	x	x	x	
Special Application (6)(9)	x	x	x	
Limitation of Use (7)(9)	x	x	x	

(Amended 2016 **and 20XX**)

Table S.4.1.b.

Multiple Dimension and Volumetric Measuring Systems Notes for Table S.4.1.a.

1. Necessary to the dimension and/or volume measuring system, but having no effect on the measuring value, e.g., auxiliary remote display, keyboard, etc.

2. Modules without "intelligence" on a modular system (e.g., printer, keyboard module, etc.) are not required to have serial numbers.

3. **For multiple dimension measuring systems, t**~~**T**~~he minimum and maximum dimensions **for each axis and for each range in each axis** ~~**(using upper or lower case type)**~~ shall be marked. For example:

Table S.4.1.b.

Multiple Dimension and Volumetric Measuring Systems Notes for Table S.4.1.a.

Length: min _____ max _____

Width: min _____ max _____

Height: min _____ max _____

For volumetric measuring devices the minimum and maximum volume shall be marked. For example:

Volume: min _____ max _____

4. Required if the range is other than − 10 °C to 40 °C (14 °F to 104 °F).

5. Multiple dimension measuring **~~devices~~systems**, which require that the object or device be moved relative to one another, shall be marked with the minimum and maximum speeds at which the device is capable of making measurements that are within the applicable tolerances.

   Volumetric Measuring Systems shall be marked with the minimum and maximum speeds at which the device is capable of making measurements that are within the applicable tolerances.

6. A device designed for a special application rather than general use shall be conspicuously marked with suitable words visible to the operator and the customer restricting its use to that application.

7. Materials, shapes, structures, combination of object dimensions, speed, spacing, minimum protrusion size, or object orientations that are inappropriate for the device or those that are appropriate.

8. Required only if a Certificate of Conformance has been issued for the equipment.

9. This marking information may be readily accessible via the display. Instructions for displaying the information shall be described in the NTEP CC **if not marked on the components of the system**.

(Amended 2004, 2008, ~~and~~ 2016**, and 20XX**)

…

N.1. Test Procedures.

N.1.1. General. ~~– The~~

N.1.1.1. Multiple Dimension Measuring Device – **A** device **that measures the dimensions and/or dimensional volume of an object** shall be tested using test standards and objects of known and stable dimensions.
(Added 20XX)

N.1.1.2. Volumetric Measuring Devices – A device that measures the volume of a bulk commodity shall be tested using a transfer standard. The means of conveyance of the transfer standard, e.g., vehicles, rail cars, etc., shall be representative of the conveyance used during the normal operation of the device.
(Added 20XX)

(Amended 20XX)

N.1.2. Position Test. – Measurements ~~are~~**shall be** made using different positions of the test object **or conveyance and** ~~and~~ consistent with the manufacturer's specified use for the device.

(Amended 20XX

…

N.1.4. Test Object or Transfer Standard Size. – Test objects **or transfer standards** may vary in size from the smallest **volume or** dimension to the largest **volume or** dimension marked on the device, and for field verification examinations, shall be an integer multiple of "d.

…

N.1.4.3. Transfer Standards. – The volume of the transfer standard must be known to an expanded uncertainty (coverage factor k = 2) of not more than one-third of the applicable device tolerance. The volume shall also be checked to the same uncertainty when used at the extreme values of the influence factors.

The volume of the transfer standard shall be verified using a reference standard that is traceable to NIST (or equivalent national laboratory) and meets the tolerances expressed in NIST Handbook 44 Fundamental Considerations, paragraph 3.2 (i.e., one-third of the smallest tolerance applied to the device).

(Added 20XX)

(Amended 2008~~ and,~~ 2012**, and 20XX**)

N.1.5. Digital Zero Stability. – A zero indication change test shall be conducted on all devices which ~~show~~**display** a digital zero. After the removal of any test object **or conveyance**, the **device shall return to a** zero indication ~~shall not change~~. (Also see G-UR.4.2. Abnormal Performance.)

(Amended 20XX)

…

T.1. Principles~~**Design. The tolerance for a multiple dimension measuring device is a performance requirement independent of the design principle used.**~~

T.1.1. Design. – The tolerance for a multiple dimension measuring device or volumetric measuring device is a performance requirement independent of the design principle used.

(Added 20XX)

T.1.2. Device Division. – The tolerance for a multiple dimension measuring device or volumetric measuring device is related to the value of the measuring division (d) and is expressed in terms of d.

(Added 20XX)

(Amended 20XX)

…

T.3. Tolerance Values. ~~**– The maintenance and acceptance tolerance values shall be ± 1 division.**~~

T.3.1. For Volumetric Measuring Devices.

(a) Maintenance Tolerance Values. – The maintenance tolerance values shall be as specified in Table T.3.1. Maintenance Tolerances.

(b) Acceptance Tolerance Values. – The acceptance tolerance values shall be one-half of the maintenance tolerance values with a minimum tolerance of 1 d.

(Added 20XX)

Table T.3.1. Volumetric Measuring Devices

Maintenance Tolerances

(All values in this table are in measuring divisions)

1	2	3	4
0 – 200[1]	**201 – 400**	**401- 800**	**801 +**

[1] See S.1.7. Minimum Measurement (12 d).

(Added 20XX)

T.3.2. For Multiple Dimension Measuring Devices. – The maintenance and acceptance tolerance values shall be ± 1 division.

(Added 20XX)

(Amended 2004 **and 20XX**)

…

UR.3.1. Minimum and Maximum Measuring Ranges. – A device shall not be used to measure objects ~~**smaller than**~~ **or a commodity in an amount less than** the minimum or ~~**larger**~~**more** than the maximum **volume or** dimensions marked on the device.

(Amended 20XX)

UR.4.1. Zero or Ready Condition. – The zero-setting adjustment of a multiple dimension measuring device **or volumetric measuring device** shall be maintained so that, with no object **or conveyance** ~~**in or**~~ on **or within the range of** the measuring element, the device shall indicate or record a zero or ready condition.

(Amended 20XX)

And Appendix D, Definitions amend the definition of "d," dimension division value as follows:

measuring division, value of "d," ~~**dimension division value.**~~ – The smallest increment that the device displays for any axis and length of object in that axis **or for the total volume**. [5.58]

(Amended 20XX)

dimensional volume. - Volume of the smallest rectangular box which fully encloses the object, and is the product of the indicated values of length axis (x), width axis (y) and height axis (z) ($dv = x \times y \times z$). [5.58]

(Added 20XX)

Previous Status:
2025: Informational

Original Justification:
These devices are already in the marketplace and two manufacturers have a Provisional NTEP Certificate of Conformance. The changes to NIST Handbook 44 will permit the certificates to be accepted in all states. The MDMD Work Group voted to support this proposal with no opposing votes.

Some may believe that the tolerance are rather large. Currently in the marketplace methods being used include front end loaders with the bucket being an approximation of X cubic yard. Scales are also being used with a conversion from weight to cubic yards. The conversion from weight to cubic yards using a conversion number for the commodity being weighed. Weighing fails to take into account the moisture content of the commodity or the accuracy of the conversion number for the actual commodity being weighed. The MDMD direct volume devices accurately measure the actual volume of the commodity being sold.

To arrive at the proposed tolerance for these devices the current MDMD tolerance was used as a starting point. The current MDMD maintenance and acceptance tolerance is 1d for the entire measurement range of each of the 3 axes. Looking at the many NTEP Certificates for devices making 3 measurements to determine a volume the tolerance at the largest dimension in terms of percent was consistently 0.2% for each axis. This means the effective tolerance for the measurement of volume is plus or minus 0.6%. The maintenance tolerance proposed for devices directly measuring volume is slightly tighter at 0.5% at the break points in the proposed tolerance table with acceptance tolerance being one half of maintenance tolerance and a minimum tolerance of 1d.

The submitter recommends that this be a Retroactive Voting item in 2025.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Nebraska: FCSP- Weights & Measures, supports this item, and stated volume measuring is not limited to liquid and those terms being used intermixed should not hold this up. states that the initial testing has been completed in Nebraska and that transfer standards are typically maintained on site, and they understand they will need those devices for testing these devices.
- 2026 Annual: A Representative from Iowa Department of Agriculture/Weights & Measures, supports this item.
- 2026 Annual: A Representative from Maryland Department of Agriculture is in support of this item and does not want to limit technology. The Representative stated these devices do not replace scales.
- 2026 Annual: A Representative from Florida Department of Agriculture and Consumer Services, supports the item.
- 2026 Annual: A Representative from Delaware Department of Agriculture raised concern with the supply of testing standards and how to use them. A Representative from NIST responded that general code allows for jurisdictions to require owners to provide equipment and standards for field testing. Later stated they recommend voting.
- 2026 Interim: Regulators from Iowa, New York, Florida, Minnesota, and Arizona support this item and recommend voting status.

Industry:

- 2026 Annual: A Representative from Richard Suiter Consulting gave a presentation which is available on the website.
- 2026 Annual: A Representative from Loadscan Ltd. gave a presentation which is available on the website.
- 2026 Annual: A Representative from Wingfield Scales Company, Inc. gave a presentation which is available on the website.
- 2026 Annual: A Representative from Richard Suiter Consulting, stated the assistance requirement that is needed to test the device is in the handbook. They reiterated that the item needs to be adopted.
- 2026 Annual: A Representative from Zebra supports this item.
- 2026 Annual: A Representative from MDMD Focus Group, commented what appears in this agenda is work from the committee and NIST, and they find it developed and support it. At the NCWM interim

meeting open hearing support for the item was stated from the floor. The only opposition was expressed by a representative of the SMA. He believes that during the open hearing the MDMD Volume Focus Group provided a response to each of the concerns. Some states don't allow provisional NTEP certificates. Stated this item is the result of the close collaboration between OWM and the Volume Focus Group. The MDMD Volume Focus Group believes the changes are complete and appropriate for recognition of devices that directly measure the volume of a commodity.

- 2026 Annual: A Representative from Walz Scale & Scanner supports this item.
- 2026 Interim: An associate member from Waltz Scale recommends voting.
- 2026 Interim: An associate member from Richard Suiter Consulting stated, during the presentation, that the item is complete and ready to vote.
- 2026 Interim: An associate member from Rice Lake Weighing System recommends the item be given a voting status.

Advisory:

- 2026 Annual: None
- 2026 Interim: A technical advisor with The National Institute of Standards and Technology, Office of Weights and Measures, recommends voting status and explained that separating the terms MDMD, VMD and specifically outline which device could measure volume.

Comments Against:

Regulatory:

- 2026 Annual: A Representative from California Division of Measurement Standards, agreed with SMA and Los Angeles County with concerns over speed. Currently devices require an error, and this will not apply to these devices. There is precedence that different commodities have different tolerances, different commodities may require different tolerance as of right now there is only one tolerance. He does not doubt the accuracy of these devices but with concerns with code as presented. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting discussed it's the commodities with large voids that causes a limitation, not the technology.
- 2026 Annual: A Representative from Colorado Department of Agriculture stated that Los Angeles County brought up good points on material being tested and being on provisional certificate. Questioned why we are including it in NTEP certificates but not in HB 44 to be used. Has concerns that throughout the item we are mixing devices for dimensions and volume needs to be specified. Concerns about UR.4.1 - is this addressing if these devices are returning to zero and/or going past zero, as it is a requirement for all other devices not in this section. He also stated the certificate and/or the handbook should exclude liquids. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting responded to the questions and concerns and stated that there is precedence for listing materials/products on NTEP certificates and gave an example of liquid measuring devices. The representative also stated these devices measure volume directly and do not apply to dimensional measurements, and lidar technology can't be used to measure liquids. The Representative from Colorado Department of Agriculture stated we must look at how the device is being used not how it is used in perfect conditions and gave the example that moisture meters can measure multiple different grains. The representative later asked, are the field standard tolerances tighter than the device tolerances? Do they meet the requirement in definition of a field [transfer] standard? The item refers to a zero indication or ready condition, and they are concerned about the practicality of this language in the field. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting, responded to the concern stating that "ready condition" is already in the code, and transferred standards should be able to meet the 1/3 requirement.
- 2026 Interim: None

Industry:

- 2026 Annual: A Representative from SMA stated the SMA opposes this item in its current state and recommends further development. They believe this item should reference Handbook 130 as a reminder that selling by volume is only allowed for certain commodities. They also believe this item is missing many specifications that were included when Weigh-In-Motion Vehicle Scales (section S.1.14, additions to Table S.6.3.b, section N.7) were added in 2021, including out of measurement zone, direction (one way/both ways), out of level, and operator notifications of an error condition.

- 2026 Interim: An associate member from the Scale Manufacturers Association opposes this item as written and recommends it be assigned a developing status.

Advisory:

- 2026 Annual: None
- 2026 Interim: No comments were heard from the floor.

Neutral Comments:

Regulatory:

- 2026 Annual: A Representative from Ohio Department of Agriculture Division of Weights & Measures asked a question of the NTEP Coordinator about the NTEP's method for the approving these devices without a published process. The representative stated they would support this item if there was a plan for a pub 14. A Representative from NTEP responded that the NTEP committee has a document that isn't published but could be finalized within 30 days of the approval of this proposal.
- 2026 Annual: A Representative from Maryland Department of Agriculture requested clarification about equating the division and tolerances of scales with these systems. It appears the effective tolerance of MDM devices would be much larger than those of a scale measuring the same product. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting, responded you cannot make the comparison of these to a scale. For example, the liquid measuring code is different than the scale code.
- 2026 Annual: A Representative from Los Angeles County Agricultural Commissioner/Weights & Measures, asked if there are any guidelines on restricting the speed the vehicle goes through, he didn't see it in regulation or NTEP certificates? Perhaps it needs to be in the user requirement. Other concern is the compatibility of the material, (clay or moisture, or grain) do we have to take into account compactibility. A Representative from MDMD Volume Focus Group/Richard Suiter Consulting, replied the NTEP procedure does take speed in account. NTEP uses material that is not compactable and moisture does not have an impact and is not a concern.
- 2026 Interim: A regulator from Maryland recommended an informational session be held during the 2026 Annual meeting to assist regulators with a better understanding of the technology and ask questions.

Industry:

- 2026 Annual: A Representative from Guidant Measurement stated there is confusion in the language between volumetric measuring vs volumetric dimensioning. By using the word 'dimensioning' instead of 'measuring', this could eliminate some confusion.
- 2026 Interim: An associate member from Guidant Measurement questioned why an MDMD states it is used to measure volume?
- 2026 Interim: An associate member from Endress + Hauser posed the question if this device could be used for liquids? An associate member from Richard Suiter Consulting replied these devices are not for liquids. An associate member from Wingfield Scale Company explained the device does not measure liquids because lidar refracts in liquids.
- 2026 Interim: An associate member from Richard Suiter Consulting responded to Guidant Measurement and Endress + Hauser that the NTEP Certificate of Conformance outlines the commodities that can be measured.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: This item was voted on and not adopted and will be carried over as a Voting item. The Committee edited Table T.3.1. to include "Volumetric Measuring Devices to provide clarity in the 2026 Annual Meeting Addendum.

NCWM 2026 Interim Meeting: After hearing comments from the floor the committee believes the item is fully developed and assigned a Voting status.

NCWM 2025 Annual Meeting: Following comments during the open hearing and after requesting clarification from the developer during the work session, the Committee modified Table T.3.1 tolerances and added "Volumetric Measuring Devices" to the title of S.1.6.3. During the voting session, Sherry Turvey, representing the CWMA, requested the item be downgraded to Informational due to substantial changes made by the NCWM S&T Committee during the Annual Meeting work session. Considering this request and prior open hearing comments on the item's development, the Committee agreed to downgrade the item to Informational before it was voted on by the body.

NCWM 2025 Interim Meeting: The Committee has combined MDM-25.1, MDM-25.2, and MDM-25.3 into a single item and updated the proposal to include revisions from NIST OWM and agreed upon by the submitter. The Committee believes the item has merit, is fully developed, and has assigned it a voting status.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from MDMD Volume Focus Group said questions from California and Colorado representatives have been answered and submitted written comments in support of this item. Written comments are attached.
Representatives from Iowa Department of Agriculture/Weights & Measures, Illinois Department of Agriculture, Nebraska FCSP-Weights & Measures, and Kansas Department of Agriculture support this item and recommended a voting status.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufacturers Association): The SMA opposes this item in its current state and recommends further development. The SMA believes this item should reference Handbook 130 as a reminder that selling by volume is only allowed for certain commodities. SMA also believes this item is missing many specifications that were included when Weigh-In-Motion Vehicle Scales (section S.1.14, additions to Table S.6.3.b, section N.7) were added in 2021, including out of measurement zone, direction (one way/both ways), out of level, and operator notifications of an error condition. SMA written comments are also available in Pub 16.

Mr. Richard Suiter (Richard Suiter Consulting and MDMD Chair): PowerPoint is available on the website. He supports this as a voting item. He indicated that there was support at NCWM, and the 3 regions. The changes proposed have been developed through a lengthy process involving the manufacturers, the MDMD work group, and NIST OWM. Those groups and the NCWM S&T Committee agree that the item is fully developed and ready. The speed limitation is on the CoC, if it is above or below, it will give no reading.

Mr. Steve Harrington (Oregon Weights & Measures): Supports this as a voting item.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Overall California supports this, but he feels that their concerns have not been satisfactorily addressed. He recommends that the submitter introduce language similar to S.1.14. from the 2.20 Scales Code requiring an indication of a fault for volumetric measuring devices. Currently, the only fault indication identified is based on when the commodity being measured is smaller than the marked minimum or larger than the marked maximum volume plus 9 divisions. What if the vehicle is traveling at speeds outside of the marked minimum and maximum for instance? They could support a voting status if this concern is addressed.

The 2026 S&T Committee recommends a Voting status. The committee believes that the item meets its intended purpose and is ready for a vote.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from Richard Suiter Consulting gave a presentation on this item.

2026 NEWMA: A representative from NYS Weights & Measures stated the item is fully developed and ready for a vote.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from MDMD Volume Focus Group gave a presentation and gave comments addressing concerns presented during the annual meeting and believes they've been answered. He believes the item is fully developed.

A representative from Scales Manufacturing Association SMA opposes and recommends further development, feels that it's missing many items. Several statements they've suggested were not included.

A representative from MDMD Volume Focus Group believes group has addressed all the SMA.

A representative from Arkansas Department of Agriculture supports item.

A representative from Maryland Department of Agriculture supports item, recommends additional informational session on the item.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

MDM-27.1 Table S.1.6. Required Information to be Provided by Multiple Dimension Measuring Systems, S.2.2. Dimensional Offset, and UR.3.4. Use of Dimensional Offset with Palletized Freight.

Source:
Louisiana Department of Agriculture and Forestry

Purpose:
Clearly identify and to restrict the use of dimensional offset in Multiple Dimension Measuring Devices.

Item under Consideration:
Amend NIST Handbook 44 Multiple Dimension Measuring Devices Code as follows:

Table S.1.6.
Required Information to be Provided by Multiple Dimension Measuring Systems

Information	Column I[1]	Column II[1]		Column III
	Provided by device	Provided by invoice or other means		Provided by invoice or other means as specified in contractual agreement
		Customer present	Customer not present	
1. Device identification[2]	D or P	P	P	P or A
2. Error message (when applicable)	D or P	P	N/A	N/A
3. Hexahedron dimensions[3]	D or P	P	P	P or A
4. Hexahedron volume (if used)[3]	D or P	P	P	P or A
5. Actual weight (if used)[3]	D or P	P	P	P or A
6. Dimensional Offset (if used)[3]	D ~~or~~ **and** P	~~N/A~~ **P**	~~N/A~~ **P**	~~N/A~~ **P**
7. Hexahedron measurement statement[4]	D or P or M	P	P	P or G

A = AVAILABLE UPON REQUEST BY CUSTOMER[5]
D = DISPLAYED
G = PUBLISHED GUIDELINES OR CONTRACTS
M = MARKED
N/A = NOT APPLICABLE
P = PRINTED or RECORDED IN A MEMORY DEVICE and AVAILABLE UPON REQUEST BY CUSTOMER[5]

Notes:
[1] As a minimum all devices or systems must be able to meet either column I or column II.
[2] This is only required in systems where more than one device or measuring element is being used.
[3] Some devices or systems may not utilize all of these values; however, as a minimum either hexahedron dimensions or hexahedron volume must be displayed or printed.
[4] This is an explanation that the dimensions and/or volume shown are those of the smallest hexahedron in which the object that was measured may be enclosed rather than those of the object itself.
[5] The information "available upon request by customer" shall be retained by the party having issued the invoice for at least 30 calendar days after the date of invoicing.

…

S.2.2. Dimensional Offset.
– The dimensional offset shall eliminate the effect of the conveyance method resulting in the measurement of only the object intended to be measured. **When a dimensional offset is applied, the value of the dimensional offset and a clear indication that a dimensional offset has been applied, shall be indicated and shall be recorded as part of the transaction record.**
(Amended 2021) **(Amended 20XX)**

…

UR.3.4. Use of Dimensional Offset with Palletized Freight.

-Dimensional offset shall not be used when measuring palletized freight consisting of non-standard-size or different size pallets. When non-standard or different size pallets are measured, the device shall be operated without dimensional offset, or the offset shall be set to zero, and the actual measured dimensions of the palletized load shall be used.
(Added 20XX)

Previous Status:
2027: New Proposal

Original Justification:
It seems to have become common practice for freight companies to use MDMDs to measure palletized freight in transit through their facilities to determine dimensions and/or density class of the freight. The majority of these devices, if not all of them, are ceiling mounted and can not accurately capture the pallet height when the freight is measured from the forks of a forklift rather than from the floor. Due businesses wanting to measure without setting the pallet on the floor, and the device lacking the ability to accurately capture pallet height, they have begun using a dimensional offset feature which adds a set amount of height to each measurement. For example, if a business decides that a typical pallet is six inches tall, they will simply set the device to add 6 inches to the height dimension measurement. The idea being that the device will measure from the forks up, and adding the 6 inches will capture the height of the pallet. The folly in this practice is multifold. First, the top deck portion of the pallet is captured in the measurement since it is above the forks. So, the dimensional offset should not have included the entire height of the pallet, only the portion below the forks. The measurement of the top deck thickness alone could vary enough from pallet to pallet to make the use of a standard offset untenable. The measurement of the lower section of the pallet can vary even more than the top deck, also making the use of a standard offset inappropriate. Additionally, these businesses receive freight on pallets from all of their different customers. This means that almost every pallet they measure is of a different size. Obviously, the practice of adding a standard offset of say 6 inches, when pallet height could vary from 4 to 8 inches, is not capable of producing fair, consistently accurate, or equitable measurements. Some businesses even compound their error by charging their customers an excessive fee for any change in dimensional measurement or density class, even if the change or error is in the shipper's favor.

Device manufacturers could argue that these devices can measure pallet height with the addition of a floor level element. Requiring that element could nullify the need for the user requirement. They could also argue that dimensional offset is already an NTEP approved feature for some of these devices, and any restriction would negatively affect that status. Freight shippers will argue that setting the pallets on the floor for measurement takes up too much time and that the offset is close enough.

The submitter requests that this be a Voting Item in 2027.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal in 2027

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item, however, the S & T committee feels there are new terms introduced without definition.

The committee recommends his item as assigned to the MDMD Work Group with the task of defining "standard" and "non-standard" pallet sizes.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference no comments were received.

The 2026 S&T Committee recommends an Informational Status. The Committee would like to hear from other stakeholders.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures believes this item has merit and recommends a developing status.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture had a question about how this is currently being applied.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Louisiana Department of Agriculture and Forestry who is the submitter of the item stated that due to a consumer complaint, this is for dimensional devices and not volume, sensors have a problem measuring palletized freight below the forks. This item requires that an offset be displayed and printed if it is being utilized. Because the offset is not able to be standardized on pallets dimensional offset is not appropriate.

Representatives from Maryland and Arkansas Departments of Agriculture support this item and recommend voting.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH – OTHER ITEMS

OTH-25.1 A 2.26 Weigh-in-Motion Systems Used for Vehicle Direct Enforcement

Source:
New York City Department of Transportation

Purpose:
Add a new Section 2.26 Weigh-In-Motion Systems Used for Vehicle Direct Enforcement to standardize the testing method for WIM systems for jurisdictions involved in direct weight limit enforcement. The update is being requested by

NYS Dept of Ag & Markets, NJ Off. of W & M, Oregon Dept of Ag, NYCDOT, Washington DC DOT, C2SMARTER and Kistler.

Item under Consideration:
Amend Handbook 44, adding new Section 2.26. Weigh-in-Motion Systems Used for Vehicle Direct Enforcement as follows:

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Section 2.26 Weigh-In-Motion Systems Used for Vehicle Direct Enforcement

A. Application

A.1. General. – This code only applies to systems installed in a fixed location used to weigh vehicles, while in motion, for the purpose of direct enforcement of legal weight limits.

A.2. Exceptions.

A.2.1. This code does not apply to weighing systems intended for the collection of statistical traffic data and weighing systems used for the purpose of screening and sorting the vehicles based on the vehicle weight to determine if a static weighment is necessary. (Also see Section 2.25. Weigh-In-Motion Systems Used for Vehicle Enforcement Screening – Tentative Code)

A.2.2. This code does not apply to highway vehicles mounted with tanks or coupled to tank trailers that are designed to contain liquids.

A.3. Additional Code Requirements. – In addition to the requirements of this code, weigh-in-motion systems shall meet the requirements of Section 1.10. General Code.

S. Specifications

S.1. Design of Indicating and Recording Elements and of Recorded Representations.

S.1.1. Ready Indication. – The system shall provide a means of verifying that the system is operational and ready for use.

S.1.2. Value of System Division Units. – The value of a system division "d" expressed in a unit of weight shall be equal to:

(a) 1, 2, or 5; or

(b) a decimal multiple or submultiple of 1, 2, or 5.

Examples: divisions may be 10, 20, 50, 100; or 0.01, 0.02, 0.05; or 0.1, 0.2, 0.5, etc.

S.1.2.1. Units of Measure. – The system shall indicate weight values using only a single unit of measure.

S.1.3. Maximum Value of Division. – The value of the system division "d" for weigh-in-motion (WIM) system shall not be greater than 200 kg or 500 lb.

S.1.3.1. Number of System Divisions. – The number of system divisions shall be a minimum of 50 and a maximum of 1,000.

S.1.3.2. Minimum Capacity. – The minimum capacity in system divisions shall be 10.

S.1.4. Value of Other Units of Measure.

S.1.4.1. Speed. – Vehicle speeds shall be measured in miles per hour or kilometers per hour.

S.1.4.2. Axle-Spacing (Length). – The center-to-center distance between any two successive axles shall be measured in:

(a) meters and decimal submultiples of a meter;

(b) feet and inches; or

(c) feet and decimal submultiples of a foot.

S.1.4.3. Vehicle Length. – If the system is capable of measuring the overall length of the vehicle, the length of the vehicle shall be measured in feet and/or inches, or meters.

S.1.5. Capacity Indication. – An indicating or recording element shall not display nor record values greater than 105 % of the specified capacity of the load receiving element.

S.1.6. Identification of a Fault. – Fault conditions affecting accuracy as specified in Table T.2.3. Maintenance Tolerances shall be presented to the operator in a clear and unambiguous means. No weight values shall be indicated or recorded when a fault condition is detected. The following fault conditions shall be identified:

(a) Vehicle speed is below the minimum or above the maximum system specified speed.

(b) The maximum number of vehicle axles as specified has been exceeded.

(c) A change in vehicle speed greater than that specified has been detected.

(d) Imbalanced weight between the left and right wheels has exceeded the specified values.

(e) Vehicle has changed lanes between or in the proximity of the first and the last sensors.

(f) Any axle or wheel, or part of each is not on the load-receiving element of the sensors.

(g) Vehicle direction of travel is not valid for the installation.

S.1.7. Recorded Representations.

S.1.7.1. Values to be Recorded. – At a minimum, the following values shall be stored electronically for each vehicle weighment. Values shall be stored electronically for a minimum of one year and available at the time of inspection. A printed copy shall be available upon request.

(a) time and date;

(b) transaction identification number;

(c) station ID;

(d) lane identification (required if more than one lane at the site has the ability to weigh a vehicle in motion);

(e) vehicle speed;

(f) number of axles;

(g) weight of each axle;

(h) identification and weight of axle groups;

(i) axle spacing;

(j) total wheelbase length;

(k) gross vehicle weight;

(l) all fault conditions that occurred during the weighing of the vehicle, as identified in paragraph S.1.6. Identification of a Fault; and

(m) violations, as identified in paragraph S.2.1. Violation Parameters, which occurred during the weighing of the vehicle.

Note: Consult the specific jurisdictional legislation for additional values that may be required to issue enforcement violations. All gross vehicle, axle, and axle group weights must be stored with the corrected values and any additional reductions as outlined in UR.4. Enforcement Guidance.

S.1.8. Value of the Indicated and Recorded System Division. – The value of the system's division "(d)," as recorded, shall be the same as the division value indicated.

S.2. System Design Requirements.

S.2.1. Violation Parameters. – The instrument shall be capable of accepting user-entered violation parameters for the following items:

(a) single axle weight limit;

(b) axle group weight limit;

(c) gross vehicle weight limit; and

(d) bridge formula maximum.

The instrument shall display and/or record violation conditions when these parameters have been exceeded.

Note: Jurisdiction-defined weight limits for S.2.1 Violation Parameters (a) through (d) can be used to determine the violation.

S.3. Design of Weighing Elements.

S.3.1. Multiple Load-Receiving Elements. – An instrument with a single indicating or recording element, or a combination indicating-recording element, that is coupled to two or more load-receiving elements with independent weighing systems, shall be provided with means to prohibit the activation of any load-receiving element (or elements) not in use, and shall be provided with automatic means to indicate clearly and definitely which load receiving element (or elements) is in use.

S.4. Design of Weighing Devices. – WIM systems for direct enforcement of legal weight limits shall meet the requirements of this code.

S.5. Design of Balance

S.5.1. Zero-Tracking Device. – A zero-tracking device shall have a range of 4% of the system capacity and operate only when:

(a) the system is in a no-load condition;

(b) is in stable equilibrium; and

(c) the corrections are not more than 0.5 d per second

S.5.2. Totalizing Device. – WIM systems may be provided with a totalizing device for determining gross vehicle weight which operates:

(a) automatically, in which case the instrument shall be provided with a vehicle recognition device defined in S.5.3. Vehicle Recognition/Presence Device; or

(b) semi-automatically (e.g., it operates automatically following a manual command).

S.5.3. Vehicle Recognition/Presence Device. – WIM systems which are able to operate without the intervention of an operator shall be provided with a vehicle recognition device. The device shall detect the presence of a vehicle in the weigh zone and shall detect when the whole vehicle has been weighed. WIM systems shall not indicate or print the vehicle mass unless all wheel loads of the vehicle have been weighed.

S.6. Accidental Breakdown and Maladjustment. – WIM systems shall be so constructed that an accidental breakdown or maladjustment of control elements likely to disturb its correct functioning cannot take place without its effect being evident.

S.7. Marking Requirements. – In addition to the marking requirements in G-S.1. Identification, the system shall be marked with the following information:

(a) value of the system division "d";

(b) operational temperature limits;

(c) number of instrumented lanes (not required if only one lane is instrumented);

(d) minimum and maximum vehicle speed;

(e) maximum number of axles per vehicle;

(f) maximum change in vehicle speed during weighment;

(g) minimum and maximum load;

(h) any restrictions specified in the NTEP Certificate of Conformance; and

(i) accuracy class.

S.7.1. Location of Marking Information. – The marking information required in Section 1.10. General Code, G-S.1. Identification and S.7. Marking Requirements shall be visible after installation. The information shall be marked on the system or recalled from an information screen.

N. Notes

N.1. Test Procedures.

N.1.1. Selection of Test Vehicles. – All dynamic testing associated with the procedures described in each of the subparagraphs of N.1.6 Test Procedures shall be performed with vehicles of these three types, at a minimum.

(a) a two-axle, six-tire, single-unit truck or Federal Highway Administration (FHWA) Class 5; that is, a vehicle with two axles with the rear axle having dual wheels;

(b) a three-axle, single-unit truck or FHWA Class 6; and

(c) a five-axle, single-trailer truck or FHWA Class 9 (3S2 Type).

(d) The gross vehicle weights shall be as stated in N.1.2.2. Dynamic Test Loads.

Note 1: Consideration should be made for testing the system using vehicles that are typical of the roadway in which the system is installed, if different than the types listed in (a) through (c) above.

N.1.1.1. Weighing of Test Vehicles. – All test vehicles shall be weighed statically on a reference scale, meeting the requirements of Appendix A, before being used to conduct dynamic tests.

N.1.1.2. Determining Reference Weights for Axles, Axle Groups, and Gross Vehicle Weight. – The reference weights shall be the average weight value of a minimum of three static weighments of all single axles, axle groups, and gross vehicle weight on a reference scale before being used to conduct the dynamic tests.

Note: The axles within an axle group are not considered single axles.

N.1.2. Test Loads.

N.1.2.1. Static Test Loads. – All static test loads shall use certified field standards

N.1.2.2. Dynamic Test Loads. – Test vehicles used for dynamic testing shall be loaded as specified below. The "load" shall be non-shifting and shall be positioned to present as close as possible, an equal side-to-side load.

(a) a half load condition (60-80% of the legal load limit of the test vehicle) for a minimum of 10 runs per test vehicle type;

(b) a full load condition (> 90% of the legal load limit for the test vehicle) for a minimum of 20 runs per test vehicle type; and

(c) When it is anticipated that a system will be used to enforce weight limits for vehicles that may be unloaded, e.g., an unloaded Class 9 vehicle crossing a bridge with a 20 TN maximum capacity, tests shall include unloaded vehicles as part of the test load.

N.1.3. Reference Scale. – Each reference vehicle shall be weighed statically on a multi-independent platform vehicle scale. The scale shall be tested no more than one day prior to use to establish reference test loads and shall meet the applicable NIST Handbook 44 tolerances.

N.1.3.1. Multi-Independent Platform Vehicle Scale System. – When using a multi-independent platform vehicle scale system, the three individual weighing/load receiving elements shall be of such dimensions and spacing to facilitate the single-draft weighing of all reference test vehicles;

(a) the simultaneous weighing of each single axle and axle group of the reference test vehicles on different individual elements of the scale; and

(b) gross vehicle weight determined by summing the values of the different reference axle and reference axle groups of a test vehicle.

N.1.4. Test Speeds. – All dynamic tests shall be conducted at two designated speeds.

(a) at a high speed – posted speed limit (S_{max}); and

(b) at a low speed – site-specific minimum speed, not below manufacturer's requirement (S_{min}).

N.1.5. Reference Axle Spacings. – To establish reference axle spacing, before measuring the axle spacing, the test vehicle shall be positioned straight, and the driving axle shall also be straight. A steel tape measure shall be used for measurement. Both left and right axle spacing shall be measured, and the average of two measurements shall be recorded by the nearest cm (inches). Each axle spacing shall be made by a single measurement.

N.1.6. Test Procedures.

N.1.6.1. Dynamic Load Test. – The dynamic test shall be conducted using the test vehicles defined in N.1.1. Selection of Test Vehicles and at the load condition as stated in N.1.2. Test Loads and at the speed as stated in N.1.4. Test Speeds. The number of runs shall be per Table N.1.6.

N.1.6.2. Initial Verification Test. – Initial verification tests shall be performed on any new WIM system, a WIM system at an existing direct enforcement site that has undergone major reconditioning or overhaul, or when the pavement in which the system is installed requires maintenance. At the conclusion of the dynamic test, there shall be a minimum of 20 weight readings for each single axle, axle group, and gross vehicle weight of each test vehicle. The tolerance for each weight reading shall be based on the percentage values specified in Table T.2.1. Maintenance Tolerances.

N.1.6.3. Subsequent Verification Test. – At the conclusion of the dynamic test, there shall be a minimum of 10 weight readings for each single axle, axle group, and gross vehicle weight of each test vehicle. The tolerance for each weight reading shall be based on the percentage values specified in Table T.2.3. Maintenance Tolerances.

Note. Any vehicle records identified as fault conditions listed in S.1.6. Identification of a Fault or jurisdiction defined fault conditions shall be excluded from the minimum weight readings in N.1.6.1. Dynamic Load Test.

See Table N.1.6 below to summarize the minimum number of test runs for Initial and Subsequent Verification Tests.

Table N.1.6 **Minimum Number of Test Runs per Each Test Vehicle**	
Initial Verification Test	
Load Condition	**Speed**
Half Load (10 runs)	**High Speed S_{max} (5 runs)**
	Low Speed S_{min} (5 runs)
Full Load (20 runs)	**High Speed S_{max} (10 runs)**
	Low Speed S_{min} (10 runs)
Subsequent Verification Test	
Load Condition	**Speed**
Half Load (6 runs)	**High Speed S_{max} (3 runs)**
	Low Speed S_{min} (3 runs)
Full Load (10 runs)	**High Speed S_{max} (5 runs)**
	Low Speed S_{min} (5 runs)

N.1.6.4. Axle Spacing Test. – The axle spacing test is a review of the displayed and/or recorded axle spacing distance of the test vehicles. The tolerance value for each distance shall be based on the tolerance value specified in T.2.4. Tolerance Value for Axle Spacing.

T. Tolerances

T.1. Principles.

T.1.1. Design. – The tolerance for a weigh-in-motion system is a performance requirement independent of the design principle used.

T.2. Tolerance Values.

T.2.1. Acceptance Tolerance. – Acceptance tolerance shall be 50% of tolerances in Table T.2.3. Maintenance Tolerances. The acceptance tolerance shall apply to a new installation, within 30 days of a new installation being placed in service, when an existing system undergoes major reconditioning or overhaul, or during type evaluation.

T.2.2 Tests Involving Digital Indications or Representations. – To the tolerances that would otherwise be applied in paragraphs T.2.3. Tolerance Value for Dynamic Load Test, there shall be added an amount equal to one-half the value of the system division to account for the uncertainty of digital rounding.

T.2.3. Maintenance Tolerance Values for Dynamic Load Test. – The tolerance values applicable during dynamic load testing are as specified in Table T.2.3. Maintenance Tolerances based on class. See UR.1. Selection Requirements

Table T.2.3. Maintenance Tolerances		
Load Description	**Tolerance as a Percentage of Applied Test Load GVW ±5% = Class 5 Tolerances**	**Tolerance as a Percentage of Applied Test Load GVW±10% = Class 10 Tolerances**
Gross Vehicle Weight	**± 5 %**	**± 10 %**
Axle Load	**± 10 %**	**± 20 %**
Axle Group Load (including bridge formula)	**± 8 %**	**± 15 %**

T.2.4. Tolerance Value for Axle Spacing. – The tolerance value applied to each axle spacing measurement shall be ± 0.15 m (6 inches) at 100% compliance.

T.3. Influence Factors. – The following factors are applicable to tests conducted under controlled conditions only.

T.3.1. Temperature. –The instrument shall operate within tolerance throughout the specified operational temperature range.

T.3.2. Temperature Effect on Zero-Load Balance. – The zero-load indication shall not vary by more than one division per 5°C (9°F) change in temperature.

T.3.3. Power Supply. – System shall satisfy the tolerance requirements in Table T.2.3. Maintenance Tolerances under voltage ranges of -15% to +10% of the marked nominal line voltage(s) at 60 Hz or the voltage range marked by the manufacturer at 60 Hz. The battery-operated systems shall satisfy the tolerance requirements in Table T.2.3. Maintenance Tolerances when the battery power output is not excessive or deficient.

T.4. Radio Frequency Interference (RFI) and Other Electromagnetic Interference Susceptibility. – The difference between the weight indication due to the disturbance and the weight indication without the disturbance shall not exceed the tolerance value as stated in Table T.2.3. Maintenance Tolerances.

UR. User Requirements

UR.1. Selection Requirements. – Equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to, its capacity, number of system divisions, value of the system division, minimum capacity, and the accuracy class. The system owner shall determine the appropriate accuracy class based on an analysis of the site per ASTM E1318, roadway maintenance capacity, legislative requirements, and manufacturer's recommendations.

UR.2. Installation and Maintenance.

UR.2.1. System Modification. – The dimensions (e.g., length, width, thickness, etc.) of the load receiving element of a system shall not be changed beyond the manufacturer's specifications, nor shall the capacity of a sensor be increased beyond its design capacity by replacing or modifying the original primary indicating or recording element with one of a higher capacity, except when the modification has been approved by a competent engineering authority, preferably that of the engineering department of the manufacturer of the system, and by the weights and measures authority having jurisdiction over the system.

UR.2.2. Foundation, Supports, and Clearance. – The foundation and supports shall be such as to provide strength, rigidity, and permanence of all components.

On load-receiving elements which use moving parts for determining the load value, clearance shall be provided around all live parts to the extent that no contacts may result when the load-receiving element is empty, nor throughout the weighing range of the system.

UR.2.3. Access to Weighing Elements. – If necessary, adequate provision shall be made for inspection and maintenance of the weighing elements.

UR.2.4. Site Selection. - In order for any WIM system to perform properly, the user must provide and maintain an adequate operating environment for the system's sensors and instruments. This includes maintaining surface smoothness in advance of and beyond the WIM-system sensors per manufacturer's recommendation.

UR.3. Maximum Load. – A system shall not be used to weigh a load of more than the marked maximum load of the system.

UR.4. Enforcement Guidance. – Prior to the issuance of an enforcement violation, the enforcement entity shall subtract the maintenance tolerance from the weighments to calculate the corrected value. All gross vehicle, axle, and axle group weights must be electronically stored, along with the corrected values and any additional reductions as outlined in specific jurisdictional legislation.

UR.5. Notification of Violation. – If a violation occurs, there shall be an audible or visual notification provided to the vehicle operator. The method used to provide notification of a violation shall be determined by the jurisdiction with authority.

Add the following definitions to Appendix D:

axle. – The axis oriented transversely to the nominal direction of vehicle motion, and extending the full width of the vehicle, about which the wheel(s) at both ends rotate. [2.26]

axle-group load. – The sum of all tire loads of the wheels on a group of adjacent axles; a portion of the gross-vehicle weight. [2.26]

axle load. – The sum of all tire loads of the wheels on an axle; a portion of the gross-vehicle weight. [2.26]

axle spacing. – The distance between the centers of any two axles. When specifying axle spacing, the axels used also need to be identified. [2.26]

federal bridge formula.-The formula incorporating axle spacing and weights used to determine the maximum weight any set of axles on a motor vehicle may carry on the road or bridge surface. The formula can be found at 23 U.S.C. § 127 and 23 C.F.R. § 658.

corrected value. – The difference of the gross weight of the vehicle, individual axles, axle groups, and the maintenance tolerance of the system for each.

weigh-in-motion (WIM). – A process of determining a moving vehicle's gross weight and the portion of that weight that is carried by each wheel, axle, or axle group, or combination thereof, by measurement and analysis of dynamic vehicle tire forces. [2.26]

WIM System. – A set of load receptors and supporting instruments that measure the presence of a moving vehicle and the related dynamic tire forces at specified locations with respect to time; determine tire loads; calculate speed, axle spacing, vehicle class according to axle arrangement, and other parameters concerning the vehicle; and process, display, store, and transmit this information. This standard applies only to highway vehicles. [2.26]

Previous Status:
2026: Assigned
2025: New Proposal

Original Justification:

1. INTRODUCTION

As noted in NIST Special Publication 2200-05 and according to the 2021 Fact Sheet: The Bipartisan Infrastructure Deal, one in five miles of U.S. highways and major roads and over 45,000 bridges are in poor condition. A major contributor to road damage stems from heavy or excess weight vehicles – or to be more precise – the heavy axle loads of these vehicles onto the road surface and/or pavement. As claimed by an article of Inside Science, this damage grows exponentially with the axle load of the vehicle. For comparison, a 40-ton commercial truck with 8 axles causes 625 times more road damage than a 2-ton passenger sedan with 2 axles. See Attachment B for NIST Special Publication 2200-5 for full document.

Enforcement of vehicle weight limits is typically cumbersome, requiring dedicated stations, contributing to freight and travel delays and strain on law enforcement resources. Even with the use of portable scales and virtual WIM systems, these efforts are not comprehensive, and have led to a culture where the disregard of the highway weight limits is giving an unfair economic advantage to those companies willing to risk running overweight trucks on our highways. This issue is exacerbated in our urban environments where limited space and enforcement personnel make it difficult or impossible to catch and cite these violators.

Recognizing the need for better weight limit enforcement, the New York State legislature authorized the New York City Department of Transportation (NYCDOT) in 2021 to conduct direct overweight vehicle enforcement using WIM as a demonstration program on a portion of the I-278 , connecting Brooklyn to Manhattan, Staten Island, and Queens otherwise known as the Brooklyn Queens Expressway or the BQE. The system was certified by the New York State Department of Weights and Measures using the procedure previously submitted for handbook 44 update item WIM 23.1 as developed by NYCDOT, C2SMARTand Kistler. NYCDOT provided all the logistical support and covered the cost of the testing.

In the seven months leading up to the launch of the program, a monthly average of 7,777 overweight trucks traveled this section of the roadway. During the first seven months of direct enforcement, the rate dropped to monthly average of 2,769 overweight trucks. As shown in Figure 1, the decline comes as the overall number of vehicles, including trucks, remains steady, with the share of overweight trucks falling from about 6.3 percent of all trucks on the roadway to 1.9 percent in most recent months. There have been no challenges in this time related to the accuracy of the system.

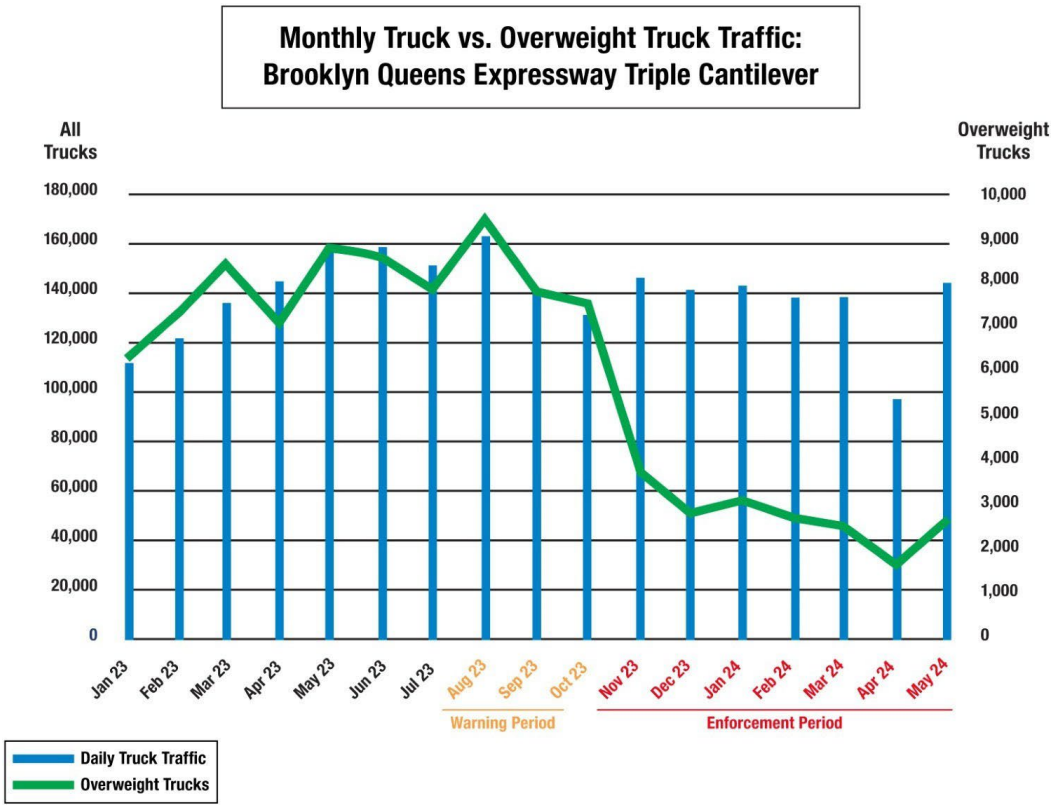


Figure 1 – Monthly Truck versus Overweight Truck Traffic on Brooklyn Queens Expressway (BQE) Triple Cantilever Structure

Since the time NYCDOT began its effort, several other states have proposed legislation for direct enforcement including Georgia and New Jersey. Several other jurisdictions are considering Direct Enforcement using WIM Systems.

The inclusion of the procedure in the handbook does not require a jurisdiction to begin direct enforcement using WIM. That authority remains with the legislative bodies of the jurisdiction. However, it is important for the proposed standard for the system to be formalized and harmonized across the nation to ensure that a unified testing protocol is being used by jurisdictions who so choose. Guarding against violations of vehicle weight restrictions to protect critical infrastructure is an issue of national concern and each jurisdiction will proceed based on local legislative authority

In addition to enforcing weight limits, officers in most States are responsible for checking Commercial Motor Vehicles (CMV's) for safety. This includes different levels of truck inspection, including the driver credentials, hours of service, key systems on the truck, load securement, and many more. Automating the weighing portion of the inspection will allow for a more efficient flow of vehicles through an inspection site and allow officers more time to focus on these other safety issues. Currently, with most sites running with a single officer, as they are focused on weighing, doing an inspection, or interviewing a driver, other unsafe vehicles behind the current one go by without scrutiny. See Attachment C Supporting Letters for letters of support from CVSA and ASCE.

This proposal seeks an amendment of NIST Handbook 44 by adding Section 2.26 to allow for Weigh-In-Motion Systems Used for Direct Vehicle Weight Enforcement certification requirements to be standardized. The remainder of this proposal lays out the justification for the amendment as well as address some of the arguments that have been raised previously in opposition, using the BQE as an example to establish the urgent need for the amendment.

2. REVIOUS PROPOSAL DATA

A similar proposal, item WIM 23.1 was voted on during the 109th Annual meeting. The original submission was made on 8/15/2022 and received a voting status at the 2024 interim meeting. However, that proposal did not receive adequate support for inclusion into HB 44.

Commenters expressed concerns of the system's tolerance and the testing procedure during open hearings that was previously considered. Previously submitted documents and comments from the regions can be found in the archives of the 108th and 109th annual meeting archives as well as 2023 and 2024 interim meeting archives. Some of the relevant documents are being attached to this submission.

During the development of the item over the time between August 2022 and voting in July 2024, all of the regions had an opportunity to review the proposal and amendments and hear from the stakeholders including the proposers in various forums. A demonstration of the proposal was also conducted in April of 2023 in Madison Wisconsin and witnessed by members of NCWM as well as NIST. In October of 2023, NYS Department of Agriculture certified the BQE site in NYC based on the proposal version of August, 2023. NYCDOT began issuing violations in November of 2023 and data related to decrease in overweight since this effort began was also shared with the council. See Attachment F 2024 Annual Meeting WIM Presentation for summary of previous data.

3. READINESS OF PROPOSAL

With the input that was gathered in the prior efforts, the current proposal has been updated to address several concerns that were raised in the process.

A. Testing Requirements: - Some jurisdictions were concerned that the testing requirements could be burdensome and lengthy. The current proposal has incorporated a potential for reduced number of runs for operational testing after the first acceptance testing is done with the larger number of runs. In addition, a test procedure guidance based on successful testing in NYC with potential ways to handle the test logistics has been attached to provide a roadmap of actual implementation. While the requirements are extensive, they are in line with belt scale testing which is included in the handbook and match international standards. Additionally, the time required is comparable to testing large belt scale installations, in-motion rail systems, and other weighing systems for materials testing where evaluating performance using materials and a reference scale is necessary.

B. Thorough Technical Review: At the Interim 2023 meeting, the previous proposal received a status of informational. This allowed close collaboration with the S&T committee as well as NIST. With this collaboration, the entire proposal was thoroughly reviewed and harmonized with other applicable sections of the Handbook 44 as well as comparable international standards like OIML. Clarifications and updates based on actual implementation in NYC have been incorporated along with the lessons learnt from the demonstration in Wisconsin.

C. Need Across the Nation: While the proposal was brought forward by NYCDOT in 2022, currently there are multiple jurisdictions who are either actively seeking legislation to move forward with Direct Enforcement or are interested in having standards made available for future efforts to obtain legislative approval. Having a national standard will ensure that jurisdictions moving forward with this approach to weight enforcement will have a better understanding of the resources needed to implement and can appropriately plan for it. In addition, while several WIM manufactures exist, without a clear standard there are varying outcomes from the systems, the industry will have clarity on expectations and can develop their products to match a recognized standard.

4. AUTOMATED TRUCK ENFORCEMENT USING WIM: ACCURACY OF WIM TECHNOLOGY VERSUS ACCEPTABLE TOLERANCE

ACCEPTABLE TOLERANCE: One of the more frequent concerns often voiced is the relatively large tolerance applied to gross vehicle weights, the axle loads, and axle-group loads. The proposal has been updated to include 2 classes of tolerance similar to the OIML standards allowing those officials charged with enforcing the regulations specific to commercial vehicles to select as appropriate based on need, site conditions, and manufacturer's recommendations.

While the tolerances proposed may seem large to the weights and measures community in comparison to commercial weighing equipment, they are non-the-less realistic and suitable for use by law enforcement. Unlike commercial vehicle scales which are installed and operated under very controlled conditions these systems are installed on interstate highways to weigh fully loaded vehicles traveling at highway speeds. The systems are continuously subject to the vibrations and stresses inherent to that environment. Unlike commercial applications where scale tolerances are made intentionally low so that they are a neglectable part of any business transaction in which the scale is used, the law enforcement official must consider the system's tolerances when issuing citations if those citations are to be upheld by a court of law. There is precedence in Handbook 44 to the idea that law enforcement scales be treated separate from commercial scales. Wheel load weighers have their own accuracy class, class IIII and weighing systems are allowed to collect and sum axle weights as an estimate of the gross vehicle weight. It is important to remember that the goal here is to protect our public roads and bridges from some of the worst offenders who are responsible for a disproportionate share of the damage to our infrastructure. Putting it another way, in a state with 80,000 lb weight limits we can risk allowing a truck weighing 85,000 lb to pass undetected if we can catch the one weighing 100,000 lbs.

Scales are evaluated not only to tolerance but to permanence. We expect them to hold their calibration for an extended period of time.

ACCURACY OF THE SYSTEM: The WIM system on the BQE has been certified multiple times and consistently met the tolerances included in the proposal. Prior to the 2nd certification, the system was tested to verify the accuracy retention over 6 months. The maximum error was 6.2%, 9.2% and 5.7% for GVW, single axle weight, and group axle weight, respectively.

The overweight enforcement system retained its accuracy over 6 months. In addition, after the system was installed but before it began to be used for direct violations at the BQE, the data from WIM was shared with NYPD in real time and then violations were issued based on portable scale weighments by the Highway Patrol. Over a span of 27 days, the NYPD enforced penalties on 48 overweight trucks, averaging less than 2 trucks per day using the more typical portable scales. The maximum GVW error was 9.2%, while the mean and average GVW errors were 0.25% and 0.05%, respectively. It should be noted that at the same time several overweight trucks identified by the WIM System could not be stopped as it took the Officers more than 2 hours to completed the inspection of each truck. No major impact was seen in the total number of overweight trucks on the corridor during this period. This is in stark contrast to the impact observed after the direct enforcement began.

Table 1 shows a summary of the data for the accuracy achieved at various sites that have applied similar WIM-based systems. The related background data is provided in Attachment D Sample WIM System Data and Attachment E Purdue WIM Report.

Table 1 – Maximum observed error for WIM-based systems collected at various sites

Sites and Testing Dates	Maximum Observed Error (%)		
	GVW	Single Axle	Group Axle
1- NY BQE Site NY PD Comparison in Mar-Apr '23	9.01%	N/A	N/A
2- NY BQE Site Validation 1 in Oct. '23	9.7%	13.1%	14.2%
3- NY BQE Site Validation 2 in Apr. '24	9.5%	19.2%	13.5%
4- WI Madison SWEF Demonstration in Apr. '23	6.4%	11.3%	7.8%
5- Indiana Study (2018)	5%*	N/A	N/A
* 5% maximum error at 95% compliance			

5. LOGISTICS OF THE TEST

The certification testing requires multiple trucks with varying loads along with drivers to complete the required number of runs. The results are then observed by the inspectors. This type of situations have already been addressed in Handbook 44 General Code, G-UR.4.4

Assistance in Testing Operations. – If the design, construction, or location of any device is such as to require a testing procedure involving special equipment or accessories or an abnormal amount of labor, such equipment, accessories, and labor shall be supplied by the owner or operator of the device as required by the weights and measures official.

As these systems are likely to be owned and operated by the state Department of Transportations, with readily available equipment and personnel to provide assistance with trucks and drivers along with traffic management should it be needed, such assistance should not be difficult to obtain for certification testing. The DOTs also have the option to contract with vendors to provide these services.

In addition, to reduce the time it would require the inspectors to test the systems, the proposal allows for reduced level of testing after the initial acceptance test has been successfully conducted. The requirements around testing and certification of reference scales have also provided jurisdictions with the ability to move forward with the option that best meets their needs based on the WIM site that is to be certified. The attached Test Procedure Guidance for WIM for Direct Enforcement Examination provides potential ways to address the logistics of the test. For reference, the demonstration runs at Wisconsin were completed in a single daytime 8 hour shift for 1 lane, while at the BQE due to traffic congestion, the test occurred during overnight single shift. Overnight testing was a site specific decision and not a requirement of the proposal. See Attachment G for Test Procedure Guidance.

6. CONCLUSIONS

Across the nation, the deterioration of aging infrastructure is exacerbated by the presence of overweight vehicles in excess of the Federal Bridge Formula (FBF). Though several states have implemented vehicle weight enforcement measures using a screening protocol that includes the use of mobile enforcement officers and stationary scales, these measures have been insufficient in significantly reducing the volumes of overweight vehicles on the nation's infrastructure. The use of WIM for the purposes of direct vehicle weight enforcement would both alleviate this problem and free up local and state resources to address other safety concerns. As noted in the attached letter from CVSA "This action correlates to a positive impact for highway safety, congestion reduction by means of an option to traditional weighing techniques especially in high traffic volume areas and acts as a force multiplier for jurisdictions facing increased traffic volumes with static weight enforcement resources. Coupled with WIM certification standards in place and accurate technology, direct WIM enforcement provides a mechanism for enabling jurisdictions to align weight compliance beyond inefficient past weight enforcement methodologies traditionally used only for screening purposes with minimal detection capability and an effective leveling of the playing field for the trucking industry."

The amendment of NIST Handbook 44 to include the attached proposal as Section 2.26 will provide a standard directly comparable to international standards. This request is not to introduce new regulations to the trucking industries but to guide the trucking industries to comply with the existing applicable laws to protect our infrastructure, provide safe

corridors to the nation's taxpayers, and improve the resilience of our built environment. Moreover, this request would allow the United States to catch up with other countries globally (shown in Figure 2) that have successfully implemented and proved automated weight enforcement, including China (2004), the Czech Republic (2010), Russia (2013), Hungary (2016), France (in process) and Brazil (in process).

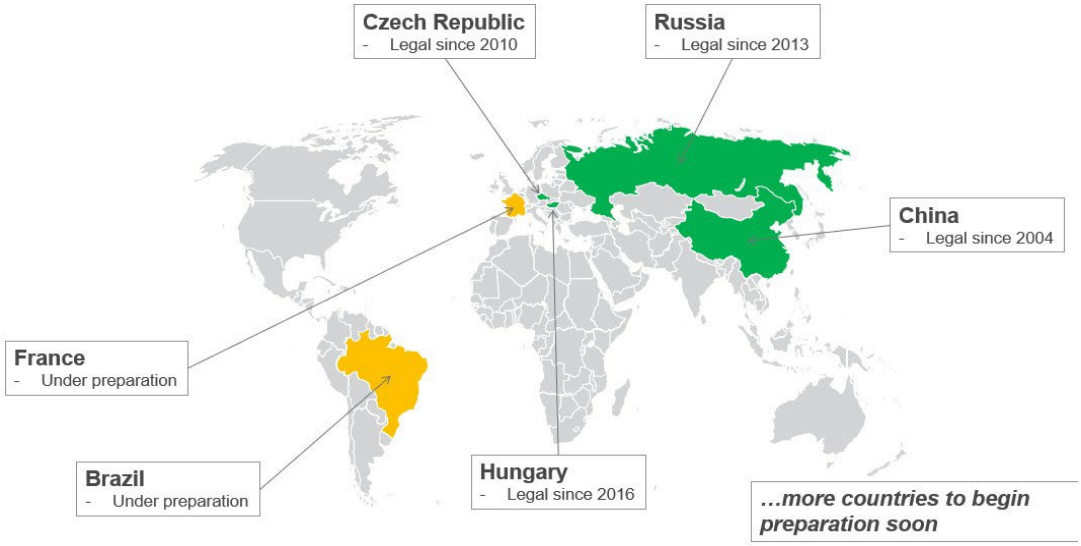


Figure 2. Automated enforcement around the world

The submitter included attachments that are available at https://www.ncwm.com/publication-15.

The submitter recommended that this be a Nonretroactive Voting item in 2025.

Comments in Favor:

Regulatory:

- 2026 Interim: Regulators from New Jersey, New York, Iowa, and Massachusetts support this item as written and recommend it be assigned a voting status.
- 2026 Interim: A regulator from New York stated that these systems will not replace regular weigh stations, instead the code would provide a roadmap to use these devices for enforcement.

Industry:

- 2026 Interim: Associate members from Quarterhill and Rutgers support this item and recommends it be assigned a voting status.

Advisory:

- 2026 Interim: A technical advisor from the National Institute of Standards and Technology, Office of Weights and Measures feels all technical problems have been addressed and recommends it be assigned a voting status

Comments Against:

Regulatory:

- 2026 Interim: A regulator from Arkansas opposes this item and recommends it be withdrawn with concerns based on opposing the intended use, permanence of the device, accuracy, and potential environmental effects on the device.
- 2026 Interim: A regulator from West Virginia opposes this item and recommends it be withdrawn stating the tolerances are too large and all variables are not accounted for.

- 2026 Interim: A regulator from California agrees with Arkansas and West Virgina and recommends the item be withdrawn.
- 2026 Interim: A regulator from Delaware is opposed to the item stating concerns on using wheel load weighers as a standard and recommends the item be withdrawn.
- 2026 Interim: A regulator from Maryland opposes the item as written and provided suggested amendments to the submitter of the item and committee in writing to include added wording to outline enforcement only when tolerances are exceeded; the ability to retrieve recorded values for one year; remove sections indicating axle-load, portable axle-load weighers, wheel load weighers as a reference standard; provide clarity to refence scale testing timeline; and additional suggested wording; the regulator recommends a voting status with these suggested amendments.
- 2026 Interim: A regulator from Louisiana states the item needs more work and recommends assignment to a task group.

Industry:

- 2026 Interim: An associate member from the Scale Manufactures Association says they oppose this item and recommends it be withdrawn.
- 2026 Interim: An associate member from the National Motor Freight Traffic Association spoke in opposition stating concerns surrounding tolerances and accuracy of the device and safety checks not being utilized due to automatic nature.

Advisory:

- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Interim: None

Industry:

- 2026 Interim: None

Advisory:

- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: The item remains Assigned to the Weigh in Motion Task Group.

NCWM 2026 Interim Meeting: The Specification and Tolerances committee is requesting the formation of a task group to further develop this item. The committee recommends an Assigned status.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

A representative from Nebraska FCSP-Weights & Measures does not support this item and recommends this item is withdrawn.

A representative from Iowa Department of Agriculture/Weights & Measures supports this item and recommends this item remains assigned to the task group.

A representative from Iowa Department of Agriculture/Weights & Measures questioned a representative from Nebraska about why they do not support this item. The representative answered he had concerns about accuracy during commercial use and that, if this is in code, then it could be used for commercial use. They support if it is for law enforcement use only. The Nebraska representative further stated that if it was adopted into Handbook 44 the state of Nebraska would not be able to adopt Handbook 44 in its entirety.

The committee recommends this item remain assigned to WIM Vehicle Scale Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufactures Association): The SMA opposes this item, and recommends it be withdrawn.

Mr. Jason Flint (State of New Jersey and Member of Weigh-in-Motion Vehicle Scale Task Group): Since the NCWM Annual meeting the Task Group has met several times to address. The work is complete and reflective in the current proposal, and should be ready for voting.

Mr. Steve Harrington (State of Oregon): Supports the task group and their work.

Mr. John Sorfleet (Santa Clara County, California): Opposes the item. He believes that the tolerances are too large and that the item should be withdrawn.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Agrees with John Sorfleet's comment and believes the item should be withdrawn.

The 2026 S&T Committee initially recommended a Voting status based on testimony heard during open hearings. The following comments were then heard during the voting session:

Mr. Steve Harrington (State of Oregon): Stated that he felt that the written comments in the addendum sheets did not capture the spirit of the comments heard on the floor and that the item should be given an assigned status based on a correction to the comments spoken from the WIM task group member.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Spoke specifically to items on S&T agenda page 102 access to a certified vehicle scale, 3 different class of semi-trucks, tolerance values, what does 100% compliance mean, T.3.3. Power Supply-voltage rages, how will this be verified, S.7.1. Information screen, an inspector must know how to get to this correct display screen. He recommended that the item stay assigned to the NCWM WIM task group.

Mr. Kurt Floren (County of Los Angeles, California): Stated that he is conflicted on the item because of the extensive testing requirements and the 15% to 20% tolerance. He opposes the item.

Mr. John Beall (Ventura County, California): Stated that the tolerance is just too large to be able to vote in favor. He recommended that the item remain assigned to the NCWM WIM task group.

The item then went to a vote and the WWMA S&T Committee's recommendation of a Voting status was not passed.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from NYS Weights & Measures gave an update from the task group.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture continues to oppose this item as written. For Vermont to support this proposal the class 10 tolerances would need to be removed and there would need to be a requirement that the reference scale be adjusted to zero error in preparation for the test. Additionally, line S.1.7.1. (b) refers to a "transaction number", these devices are not commercial, so there isn't a transaction.

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group continues to work on the item and engage with stakeholders regarding their concerns.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no comments.

The committee recommends Assigned on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH-26.5 I Appendix D – Definitions: recorded representation.

Item was previously part of GEN-26.1

recorded representation. – The printed, embossed, electronic, or other representation that is recorded as a quantity, unit price, total price, product identity, or other information required by a weighing or measuring device **that the consumer can obtain in a readily accessible, reasonably permanent form, which is unalterable**. [1.10, 2.20, 2.21, 2.22, 2.24, 2.25, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 5.54, 5.55, 5.56(a), 5.56(b), 5.57, 5.58, 5.60]

Previous Status:
2026: New Proposal

Original Justification:
Having a definition for an electronic receipt will benefit industry, the regulatory community and NTEP and promote uniformity.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Vermont Agency of Agriculture Food & Markets supports the item.
- 2026 Annual: A Representative from Iowa Department of Agriculture/Weights & Measures and NEW Jersey Weights & Measures support this item as presented but would also support the partitioning of the item.
- 2026 Annual: A Representative from New York Department of Agriculture & Markets would support the NIST edits with the removal of the final sentence allowing the consumer to request a receipt by phone.
- 2026 Interim: A regulator from California supports this as a Developing item with consideration that the developed term is being placed in the General Code and as such would apply to all device types. They believe that specification and user requirements would be necessary for a QR code to be used to facilitate access to recorded representations. This regulator would also support this as a Voting item if the QR code is removed from the suggested General Code location and the NIST OWM recommended definition change is adopted. In separate comments, this regulator spoke on potential issues such as not being able to scan the QR code, questioning if there is a requirement on how long the code needs to be displayed, and stating that this is different than entering information to receive a receipt.
- 2026 Interim: A regulator from Vermont spoke in support of this item as it will help define what an acceptable method of recorded representation is. This regulator supports the NIST OWM proposed definition change and supports this item as a Voting item.
- 2026 Interim: A regulator from New Jersey spoke in support of the NIST OWM analysis and supports this item as a Voting item.
- 2026 Interim: A regulator from Iowa spoke in support of this item as a Voting item.

Industry:

- 2026 Annual: A Representative from the Meter Manufacturers Association, Gilbarco Inc, and ChargePoint support this item with edits.
- 2026 Annual: A Representative from Tesla stated that this proposal provides clear definition of electronic receipt and is an important clarification for Type Evaluation and manufactures.
- 2026 Annual: A Representative from the Scale Manufacturers Association supports the item.
- 2026 Interim: A representative of NEMA spoke in support of this item as a Voting item.
- 2026 Interim: A representative from Tesla spoke in support of this item as a Voting item and notes that this item brings much needed clarity on the nature of electronic receipts.
- 2026 Interim: A representative from Electrify America spoke in support of this item as it gives clarity to existing ambiguity of the handbook requirements. It was noted that a QR code is not a receipt, but a means to deliver the receipt to a consumer.

- 2026 Interim: A representative from Endress + Hauser Flow USA Inc. echoed comments heard from the MMA and Gilbarco Inc with support to comments heard from the Arkansas regulator. It was stated that this item could reside in the definition section with perpetuity and without much attention. A Developing status was recommended.
- 2026 Interim: A representative from ChargePoint commented that this type of receipt is happening whether we like it or not and that this can continue to be worked while being given a Voting status this cycle.

Advisory:

- 2026 Annual: A Representative from NIST supports this item with NIST edits and recommends striking examples in the definition.
- 2026 Interim: A representative from NIST OWM supports this as a Developing item and voiced appreciation to the NTEP Committee for the work that has been done to address this issue. NIST OWM also provided a suggested modification to the definition of **recorded representation**. If this modification is accepted, NIST OWM would support this as a voting item.

Comments Against:

Regulatory:

- 2026 Annual: A Representative from Arkansas Bureau of Standards recommends the two parts of this item be separated into two individual items (recorded representation and electronic receipt). Arkansas does not support the definition of electronic receipt.
- 2026 Annual: A Representative from Colorado Department of Agriculture asked a question about changes and recommends downgrading to address previous comments.
- 2026 Annual: A Representative from California Division of Measurement Standards supports the intention of the proposal but states no code sections are listed at the end of this item. They are supportive of the NIST recommended edits, but more work is needed to the definition of electronic receipt, so it applies to the correct code.
- 2026 Annual: A Representative from Delaware Department of Agriculture stated opposition to the electronic receipt definition but supports the rest of the proposal.
- 2026 Annual: A Representative from Maryland Department of Agriculture agrees with Arkansas about the definition.
- 2026 Interim: A regulator from Arkansas spoke in opposition to this item and recommended that it remains Developing. The main concern voiced was that having secondary methods of delivering a recorded representation to consumers in the same code and paragraph of the primary method has given industry the impression that the primary method is optional or can be replaced by secondary means. It was conveyed that secondary options are in addition to the primary and that secondary options, if listed, should be in device specific codes. In separate comments, this regulator recommended that this should be placed in device specific codes and not the definitions.
- 2026 Interim: A regulator from Washington spoke in support of comments heard from Arkansas and wants to recognize and emphasize that the default method of receipt delivery should be in printed form.
- 2026 Interim: A regulator from Maryland spoke in agreement with the representatives from Arkansas, California, and the MMA and recommends a Developing status.

Industry:

- 2026 Interim: A representative of MMA spoke in support of this item in principle as a Developing item. It was stated that an exhaustive list should be based on requirements and not a list of technologies of the time.
- 2026 Interim: A representative from Gilbarco Inc. supports the position of the MMA in that this list of recorded representations could be taken as restrictive and that the language could be more generic to allow for different types of technologies.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:
- 2026 Annual: None
- 2026 Interim: None

Industry:
- 2026 Annual: None
- 2026 Interim: None

Advisory:
- 2026 Annual: None
- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: After the Annual Meeting, the Committee revised and divided this item into three separate items GEN-26.1, OTH-26.5, OTH-26.6, based on the comments heard during open hearing. The body voted to assign an Informational status to this item at the Annual meeting. NCWM 2026 Interim Meeting: Hearing comments on this item, the Committee has assigned a voting status to the item, incorporated the definition of **recorded representation** as provided by NIST OWM, and removed the electronic form example list from the proposed **electronic receipt** definition.

The Committee noted that the item was incorrectly identified in Publication 15 at the NCWM 2026 Interim Meeting. The item was corrected from GEN-26.5 to GEN-26.1

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): He is supportive of a voting status. He pointed out that this does not apply to EVSE. If it does apply to EVSE, the EVSE code will need to be changed or merged.

The 2026 S&T Committee recommends a Voting Status. The committee believes that the item has merit and is fully developed.

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends voting with the removal of ", reasonably permanent".

2026 NEWMA: A representative from New Jersey Weights & Measures recommends a voting status.

2026 NEWMA: A representative from NYS Weights & Measures questions the words "reasonably permanent".

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture supports this item and recommends the item be assigned a voting status with the following verbiage addition. that the consumer can obtain "immediately following the completion of the transaction in a readily accessible, reasonably permanent form, which is unalterable. "

Representatives from Louisiana, Arkansas and TDLR support Maryland's comments

The committee recommends Voting on this item with updated version included adding "immediately following the completion of the transaction."

Additional letters, presentation and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

OTH-26.6 I Appendix D – Definitions: electronic receipt.

Item was previously part of GEN-26.1

Source:
NCWM National Type Evaluation Program Committee

Purpose: Remove the examples from G-S.5.6. Recorder representations and add a definition to HB 44 for Electronic Receipts to assist in clarification for regulatory, manufacturers and NTEP as to what an electronic receipt is.

Item under Consideration:
Amend NIST Handbook 44 Definitions

electronic receipt. – A~~n electronic~~ version of a recorded representation in electronic form ~~the form of a downloadable PDF or HTML file~~ accessed or delivered electronically. [1.10, 2.20, 2.21, 2.22, 2.24, 2.25, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 5.54, 5.55, 5.56(a), 5.56(b), 5.57, 5.58, 5.60]
(Added 20XX)

Previous Status:
2026: New Proposal

Original Justification:
Having a definition for an electronic receipt will benefit industry, the regulatory community and NTEP and promote uniformity.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Vermont Agency of Agriculture Food & Markets supports the item.
- 2026 Annual: A Representative from Iowa Department of Agriculture/Weights & Measures and NEW Jersey Weights & Measures support this item as presented but would also support the partitioning of the item.
- 2026 Annual: A Representative from New York Department of Agriculture & Markets would support the NIST edits with the removal of the final sentence allowing the consumer to request a receipt by phone.
- 2026 Interim: A regulator from California supports this as a Developing item with consideration that the developed term is being placed in the General Code and as such would apply to all device types. They believe that specification and user requirements would be necessary for a QR code to be used to facilitate access to recorded representations. This regulator would also support this as a Voting item if the QR code is removed from the suggested General Code location and the NIST OWM recommended definition change is adopted. In separate comments, this regulator spoke on potential issues such as not being able to scan the QR code, questioning if there is a requirement on how long the code needs to be displayed, and stating that this is different than entering information to receive a receipt.
- 2026 Interim: A regulator from Vermont spoke in support of this item as it will help define what an acceptable method of recorded representation is. This regulator supports the NIST OWM proposed definition change and supports this item as a Voting item.
- 2026 Interim: A regulator from New Jersey spoke in support of the NIST OWM analysis and supports this item as a Voting item.
- 2026 Interim: A regulator from Iowa spoke in support of this item as a Voting item.

Industry:

- 2026 Annual: A Representative from the Meter Manufacturers Association, Gilbarco Inc, and ChargePoint support this item with edits.

- 2026 Annual: A Representative from Tesla stated that this proposal provides clear definition of electronic receipt and is an important clarification for Type Evaluation and manufactures.
- 2026 Annual: A Representative from the Scale Manufacturers Association supports the item.
- 2026 Interim: A representative of NEMA spoke in support of this item as a Voting item.
- 2026 Interim: A representative from Tesla spoke in support of this item as a Voting item and notes that this item brings much needed clarity on the nature of electronic receipts.
- 2026 Interim: A representative from Electrify America spoke in support of this item as it gives clarity to existing ambiguity of the handbook requirements. It was noted that a QR code is not a receipt, but a means to deliver the receipt to a consumer.
- 2026 Interim: A representative from Endress + Hauser Flow USA Inc. echoed comments heard from the MMA and Gilbarco Inc with support to comments heard from the Arkansas regulator. It was stated that this item could reside in the definition section with perpetuity and without much attention. A Developing status was recommended.
- 2026 Interim: A representative from ChargePoint commented that this type of receipt is happening whether we like it or not and that this can continue to be worked while being given a Voting status this cycle.

Advisory:

- 2026 Annual: A Representative from NIST supports this item with NIST edits and recommends striking examples in the definition.
- 2026 Interim: A representative from NIST OWM supports this as a Developing item and voiced appreciation to the NTEP Committee for the work that has been done to address this issue. NIST OWM also provided a suggested modification to the definition of **recorded representation**. If this modification is accepted, NIST OWM would support this as a voting item.

Comments Against:

Regulatory:

- 2026 Annual: A Representative from Arkansas Bureau of Standards recommends the two parts of this item be separated into two individual items (recorded representation and electronic receipt). Arkansas does not support the definition of electronic receipt.
- 2026 Annual: A Representative from Colorado Department of Agriculture asked a question about changes and recommends downgrading to address previous comments.
- 2026 Annual: A Representative from California Division of Measurement Standards supports the intention of the proposal but states no code sections are listed at the end of this item. They are supportive of the NIST recommended edits, but more work is needed to the definition of electronic receipt, so it applies to the correct code.
- 2026 Annual: A Representative from Delaware Department of Agriculture stated opposition to the electronic receipt definition but supports the rest of the proposal.
- 2026 Annual: A Representative from Maryland Department of Agriculture agrees with Arkansas about the definition.
- 2026 Interim: A regulator from Arkansas spoke in opposition to this item and recommended that it remains Developing. The main concern voiced was that having secondary methods of delivering a recorded representation to consumers in the same code and paragraph of the primary method has given industry the impression that the primary method is optional or can be replaced by secondary means. It was conveyed that secondary options are in addition to the primary and that secondary options, if listed, should be in device specific codes. In separate comments, this regulator recommended that this should be placed in device specific codes and not the definitions.
- 2026 Interim: A regulator from Washington spoke in support of comments heard from Arkansas and wants to recognize and emphasize that the default method of receipt delivery should be in printed form.
- 2026 Interim: A regulator from Maryland spoke in agreement with the representatives from Arkansas, California, and the MMA and recommends a Developing status.

Industry:

- 2026 Interim: A representative of MMA spoke in support of this item in principle as a Developing item. It was stated that an exhaustive list should be based on requirements and not a list of technologies of the time.

- 2026 Interim: A representative from Gilbarco Inc. supports the position of the MMA in that this list of recorded representations could be taken as restrictive and that the language could be more generic to allow for different types of technologies.

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Annual: None
- 2026 Interim: None

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Item Development:

NCWM 2026 Annual Meeting: After the Annual Meeting, the Committee revised and divided this item into three separate items GEN-26.1, OTH-26.5, OTH-26.6, based on the comments heard during open hearing. The body voted to assign an Informational status to this item at the Annual meeting. NCWM 2026 Interim Meeting: Hearing comments on this item, the Committee has assigned a voting status to the item, incorporated the definition of **recorded representation** as provided by NIST OWM, and removed the electronic form example list from the proposed **electronic receipt** definition.

The Committee noted that the item was incorrectly identified in Publication 15 at the NCWM 2026 Interim Meeting. The item was corrected from GEN-26.5 to GEN-26.1

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item is assigned a voting status.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Ms. Mal Skowron (Tesla): Recommends a voting status.

Mr. Matt Douglas (State of California, Division of Measurement Standards): Supports the item and recommends further development. He does not think the strike through is needed.

Mr. Steve Harrington (State of Oregon): Recommends that the item remain Informational.

The 2026 S&T Committee recommends a Developing Status. The committee recommends adding language that is being proposed in OTH-26.5 (that the consumer can obtain in a readily accessible, reasonably permanent form, which is unalterable).

NEWMA 2026 Interim Meeting:

NEWMA S&T Committee recommends voting with the following change: "electronic receipt. – A version of a recorded representation accessed or delivered electronically. [1.10, 2.20, 2.21, 2.22, 2.24, 2.25, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 5.54, 5.55, 5.56(a), 5.56(b), 5.57, 5.58, 5.60]"

2026 NEWMA: A representative from New Jersey Weights & Measures is unsure if this is needed. A receipt is a receipt no matter how you get it. The language is also clunky. NJ submits the following language change:

electronic receipt. – A version of a recorded representation which can be accessed or delivered electronically.

The string of code reference in brackets needs to be sifted through. Not all of the codes reference electronic receipts and some need to be deleted.

2026 NEWMA: A representative from State of Vermont Agency of Agriculture does not think this language adds anything to the handbook but might suggest the words “digital proof of purchase” to replace most of what is currently in this proposal.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland Department of Agriculture supports this item and recommends the item be assigned a voting status with the following verbiage addition “immediately following the completion of the transaction”

A representative from Arkansas Department of Agriculture supports Maryland’s comments.

The committee recommends Voting on this item with updated version included adding “immediately following the completion of the transaction.”

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ITEM BLOCK 1 (B1) – TRANSPORTATION-FOR-HIRE SYSTEMS

B1-TNS-25.1 I Section 5.60. Transportation Network Measurement Systems – Tentative Code

Source:
Transportation-For-Hire Systems Task Group

Purpose:
Remove the Transportation Network Measurement Systems Tentative Code completely.

Item under Consideration:
Delete the Handbook 44, Section 5.60. Transportation Network Measurement Systems – Tentative Code as follows:

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Section 5.60. Transportation Network Measurement Systems – Tentative Code

This tentative code has a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final code. Officials wanting to conduct an official examination of a device or system are advised to see paragraph G-A.3. Special and Unclassified Equipment.

(Tentative Code Added 2017)

A. Application

A.1. General. This code applies to a transportation network measurement system used in connection with a digital network that determines the actual time elapsed and/or distance travelled during a network-arranged ride to calculate a fare for transportation services.

Note: The fare is calculated by software services residing on the transportation network company servers using data transmitted by the indicating elements present in the vehicle, which are running software applications or services supplied by the transportation network company. The measurement data is generated from sources not physically connected to the vehicle (e.g., a navigation satellite system such as GPS and/or other location services).

A.2. Exceptions. This code does not apply to the following:

(a) Any system that charges a flat rate or fixed charge, and/or does not use a measurement of actual time elapsed or distance travelled to calculate a fare for transportation services.

(b) Odometers on vehicles that are rented or hired on a distance basis. (Also see Section 5.53. Odometers.)

(c) Taximeters. (Also see Section 5.54. Taximeters.)

(d) Any system where the fare is calculated by equipment located in the vehicle.

A.3. Additional Code Requirements. In addition to the requirements of this code, transportation network measurement systems shall meet the requirements of Section 1.10. General Code.

S. Specifications

S.1. Design of Indicating and Recording Elements. Indicating and recording elements shall provide indications and recorded representations that are clear, definite, accurate, and easily read under any conditions of normal operation of the device(s).

All indicating and recording elements used in a transportation network measurement system shall operate correctly while using the online-enabled technology application service provided by the transportation network company.

S.1.1. General Indicating Elements. A transportation network measurement system shall include, as a minimum:

(a) an indicating element used by a transportation network company driver that displays information and facilitates the measurements during a network-arranged ride to calculate a fare for transportation services; and

~~(b) an indicating element used by a transportation network company rider that displays information that allows the rider to review the current rate(s) for the transportation service and to request a ride.~~

~~**S.1.2. General Recording Elements.** A transportation network measurement system shall be capable of:~~

~~(a) recording all information necessary to generate a receipt specified in S.1.10. Receipt;~~

~~(b) providing information to transportation network company drivers, including, but not limited to, a summary of rides given as specified in S.1.11. Driver's Summary; and~~

~~(c) providing a copy of all metrological data required by law to a weights and measures jurisdiction with statutory authority.~~

~~**S.1.3. Identification.** All transportation network measurement system indicating elements shall display for the purposes of identification the following information:~~

~~(a) the name, initials, or trademark of the transportation network measurement system manufacturer, distributor, or developer; and~~

~~(b) the current version or revision identifier of the software application service provided by the transportation network company running on the indicating elements identified in S.1.1. General Indicating Elements.~~

~~(1) The version or revision identifier shall be prefaced by words or an abbreviation that clearly identifies the number as the required version or revision.~~

~~(2) Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the word "Number." Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the word "Number." The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).~~

~~**S.1.4. Location of Identification Information.** The information required by S.1.3. Identification shall be accessible through an easily recognized menu and, if necessary, a submenu or other appropriate means. Examples of menu and submenu identification include, but are not limited to, "Help," "About," "System Identification," "Weights and Measures Identification," or "Identification."~~

~~**S.1.5. Display of Rates and Additional Charges**. The transportation network measurement system shall be designed to make available to transportation network company riders the rate(s) for transportation services before the beginning of a network arranged ride. The system shall be capable of providing an explanation of the basis for calculating a fare including, if applicable, the base fare, rates for time and distance, and the amount of a booking fee, platform fee, or other similar service fee, before a rider submits the request for a network arranged ride.~~

~~**S.1.6. Fare Estimates.** The transportation network measurement system shall be capable of displaying a fare estimate to the transportation network company rider before a request for a network arranged ride is made.~~

~~**S.1.7. Actuation of Measurement System.** Following the initiation of a network arranged ride by the transportation network company driver, and prior to the conclusion of that network arranged ride, the transportation network measurement system shall only indicate and/or record measurements resulting from the movement of the vehicle or by the time mechanism.~~

~~***S.1.8. Fare Adjustment.** A transportation network measurement system shall be designed with:~~

~~*(a) a "time off" mechanism and a "distance off" mechanism provided for the transportation network system driver to render the measurement of time and distance either operative or inoperative during the ride; or*~~

~~*(b) the capability to make post-transaction fare adjustments to reduce the amount of the fare, provided the*~~

system creates a record of all location and time data from the time the ride request was accepted by the transportation network company driver.

[Nonretroactive as of January 1, 2018]

S.1.9. Fare Identification and Other Charges.

S.1.9.1. Fare Identification. Fare indications shall be identified by the word "Fare" or by an equivalent expression when displayed on the transportation network company system receipt required by S.1.10 Receipt. Values shall be defined by suitable words or monetary signs.

S.1.9.2. Other Charges. Other charges shall be indicated as separate line items when displayed on the receipt required by S.1.10. Receipt. Other charges shall be identified using an appropriate descriptive term, including but not limited to "Booking Fee," "Tolls," "Airport Pickup/Drop-off Surcharge" or an equivalent expression. Values shall be defined by suitable words or monetary signs.

S.1.10. Receipt. A transportation network measurement system shall issue a printed or electronic receipt to a transportation network company rider. This receipt shall include as a minimum the following:

(a) date of the start of the trip;

(b) unique identifying information sufficient for the transportation network company to identify the transaction, or other identifying information as specified by the statutory authority;

(c) start and end time of trip, total time of trip (maximum increment of one second), and if applicable, the total elapsed time during any time-off period;

(d) distance traveled, maximum increment of 0.01 km or 0.01 mi;

(e) the associated fare in $;

(f) other charges where permitted shall be identified and itemized;

(g) total charge in $;

(h) the start and end addresses or locations of the trip;

(i) a map showing the route taken; and

(j) a means to obtain transportation network company rider assistance.

S.1.11. Driver's Summary. A transportation network measurement system shall be capable of providing a summary of the driver's activity regarding network-arranged rides. The summary shall include, but not be limited to, the following information about each ride:

(a) date and time for start of trip;

(b) unique identifying information sufficient for the transportation network company to identify the transaction, or other identifying information as specified by the statutory authority;

(c) total time of trip, maximum increment of one second;

(d) distance traveled, maximum increment of 0.01 km or 0.01 mi;

(e) the total fare received;

(f) other charges where permitted; and

(g) a means to obtain transportation network company driver assistance.

S.2. Provision for Sealing.

S.2.1. System Security. Adequate provision shall be made to provide security for a transportation network measurement system. The system shall be designed to:

(a) protect the integrity of metrological data and algorithms used to compute fares from such data against unauthorized modification using industry standard technological protection mechanisms such as data encryption; and

(b) use software based access controls or equivalent technological protections that limit access to metrological data and algorithms used to compute fares from such data only to authorized persons.

S.2.2. System Audit. The transportation network measurement system shall be designed in a manner that permits officials having statutory authority to verify compliance with this transportation network measurement system code.

S.2.3. Change Tracking. Changes made by the manufacturer, distributor, or developer of a transportation network measurement system to any algorithms or code, which have a metrological effect, shall be logged and recorded. The period covered by this change record is not required to exceed one year.

S.3. Provision for Trip Data Loss. If a portion of the trip data is lost due to power or signal interruption by the transportation network company driver's indicating element, the transportation network measurement system shall be capable of determining the information needed to complete any transaction in progress at the time of the power or signal loss.

S.3.1. Intermittent Trip Data Loss. When the location services signal is lost intermittently during a prearranged ride (e.g., traveling through a tunnel), but recovered prior to the end of the ride, the transportation network measurement system shall be capable of calculating an accurate fare in accordance with T.1. Tolerance Values.

S.3.2. Significant Trip Data Loss. When the location services signal is lost for a significant portion of the network-arranged ride, the transportation network measurement system shall provide for alternative fare structures.

Note: Significant trip data loss refers to instances when the location services signal is lost to the extent the transportation network measurement system is not capable of calculating an accurate fare in accordance with T.1. Tolerance Values using actual time and actual distance, or when the signal is not regained by the end of the ride.

S.3.3. Alternative Fare Structures. If the transportation network measuring system is not using actual time and actual distance for a particular trip (e.g., zone based fares, signal loss), that portion of the fare not based on actual time and actual distance is not subject to this code. Charges not based on actual time and actual distance measurements may be based on the terms of service.

N. Notes

N.1. Distance Tests.

N.1.1. Test Methods. To determine compliance with distance tolerances, distance test(s) of a transportation network measurement system shall be conducted. The distance test(s) shall consist of a road test unless safety or other practical concerns prohibit road testing. A transfer standard test may be performed in the absence of a road test. At least one test shall be of a length sufficient to exceed the minimum fare.

N.1.1.1. Road Test. The test consists of operating the conveyance over a precisely measured course calibrated to a traceable linear measure of at least one mile in length

N.1.1.2. Transfer Standard Test. The test consists of operating the conveyance over an unmeasured course while

using a calibrated transfer standard, such as a fifth-wheel, to measure the distance travelled.

Note: Field examinations of transportation network measurement systems need not include testing of all individual devices used as driver/passenger indicating elements in connection with the service provided. It is considered sufficient that a representative sample of various indicating elements be incorporated in testing to verify proper operation of the system.

N.1.2. Test Procedures.

N.1.2.1. Test Length. All tests must be at least one mile in length. If a measured course or testing equipment is not readily available that will enable a test of a length sufficient to exceed the minimum fare, after completing the testing specified in N.1.1. Test Methods, an additional unmeasured test may be conducted. The purpose of this additional unmeasured test is to verify compliance with S.1.10. Receipt.

N.1.2.2. Additional Tests. If during testing a transportation network measurement system produces a measurement that does not comply with the tolerance values in T.1.1. Distance Tests, a minimum of three additional tests shall be conducted at the same location where all test variables are reduced to the greatest extent practicable to verify the system's ability to repeat transaction indications. Repeatability testing performed in excess of these three additional tests is done at the discretion of the official with statutory authority.

To verify system-wide noncompliance, tests for variability shall be conducted, including a minimum of three consecutive tests of varying lengths, locations, and/or environmental conditions.

N.1.3. Test Conditions.

N.1.3.1. General. Except during type evaluation, all tests shall be performed under the conditions that are considered usual and customary within the location(s) where the system is normally operated as deemed necessary by the statutory authority.

N.1.3.2. Roads. All tests shall be conducted on public roads.

N.1.3.3. Testing for Environmental Influences. During type evaluation, the distance test may include a route traveled by the vehicle that will expose the system to conditions that could contribute to the loss of, or interference with, the location service's signal. This may include:

(a) objects that may obstruct or reflect signals such as tall buildings/structures, forestation, tunnels, etc.;

(b) routes that do not follow a straight line path;

(c) significant changes in altitude; and

(d) any other relevant environmental conditions.

N.2. Time Test. A transportation network measurement system, which determines time elapsed, shall be tested for compliance with the tolerances values specified in T.1.2. Time Tests, using a certified, traceable standard.

T. Tolerances

S.4. Tolerance Values. The tolerances will be as specified in T.1.1. Distance Tests and T.1.2. Time Tests. (The following proposed tolerance values will be confirmed based on performance data evaluated by the NIST U.S. National Work Group on Taximeters before the transportation network measurement systems code becomes a permanent code.)

S.4.1. Distance Tests. Maintenance and acceptance tolerances shall be as follows:

(a) On Overregistration: 2.5

(b) On Underregistration: 2.5 %

S.4.2. Time Tests. Maintenance and acceptance tolerances shall be as follows:

(a) On Overregistration: 5 seconds or 0.5 %, whichever is greater

(b) On Underregistration: 5 seconds or 0.5 %, whichever is greater

S.5. Tests Using Transfer Standards. 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 transfer standard when compared to a basic reference standard.

UR. User Requirements

UR.1. System Indications. The indicating elements identified in S.1.1. General Indicating Elements shall display indications and information in a manner such that they can be conveniently read by the user of the device, computer, website, or online-enabled technology application service.

UR.1.1. Statement of Rates. The transportation network company rider shall be able to view the basis for calculating the fare including, if applicable, the base fare, rates for time and distance, and the amount of a booking fee, platform fee, or other similar service fees.

UR.2. Change Tracking. Upon request by an official having statutory authority, the transportation network company shall provide an explanation of changes that are logged pursuant to S.2.3. Change Tracking requirement during the time period covered by the request. Any such request shall be answered within two business days, unless extended by the official having statutory authority. Records provided pursuant to S.2.3. Change Tracking shall be treated as confidential and proprietary to the extent permitted by any applicable law.

UR.3. System Installation and Operation. The transportation network company driver shall use the indicating elements identified in S.1.1.(a) General Indicating Elements in accordance with the requirements of the manufacturer, distributor, or developer.

UR.4. Fare Estimates. Estimates for fare charges shall be provided by the transportation network measurement system when requested by the transportation network company rider and following the input of a final destination for the trip being requested. The recipient of the fare estimate shall be able to access information about the fare estimate, including key variables that may lead to discrepancies between actual fare charged and the fare estimate provided as required by law.

UR.5. Determination of Total Charges When Location Service Data Is Lost. At the conclusion of the trip, the transportation network company shall disclose to the transportation network measurement service rider and driver the manner in which total charges are determined when there is significant data loss from location services.

Appendix D.

Definitions D

digital network. An online enabled technology application service, website, or system offered or used by a transportation network company that enables a transportation network company rider to arrange a network arranged ride with a transportation network company driver. [5.60]

N

network arranged ride. The provision of transportation by a transportation network company driver to a transportation network company rider, or other persons selected by the transportation network company rider, arranged through a digital network. [5.60]

T

~~**transportation network company.** An entity that uses a digital network to connect transportation network company riders with transportation network company drivers who provide network arranged rides, and offers or provides a transportation network measurement system, subject to an agreement or terms of service between the transportation network company and transportation network company rider or driver. [5.60]~~

~~**transportation network company driver.** An individual authorized by the transportation network company to access the digital network and receive connections to transportation network company riders for the purpose of providing network arranged rides. [5.60]~~

~~**transportation network company rider.** An individual who has obtained an account with a transportation network company and uses the transportation network company's digital network to connect with a transportation network company driver who can offer or provide a network arranged ride to the transportation network company rider or other persons selected by the transportation network company rider. [5.60]~~

~~**transportation network measurement system.** The information technology infrastructure and services offered or used by a transportation network company that receives data collected through a digital network and calculates a fare for a network arranged ride. [5.60]~~

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard from the floor on this item.

The committee recommends this item remain informational.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comment was received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Recommends that this block be assigned to the Transportation-For-Hire Systems Task Group. While he is generally supportive of the item and the intent, he does not believe the item is fully developed. He questioned whether an app-based taxi falls under S.1.1.1. or S.1.1.2.? Or if this can vary based on design? S.1.1.1. speaks to "built for purpose" devices, while S.1.1.2. states in the title "Application Software Installed on Not Built-for-Purpose Devices" which seems to fit the description of an App-based taxi). The language speaks to "transportation network measurement systems". He also commented on S.1.10 regarding recorded representations – these requirements seem to only apply to a "built-for-purpose device installed in the vehicle", while S.1.12 speaks to electronic representations being required, it does not speak to the required content of the recorded representation. This seems to imply that only built for purpose devices will need to provide the content identified in S.1.10.

The 2026 S&T Committee recommends that the item be assigned back to the Transportation for Hire Systems Task Group based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representatives from New Jersey Weights & Measures and NYS Weights & Measures support a voting status.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Louisiana Department of Agriculture and Forestry stated the task group has been dissolved; this group was put together at the request of NCWM. This code provides an equitable code for transportation for hire for measurement of time and distance.

A representative from NIST shared concerns that were brought forward that are not HB 44 related items. He believes this is fully developed.

A representative from Maryland Department of Agriculture supports Voting status.

The committee recommends Voting on this item.

B1-TXI-25.1 I 5.54 ~~Taximeters~~ Transportation-For-Hire Systems

Source:
Transportation-For-Hire Systems Task Group

Purpose:
Add a new Transportation-For-Hire Systems Code to replace the existing Taximeter Code and Transportation Network Measurement Systems Tentative Code.

This code has been developed by the Transportation for Hire Task Group with the goal of producing a unified code that can be applied to all transportation for hire systems including traditional taximeters and app based rideshare companies.

It is based off of Section 5.54 Taximeters, which it will ideally replace. Bold and underlined portions in the submission indicate Task Group additions to the existing Taximeter Code. The Committee can decide whether a better path would be to wholly replace Section 5.54 with this item or to amend it throughout.

Item under Consideration:
Amend the Handbook 44, Section 5.54. Taximeters Code as follows:

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Section 5.54. ~~Taximeters~~Transportation-for-Hire-Systems

A. Application

A.1. General. – This code applies to ~~taximeters; that is, to~~ devices **and systems** that ~~automatically~~ calculate ~~at a predetermined rate or rates and indicate~~**fare charges for transportation services when those charges are based on** the ~~charge for hire of a vehicle~~**distance traveled and/or time elapsed during the transport of passenger(s). This code applies to systems using single or multiple sources of data used to determine distance and/or time during transportation service for the purpose of calculating fees charged to passengers and/or payment for drivers.**

Except where expressly stated as applicable only to specific types of systems:

(a) the requirements for transportation-for-hire systems in this code will apply to those systems using the data input used for calculation of charges from sources that are physically connected to the vehicle, systems using data input from external sources, or a combination of these sources; and

(b) requirements in this code apply to systems that provide periodic updates of fare charges accumulated during a trip and those systems that supply a good faith estimate of the total fare charges prior to a trip.

(Amended 20XX)

A.2. Exceptions. – This code does not apply to the following:

(a) any system that charges a flat rate or fixed charge which does not use a dynamic measurement of time elapsed, or distance travelled to calculate a fare for transportation services;

~~(a)~~**(b)** odometers on vehicles that are rented **or hired** on a distance basis. (Also see Section 5.53. Code for Odometers.)

~~(b)~~**(c)** devices ~~that only display a flat rate~~ or ~~negotiated rate;~~ **systems used to determine shipping** or **freight charges.**

~~(c) Transportation Network Measurement Systems. (Also see Section 5.60. Transportation Network Measurement Systems.)~~

(Amended 1977, 2016, ~~and~~ 2017**, and 20XX**)

A.3. Additional Code Requirements. – In addition to the requirements of this code, ~~Taximeters~~**transportation-for-hire systems** shall meet the requirements of Section 1.10. General Code.

(Amended 20XX)

S. Specifications

S.1. Design of Indicating and Recording Elements. – Indicating and recording elements shall provide indications and recorded representations that are clear, definite, accurate, and easily read under any conditions of normal operation of the device(s).

For transportation-for-hire systems operating using application software provided by a transportation network company and installed on a user's computing device (i.e., transportation network measurement systems), the indicating and recording elements shall provide an appropriate digital platform (i.e., operating system) for the online-enabled application software allowing the system to operate as designed. Any additional features or functions installed on the user's indicating/recording element shall not interfere with the proper operation of the transportation-for-hire application software.

(Amended 20XX)

S.1.1. General. ~~– A taximeter shall be equipped with a primary indicating element.~~

(Amended 1988~~ and,~~ 2015**, and 20XX**)

S.1.1.1. For Systems Including a Built-for-Purpose Device Installed in the Vehicle. – A built-for-purpose device (e.g., taximeter) shall be equipped with a primary indicating element. The indicating element shall be installed and positioned in the vehicle so that all relevant indications are readily observable by a driver and passengers.

(Added 20XX)

S.1.1.2. For Systems Consisting of Application Software Installed on Not Built-for-Purpose Devices. – The indicating element(s) in systems for transportation network measurement systems using not built-for-purpose devices on which an application software has been installed shall operate as follows.

(a) An indicating element used by a transportation network company driver shall:

- **receive data input used to compute distance traveled and/or time elapsed;**
- **display trip information;**
- **provide a means of communications between system components; and**
- **provide a trip summary at the conclusion of all network-arranged transportation services.**

The device used by the driver shall perform only those functions necessary to facilitate transportation-for-hire service during the period of time when that service is being provided.

(b) An optional device operated by a rider or consumer shall provide the user with all required information on a rider/consumer's receipt of the transaction and may also provide a means for making payment for the transportation service.

(Added 20XX)

S.1.~~1~~2.~~1.~~Recording Elements, General. – A **transportation-for-hire service shall be capable of making available a** receipt ~~providing~~**(in printed or electronic format) including** information as required in S.1.~~9~~**10**. Recorded Representations ~~shall be available from a taximeter or taximeter system~~ through an integral or separate recording element for all transactions conducted.

~~*[Nonretroactive January 1, 2016]*~~

(Added 2015) **(Amended 20XX)**

S.1.~~2~~3. Advancement of Indicating Elements. – ~~Except when a taximeter is being cleared, t~~**T**he primary indicating and recording elements shall be susceptible of advancement only by the movement of the vehicle or by the time mechanism **except where an advancement of analog indications occurs on a taximeter when being cleared.**

(Amended 20XX)

S.1.3.1. For Systems Using a Built-for-Purpose Device Installed in the Vehicle. –

(a) *At the conclusion of a transaction (e.g., following the totalizing of all accrued charges and having a customer receipt made available), no other advancement of fare, extras, or other charges shall occur until the taximeter has been cleared.*

[Nonretroactive as of January 1, 2017]

(b) Where permitted, a flat rate or negotiated rate shall be displayed in the "fare" indicating mechanism, provided that once a flat rate or negotiated rate is entered the fare may no longer be advanced by movement of the vehicle or the time mechanism.

(Amended 1988~~ and,~~ 2016 **and 20XX**)

**S.1.~~2~~3.~~1~~2. Time and Distance Mechanisms.~~ Means shall be provided on all taximeters designed to calculate fares based on a combination of time elapsed and distance traveled, to enable the vehicle~~

~~operator to render the time mechanism either operative or inoperative with respect to the fare-indicating mechanism.~~ **A transportation-for-hire system shall include either of the following:**

~~*S.1.2.2. Distance Mechanism.*~~ **(a)** ~~*Means shall be provided on all taximeters designed to calculate fare based on a combination of time elapsed and/or distance traveled to enable*~~***a "time off" mechanism and a "distance off" mechanism for*** *the vehicle operator to render the* ***measurement of time and/or*** *distance* ~~*mechanism either operative or*~~ *inoperative* ~~*with respect to the fare-indicating mechanism*~~***during a ride. Each use of these mechanisms shall be reflected in the calculation of total charges and recorded on the passenger's receipt; or***

[Nonretroactive as of January 1, ~~*2020*~~***20XX****]*

(Amended 2018 **and 20XX**)

(b) for systems not equipped with a "time off" and/or "distance off" mechanism, the system shall be equipped with means to make post-transaction fare adjustments to reduce the amount of the fare, provided the system creates a record of all location and time data from the initiation of the transportation service.
(Added 20XX)

(Added 2017) **(Amended 20XX)**

S.1.~~3~~4. Visibility of Indications. – Primary indications displayed on indicating elements shall be clear, definite, accurate, and easily read under any conditions of normal operation.
(Amended 20XX)

S.1.~~3~~4.1. – ~~Taximeter~~ Indications For Built-for-Purpose Devices Installed in the Vehicle. – The indications of fare, including extras, and the mode of operation, such as "time" or "hired," shall be constantly displayed whenever the meter is in operation. All indications of passenger interest shall be easily read from a distance of 1.2 m (4 ft) under any condition of normal operation. This includes any necessary lighting, shading, or other means necessary to make displayed indications clearly visible to operator and passenger.

(Amended 1977, 1986, 1988, ~~and~~ 2017**, and 20XX**)

S.1.~~3~~4.~~2~~1.1. Minimum Height of Figures, Words, and Symbols. – The minimum height of the figures used to indicate the fare shall be 10 mm and for extras, 8 mm. The minimum height of the figures, words, or symbols used for other indications, including those used to identify or define, shall be 3.5 mm.

(Added 1986)

S.1.~~3~~4.~~3~~1.2. Passenger's Indications. *– A supplementary indicating element installed in a taxi to provide information regarding the taxi service to the passenger (i.e., Passenger Information Monitor or PIM), shall clearly display the current total of all charges incurred for the transaction. The accruing total of all charges must remain clearly visible on the passenger's display (unless disabled by the passenger) at all times during the transaction.*

[Nonretroactive as of January 1, 2016]

(Added 2015) (Amended 2017)

S.1.~~3~~4.~~3~~1.2.1. Additional Information. *– Additional information shall be displayed or made available through a passenger's indicating element (as described in S.1.~~3~~4.~~3~~1.2 Passenger's Indications) and shall be current and reflect any charges that have accrued. This additional information shall include:*

(a) an itemized account of all charges incurred including fare, extras, and other additional charges; and

(b) the rate(s) in use at which any fare is calculated.

*Any additional information made available must not obscure the accruing total of charges for the taxi service. This additional information may be made accessible through clearly identified operational controls (e.g., keypad, button, menu, **~~touch screen~~touchscreen**).*

[Nonretroactive as of January 1, 2016]

(Added 2015) **(Amended 20XX)**

S.1.~~3~~4.~~3~~1.~~2~~3. Fare and Extras Charges. *– The indication of fare and extras charges on a passenger's indicating element shall agree with similar indications displayed on all other indicating elements in the system.*

[Nonretroactive as of January 1, 2016]

(Added 2015)

S.1.4~~5~~. Actuation of Fare Indicating Mechanism. – When a **~~taximeter~~built-for-purpose device installed in the vehicle** designed to calculate fares upon the basis of a combination of distance traveled and time elapsed, but not both time and distance used concurrently to calculate fare, is operative with respect to fare indication, the fare indicating mechanism shall be actuated by the distance mechanism whenever the vehicle is in motion at such a speed that the rate of distance revenue equals or exceeds the time rate, and may be actuated by the time mechanism whenever the vehicle speed is less than this and when the vehicle is not in motion.

(Amended 1977 **~~and~~** 2017**, and 20XX**)

S.1.~~5~~6. Operating Condition.

S.1.~~5~~6.1. General. – When a **~~taximeter~~built-for-purpose device installed in the vehicle** is cleared, the indication "Not Registering," "Vacant," or an equivalent expression shall be shown. Whenever a **~~taximeter~~built-for-purpose device installed in the vehicle** is set to register charges, it shall indicate "Registering," "Hired," or an equivalent expression and the rate at which it is set shall be automatically indicated (Rate 1 or Rate A, for example).

(Amended 1988 **and 20XX**)

S.1.~~5~~6.2. Time not Recording. – When a **~~taximeter~~built-for-purpose device installed in the vehicle** is set for fare registration with the time mechanism inoperative, it shall indicate "Time Not Recording" or an equivalent expression.

(Amended 1988 **and 20XX**)

S.1.~~5~~6.3. Distance Not Recording. *– When a **~~taximeter~~built-for-purpose device installed in the vehicle** is set for fare registration with the distance mechanism inoperative, it shall indicate "Distance Not Recording" or an equivalent expression.*

[Nonretroactive as of January 1, 2020]

(Added 2017) (Amended 2018 **and 20XX**)

S.1.~~6~~7. Fare Identification. – Fare indications shall be identified by the word "Fare" or by an equivalent expression. Values shall be defined by suitable words or monetary signs.

S.1.~~7~~8. Extras. – Extras shall be indicated as a separate item and shall not be included in the fare indication. They shall be identified by the word "Extras" or by an equivalent expression. Values shall be defined by suitable words or monetary signs. Means may be provided to totalize the fare and extras if the totalized amount returns to separate indications of fare and extras within 5 seconds or less.

(Amended 1988)

S.1.~~7~~8.1. Nonuse of Extras. – If and when **~~taximeter~~** extras are prohibited by legal authority or are discontinued by a vehicle operator, the extras mechanisms shall be rendered inoperable, or the extras indications shall be effectively obscured by permanent means.

(Amended 20XX)

S.1.~~8~~9. Protection of Indications. – All indications of fare and extras shall be protected from unauthorized alteration or manipulation.

(Amended 2015)

S.1.9~~10~~. Recorded Representation. *– A printed or electronic receipt issued from a* ~~***taximeter***~~***built-for-purpose device installed in the vehicle****, whether through an integral or separate recording element, shall include as a minimum, the following information when processed through the taximeter system:*

(a) date;

*(b) unique vehicle identification number, such as the medallion number, taxi number, vehicle identification number (VIN), permit number, or other identifying information as specified by the statutory authority;**

*(c) start and end time of the trip;**

*(d) distance traveled, maximum increment of 0.1 km (0.1 mi);**

(e) fare in $;

*(f) each rate at which the fare was computed and the associated fare at that rate;**

*(g) additional charges (in $) where permitted such as extras, any surcharges, telecommunication charges, and taxes shall be identified and itemized;**

*(h) total charge for service in $ (inclusive of fare, extras, and all additional charges);**

*(i) trip number, if available;***

*(j) telephone number (or other contract information) for customer assistance;*** ~~***and***~~

*(k) a statement of chargeable time and chargeable distance for taximeters that calculate fare using time and distance concurrently~~.~~**;***** ***and***

(l) for software-based systems, the software version identification number *.***
(Added 20XX)

Note: When processed through the taximeter or taximeter system, any adjustments (in $) to the total charge for service including discounts, credits, and tips shall also be included on the receipt.**

[Nonretroactive as of January 1, 1989]

**[Nonretroactive as of January 1, 2000]*

***[Nonretroactive as of January 1, 2016]*

****[Nonretroactive as of January 1, 2018]*

*******[Nonretroactive as of January 1, 20XX]***

(Added 1988) (Amended 1999, 2015, ~~**and**~~ 2017**, and 20XX**)

S.1.9~~10~~.1. Multiple Recorded Representations - Duplicate Receipts. – *A recording element may produce a duplicate receipt for the previous transaction provided the information printed is identical to the original with the exception of time issued. The duplicate receipt shall include the words "duplicate" or "copy." The feature to print a duplicate receipt shall be deactivated at the time the meter is hired for the next fare.*

[Nonretroactive as of January 1, 2000]

(Added 1999)

S.1.~~10~~11. Non-fare Information. *– The fare and extras displays may be used to display auxiliary information, provided the meter is in the ~~v~~Vacant condition, and such information is only displayed for10 seconds, or less. If the*

information consists of a list of information, the list may be displayed one item after another, provided that each item is displayed for 10 seconds, or less.

[Nonretroactive as of January 1, 2002]

(Added 2000) **(Amended 20XX)**

S.1.12. Electronic Receipt Required. – An electronic receipt shall be provided to the customer from software and application-based meters, when the payment transaction is completed electronically via the businesses application or software program.

(Added 20XX)

S.2. Basis of Fare Calculations. – A ~~taximeter~~**transportation-for-hire system** shall calculate fares only upon the basis of:

(a) distance traveled;

(b) time elapsed; or

(c) a combination of distance traveled and time elapsed.

A ~~taximeter~~**transportation-for-hire system** may utilize more than one rate to calculate the fare during a trip. Any change in the applied rate must occur at the completion of the current interval.

(Amended 1977~~ and,~~ 2016**, and 20XX**)

S.2.1. Initial Time and Distance Intervals. – The time and distance intervals of a ~~taximeter~~**built-for-purpose device installed in the vehicle** that does not calculate fares based on distance traveled and time elapsed used concurrently shall be directly proportional as expressed in the following formula:

$$\frac{\textit{Seconds of Initial Time Interval}}{\textit{Seconds per Non} - \textit{Initial Time Interval}} = \frac{\textit{Distance of Initial Mileage Interval}}{\textit{Distance per Non} - \textit{Initial Mileage Interval}}$$

(Added 1990) (Amended 2017)

S.3. Design of Operating Control.

S.3.1. Positions of Control. – The several positions of the operating controls shall be clearly defined and shall be so constructed that accidental or inadvertent changing of the operating condition of the ~~taximeter~~**built-for-purpose device installed in the vehicle** is improbable. Movement of the operating controls to an operating position immediately following movement to the cleared position shall be delayed enough to permit the ~~taximeter~~**device's display** to come to a complete rest in the cleared position.

(Amended 1988 **and 20XX**)

S.3.2. Control for Extras Mechanism. – The knob, handle, or other means provided to actuate the extras mechanism shall be inoperable whenever the ~~taximeter~~**built-for-purpose device installed in the vehicle** is cleared.

(Amended 20XX)

S.4. Interference. – The design of a ~~taximeter~~**built-for-purpose device installed in the vehicle** shall be such that when a fare is calculated by using time and/or by using distance (but not used concurrently) there will be no interference between the time and the distance portions of the mechanism device at any speed of operation.

(Amended 1977, 1988, ~~and~~ 2017**, and 20XX**)

S.5. Provision for Security Seals. – 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 requires the security seal to be broken before an adjustment or interchange can be made of:

(a) any metrological parameter affecting the metrological integrity of the ~~taximeter~~**transportation-for-hire systems** and associated equipment; or

(b) any metrological parameter controlled by software residing in the ~~taximeter~~**built-for-purpose device installed in the vehicle** or an associated external computer network.

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

(Audit trails shall use the format set forth in Table S.5. Categories of Device and Methods of Sealing)

(Amended 1988, 2000, ~~and~~ 2017**, and 20XX**)

Table S.5.

Categories of Device and Methods of Sealing

Categories of Device	*Methods of Sealing*
Category 1: *No remote configuration capability.*	*Seal by physical seal or* ~~*two event counters: one*~~**,** *for* ~~*calibration parameters*~~***components that may be removed from the vehicle, a combination of physical seals*** *and* ~~*one for configuration parameters*~~***a physical or electronic link as described in S.5.2. Taximeters Calibrated to Specific Vehicles****.*
Category 2: *Remote configuration capability, but access is controlled by physical hardware.* *The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode. The device shall not operate as normal when in the remote configuration mode.*	*The hardware enabling access for remote access to calibration functions must be at the device and sealed using a physical seal and the device shall include an event logger.* *An event logger must be used to record changes to configuration parameters made through remote access.* *The event logger must include event counters (000 to 999 with a minimum count of 1000 events), the parameter ID, the date and time of the change, and the new value of the parameter. A printed or electronic copy of the information must be available through the device. 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.*

Table S.5. *Categories of Device and Methods of Sealing*	
Category 3: *Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).* *The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode. The device shall not operate as normal when in the remote configuration mode.*	*An event logger must be used to record changes to adjustable parameters that are made through remote access, and which is accessible only by authorized persons (using an Internet web browser or other such secure software.* *The event logger shall include event counters, the date and time of the change, the parameter ID, and the new value of the parameter. A printed or electronic copy of the information must be available through the device. The event loggers 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 change to be stored for each parameter.)* *The device shall become inoperable when access to the system's metrological parameters is made through unapproved or unauthorized means. The device shall remain inoperable until cleared by the official having statutory authority.*

[Nonretroactive as of January 1, 2018]

(Table Added 2017) (Amended 2022 **and 20XX**)

S.5.1. Taximeter Connected to Networked Systems. – Metrological features that are not located on the taximeter device installed in the vehicle (i.e., accessed through a computer network, server, or "cloud") shall be secured by means that will:

(a) protect the integrity of metrological data and algorithms used to compute fares from such data against unauthorized modifications; and

(b) use software-based access controls or equivalent technological protections that limit access to metrological data and algorithms used to compute fares from such data only to authorized persons.

(Added 2017)

S.5.2. Taximeters Calibrated to Specific Vehicles. – In the case of taximeters where the proper performance and calibration of the device has been verified when used in a specific vehicle and which may be removed from the vehicle (e.g., slide mounting the taximeter), means shall be provided through a physical seal or electronic link between components affecting accuracy or indications of the device to ensure that its performance is not affected and operation is permitted only with those components having the same unique properties.

(Added 2017)

S.6. Power Interruption, Electronic Taximeters.

(a) After a power interruption of three seconds or less, the fare and extras indications shall return to the previously displayed indications and may be susceptible to advancement without the taximeter being cleared.

(b) After a power interruption exceeding three seconds, the fare and extras indications shall return to the previously displayed indications and shall not be susceptible to advancement until the taximeter is cleared.

*After restoration of power following an interruption exceeding three seconds, the previously displayed fare shall be displayed for a maximum of one minute at which time the fare shall automatically clear, and the taximeter shall return to the vacant condition.**

*[*Nonretroactive as of January 1, 2002]*

(Added 1988) (Amended 1989, 1990, and 2000)

S.7. Measurement Signal Loss. – If the measurement signal is interrupted, the taximeter shall be capable of determining any information needed to complete a transaction in progress at the time of signal loss/interruption.

Note: If the meter ceases to increment fare based on distance, the taximeter may continue to increment fare based on elapsed time provided the time mechanism is not affected by signal loss.

(Added 2017)

S.7.1. Intermittent Trip Data Loss. – When the measurement signal is lost intermittently during a trip (e.g., traveling through a tunnel), but recovered prior to the end of the trip, the taximeter shall be capable of calculating an accurate fare in accordance with T.1. Tolerance Values.

(Added 2017)

S.7.2. Significant Trip Data Loss. – When the signal is lost for a significant portion of the trip, the taximeter shall calculate the total charge utilizing recorded time and distance measurements and other charges (e.g., tolls and airport fees), and may also include other means in accordance with the terms of service (or other agreement) the passenger has agreed to.

Note: Significant trip data loss refers to instances when the measurement signal is lost to the extent that the taximeter cannot perform an accurate measurement or when the signal is not regained by the end of the trip.

(Added 2017)

S.8. Anti-Fraud Provisions, Electronic Taximeters. – An electronic taximeter may have provisions to detect and eliminate distance input that is inconsistent with the taximeter's source(s) of distance measurement data. When a taximeter equipped with this feature detects input inconsistent with the distance measurement data source(s):

(a) the meter shall either filter out the inconsistent distance input signals or cease to increment fare based on distance until the distance input signal is restored to normal operation. If the meter ceases to increment fare based on distance, the taximeter may continue to increment fare based on elapsed time when (1) permitted by the statutory authority; and (2) the time mechanism is not affected by inconsistent signals;

(b) the taximeter shall provide a visible or audible signal that inconsistent input signals are being detected; and

(c) the taximeter shall record the occurrence in an event logger. The event logger shall include an event counter, the date, and the time of at least the last 1000 occurrences.

(Added 2001) (Amended 2017)

N. Notes

N.1. Distance Tests.

N.1.1. Test Methods. – To determine compliance with distance tolerances, a distance test of a taximeter shall be conducted utilizing one or more of the following test methods:

(a) **Road Test.** – A road test consists of driving the vehicle over a precisely measured road course.

(b) **Fifth Wheel Test.** – A fifth wheel test consists of driving the vehicle over any reasonable road course and determining the distance actually traveled through the use of a mechanism known as a "fifth wheel" that is attached to the vehicle and independently measures and indicates the distance.

(c) **Simulated Road Test.*** – A simulated road test consists of determining the distance traveled by use of a roller device, or by computation from rolling circumference and wheel turn data.

*Simulated-road testing is not appropriate for taximeters using measurement data from sources other than signal(s) generated by rotation of the wheels of the vehicle.

Note: Field examinations of transportation network measurement systems need not include testing of all individual devices used as driver/passenger indicating elements in connection with the service provided. It is considered sufficient that a representative sample of various indicating elements be incorporated in testing to verify proper operation of the system.

(Amended 1977 ~~and~~ 2017**, and 20XX**)

N.1.2. Test Procedures. – The distance test of a taximeter, whether a road test, a simulated road test, or a fifth wheel test, shall include at least duplicate runs of sufficient length to cover at least the third money drop or 1 mi, whichever is greater, and shall be at a speed approximating the average speed traveled by the vehicle in normal service. In the case of metric calibrated taximeters, the test should cover at least the third money drop or 2 km, whichever is greater.

(Amended 1977)

N.1.2.1. Taximeters Using Measurement Data Sources from Other Than Rotation of the Wheels.

N.1.2.1.1. Testing, General. – Testing of taximeters with metrologically significant parameters that do not completely reside within the taximeter device shall include tests performed under variable conditions to verify that any non-compliant issue is generated from a network system rather than a single taximeter device. The variability tests shall include a minimum of three consecutive tests of varying lengths, locations, and/or ~~environment~~**environmental** conditions.

(Added 2017) **(Amended 20XX)**

N.1.2.1.2. Repeatability Testing, Taximeters Using Measurement Data Sources From Other Than Rotation of the Wheels. – Repeatability testing shall be conducted if, during testing, a taximeter registers a distance measurement that does not comply with the tolerance values in T.1.1. Distance Tests. A minimum of three additional tests shall be conducted at the same location and where all test variables are reduced to the greatest extent practicable to verify the system's ability to repeat transaction indications. Repeatability testing performed in excess of these three additional tests is done at the discretion of the official with statutory authority.

(Added 2017)

N.1.3. Test Conditions.

N.1.3.1. Measurement Data Based on the Rotation of the Vehicle's Wheels. – For taximeters that receive input of measurement data generated (directly or indirectly) from rotation of the vehicle's wheels, the test of the taximeter shall be performed under the following conditions.

(Added 2017)

N.1.3.1.1. Vehicle Lading. – During the distance test of a taximeter, the vehicle shall carry two persons, or in the case of a simulated road test, 70 kg or 150 lb of test weights may be substituted in lieu of the second person.

N.1.3.1.2. Tire Pressure. – At the completion of test run or runs, the tires of the vehicle under test shall be checked to determine that the tire pressure is that operating tire pressure posted in the vehicle. If not, the tire pressure should be adjusted to the posted tire pressure and further tests may be conducted to determine the operating characteristics of the taximeter.

(Amended 1977)

N.1.3.2. Taximeters Using Other Measurement Data Sources. – Except during type evaluation, all tests shall be performed under conditions that are considered usual and customary for the location(s) where the system is normally operated and as deemed necessary by the statutory authority.
(Added 2017)

N.1.3.2.1. Testing for Environmental Influences. – During type evaluation, the distance test may be performed on a route traveled by the vehicle that exposes the system to conditions possibly contributing to the loss of, or interference with, the signal(s) providing measurement data. This may include:

(a) objects that may obstruct or reflect signals such as tall buildings/structures, forestation, tunnels, etc.;

(b) routes that do not follow a straight-line path;

(c) significant changes in altitude; and

(d) any other relevant environmental conditions.
(Added 2017)

N.2. Time Test. – If a taximeter is equipped with a timing device through which charges are made for time intervals, the timer shall be tested at the initial interval, four separate subsequent intervals, and an average time test of at least four consecutive subsequent time intervals.
(Amended 1988)

N.3. Interference Test. – For taximeters that calculate fares based on time and/or distance but not simultaneously, a test shall be conducted to determine whether there is interference between the time and distance elements. During the interference test, the vehicle's operating speed shall be 3 km/h or 4 km/h (2 mi/h or 3 mi/h) faster, and then 3 km/h or 4 km/h (2 mi/h or 3 mi/h) slower than the speed at which the basic distance rate equals the basic time rate. The basic rate per hour divided by the basic rate per mile is the speed (km/h or mi/h) at which the basic time rate and basic distance rate are equal.

Note: Performance of the interference test may not be considered appropriate as a field test while travelling in a vehicle equipped with a taximeter. This test may be performed during type evaluation under controlled conditions for practicality and for safety concerns.
(Amended 1988 and 2017)

T. Tolerances

T.1. Tolerance Values.

T.1.1. On Distance Tests. – Maintenance and acceptance tolerances for taximeters shall be as follows:

(a) On Overregistration: 1 % of the interval under test.

(b) On Underregistration: 4 % of the interval under test, with an added tolerance of 30 m or 100 ft whenever the initial interval is included in the interval under test.

T.1.2. On Time Tests.

T.1.2.1. On Individual Time Intervals. – Maintenance and acceptance tolerances on individual time intervals shall be as follows:

(a) On Overregistration: 3 seconds per minute (5 %).

(b) On Underregistration: 9 seconds per minute (15 %) on the initial interval, and 6 seconds per minute (10 %) on subsequent intervals.

T.1.2.2. On Average Time Interval Computed After the Initial Interval. – Except for the initial interval, maintenance and acceptance tolerances on the average time interval shall be as follows:

(a) On Overregistration: 0.2 second per minute (0.33 %).

(b) On Underregistration: 3 seconds per minute (5 %).

(Amended 1991)

T.1.3. On Interference Tests. – For taximeters designed to calculate fares upon the basis of a combination of distance traveled and time elapsed (but not using both simultaneously), the distance registration of a taximeter in the "time on" position shall agree within 1 % of its distance registration in the "time off" position.

(Added 1988) (Amended 2017)

T.2. Tests Using Transfer Standards. – 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 transfer standard (i.e., fifth wheel) when compared to the basic reference standard.

(Added 2017)

UR. User Requirements

UR.1. Inflation of Vehicle Tires. – For taximeters that receive input of measurement data generated (directly or indirectly) from rotation of the vehicle's wheels, the operational tire pressure of passenger vehicles and truck tires shall be posted in the vehicle and shall be maintained at the posted pressure.

(Amended 1977 and 2017)

UR.2. Position and Illumination of Taximeter. – A taximeter shall be so positioned and illuminated that its indications, operational markings, and controls of passenger interest can be conveniently read by a passenger seated in a position of up to 1.2 m (4 ft) away from the taximeter under any condition of normal operation.

Note: Software and application-based systems are exempt from this user requirement if all transaction related information is readily accessible, clear, and verifiable by customers through their digital interface.

(Amended 1985, 1986, ~~and~~ 2017**, and 20XX**)

UR.3. Statement of Rates. – The distance and time rates for which a taximeter is set, including the initial distance interval and the initial time interval, the local tax rate, and the schedule of extras when an extras indication is provided shall be conspicuously displayed inside the front and rear passenger compartments. The words "Rate," "Rates," or "Rates of Fare" shall precede the rate statement. The rate statement shall be fully informative, self-explanatory, and readily understandable by the ordinary passenger, and shall either be of a permanent character or be protected by glass or other suitable transparent material.

Note: Software and application-based systems are exempt from this user requirement if all transaction related information is readily accessible, clear, and verifiable by customers through their digital interface.

(Amended 1977, 1988, 1990, ~~and~~ 1999**, and 20XX**)

Previous Status:
2025: Informational

Original Justification:
A unified code is needed because these devices and systems exist across a spectrum. Traditional taxicab companies can now use fully app-based fare calculating measurement and payment systems. Some systems blend in vehicle app-based

GPS measurement systems with traditional in person ride pick-ups, while others can utilize physical metering inside the vehicle with electronic ride acquisitions.

A unified code will standardize the specifications, tolerances, test procedures, and user requirements for all types of these systems, as much as possible, bringing equity to the industry.

Comments in Favor:

Regulatory:

- 2026 Annual: A Representative from Louisiana Department of Agriculture supports this item as it is fully developed.
- 2026 Interim: A representative from Transportation-For-Hire Systems Task Group, The block was designed to bring all the disparate codes under one umbrella. The new code would allow the regulation of all transportation-for-hire systems and bring some equity to the marketplace. Due to technological evolution, the code is as developed as it can be at this time and recommends a voting status. In response to a question from the floor: Uber did participate but left task group when they felt the proposal was finished. Ride-share companies should be regulated equitably but not necessarily the same way as taxis. This proposal would not change the way industry operates.
- 2026 Interim: A representative from Louisiana Department of Agriculture supports a voting status.
- 2026 Interim: A representative from Orange County Weights & Measures, Supports the proposal. There is a level of ambiguity around exemptions for flat rate charges, when, and how to regulate them. Language around quoted price verse fee rate needs refinement.

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Comments Against:

Regulatory:

- 2026 Annual: None
- 2026 Interim: None

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Annual: A Representative from California Division of Measurement Standards provided comments at interim and should be assigned to the task group to address those comments.
- 2026 Interim: A representative from LA County Agricultural Commissioner/Weights & Measures, believes this item has merit and recognizes the hard work the committee has done. They recommend an assigned status because there are few items that will require additional clarification. They have three concerns that require additional clarification due to opportunities for exploitation. 1. Good Faith Estimates. 'Good Faith' is subjected to change when circumstances arise. 2. Surge pricing exploitation. 3. The testing of the

application will be based on random sampling. Additional clarification is needed to provide guardrails to prevent software exploits.

- 2026 Interim: A representative from San Diego County Department of Agriculture, Weights & Measures, this is an important proposal, as increasingly taxis are turning to new technology that is imperfectly covered by the code as it is written. There is still room for editing and refinement. Modern Rideshare systems provide customers a price up front, which fall into the first exemption, but how would the new code apply in the cases where the price changes due to conditions or route. This proposal also includes a note that allows jurisdictions to test a sample of Transport Network System devices in their jurisdiction rather than all of them. More details are needed around this section of the item. This proposal is needed, and the Task Group has made great progress, but fundamental question of scope and the implications of sample-based inspections need to be resolved before moving forward. Recommend this item remain assigned to the Task Group.
- 2026 Interim: A representative from California Division of Measurement Standards, Appreciates the work done by the task group, but supports CA county comments. Not fully developed and recommends assigned status.
- 2026 Interim: A representative from San Diego County Department of Agriculture, Weights & Measures, Question: Did the participates feel that this code would apply to them?

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: None
- Interim 2026: A representative from NCWM, once members of the task group thought the work was done, they began dropping off, so maybe the full group should be reconvened.

Item Development:

2026 NCWM Annual Meeting: The Committee chose to retain Informational status for this item to receive specific recommendations for language development. If there are no specific suggestions the item may be assigned a Voting status.

2026 NCWM Interim Meeting: Upon receiving comments during open hearings the committee addressed two concerns by providing updated language in 5.54 Transportation for Hire Systems A.1. (b) to clarify application of good faith estimates. Additional updates to language include clarification of jurisdictional authority on appropriate representative sample size determination. The committee assigned this item Informational status to receive additional comments during the annual meeting

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remains informational.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comment was received:

Mr. Matt Douglas (State of California, Division of Measurement Standards): Recommends that this block be assigned to the Transportation-For-Hire Systems Task Group. While he is generally supportive of the item and the intent, he does not believe the item is fully developed. He questioned whether an app-based taxi falls under S.1.1.1. or S.1.1.2.? Or if this can vary based on design? S.1.1.1. speaks to "built for purpose" devices, while S.1.1.2. states in the title "Application Software Installed on Not Built-for-Purpose Devices" which seems to fit the description of an App-based taxi). The language speaks to "transportation network measurement systems". He also commented on S.1.10 regarding recorded representations – these requirements seem to only apply to a "built-for-purpose device installed in the vehicle", while S.1.12 speaks to electronic representations being required, it does not speak to the required content of the recorded

representation. This seems to imply that only built for purpose devices will need to provide the content identified in S.1.10.

The 2026 S&T Committee recommends that the item be assigned back to the Transportation for Hire Systems Task Group based on testimony heard during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: Representatives from New Jersey Weights & Measures and NYS Weights & Measures support a voting status.

The committee recommends a voting status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Louisiana Department of Agriculture and Forestry stated the task group has been dissolved; this group was put together at the request of NCWM. This code provides an equitable code for transportation for hire for measurement of time and distance.

A representative from NIST shared concerns that were brought forward that are not HB 44 related items. He believes this is fully developed.

A representative from Maryland Department of Agriculture supports Voting status.

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

ITEM BLOCK 2 (B2) – ELECTRIC VEHICLE SUPPLY EQUIPMENT

B2: EVS-26.2a A EVSE Indicating Element

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

S.1.2. EVSE Indicating Elements. ~~**An EVSE used to charge electric vehicles shall include an indicating element that accumulates continuously and displays, for a minimum of 15 seconds at the activation by the user and at the start and end of the transaction, the correct measurement results relative to quantity and total price. Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the device. All indications and representations of electricity sold shall be clearly identified and separate from other time-based fees indicated by an EVSE that is used for both the sale of electricity as vehicle fuel and the sale of other separate time-based services (e.g., vehicle parking).**~~

(a) **An EVSE** ~~**used to charge electric vehicle**~~ **placed in service prior to January 1, 20XX** shall include an indicating element that accumulates continuously and displays, for a minimum of 15 seconds at the ~~**activation**~~**authorization** by the user and at the start and end of the transaction, the correct measurement results relative to quantity and total price.

(b) An EVSE placed in service on or after January 1, 20XX shall include an indicating element that accumulates continuously and, when activated by the user, displays the quantity and

total price for a minimum of one minute. The correct measurement results relative to quantity, unit price, total price, and any other fees shall be displayed for a minimum of one minute following the EVSE being disconnected from the vehicle, or until the next transaction is initiated, or until other consumer-initiated controls clear the information.

Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the device. All indications and representations of electricity sold shall be clearly identified and separate from other time-based fees indicated by an EVSE that is used for both the sale of electricity as vehicle fuel and the sale of other separate time-based services (e.g., vehicle parking).

(Amended 20XX)

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers'

flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.

S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.

S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.

S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

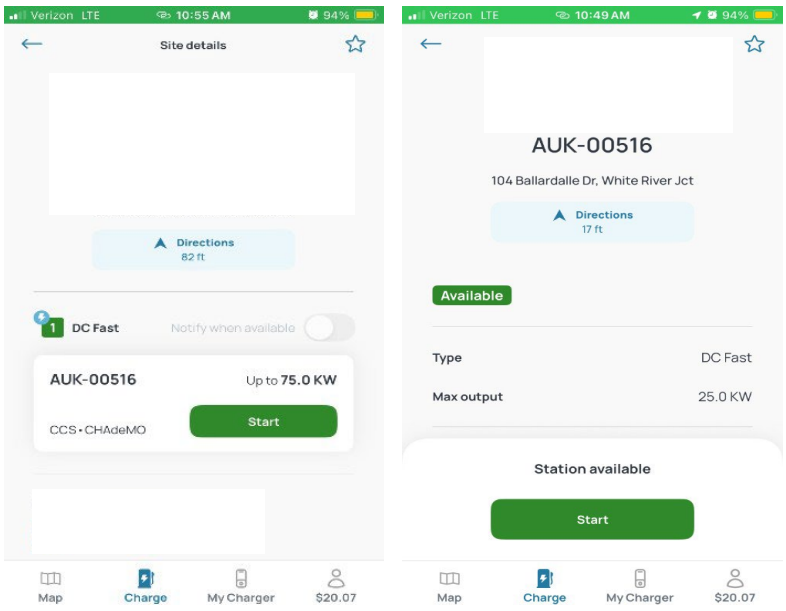


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remains assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California): Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland is in support of this item and appreciates the amount of work that has gone into it. Maryland recommends a voting status with the following additions to the item verbiage and would like it to be non retroactive.

B2:EVS-26.2a

S.1. Primary Indicating and Recording Elements.

S.1.X. General. – Electric Vehicle Supply Equipment (EVSE).

(a) shall be equipped with a primary indicating element as part of the device; and

(b) may be equipped with a primary recording element

[Nonretroactive as of January 1, 20XX]

Representatives from Arkansas Department of Agriculture, Delaware and Texas echoed Maryland.

A representative from Louisiana Department of Agriculture and Forestry support this item, but adds it needs an integral indicating element.

The committee recommends Voting on this item with the inclusion of the updated recommended verbiage.

B2: EVS-26.2b A Decimal Standardization

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

S.1.3.2. EVSE Value of Smallest Unit. – The value of the smallest unit of indicated delivery by an EVSE, and recorded delivery ~~**if the EVSE is equipped to record**~~:

(a) ~~**for AC systems shall not exceed 0.0001 kWh;**~~

(b) ~~**for DC systems**~~ shall not exceed 0.00**0**1 kWh; and

(c) the value of the kWh shall be expressed only as a decimal submultiple of 1 ~~**that satisfy (a) and**~~

~~**(b)**~~.

(Amended 20XX)

S.2.4.4. Agreement Between Indications. – All quantity, unit price, and total price indications within a ~~**measuring**~~ system shall agree for each transaction.

(Amended 20XX)

S.2.5.1. Money-Value Divisions Digital. – An EVSE with digital indications shall comply with the requirements of paragraph G-S.5.5. Money-Values, Mathematical Agreement, and the total price computation at the end of the transaction shall be based on ~~**quantities not exceeding 0.01**~~ **the quantity indicated as required by S.1.3.2. EVSE Value of Smallest Unit**.

(Amended 20XX)
Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.
S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.
S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

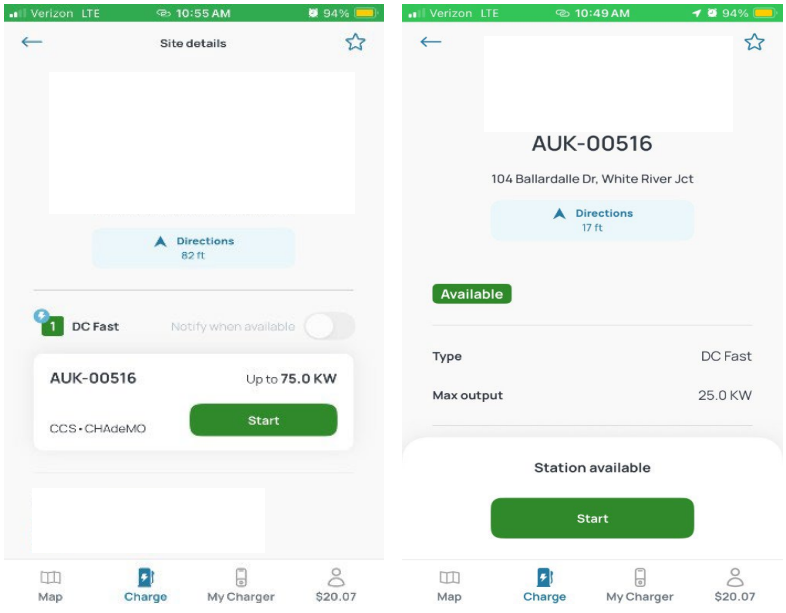


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.

2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on b:

The committee recommends Voting on this item.

B2: EVS-26.2c A Totalizer Availability

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

S.7. Totalizers for EVSE Systems. – EVSE systems shall be designed with a non-resettable totalizer for the quantity delivered through each separate measuring device. Totalizer information shall be adequately protected and unalterable. **The system shall provide** ~~**T**~~**t**otalizer information ~~**shall be provided by the system and**~~ **that is** readily available ~~**on site or via on site internet access**~~**at the time of inspection**.

(Amended 20XX)
Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, “using EVSE should be the same experience as using a gas pump.”

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation “y,” while another operates under assumption “x,” and compliance jurisdictions take actions based on interpretation “z.” This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word “used” is ambiguous and lends itself to multiple interpretations. “Used” could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is “using” the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn’t explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across

all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.

S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.

S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to

power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco

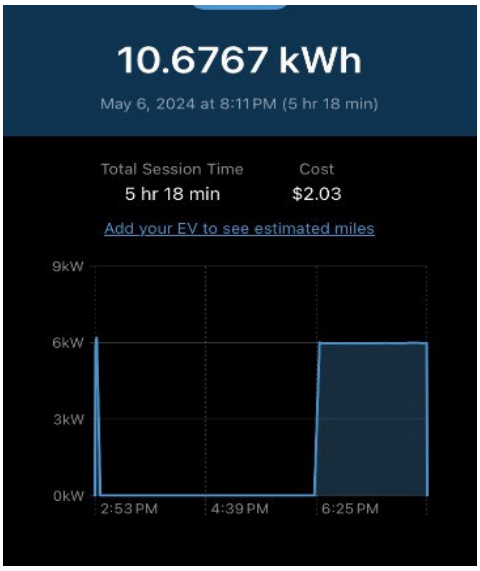


Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.
S.2.4.4

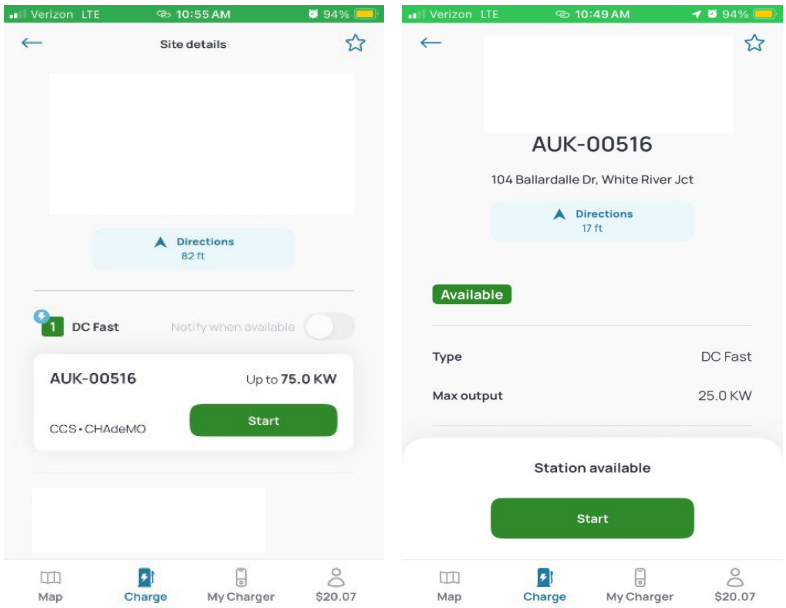


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.

S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.

N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard the following comments:

A representative from Maryland is in support of this item and appreciates the amount of work that has gone into it. Maryland recommends a voting status with the following additions to the item verbiage would like it to be non retroactive.

B2: EVS-26.2c Totalizer Availability

S.7. Totalizers for EVSE Systems. – EVSE systems shall be designed with a non-resettable totalizer for the quantity delivered through each separate measuring device. Totalizer information shall be adequately protected and unalterable. The system shall provide Totalizer information shall be provided by the system and that is readily available through the device or approved application on site or via on site internet accessat the time of inspection.

(Amended 20XX)

Representatives from Arkansas Department of Agriculture, Delaware and Texas echoed Maryland.

A representative from Louisiana Department of Agriculture and Forestry supports this item, but adds it needs an integral indicating element.

The committee recommends Voting on this item with the inclusion of the updated recommend verbiage.

B2: EVS-26.2d A Removal of NTEP Language

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

~~**N.3.2. Type Evaluation Testing of a DC EVSE. – Tests shall be performed at the following voltage points one between 350 VDC and 450 VDC and if supported by the EVSE a second at between 700 VDC and 900 VDC:**~~

~~**Accuracy tests shall be performed at the following current levels:**~~
~~**A point between 10 % and 20 % of the MDA, but not less than 30 A;**~~
~~**A point between 40 % and 60 % of the MDA; and**~~
~~**A point between 70 % and 100 % of the MDA.**~~

~~**(Amended 2024)**~~

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should <u>not</u> be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers.

While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.
S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.
S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco

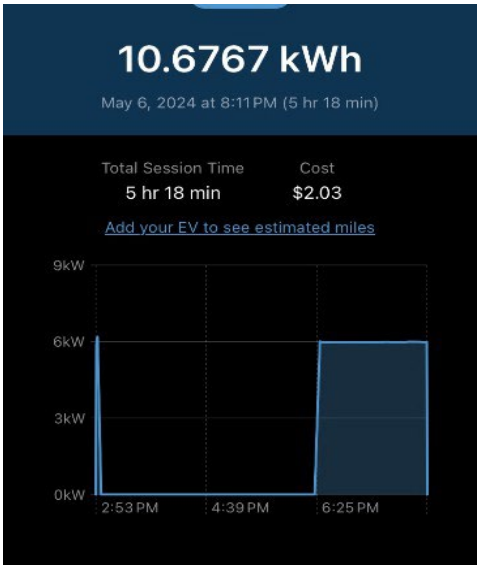


Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

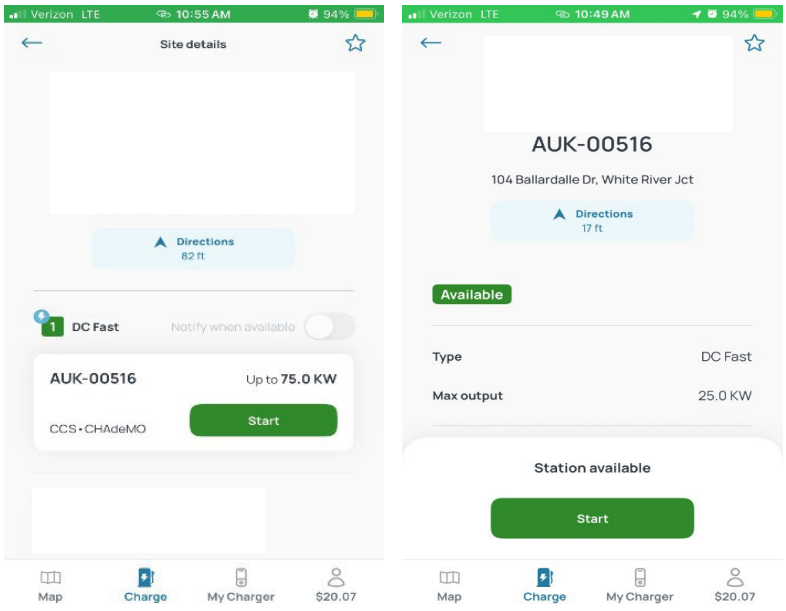


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for

S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

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2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on d:

The committee recommends Voting on this item.

B2: EVS-26.2e A Consistent Language between AC and DC Testing

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

N.3.3. ~~Performance Verification in the Field~~ Testing of a DC EVSE. – Accuracy tests shall be performed at any voltage and the following current levels:

(Amended 20XX)

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, “using EVSE should be the same experience as using a gas pump.”

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation “y,” while another operates under assumption “x,” and compliance jurisdictions take actions based on interpretation “z.” This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.
S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.
S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.
S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.
S.2.4.4

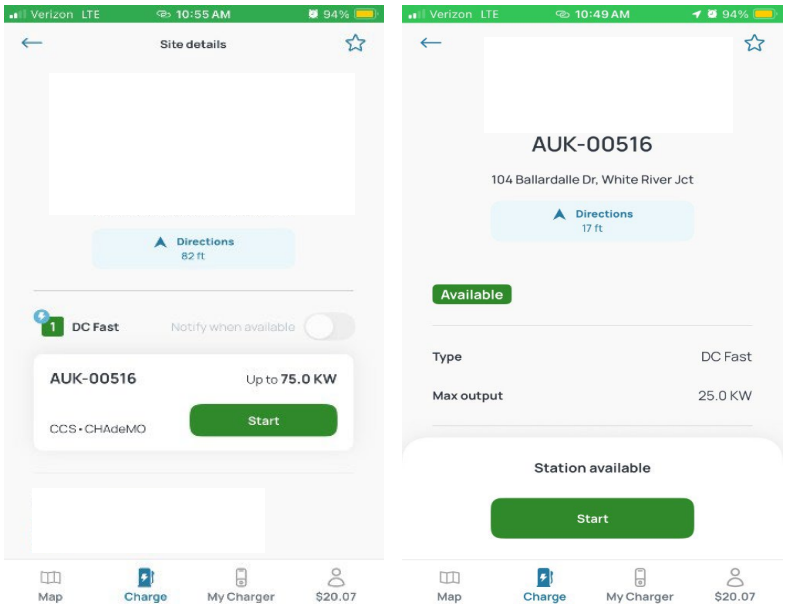


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.

S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.

N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on e:

The committee recommends Voting on this item.

B2: EVS-26.2f A Exceptions

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

A.2. Exceptions. – This code does not apply to:

(a) The use of any measure or measuring device **that is otherwise subject to the jurisdiction of a** ~~**owned, maintained, and used by a public utility or municipality only in connection with measuring electricity subject to the authority having jurisdiction such as the**~~ Public Utilities Commission **or other local governing bodies regulating utilities.**

~~**(b) Electric Vehicle Supply Equipment (EVSEs) used solely for dispensing electrical energy in connection with operations in which the amount dispensed does not affect customer charges or compensation.**~~

(c) The wholesale delivery of electricity.

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should <u>not</u> be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.
S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.
S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to
power loss also apply to network loss.
S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

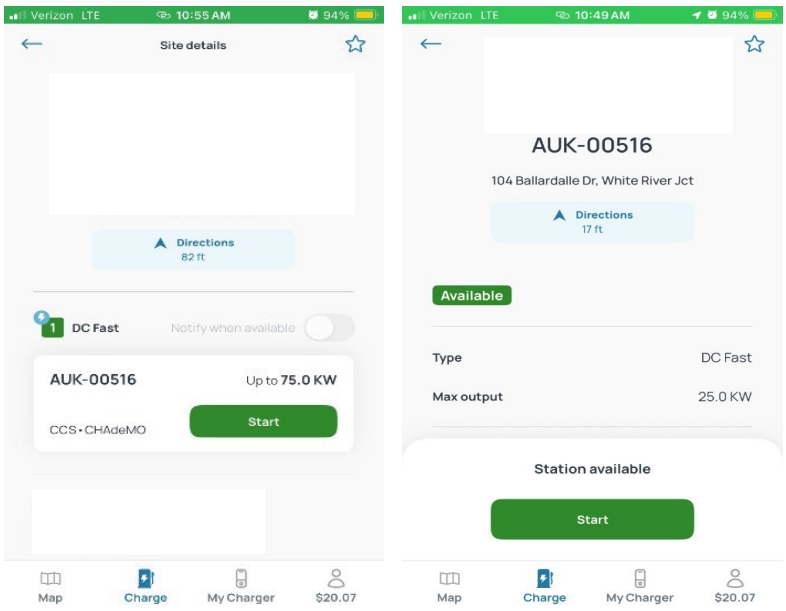


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for

S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on f:

The committee recommends Voting on this item.

B2: EVS-26.2g A Network Loss

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

S.2.3. EVSE Provision for Power or Network Loss.

S.2.3.1. Transaction Information. – In the event of a power loss ***or network loss, which causes an interruption to energy delivery*,*** the information needed to complete any transaction (i.e., delivery is complete and payment is settled) in progress at the time of the power loss ***or network loss, which causes an interruption to energy delivery*,*** (such as the quantity and unit price, or sales price) shall be determinable through one of the means listed below or the transaction shall be terminated without any charge for the electrical energy transfer to the vehicle:

(a) at the EVSE;

(b) at the console, if the console is accessible to the customer;

(c) via on site internet access; or

(d) through toll-free phone access.

For EVSEs in parking areas where vehicles are commonly left for extended periods, the information needed to complete any transaction in progress at the time of the power loss ***or network loss, which causes an interruption to energy delivery*,*** shall be determinable through one of the above means for at least eight hours.

[*Nonretroactive as of January 1, 20XX]

(Amended 20XX)

S.2.3.2. Transaction Termination. – In the event of a power loss ***or network loss, which causes an interruption to energy delivery**** either:

(a) the transaction shall terminate at the time of the power loss ***or network loss, which causes an interruption to energy delivery**;*** or

(b) the EVSE may continue charging without additional authorization if the EVSE is able to determine it is connected to the same vehicle before and after the ~~**supply**~~ power ~~**outage**~~**loss** ***or network loss, which causes an interruption to energy delivery**.***

In either case, there must be a clear indication on the receipt provided to the customer of the interruption, including the date and time of the interruption along with other information required under S.2.6. EVSE Recorded Representations.

[*Nonretroactive as of January 1, 20XX]

(Amended 20XX)

S.2.3.3. User Information. – The EVSE memory, or equipment on the network supporting the EVSE, shall retain information on the quantity of fuel dispensed and the sales price totals during power loss ***or network loss, which causes an interruption to energy delivery****.

[*Nonretroactive as of January 1, 20XX]

(Amended 20XX)

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.



Example 1: EVSE behind a fence owned by a public utility for their exclusive use.



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A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

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The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated

language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.

S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.

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This language would make the requirements which currently apply to
power loss also apply to network loss.

S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

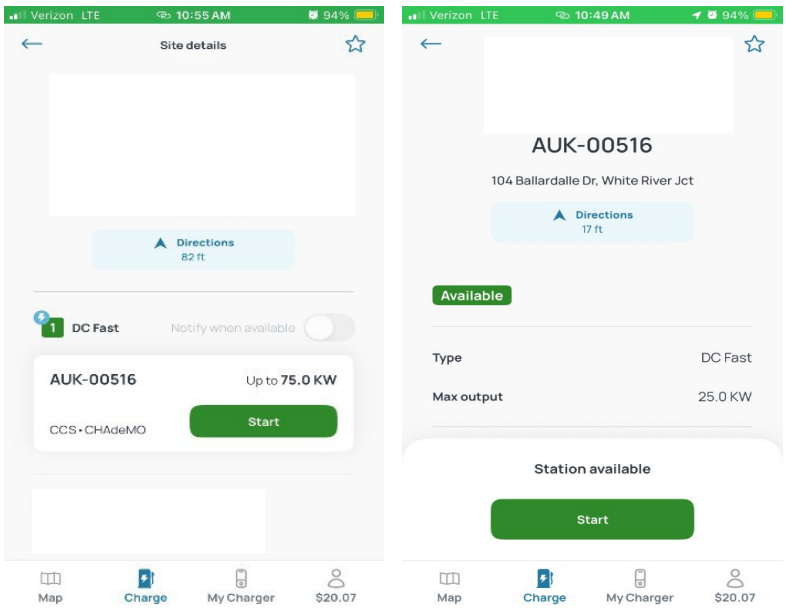


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.
S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.
N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends and assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on g:

The committee recommends Voting on this item.

B2: EVS-26.2h A Consumer Labeling

Source:
Vermont Division of Food Safety & Consumer Protection Weights and Measures

Purpose:
The intent of the proposed changes is to add clarity, uniformity, and consistency to NIST Handbook 44, Section 3.40. Electric Fueling Systems. The proposal adds language and removes exemptions, which will be beneficial to compliance programs, consumers, and the EVSE industry.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

Option A:

S.2.4.2. Equipment Capacity and Type of Voltage.

S.2.4.2.1. – An **unrestricted/dedicated service** EVSE shall be able to conspicuously indicate on each face the ~~**maximum rate of energy transfer (i.e.,** maximum power**)**~~ and the type of current associated with each unit price offered (e.g., **Max** 7 kW AC, 25 kW DC **Max**, etc.).

S.2.4.2.2. – A restricted/variable service EVSE shall be able to conspicuously indicate on each face the range of power and the type of current associated with each unit price offered (e.g., 0 kW to 7 kW AC, 25 kW to 100 kW DC, etc.).

Appendix D Definitions

service, unrestricted/dedicated.

– Service that provides the maximum power available based on the conditions of installation and the conditions present during the charging session.

(Added 20XX)

service, restricted/variable.

– Service that restricts power by the configuration of the EVSE based on the conditions of installation and the conditions present during the charging session, which may result in periods of reduced, and/or interrupted transfer of electrical energy.

(Added 20XX)

maximum power. – The maximum rate of power transfer, based on the conditions of installation. Maximum power may differ from the rated power of an EVSE. [3.40]

(Added 20XX)

Option B:

S.2.4.2. Equipment Capacity and Type of Voltage. – An EVSE shall be able to conspicuously indicate on each face the maximum ~~**rate of energy**~~ **power** transfer ~~**(i.e., maximum power)**~~ **available based on the conditions of installation** and the type of current associated with each unit price offered (e.g., **Max** 7 kW AC, 25 kW DC **Max**, etc.)

Previous Status:
New Proposal

Original Justification:

The EVSE industry, consumers, and regulators can benefit from increased clarity, uniformity, and consistent expectations. These proposed changes will enhance consumer confidence, leading to increased use and support of the electric vehicle charging network. Many consumers desire more clarity and understanding when using EVSEs. As one consumer stated, "using EVSE should be the same experience as using a gas pump."

Several of the proposed changes clarify legally ambiguous and inconsistent statements within the Electric Vehicle Fueling Systems code. As weights and measures compliance programs are implemented around the country, it is crucial to establish clear standards where everyone agrees on the meaning of each requirement. Standards that are unclear, confusing or susceptible to multiple interpretations promote misunderstanding and a lack of confidence in the industry and enforcement programs. One manufacturer might be trying to comply with interpretation "y," while another operates under assumption "x," and compliance jurisdictions take actions based on interpretation "z." This last type of misunderstanding leads to added costs to manufacturers and installers, as well as wastes time of compliance programs.

A.2. Exemptions (a)

In Vermont, public utilities own between 15% and 20% of EVSEs commercially available to the public and in direct competition with EVSEs owned by the government and other private companies. This exemption, as is currently written, creates varying standards within the industry. To ensure uniformity, all commercial EVSEs available to the public should comply with a single standard. Therefore, EVSEs owned by public utilities and accessible to the public should not be exempt from these regulations, as they are in direct competition with those EVSEs that are subject to these requirements.

The word "used" is ambiguous and lends itself to multiple interpretations. "Used" could mean the person who plugs in to charge their personal vehicle, but it could also mean the entity who is "using" the EVSE to sell power, or both. The added language aims to provide a clear interpretation of this exemption.

Public utilities and private companies should be permitted to own and operate EVSEs for internal use and which are not open to the public, without having to comply with Handbook 44 requirements for these chargers. Example 1 shows a set of EVSEs inside a fence in the yard of a public utility which are not open to the public and are only used to charge company vehicles. These devices should remain exempt from this regulation.

Example 2 shows EVSEs owned by the same public utility and located in the same town as those shown in Example 1. However, these Example 2 devices are in a public parking lot, open to the general public, and charge a fee to anyone who uses them, just like another set of privately owned EVSEs across the street.





Example 1: EVSE behind a fence owned by a public utility for their exclusive use.

Example 2: EVSE is a public parking lot owned by a public utility open to anyone who would like to use it and charging the general public by kWh and time.

A.2 Exemptions (b)

This exemption is inconsistent with other parts of the standard and potentially creates a loophole for anyone wanting to be exempt from these requirements. With this exemption in place, any device charging $0.00 per kWh could be considered exempt from NIST Handbook 44 Section 3.40. Although Handbook 130 specifies electrical energy kept, offered, or exposed for sale and sold as vehicle fuel must be in terms of kWh (section 2.33.2 of the Uniform Regulation for the Method of Sale of Commodities). This does not prohibit charging $0.00 per kWh to circumvent these requirements.

Presently, consumers encounter various methods of sale from one EVSE to another. Some EVSEs bill by the kilowatt-hour, others by the hour, and some employ both methods of sale. For consumers to make accurate value comparisons between EVSEs with these different billing criteria, the consumer must be informed of the total kilowatt-hours received following all transactions.

Exception A.2 (b) exempts devices charging by time alone (or $0.00 per kWh) from the requirements of Section 3.40. Removing Exemption (b) would explicitly mandate all EVSEs to adhere to the same standards if they charge fees, whether by time, or energy, or any other method. For instance, Section 2.2.6. EVSE Recorded Representation requires the receipt to provide the total quantity of energy delivered, regardless of the cost per kWh, which would allow all consumers to make value comparisons between EVSEs.

S.1

The requirement for an indicating element which is part of the EVSE itself is implied throughout the 3.40 Electric Vehicle Fueling Systems standard, but it isn't explicitly stated as in the NIST HB 44 3.30 Liquid-Measuring Devices code. This proposal would explicitly require an indicating element to be part of the device, using language nearly identical to the LMD code.

This proposal would enhance clarity for both manufacturers and state officials alike, enabling consistent enforcement across all weights and measure jurisdictions. Most EVSE models currently have some form of display, so requiring all devices to have them would not increase the cost of most EVSE devices. Moreover, it would be a non-retroactive requirement, taking effect with its adoption into the handbook. Consequently, existing devices would not need to be updated until they require replacement or significant upgrades to their measuring systems.

S.1.2

Vermont Weights & Measures has identified numerous cases where the information on the receipt regarding the energy dispensed differs from the information provided on the primary indicating element of a device. Most of these discrepancies arise from rounding or truncation, but other times are simply different numbers. While these inconsistencies have been minor and have not affected monetary calculations based on what we have seen thus far, they may be confusing to the consumer.

This change aims to provide a more consistent experience for the consumer while preserving manufacturers' flexibility. Unlike gas pumps or deli scales, the consumer may not be present watching the fueling process. The updated language would require the important transaction-related information (total quantity of energy dispensed, total price, unit price, sales tax, etc.) to be displayed on the primary indicating element after the transaction but also when the purchaser

is present. Currently, many EVSEs display his information immediately following the completion of power delivery, typically without the consumer present. Additionally, the new language extends the time available to read and comprehend this information (to 1 minute from 15 seconds) before the primary indicating element resets to the default screen.

The revised language empowers manufacturers to display pertinent information during the charging process, so long as the consumer can access all the necessary information on the primary indicating element at their leisure during the fueling process.

S.1.3.2. & S.2.5.1

The number of decimal places required should be simplified because it will make it easier for manufacturers to comply with the requirements. Moreover, the fourth decimal place does not affect the final dollar amount charged to the consumer or the measurement integrity for most minimum measured quantity (MMQ) used during testing.

Numerous EVSE brands currently do not comply with the existing requirements in S.1.3.2. The quantities displayed on the primary indicating element and information on the primary recording element (i.e. receipt, statement, etc.) can be inconsistent in relation to energy delivered by a device. These errors are usually due to rounding or truncation.

While these discrepancies have been small and have not impacted monetary computation based on what we have seen, they may be confusing to the consumer.

The proposed change to S.2.5.1. is put forth because this section is inconsistent with section S.1.3.2 EVSE Value of Smallest Unit. If the devices need to measure in finer units, then the computation of money-value should be displayed and be based on those units. As the cost increases, this discrepancy could lead to unnecessary computational errors.

In this case, presenting consistent information to the consumer will benefit the industry by increasing consumer confidence.

S.2.3.

Many, if not all, EVSEs require a network connection to complete and finalize transactions, and do not automatically time out when the plug is returned to the holster/port. Vermont Weights & Measures has encountered one case where an EVSE lost its network connection during our testing and did not time out when the plug was returned to the holster/port. Figure 1 shows the charging timeline of a transaction where the inspector tested the device a little before 3:00 pm and received a network lost message and did not time out, as indicated with the sharp spike on the left-hand side of the graph. Later that same day just before 6:30 pm, someone else plugged their vehicle into the EVSE and charged their vehicle for roughly 2 hours on our account, as shown by the blue shaded block to the right of the graph.

This language would make the requirements which currently apply to power loss also apply to network loss.

S.2.4.2.

Vermont Weights & Measures has found that about 30% of DC EVSE are not supplying the maximum kW amount stated on the device and/or the app used to advertise and activate the EVSE when we test them with the Tesco



Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

PL4150 load emulator. Consumers rely on this information to select which EVSE they will use when multiple units are available, so the information presented to the potential purchaser must be accurate and correct. These changes will allow the consumer to make informed purchasing decisions, regardless of their preferences.

In some instances, a single app shows different maximum kW ratings at different times. Figure 2 shows charger AUK-00516 advertised as up to 25 kW at 10:49 am while at 10:55 am the same charger was advertised on the app as a maximum output of 75 kW. The inspector was on site this entire time, and nothing about the state of the EVSE had changed.

This proposed language would expand the labeling requirement that apply to the device itself to the apps used to locate and sometimes operate those same EVSEs, so the consumer knows what to expect in advance of arriving on site. It would also require the device to be labeled with the maximum power output the consumer can realistically expect at that time.

S.2.4.4

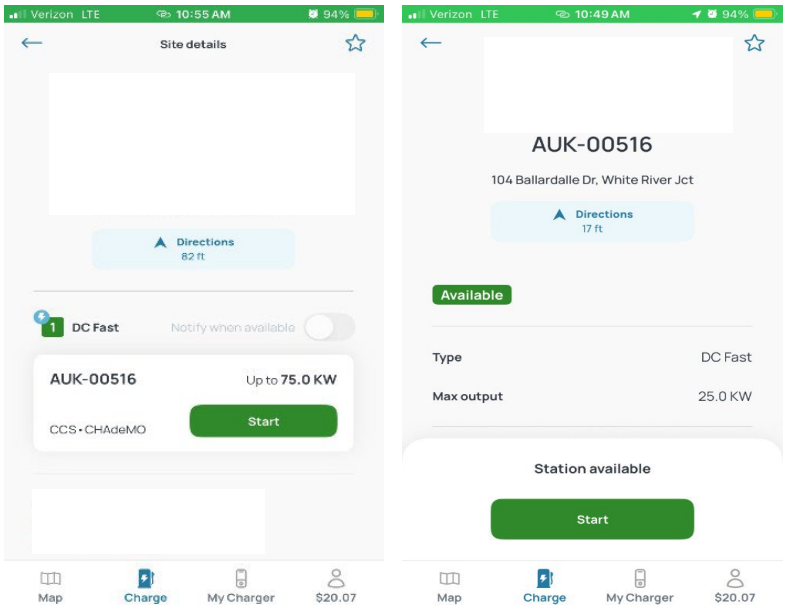


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

This language is put forward because we have discovered discrepancies between information displayed on the EVSE and information recorded in apps providing receipt or billing information or both for transactions. See the justification for S.1.2, S.1.3.2, and S.2.5.1 above.

S.7

The new language simplifies complicated wording. The proposed language requires the totalizer information to be available on the face of the device, regardless of whether the face is built into the device, or it is a remote display such as the vehicle, or a phone based app.

N.3.2

Type evaluations information belongs in the NCWM Publication 14 EVSE Devices not in Handbook 44. No other device type has type evaluation information in Handbook 44.

Possible Opposing Arguments:

The EVSE industry has argued and presumably will continue to argue that consumers don't use EVSE's like gas pumps or scales and are not present during the bulk of the transaction, so a display and consistency doesn't matter if the consumer ultimately gets what they paid for. The EVSE industry will likely advocate that the maintenance of screens adds significant cost to the operation of the device and creates an unnecessary financial burden on the industry.

Opposition may argue that all EVSE's operated by public utilities should not come under weights & measures jurisdiction because they are already regulated by public utility commissions and the like throughout the country.

Another opposing argument might be that if the power is free then the transaction is not commercial, and the standard should not apply.

The possible argument against standardizing the number of decimal places measuring the power dispensed does not make a difference in the end price, then they shouldn't have to include it in the recorded information.
A possible argument about the totalizer wording is that if it is available, why does it matter where and how it is available. The industry will argue that type evaluation criteria need to be somewhere, so Handbook 44 is where it should be.

The submitter requested Voting status in 2026.

Comments in Favor:

Regulatory:

- 2026 Annual: None
- 2026 Interim: A regulator from Maryland supports voting status. Stated they have concerns that this industry wants to dictate how they are regulated.
- 2026 Interim: Regulator from California recommend a developing status or assigned to a task group. They noted that some app-based indicators are currently NTEP-approved, but only the app listed on the device's evaluation may be used and is overall in support of the item.

Industry:

- 2026 Annual: None
- 2026 Interim: None

Advisory:

- 2026 Annual: A Representative from the EVSE Task Group reported the EVSE task group has divided EVF 26.2 into 9 sections and has agreed on the final language for 6 of those 9 sections. This language will be shared with the BOD and the S&T committees, so the information can be included in the report for this meeting. The language for the other sections should be agreed upon this fall to be presented to the body at the interim meeting in January 2027 with a recommendation that the entire block have a voting status for the annual meeting in 2027. The EVSE task group also formed 4 focus groups to look at and moving forward with forming a director's group, creating a database of state regulations and industry contacts, modernizing the handbook in relation to the EVSE code, and setting up a survey to collect and share EVSE inspection data in 2027.
- 2026 Interim: None

Comments Against:

Regulatory:

- 2026 Annual: None
- 2026 Interim: None

Industry:

- 2026 Annual: None

- 2026 Interim: None

Advisory:

- 2026 Annual: None
- 2026 Interim: None

Neutral Comments:

Regulatory:

- 2026 Annual: None
- 2026 Interim: A regulator from Colorado recommends this to be assigned to the EVSE task group.
- 2026 Interim: A regulator from Massachusetts recommends developing and suggested reviewing utilities and EVSE providers that offer free charging.
- 2026 Interim: A regulator from New Jersey recommends item to be developing or assigned to task group.
- 2026 Interim: A regulator from Orange County California is in support of item and recommends developing or assigned, and to remove any wording of device specific exceptions.
- 2026 Interim: Regulator from New York recommends item to be developing.
- 2026 Interim: Regulator from Louisiana wonders if the item should be broken up into multiple items.
- 2026 Interim: Regulator from Los Angeles County California supports comments made by California and recommends it be assigned to a task group and removal of the exceptions.
- 2026 Interim: Regulator from Iowa echoes Los Angeles County California and recommends developing

Industry:

- 2026 Annual: None
- 2026 Interim: An associate member from Tesla supports assigned status and stated that determining the maximum power that might be currently available is more technically complex than it sounds. Tesla equipment displays maximum rated power, as a static value. Power that may be available to a driver is a dynamic value and not something that can be reliably calculated or communicated to a driver ahead of time, causing confusion. Tesla does not support requirement of built-in screens as they are not used by drivers as the primary indicator for the EV charging devices.
- Requiring them may have the unintended consequence of diminishing customer experience by lowering reliability and increasing coast. Tesla supports language in Handbook 44 that has allows Tesla chargers to receive type evaluation with remote displays, such as the mobile app or vehicle dashboard, as the indicating element.
- 2026 Interim: An associate member from National Electrical Manufacturers Association recommends developing
- 2026 Interim: An associate member from Electrify America recommends developing and noted that requiring dynamic values may confuse and frustrate customers, as it does not reflect what they are receiving.
- 2026 Interim: An associate member from SWTCH recommended developing and suggested that greater uniformity would benefit the industry; however, they noted that the gas pump model is not comparable to electric vehicle charging.
- 2026 Interim: An associate member from ChargePoint recommends assigning to a task group.
- 2026 Interim: An associate member from EV Advisors, LLC supports developing status and emphasized the importance of allowing indications to be non-integral, best delivered through an app or vehicle screen. They advised against treating chargers like gas pumps and stressed giving consumers what they want.

Advisory:

- 2026 Annual: None
- 2026 Interim: A technical advisor from The National Institute of Technology, Office of Weights and Measures stated they have not analysis new language but supports developing due to number of changes. This version will make a whole class of devices obsolete and impact should be considered. Public utilities must be handled state by state.

Item Development:

NCWM 2026 Annual Meeting: The Committee adopted the most current language submitted in a block format by the EVSE Task Group and chose to retain an Assigned status for the EVSE task group to continue development.

NCWM 2026 Interim Meeting: The Committee adopted the most current language as presented in open hearings and recommends the item be assigned to the EVSE task group.

Regional Associations' Comments:

CWMA 2026 Interim Meeting:

No comments were heard on this item.

The committee recommends this item remain assigned to the EVSE Task Group.

WWMA 2026 Annual Meeting:

During the 2026 WWMA Annual Conference the following comments were received:

Mr. Matt Douglas (State of California, Division of Measurement Standards / EVSE Task Group): He states that the task group meets monthly. He clarified that this carryover item was broken apart, and that the general consensus is as follows: Items A through G were agreed upon by the task group and are ready for a vote. Item H will be a discussion point next and they are looking for feedback.

Mr. Kurt Floren (County of Los Angeles, California) Recommends that the item remain assigned.

The 2026 S&T Committee recommends that the item remain Assigned to the EVSE Task Group, based on the testimony heard from the EVSE Task Group during open hearings.

NEWMA 2026 Interim Meeting:

2026 NEWMA: A representative from New Jersey Weights & Measures stated the task group is doing great work reviewing all items in this Block and recommends as the items are ready for voting, they be pulled from the Block and made stand-alone items.

"2026 NEWMA: A representative from EVSE Task Group has worked through the original proposal and feels that the language presented here is fully developed and ready for a vote. Other than the following items that are still being revised.

1. In EVS-26.2a: the word activation is still being discussed.
2. EVS-26.2h: is still under discussion and may change prior to the interim meeting."

2026 NEWMA: A representative from NYS Weights & Measures agrees that blocks a and h need further development.

The committee recommends an assigned status for this item.

SWMA 2026 Annual Meeting:

The 2026 SWMA S&T Committee heard no specific comments on h:

The committee recommends Voting on this item.

Additional letters, presentations and data may have been submitted for consideration with this item. Please refer to https://www.ncwm.com/publication-15 to review these documents.

Mark Lovisa, Louisiana | Committee Chair
Brett Willhite, Minnesota | Vice-Chair
Scott Dolan, Vermont | Member
Nathaniel Waldron, Nevada | Member
Steve Timar, New York | Member
Mr. Éric Turcotte, Measurement Canada | Canadian Technical Advisor
Mr. Loren Minnich, NIST OWM | NIST Technical Advisor
Mr. Allen Katalinic, NCWM | NTEP Technical Advisor
Mr. Brian Terry, Arkansas | Committee Coordinator

Specifications and Tolerances Committee