Specifications and Tolerances (S&T) Committee
2026 Interim Meeting Agenda

Mark Lovisa, Committee Chair
Louisiana

INTRODUCTION

The S&T Committee will address the following items in Table A during the Interim Meeting. Table A identifies the agenda items by reference key, title of item, page number and the appendices by appendix designations. The headings and subjects apply to *Handbook 44 Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, 2026 Edition*. The first three letters of an item's reference key are assigned from the Subject Series List. The next 2 digits represent the year the item was introduced. The acronyms for organizations and technical terms used throughout the agenda are identified in Table B. In some cases, background information will be provided for an item. The fact that an item appears on the agenda does not mean it will be presented to the National Council on Weights and Measures (NCWM) for a vote. The Committee will review its agenda and may withdraw some items, present some items for information meant for additional study, issue interpretations, or make specific recommendations for change to the publications identified, which will be presented for a vote at the Annual Meeting. The Committee may also take up routine or miscellaneous items brought to its attention after the preparation of this document. The Committee may decide to accept items for discussion that are not listed in this document, providing they meet the criteria for exceptions as presented in *NCWM Policy 3.1.4. Handbooks, Procedures to Modify Handbooks*. The Committee has not determined whether the items presented will be Voting or Informational in nature; these determinations will result from their deliberations at the Interim Meeting.

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.

An "Item Under Consideration" is a statement of proposal and not necessarily a recommendation of the Committee. 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, presentations and data may have been part of the committee's consideration. Please refer to www.ncwm.com/publication-15 to review these documents.

In some cases, there may be proposed changes affecting multiple model laws or regulations that share the same purpose or proposed changes to one model law or regulation may be dependent on the adoption of proposed changes to another. The Committee may group such items into "Blocks" to facilitate efficient handling for open hearings and voting. These blocks are identified in Committee's agenda.

All sessions are open to registered attendees of the meeting. If the Committee 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 their 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 table. If possible, the posting will be done at least a day prior to the planned closed session.

Note: It is policy to use metric units of measurement in publications; however, recommendations received by NCWM technical committees and regional weights and measures associations have been printed in this publication as submitted. Therefore, the report may contain references to inch-pound units.

Subject Series List

Table A
Table of Contents

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-25.1 W G-S.5.6. Recorded Representations

Source:
Tesla, NEMA, ABB, Electrify America, RaceTrac, Colorado Division of Oil and Public Safety, Michigan Department of Agriculture & Rural Development

Purpose:
Update Handbook 44 Section G-S.5.6 Recorded Representations, to explicitly include QR codes as an acceptable form of electronic receipt, enhancing customer convenience and aligning with modern technology practices.

Item under Consideration:
Amend Handbook 44, Section 1.10. General Code as follows:

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, **unique and dynamic quick response QR code,** etc.) in lieu of or in addition to a hard copy.

(Amended 1975, 2014, ~~**and**~~ 2023, **and 20XX**)

Previous Status:
2025: Voting - Returned to Committee

Original Justification:
Integrating unique QR codes as an acceptable form of electronic receipt offers numerous benefits that align with the goals of modernizing transactional processes and enhancing customer convenience. QR codes provide enhanced accessibility as they can be easily scanned using mobile devices, offering a quick and efficient way for customers to access their receipts rather than having to input personal information to receive an emailed receipt. This eliminates the risk of losing physical copies and allows for more organized and easily retrievable records. QR codes have become ubiquitous across various industries, with a significant increase in their use for payment and information dissemination purposes. In fact, the global QR code payment market was valued at $9.98 billion in 2022 and is expected to expand at a compound annual growth rate of 16.9% by 2030.[1] Moreover, it's predicted that the global spend using QR code payments will reach over $3 trillion by 2025; rising from $2.4 trillion in 2022.[2]

From a technological standpoint, QR codes are highly versatile and can be integrated across various platforms and systems, making them adaptable to different business environments and customer preferences. Moreover, QR codes can be unique to individual customers and present transaction information via a payment terminal or kiosk. Lastly, digital receipts via QR codes can be encrypted, ensuring a secure means of transmitting transactional information and reducing

[1] Grand View Research, QR Code Payment Market Size, Share & Trends Analysis Report By Offerings, By Solution, By Payment Type, By Transaction Channel, By End-user, By Region, And Segment Forecasts, 2023 – 2030, (April 24, 2023).
[2] Juniper Research, QR Code Payments: Key Opportunities, Competitor Leaderboard & Marketing Forecasts 2022-2026, (May 2022).

the risk of fraud associated with other receipt types.

QR codes align with current standards as stipulated in Section G-S.5.6, which requires recorded representations to be printed digitally. QR codes can encapsulate all necessary information required by the standard and can be easily integrated into existing systems that comply with Handbook 44. As technology continues to advance, QR codes are likely to remain relevant and be supported by emerging technologies, ensuring long-term compliance and usability.

Potential opposing arguments, include technical barriers, privacy concerns, and implementation costs. While not all customers may have mobile device capable of reading QR codes, businesses can offer multiple options, including traditional printed receipts, to accommodate all customers. Maintaining redundancy and offering multiple options for consumers to receive receipts is essential for enhancing consumer trust and accommodating diverse needs and preferences. Privacy concerns can be mitigated by implementing secure methods of generating QR codes, which can include less personally identifiable information than paper receipts and other forms of digital receipts. Although there may be initial costs associated with transitioning to QR codes, these can be offset by long-term savings from reduced paper usage and improved operational efficiency, with many modern point-of-sale systems already supporting QR code generation with minimal additional investment. Moreover, there may be implementation costs for industries that already utilize digital receipts, such as expenses related to software updates. However, such providers can likely leverage existing infrastructure, minimizing the need for significant additional investment. Ensuring compliance with Handbook 44 when using QR codes can be achieved by standardizing the format and content of QR codes to provide all required information in a verifiable manner.

The submitters requested that this be a Retroactive Voting item in 2025.

Comments in Favor:

Regulatory:
2025 Annual: Tim White, Michigan Department of Agriculture and Rural Development, supports the item.
2025 Annual: Jason Flint, New Jersey Weights and Measures, supports Voting on the item with the additions of the "unique" and "dynamic", the current language. He also stated that in his opinion customers should get a physical receipt with QR as another option. He doesn't think the concern about QR codes is what's being voted on in this item, because nothing currently disallows QR codes as a receipt method.
2025 Annual: Mahesh Albuquerque, Colorado Division of Oil and Public Safety, supports the item with the new revisions. He also stated that the intent of this item is to provide clarification of something that is already allowed. Other electronic methods don't have additional specifications. He implored the body that we do really need to think about the concerns raised, and if valid, they should be added in a different section of the handbook for security.
2025 Annual: Mike Harrington, Iowa Department of Agriculture, supports the item.
2025 Annual: Steve Harrington, Oregon Department of Agriculture, stated that his colleagues have brought up good points, but he views this as a clarity item, as to what can be provided. He supports the item.
2025 Interim: Craig VanBuren, Michigan Department of Agriculture, stated that he can argue on both sides of whether a QR Code qualifies as an electronic method of receipt. He supports the item as written.
2025 Interim: Mahesh Albuquerque, Colorado Division of Oil and Public Safety, supports Voting status for this item using the WWMA amendments. He also noted that many people claiming this item is redundant are also saying that they understand the handbook to already allow QR Codes as acceptable forms of receipt. This item is just adding guardrails for that method, and otherwise we will be dealing with this down the road.
2025 Interim: Matt Williams, Texas Department of Licensing and Regulation, supports Voting status for this item.
2025 Interim: Mike Harrington, Iowa Department of Agriculture, supports Voting status for this item.
2025 Interim: Paul Floyd, Louisiana Department of Agriculture and Forestry, supports Voting status for this item.
2025 Interim: Mike Brooks, Arizona Department of Agriculture, stated that this item is not redundant because it specifies that the QR Code must be "unique". He also recommended either Developing status or Voting status.
2025 Interim: Steve Harrington, Oregon Department of Agriculture, recommended Developing status, but stated that he supports the item. He also stated that a philosophical discussion about adding examples to the handbook may need to take place since new technologies are widespread, can be misused, and the handbook may need these clarifications.

Industry:
2025 Annual: Corey Hainy representing the Scale Manufacturers Association submitted detailed written comments to the Committee and supports the item.
2025 Annual: John Hathaway, Murray Equipment, Total Controls, Supports the item. The companies he represents offer QR codes as a receipt method and they believe this is a positive alternative option to a printed receipt. He also stated that before this meeting he believed that QR codes were already allowed as a method of receipt. He now doubts that inspectors will approve QR codes and suggests downgrading the item to Developing, so that these issues can be addressed.
2025 Annual: Steve Griffith, National Electrical Manufacturers Association, supports the item and wants uniform guidance in the handbook.
2025 Annual: Steve Bright, Electrify America, supports the item because it brings clarity to the handbook. He understands the concern about lists of examples being added, but this ultimately gives clarity to an additional method for receipts.
2025 Annual: Justin Wilson, ChargePoint, supports the item as a valuable clarification that aligns with consumer preferences. He stated that it's really easy to screenshot a QR code linked receipt. He questioned what harm there was in adding clarity to the handbook. He stated that the code can always be updated in the future to add any specifics found to be needed, and that this item was a commonsense step forward. He also stated that he was concerned about the dialogue back and forth, one point being about whether QR codes were already allowed, and the other about the technical specifications for them. The question we are addressing today is whether they are currently an acceptable form of receipt delivery. Many have stated that they are already acceptable, and if that is the case additional safeguards can be added later, but vote Yea on this item, so we have clarity provided for the industry.
2025 Annual: Mal Skowron, Tesla, a joint submitter of the item, stated that she appreciates that many already interpret the code to allow the use of QR codes, but that's not universal. She believes that this item would establish that they can be a receipt option, and that clarity is needed for manufacturers. She also clarified how receipts are delivered via QR code. The code is a link that points to a PDF receipt that can be saved on its own. That PDF file is not alterable.
2025 Annual: Mike Frisnia, SWTCH Energy, supports the item and echoes colleagues, station owners, and site hosts in that they want to provide this.
2025 Interim: Tessa Sanchez, Tesla and speaking on behalf of the submitters, gave a presentation on this item; She stated that the entities she represents support the item as Voting. She also stated that there doesn't seem to be a consensus about this item being redundant, but did receive guidance that it should be clarified. She also responded to LA County, stating that taking a picture of the QR Code would not be a fraud concern because they are required to be unique or dynamic.
2025 Interim: Cory Hainy, representing the Scale Manufacturers Association, supports the item as Voting, with "unique" added to the QR Code description language. He also provided detailed written comments to the Committee.
2025 Interim: Steve Bright, Electrify America, stated that he thinks consistency is needed, and adding the example will clarify the handbook. He supports Voting status for this item.

Advisory:
2025 Interim: None

Comments Against:

Regulatory:
2025 Annual: Allison Wilkinson, Maryland Department of Agriculture, opposes the item. She stated that it is unnecessary as it is only an example. She also stated that she agreed with Dr. Curran from Florida and NIST OWM. As a regulator, she has concerns about receiving consumer complaints regarding receipts. She envisions consumers not being able to get the receipt or provide it to her for complaints. She suggests that clarity should be provided that the end product cannot be altered and that it lasts forever. She understands that QR codes and electronic receipts are needed, but more guidelines are necessary too. She recommends Withdrawal of this item, and that a new proposal be submitted to clear this up or even that a work group be formed to explore the issues that have been raised.
2025 Annual: Matt Douglas, California Division of Measurement Standards, stated that he agrees with NIST, opposes the item, and recommends Withdrawal. He does not feel this item is redundant but is concerned that QR codes would become the de facto receipt method, eliminating consumer choice. He believes that real guidelines need to be

established for QR codes such as display length, and the inability for a consumer to successfully scan. He also stated that without specifications, he agrees that QR codes could reference a PDF, but that's not what he's seen. He's seen them go to a series of links. He believes we must have a specification that requires the post transactions PDF representation with display length.
He pointed out that there is no recourse for the QR code disappearing prematurely if it's not in the specifications. He also provided written comments to the Committee.
2025 Annual: Kristin Walter, Arkansas Bureau of Standards, opposes the item and recommends Withdrawal. She agrees with Maryland's comments and believes the regulation is already clear.
2025 Annual: Robert Huff, Delaware Department of Agriculture, recommends Withdrawal.
2025 Annual: Kurt Floren, Los Angeles County, stated that he was initially neutral on this item, but has been swayed to oppose it until the concerns raised have been fixed. He believes this will need to be type evaluated as a software issue.
2025 Annual: Steve Timar, New York, recommends Withdrawal if the item can't be reworked.
2025 Interim: Jason Flint, New Jersey Office of Weights and Measures, stated that he agrees with NIST OWM about not adding examples to the handbook. He also stated that he believed QR Codes were already allowed as a form of electronic receipt. He supports withdrawing this item.
2025 Interim: Matt Douglas, California Division of Measurement Standards, stated that he agrees with NIST OWM and recommended Withdrawn or Developing status. The device should ensure that the customer receives a permanent recorded representation, and it needs the safeguards referenced in the WWMA comments. He also clarified that his position on this item is that the language does not satisfy the spirit of our model law. It needs a lot of parameters that would not normally apply, and the process is not clearly vetted and identified.
2025 Interim: Steve Timar, New York Department of Agriculture & Markets, stated that he doesn't believe the example is needed, that it is redundant, and that QR Codes are already allowed. He recommended it be Withdrawn.

Industry:
2025 Annual: Michael Kielty, Endress + Hauser Flow USA, Inc., stated that a comment attributed to him in Publication 16 was incorrect. He does NOT think that there should be a possibility for consumers to not receive a printed receipt if they want one. He thinks the QR code conversation is going down the path that the seller can opt not to provide a printed receipt. This general code was intended to allow electronic forms as an option for the consumer. He opposes this item on the premise that the consumer can always choose to have printed receipt. He recommends Withdrawal, and that someone come forward to strengthen language about consumer receiving a printed receipt.
2025 Interim: Dmitri Karimov, Liquid Controls, opposes adding examples to the handbook and recommended either Withdrawn or Developing status with all examples struck for this item.

Advisory:
2025 Annual: Loren Minnich, NIST OWM, provided detailed written comments to the committee. He recommended Withdrawal of the item, since examples do not actually create limitations in the handbook. NIST OWM's position is that real guidelines need to be put into place to ensure QR codes are being used properly, and since they pose a security risk. They do not believe that this item provides the necessary changes to address the issue.
2025 Interim: Jan Konijnenburg, NIST OWM, suggested either Withdrawn or Developing status for this item. He stated that the current language raises questions, QR codes are already allowed, and he thinks it's unnecessary to add all kinds of examples and he discouraged doing so. He also stated that he does not believe that a QR code is a receipt, just a pathway to one, and that this item provides no assurance that the customer has unrestricted access to the transaction receipt or that they will not be required to pay for access. NIST OWM provided detailed written analysis for this item to the Committee.

Neutral Comments:

Regulatory:
2025 Annual: Matt Curran, Florida Department of Agriculture and Consumer Services, stated that he was neutral on this item, but that they require QR codes to be on select food packages in Florida, and they have found that when violations are discovered, businesses can change the information that the QR codes link to. This should not be a possibility for QR code receipts. He also provided written comments to the Committee.

2025 Annual: Jose Arriaga, Orange County, California, generally supports allowing QR codes and provided some edits for clarification. Change language to customer can "opt" for QR code. On electronic representations there should be a requirement for how long the QR code must be displayed on the screen so consumers can't miss it.
2025 Interim: Khoa Lam, Los Angeles County CA, asked if the QR Code would be saved forever or recycled for future transactions. His main concern is fraud, and he cited an example of a fraudulent QR code sticker being placed on a device. He recommended Developing status.

Industry:
2025 Annual: Dimitri Karimov, Liquid Controls, stated that he has seen two types of QR codes. One is local and acts as a mirror of the printed ticket. The other shows information stored on the cloud. He suggested that this could be an area to clear things up.
2025 Annual: James Leung, Zerova Technologies, an EV manufacturer, stated that California already regulates this, requiring what's on the receipts.
2025 Interim: Michael Kielty, as a consumer, stated that it should always be permissible to not receive a paper receipt. The consumer can choose based on this language. The button in Tesla's presentation only offered the QR Code receipt option. He recommends Developing status until there is an assurance that the customer will always have the option of receiving a paper receipt.

Advisory:
2025 Interim: None

Item Development:
NCWM 2025 Annual Meeting: The Committee agrees that QR codes are a method of delivering a receipt that is already allowed by G-S.5.6., and the additional example is not needed, therefore the Committee is withdrawing the item. However, the Committee believes that more clarification is needed as to what constitutes an electronic receipt and how to properly deliver it to address the security concerns that have been raised.

NCWM 2025 Interim Meeting: The Committee updated the language in the proposal using the submitters' amended language, which included the 2025 version of G-S.5.6. Recorded Representations. The Committee believes the item has merit, is fully developed, and has assigned Voting status to the item.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Aaron Yanker (WWMA S&T Committee Chair): Updated the body to the status of the item as Withdrawn by the NCWM 2025 S&T Committee.

As a point of clarification, this item went to vote at the 2025 NCWM Annual Conference and was returned to the 2025 NCWM S&T Committee. It was incidentally included in the 2025 WWMA S&T agenda as a carry-over from the 2025 NCWM Annual Conference.

The 2025 WWMA S&T committee recognizes the 2025 NCWM S&T position of Withdrawal of this item.

The WWMA S&T Committee has no recommendation for this item.

CWMA 2025 Interim Meeting:

Withdrawn during 2025 NCWM Annual meeting. No comments were taken.

NEWMA 2025 Interim Meeting:

No comment. No recommendation.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Matt Curran, Florida – The National S&T assigned Withdrawn status – no comments to be heard.

The item is Withdrawn.

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-26.5 G-S.5.6. Recorded Representations and Appendix D – Definitions: electronic receipt.

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 and Appendix D as follows.

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)

and

electronic receipt. – An electronic version of a recorded representation in the form of a downloadable PDF or HTML file accessed or delivered via email, Dynamic QR Code, Short Message Service (SMS) or approved Mobile Device application installed on a Smart Phone or Tablet. A Toll -Free Customer Support Number may also be utilized to request an electronic receipt via email or SMS.
(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:
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Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal

Regional Associations' Comments:
This item from the NTEP Committee was not developed in time for the 2025 fall regional association meetings.

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.

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)

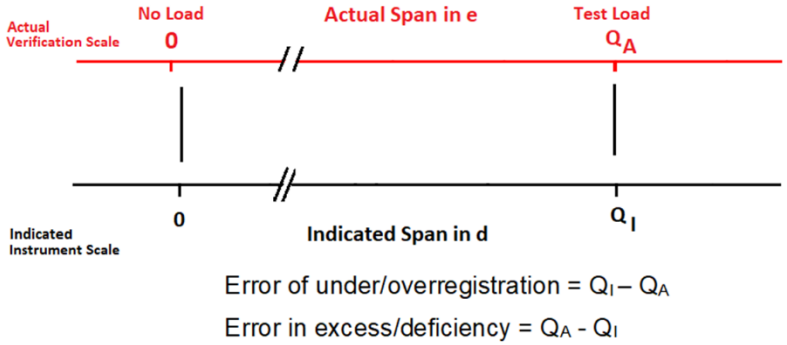
T.N.2.1. General. – The tolerance values ~~**are positive (+) and negative (–)**~~ **herein prescribed shall be applied to errors of overregistration and underregistration.** ~~**with the weighing device adjusted to zero at no load. When tare is in use, the tolerance values are applied from the tare 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.

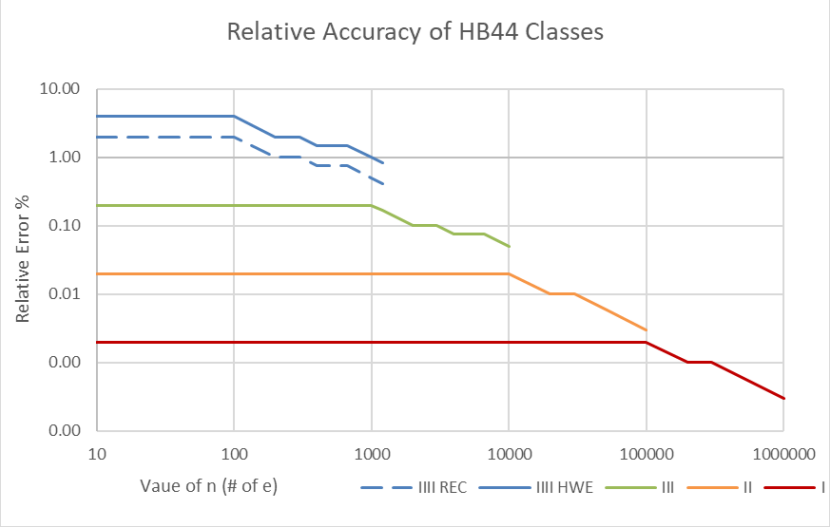
The new test note N.1.13. sets both zero accuracy requirements and resolution requirement for testing the scale. More information of the tolerance structures in the Scales Code and the issue of resolving errors is added below.

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)

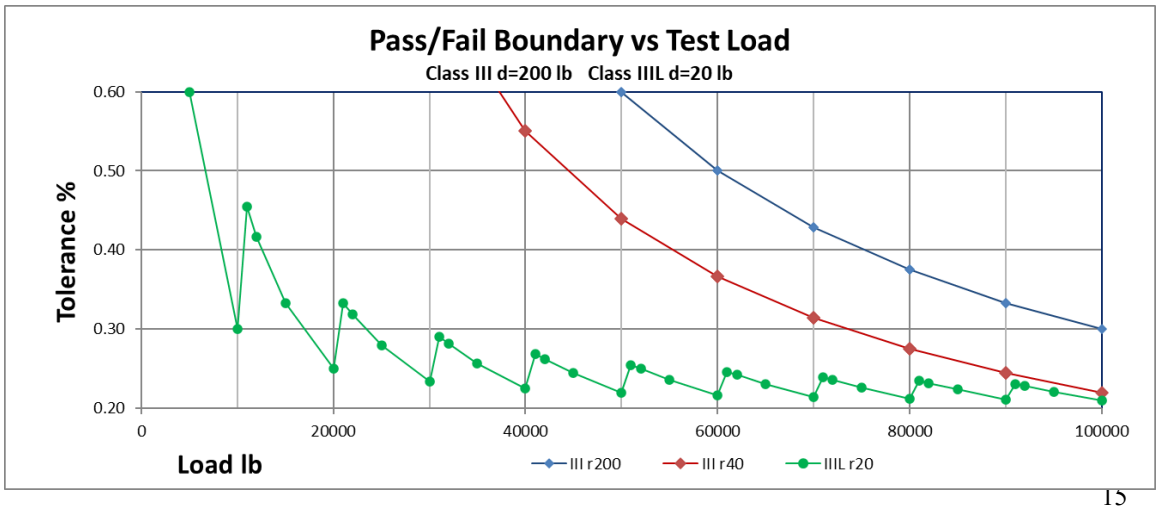
@ 500 e load – (1 e tolerance + 0.5 e rounding error) / 500 e * 100 = 0.3 % fail threshold

@ 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.



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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:
2025 Interim: None

Industry:
2025 Interim: None

Advisory:
2025 Interim: Loren Minnich, NIST OWM, NIST OWM supports the item but stated that it is not yet fully developed. They are working with the submitter to make the needed updates and recommend Developing status.

Comments Against:

Regulatory:
2025 Interim: None

Industry:
2025 Interim: Corey Hainy, Scale Manufacturers Association, does not support this item based on the previous language and recommends Withdrawal. The SMA also provided detailed written comments for this item to the Committee.

Advisory:
2025 Interim: None

Neutral Comments:

Regulatory:
2025 Interim: Matt Douglas, California Division of Measurement Standards, recommended Developing status. He also provided detailed written comments to the Committee which are available in the supporting documents section of the NCWM website.
2025 Interim: Mike Brooks, Arizona Department of Agriculture, recommended Developing status and for the submitter to work with NIST OWM.

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Item Development:
NCWM 2025 Annual Meeting: No comments were heard at the Annual Meeting. The Committee looks forward to the continued development of the item.

NCWM 2025 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 and to work with NIST OWM to address the issues that have been raised.

Contact: Ross Andersen, New York, Retired
rjandersen12@gmail.com

NCWM 2024 Annual Meeting: The Committee heard no comments on this item. The committee looks forward to further development of the item by the submitter and encourages input from all relevant stakeholders.

NCWM 2024 Interim Meeting: The committee made formatting changes to the item to make it consistent with the Form 15. The committee also renumbered paragraphs S.1.15. - S.1.17. to S.1.16. - S.1.18. along with relative references in the justification.

The committee recommends that the submitter develop the item further, possibly breaking it up into separate items and developing them individually. The submitter should also clarify where paragraphs S.2.3.1. Tare Mechanism and S.2.3.2. Preset Tare Mechanism are intended to be inserted.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Cory Hainy (Scale Manufactures Association): SMA does not support this item. SMA does not see confusion with the current language and does not warrant the changes to this section of the handbook. SMA recommends the item be Withdrawn.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): As presented, he is having difficulty with what language is part of the amendments. It is difficult to identify what parts were under consideration. The language is confusing for enforcement, recommended a Developing status.

Mr. Loren Minnich (NIST Office of Weights and Measures): Confirmed NIST OWM has not had time to develop their analysis yet.

The 2025 WWMA S&T Committee recommends that this item remain Developing. The Committee recommends that

the submitter continue to work with NCWM to further develop the item and clarify the language.

The Committee additionally recommends that the submitter of the item address the formatting and move the justification found throughout this item to the appropriate section under Original Justification.

CWMA 2025 Interim Meeting:

Hearing no comments, the Committee recommends this item remain Developing.

NEWMA 2025 Interim Meeting:

Representative from NJ –Asked whether the committee was aware that the submitter is working with NIST on this item. Recommended developing status.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Corey Hainey, Scale Manufacturing Association – There is a document containing their position on the website – carryover - SMA stated their stance in April. They are not in support of this item and recommend Withdrawn Status. They do not believe there is enough confusion to constitute a change.

The committee recommends Withdrawn status 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:

UR.3. Use Requirements.

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.
.

UR.3.1.X. Required Minimum Loads for *Cannabis* Products.

(a) The use of italicized text in the references to "*Cannabis*" is only to denote its proper taxonomic term; the italicized font does not designate a "nonretroactive" status as is the convention used throughout NIST Handbook 44.

(b) The recommended minimum loads specified in Table 8 shall be considered required minimum loads for scales used to weigh *Cannabis* and *Cannabis*-containing products.

(c) Scales used for commercial purposes to buy or sell all *Cannabis* products or the production of *Cannabis* products that have a total weight of 3 ounces or less shall be a Class II scale, be traceable to a National Type Evaluation Program Certificate of Conformance, and have a verification scale interval (e) of not greater than 0.01 g. A scale with a higher accuracy class than that specified as "typical" in Table 7a. Typical Class or Type of Device for Weighing Applications may be used.

(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:
2025 Interim: Matt Douglas, California Division of Measurement Standards, recommended Assigned status.
2025 Interim: Kurt Floren, Los Angeles County CA, supports Assigned status for further development with NIST OWM and the Task Group working together. He pointed out that SCL-25.1 proposes to delete Table 8, which this item references. He also stated that it is astounding that NCWM still hasn't figured out appropriate scales.

Industry:
2025 Interim: Corey Hainy, Scale Manufacturers Association, supports Assigned status, and recommended removing part (b) or change the word "considered" to "the". The SMA provided detailed written comments for this item in the SMA Fall Positions.
2025 Interim: Dick Suiter, Richard Suiter Consulting, echoed Kurt Floren's comments about never answering the question of scale suitability in the past, although they've tried. He thinks it's time to do so and make the minimum loads required. He recommends Assigned status for this item due to the conflict with SCL-25.1.

Advisory:
2025 Annual: Robert Huff, Cannabis Task Group, commented that there was nothing new to report on the item.
2025 Interim: Evan Foisy, Cannabis Task Group, provided an update from the task group and requested Assigned status so that the Task Group can continue to develop the item with NIST OWM input to harmonize with SCL.25-1.
2025 Interim: Loren Minnich, NIST OWM, recommended Assigned status and stated that he would be happy to work with the Cannabis Task Group to develop these items. NIST OWM provided detailed written analysis for this item to the Committee.

Comments Against:

Regulatory:
2025 Interim: None

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Neutral Comments:

Regulatory:
2025 Interim: None

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Item Development:
NCWM 2025 Annual Meeting: The Committee looks forward to the continued development of the item. The Committee continues to encourage the task group to work with NIST OWM to ensure there is no future conflict with SCL-25.1 as updated by the Committee at the Annual Meeting.

NCWM 2025 Interim Meeting: The Committee encourages the task group to address the issues that have been raised and to work with NIST OWM to resolve the conflict with SCL-25.1 that was noted during open hearings. The item status remains Assigned.

NCWM 2024 Annual Meeting: The Committee updated the item under consideration based on changes received from the Cannabis Task Group. The new language proposes adding a user requirement for required minimum loads for cannabis products instead of modifying Table 7a and Table 8. The Committee removed UR.1.1. from the task group proposal, changed UR.3.1.X.(b) to retroactive, and clarified NTEP requirements in UR.3.1.X.(c).

NCWM 2024 Interim Meeting: The Committee updated the item to the latest version from the task group and the title to reflect the current item under consideration. The Committee has some concerns with the language “National Type Evaluation Program compliant” in the note being added to Table 8. The Committee also heard support during open hearings for a previous version of the item and concerns about the use of the terms "all cannabis" and “non-retail cannabis". The Committee has given this item an assigned status and requests the task group address the concerns that have been raised.

NCWM 2023 Annual Meeting: The committee heard from Charles Rutherford (Co-Chair of the task group) that they were waiting on the outcome of item SCL-23.3 before moving forward with this item.

NCWM 2023 Interim Meeting: The committee updated the item to include UR-3.1.2., as recommended by NEWMA. The committee has designated this item as assigned per recommendations from the submitters.

NCWM 2022 Annual Meeting: The Committee was given an update from Mr. Charles Rutherford, NCWM Cannabis Task Group Co-Chair. In his update, Mr. Rutherford requested that this item remain Assigned to the Task Group for further discussion. The Scales Focus Group will be regrouping, with Mr. Lou Sakin (Hopkinton, MA) as the Chair, for further development of the item. The Committee has agreed that this item will retain an Assigned status.

NCWM 2022 Interim Meeting: After hearing comments from the floor and referencing submitted supporting documents, the Committee has assigned this item back to the NCWM Cannabis Task Group for further development. The Task Group should consider the several proposals for alternate language that were provided by the regional associations. For more information or to provide comment, please contact:

Charles Rutherford, Chair
NCWM Cannabis Task Group
mailto:charlie@cprsquaredinc.com

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minnich (NIST Office of Weights and Measures): This new item has a note that identifies the reason the word cannabis is italicized is it is the scientific name; he is not sure if the language is necessary. He suggested moving this to a note in the section being proposed.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Agreed with NIST, in moving the language from subsection A to a note. He also had questions about the intent regarding retroactive versus nonretroactive. He recommended that the item remain Assigned to the task group.

Mr. Kurt Floren (Los Angeles County, California): Questioned whether there is another version of this item that does not appear in the agenda. He stated that the scientific name of a plant must be italicized, and this explains why. He also pointed out that there is an item to delete Table 8. He stated that this gives guidance to the cannabis industry on what scale is suitable and this item accomplishes what the task group is intending.

Mr. Aaron Yanker (WWMA S&T Committee Chair): Clarified what is posted on the website is the most current version.

Mr. Loren Minnich (NIST Office of Weights and Measures): Stated during the NCWM Annual it was suggested that NIST OWM work with the Cannabis Task Group to make sure that the two items do not affect each other. They are moving away from that and trying to get Table 8 to be clearer. They felt that the values in the table were not large enough for cannabis. NIST did not think this was a viable option, because changing Table 8 would change it for all scales.

Mr. Cory Hainy (Representing the Scale Manufactures Association): SMA supports the continued development of this item.

Mr. Jason Flint (New Jersey): Asked if the new language was sent to all the other regions?

Mr. Aaron Yanker (WWMA S&T Committee Chair): Stated he would follow up, it is unknown currently.
The 2025 WWMA S&T Committee recommends that this item remain Assigned to the NCWM Cannabis Task Group and looks forward to further development by the NCWM Cannabis Task Group, with consideration to comments heard during Open Hearings.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that a more up to date version of this item was made available to the WWMA, with language including Class II scales and a minimum load of 100 e. Suggested that A should be a note and that B should have some language change. Further, that retroactivity should be included.

Greg VanderPlaats – MN, supports further development of this item, and agrees with the inclusion of 100 e.

Ivan Hankins – IA, agrees with MN, supports further development.

The Committee recommends this item remains Assigned based on comments made during open hearing.

NEWMA 2025 Interim Meeting:

Representative from NY – Subpart (c) – Would like clarity on use of "total weight" is this intended to mean net or gross weight.

Representative from NJ – New language for the proposal has been submitted and wanted to know if this was shared with NEWMA. Recommends the item stays assigned.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Mauricio Mejia, Florida – supports the item and recommends Voting status.

Alison Wilkinson, Maryland – Cannabis Task Group hasn't met in some time. Item has been in assigned status for a while. MD believes we need this scale suitability to move forward. Requests the group meet and replace lost members to allow this item to continue. Recommends Voting Status

Corey Hainey, SMA – supports the continued development of the item. Would like to remove Statement B – replace "considered" with "the"

Robert Huff, Delaware – Member of the Task Group – haven't met and is unsure who is the current chair. The task group was waiting on 25.1 (removing Table 8) to see how the changes would affect their work on this item. Recommends Voting Status.

The committee recommends Voting status 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-25.1 I S.5.2., S.6., and UR.3.1.

Source:
NIST Office of Weights and Measure

Purpose:
To amend Table 8 to reference d as the value for determining the recommended minimum load

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

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 ~~Division~~Interval (~~d or~~ e*)**	**Recommended Minimum Load (d ~~or e*~~)**
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 ~~**division**~~**interval** "e" is the value of the scale division immediately preceding the auxiliary means. For Class III and IIII devices ~~**the value of "e" is specified by the manufacturer as marked on the device;**~~ "e" must be ~~**less than or**~~ 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 20XX**)

Previous Action:
2025: Informational

Original Justification:
UR.3.1. and Table 8 were adopted to reduce the error associated with rounding of the scale division (d).
Most scales are configured with e = d, this proposal has no effect on these devices.
Using d to determine the recommended minimum load is technically correct.

Comments in Favor:

Regulatory:
2025 Interim: Steve Timar, New York Department of Agriculture & Markets, voiced support of the intent of this item by removing Table 8 as a User Requirement and supports making minimum load requirements enforceable by placing them in the Specifications section of the handbook. He recommends a Developing status.
2025 Interim: Michelle McCulley, Maryland Department of Agriculture, supports removing the recommendations of minimum loads and voiced concerns that testing with loads smaller than the minimum recommended load could lead to confusion. She recommended an Informational status.
2025 Interim: Greg VanderPlaats, Minnesota Department of Weights and Measures, voiced support for removing the word "recommended" from minimum loads and cautioned that tolerances based on 'e' could be as large as 50% of the minimum load if the minimum load is based on 'd'. He further recommended changing the minimum capacity for Class II scales in Table S.5.2. from 20 to 50 and an Informational status.

Industry:
2025 Interim: Richard Suiter, Richard Suiter Consulting, commented that whether 'd' is used or not, if minimums are made into requirements, it would still be on the user to select the appropriate scale for the desired use.

Advisory:
2025 Annual: Loren Minnich, NIST OWM, provided an amended version of the item with "d" as the value used to figure the minimum load to limit rounding errors. He recommended moving the amended version forward as the item.
2025 Interim: Loren Minnich, NIST OWM, supported this item as Informational, stating this item makes a distinction between the minimum capacity and the minimum load, clarifies that the minimum capacity of the scale depends on the scale division, ties the minimum capacity to the classification, requires the minimum capacity to be marked on the scale, and that this proposal brings the Scales Code in line with OIML R 76.

Comments Against:

Regulatory:
2025 Interim: None

Industry:
2025 Annual: Corey Hainey representing the Scale Manufacturers Association stated that the SMA opposes the item as written. He stated that using "d" allows larger load and larger errors. He provided detailed written comments to the committee as well.
2025 Interim: Cory Hainy, SMA, spoke against the item as written, citing that using 'd' for a minimum capacity requirement allows a much smaller minimum load, resulting in a larger relative error. The marking requirement would also be burdensome on manufacturers, with limited benefit to the end user.
2025 Interim: Evan Foisy, A&D Engineering, spoke against the item as written, but generally supports the intent of the submitter. Comments made reflected previous comments regarding the error if 'd' was used, and that the minimum would be marked on the device if minimums were made requirements but not marked if the minimum load was left as a recommendation.

Advisory:
2025 Interim: None

Neutral Comments:

Regulatory:
2025 Annual: Matt Douglas, California Division of Measurement Standards, recommended the item remain Informational so that the comments heard during open hearings could be addressed and the item could be further developed.
2025 Interim: Steve Harrington, Oregon Department of Agriculture, stated that if the minimum load was made a marking requirement, then the minimum load itself would turn into a requirement. He recommended an Informational status.
2025 Interim: Matt Douglas, California Division of Measurement Standards, supports further development of this item to allow for changes based on comments heard.

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Item Development:
NCWM 2025 Annual Meeting: The Committee updated the item based on the recommendations from NIST OWM including amendments to the purpose, justification, and IUC, all of which have been implemented. The Committee is requesting further feedback on these changes.

NCWM 2025 Interim Meeting: The Committee retained the Informational status following the submitter's request and comments heard from the floor during the open hearing.

NCWM 2024 Annual Meeting: The Committee removed UR.3. Use Requirements, UR.3.1. Recommended Minimum Load, and Table 8 from SCL-23.3 to become a stand-alone item. During open hearings of SCL-23.3, the committee heard comments from 5 members of the Council in support of removing Table 8 from SCL-23.3 due to technical concerns expressed by NIST OWM in their analysis specifically the refence to e as the value for the recommended minimum load, instead of d, while other comments remained neutral. There were no comments objecting to the removal of Table 8. The committee would like to hear input from stakeholders to further develop the item.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minnich (NIST Office of Weights and Measures): Recommended that this table be updated to clarify that the determination for recommended load be based on the scale interval when a scale has an (e) not equal to (d), the recommended load is based on (e) right now. The table says to use (e) no matter what and that is confusing and technically incorrect. This will reduce rounding error, and its intended purpose is to reduce rounding errors with display of digital indication. The way that it is proposed now is the correct way.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): He is generally supportive, however asked why the recommended minimum load would be based on (d) if the tolerances are based on (e)?

Mr. Loren Minnich (NIST Office of Weights and Measures): Clarified per the definition, tolerances are based on verification scale intervals and that Table 8 does not have to do with tolerance, just established suitable use of devices. He gave an example of a beam scale that is balanced between divisions, you can see where it's at but with a digital scale you cannot see that. You can see where it lands but not where it came from. This attempted to require a minimum load, so that rounding error does not have a significant effect on scale determination. That is why it is based on (d) and not (e).

Mr. Khoa Lam (Los Angeles County, California): Asked if this refers to Class I or II scales, where sometimes the last number is in a bracket, and we could see the (e) that was used to determine.

Mr. Loren Minnich (NIST Office of Weights and Measures): Stated that (d) value is the one in brackets, (e) is the one to the left of that.

Mr. Cory Hainy (Representing the Scale Manufactures Association): SMA opposes this item as written as it also poses a burden to the scale manufacturer.

The 2025 WWMA S&T Committee recommends that this item remain Informational. The Committee looks forward to further development of this item and encourages stakeholders to review and provide feedback to the submitter of this item.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that NIST provided a new version of this item to the NCWM S&T Committee which proposes changing Table 8 to clarify using "d" as recommended minimum load and keeping "e" in the middle column.

Greg VanderPlaats – MN, supports further development of this item, suggesting removing the word "Recommended" from the table title. Does not agree with using "d" for the minimum load column due to conflicts with applied tolerances. Recommend increases to minimum load values.

Ivan Hankins – IA, agrees with MN, supports further development.

The Committee recommends this item remain Informational to address comments made during open hearing.

NEWMA 2025 Interim Meeting:

Representative from NY – Supports the use of "d" when determining the recommended minimum load because this is technically correct. Recommends voting status.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Corey Hainey, SMA – opposes the item, as written. Using d as minimum capacity allows for smaller load, increasing error. This would put a burden on the manufacturer, with little to no benefit to consumers.

Mauricio Mejia, Florida – supports item as Voting.

The committee recommends Voting status 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-25.3 D UR.3.15. Zero-Balance Recorded Weight for Forklift Scales

Source:
Pennsylvania Bureau of Ride and Measurement Standards

Purpose:
Add a provision to the User Requirements for medium capacity forklift scales to record zero reading immediately prior to weighing.

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

S.1.13. Vehicle On-Board Weighing Systems~~:~~

S.1.13.1. Vehicle in Motion. – When the vehicle is in motion, a vehicle on-board weighing system shall either:

(a) be accurate; or

(b) inhibit the weighing operation.

(Added 20XX)

S.1.13.2. Zero-Load Balance for Forklift Scales. - A forklift scale shall be capable of recording zero.
[Nonretroactive as of January 1, 20XX]
(Added 20XX)

(Added 1993) **(Amended 20XX)**

UR.3.15. Zero-Load Balance Recorded Weight for Forklift Scales – When a forklift scale is used in an indirect sale, zero shall be recorded prior to initiating the weighment.
[Nonretroactive as of January 1, 20XX]
(Added 20XX)

Add the following definitions to Appendix D:

Forklift Scale. - The vehicle on-board weighing system, typically on a pronged device, in the front of a vehicle used to lift and move materials over short distances. [2.20]

(Added 20XX)

Previous Status:
2025: Developing

Original Justification:
The Commonwealth of Pennsylvania is a major hub of commercial shipping throughout the Northeast and the United States. Commercial LTL shippers routinely conduct re-weighs on the products being shipped, often resulting in increased charges and fees to the consumer shipping the products from throughout the country and world. Over the last 30 years and especially over the last 15 years, the use of forklift scales in lieu of stationary floor scales has increased significantly. These re-weighs have no documentation of a zero-load balance preceding weighing, and the scales are subject to extensive wear on the shipping docks. In 2024, the 9-county region in South Central Pennsylvania inspected the forklift scales at 18 locations approving 566 and rejecting 249 and upon re-inspection of 211 forklift scales approved 162 and rejected 49, with the balance have been taken out of service. This was but one of the 7 regions in our state tracked in that period. Our Inspectors observed the forklifts traveling at significant speeds across the docks with pallets conducting undoubtedly individually hundreds of weighing's a day and noted on numerous occasions when inspecting those scales, they not to be in zero-load balance. Many of the units do not have active displays, most with the weights being transmitted directly to a master database system without the operator observing the weight, effectively operating blindly. Additionally, we have noted an increasing growth in the number of complaints regarding increased charges, even when the shipper weighed the commodity on state-inspected and certified scales. We were advised by one customer that the shipper would only entertain a challenge to the re-weigh if they had a photograph of their shipment on a state certified scale with the bill of laden for that shipment in the photo. Having taken into advisement of all the suggestions and guidance to the original proposal, the Commonwealth of Pennsylvania continues to feel that this revised proposal should proceed and so that the recording of a zero-load balance preceding to the weighing providing equity in the transaction to all parties involved.

The added requirement of recording the zero-load balance prior to weighing would add a minimal encumbrance to the shipper's efficiency, by requiring the user to record zero immediately before each weighing. It should be noted that most of the systems they record on should already be capable of recording the zero-load balance immediately prior and provide traceability to the weighing process.

Comments in Favor:

Regulatory:
2025 Interim: The submitter of this item John Dillabough, Pennsylvania Bureau of Ride and Measurement Standards, requested this item be assigned a Developing status to address issues with the item that were identified in the regional meetings.

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Comments Against:

Regulatory:
2025 Interim: None

Industry:
2025 Interim: Cory Hainy, SMA, stated that recording '0' will not prevent the scale from being out of tolerance and that this item is too vague.

Advisory:
2025 Interim: None

Neutral Comments:

Regulatory:
2025 Interim: Steve Harrington, Oregon Department of Agriculture, stated that this item does not sound like a User Requirement item, but more like a Specifications item. He recommended a Developing status.
2025 Interim: Matt Douglas, California Division of Measurement Standards, agreed with the suggestion that the submitter work with the Uniform Shipping Law Task Group. He recommended a Developing status.

Industry:
2025 Interim: None

Advisory:
2025 Interim: Jan Konijnenburg, NIST OWM, stated this item could be interpreted as extending the requirement to apply to all on-board weighing systems which may have unforeseen consequences. It was also noted that this item, as a specification, will have a significant impact on the certification of on-board weighing systems. NIST OWM recommends that the submitter should consider working with the NCWM Uniform Shipping Law Task Group to coordinate efforts.

Item Development:
NCWM 2025 Annual Meeting: No comments were heard during the Annual Meeting.

After the Annual Meeting, the submitter requested updates to the Item Under Consideration and the Original Justification. The Committee has amended the item to include those updates.

NCWM 2025 Interim Meeting: The Committee has set the status of this item to Developing following the submitter's request and comments heard from the floor during the open hearing. The Committee recommends the submitter address concerns raised during open hearings.

Contact: John Dillabaugh
jkdillabaugh@gmail.com

Regional Associations' Comments:

WWMA 2025 Annual Meeting: During the WWMA 2025 Annual Conference the following comments were received:

Mr. Cory Hainy (Representing the Scale Manufactures Association): SMA opposes this item, recording 0 will not solve a scale being out of tolerance and "immediately prior" is too vague

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Recommended that this remains Developing to get feedback from stakeholders.

The 2025 WWMA S&T Committee recommends that this item be assigned a Withdrawal status.
The Committee encourages the submitter to work with the NCWM L&R Uniform Shipment Law Task Group to accomplish the intent of this item. The Committee also feels this item, as currently written, does not resolve the issue presented in the justification.

CWMA 2025 Interim Meeting:

Greg VanderPlaats – MN, supports further development of this item, the word "record" in Line 22 Page 29 of the agenda implies that all forklift scales would require ticket printers.

Richard Suiter – Richard Suiter Consulting, commented that the term "recording" now also refers to electronic recording and not necessarily a physical printed ticket.

Loren Minnich – NIST OWM, echoes the comments of Richard Suiter. A "recording" could mean a physical ticket or a digitally recorded representation in the background.

The Committee recommends this item remain Developing to address comments made during open hearing.

NEWMA 2025 Interim Meeting:

Retired representative from PA – The proposal has been workshopped and revised by expanding the Specification and user requirements and he now recommends voting status.

Representative from NJ – The proposal has merit and also recommends voting status.

Representative from NH – Recommends voting status.

Representative from NY – Recommends voting status.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Corey Hainey, SMA – opposes item. Recording zero won't solve balance being out of tolerance. In addition, the term "immediately prior" is too vague.

The committee recommends Developing status on this item.

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.

LMD – LIQUID MEASURING DEVICES

LMD-24.2 I N.4.1. Normal Tests.

NOTE: This item was introduced through the Northeastern Weights and Measures Association.

Source:
New Hampshire Department of Agriculture, Markets, and Food

Purpose:
Provide clarity to 3.30. Liquid—Measuring Devices, N.4.1. Normal Tests.

Item under Consideration:
Amend Handbook 44, Section 3.30. 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**~~ test~~s~~ conducted at **the maximum discharge flow rate developed under the conditions of installation** ~~**flow rates**~~ down to and including one-half of the sum of the maximum discharge flow rate ~~**(MDFR)**~~ **developed under the conditions of installation** and the rated minimum discharge flow rate

~~(RMDFR)~~ shall be considered **a** normal test**~~s~~**. **~~As a formula, this is stated as~~To determine the minimum flow rate at or above which a "normal" test is conducted, the following equation is provided**:

$$\frac{(\textbf{\textit{MDFR}}\textit{maximum discharge flow rate} + \textbf{\textit{RMDFR}}\textit{rated minimum discharge flow rate})}{2} = \textit{minimum discharge flow rate for additional tests}$$

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 1991**,** **~~and~~** 2023**, and 20XX**)

Previous Status:
2025: Informational
2024: Developing

Original Justification:
The existing code requirement is very wordy and difficult to understand without an example and a formula. This proposal adds an example and formula that will give clarity to N.4.1. Normal Tests.

The additional language will be one of several other NIST HB 44 codes that give clarifying examples.

NIST has indicated that in the near future the handbooks will not be printed but will be digitally produced. Therefore, we are no longer constrained by the size of the handbook if the information adds value.

The problem can be resolved through more thorough training. We were informed that a formula can be added, however, an example will make the handbook longer and it sets a precedence for adding examples in the future.

The submitter requested Voting status in 2024.

Comments in Favor:

Regulatory:
2025 Annual: Matt Douglas, California Division of Measurement Standards, commented that he supports Informational status and noted that there may be other codes that require similar language.
2025 Interim: Cheryl Ayer, New Hampshire Department of Agriculture, Markets, & Food, as the submitter of the item, requests a Voting status with the updated language provided by NIST OWM. Currently, in New Hampshire, registered service agents are performing the tests on behalf of the state and this language will help clarify a normal test.
2025 Interim: Matthew Curran, Florida Department of Agriculture & Consumer Services, recommended a Developing or Informational status so that the updated language presented during open hearings can be vetted through the regional associations to gather more input. He doesn't agree with adding examples in the handbooks and thinks examples would be better served in an EPO or other guidance document that is not part of a regulation.
2025 Interim: Scott Wagner, Colorado Division of Oil and Public Safety, supports a Developing status. He recognizes the formula in the 2025 edition of NIST Handbook 44 needs corrected but does not support the example in the item. He recommends the item be vetted through the regional associations.
2025 Interim: Alison Wilkinson, Maryland Department of Agriculture, supports a Developing status. She agreed with the previous comments from Florida and Colorado. She also recommended the formula in the existing code be corrected.

2025 Interim: Steven Harrington, Oregon Department of Agriculture, Weights and Measures Program, supports a Developing status. He commented that he appreciates the use of examples that add clarity.
2025 Interim: Jose Arriaga, Orange County CA Weights & Measures, supports a Developing status to allow the regions to provide feedback.
2025 Interim: Matthew Douglas, California Division of Measurement Standards, supports a Voting status with the language recommended by the WWMA. He recommended a Developing status for all other versions. He is opposed to the example and stated that the last sentence in the updated version presented during open hearings is unnecessary. He noted further that the VTM code may also need similar updates.

Industry:
2025 Annual: Dimitri Karimov, Meter Manufacturers Association, commented that he appreciates the changes that have been made to the item and supports it moving forward.
2025 Annual: Brent Price, Gilbarco, commented that he supports the item.
2025 Interim: Brent Price, Gilbarco Inc, supports a Developing or Informational status. He agrees with the previous comments from Florida and Maryland and recommends the item be vetted through the regional associations.
2025 Interim: Dmitri Karimov, Advanced Flow Solutions, Inc d/b/a Liquid Controls, supports a Developing status. He thinks the item is almost there.

Advisory:
2025 Interim: Loren Minnich, NIST OWM, recommended a Voting status with the updated language suggested in NIST OWM's Detailed Analysis. This suggested language was developed to emphasize that it is the maximum discharge flow rate developed under the conditions of installation along with the rated minimum discharge flow rate that is used in the calculation "To determine the minimum flow rate at or above which a "normal" test is conducted. This new language also amends the formula, which is now part of the paragraph, replacing the acronyms with the terms "maximum discharge flow rate" and "rated minimum discharge flow rate" and provides a description of these terms. In addition, there is a statement that specifies "At a minimum, one "normal" test shall be conducted on each meter at the maximum discharge flow rate developed under the conditions of installation". The language OWM has proposed is intended to provide clarification in regard to how the normal test is conducted but does not change the application of the paragraph.

Comments Against:

Regulatory:
2025 Interim: None

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Neutral Comments:

Regulatory:
2025 Interim: None

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Item Development:
NCWM 2025 Annual Meeting: The Committee heard support for the updated language in the item under consideration and is requesting additional feedback from stakeholders.

NCWM 2025 Interim Meeting: The Committee received comments opposing the example and in favor of keeping the equation with correction to the formula. The Committee updated the item to the language developed by the submitter and NIST OWM. The item has been assigned an Informational status to allow the new language to be reviewed by the regions and further development.

NCWM 2024 Annual Meeting: The committee recommends that the submitter works with NIST OWM to harmonize the item under consideration with what currently appears in NIST Handbook 44.

NCWM 2024 Interim Meeting: The committee notes that the item under consideration is inconsistent with 2024 edition of Handbook 44 language and encourages the submitter to work with NIST OWM to harmonize the differences and address the concerns raised during open hearings. The committee has assigned a developing status for this item.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Curious if other sections might benefit from this language and supports Voting status.

The 2025 WWMA S&T Committee recommends a Voting status. The committee believes the item is fully developed and ready for a vote.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that NIST's analysis of this item has not changed, believes it is fully developed, and supports voting status.

The Committee recommends this item be given a Voting status based on comments heard during open hearing.

NEWMA 2025 Interim Meeting:

Representative from NH – Trying to add clarity to determining what is a normal test. NIST advised to change this code first then change other codes.

Representative from NJ – Recommends voting status.

Representative from NY – Questions if the definition of "Normal Test" could be changed, and an example be provided.

Representative from VT – Questioned the word "developed" means as used, and proposes it would be clearer to use a "percentage of the maximum flow rate as installed" instead of the current equation.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:
Alison Wilkinson, Maryland – Proposal causes confusion with example formula. Recommendation is to remove formula and move forward with just the wording. It was intended to be added as editorial but believes the formula doesn't belong in handbook. Remove formula and move forward with voting.

The committee recommends Voting status on this item with editorial changes.

or above which a "normal" test is conducted~~, the following equation is provided~~:

~~$$\frac{(MDFR_{maximum\ discharge\ flow\ rate} + RMDFR_{rated\ minimum\ discharge\ flow\ rate})}{2} = minimum\ discharge\ flow\ rate\ for\ additional\ tests$$~~

Where:

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-26.1 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 Electronic Automatic Density-Correction Systems.

S.2.9.1. Automatic Density Correction. – If a device is equipped with an automatic means for adjusting the indication and registration of measured volume of product to correct for the expansion of volume when blending separately metered components to create a new product with altered properties.

(a) Wholesale device must also be equipped with an electronic Automatic Temperature-Compensating System; and

(b) An automatic means to determine and correct for changes in product density shall be incorporated in the system:

(1) automatic means to accept, calculate, or measure a density of the finished product; or

(2) automatic means to accept, calculate, or measure a density and volume of each base component.

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 so that the meter can indicate and record in terms of the uncorrected volume.

S.2.9.3. Provision for Sealing Automatic Density Correction System. – Provision shall be made for applying security seals for a densimeter in such a manner that no adjustment may be made to the system without breaking the seal.
(Added 202X)
Nonretroactive

…

S.4 Marking Requirements

…

S.4.3. Wholesale Devices.

…

S.4.3.3. Automatic Density Correction for Changes in Product Composition. – If a device is displaying density-corrected volumes, then the volumes must be labeled clearly and conspicuously on the primary indicating elements, recording elements, and recorded representation that the adjustment has been made.
(Added 202X)
Nonretroactive

…

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 by comparing the density corrected volume as indicated by the device to the actual delivered volume corrected by a reference implementation.

The first test shall be performed with the automatic density-correction system operating in the "as found" condition.

On devices that indicate or record the density-corrected volume, temperature-compensated 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)
Nonretroactive

…

T. Tolerances

T.4. Automatic Temperature-Compensating Systems. *– The difference between the meter errors (expressed as a percentage) determined with and without the automatic temperature-compensating system activated shall not exceed:*

(a) 0.2 % for mechanical automatic temperature-compensating systems; and

(b) 0.1 % for electronic automatic temperature-compensating systems.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.
[Nonretroactive as of January 1, 1988]
(Added 1987) (Amended 1992, 1996, and 2002)

T.5. Density Compensation Systems. - The error between the calculated net standard volume and the volume as determined in a reference implementation shall not exceed 0.1% for nonautomatic or automatic density-correction system for the total delivered volume.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.
[Nonretroactive as if January 1, 202X]
(Added 202X)

…

UR.3.6. ~~Temperature~~ Volume Compensation and 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. Invoices.

(a) A written invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show the net volume delivered and 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.

(c) The invoice issued from a wholesale system equipped with an automatic density correction system, in addition to the requirements in (b) above, shall indicate:

(1) excess volume for the finished product; and

(2) the net standard volume inclusive of the excess volume.

Note: Shall include the statement, "Volume delivered has been adjusted to the volume at 15 °C (60 °F) and for changes in density."
Nonretroactive
(Added 202X)

UR.3.6.2. Nonautomatic.

UR.3.6.2.1. Temperature Determination. – If the volume of the product delivered is adjusted to the volume at 15 °C (60 °F), the product temperature shall be taken during the delivery in:

(a) the liquid chamber of the meter; or

(b) the meter inlet or discharge line adjacent to the meter; or

(c) the compartment of the receiving vehicle at the time it is loaded.

UR.3.6.2.2. Density Determination. – If the volume of the product delivered is adjusted for changes in the density of the finished product, then the product density shall be measured, or the product density at base conditions shall be determined by industry accepted practices and applied in the calculation via analysis of each of the base components.
Nonretroactive
(Added 202X)

UR.3.6.2.3. Invoices. The accompanying invoice for a nonautomatic density corrected finished product shall indicate that the volume of the product has been adjusted for temperature variations to a volume at 15 °C (60 °F). Further 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) excess volume for the finished product; and

(5) the net standard volume inclusive of the excess volume.

Note: Shall include the statement, "Volume delivered has been adjusted to the volume at 15 °C (60 °F) and for changes in density".
Nonretroactive
(Added 202X)

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 60^{O}F.

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.]

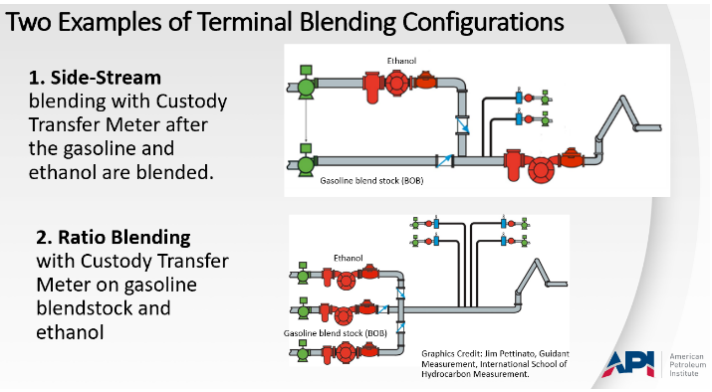
The proposed changes to HB 44 are the result of nine task force meetings where the group reviewed the science of the expanded volume, raised and discussed concerns, and discussed the proposed language incorporated in this proposal. The task force was led by API with participation from five states, NIST 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:

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

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.[3]

- 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

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

agreements may state that where temperature compensation is used, those calculations incorporate the methods and procedures specified in API MPMS Chapter 11.

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:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
[Explain any changes made to the original proposal and committee recommendations]

Regional Associations' Comments:

WWMA 2025 Annual Meeting:
During the WWMA 2025 Annual Conference the following comments were received:

Mr. Matthew Shein (Chevron): Handbook 144 was the original intention on density correction, believes the item can move forward on its own, LNR remains important, presented a 10 minute slideshow, temperature compensation is done appropriately, and has been calculated through calibration, blended molecules do not stack well, add statements to NIST HB 44 to calculate density with information that has already been collected, submitted a form 15, goal of voting in January of 2026.

Mr. Rusty Lewis (Marathon): Was part of the work group and requests the item be Voting.

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

Mr. Mahesh Albuquerque (Colorado Division of Oil & Public Safety): Questions if the expansions are over tolerance but supports Voting status.

Mr. Matthew Shein (Chevron): Admits that tolerance could be over the expansion.

Mr. Steve Benjamin (API Consulting): States expansion happens in transit; expansion cannot occur twice.

Mr. Matthew Shein (Chevron): Supports Voting status.

The 2025 WWMA S&T Committee recommends a Voting status. The committee believes this item is fully developed and ready for a vote.

CWMA 2025 Interim Meeting:

Prentiss Searles – API, gave a presentation in support of this item.
Steve Carter – IL, gave a presentation in opposition of this item.

Steve Carter – IL, recommends withdrawal of this item, commenting that billing should not be based off estimates.
Andrew Montanye – NE, recommends withdrawal of this item, commenting that this has not been vetted and questions why a meter can't be used to measure the blended product.
Marcus Belshe – MO, recommends withdrawal of this item, and suggests that a meter be used to measure the blended product.

Chuck Corr – CC Consulting, states that this is not fully developed nor ready for a vote. Questions the variability of the calculation due to the unpredictability of the blending process, and questions if this could be applied to, and impact, many different products. Suggests that a meter be used to measure the blended product. Written comments were also provided and available on the CWMA site.

Ivan Hankins – IA, supports further development or withdrawal. Suggests that a meter be used to measure the blended product.

Greg VanderPlaats – MN, commented that this would not apply in MN, since they do not allow temperature or other compensation. Recommends that some terms being used be defined, such as "reference", "excess volume", "net standard volume", "industry accepted practices", and "base condition." Suggests the solution is to use a meter to directly measure the blended product.

The Committee recommends this item be given a Developing Status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

Representative from API – Gave a presentation on the science and reasons this proposal is warranted. Recommends voting status. Responded to the Representative from NJ that "densimeter" is the best term. The presentation is available on the NEWMA website.

Representative from NY – Questions whether there should be a UR disallowing Density Corrections for side stream blending since the custody meter already accounts for the volume growth. Recommends developing status.

Representative from NJ – "Densimeter" should it be that word or not. Should this be defined in Appendix D. In UR.3.6 the word "temperature" should be kept when adding "volume" and "correction". Suggested keeping temperature in the title and adding a separate line requirement for volume correction. Recommends developing status.

Representative from Marathon Petroleum – Supports this proposal.

Representative from Growth Energy – No position but has question about implementation for blending and retailers.

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Prentiss Searles, American Petroleum Institute– Presentation – Fact Sheet Handout – looking at density correction for gasoline-ethanol blend stating it is necessary at certain terminals to provide equitable comparison of fuel volumes. A technician – using software - you can test and grab variables and calculate – let spreadsheet do the math Not an actual device being recommended – more a practice – using temperature probes already in place and software. Doing a net calculation, take variables and input to find temperature compensated volumes.

Software did go through NTEP approved for Guidant. Software was approved for density correction. Recommends voting status.

Jason Glass, Kentucky – Presented a question; while not arguing the science he is curious how to look at meters/provers and questions if this has shown up to be an error often.

Prentiss Searles, API– answers, issue initiated in Illinois – a bill of lading didn't identify how additional gallons "got there". This proposal can add language to the bill of lading, net and "new" gallons, to better understand how it comes together. There is an L&R recommendation that accompanies this proposal.

Tory Brewer, West Virginia – Presented a question. Is this a new device or more a software in S.2.9.3. Are inspectors to be looking for an actual seal or an audit log?

Prentiss Searles, API – Confirms it is not a device and may not need the section regarding sealing. Software must be sealable and auditable (per other sections) so that is why it was included.

Mauricio Mejia, Florida – What is the impact of the 0.2 % ? This could be very impactful economically – comparing that value to the cost to replace the pipes at the terminal.

Prentiss Searles, API– He doesn't have a specific cost, the terminal may not have the ability to have the additional meters installed due to lack of real estate.

Michael Keilty, Endress+Hauser – There is no NTEP test procedure but there is a policy added. In recent discussions, because there is no reference in HB44, they removed that policy. No device has been tested for this mechanism. It is simply an adjustment factor in the existing device – not compared at each individual location. Number of companies that have this type of ratio blending system is approx. 20, nationwide per Jim Pettinato. Diagram of testing system and asked about the timing, given that it takes time for the readjustment. What happens when ethanol is added to just before

the custody meter – blend must happen significantly upstream. If it isn't blended at time of testing, this changes how it would be applied. How would a WM official know which system is eligible for this density correction? How will the mechanism be tested for type approval?

Prentiss Searles, API – To clarify, density is calculated each time you get a new batch at the terminal and is not a fixed correction. Density of the blend stock side stream takes 6 feet to completely blend the product.

Michael Keilty, Endress+Hauser – The correction value is not "behind the seal" and would require a readjustment each delivery. What are the limits of adjustability?

Prentiss Searles, API – It is not being adjusted, density is measured for net also and comes as each batch of new fuel comes into the terminal. When they receive a batch they have a grab sample from bottom, middle and top checking for density.

Alison Wilkinson, Maryland – reading the proposal is misleading that it is portrayed as a device and not a software. She would like to see the software submitted as a system with an NTEP approved meter for evaluation and receive a certificate of conformance as a whole system. If it goes into the handbook, as written, it leads to confusion for inspectors. They'll be looking for a device. Using software in confusion with already approved devices (temperature probe). Recommends Withdrawn or Developing, as it isn't ready for handbook.

Russell Lewis, Marathon Petroleum – Regarding comments to if it is a device or not – devices are in place – a study in 2019 was done to create 11.3.4 – it went through D0202 ASTM – as a peer review during that study gathering roughly 6,000 data points and then pared down to under 2,000 to meet the criteria for test conditions. 11.3.4 is cited in an ASTM document. The difference is getting factors off existing factors – applying a formula from that 2019 study (spreadsheet or software). Using temperature corrections and density already – this is an additional step based on different hydrocarbon densities. Work Group had state regulators and NIST who collectively came up with this language. There have been suggestions for consideration, but the item doesn't change the technical approach. In support of this being a Voting Item

Alison Wilkinson, S&T Committee – Software vs charts . Inquired whether to use the correction factors for density with software or by hand using charts.

Russel Lewis, Marathon Petroleum– Answered previous question that it could be both. The working group decided these were the parts of the HB that needed to be addressed (it is also affecting HB130 with L&R)

Matt Sheehan, Chevron –in support of Prentiss' and Russ' comments. They prefer to use this calculation. In support of this item.

Jared Scott, Exxon – in support of this item. Believes this is a way to ensure fair and equitable trade. We want accuracy, both as a consumer and business.

Alison Wilkinson, Maryland – Proposal uses existing technology with addition of correction factors – feels this proposal is misleading the way it's currently written. Recommends Developing for further development, for clarification.

The committee recommends Developing status on this item.

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

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:

NOTE: This item was modified for 2026 by the developer. Changes are highlighted.

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.**~~ **shall advance only by the designed operation of the device.**

(Amended 20XX)

S.1.1.5. Proving Indicator. – **All Hydrocarbon Gas Vapor-Measuring Devices shall be equipped with a proving indicator as described below or an indication which satisfies the resolution requirements identified below applicable to a proving indicator.**

(a) For mechanical (analog) proving indicators the following applies:

(1) Devices rated less than 280 m3/h (10 000 ft3/h) gas capacity shall be equipped with a proving indicator measuring 0.025 m3, 0.05 m3, 0.1 m3, 0.2 m3, or 0.25 m3 per revolution, (1 ft3, 2 ft3, 5 ft3, or 10 ft3 per revolution) for testing the meter. ~~**Devices with larger capacities shall be equipped as follows:**~~

~~(a)~~(2) Devices rated 280 m3 (10 000 ft3) up to but not including 1700 m3/h (60 000 ft3/h) gas capacity shall be equipped with a proving indicator measuring not greater than 1 m3 (100 ft3) per revolution.

~~(b)~~(3) Devices rated 1700 m3/h (60 000 ft3/h) gas capacity or more shall be equipped with a proving indicator measuring not more than 10 m3 (1000 ft3) 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.

(b) For electronic (digital) proving indications, 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 applying security seals in such a manner that no adjustment or interchange can be made of any measurement element.**~~

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

(a) any measuring or indicating element;

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

(c) any metrological parameter that will affect the metrological integrity of the device or system.

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

Audit trails shall use the format set forth in Table S.2.2. 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. A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)***

[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, Hydrocarbon Gas Vapor-Measuring Devices 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 Hydrocarbon Gas Vapor-Measuring 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, this 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**:**

(a) For devices equipped with a mechanical indicating and/or recording elements:

(1) Meters equipped with test circles - one complete revolution of the largest capacity proving indicator and shall in no case be less than 0.05 m3 or 2 ft3.

(2) Meters not equipped with test circles - ten times the smallest proving indicator division and shall in no case be less than 0.05 m3 or 2 ft3.

(b) For devices equipped with an electronic register - at least 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 which 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.1.1. Customer Indicating Element, Accessibility. – For systems in which the primary indicating element is not reasonably accessible to the customer, one of the following shall be provided.

(a) Console display which is accessible to the customer on which the customer can clearly identify and then select the device's reading information,

(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 readings in real time. [Nonretroactive as of January 1, 20XX]

(Added 20XX)

UR.2.4.6. 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 indications shall be readily identifiable and readily associated with the customer's premises. Recorded indications shall also include time and date information.

[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:
2025 Annual: Matt Douglas, California Division of Measurement Standards, commented that he received feedback from NIST OWM that he plans to incorporate into the item. He hopes revised language will be available by the Interim Meeting, if not by the fall regional meetings. He is also requesting additional feedback.
2025 Interim: Matthew Douglas, California Division of Measurement Standards, as submitter of the item, requests a Developing status to get additional feedback and technical assistance. This item is intended to address new technologies in the meters. He referenced his comments from the Western Weights and Measures Association S&T Committee 2024 annual report. He also clarified S.1.1.4. as referenced in NIST OWM's analysis is in congruence with water meter codes.

Industry:
2025 Interim: None

Advisory:

2025 Interim: Loren Minich, NIST OWM, supports a Developing status. NIST OWM will evaluate other requirements in this section to ensure they adequately address newer technologies. This may require additional paragraphs, such as the new paragraphs suggested in the NIST OWM Detailed Technical Analysis, or amendment of existing paragraphs.

Comments Against:

Regulatory:
2025 Interim: None

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Neutral Comments:

Regulatory:
2025 Interim: None

Industry:
2025 Interim: None

Advisory:
2025 Interim: None

Item Development:
NCWM 2025 Annual Meeting: The Committee looks forward to revisions for this item and encourages stakeholders to provide additional feedback to the submitter.

NCWM 2025 Interim Meeting: The Committee added the original justification to the item and assigned a Developing status based on comments heard during Open Hearings. The Committee encourages the submitter to continue developing the item in collaboration with NIST OWM and other stakeholders.

Contact: Matthew Douglas
matthew.douglas@cdfa.ca.gov

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Submitter of the item, worked with NIST to develop this item, this is the first time he has introduced an item with substantial changes, supports a voting status, font changes S&T page 50 lines 7-9 and 20: larger font is an error.

The 2025 WWMA S&T Committee recommends this item remain Developing. The committee encourages the submitter to seek feedback from stakeholders and allow NIST OWM time to review the changes made by the submitter.

The committee recognizes the submitter's intention to highlight changes to the item; however, the committee encourages the submitter to consider proper editorial notations and remove the highlighted sections from the proposed item.

CWMA 2025 Interim Meeting:

Hearing no comments, the Committee recommends this item be given a Voting status.

NEWMA 2025 Interim Meeting:

No comments. No recommendation.

SWMA 2025 Annual Meeting:

No comments were heard

The committee has no recommended status for this item.

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.

WTR – WATER METERS CODE

WTR-26.2 S.1.1.4. Advancement of Indicating and Recording Elements.

Source:
NIST Office of Weights and Measures

Purpose:
Clarify that a meter shall advance only by the designed operation of the device in accordance with General Code requirements, specifically G-S.3. Permanence.

Item under Consideration:
Amend NIST Handbook 44 Water Meters Code as follows:

> **S.1.1.4. - Advancement of Indicating and Recording Elements.** – Primary indicating and recording elements shall advance only by the designed operation of the device~~**, as intended by the manufacturer**~~. (Amended 2021 **and 20XX**)

Previous Status:
New Proposal

Original Justification:
The phrase “as intended by the manufacturer” may be interpreted as allowing a device to be designed to operate in a manner that is contrary to the principles of NIST Handbook 44. By removing this phrase, this implication is removed. While manufacturers may intend to make a device that complies with the parameters of NIST Handbook 44, there are times when, inadvertently, a device is developed that does not comply.

It should be recognized that very few jurisdictions evaluate or regulate water meters. In this context, this paragraph has been in the handbook since 2021, and no concerns have been raised since then.

The submitter requested Voting Status.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minnich (NIST Office of Weights and Measures): This item removes the term as intended by the manufacture and is editorial change. The item is ready for a vote.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Supports Voting status.

The 2025 WWMA S&T Committee recommends a Voting status. The committee believes the item is fully developed and ready for a vote.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that the language has been amended to incorporate meters with no mechanical parts, which was a necessary change and now better reflects the intent of the item. Supports as voting.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

No comments. No recommendation.

SWMA 2025 Annual Meeting:

No comments were heard

The committee has no recommended status for this item.

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

EVF – ELECTRIC VEHICLE FUELING SYSTEMS

EVF-26.2 3.40 Electric Vehicle Fueling System A.2. Exemptions, S.1 Primary Indicating and Recording Element, S.1.2. EVSE Indication Elements, S.1.3.2 EVSE Values of Smallest Units, S.2.3. EVSE Provision for Power Loss, S.2.4.2. Equipment Capacity and Type of Voltage, S.2.4.4. Agreement Between Indications, S.2.5.1. Money-Value Divisions Digital, S.7 Totalizer for EVSE Systems, N.3.2. Type Evaluation of a DC EVSE

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.1. General. – This code applies to devices, accessories, and systems used for the measurement of electricity dispensed in vehicle fuel applications wherein a quantity determination or statement of measure is used wholly or partially as a basis for sale or upon which a charge for service is based.

A.2. Exceptions. – This code does not apply to:

The use of any measure or measuring device owned, maintained, and **only used to charge equipment owned by that** public utility or municipality **operating in a public utility system and** only in connection with measuring electricity subject to the authority having jurisdiction such as the Public Utilities Commission.

~~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.~~

The wholesale delivery of electricity.

A.3. Additional Code Requirements. – In addition to the requirements of this code, Electric Fueling Systems shall meet the requirements of Section 1.10. General Code.

A.3.1. Electric Vehicle Supply Equipment (EVSE) with Integral Time-Measuring Devices. – An EVSE that is used for both the sale of electricity as vehicle fuel and used to measure time during which services (e.g., vehicle parking) are received. These devices shall also meet the requirements of Section 5.55. Timing Devices.

A.4. Type Evaluation. – The National Type Evaluation Program (NTEP) will accept for type evaluation only those EVSEs that comply with all requirements of this code and have received safety certification by a nationally recognized testing laboratory (NRTL).

S. SPECIFICATIONS

S.1. Primary Indicating and Recording Elements.

S.1.X. General. – Electric Vehicle Supply Equipment (EVSE).

shall be equipped with a primary indicating element as part of the device; and

may be equipped with a primary recording element

[Nonretroactive as of January 1, 2027]

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.

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.

S.1.2. EVSE Indicating Elements. – An EVSE used to charge electric vehicles shall include an indicating element that accumulates continuously and can display~~**, for a minimum of 15 seconds at the activation by the user and at the start and end of**~~ **the required information throughout the transaction at the consumers request. Following the completion of a charge and transaction, the correct measurement results relative to quantity, unit price, total price, and any other fees shall be displayed for a minimum of 1 minute following the charger being unplugged from the vehicle.** 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.1.3. 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**~~**:**

~~**for AC systems shall not exceed 0.0001 kWh;**~~

~~**for DC systems**~~ shall not exceed 0.001 kW and kWh; and

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

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.2.1. EVSE Return to Zero.

The primary indicating and the primary recording elements of an EVSE used to charge electric vehicles, if the EVSE is equipped to record, shall be provided with a means for readily returning the indication to zero either automatically or manually.

It shall not be possible to return primary indicating elements, or primary recording elements, beyond the correct zero position.

S.2.2. EVSE Indicator Zero Reset Mechanism. – The reset mechanism for the indicating element of an EVSE used to charge electric vehicles shall not be operable during a transaction. Once the zeroing operation has begun, it shall not be possible to indicate a value other than: the latest measurement; "all zeros;" blank the indication; or provide other indications that cannot be interpreted as a measurement during the zeroing operation.

S.2.3. EVSE Provision for Power <u>or Network</u> Loss.

S.2.3.1. Transaction Information. – In the event of a power loss <u>or network loss</u>, 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 (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:

at the EVSE;

at the console, if the console is accessible to the customer;

via on site internet access; or

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 shall be determinable through one of the above means for at least eight hours.

S.2.3.2. Transaction Termination. – In the event of a power loss <u>or network loss</u>, either:

(a) the transaction shall terminate at the time of the power loss <u>or network loss</u>; 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.

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.

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.

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.2.4.2. Equipment Capacity and Type of Voltage. – An EVSE **and any app used to advertise, or activate, or both shall ~~be able to~~** conspicuously indicate **~~on each face~~** the maximum rate of energy transfer **possible and the maximum rate of energy transfer currently** available (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 and billing system shall agree for each transaction.

S.2.5. EVSE Money-Value Computations. – An EVSE shall compute the total sales price at any single-purchase unit price for which the electrical energy being measured is offered for sale at any delivery possible within either the measurement range of the EVSE or the range of the computing elements, whichever is less.

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 kWh~~ the minimum value of the smallest unit as defined in S.1.3.2.**

(Amended 2023)

S.2.5.2. Auxiliary Elements. – If a system is equipped with auxiliary indications, all indicated money value and quantity divisions of the auxiliary element shall be identical to those of the primary element.

…

S.7. Totalizers for EVSE Systems. – EVSE systems shall be designed with a nonresettable totalizer for the quantity delivered through each separate measuring device. Totalizer information shall be adequately protected and unalterable. The system shall provide totalizer information and readily available on the face of the device ~~site or via on site internet access~~.

…

N.3. Test of an EVSE System. – The testing methodology compares the total energy delivered in a transaction and the total cost charged as displayed/reported by the EVSE with that measured by the measurement standard. Each test shall be performed for at least the minimum measured quantity (MMQ).

N.3.1. Testing of an AC EVSE. – Accuracy tests shall be performed at the following current levels:

A point between 4 A and 10 A;

A point between 40 % and 60 % of the MDA; and

A point between 70 % and 100 % of the MDA.

(Amended 2024)

~~**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)**~~

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:

A point between 10 % and 20 % of the MDA, but not less than 30 A; and

A point between 25 % and 100 % of the MDA, with the recommendation to test at the maximum power level within that range that is possible using the test load and test standard available.

Note: The test points (a) and (b) above must not be at the same current level. It is recommended that the current levels should be separated to the extent that the test load and test standard will allow.

For DC systems it is anticipated that an electric vehicle may be used as the test load. Under that circumstance, testing at the load presented by the vehicle shall be sufficient for field verification provided that it is greater than 40 % of the MDA and no less than 30 A.

All DC EVSE placed into service prior to January 1, 2025 are exempt from this requirement until January 1, 2028.
(Amended 2022 and 2024)

N.4. Repeatability Tests. – Tests for repeatability shall include a minimum of three consecutive tests at the same load, similar time period, etc., and be conducted under conditions where variations in factors are reduced to minimize the effect on the results obtained.

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.

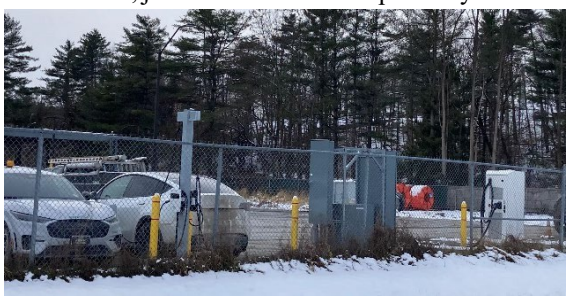
A.2. Exemptions (a)

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

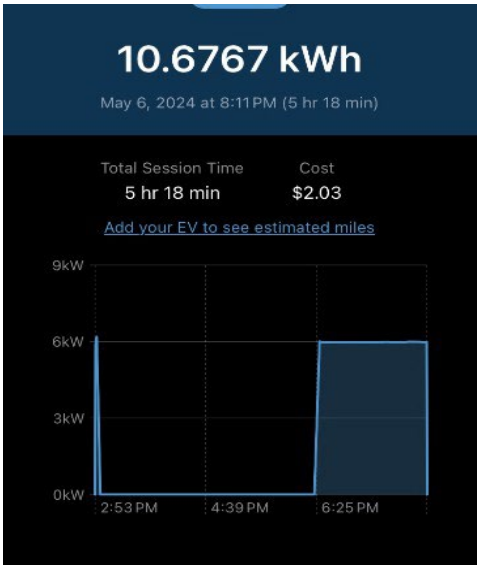


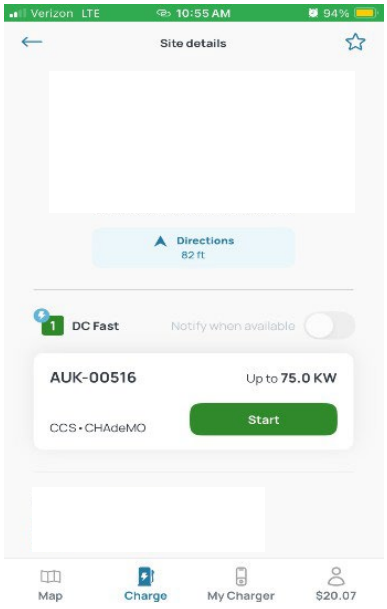
Figure 1: EVSE did not time out following a network loss during test and another consumer commenced charging on the Vermont account 2.5 hour after we had left the site.

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



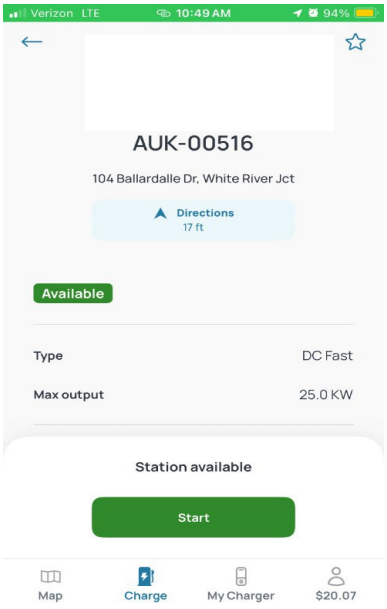


Figure 2: Two screen shot of the same EVSE taken 6 minutes apart on the same app

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:
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Industry:
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Advisory:
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Comments Against:

Regulatory:
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Industry:
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Advisory:
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Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
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Item Development:
New proposal.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Recommends a Developing status, disagrees with changing the smallest indicated unit, feels the change should be to make the DC requirement match the AC value, will provide references in writing.

Mr. Mal Scalron (Tesla): Recommends a Developing status, including many minor changes to 3.40 that require stakeholder input, S.1. requires indicating element to be part of the device, EV charging is different than gas pumps, it takes 25 minutes or more to charge in that time a consumer may step away, the remote is more transparent and allows users to monitor the charging, S.1. needs a revision, S.2.4.2. agrees with the premise but the language is too broad, language should be limited, S.7 is not wording clarification but substantive change, no longer web based.

Mr. Mahesh Albuquerque (Colorado Division of Oil & Public Safety): Supports this item, this item has good intent, and recommends a Developing status.

The 2025 WWMA S&T Committee recommends a Developing status. The committee encourages the submitter to consider comments made during Open Hearings and seek feedback from stakeholders to continue developing this item.

CWMA 2025 Interim Meeting:

Ron DePouw – WI, supports the item as developing with the suggestion to add a date requirement for older equipment. Steve Griffith – NEMA, supports the item as developing, with additional clarifications and definitions needed. S.7. Totalizer information could be provided via a web portal.

The Committee recommends this item be given a Developing status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

Representative from VT – Gave a presentation explaining what is trying to be accomplished with each change. The presentation is available on the NEWMA Website.

Representative from ChargePoint – Recommends developing status. Revisions of small words but big practical changes. Support public utility exemption. We should develop language around how a device operates with network loss. S.2.4.2. Any app language.

Representative from NEMA – Display requirement encourage that remote display should be allowed. EVSE are usedn differently than gas pumps. Oppose as currently written.

Representative from NJ – S.2.4.4. The words “and billing” should be bolded. Billing system needs a definition. Recommends developing status.

Representative from SWTCH – Supports ChargePoint’s comments. Supports Developing status.

Representative from MN8 Energy – Supports ChargePoint’s comments.

Representative from NY – Recommends developing status.

Committee recommends a Developing Status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Robert Huff, Delaware – S.1.2 states indication will remain on device 1 minute. Recommends 5 minutes to align with gas pumps. Recommends Voting status.

Alison Wilkinson, Maryland – recommends Voting status as this item will help states and regulators clarify EV code and defines gray area.

Steve Griffith, NEMA - Recommends Developing Status. He believes it to have merit but needs more development.

Mauricio Mejia, Florida – Supports item as Developing. As it is proposed, it removes the verbiage that it does not apply to Non-Commercial Devices, by hour / time, and would like to have that added. Believes the primary indicator for all devices is a good idea.

The committee recommends Developing status on this item.

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.

FMT – FARM MILK TANKS

FMT-26.1 S.1.4. General.

Source:
USDA

Purpose:
To add a physical address requirement to the conversion charts of on farm milk bulk tanks.

Item under Consideration:
Amend NIST Handbook 44 Farm Milk Tanks Code as follows:

> **S.4.1. General.** – A volume chart shall show volume values only, over the entire range of the volume of the tank from 5% of capacity or 2m3 (500 gal) whichever is less, to its maximum capacity. All letters and figures on the chart shall be distinct and easily readable. The chart shall be substantially constructed, and the face of the chart shall be so protected that its lettering and figures will not tend easily to become obliterated or illegible. **The volume chart shall also include the address where the tank was most recently gauged.**

Previous Status:
New Proposal

Original Justification:
The calibrations that are performed on farm bulk tanks are specific for that location. If a bulk tank is moved it needs to be calibrated again. Without the address requirement on the chart it is harder to know at what location the calibration was perform at and if it is still valid.

The submitter acknowledges that milk bulk tank calibration agencies may have to update conversion chart templates.

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:
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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.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Questioned how often milk tanks are calibrated as associated with the corresponding volume chart and gauge on the tank.

Mr. Loren Minich (NIST Office of Weights and Measures): Addressed the question posed by Mr. Matt Douglas regarding certain locations often moves milk tanks. He stated that the USDA is finding tanks in a location that was moved from another location and cannot verify if it is accurate in the new location. He clarified that the tank is gauged in the new location after being transported.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Appreciated the clarification from Mr. Minich and questioned if the item should be a Retroactive requirement. He stated consideration should be given to the implication for locations that don't have addresses already marked on the volume chart and the potential burden to put the address on the chart. He stated he has no position on the item.

The 2025 WWMA S&T committee recommends that this item be assigned a Developing Status and recommends the submitter consider the comments heard during open hearings.

Furthermore, the WWMA S&T Committee recommends the submitter work with the NCWM S&T Milk Meter Tolerance Task Group to further develop this item.

CWMA 2025 Interim Meeting:

Hearing no comments, the Committee recommends this item be given a Voting status.

NEWMA 2025 Interim Meeting:

Representative from NY – – Instead of using the word "address" change it to "physical location", or add the word "physical" to address. "recently gauged" should be changed to calibrated, certified or some other common weights & measure term.

Representative from USDA – Gauged is not a term used by USDA but is consistent with the rest of the section. These were words that OWM suggested.

Representative from NJ – Recommends a voting status with language changes proposed by NY.

Representative from VT – Recommends voting status.

The committee recommends voting status with the following language change:

S.4.1. General. – A volume chart shall show volume values only, over the entire range of the volume of the tank from 5% of capacity or 2m3 (500 gal) whichever is less, to its maximum capacity. All letters and figures on the chart shall be distinct and easily readable. The chart shall be substantially constructed, and the face of the chart shall be so protected that its lettering and figures will not tend easily to become obliterated or illegible. **The volume chart shall also include the physical address where the tank was most recently gauged.**

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Matthew Curran, Florida – We recommend this item moving forward with a Developing status. The intent appears to capture when tanks are moved so regulators can ensure they are recalibrated, which we can appreciate. However, the proposal does not capture on-farm movement (i.e., same address), which should arguably require the same.

The committee recommends Developing status on this item.

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.

FMT-25.1 D UR.1. Installation

Source:
USDA-AMS-Dairy Programs

Purpose:
To create more robust installation requirements for On Farm Milk Bulk Tanks

Item under Consideration:
Amend the Handbook 44, Section 4.42. Farm Milk Tanks Code as follows:

UR.1. Installation – A stationary tank shall be rigidly installed in level without the use of removable blocks or shims under the legs. **A means shall be in place to prevent any readjustment or shifting out of level after the equipment's calibration. The means used shall be constructed of impervious material, maintained free of breaks, depressions and surface peelings. A stationary tank shall not move during the loading or unloading process.** If such tank is not mounted permanently in position, the current position on the floor for each leg shall be clearly and permanently defined.

(Amended 20XX)

Previous Status:
2025: Developing

Original Justification:
In many states in the Northeastern region such as NY, PA and VT this change is of little importance because the States already have a cement requirement on the books. However, in states with no such cement requirement such as CT or ME I find significantly higher rates of failed recertification in my capacity as a dairy regulator.

This will increase costs associated with the installation of on-farm milk bulk tanks and increase the time associated with the installation of on-farm milk bulk tanks.

The submitter recommended that this be a Retroactive requirement.

Comments in Favor:

Regulatory:

- 2025 Interim: Joel Northrop, USDA, gave a presentation and asked for this item to be assigned Voting status. Regarding comments from Florida, he also commented that he has had no issues regarding health. He finalized comments by agreeing to move forward with developmental status.
- 2025 Interim: Steve Timar, New York Department of Agriculture & Markets, expressed support as this proposal is already a requirement in NY and recommended a voting status.

Industry:

- 2025 Interim: None

Advisory:

- 2025 Interim: Loren Minnich, NIST OWM, recommended a developing status. He supports intent but believes the language is too prescriptive and noted alternative language in the NIST analysis.

Comments Against:

- **Regulatory:**2025 Interim: Matt Curran, Florida Department of Agriculture and Consumer Services, raised possible issues with floor pitting and permanently mounting to the floor creating a possible health issue. He recommended a development status.

Industry:

- 2025 Interim: None

Advisory:

- 2025 Interim: None

Neutral Comments:

Regulatory:

- 2025 Interim: Aaron Yanker, Colorado Department of Agriculture, recommended development status and suggested the submitter work with the Milk Meter Task Group.
- 2025 Interim: Regulators from California and Arizona recommended developmental status in order to work through some of the issues and comments heard.

Industry:

- 2025 Interim: None

Advisory:

- 2025 Interim: None

Item Development:

NCWM 2025 Annual Meeting: The Committee looks forward to the continued development of the item. No comments were heard at the Annual Meeting. However, the Committee did receive written comments after the meeting and has requested they be posted in supporting documents on the NCWM website.

NCWM 2025 Interim Meeting: The Committee believes this item needs additional development. The submitter provided new language to the Committee following the Interim Meeting and the Item Under Consideration reflects updated language. The original Item Under Consideration is shown below for reference. The Committee encourages the submitter to continue to collaborate with other regulators, NIST OWM, and other stakeholders to further develop the item.

UR.1. Installation. – A stationary tank shall be rigidly installed in level without the use of removable blocks or shims under the **leveling** legs**. The leveling legs must be permanently cemented using a form to the floor to prevent any adjustment after the calibration.** ~~**If such tank is not mounted permanently in position, the correct position on the floor for each leg shall be clearly and permanently defined.**~~ **A stationary tank shall not move during the loading or unloading process.**

Contact: Joel Northrop
jnorthrop@fedmilk1.com

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

No comments were received during open hearings.

The 2025 WWMA S&T committee recommends that this item be assigned a Developing Status. The WWMA S&T Committee recommends the submitter work with the NCWM S&T Milk Meter Tolerance Task Group to further develop this item.

CWMA 2025 Interim Meeting:

Ron DePouw – WI, supports the item and is in favor of this update.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

Representative from NY – Recommends voting status with the recent updated changes.

Representative from NJ – Recommends voting status.

Representative from VT – Recommends voting status.

Representative from ME – Recommends voting status.

Representative from CT - Recommends voting status.

Representative from NH - Recommends voting status.

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Matthew Curran, Florida – We recommend this item moving forward with a Voting status. We appreciate the submitter acknowledging our previous concerns and believe the changes now allow for compliance without receiving debits during IMS rating inspections.

The committee recommends Voting status on this item.

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.

TIM – TIMING DEVICES

TIM-26.1 S.1.1.3. Value of Smallest Division

Source:
NIST Office of Weights and Measures

Purpose:
To provide clarification that the maximum interval of time specified for Electric Vehicle Supply Equipment (EVSE) that have an integral time-based feature is one minute.

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

S.1.1.3. Value of Smallest Unit. – The value of the smallest unit of indicated time and recorded time, if the device is equipped to record, shall not exceed the following.

(a) For parking meters:

(1) one-half hour on parking meters indicating time in excess of two hours; or

(2) six minutes on parking meters indicating time in excess of one but not greater than two hours.

(b) For an EVSE equipped with an integral time-based feature~~:~~**, one minute for each separate service related to a delivery of electrical energy to be displayed in:**

(1) ~~**One**~~minute**s** on an EVSE **when** indicating **quantities of** time not greater than or **that are** equal to 60 minutes; or

(2) **a combination of** hours and minutes on an EVSE indicating time intervals in excess of 60 minutes.

(c) For all other devices five minutes, except those equipped with an in-service light.

(Amended 1975~~ **and,**~~ 2021**, and 20XX**)

Previous Status:
New Proposal

Original Justification:
When S.1.1.3. Value of Smallest Unit was amended in 2021, the intent was to specify an interval of no more than one minute for EVSE that have an integral time-based feature. While S.1.1.3.(b)(1) is very clear in regard to requiring an interval of no more than one minute for EVSE that accesses a time-based fee of 60 minutes or less, S.1.1.3.(b)(2) only references "hours and minutes" but does not specify a maximum interval for an EVSE that accesses a time-based fee of more than 60 minutes.

The application of paragraph S.1.1.3 (b)(2) in the current version of NISTHandbook 44 is unclear for devices measuring time-related services of more than 60 minutes. Some devices may be designed with an interval that exceeds a one-minute interval, as was intended when this item was amended in 2021 to incorporate EVSE that access time-related fees.

The submitter requested Voting status in 2026.

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:
[Explain any changes made to the original proposal and committee recommendations]

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): After reviewing the time code specifications of what is required, the item is intended to clarify the intervals should not exceed 1 minute. If it is over 60 minutes, then it can display hours and minutes.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Recommended the item be assigned a Voting Status.

The 2025 WWMA S&T Committee recommends a Voting status. The committee believes the item is fully developed and ready for a vote

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that this clarification was needed to be clear that the maximum value is 1 minute. Supports as voting.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

Representative from NJ – Item has merit, but the language needs work. In the future device could be used as both parking meter and/or EV charging. The code should separate analog and digital parking meters due to potential large tolerance or have EVSE fall under digital. Recommends developing status.

SWMA 2025 Annual Meeting:

No comments were heard

The committee has no recommended status for this item.

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

MDM – MULTIPLE DIMENSION MEASURING DEVICES

MDM-25.1 I 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.**~~

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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~~ 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

Table S.1.6.1.
Required Information to be Provided by Multiple Dimension Measuring Systems

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)

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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**				
	Multiple Dimension and Volumetric Measuring Equipment			
To Be Marked With ⇓	**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~~Speed (5)(9)	x	x	x	
Special Application (6)(9)	x	x	x	
Limitation of Use (7)(9)	x	x	x	

1 (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: 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).

Table S.4.1.b. Multiple Dimension and Volumetric Measuring Systems Notes for Table S.4.1.a.
5. Multiple dimension measuring ~~**devicesystem**~~s, 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**)

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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**~~ consistent with the manufacturer's specified use for the device.

(Amended 20XX)

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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."

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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)

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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)

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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. 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**)

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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 × y × 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:

- 2025 Annual: Mike Harrington, representing the Iowa Department of Agriculture Weights and Measures Bureau, commented that he has witnessed this device in use and supports this item.
- 2025 Interim: Mike Harrington, Iowa Department of Agriculture, commented that he observed this system in use, and it was accurate when compared to vehicle scales. However, the aggregate seemed to retain moisture, affecting the readings. After redetermining the density, accuracy was restored.

Industry:

- 2025 Annual: Derek Schussle, representing Walz Scale, commented that there are real benefits to using this system.
- 2025 Annual: Adrian Ruthe, representing Loadscan Ltd, stated that these scanners are not a replacement for scales and that they are intended to only meet a niche application for a niche market. He continued that the type approval will limit the applications for this device and that there are a lot of checks and balances built in to ensure the device only functions when all criteria are met.
- 2025 Interim: Derek Schussle, Walz Scale, recommended voting status.

Advisory:

- 2025 Interim: Richard Suiter, Multiple Dimension Measuring Devices Work Group, gave a presentation and recommended voting status. He explained that devices with the provisional NTEP CCs are not being allowed in some locations and NTEP needs a code to evaluate the items against.

Comments Against:

Regulatory:

- 2025 Annual: Greg VanderPlaats, representing the Minnesota Commerce Department Weights and Measures Division, stated that he has tolerance table concerns and that the tolerance per load is too high for the divisions listed in that table. He stated that as written, the smallest tolerance applied would be 3.5% of the load and that that is too large. Additionally, there is nothing in this code that limits the use of this device to a niche market. Jeff Gibson, representing NTEP, responded that limitations for this device are listed on the NTEP Certificate of Conformance.
- 2025 Annual: Matthew Douglas, representing the California Division of Measurement Standards, stated his agreement with NIST OWM, the SMA, and Greg VanderPlaats, and requested that this item be downgraded to informational to address the concerns that those parties raised.
- 2025 Annual: Michael Brooks, representing the Arizona Department of Agriculture, Environmental and Consumer Protection Division, stated that establishing this as a code and leaving specs unaddressed could open issues later when a less scrupulous manufacturer creates their own device. Jeff Gibson, representing NTEP, stated that specification changes are addressed in Pub 14 and that NTEP testing will keep lesser devices from being approved.
- 2025 Interim: None

Industry:

- 2025 Annual: Cory Hainy, representing the Scale Manufactures Association, is opposed to this item being a Voting item because there needs to be more clarity regarding commodity limitations, out of level indicators, and error conditions. Dick Suiter, representing Richard Suiter Consulting, responded that commodities to be used by this device are listed on the NTEP Certificate of Conformance and that any error in reading will result in an error code on the device. Mr. Hainy responded that he was glad that current manufacturers are developing these devices to account for scenarios not addressed in this item, but is unsure if future developers will.
- 2025 Interim: None

Advisory:

- 2025 Annual: Loren Minnich, representing NIST OWM, commented that NIST OWM acknowledges the work of the subgroup and is supportive of this item, but that NIST OWM has concerns regarding the number of changes that have occurred within this item and the lack of time allowed for the Body to review those changes. He also stated that S.1.6.3. needs a title change as that code should only apply to volumetric devices.
- 2025 Interim: None

Neutral Comments:

Regulatory:

- 2025 Annual: Kurt Floren, representing LA County ACWM, asked what would happen if a truck that is to be measured is so trapezoidal that the sensors cannot get a good reading and what would happen if the product being measured flexes the container that is being measured. He also asked if there were any speed concerns. Dick Suiter, representing Richard Suiter Consulting, answered that vehicle types and speed requirements are identified in the NTEP Certificate of Conformance and that if a scanner is not able to read a container it will not function.
- 2025 Annual: Éric Turcotte, representing Measurement Canada, stated in response to the presentation that in fact this device is not approved for use in Canada due to accuracy concerns, contrary to what was presented to the body. Jeff Gibson, representing NTEP, responded there isn't a permanence test for the devices but NTEP conducts repeatability tests and repeatability isn't a concern.
- 2025 Interim: Matt Douglas, California Division of Measurement Standards, noted that a more recent version of the proposal is available on the NCWM website. He recommended blocking the MDM items together and assigning a developing status.

Industry:

- 2025 Annual: John Hathaway, representing Murray Equipment, Inc., asked how one would prove the system. Dick Suiter, representing Richard Suiter Consulting, answered that a verified container was created to serve as a transfer standard.
- 2025 Interim: John Hathaway, Murray Equipment, asked for the relevant NTEP CC numbers to be provided, resulting in them being identified as 23-001P and 24-001P.
- 2025 Interim: Cory Haney, Scale Manufacturers Association, recommended developmental status and raised concerns with out of level device conditions, speed, and direction of travel.

Advisory:

- 2025 Interim: Loren Minnich, NIST OWM, recommended combining the MDM items into a single proposal and assigning a developmental status. NIST OWM recommends a thorough investigation of other requirements that need amendment to apply to devices designed to make multiple measurements automatically to determine the volume of a commodity as opposed to multiple dimension measuring devices used to determine freight, postage, or shipping charges.
- 2025 Interim: Jeff Gibson, NCWM NTEP, clarified that the NTEP CCs are limited to aggregate based items.

Item Development:
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:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Cory Hainy (Representing the Scale Manufacturers Association): SMAs position is published on Publication 16 prior to the 2025 NCWM Annual Conference and recommends further development of this item.

The 2025 WWMA S&T Committee recommends this item remain Informational. No comments were heard from the Multiple Dimensions Measuring Devices Work Group.

The committee encourages the Multiple Dimensions Measuring Devices Work Group to consider the comment made during Open Hearings and seek feedback from stakeholders to continue developing this item.

CWMA 2025 Interim Meeting:

Richard Suiter – Richard Suiter Consulting / MDMD Volume Focus Group, gave a presentation in support of this item, and provided written comments which are on the CWMA site.

Greg VanderPlaats – MN, expressed several concerns for this item and provided written comments which are on the CWMA site. Suggests that the minimum measurement be raised to at least 20 d; and that several marking requirements be revisited such as min/max speeds, direction of travel, special application vs. general use, and materials which are allowed or disallowed.

Richard Suiter – Richard Suiter Consulting / MDMD Volume Focus Group, provided written responses to Mr. VanderPlaats which can be found on the CWMA site. Mr. Suiter commented that the minimum measurement size is comparable to limits already established in the Scales Code, and that raising this value could eliminate the ability for consumers to purchase products in a pickup truck. Concerns for the marking requirements were also addressed in Mr. Suiter's written comments.

Mike Harrington – IA, recommends the item remain informational to allow for more discussion at the National meeting. Agreed with many points from MN.

The Committee recommends this item remain Informational to address comments made during open hearing.

NEWMA 2025 Interim Meeting:

Representative from NY – Supports voting status.

Submitted supporting documents available on NEWMA website.

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Corey Hainey, SMA - They are not in support of Voting Status but recommends Developing Status. Currently, it lacks indications for certain errors.

Online comments were submitted to the committee.

The committee recommends Developing status on this item.

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.

MDM-26.1 S.1.5.2. Devices Capable of Measuring Irregularly Shaped Objects

Source:
Multiple Dimension Measuring Device Workgroup

Purpose:
Amend Handbook 44 to permit Multi-Interval Multi-Dimensional Measuring Devices (MDMD) to measure irregularly shaped objects. This update reflects advancements in technology and aligns with international standards, such as OIML R129, which already accommodates Multi-Interval MDMD for measuring objects with irregular shapes. By incorporating these changes, the regulations will support the adoption of innovative measurement technologies while maintaining consistency with global practices.

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

> **S.1.5.2. Devices Capable of Measuring Irregularly-Shaped Objects. –** For devices capable of measuring irregularly shaped objects, the value of the 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. ***For multi-interval devices, if the measuring interval for each axis is determined automatically according to the actual dimension being measured, then the division size (d) for each dimension (length, width, height) shall not differ by the orientation of the measured item in the x-y plane.***
> ***(Nonretroactive as of January 1, 20XX)***

Previous Status:
New Proposal

Original Justification:
When the MDMD requirements were initially established, there were no Multi-Interval MDMD devices available on the market. However, with advancements in technology, more multi-interval devices are now being developed, necessitating updates to the regulations to ensure they remain relevant and effective. These updates will also support alignment with existing international standards, such as OIML R129, which currently permits Multi-Interval MDMD devices to measure irregularly shaped objects.

The submitter requested voting status.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
New proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

No comments were received during open hearings.

The 2025 WWMA S&T Committee does not recommend a status. During Open Hearings there was no technical analysis available, and no comments were heard on the item. The committee encourages feedback from stakeholders and looks forward to an analysis from NIST OWM to help formulate a position.

CWMA 2025 Interim Meeting:

Richard Suiter – Richard Suiter Consulting / MDMD Volume Focus Group, commented that he is a member of the work group for this item, and they believe it is developed and ready for voting.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

No comments. No Recommendation.

SWMA 2025 Annual Meeting:

No comments were heard.

The committee has no recommended status for this item.

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 – OTHER ITEMS

OTH-25.1 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. Exception. – 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.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" 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 any 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 printed and/or stored electronically for each vehicle weighment:

(a) transaction identification number;

(b) station ID;

(c) lane identification (required if more than one lane at the site has the ability to weigh a vehicle in motion);

(d) vehicle speed;

(e) number of axles;

(f) weight of each axle;

(g) identification and weight of axle groups;

(h) axle spacing;

(i) gross vehicle weight;

(j) total vehicle length;

(k) all fault conditions that occurred during the weighing of the vehicle, as identified in paragraph S.1.6. Identification of a Fault;

(l) violations, as identified in paragraph S.2.1. Violation Parameters, which occurred during the weighing of the vehicle; and

(m) time and date.

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 printed and/or stored with the corrected values that include any necessary reductions due to the system tolerance and adopted violation thresholds. Violation thresholds may be dependent on additional items, not specified in this code.

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 which are typical to the roadway in which the system is installed if different than the types listed in (a) through (c) above.

Note 2: If the WIM system will be used to enforce the weight limit for vehicles with liquid loads, a vehicle with a liquid load shall be included in the selection of test vehicles.

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 test weights.

N.1.2.2. Dynamic Test Loads. – Test vehicles used for dynamic testing shall be loaded as specified below. Except when testing for liquid loads, 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 multiple platform vehicle scale, an axle-load scale, portable axle-load weighers, or wheel-load weighers.

The scale shall be tested prior to use to establish reference test loads and shall meet the applicable NIST Handbook 44 tolerances. The official with statutory authority has the discretion to establish the location of the reference scale and timeframe in which it shall be tested.

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 dimension 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.1.3.2. Axle-Load Scale. – When using an axle-load scale, each individual axle or axle group of the reference test vehicle shall be measured on the axle-load scale. Only one single axle or axle group for measurement shall be on the single platform, while other single axles or axle groups shall be off the platform. The gross vehicle weight shall be determined by summing all the single axles and axle groups.

N.1.3.3. Portable Axle-Load Weighers.

(a) When using a single portable axle-load weigher, each individual axle or axle group of the reference test vehicle shall be measured on the portable axle-load weigher. Only one single axle or axle group for measurement shall be on the weighing element of the device. The other single axles or axle groups shall not be in contact with the weighing element. The gross vehicle weight shall be determined by summing all the single axles and axle groups.

(b) When using more than a single portable axle-load weigher, each individual axle or axle group of the reference test vehicle shall be on the weighing element of a device. The gross vehicle weight shall be determined by summing all the single axles and axle groups.

N.1.3.4. Wheel-Load Weighers. – When using wheel-load weighers, each individual axle load of the reference test vehicles shall be measured on wheel-load weighers. The gross vehicle weight shall be determined by summing all axle loads.

When utilizing portable axle-load weighers or wheel-load weighers to determine the value of individual axles or axle-group loads, the reference vehicle shall be in a reasonably level position not to exceed 3 degrees or 5 % at the time of such determination.

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)**

Table N.1.6 Minimum Number of Test Runs per Each Test Vehicle	
Initial Verification Test	
Load Condition	**Speed**
	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 (Class 5)**	**Tolerance as a Percentage of Applied Test Load (Class 10)**
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 ensure compliance with specific jurisdictional legislation and/or protocols taking into account system tolerance. All gross vehicle, axle, and axle group weights must be printed and/or stored with the corrected values that include any necessary reductions due to the system tolerance and adopted violation thresholds.

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]

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:

2025: Voting – Returned to Committee

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.

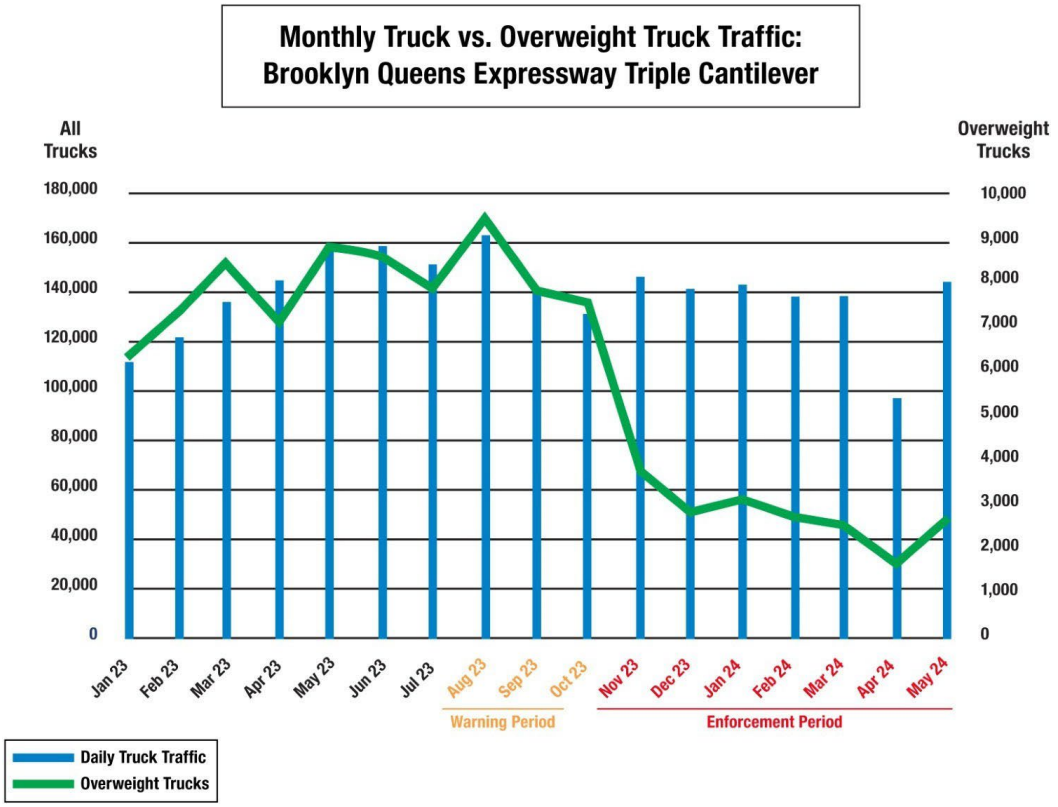

Figure 1 – Monthly Truck versus Overweight Truck Traffic on Brooklyn Queens Expressway (BQE) Triple Cantilever Structure

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).

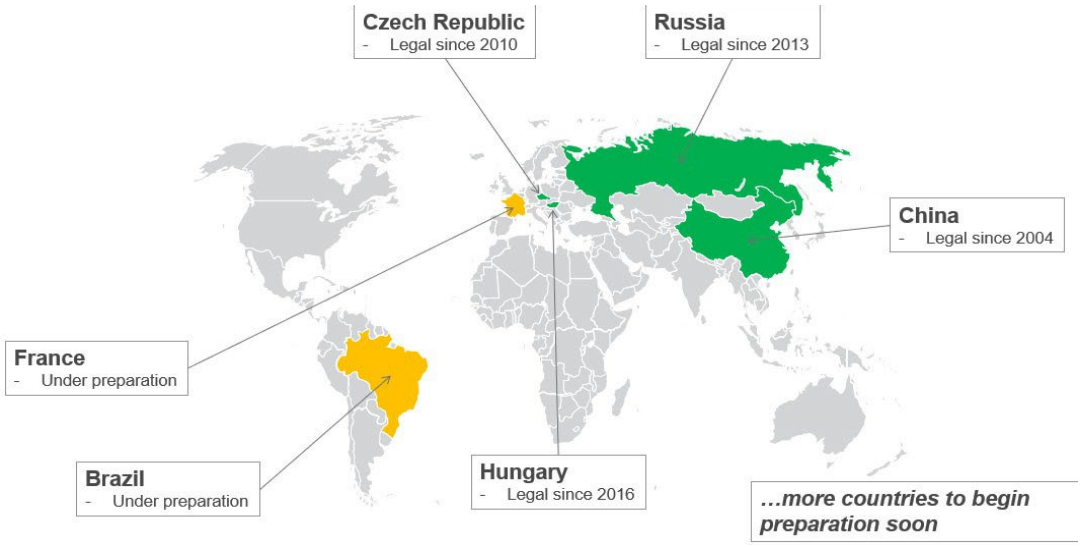

Figure 2. Automated enforcement around the world

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:

- 2025 Annual: Jason Flint, New Jersey Weights & Measures, who is a joint submitter of the item, stated that WIM devices are not a new concept. He noted that the screening code was brought forward by NIST in 2011, and a task group was later formed that developed updates for the scales code. He explained that the task group eventually disbanded due to a lack of data, leaving direct enforcement for the future, and that now there is supporting data. He asked everyone to keep in mind that these systems are intended for government operation to protect highway infrastructure, not the general public. He further explained that having this code in the handbook doesn't mean jurisdictions have to accept its use or can't carve out exceptions or additional requirements. He stated that jurisdictions need a uniform standard for enforcement, and this proposal provides that. He supports the item, urges its adoption, and encourages those opposed to address their concerns with their legislature.
- 2025 Annual: Steve Harrington, Oregon Department of Agriculture, who is a joint submitter of the item, stated that Oregon supports the item and echoes New Jersey. He commented that the Department of Transportation has its own authority in Oregon, they are facing budget constraints, and it is just a matter of time until there is pressure to adopt these types of requirements.
- 2025 Annual: Jim Willis, New York Department of Agriculture & Markets, who is a joint submitter of the item, stated that New York is in support of the item and desperately needs it to be adopted. He commented that it is up to legislatures to approve the devices for use in direct enforcement. He explained that his agency relies heavily on the Department of Transportation to provide vehicles and assistance in testing the devices.
- 2025 Annual: Mike Harrington, Iowa Department of Agriculture, stated that he supports the item and agrees with the comments made by New Jersey.

- 2025 Annual: Dave Rodriques, Massachusetts Division of Standards, commented in favor of the item.
- 2025 Interim: Jason Flint, New Jersey Office of Weights and Measures, who is a joint submitter of the item, stated the submitters have addressed concerns and the item is fully developed. He also noted the system is intended for law enforcement and not for commercial purposes. He recommends a Voting status.
- 2025 Interim: Jim Willis, New York State Department of Agriculture and Markets, who is a joint submitter of the item, expressed agreeance with NIST OWM. He expressed confidence in the system and that any overweight tickets issued from the system installed in New York were correct. He recommends a Voting status.
- 2025 Interim: Mike Harrington, Iowa Department of Agriculture, recommends a Voting status.
- 2025 Interim: Tory Brewer, West Virginia Weights and Measures, stated the item is fully developed but has not substantially changed from last year. He recommends a Voting status.
- 2025 Interim: Steve Harrington, Oregon Department of Agriculture, stated the item will not mandate the use of this equipment. He recommends a Voting status.

Industry:

- 2025 Annual: Tanvi Pandya (New York City Dept of Transportation) and Lukas Koch (Kistler Instrument Corp), joint submitters of the item, delivered a presentation noting that G-A.1. applies to law enforcement devices. They reviewed data from a WIM system installed in New York City in 2023, stating that 3025 violations had been issued, with only 24 dismissals, none of which were due to system accuracy questions. They explained some challenges necessitating the use of WIM systems, such as autonomous trucks and static scale installation space constraints. The presentation included a tradeoff assessment illustrating some of the advantages and disadvantages of a WIM system compared to a static scale. They also pointed out that WIM systems are currently being used for direct enforcement internationally.
- 2025 Annual: Tanvi Pandya, New York City Dept of Transportation, a joint submitter of the item, stated that the test speeds are left to the user and inspector based on the conditions, and the point is to prove it can measure the traffic at its speed. She further commented that many studies have been submitted, including one comparing the devices to a static scale.
- 2025 Interim: Tanvi Pandya, New York City DOT, delivered a presentation illustrating the changes made to the proposal to address concerns raised last year, including the addition of Class 5 and a reduced number of runs on subsequent tests. She stated that Class 5 devices are in use in Europe for enforcement and that the item will address autonomous trucks appearing this year. She stressed that these devices are intended to address grossly overweight vehicles and recommends a status of Voting.

Advisory:

- 2025 Interim: Jan Konijnenburg, NIST OWM, stated the system is suitable for its intended application and the submitters have demonstrated the need for such systems. Complete comments were submitted in the NIST OWM Technical Analysis. He stated it is fully developed and recommends a Voting status.

Comments Against:

Regulatory:

- 2025 Annual: Chad Parker, North Carolina Department of Agriculture, in response to the submitter's presentation, clarified that officials from North Carolina Weights and Measures have not met with the North Carolina Department of Transportation regarding this item, and he doesn't support the item.
- 2025 Annual: Kristin Walter, Arkansas Bureau of Standards, pointed out that one of the slides in the submitter's presentation stated that it isn't just about accuracy, yet accuracy is the main responsibility of weights and measures officials. She also explained that she had visited some WIM sites in her state and noticed that environmental variables, such as road conditions, affect the weighments. She also voiced concern with a lack of uniformity in the testing methods, such as the speed requirements, and thinks that additional data would be beneficial in proving the devices are accurate.

- 2025 Annual: Alison Wilkinson, Maryland Department of Agriculture, stated that she respects the need for the devices, but doesn't see any new data or significant changes compared to the item that failed last year. She also noted that most of the data came from other countries. She questioned whether each weighing starts with the device at zero and if the devices can meet the specifications outlined in the proposal. She stated that comments that the systems do not need to be very accurate are contrary to the principles of Handbook 44. She explained that her agency is required to test all law enforcement scales in its jurisdiction. She expressed concerns that some members have directives to vote for the item even though they disagree with it. She agrees that the item is fully developed, but she is opposed to it.
- 2025 Annual: Robert Huff, Delaware Department of Agriculture, pointed out that the proposal doesn't include a requirement for applying acceptance tolerance within 30 days of rejection and suggested referencing the General Code requirements instead of T.2.1.. He explained that his agency is required to check every scale twice per year and testing one of the systems in their jurisdiction would require a 600-mile round trip. He expressed concerns with split weighing, using the devices for liquid loads, and that their use for enforcement would result in unwarranted fines. He recommended withdrawing the item.
- 2025 Annual: Matt Douglas, California Division of Measurement Standards, stated that the item is essentially the same as last year's item and recommends withdrawing it.
- 2025 Annual: Greg Gholston, Mississippi Department of Agriculture and Commerce, stated that Mississippi remains opposed to this item. He expressed concerns that the current language in UR.4. Enforcement Guidance does not go far enough to clarify how to account for the tolerances, leaving it up to jurisdictional legislation and/or protocols to determine. He stated that he believes that deducting the applicable tolerance from the weighments must be mandatory before issuing citations.
- 2025 Annual: Maurico Mejia, Florida Department of Agriculture and Consumer Services, stated that he is opposed to the item for reasons already stated and that using a non-commercial device with such wide tolerances is not appropriate.
- 2025 Interim: Alison Wilkinson, Maryland Department of Agriculture, expressed opposition to the item and recommended the item be withdrawn. It was stated the item was reintroduced from last year and now the item is written more broadly and vague, including the examples and language. She expressed that the item does not belong in Handbook 44. She added these devices will need to be tested in Maryland, adding the complexities involved with ensuring valid, repeatable data is gathered for initial installations.
- 2025 Interim: Kristen Walter, Arkansas Bureau of Standards, questioned the accuracy of the system and the validity of notices of violations issued as it relates to the tolerance of the system. The regulator recommends a status of Withdrawn.
- 2025 Interim: Matt Douglas, California Division of Measurement Standards, agrees with comments from the regulator from the state of Maryland. As a state with the most freight commerce, he recommends a status of Withdrawn.
- 2025 Interim: Mauricio Mejia, Florida Department of Agriculture and Consumer Services, stated the item does not belong in Handbook 44. He recommends a status of Withdrawn.
- 2025 Interim: Aaron Yanker, Colorado Department of Agriculture, stated the item does not belong in Handbook 44, adding the item has not substantially changed from last year. The regulator stated concerns about infrastructure and maintenance, recommending a status of Withdrawn.
- 2025 Interim: Paul Floyd, Louisiana Department of Agriculture, questioned if this item is a weights and measures issue, particularly since the system is already being used by law enforcement. He recommends a status of Withdrawn.
- 2025 Interim: Robert Huff, Delaware Department of Agriculture, questioned the requirements to test with liquid filled test vehicles along with empty vehicles. He recommends a status of Withdrawn.

Industry:

- 2025 Annual: Jeff Cooper, National Motor Freight Traffic Association, stated that he is opposed to the item due to its lack of accuracy. He commented that he likes the technology but doesn't think we should use it until it is more accurate.
- 2025 Annual: Cory Hainy, Scale Manufacturers Association, stated that the SMA is opposed to the item due to the tolerances being too large.

- 2025 Interim: Cory Hainy, SMA, stated opposition to the item. Specific comments were provided in SMA's letter posted to the supporting documents on NCWM's website.
- 2025 Interim: Jeffrey Cooper, National Motor Freight Traffic Association, agrees with previous comments from regulators of Arkansas and Maryland. He believes the tolerances are too large and out of line with scales currently being used. He recommends a status of Withdrawn.

Advisory:
- 2025 Interim: None

Neutral Comments:

Regulatory:
- 2025 Interim: None

Industry:
- 2025 Interim: None

Advisory:
- 2025 Interim: None

Item Development:
NCWM 2025 Annual Meeting: During work sessions, for consistency with other code sections, the Committee removed the words "for Accuracy" from T.2. and corrected the references to Table T.2.3. Maintenance Tolerances in paragraphs S.1.6., T.3.3., and T.4. The Committee agrees that the handbook applies to devices used for law enforcement and recognizes the need for a standard to apply to such devices for that purpose. Recognizing that the item did not receive enough votes to pass or fail, the Committee recommends the submitters address the concerns raised. The Committee would like to hear comments from the regional meetings before assigning a status to the item.

NCWM 2025 Interim Meeting: During open hearings, the Committee Chair announced that updates to the proposal from the submitters are on the NCWM website. The Committee modified the proposal to include those updates and some additional changes, which include amending the language in paragraphs A.1. General, N.1.6.2. Initial Verification Test, and UR.1. Selection Requirements, as well as paragraph references in paragraph T.2.3. Maintenance Tolerance Values for Dynamic Load Test. The Committee believes the item is fully developed and has assigned it a Voting status.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Aaron Yanker (WWMA S&T Committee Chair): Updated the body to the item not having an assigned status by the NCWM S&T Committee.

As a point of clarification, this item went to vote at the 2025 NCWM Annual Conference and was returned to the 2025 NCWM S&T Committee. The 2025 NCWM S&T Committee recommended the submitters address concerns raised and requested comments from the regions before assigning a status at the 2026 NCWM Interim Conference.

Mr. Cory Hainy (Representing the SMA): SMA believes the tolerances are too large and opposes this item, recommends a Withdrawal status.

Mr. Kyle Plas (Kissler): Acknowledged he is one of the submitters of the item. Recognizes there are concerns with some specific sections of the item and open to discussion, recommends a Voting status.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Confirmed his previous comments on the item still applies and opposes the item, recommends a Withdrawal status.

Mr. Kurt Floren (Los Angeles County, California): Expressed several issues he has with the item including the exorbitant testing requirements. He also stated the 15% and 20% tolerances are too large and oppose this item. recommends a Withdrawal status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Withdrawal status based on comments heard during the 2025 WWMA Annual Conference Open Hearing.

As a point of technical reference, the 2025 WWMA's review of the item as published on the 2025 WWMA S&T Agenda does not appear to reflect changes addressing concerns raised at the 2025 NCWM Annual Conference.

CWMA 2025 Interim Meeting:

Andrew Montanye – NE, opposed to this item.
Ron DePouw – WI, is generally supportive of this item for jurisdictions that need it.
Mike Harrington – IA, is supportive of this item as voting. The Handbook gives authority to states/directors to choose to not enforce, and this is a law enforcement issue and not applicable to commercial transactions.

The Committee recommends this item be given a Voting status as no changes were made since the NCWM 2025 Annual meeting.

NEWMA 2025 Interim Meeting:

Representative from VT – Feels proposal is fully developed and Recommends Voting but opposes this item. Tolerances are excessive. How class designation is assigned is unclear and potentially problematic.

Representative from NJ – Recommends voting status.

Representative from NY – Recommends voting status. Given statutory requirements for fines and penalties, the tolerances are adequate. NY plans to reduce the number of runs on subsequent certify the accuracy of these devices.

Representative from CT – Supports this item.

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Kiel Clasing, Kistler- co sponsor – Presentation was given and brought device samples. Recommends Voting Status.

Roy Czinku, ITS Solutions & Maintenance – Standardizing testing is very important to ensure everyone is using same standard across the board in all states. Proposal compliments existing procedures. He believes this is a necessity to preserve infrastructure and is in support of this item.

Robert Huff, Delaware – The verbiage where it states that an official has discretion is too vague and leaves it open. If this is verified – it should be used immediately prior and immediately after. If margin of error is established – "each state can determine error" He doesn't believe this should be in the handbook. Recommends Withdrawn status.

Corey Hainey, SMA – opposes item because the tolerance is too large.

Tory Brewer, West Virginia – there are a lot of variables that affect accuracy that are addressed in the handbook in other places to account. He finds it concerning that these variables are not addressed in this proposal. Recommends Withdrawn status.

Brian Terry, Arkansas – agrees with West Virginia's comments and would like clarification of the variation of when conditions are ideal versus not ideal. He doesn't agree with an inflation of tolerance due to this variation and recommends

Withdrawn status. Overcompensation of tolerance is not allowed for other devices and they have set tolerance they are required to meet.

Kiel Clasing, Kistler– While the road conditions are one factor, so is braking and acceleration. The tolerance window accounts for all of that and sets realistic thresholds to account for all.

Robert Huff, Delaware – He would like wheel load weighers removed as a verification standard

Alison Wilkinson, Maryland – opposed to this item, as currently written. Recommendations are as follows:
When using static scales as a reference standard they should be tested before and upon conclusion of testing
User requirements – maintenance tolerances should be taken into consideration when applying enforcement action.
Another recommendation is that sites are used only in enforcement when used at a site not available for static scales.

Kiel Clasing, Kistler – addresses question saying that is a policy decision to be made.

Alison Wilkinson, Maryland – Recommends adding a user requirement in the proposal that a double fine cannot be assess on the same day/same road. Only the first violation can be implemented on the same load.

The committee recommends Withdrawn status on this item based on testimony from 3 states in the region requesting the item be withdrawn.

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-26.1 Appendix D Definitions – interference test.

Source:
NIST Office of Weights and Measures

Purpose:
This is a new proposal to define the term "interference test" and clarify how the test applies to an electric vehicle supply equipment (EVSE) system. The proposed new definition was developed to clarify the specific parameters to be examined and verified when these systems operate to indicate and record sales transactions information for the delivery of electrical energy (by the kilowatt-hour) along with time related services that are being assessed as part of an EV charging session.

Item under Consideration:
Amend NIST Handbook 44 Appendix D as follows:

interference test. – A test intended to determine the proper operation of the measuring, indicating, and recording elements of an EVSE designed to assess time fees associated with the fees for the delivery of electrical energy (by the kilowatt-hour) to an EV automatically, accurately, clearly, and separately provide all required transaction information for the sale as set forth in NIST Handbook 44 Sections 3.40 and 5.55. [5.55]

(Added 202X)

Previous Status:
New Proposal

Original Justification:
The NIST Handbook 44 General Code and other code sections require that interference tests are performed to determine if conditions such as radio frequency interference (RFI), if when verified to exist, adversely affect the performance of a device under conditions that are usual and customary for the environment and location where a device is in commercial use. The permissible tolerance between the device's performance with and without such conditions are specified in the device-specific codes or some codes will specify options such as the equipment shall clearly blank the indications, provide an error message, or be so uninterpretable as to be unusable.

In the case of two other devices (i.e., the EVSE and taximeter) their applicable codes specify there will be no interference between the measurement of time and any portion of any other parameter driving any measurement mechanism of the device. For the taximeter the other type of measurements that occur during the normal operation of the device along with time measurement is that of distance. However, the taximeter has a design feature where at the point when the vehicle reaches a threshold where the vehicle when accelerated in speed reaches the "crossover speed" then only the distance traveled is registering. The taximeter code specifies separate tolerances that apply in the direction of overregistration and underregistration for distance and time registration. In the case of the "Interference Test" for the taximeter, the device must meet a specified distance tolerance when the operation of the vehicle is at speeds where the normal conditions of operation for the taximeter were to assess fares for distance traveled in the "time on" and "time off" mode. Clearly a unique set of procedures applicable only to the taximeter.

EVSE transactions may consist of fees (fixed and/or variable) for the total kilowatt-hours of electrical energy the system delivers to an EV as well as the total amount of time and the corresponding fee that is assessed for time-related service associated with the charging of the EV's battery. Given the NIST Handbook 44 codes also include unique procedures and requirements for the implementation of an interference test, NIST OWM recommends a definition for the test that is applicable to EVSEs be included in Appendix D.

Possible Opposing Arguments: Currently NIST Handbook 44 does not include any device-specific definition(s) for the "interference test" even though the procedure is required in various code sections. The adoption of the EVSE Code and modification to the Timing Devices Code to recognize time related fees assessed by the EVSE in association with EV battery charging are relatively new to the Handbook (circa 2015), hence the test procedure is not likely being applied. Additionally, EVSEs which feature both an electrical energy and a time measuring element are not prevalent in the marketplace.

In contrast, currently the handbook code sections that cite and require an interference test are expanding and do include variations on the interference test. Therefore, the test should be clear to any sector performing an examination of a device. There are a multitude of devices in the marketplace where General Code paragraph G.N.2. Testing with Nonassociated Equipment would apply because of the device's and its associated equipment's proximity to other equipment that might generate signals that could affect the device's performance. In each case an interference test should be performed to ensure there is no disruption of normal operation or the accuracy of those devices. The interference test of an EVSE as required in paragraph N.3. Interference Test, EVSE in Code Section 5.55 Timing Devices examines operational conditions beyond environmental factors to verify the system's design. Including this newly developed device-specific definition of an EVSE interference test provides everyone with a clear uniform interpretation and application of the test.

The submitter requests Voting status in 2026.

Comments in Favor:

Regulatory:

-

Industry:

-

Advisory:

-

Comments Against:

Regulatory:

-

Industry:

-

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minnich (NIST Office of Weights and Measures): This item is intended to define Interference Test. Currently there is no definition, this item will add clarity to what an interference test is.

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

The 2025 WWMA S&T Committee recommends a Voting status. The committee believes the item is fully developed and ready for a vote.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that this adds more guidance for testing of timing devices associated with EVSE, and recommended voting status.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

Representative from NJ –
- Interference test is explained in the Taxi Meter Code 5.54 N.3 Interference Test.
- In the Timing Device Code 5.55, it is already explicit in S.3 Interference that for EVSE, no interference between the time and electrical energy measurement elements of the system shall exist.
- In N.3 Interference Tests, EVSE., there is an explanation of the test to include no interreference between time and electrical energy measurements. If the accuracy of associated fees, indicating and recording elements are desired, as this item proposes, it should be added to this specification.
- If this definition is to exist in Appendix D - Definitions, it should read interference test, EVSE. But I would caution against defining every interreference test for every device. The parameters of the test should be included in each individual code if needed.
- Recommends developing status.

Representative from NY – Recommends developing status and including the EVSE language proposed by New Jersey.

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Michael Keilty, Endress+Hauser - recommends a Developing Status. He would like there to be a reference to OIML R117, which has a testing procedure for this. Proposal is blind to any other type of reference to this test and needs to be consistent. He also noticed there is minimal reference to interference in the EVSE HB 44 S.3.4 (b) code to implement this definition.

The committee recommends Developing status on this item.

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-26.2 Appendix D Definitions – scale division, value of (d).

Source:
NIST Office of Weights and Measures

Purpose:
To update the definition of scale division to recognize electronic recorded representations.

Item under Consideration:
Amend NIST Handbook 44 Appendix D as follows:

scale division, value of (d). T**~~he value of the scale division, expressed in units of mass, is t~~**he smallest subdivision of the scale for **an** analog indication or the difference between two consecutively indicated or **~~printed~~recorded** values for **a** digital indication or **~~printing~~recorded representation, expressed in units of mass**. (Also see "verification scale division.") [2.20, 2.22]

Previous Status:
New Proposal

Original Justification:
NIST Handbook 44 was amended in 2014 and 2023 to allow recorded representations in electronic form, but this definition seems to limit the use of the scale division, d, to printed receipts. The NIST Office of Weights and Measures views this as a clean-up item. This wouldn't change the intent of the definition; it would just update it to reflect the current handbook.

It's rare that there aren't possible arguments against a proposed change, but in this case, the definition is out of date and could cause an issue with systems that issue electronic receipts.

The submitter requested Voting status in 2026.

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
[Explain any changes made to the original proposal and committee recommendations]

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minnich (NIST Office of Weights and Measures): This item is a "clean up", the definition of scale division seems to limit the recording of the values to printing only. This item is to allow electronic representation along with printed recorded representation.

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

The 2025 WWMA S&T Committee recommends a Voting status. The committee believes the item is fully developed and ready for a vote.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that this adds clarity to the definition to align with the allowance of electronic recorded representations, and recommended voting status.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

No comments. No recommendation.

SWMA 2025 Annual Meeting:

No comments were heard.

The committee has no recommended status for this item.

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

ITEM BLOCK 1 (B1) – TRANSPORTATION-FOR-HIRE SYSTEMS

B1-TNS-25.1 V ~~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:

~~Table of Contents~~

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:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Recommends the item be assigned to the NCWM Transportation for Hire Systems Task Group, this item is not fully developed, needs repeatability testing, this is an opportunity to update the code.

The 2025 WWMA S&T Committee recommends an Assigned status. The committee is recommending this item be returned to the NCWM S&T Transportation-For-Hire Systems Task Group for further development with consideration to the comment heard during Open Hearings.

CWMA 2025 Interim Meeting:

Hearing no comments, the Committee recommends this item remain Voting.

NEWMA 2025 Interim Meeting:

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

No comments were heard.

The committee does not recommend changing the status of this item.

B1-TXI-25.1 V 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:

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 ~~,~~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:

$$\frac{\textit{Seconds of Initial Time Interval}}{\textit{Seconds per Non – Initial Time Interval}} = \frac{\textit{Distance of Initial Mileage Interval}}{\textit{Distance per Non – Initial Mileage Interval}}$$

(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:

- 2025 Annual: Matt Douglas, California Division of Measurement Standards, commented in support of the informational status and appreciates the efforts of the task group. He stated that language in the TNS code might not apply and thinks updates to TXI code are necessary.
- 2025 Interim: Matt Douglas, California Division of Measurement Standards, stated he agrees with the intent of the item and supports the merging of the codes, but expressed concern with the way certain devices are identified. An example provided was S.1.4. It was recommended that the item be assigned a Developing status to identify and review how devices are identified throughout the item.

Industry:

- 2025 Interim: None

Advisory:

- 2025 Interim: None

Comments Against:

Regulatory:

- 2025 Interim: Kurt Floren, County of Los Angeles, CA, expressed concern with how this may impact different technologies. He recommended clarifying “built for purpose” and referenced page S&T 180, S.1.3.2., where language was struck and may not incorporate legacy taximeters.

Industry:

- 2025 Interim: None

Advisory:

- 2025 Interim: None

Neutral Comments:

Regulatory:

- 2025 Annual: Austin Sheppard, San Diego County Department of Agriculture, stated that he thinks it’s looking better, but still has questions about the scope and thinks the language is ambiguous. He commented that Sections A and B in the exemptions are confusing and need clarification.
- 2025 Interim: Austin Shepherd, San Diego County CA Department of Agriculture, recommended an Informational status. He stated there were four areas of concern that should be addressed.
    - Page S&T 189, line 22 and 31: The provisions exempt the device from a customer display if the required information can be displayed on a customer’s device. He suggested removing this provision from the proposal.
    - Page 187. line 19: The requirement for 3 additional tests for out of tolerance verification. He proposes this requirement be removed.
    - Page 187, line 1: This provides regulatory discretion in sampling devices running a single network system. He recommends defining “representative sample of various indicating elements” as this leads to several unanswered questions including, but not limited to hardware and software questions, owner responsibility (network software v. device owner).

- Page 183, line 3: Allowance for electronic receipts; he believes the code should allow for paper receipts.

Industry:

- 2025 Interim: None

Advisory:

- 2025 Annual: Mark Lovisa, Chair of the Transportation-for-Hire Systems Task Group, commented that the task group has mostly decided to stick with the current language with some additional clarifications, such as adding a footnote to clarify built for purpose devices. He noted that the representative sample of indicating elements is up to the local jurisdiction and determined by the software version and type of device.
- 2025 Interim: Mark Lovisa, Chair of the Transportation-for-Hire Systems Task Group, updated the Committee on the progress of the group and referenced written comments he provided to the Committee. He recommended an Informational status.
- 2025 Interim: John McGuire, NIST OWM, and serving as the NIST technical advisor to the task group, recommends an Informational status for the block of items.

Item Development:

NCWM 2025 Annual Meeting: Based on some of the comments received, the Committee discussed the existing definition for "built-for-purpose device" and agrees that the item as written makes a distinction between built-for-purpose and not-built-for-purpose devices. The Committee believes the item is fully developed and has assigned it a voting status for 2026.

NCWM 2025 Interim Meeting: During open hearings, the Committee heard from several members in support of further development of the item. The Committee has assigned an Informational status to allow for further development by the task group. The Committee recommends the task group consider the questions and concerns brought up during open hearings along with those brought up in the NIST OWM Technical Analysis.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Recommends moving item to the TNS task group, this item is not fully developed, needs repeatability testing, this is an opportunity to update the code.

The 2025 WWMA S&T Committee recommends an Assigned status. The committee is recommending this item be returned to the NCWM S&T Transportation-For-Hire Systems Task Group for further development with consideration to the comment heard during Open Hearings

CWMA 2025 Interim Meeting:

Hearing no comments, the Committee recommends this item remain Voting.

NEWMA 2025 Interim Meeting:

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

No comments were heard.

The committee does not recommend changing the status of this item.

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.

ITEM BLOCK 2 (B2) – REFERENCES TO TYPE EVALUATION

Source:
NIST Office of Weights and Measures

Purpose:
To remove several paragraphs that require a device or systems to comply with NIST Handbook 44, before being submitted for NTEP evaluation.

Original Justification:
These paragraphs specify that a device must meet NIST Handbook 44 requirements before being submitted for type evaluation. These paragraphs were part of various codes when they had a tentative status but were not removed when the code was changed to permanent status.

Codes adopted prior to 1998 did not include a variation of this paragraph. The language creates a circular argument, in that a device can't be determined to comply with NIST Handbook 44 until evaluated, but the device can't be submitted for evaluation until it is determined to comply with NIST Handbook 44.

The submitter acknowledged that these paragraphs establish the responsibility of manufacturers to design devices that comply with NIST Handbook 44 requirements, and, although they are not included in each section, they should remain.

B2: CDL-26.1 ~~A.4. Type Evaluation.~~

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

~~**A.4. Type Evaluation. – The National Type Evaluation Program will accept for type evaluation only those devices that comply with all requirements of this code.**~~
~~**(Added 1998)**~~

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): OWM believes this item is cleanup, each code section listed has similar language that was added during the tentative status stating they must comply with HB44 before being submitted for NTEP evaluation. This section should have been removed when the codes changed to permanent status. OWM has consulted with NTEP and both believe the paragraph
can be removed. This issue is covered by NTEP administrative policy.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Acknowledged the comments from NIST OWM, supports Voting status.

Mr. Kurt Floren (Los Angeles County, California): supports Voting status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Voting status based on comments and support heard during the 2025 WWMA Annual Conference Open Hearing.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that references to type evaluation were added to Codes when they were tentative, but not removed once the codes became permanent. No effects on the application of any Code sections. Recommends as voting.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Alison Wilkinson, Maryland – is unsure why this item was proposed, believes it to have no merit and recommends Withdrawn status. When a developer submits their device, they should be familiar with Handbook 44 requirements and how they apply to the device to ensure the device is capable of meeting NIST HB 44 requirements. Device should be ready for evaluation upon submission and NTEP evaluators shouldn't be used as consultants.

Michael Keilty, Endress+Hauser – agrees with Alison that there isn't a need to make this modification. He doesn't believe that it is a circular argument and doesn't see the need to change the language – Recommends Developing or Withdrawn status.

The committee recommends Withdrawn status on this item.

B2: HGV-26.1 ~~A.4. Type Evaluation.~~

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

> ~~**A.4. Type Evaluation. – The National Type Evaluation Program will accept for type evaluation only those devices that comply with all requirements of this code.**~~

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): OWM believes this item is clean up, each code section listed has similar language that was added during the tentative status stating they must comply with HB44 before being submitted for NTEP evaluation. This section should have been removed when the codes changed to permanent status. OWM has consulted with NTEP, and both believe the paragraph can be removed. This issue is covered by NTEP administrative policy.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Acknowledged the comments from NIST OWM, supports a voting status.

Mr. Kurt Floren (Los Angeles County, California): supports Voting status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Voting status based on comments and support heard during the 2025 WWMA Annual Conference Open Hearing.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that references to type evaluation were added to Codes when they were tentative, but not removed once the codes became permanent. No effects on the application of any Code sections. Recommends as voting.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Alison Wilkinson, Maryland – is unsure why this item was proposed, believes it to have no merit and recommends Withdrawn status. When a developer submits their device, they should be familiar with Handbook 44 requirements and how they apply to the device to ensure the device is capable of meeting NIST HB 44 requirements. Device should be ready for evaluation upon submission and NTEP evaluators shouldn't be used as consultants.

Michael Keilty, Endress+Hauser – agrees with Alison that there isn't a need to make this modification. He doesn't believe that it is a circular argument and doesn't see the need to change the language – Recommends Developing or Withdrawn status.

The committee recommends Withdrawn status on this item.

B2: EVF-26.1 A.4. Type Evaluation.

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

A.4. Type Evaluation. – The National Type Evaluation Program (NTEP) will accept for type evaluation only those EVSEs that ~~**comply with all requirements of this code and**~~ have received safety certification by a nationally recognized testing laboratory **also referred to as an** ~~(~~NRTL~~)~~.

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): OWM believes this item is clean up, each code section listed has similar language that was added during the tentative status stating they must comply with HB44 before being submitted for NTEP evaluation. This section should have been removed when the codes changed to permanent status. OWM has consulted with NTEP, and both believe the paragraph can be removed. This issue is covered by NTEP administrative policy.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Acknowledged the comments from NIST OWM, supports a voting status.

Mr. Kurt Floren (Los Angeles County, California): supports Voting status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Voting status based on comments and support heard during the 2025 WWMA Annual Conference Open Hearing.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that references to type evaluation were added to Codes when they were tentative, but not removed once the codes became permanent. No effects on the application of any Code sections. Recommends as voting.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Alison Wilkinson, Maryland – is unsure why this item was proposed, believes it to have no merit and recommends Withdrawn status. When a developer submits their device, they should be familiar with Handbook 44 requirements and how they apply to the device to ensure the device is capable of meeting NIST HB 44 requirements. Device should be ready for evaluation upon submission and NTEP evaluators shouldn't be used as consultants.

Michael Keilty, Endress+Hauser – agrees with Alison that there isn't a need to make this modification. He doesn't believe that it is a circular argument and doesn't see the need to change the language – Recommends Developing or Withdrawn status.

The committee recommends Withdrawn status on this item.

B2: EMS-26.1 A.4. Type Evaluation.

Item under Consideration:
Amend NIST Handbook 44 Non-Utility Electricity-Measuring Systems Code as follows:

> A.4. Type Evaluation. – The National Type Evaluation Program (NTEP) will accept for type evaluation only those measuring systems that have received safety certification by a nationally recognized testing laboratory (also referred to as "NRTL") **~~and shall issue an NTEP Certificate of Conformance only to those measuring systems that comply with all requirements of this code.~~**

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): OWM believes this item is clean up, each code section listed has similar language that was added during the tentative status stating they must comply with HB44 before being submitted for NTEP evaluation. This section should have been removed when the codes changed to permanent status. OWM has consulted with NTEP, and both believe the paragraph can be removed. This issue is covered by NTEP administrative policy.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Acknowledged the comments from NIST OWM, supports a voting status.

Mr. Kurt Floren (Los Angeles County, California): supports Voting status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Voting status based on comments and support heard during the 2025 WWMA Annual Conference Open Hearing.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that references to type evaluation were added to Codes when they were tentative, but not removed once the codes became permanent. No effects on the application of any Code sections. Recommends as voting.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Alison Wilkinson, Maryland – is unsure why this item was proposed, believes it to have no merit and recommends Withdrawn status. When a developer submits their device, they should be familiar with Handbook 44 requirements and how they apply to the device to ensure the device is capable of meeting NIST HB 44 requirements. Device should be ready for evaluation upon submission and NTEP evaluators shouldn't be used as consultants.

Michael Keilty, Endress+Hauser – agrees with Alison that there isn't a need to make this modification. He doesn't believe that it is a circular argument and doesn't see the need to change the language – Recommends Developing or Withdrawn status.

The committee recommends Withdrawn status on this item.

B2: GMA-26.1 ~~A.3. Type Evaluation.~~

Item under Consideration:
Amend NIST Handbook 44 Non-Utility Electricity-Measuring Systems Code as follows:

~~**A.3. Type Evaluation. The National Type Evaluation Program (NTEP) will accept for type evaluation only those devices that comply with this code. State enforcement will be based upon the effective dates identified with each requirement when specific dates are shown.**~~

~~**(Added 1993)**~~

Previous Status:
New Proposal

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
New Proposal.

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): OWM believes this item is clean up, each code section listed has similar language that was added during the tentative status stating they must comply with HB44 before being submitted for NTEP evaluation. This section should have been removed when the codes changed to permanent status. OWM has consulted with NTEP, and both believe the paragraph can be removed. This issue is covered by NTEP administrative policy.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Acknowledged the comments from NIST OWM, supports a voting status.

Mr. Kurt Floren (Los Angeles County, California): supports Voting status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Voting status based on comments and support heard during the 2025 WWMA Annual Conference Open Hearing.

CWMA 2025 Interim Meeting:

Loren Minnich – NIST OWM, commented that references to type evaluation were added to Codes when they were tentative, but not removed once the codes became permanent. No effects on the application of any Code sections. Recommends as voting.

The Committee recommends this item be given a Voting status based on comments received during open hearing.

NEWMA 2025 Interim Meeting:

The committee recommends a voting status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Alison Wilkinson, Maryland – is unsure why this item was proposed, believes it to have no merit and recommends Withdrawn status. When a developer submits their device, they should be familiar with Handbook 44 requirements and how they apply to the device to ensure the device is capable of meeting NIST HB 44 requirements. Device should be ready for evaluation upon submission and NTEP evaluators shouldn't be used as consultants.

Michael Keilty, Endress+Hauser – agrees with Alison that there isn't a need to make this modification. He doesn't believe that it is a circular argument and doesn't see the need to change the language – Recommends Developing or Withdrawn status.

The committee recommends Withdrawn status on this item.

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.

ITEM BLOCK 3 (B3) – METHOD OF SEALING, CATEGORY 3

Source:
Endress+hauser Flow USA Inc. and Metron

Purpose:
In 2022, HB 44 Code Section 3.30 LMD Table S.2.2 Methods of Sealing, Category 3 was amended. The purpose of this proposal is to amend the same section found in the other HB 44 Device 3.XX Code Sections with the same language.

Original Justification:
Technology has advanced in all measurement areas with the integration of electronics for measuring devices and wireless transmission.

It is not practical to have direct wired connections to measuring devices where there are multiple devices or where access is limited for safety or installation requirements.

It was shortsighted to not address this when the change was made to 3.30 LMD Table S.2.2 Methods of Sealing Category 3 back in 2022.

The proposed language enables non-wired transmission from the measuring device to another device from which the information can be printed.

The submitter acknowledged these potential arguments against:

- Do not change the other code sections Method of Sealing Category 3because the LMD code section was modified for RMFDs which are burdened if required a direct wired connection.
- Devices are not secure and could be fraudulently adjusted if wireless transmission is allowed for all measuring devices.
- Weighing devices in Code Sections 2.XX are not recognized in the proposal.

The submitter requested Voting status in 2026.

B3: VTM-26.1 Table S.2.2. Categories of Device and Methods of Sealing

Item under Consideration:
Amend NIST Handbook 44 Vehicle Tank Meters Code as follows:

Table S.2.2. ***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 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. A printed copy of the information must be available on demand through the device or through another on-site device* ~~***. The information may also be available***~~***, or transmitted*** *electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): NIST OWM has not had time to evaluate this block of items thoroughly. We understand the idea of the proposal, however the LMD language should be reviewed as this language could be used as an alternative, or it could be helpful in developing this item further. The language currently as written in this item does not seem to carry out the stated purpose.

Mr. Kurt Floren (Los Angeles County, California): Spoke to concerns with the event logger. An onsite inspector should be able to review a printed copy at the time of inspection. The information may also be available electronically, but it must be available on site. The current language may allow the event log to only be available off site.

Mr. Cory Hainy (Avery Weigh-Tronix): Asked why the submitter chose to leave out weighing devices. Position on the item is neutral.

Mr. Loren Minich (NIST Office of Weights and Measures): Stated OWM did not know why scales code was not included. OWM believes this proposal is an attempt to harmonize with the LMD code. The event logger must be available at the time of inspection printed or electronically. This must be in the language.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Responding to Mr. Hainy – see additional documentation as to why 2.20 was not included. Language from 3.30 categories for sealing table code could be used: "The information may be printed by the device, printed by another on-site device, or transmitted electronically." Rather than the language as it appears in the agenda, which seems to still require a printed copy of the event logger information. Each one of these codes will need to be assessed to verify that the proposed update is applicable and appropriate and that they all reflect that this information must be produced by the device and available at the time of the inspection. If the item moves forward Recommends a Developing status.

Mr. Kurt Floren (Los Angeles County, California): Supports California DMS and OWM. Requests the committee include the LMD language as a suggestion to the submitter. The language at the time of inspection is critical language that must be included. The item should remain Developing and hear the comments from the other regions.

Mr. Scott Wagner (Colorado Division of Oil & Public Safety): Raised concern as this proposal applies to Category 3 sealing and would this language conflict with current methods particularly USB devices. The item has merit but needs additional work. Supports a Developing status.

Mr. Scott Simmons (P20:10 Services, LLC): Raised concern that the ability to use a memory stick device remains available. Supports a Developing status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Developing status based on comments and testimony heard during the 2025 WWMA Annual Conference Open Hearing.

The WWMA S&T Committee recommends the submitter review the comments stated above particularly the language referenced from the LMD code and seek feedback from all stakeholders including NIST OWM and all the regional associations and its members who speak to this item.

CWMA 2025 Interim Meeting:

The Committee reviewed and considered updated language from the submitter of this block of items. This language differed from what was printed in the agenda. After the original Block 3 items were published, the NTEP Measuring Sector met and wanted to further harmonize the Category 3 Sealing language between various Codes. The updated

language from the NTEP Measuring Sector was presented to the Body during open hearing. The comments and recommendation below are based on the updated language. All supporting documents can be found on the CWMA site.

Loren Minnich – NIST OWM, commented that "may" in the proposal needs further review. This seems to move away from what was previously required. The intent is to allow electronic as an option in place of physical, but this could be interpreted to not require either method.

The Committee recommends this item, as appears below, be given a Developing status based on comments received during open hearing.

3.30 LMD Table S.2.2,

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~~ may be ~~available at the time of inspection either as a printed copy or in electronic format~~. provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. ~~The information may be printed by the device, printed by another on-site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

3.31 VTM Table S.2.2., 3.32 LPG&AALM Table S.2.2., 3.34 CLM Table S.2.5., 3.35 MM Table S.2.3., 3.36 WM Table S.2.1., 3.37 MFM Table S.3.5., 3.38 CDLM Table S.2.5., 3.39 HGM Table S.3.3, 3.4.1 NUEMS Table S.2.2.

An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. ~~A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically.~~ The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. 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.)

3.40 EVFS Table S.3.3.,

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 may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the ~~EVSE~~ device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)

NEWMA 2025 Interim Meeting:

Representative from VT – Recommends these tables should be consolidated and moved to a single location in the handbook, for example the general code or in an appendix.

Representative from NJ – Explained that the event logger information should be available at the time of inspection and wasn't sure if the information is transmitted electronically would allow for this. Recommends developing status.

Updates submitted to NEWMA S&T Chair.

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The 2025 SWMA S&T Committee heard the following comments:

Michael Keilty, Endress+Hauser (submitter) – questioned about Cat 3 devices – descriptions in each measuring code has disparities. LMD had the best initially, so they used it in the original proposal to recommend all are uniform.
Later, it was revised to the EVSE Cat 3 description as it is more explicit on how to provide event log information.
Materials available online – 2 submittals – a letter to Withdraw original language (using LMD language) and submit new request (using EVFS language) MS Form 15 Method of Sealing 3.40 EVFS Table S 3 3 description - edit to strike EVSE and replace with Device.
Sections to be affected to allow uniformity:
3.30 LMD Table S.2.2,
3.31 VTM Table S.2.2.,
3.32 LPG&AALM Table S.2.2.,
3.34 CLM Table S.2.5.,
3.35 MM Table S.2.3.,
3.36 WM Table S.2.1.,
3.37 MFM Table S.3.5.,
3.38 CDLM Table S.2.5.,
3.39 HGM Table S.3.3,
3.40 EVFS Table S.3.3.,
3.41 NUEMS Table S.2.2.
This proposal allows for a device to be designed so that the event log can be obtained by some format, securely
He recommends Voting Status.

Brent Price, Gilbarco – supports the item moving forward as Voting - be sure to include LMDs as part of this

Alison Wilkinson, Maryland - supports Voting status

The committee recommends Voting status on the item, as revised and with the additional editorial revision removing the extra period in 3.4.1 NUEMs, changing it to 3.41 NEUMS.

Comments apply for all Block 3 items.

S&T committee added LMD-26.2 to the addendum sheet because it was left off from the form 15 codes to be edited.

B3: LPG-26.1 Table S.2.2. Categories of Device and Methods of Sealing

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

Table S.2.2. ***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 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*

Table S.2.2. *Categories of Device and Methods of Sealing*	
Categories of Device	***Methods of Sealing***
	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. A printed copy of the information must be available on demand through the device or through another on-site device~~. The information may also be available~~**, or transmitted** electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): NIST OWM has not had time to evaluate this block of items thoroughly. We understand the idea of the proposal, however the LMD language should be reviewed as this language could be used as an alternative, or it could be helpful in developing this item further. The language currently as written in this item does not seem to carry out the stated purpose.

Mr. Kurt Floren (Los Angeles County, California): Spoke to concerns with the event logger. An onsite inspector should be able to review a printed copy at the time of inspection. The information may also be available electronically, but it must be available on site. The current language may allow the event log to only be available off site.

Mr. Cory Hainy (Avery Weigh-Tronix): Asked why the submitter chose to leave out weighing devices. Position on the item is neutral.

Mr. Loren Minich (NIST Office of Weights and Measures): Stated OWM did not know why scales code was not included. OWM believes this proposal is an attempt to harmonize with the LMD code. The event logger must be available at the time of inspection printed or electronically. This must be in the language.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Responding to Mr. Hainy – see additional documentation as to why 2.20 was not included. Language from 3.30 categories for sealing table code could be used: "The information may be printed by the device, printed by another on-site device, or transmitted electronically." Rather than the language as it appears in the agenda, which seems to still require a printed copy of the event logger information. Each one of these codes will need to be assessed to verify that the proposed update is applicable and appropriate and that they all reflect that this information must be produced by the device and available at the time of the inspection. If the item moves forward Recommends a Developing status.

Mr. Kurt Floren (Los Angeles County, California): Supports California DMS and OWM. Requests the committee include the LMD language as a suggestion to the submitter. The language at the time of inspection is critical language that must be included. The item should remain Developing and hear the comments from the other regions.

Mr. Scott Wagner (Colorado Division of Oil & Public Safety): Raised concern as this proposal applies to Category 3 sealing and would this language conflict with current methods particularly USB devices. The item has merit but needs additional work. Supports a Developing status.

Mr. Scott Simmons (P20:10 Services, LLC): Raised concern that the ability to use a memory stick device remains available. Supports a Developing status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Developing status based on comments and testimony heard during the 2025 WWMA Annual Conference Open Hearing.

The WWMA S&T Committee recommends the submitter review the comments stated above particularly the language referenced from the LMD code and seek feedback from all stakeholders including NIST OWM and all the regional associations and its members who speak to this item.

CWMA 2025 Interim Meeting:

The Committee reviewed and considered updated language from the submitter of this block of items. This language differed from what was printed in the agenda. After the original Block 3 items were published, the NTEP Measuring Sector met and wanted to further harmonize the Category 3 Sealing language between various Codes. The updated language from the NTEP Measuring Sector was presented to the Body during open hearing. The comments and recommendation below are based on the updated language. All supporting documents can be found on the CWMA site.

Loren Minnich – NIST OWM, commented that “may” in the proposal needs further review. This seems to move away from what was previously required. The intent is to allow electronic as an option in place of physical, but this could be interpreted to not require either method.

The Committee recommends this item, as appears below, be given a Developing status based on comments received during open hearing.

3.30 LMD Table S.2.2,

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~~ may be ~~available at the time of inspection either as a printed copy or in electronic format~~. provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. ~~The information may be printed by the device, printed by another on-site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

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An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. ~~A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically.~~ The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. 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.)

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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 may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the ~~EVSE~~ device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)

NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

B3: CLM-26.1 Table S.2.5. Categories of Device and Methods of Sealing

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

Table S.2.5. 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 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. A printed copy of the information must be available on demand through the device or through another on-site device* ~~***. The information may also be available***~~***, or transmitted*** *electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

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Mr. Kurt Floren (Los Angeles County, California): Supports California DMS and OWM. Requests the committee include the LMD language as a suggestion to the submitter. The language at the time of inspection is critical language that must be included. The item should remain Developing and hear the comments from the other regions.

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The WWMA S&T Committee recommends the submitter review the comments stated above particularly the language referenced from the LMD code and seek feedback from all stakeholders including NIST OWM and all the regional associations and its members who speak to this item.

CWMA 2025 Interim Meeting:

The Committee reviewed and considered updated language from the submitter of this block of items. This language differed from what was printed in the agenda. After the original Block 3 items were published, the NTEP Measuring Sector met and wanted to further harmonize the Category 3 Sealing language between various Codes. The updated

language from the NTEP Measuring Sector was presented to the Body during open hearing. The comments and recommendation below are based on the updated language. All supporting documents can be found on the CWMA site.

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An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. ~~A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically.~~ The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. 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.)

3.40 EVFS Table S.3.3.,

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 may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the ~~EVSE~~ device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)

NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

B3: MLK-26.1 Table S.2.3. Categories of Device and Methods of Sealing

Item under Consideration:
Amend NIST Handbook 44 Milk Meters Code as follows:

Table S.2.3. *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 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. A printed copy of the information must be available on demand through the device or through another on-site device****~~. The information may also be available~~, or transmitted*** *electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (****Note:*** *Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): NIST OWM has not had time to evaluate this block of items thoroughly. We understand the idea of the proposal, however the LMD language should be reviewed as this language could be used as an alternative, or it could be helpful in developing this item further. The language currently as written in this item does not seem to carry out the stated purpose.

Mr. Kurt Floren (Los Angeles County, California): Spoke to concerns with the event logger. An onsite inspector should be able to review a printed copy at the time of inspection. The information may also be available electronically, but it must be available on site. The current language may allow the event log to only be available off site.

Mr. Cory Hainy (Avery Weigh-Tronix): Asked why the submitter chose to leave out weighing devices. Position on the item is neutral.

Mr. Loren Minich (NIST Office of Weights and Measures): Stated OWM did not know why scales code was not included. OWM believes this proposal is an attempt to harmonize with the LMD code. The event logger must be available at the time of inspection printed or electronically. This must be in the language.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Responding to Mr. Hainy – see additional documentation as to why 2.20 was not included. Language from 3.30 categories for sealing table code could be used: "The information may be printed by the device, printed by another on-site device, or transmitted electronically." Rather than the language as it appears in the agenda, which seems to still require a printed copy of the event logger information. Each one of these codes will need to be assessed to verify that the proposed update is applicable and appropriate and that they all reflect that this information must be produced by the device and available at the time of the inspection. If the item moves forward Recommends a Developing status.

Mr. Kurt Floren (Los Angeles County, California): Supports California DMS and OWM. Requests the committee include the LMD language as a suggestion to the submitter. The language at the time of inspection is critical language that must be included. The item should remain Developing and hear the comments from the other regions.

Mr. Scott Wagner (Colorado Division of Oil & Public Safety): Raised concern as this proposal applies to Category 3 sealing and would this language conflict with current methods particularly USB devices. The item has merit but needs additional work. Supports a Developing status.

Mr. Scott Simmons (P20:10 Services, LLC): Raised concern that the ability to use a memory stick device remains available. Supports a Developing status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Developing status based on comments and testimony heard during the 2025 WWMA Annual Conference Open Hearing.

The WWMA S&T Committee recommends the submitter review the comments stated above particularly the language referenced from the LMD code and seek feedback from all stakeholders including NIST OWM and all the regional associations and its members who speak to this item.

<u>CWMA 2025 Interim Meeting:</u>

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Loren Minnich – NIST OWM, commented that "may" in the proposal needs further review. This seems to move away from what was previously required. The intent is to allow electronic as an option in place of physical, but this could be interpreted to not require either method.

The Committee recommends this item, as appears below, be given a Developing status based on comments received during open hearing.

3.30 LMD Table S.2.2,

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~~ <u>may</u> be ~~available at the time of inspection either as a printed copy or in electronic format~~. <u>provided electronically in lieu of or in addition</u>

to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. ~~The information may be printed by the device, printed by another on-site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

3.31 VTM Table S.2.2., 3.32 LPG&AALM Table S.2.2., 3.34 CLM Table S.2.5., 3.35 MM Table S.2.3., 3.36 WM Table S.2.1., 3.37 MFM Table S.3.5., 3.38 CDLM Table S.2.5., 3.39 HGM Table S.3.3, 3.4.1 NUEMS Table S.2.2.

An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. ~~A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically.~~ The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. 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.)

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NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

B3: WTR-26.1 Table S.2.1. Categories of Device and Methods of Sealing

Item under Consideration:

Amend NIST Handbook 44 Water Meters Code as follows:

Table S.2.1. ***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 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*

Table S.2.1. *Categories of Device and Methods of Sealing*	
Categories of Device	***Methods of Sealing***
	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. A printed copy of the information must be available on demand through the device or through another on-site device~~. The information may also be available~~, **or transmitted** electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

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Mr. Matthew Douglas (State of California, Division of Measurement Standards): Responding to Mr. Hainy – see additional documentation as to why 2.20 was not included. Language from 3.30 categories for sealing table code could be used: "The information may be printed by the device, printed by another on-site device, or transmitted electronically." Rather than the language as it appears in the agenda, which seems to still require a printed copy of the event logger information. Each one of these codes will need to be assessed to verify that the proposed update is applicable and appropriate and that they all reflect that this information must be produced by the device and available at the time of the inspection. If the item moves forward Recommends a Developing status.

Mr. Kurt Floren (Los Angeles County, California): Supports California DMS and OWM. Requests the committee include the LMD language as a suggestion to the submitter. The language at the time of inspection is critical language that must be included. The item should remain Developing and hear the comments from the other regions.

Mr. Scott Wagner (Colorado Division of Oil & Public Safety): Raised concern as this proposal applies to Category 3 sealing and would this language conflict with current methods particularly USB devices. The item has merit but needs additional work. Supports a Developing status.

Mr. Scott Simmons (P20:10 Services, LLC): Raised concern that the ability to use a memory stick device remains available. Supports a Developing status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Developing status based on comments and testimony heard during the 2025 WWMA Annual Conference Open Hearing.

The WWMA S&T Committee recommends the submitter review the comments stated above particularly the language referenced from the LMD code and seek feedback from all stakeholders including NIST OWM and all the regional associations and its members who speak to this item.

CWMA 2025 Interim Meeting:

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Loren Minnich – NIST OWM, commented that “may” in the proposal needs further review. This seems to move away from what was previously required. The intent is to allow electronic as an option in place of physical, but this could be interpreted to not require either method.

The Committee recommends this item, as appears below, be given a Developing status based on comments received during open hearing.

3.30 LMD Table S.2.2,

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~~ may be ~~available at the time of inspection either as a printed copy or in electronic format~~. provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. ~~The information may be printed by the device, printed by another on-site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

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An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. ~~A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically.~~ The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. 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.)

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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 may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the ~~EVSE~~ device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)

NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

B3: MFM-26.1 Table S.3.5. Categories of Device and Methods of Sealing

Item under Consideration:
Amend NIST Handbook 44 Mass Flow Meters Code as follows:

Table S.3.5.
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 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. A printed copy of the information must be available on demand through the device or through another on-site device****. The information may also be available, or transmitted*** *electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (****Note:*** *Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

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Mr. Cory Hainy (Avery Weigh-Tronix): Asked why the submitter chose to leave out weighing devices. Position on the item is neutral.

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Mr. Kurt Floren (Los Angeles County, California): Supports California DMS and OWM. Requests the committee include the LMD language as a suggestion to the submitter. The language at the time of inspection is critical language that must be included. The item should remain Developing and hear the comments from the other regions.

Mr. Scott Wagner (Colorado Division of Oil & Public Safety): Raised concern as this proposal applies to Category 3 sealing and would this language conflict with current methods particularly USB devices. The item has merit but needs additional work. Supports a Developing status.

Mr. Scott Simmons (P20:10 Services, LLC): Raised concern that the ability to use a memory stick device remains available. Supports a Developing status.

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CWMA 2025 Interim Meeting:

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The Committee recommends this item, as appears below, be given a Developing status based on comments received during open hearing.

3.30 LMD Table S.2.2,

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~~ may be ~~available at the time of inspection either as a printed copy or in electronic format~~. provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. ~~The information may be printed by the device, printed by another on site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

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NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

B3: CDL-26.2 Table S.2.5. Categories of Device and Methods of Sealing

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

Table S.2.5. 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 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. A printed copy of the information must be available on demand through the device or through another on-site device****~~. The information may also be available~~, or transmitted*** *electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (****Note:*** *Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

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3.30 LMD Table S.2.2,

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~~ <u>may</u> be ~~available at the time of inspection either as a printed copy or in electronic format~~. <u>provided electronically in lieu of or in addition</u>

to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. ~~The information may be printed by the device, printed by another on-site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

3.31 VTM Table S.2.2., 3.32 LPG&AALM Table S.2.2., 3.34 CLM Table S.2.5., 3.35 MM Table S.2.3., 3.36 WM Table S.2.1., 3.37 MFM Table S.3.5., 3.38 CDLM Table S.2.5., 3.39 HGM Table S.3.3, 3.4.1 NUEMS Table S.2.2.

An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. ~~A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically.~~ The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. 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.)

3.40 EVFS Table S.3.3.,

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 may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the ~~EVSE~~ device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)

NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

B3: HGM-26.1 Table S.3.3. Categories of Device and Methods of Sealing

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

Table S.3.3. ***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 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. A printed copy of the information must be available on demand through the device or through another on-site device~~. The information may also be available~~**, or transmitted** electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): NIST OWM has not had time to evaluate this block of items thoroughly. We understand the idea of the proposal, however the LMD language should be reviewed as this language could be used as an alternative, or it could be helpful in developing this item further. The language currently as written in this item does not seem to carry out the stated purpose.

Mr. Kurt Floren (Los Angeles County, California): Spoke to concerns with the event logger. An onsite inspector should be able to review a printed copy at the time of inspection. The information may also be available electronically, but it must be available on site. The current language may allow the event log to only be available off site.

Mr. Cory Hainy (Avery Weigh-Tronix): Asked why the submitter chose to leave out weighing devices. Position on the item is neutral.

Mr. Loren Minich (NIST Office of Weights and Measures): Stated OWM did not know why scales code was not included. OWM believes this proposal is an attempt to harmonize with the LMD code. The event logger must be available at the time of inspection printed or electronically. This must be in the language.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Responding to Mr. Hainy – see additional documentation as to why 2.20 was not included. Language from 3.30 categories for sealing table code could be used: "The information may be printed by the device, printed by another on-site device, or transmitted electronically." Rather than the language as it appears in the agenda, which seems to still require a printed copy of the event logger information. Each one of these codes will need to be assessed to verify that the proposed update is applicable and appropriate and that they all reflect that this information must be produced by the device and available at the time of the inspection. If the item moves forward Recommends a Developing status.

Mr. Kurt Floren (Los Angeles County, California): Supports California DMS and OWM. Requests the committee include the LMD language as a suggestion to the submitter. The language at the time of inspection is critical language that must be included. The item should remain Developing and hear the comments from the other regions.

Mr. Scott Wagner (Colorado Division of Oil & Public Safety): Raised concern as this proposal applies to Category 3 sealing and would this language conflict with current methods particularly USB devices. The item has merit but needs additional work. Supports a Developing status.

Mr. Scott Simmons (P20:10 Services, LLC): Raised concern that the ability to use a memory stick device remains available. Supports a Developing status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Developing status based on comments and testimony heard during the 2025 WWMA Annual Conference Open Hearing.

The WWMA S&T Committee recommends the submitter review the comments stated above particularly the language referenced from the LMD code and seek feedback from all stakeholders including NIST OWM and all the regional associations and its members who speak to this item.

<u>CWMA 2025 Interim Meeting:</u>

The Committee reviewed and considered updated language from the submitter of this block of items. This language differed from what was printed in the agenda. After the original Block 3 items were published, the NTEP Measuring Sector met and wanted to further harmonize the Category 3 Sealing language between various Codes. The updated language from the NTEP Measuring Sector was presented to the Body during open hearing. The comments and recommendation below are based on the updated language. All supporting documents can be found on the CWMA site.

Loren Minnich – NIST OWM, commented that "may" in the proposal needs further review. This seems to move away from what was previously required. The intent is to allow electronic as an option in place of physical, but this could be interpreted to not require either method.

The Committee recommends this item, as appears below, be given a Developing status based on comments received during open hearing.

3.30 LMD Table S.2.2,

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~~ <u>may</u> be ~~available at the time of inspection either as a printed copy or in electronic format~~. <u>provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference</u>. ~~The information may be printed by the device, printed by another on-site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable

parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

3.31 VTM Table S.2.2., 3.32 LPG&AALM Table S.2.2., 3.34 CLM Table S.2.5., 3.35 MM Table S.2.3., 3.36 WM Table S.2.1., 3.37 MFM Table S.3.5., 3.38 CDLM Table S.2.5., 3.39 HGM Table S.3.3, 3.4.1 NUEMS Table S.2.2.

An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. ~~A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically.~~ The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. 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.)

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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 may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the ~~EVSE~~ device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.

NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

B3: EVF-26.3 Table S.3.3. Categories of Device and Methods of Sealing

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

Table S.3.3. ***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 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. A printed copy of the information must be available on demand through the device or through another on-site device****~~. The information may also be available~~, or transmitted*** *electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (****Note:*** *Does not require 1000 changes to be stored for each parameter.)*

Previous Status:
New Proposal

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

During the WWMA 2025 Annual Conference the following comments were received:

Mr. Loren Minich (NIST Office of Weights and Measures): NIST OWM has not had time to evaluate this block of items thoroughly. We understand the idea of the proposal, however the LMD language should be reviewed as this language could be used as an alternative, or it could be helpful in developing this item further. The language currently as written in this item does not seem to carry out the stated purpose.

Mr. Kurt Floren (Los Angeles County, California): Spoke to concerns with the event logger. An onsite inspector should be able to review a printed copy at the time of inspection. The information may also be available electronically, but it must be available on site. The current language may allow the event log to only be available off site.

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Mr. Loren Minich (NIST Office of Weights and Measures): Stated OWM did not know why scales code was not included. OWM believes this proposal is an attempt to harmonize with the LMD code. The event logger must be available at the time of inspection printed or electronically. This must be in the language.

Mr. Matthew Douglas (State of California, Division of Measurement Standards): Responding to Mr. Hainy – see additional documentation as to why 2.20 was not included. Language from 3.30 categories for sealing table code could be used: "The information may be printed by the device, printed by another on-site device, or transmitted electronically." Rather than the language as it appears in the agenda, which seems to still require a printed copy of the event logger information. Each one of these codes will need to be assessed to verify that the proposed update is applicable and appropriate and that they all reflect that this information must be produced by the device and available at the time of the inspection. If the item moves forward Recommends a Developing status.

Mr. Kurt Floren (Los Angeles County, California): Supports California DMS and OWM. Requests the committee include the LMD language as a suggestion to the submitter. The language at the time of inspection is critical language that must be included. The item should remain Developing and hear the comments from the other regions.

Mr. Scott Wagner (Colorado Division of Oil & Public Safety): Raised concern as this proposal applies to Category 3 sealing and would this language conflict with current methods particularly USB devices. The item has merit but needs additional work. Supports a Developing status.

Mr. Scott Simmons (P20:10 Services, LLC): Raised concern that the ability to use a memory stick device remains available. Supports a Developing status.

The 2025 WWMA S&T Committee recommends that this item be assigned a Developing status based on comments and testimony heard during the 2025 WWMA Annual Conference Open Hearing.

The WWMA S&T Committee recommends the submitter review the comments stated above particularly the language referenced from the LMD code and seek feedback from all stakeholders including NIST OWM and all the regional associations and its members who speak to this item.

CWMA 2025 Interim Meeting:

The Committee reviewed and considered updated language from the submitter of this block of items. This language differed from what was printed in the agenda. After the original Block 3 items were published, the NTEP Measuring Sector met and wanted to further harmonize the Category 3 Sealing language between various Codes. The updated language from the NTEP Measuring Sector was presented to the Body during open hearing. The comments and recommendation below are based on the updated language. All supporting documents can be found on the CWMA site.

Loren Minnich – NIST OWM, commented that "may" in the proposal needs further review. This seems to move away from what was previously required. The intent is to allow electronic as an option in place of physical, but this could be interpreted to not require either method.

The Committee recommends this item, as appears below, be given a Developing status based on comments received during open hearing.

3.30 LMD Table S.2.2,

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~~ may be ~~available at the time of inspection either as a printed copy or in electronic format~~. provided electronically in lieu of or in addition

to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. ~~The information may be printed by the device, printed by another on-site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

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NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

B3: EMS-26.2 Table S.2.2. Categories of Device and Methods of Sealing

Item under Consideration:
Amend NIST Handbook 44 Non-Utility Electricity-Measuring Systems Code as follows:

Table S.2.2. ***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 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.*
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Previous Status:
New Proposal

Comments in Favor:

Regulatory:
-

Industry:
-

Advisory:
-

Comments Against:

Regulatory:
-

Industry:
-

Advisory:
-

Neutral Comments:

Regulatory:
-

Industry:
-

Advisory:
-

Item Development:
[Explain any changes made to the original proposal and committee recommendations]

Regional Associations' Comments:

WWMA 2025 Annual Meeting:

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The WWMA S&T Committee recommends the submitter review the comments stated above particularly the language referenced from the LMD code and seek feedback from all stakeholders including NIST OWM and all the regional associations and its members who speak to this item.

CWMA 2025 Interim Meeting:

The Committee reviewed and considered updated language from the submitter of this block of items. This language differed from what was printed in the agenda. After the original Block 3 items were published, the NTEP Measuring Sector met and wanted to further harmonize the Category 3 Sealing language between various Codes. The updated language from the NTEP Measuring Sector was presented to the Body during open hearing. The comments and recommendation below are based on the updated language. All supporting documents can be found on the CWMA site.

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3.30 LMD Table S.2.2,

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~~ may be ~~available at the time of inspection either as a printed copy or in electronic format~~. provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. ~~The information may be printed by the device, printed by another on site device, or transmitted electronically.~~ The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

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An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. ~~A printed copy of the information must be available on demand through the device or through another on-site device. The information may also be available electronically.~~ The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. 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.)

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NEWMA 2025 Interim Meeting:

The committee recommends a developing status for this item.

SWMA 2025 Annual Meeting:

The committee recommends voting status for this item.

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

ITEM BLOCK 4 (B4) – ELECTRIC VEHICLE ~~FUELING SYSTEMS~~ SUPPLY EQUIPMENT

Source:
National Council on Weights and Measures

Purpose:
Rename the handbook 3.40 Code to match the terminology used within the Code.

OTH-26.3 Handbook 44 Main Table of Contents

Item under Consideration:
Amend NIST Handbook 44 Main Table of Contents as follows:

Main Table of Contents

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Section 3.

Previous Status:
2026: New Proposal

OTH-26.4 Section 3 Table of Contents

Item under Consideration:
Amend NIST Handbook 44 Section 3 Table of Contents as follows:

Section 3

Table of Contents

Note: In this section of Handbook 44, the reference temperature for the temperature compensation of refined petroleum products is shown as "15 °C (60 °F)." Although these values are not exact equivalents, they reflect industry usage when the SI and U.S. customary units are used in measurements.

Previous Status:
2026: New Proposal

EVF-26.4 Section 3.40. Electric Vehicle ~~Fueling Systems~~ Supply Equipment

Item under Consideration:
Amend NIST Handbook 44 Electric Vehicle Fueling Systems Code as follows:

Table of Contents

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Section 3.40. Electric Vehicle ~~Fueling Systems~~Supply Equipment

Section 3.40. Electric Vehicle ~~Fueling Systems~~**Supply Equipment** was added as a "tentative code" in 2015. In July 2022, the status of the code was changed from "tentative" to "permanent" effective January 1, 2023. (Amended 2022)

Previous Status:
2026: New Proposal

EMS-26.1 A. Application

Item under Consideration:
Amend NIST Handbook 44 Non-Utility Electricity-Measuring Systems Tentative Code as follows:

A. Application

A.1. General**.** – This code applies to measuring systems used in non-utility sales of electric energy wherein the sale is based in whole or in part on one or more measured quantities.

A.2. Exceptions**.** – This code does not apply to:

(a) The use of any measuring system owned, maintained, and/or used by a utility.

(b) Measuring systems used solely for delivering electric energy in connection with operations in which the amount delivered does not affect customer charges or compensation.

(c) Electric vehicle fueling systems. (See 3.40. Electric Vehicle ~~**Fueling Systems**~~**Supply Equipment** Code).

Transactions not subject to weights and measures authority.

Previous Status:
2026: New Proposal

TIM-26.1 S.1.4. Recorded Representations

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

S.1.4. Recorded Representations.

S.1.4.1. Recorded Representations, Electric Vehicle Supply Equipment (EVSE) Timing Devices. – A timing device incorporated into an EVSE for use in assessing charges for timing separate from charges for electrical energy shall issue a recorded representation itemizing the charges for these services as defined in Section 3.40. Electric Vehicle ~~**Fueling Systems**~~**Supply Equipment**.

(Added 2015)

Previous Status:
2026: New Proposal

Original Justification:
The terminology, "Electric Vehicle Fueling Systems" is the title of the NIST Handbook 44 Code, but within the Code, the terminology, "Electric Vehicle Supply Equipment (EVSE)" is used. The latter is also what is defined in Appendix D. Having differing names for the same device type in Handbook 44 is confusing and unnecessary. "EVSE" has become the common acronym in referencing the devices by both regulators and industry.

NCWM recognizes that this will require changes in various sections of Handbook 44, and that NTEP staff will need to modify NCWM Publication 14 and existing NTEP Certificates of Conformance at no cost to certificate holders.

Comments in Favor:

Regulatory:
•

Industry:
•

Advisory:
•

Comments Against:

Regulatory:
•

Industry:
•

Advisory:
•

Neutral Comments:

Regulatory:
•

Industry:
•

Advisory:
•

Item Development:
[Explain any changes made to the original proposal and committee recommendations]

Regional Associations' Comments:
This block of items, as developed by NCWM, was not prepared in time for review by the regional associations.

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.

Mark Lovisa, Louisiana | Committee Chair
Brett Willhite, Minnesota | Vice-Chair
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