



**NIST Special Publication 2200
NIST SP 2200-02**

2022 NIST Summary of U.S. Legal Metrology Activities

Lisa Warfield
Tina G. Butcher
Richard A. Harshman
Jan Konijnenburg
G. Diane Lee
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National Institute of Standards and Technology
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Abstract

The NIST Office of Weights and Measures (OWM) presents its first report 2022 NIST Annual Summary of U.S. Legal Metrology Activities report.

This report includes a summary of changes made to NIST Handbook 44 (2021) Specifications, Tolerances and Other Technical Requirements for Commercial Weighing and Measuring Devices, NIST Handbook 130 (2021), Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality, and NIST Handbook 133 (2020), Checking the Net Contents of Packaged Goods. The summary will provide an archival record of proposals and associated actions with the goal of assisting the weights and measures community in consistently interpreting and implementing NIST Handbooks 44, 130, and 133. Each item in this report includes a NIST OWM technical analysis, background information, and a summary of any actions taken on proposed changes to these NIST Handbooks considered in 2022.

Keywords

area; automotive lubricants; devices; dry measures; electric vehicle fueling systems; fuels; grain analyzers; grain moisture meters; hydrogen gas-measuring devices; labeling; laws and regulations; legal metrology; length; liquid-measuring devices; LPG and anhydrous ammonia liquid-measuring; mass flow meters; measure-containers; measuring; measuring systems; meters; method of sale; multiple dimension measuring devices; NIST Handbook 44; NIST Handbook 130; NIST Handbook 133; NTEP; odometers; NIST OWM analysis; packaging; price verification; registration of servicepersons; scales; specifications and tolerances; taximeters; technical analysis; test methods; test procedures; thickness; timing devices; training; transportation network measuring systems; type evaluation; uniform laws; unit pricing; vehicle tanks; volume; weighing; weighing systems; weighmaster law; weight; weights and measures law.

Foreword

This NIST Special Publication (SP 2200-02) as prepared by the NIST Office of Weights and Measures (OWM) represents the inaugural issue of the 2022 NIST Summary of U.S. Legal Metrology Activities related to legal metrology. This publication is part of an ongoing series that will provide information on the status and development of U.S. and international legal metrology documentary standards; SI usage, facilitation, and best practices; and technical guidance and training as provided by NIST OWM. The publications in this subseries also provide additional technical information that may not be provided in the NIST Handbook series.

We envision this annual 2022 NIST Summary of U.S. Legal Metrology Activities (NIST SP 2200-02) document as a central repository and citable source of annual legal metrology and weights and measures program and meeting synopses, technical activity and working group summaries, and other inclusive information that may be relevant to our partners, customers, and U.S. and international stakeholders. This inaugural issue focuses on a summary of changes made to the NIST Handbooks through the National Conference on Weights and Measures and the regional Weights and Measures Associations together with relevant background information of each technical item as described in the NIST OWM technical analysis. Topics for future issues may include (but are not limited to) reports on workshops, conferences and meetings related to particular technical sectors; summaries of NIST OWM training activities and other technical guidance; recommendations for weight and measures field inspectors and other weights and measures professionals; and updates related to laboratory and international legal metrology activities.

We aim to better serve our weights and measures community with this NIST SP 2200-02 Summary, and other publications within the NIST 2200 subseries. We welcome all feedback at any time.

Dr. Katrice A. Lippa
Chief, NIST Office of Weights and Measures

Author Contributions

Tina G. Butcher: Data curation, Writing - Original Draft preparation, Writing - Reviewing and Editing; **Richard A. Harshman:** Data curation, Writing - Original Draft preparation, Writing - Reviewing and Editing; **Jan Konijnenburg:** Data curation, Writing - Reviewing and Editing; **G. Diane Lee:** Writing - Original Draft preparation, Data curation, Writing - Reviewing and Editing; **David A. Sefcik:** Writing – Reviewing and Editing; **Juana S. Williams:** Data curation, Writing - Original Draft preparation, Writing - Reviewing and Editing; **Lisa Warfield:** Data curation, Writing Original Draft preparation, Writing - Reviewing and Editing; **Katrice A. Lippa:** Supervision.

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Table 2. Reporting Structure
Source: Name and affiliation of submitter.
Submitter’s Purpose and Justification: The submitter’s concise statement as to the intent or purpose of this proposal. The justification describes the national importance, background on the issue, and may contain references to supporting data or documents. The justification may be summarized by NIST OWM.
NIST OWM Executive Summary: High level points that summarize the Technical Aspects of the item and recommendations pertaining to the Item Under Consideration.
Item Under Consideration – The latest language that the Committee has moved forward as the Item membership is considering. NIST OWM has applied the appropriate formatting according to NIST Handbooks
NIST OWM Detailed Technical Analysis – A detailed analysis with background information and recommendations from the NIST Office of Weights and Measures (OWM)
Summary of Discussions and Actions – A NIST OWM summary of details and discussion on this Item. This includes discussion and decisions of the Standing Committee. This may also include information from sectors, trade associations, task groups, and subcommittees.
Regional Association Reporting – An NIST OWM Summarization of the Regional Association Meeting finalized reports. <ul style="list-style-type: none"> • Each region will be identified by their regional acronym along with the year and meeting. • The meetings within each region will be in chronological order.
Found at the end of the Report: References: Appendix A: Supporting Documents

NIST Office of Weights and Measures (OWM) Specifications and Tolerances (S&T) 2022 Final Report

This NIST OWM final report contains recommendations to amend the National Institute of Standards and Technology (NIST) Handbook 44 (2021), “Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices. The National Conference on Weights and Measures (NCWM), Specification and Tolerances Committee addressed the following agenda items listed in the table of contents in NCWM Publications 15 and 16 during the 2022 NCWM Interim and Annual Meetings.

This report is based on the NIST OWM Technical Analysis, NCWM “Committee Reports,” testimony at public hearings, supplemental documents, comments received from the regional weights and measures associations and other parties, the addendum sheets issued at the NCWM Annual Meeting, and actions taken by the membership at the voting session of the Annual Meeting.

The status of each item contained in the report is designated as one of the following: (D) Developing Item: the Committee determined the item has merit; however, the item was returned to the submitter or other designated party for further development before any action can be taken at the national level; Informational (I) Item: the item is under consideration by the Committee but not proposed for Voting; (V) Voting Item: the Committee is making recommendations requiring a vote by the active members of NCWM; (W) Withdrawn Item: the item has been removed from consideration by the Committee.

Table B. Voting Results provides a summary of the results of the voting on the Committee’s items and the report in its entirety. The Committee established which items were to be voted on individually and voting-ready items to be grouped together on the consent calendar. Approval of the entire group of consent calendar items occurs as the result of one vote by active membership. Typically, items placed on the consent calendar although important have been without opposition and appear to require no further discussion.

Suggested revisions are shown in **boldface print** by ~~striking out~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in underscored ***boldfaced italics***.

Appendix A. Supplemental Documents contains additional letters, presentations, and data that have been part of the analysis performed by NIST OWM and the NCWM Specifications and Tolerances Committee for items under consideration.

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Subject Series List for the Specifications and Tolerances Committee

Handbook 44 – General Code.....	GEN Series
Scales.....	SCL Series
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Automatic Bulk Weighing Systems	ABW Series
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Milk Meters	MLK Series
Water Meters	WTR Series
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Carbon Dioxide Liquid-Measuring Devices.....	CDL Series
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Graduates.....	GDT Series
Dry Measures	DRY Series
Berry Baskets and Boxes.....	BBB Series
Fabric-Measuring Devices.....	FAB Series
Wire-and Cordage-Measuring Devices	WAC Series
Linear Measures	LIN Series
Odometers	ODO Series
Taximeters	TXI Series
Timing Devices	TIM Series
Grain Moisture Meters (a).....	GMA Series
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Transportation Network Measuring Systems	TNS Series
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Table B. Voting Results

<i>Item Number</i>	<i>House of State Representatives</i>		<i>House of Delegates</i>		<i>Results</i>
	<i>Yeas</i>	<i>Nays</i>	<i>Yeas</i>	<i>Nays</i>	
Consent Calendar					
LMD-21.1, LMD-22.1, LPG-22.1, MFM-22.1, TXI-22.1, OTH-22.2	36	0	42	16	Adopted
GEN-22.1	36	0	42	0	Adopted
VTM-18.1	24	16	28	0	Returned to Committee
EVF-20.1	33	5	36	8	Adopted
EVF-22.1	35	2	37	6	Adopted
To Accept the Report	Voice Vote				Adopted

Details of All Items
 (in order by Item Number)

GEN – General Code

GEN-22.1 V G.A.1. Commercial and Law-Enforcement Equipment.

(This Item was Adopted.)

Source: NIST Office of Weights and Measures

Submitter’s Purpose and Justification:

This proposed change is intended to add clarification regarding the implications of using weighing and measuring devices for transactions that may be considered by some as commercial while there is no clear guidance provided.

<p>NIST OWM Executive Summary for GEN-22.1 – G.A.1. Commercial and Law-Enforcement Equipment</p>
<p>NIST OWM Recommendation: OWM believes GEN-22.1 is fully developed and recommends its adoption along with the two companion L&R items.</p> <ul style="list-style-type: none"> • This item is intended to eliminate all ambiguity concerning the issue of whether or not NIST Handbook 44 is intended to apply to weighing and measuring equipment used solely for the purpose of charging a fee for the service of providing a weight or measure. • This item is somewhat related to the two remaining S&T scale items in Block 6, from which this item was removed by the Committee during the 2022 NCWM Interim Meeting and made a stand-a-lone Voting Item. The remaining two scale items are currently developing items. • There are also two companion items on L&R’s agenda related to S&T GEN-22.1, both of which are also Voting Items. The L&R items are B2: WAM-22.1 and NTP-22.1. These two L&R items were developed by OWM to harmonize the language associated with the terms “commercial” and “law enforcement” in NIST Handbook 44 and NIST Handbook 130.

Item under Consideration:

Amend Handbook 44, General Code as follows:

G-A.1. Commercial and Law-Enforcement Equipment. – These specifications, tolerances, and other technical requirements apply as follows.

(1) To commercial weighing and measuring equipment; that is:

- (a) To weights and measures and weighing and measuring devices ~~commercially~~ used or employed ~~in~~:

1. in establishing the size, quantity, extent, area, composition (limited to meat and poultry), constituent values (limited to grain), or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award;
 2. **when assessing a fee for the use of the equipment to determine a weight or measure;**
 3. **in determining the basis of an award using count, weight, or measure; or**
 4. in computing any basic charge or payment for services rendered on the basis of weight or measure.
(Amended 2008 **and 2022**)
- (b) To any accessory attached to or used in connection with a commercial weighing or measuring device when such accessory is so designed that its operation affects the accuracy of the device.
- (2)** To weighing and measuring equipment in official use for the enforcement of law or ~~for~~ the collection of statistical information by government agencies.

(These requirements should be used as a guide by the weights and measures official when, upon request, courtesy examinations of noncommercial equipment are made.)

NIST OWM Detailed Technical Analysis:

This item was originally a part of the Block 6 S&T items but was removed by the Committee and made a stand-alone Voting Item during the 2022 NCWM Interim Meeting at the recommendation of OWM and others. As a result, only two “scale” items remain in Block 6 of the Committee’s 2022 Interim Meeting Report (NCWM Publication 16). Those items are SCL-22.1 and SCL-22.3 and both remain in a Developing status. Refer to Block 6 of this report to view OWM’s analysis of these two items.

OWM developed the proposal in GEN-22.1 and the two proposals in SCL-22.1 and SCL-22.3 to:

1. remove all ambiguity surrounding the issue of whether or not NIST Handbook 44 is intended to apply to weighing and measuring equipment used solely for the purpose of providing a weight or measure for a fee; and
2. address perceived gaps in HB 44 Scales Code requirements pertaining to the design and use of multi-independent platform vehicle scales used to charge a fee for the service of providing axle- and axle-group weights, as well as total vehicle weight to those needing them (typically commercial haulers).

These (3) proposals were developed as the result of an OWM inquiry from a state questioning the permissible use of a multi-independent platform vehicle scale system (each platform having its own A/D conversion circuitry and weight indicator) that printed total vehicle weight from summing the axle- and axle-group loads of vehicles weighed when not all parts of those vehicles were able to fit onto a live portion of the scale and be weighed simultaneously. That is, the scale was being used on occasion to “split weigh” in two different drafts the different axle and axle groups of “over-sized” coupled vehicle

combinations because not all axle and axle groups would fit onto a live portion of the scale at the same time, which thus necessitated weighing those particular vehicles in multiple drafts. Even though the printed ticket provided clear indication that the total vehicle weight value recorded was “non certifiable,” it is questionable whether or not the scale system would be permitted to record this weight since HB 44 Scales Code paragraph UR.3.3. Single-Draft Vehicle Weighing requires a vehicle or coupled-vehicle combination to be weighed on a vehicle scale only as a single draft.

The two scale items in Block 6 are intended to address the design and use of multi-independent platform vehicle scale systems, including the weight information that gets displayed and recorded by these systems when in use. OWM developed the GEN-22.1 proposal when it became evident from discussions with various states that not all jurisdictions interpreted paragraph G-A.1. to mean that HB 44 was intended to apply to weighing and measuring devices and systems used solely to charge a fee for the service of providing a weight or measure and for no other purpose. Consequently, Gen-22.1 is intended to make clear the application of HB 44 to weighing and measuring equipment used to charge a fee for the service of providing a weight or measure but could also be used for commercial uses.

Based on the feedback received during the Fall 2021 Regional Weights and Measures Association meetings and the 2022 NCWM Interim Meeting, OWM concluded that most everyone seemingly agrees that NIST Handbook 44 is intended to apply to weighing equipment used in assessing a fee for the service of providing a weight. It is only reasonable to expect that when a device is used for the purpose of charging a fee for a weight or measure that that weight or measure be accurate, (i.e., to within the applicable tolerances specified in HB 44), and that the device used for this service comply with all applicable NIST HB 44 requirements. Clarifying this point was OWM’s objective in proposing a change to paragraph G.A.1. Commercial and Law-Enforcement Equipment.

Summary of Discussions and Actions:

The S&T Committee agreed at the request of OWM and others during the 2022 NCWM Interim Meeting to restructure the information in the GEN-22.1 proposal from that which was initially drafted and appearing in the Committee’s 2022 NCWM Interim Meeting Agenda. This restructuring was done to harmonize the GEN-22.1 item with two “companion items” on the Laws and Regulations Committee’s 2022 agenda that define the term “commercial equipment.” This S&T item, following its restructuring, then received widespread support from those commenting on it during open hearings.

The S&T and L&R Committees agreed to meet virtually following the 2022 NCWM Interim Meeting to make any final changes necessary to harmonize the different proposals. No changes were recommended to this item during that meeting and the Committees agreed to recommend for vote the proposal as follows:

G-A.1. Commercial and Law-Enforcement Equipment. – These specifications, tolerances, and other technical requirements apply as follows.

(1) To commercial weighing and measuring equipment; that is:

- (a) To weights and measures and weighing and measuring devices commercially used or employed in:
 - 1. establishing the size, quantity, extent, area, composition (limited to meat and poultry), constituent values (limited to grain), or measurement of quantities, things,

produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award;

2. **assessing a fee for the use of the equipment to determine a weight or measure;**
3. **determining the basis of an award using count, weight, or measure; or**
4. computing any basic charge or payment for services rendered on the basis of weight or measure.
(Amended 2008 **and 20XX**)

(b) To any accessory attached to or used in connection with a commercial weighing or measuring device when such accessory is so designed that its operation affects the accuracy of the device.

(2) To weighing and measuring equipment in official use for the enforcement of law or ~~for~~ the collection of statistical information by government agencies.

A few minor grammatical changes to the text in the Item under Consideration were suggested during open hearings of the S&T Committee at the 2022 NCWM Annual Meeting. Several state regulators voiced support for the item with the changes that had been suggested. During the Committee's work session, members of the Committee agree to present the item for vote with the suggested changes and as shown in the Item under Consideration of this report.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Open Hearings, the Committee took comments simultaneously on the three items that were originally in Block 6 to include GEN-22.1, SCL-22.1, and SCL-22.3. The following significant points were raised by the WWMA membership concerning the three items in Block 6:

- The text in GEN-22.1 needs to be restructured to include bullet points of the particular uses constituting "commercial equipment" separate from the other equipment made mention of in paragraph G-A.1. Commercial and Law-Enforcement Equipment (i.e., law-enforcement equipment and other accessory equipment).
- The current text in NIST HB 44 paragraph G-A.1. Commercial and Law-Enforcement equipment adequately addresses scales used to charge a fee for the service of providing a weight or measure. No changes are needed.
- With respect to item SCL-22.1 of the block, Mr. Lou Straub (Fairbank Scales-which is one manufacturer of multi-independent platform vehicle scale systems), noted that it is rather pointless to require the different axle and axle groups of a vehicle to be identified on a ticket or to specify on the ticket which independent platform weighed those axles or axle groups for vehicles that cannot be weighed as a single draft, i.e., "over-sized" coupled-vehicle combinations that must be "split weighed" in two different drafts because not all axle and axle groups can fit onto a live portion of the scale and be weighed at the same time, which thus necessitates weighing those particular vehicles in multiple drafts. Mr. Straub noted that when such vehicles are weighed on

the Fairbanks vehicle scale system the ticket generated from the scale specifies the weights are not-legal-for-trade. He requested the proposal be amended to exclude requiring the different axles or axle groups or scale platforms be identified on scale tickets that specify the recorded weights are “not-legal-for-trade. He noted too that preprinted labels/tickets don’t contain enough space to accomplish this unnecessary identification.

- Mr. Russell Vires (Mettler Toledo) speaking on behalf of the SMA requested these items remain developing because they were new items that the SMA had not yet vetted.
- It was also requested the items in the block be considered individually (i.e., “blow the block apart and treat each item in the block as a separate item” since the two “scale” items in the block introduce additional items and topics. Those two items should be separated from the GEN-22.1 Item.
- Mrs. Tina Butcher (NIST OWM) commented OWM had submitted the items in Block 6 hoping to clarify from the GEN-22.1 item the meaning of commercial weighing and measuring equipment. She voiced agreement with the testimony heard during open hearings. She noted OWM had also submitted other proposals to amend the Uniform Regulation for the Method of Sale of Commodities and the Uniform Weights and Measures Law. OWM determined that NIST HB 44 and two sections in HB 130 are slightly different (i.e., NIST HB’s 44 and HB 130 include slightly different terminology to define “commercial equipment.”) The Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices also needed to be aligned. She suggested the three items in Block 6, remain developing so that OWM could continue to align the language in the two NIST handbooks, i.e., to make it more uniform.

The WWMA S&T Committee recommended that this be assigned a Developmental status. The Committee recommended following the submitter’s request to remove GEN-22.1 from the Block. Based on testimony heard the Committee agreed to submit the following language for item GEN-22.1. The Committee notes that SCL-22.1 (UR.3.3.) item was reassigned as SCL-22.3.

G-A.1. Commercial and Law-Enforcement Equipment. – These specifications, tolerances, and other technical requirements apply as follows:

(1) To commercial weighing and measuring equipment

- (a) ~~To commercial weighing and measuring equipment; that is, to~~ To weights and measures and weighing and measuring devices commercially used or employed in establishing the size, quantity, extent, area, composition (limited to meat and poultry), constituent values (limited to grain), or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, ~~hire, or award, or in computing any basic charge or payment for services rendered on the basis of weight or measure.~~
(Amended 2008 and 20XX)

(b) To other commercial weighing and measuring equipment:

- i. when there is a fee assessed for the use of the equipment to determine a weight or measure;**

ii. used to determine the bases of an award using count, weight, or measure; or

iii. used in computing any basic charge or payment for services rendered on the basis of weight or measure

(Added 2022)

~~(bc)~~ To any accessory attached to or used in connection with a commercial weighing or measuring device when such accessory is so designed that its operation affects the accuracy of the device.

~~(cd)~~~~(2)~~To weighing and measuring equipment in official use for the enforcement of law or for the collection of statistical information by government agencies.

(These requirements should be used as a guide by the weights and measures official when, upon request, courtesy examinations of noncommercial equipment are made.)

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting open hearings, Mr. Vires stated that this item needs work on the wording and further review by stakeholders. Its current language could have unintended consequences, and recommended it continue with a Developing status.

The SWMA S&T Committee reported it would like clarification on the purpose and use of axle weight scale values allowed by this proposal beyond law enforcement use.

This Committee recommended that this item move forward with a Developing status.

Northeastern Weights and Measures Association

During NEWMA's 2021 Interim Meeting open hearings, its S&T Committee took comments simultaneously on the three items that were originally in Block 6 to include GEN-22.1, SCL-22.1, and SCL-22.3.

The following points of significance were raised by the NEWMA membership:

- Mr. Rick Harshman (NIST OWM) commented that the GEN-22.1 proposal needed some changes and OWM intended to complete those changes prior to the NCWM Interim Meeting that a revised proposal could be considered during that meeting.
- With respect to item SCL-22.1, Mr. Lou Straub (Fairbanks Scale, which manufacturers multi-independent platform vehicle scale systems) indicated he agreed with the proposal in general but questioned the benefit of requiring so much information appear on a scale ticket because such a large amount would be difficult to fit onto one. Others voiced agreement with Mr. Straub's comments.
- With respect to SCL-22.1 (i.e., proposed new paragraph S.1.14. Recorded Representation of Axle or Axle Group Weights), Mr. Eric Golden (Cardinal Scale) suggested striking "non-commercial" and completing additional wordsmithing to align the text with the changes proposed to paragraph UR3.4. in SCL-22.3.

- Several members spoke in support of recommending all three items in the block move forward as developing items

NEWMA agreed to recommend this block of items as developing items at its 2021 Interim Meeting.

During NEWMA's 2022 Annual Meeting Open Hearings, the following comments were heard on the Item GEN-22.1 since at NEWMA's 2022 Annual Meeting this was a standalone item:

Mrs. Butcher commented that the intent of the proposal was to remove ambiguity from NIST HB 44 paragraph G-A.1. Commercial and Law-Enforcement Equipment. as there is an expectation for customers to receive an accurate weight when a scale isn't used as a typical commercial device; but rather, to charge customers a fee for the service. She reported the item had been fully developed as presented and the language aligns with the "companion" L&R items as they relate to the terms "commercial" and "law-enforcement". Mr. Vires commented that SMA supports the item as voting as it provides clarity of what constitutes a commercial transaction. Mr. John McGuire (New Jersey) commented as the NCWM L&R Chair and indicated that both NCWM L&R and S&T Committees met in February 2022 to align this item with the L&R items.

Upon hearing these comments, the Committee considered the item to be fully developed and recommended that the item retains Voting status.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting, the Committee heard comments from the floor on all three items originally in Block 6 to include GEN-22.1, SCL-22.1, and SCL-22.3 as follows:

Mr. Loren Minnich (Kansas) suggested replacing the proposed text, "used to determine the bases of an award using count, weight, or measure" in subsection G-A.1. (c) ii of the proposal with, "when using weight, measure, or count as the basis to determine an award" as shown shaded below:

B6: GEN-22.1 – G-A.1. Commercial and Law-Enforcement Equipment. – These specifications, tolerances, and other technical requirements apply as follows:

- (a) To commercial weighing and measuring equipment; that is, to weights and measures and weighing and measuring devices commercially used or employed in establishing the size, quantity, extent, area, composition (limited to meat and poultry), constituent values (limited to grain), or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, ~~hire, or award, or in computing any basic charge or payment for services rendered on the basis of weight or measure.~~

(Amended 2008 and 20XX)

(c) To other commercial weighing and measuring equipment:

- i. when there is a fee assessed for the use of the equipment to determine a weight or measure;
- ii. used to determine the bases of an award using count, weight, or measure when using weight, measure, or count as the basis to determine an award; or

iii. used in computing any basic charge or payment for services rendered on the basis of weight or measure
(Added 20XX)

Mr. Minnich also asked NIST for clarification on G-A.1. because different states already interrupt rule different ways. Ms. Diane Lee (NIST) agreed with Mr. Minnich and suggested it be Developing. Mr. Eric Golden (Cardinal Scales) agreed with the spirit of the proposal; it is indeed a “commercial transaction” to charge a person a fee solely for the purpose of obtaining a weight of a vehicle – it is not required to have to undergo a sales transaction of weighed product in order for it to be considered a commercial transaction. Mr. Golden also recommended striking out “**or “non-commercial” weight values**” as well as “**or “non-commercial”** in item SCL-22.1 as shown shaded below because by leaving the “non-commercial” language in the proposal, it defeats the purpose of the proposal, which is to officially clarify what a non-commercial transaction is.

B6: SCL-22.1– S.1.14. Recorded Representation of Axle or Axle Group Weights

S.1.14. Recorded Representation of Axle or Axle Group Weights. – The recorded representation of weights from individual axle or axle group weights shall clearly be identified as “not legal for trade” or “non-commercial” weight values unless the entire vehicle is positioned on live elements of a multiple-platform vehicle scale and where all axles/axle groups are weighed simultaneously. All recorded weights of axles/axle groups shall be identified as representing only a portion of the vehicle’s total gross weight (e.g., by axle groupings such as: “axle group 1,” “axle group 2,” “axle group 3,” or by individual axle description such as: “steering axle,” “drive axles,” “trailer axles”).

Any total gross weight of the vehicle included in the recorded representations determined by summing axle weights shall be clearly identified as “not-legal-for trade” or “non-commercial” unless those axle weights were recorded when all parts of the vehicle rested simultaneously on live portions of the scale, or the individual components were uncoupled, positioned completely on the live elements, and weighed separately on the scale.

Mrs. Butcher (agreed that the changes proposed to paragraph G-A.1. needed additional work and had she no objection to Mr. Golden’s suggestion of separating SCL-22.1 and SCL-22.3 from the GEN.22.1 item. Mr. Straub indicated paragraph G-A.1. is already correct and needs no change. Mr. Straub also indicated he agreed on the changes Mr. Golden had suggested being made to the text in the SCL 22.1. proposal.

Others too voiced agreement that the current text in paragraph G-A.1. was adequate and needed no change.

The CWMA recommended item GEN 22.1 be withdrawn and SCL-22.1 and SCL 22.3 move forward as “Developing” items.

During the 2022 CWMA’s Annual Meeting open hearings, the following comments were heard on GEN-22.1, which had, subsequent to CWMA’s 2022 Interim Meeting, been removed from Block 6 by the national S&T Committee to be considered an individual item:

Mr. Jan Konijnenburg (NIST OWM) stated the item was fully developed and ready for a vote. Mr. Russ Vires, speaking on behalf of the SMA, supported the item. Mr. Konrad Crockford (North Dakota) supported the item. Mr. Charles Stutesman (Kansas) believed final determination of a device should be

decided by the local jurisdiction and item should not move forward. Mr. Doug Musick (Kansas) said the word commercial should be stricken from Line 13 on page 149 as well as Line 6 on page 150.

The CWMA S&T Committee reported it believes the item was fully developed and should remain a Voting Item with the following changes: Page 149 Line 13, **(1) To commercial weighing and measuring equipment; that is:**

Scale Manufacturers Association (SMA-Fall 2021 Meeting)

The SMA offered the following technical positions from its November 2021 Meeting on the three items originally in Block 6 to include GEN-22.1, SCL-22.1, and SCL-22.3 as follows:

- The SMA recommended that Block 6 be broken apart into three (3) individual items because each of these items deals with a separate topic that needs to be discussed individually.

B6: GEN-22.1 G.A.1. Commercial and Law-Enforcement Equipment

- The SMA supports this item. The proposed item provides clarity to define what constitutes a “commercial transaction.”

B6: SCL-22.1 S.1.14. Recorded Representation of Axle Group Weights

- The SMA supports this item with the following changes (shown as shaded and struck-through text):

S.1.14. Recorded Representation of Axle or Axle Group Weights. – The recorded representation of weights from individual axle or axle group weights shall clearly be identified as “not legal for trade” or “non-commercial” weight values unless the entire vehicle is positioned on live elements of a multiple-platform vehicle scale and where all axles/axle groups are weighed simultaneously. All recorded weights of axles/axle groups shall be identified as representing only a portion of the vehicle’s total gross weight (e.g., by axle groupings such as: “axle group 1,” “axle group 2,” “axle group 3,” or by individual axle description such as: “steering axle,” “drive axles,” “trailer axles”).

Any total gross weight of the vehicle included in the recorded representations determined by summing axle weights shall be clearly identified as “not-legal-for trade” or “non-commercial” unless those axle weights were recorded when all parts of the vehicle rested simultaneously on live portions of the scale, or the individual components were uncoupled, positioned completely on the live elements, and weighed separately on the scale.

Rationale: The item attempts to define what constitutes a “commercial transaction”, but the words “non-commercial” reduces its clarity. Secondly, it is not necessary to label each weight value of axle/axle group weights as “not legal for trade”; putting the words “not legal for trade” on the recorded representation once is adequate.

B6: SCL-22.3 UR.3.3. Single-Draft Vehicle Weighing, and UR.3.4. Axle and Axle Group Weight Values

Position: The SMA supports this item.

SMA-Spring 2022 Meeting

Position: The SMA supports this item (i.e., GEN-22.1.).

Rationale: The proposed item provides clarity to define what constitutes a “commercial transaction.”

SCL – Scales

SCL-20.9 W S.1.1.3. Zero Indication, Load Receiving Elements Separate from Weighing Elements. And Appendix D – Definitions: no load reference value

(This Item was Withdrawn.)

(**Note:** This item was carried over from the 2020 Interim Meeting however, it was not a Voting Item and therefore not discussed during the continuation of the 2020 Annual Meeting. Instead, the item was placed on the 2021 Interim Meeting’s agenda and was discussed during that meeting.

The original 2021 NCWM Interim Meeting Report did not include the updated Item Under Discussion. It was corrected for Publication 16 on May 27, 2021.)

Source: Kansas Department of Agriculture

Submitter’s Purpose and Justification:

This item is intended to be applied to weighing devices utilizing a hopper that, once programmed, weigh in multiple drafts to complete the weighing cycle (automatic operation) and that in the course of the normal weighing cycle may not return to zero because of material remaining in the hopper.

Item under Consideration:

Amend Handbook 44, Scales Code as follows:

S.1.1.2. No-Load Reference Value. –

S.1.1.2.1. Single Draft Manually Operated Receiving Hopper.- On a single draft manually operated receiving hopper scale installed below grade, used to receive grain, and utilizing a no-load reference value provision shall be made to indicate and record the no-load reference value prior to the gross load value.

(Added 1983)

S.1.1.2.2. Digital Indicating Hopper Scales Designed for Automatic Operation- Provisions shall be made to indicate and record a no-load reference value on both sides of zero

[Nonretroactive as of January 1, 20XX]

S.2.1. Zero-Load Adjustment.

S.2.1.7. Digital Indicating Hopper Scales Designed for Automatic Operation. – The weighing system shall be equipped with semiautomatic means by which the zero-load may be adjusted

when the indication is stable within plus or minus 1.0 scale division and the weighing cycle is not in operation.

Automatic zero-tracking and automatic zero-setting mechanisms shall not operate during the weighing cycle.

[Nonretroactive as of January 1, 20XX]

S.2.6. Weighing and Recording Sequence for Digital Indicating Hopper Scales Designed for Automatic Operation

S.2.6.1. Weighing Sequence. – For weighing systems used to receive (weigh in), the no-load reference value shall be determined and recorded only at the beginning of each weighing cycle. For systems used to deliver (weigh out), the no-load reference value shall be determined and recorded only after the gross load reference value for each weighing cycle has been indicated and recorded.

[Nonretroactive as of January 1, 20XX]

S.2.6.2. Recording Sequence. – Provision shall be made so that all weight values are indicated until the completion of the recording of the indicated value.

[Nonretroactive as of January 1, 20XX]

S.3.4. Interlocks and Flow Control-Digital Indicating Hopper Scales Designed for Automatic Operation.

S.3.1. Flow Control. – Provision shall be made to clearly indicate to the operator the status of product flow to and from the weigh hopper.

S.3.2. Interlocks. – Each system shall have operating interlocks to provide for the following:

(a) Product cannot be cycled and weighed if the weight recording element is disconnected or subjected to a power loss.

(b) The recording element cannot print a weight if either of the flow control mechanism leading directly to or from the weigh hopper is operating.

(c) A “low paper” sensor, when provided, is activated.

(d) The system will operate only in the proper sequence in all modes of operation.

(e) When an overflow alarm is activated, the system shall indicate and record an overflow condition.

S.3.5. Overflow Sensor.

(a) The load-receiving element shall be equipped with an overflow sensor which will cause the flow control mechanism filling the load-receiving element to become inactive, activate an alarm, and inhibit weighing until the overflow condition has been corrected.

(b) If the system is equipped with a lower garner or surge bin, that garner shall also be equipped with an overflow sensor which will cause the flow control mechanism emptying the

load-receiving element to remain open, activate an alarm, and inhibit weighing until the overfill condition has been corrected.
[Nonretroactive as of January 1, 20XX]

And amend Appendix D – Definitions as follows:

no-load reference value. – A positive **or negative** weight value indication with no load in the load-receiving element of a scale. ~~(Used with automatic bulk weighing systems and certain single draft, manually operated receiving hopper scales installed below grade and used to receive grain.)~~ [2.20, 2.22]

NIST OWM Detailed Technical Analysis:

The submitter of this item (State of Kansas) requested its withdrawal during S&T open hearings at the fall 2021 CWMA meeting. Based on the submitters recommended withdrawal, OWM offers no comments and recommendation on this item.

Summary of Discussions and Actions:

This item has been assigned to the submitter for further development. For more information or to provide comment, please contact:

Mr. Doug Musick
Kansas Department of Agriculture
(785) 564-6681, doug.musick@ks.gov

There are many devices currently in use that, when not returned to zero, produce an inaccurate weighment. For example, a hopper scale used to weigh aluminum cans. The hoppers of these scales tend to become very sticky from residue and cans may stick to the side. When the indicator does not return to zero the operator will typically re-zero the scale to begin the next weighment. If the operator does not notice the device didn't return to zero, they may pay for the same cans more than once. If the device is re-zeroed with the can still stuck and it is knocked loose later, the customer may be paid for less material than they brought to the facility if the operator does not notice the indicator is below zero. If properly operated, a system utilizing a load-receiving element separate from a weighing element can be used to determine an accurate net weight.

In some cases, the load receiving element of a scale will retain materials (in the case of a hopper scale often referred to as the "heel"). This is typically a positive value but if the operator manually re-zero's the indicator and the material is subsequently cleared this can result in a negative value and should be accounted for when determining a net weight.

At the NCWM 2020 Interim Meeting, Mr. Musick stated the intent of this item was directed towards weighing systems utilizing hoppers and tanks and that his understanding of the NIST OWM analysis is that the intent of the proposal may not have been clear and will work towards clarifying the purpose of the item. Mr. Musick requested the committee assign a Developing status. A representative of the NIST OWM indicated he had discussed the item with the submitter and is willing to work with him to assist in the development of the item.

A representative of the SMA commented that their group is opposed to the item because the intent is not understood.

During the Committee's work session, the Committee assigned this item a Developing status.

At the NCWM 2020 Annual Meeting, due to the 2020 COVID-19 pandemic, this meeting was adjourned to January 2021, at which time it was held as a virtual meeting. Due to constraint of time, only those items designated as 2020 Voting Items were addressed. All other items were addressed in the subsequent 2021 NCWM Interim Meeting.

At the 2021 NCWM Interim Meeting, the Committee heard testimony in the open hearing session from Mr. Loren Minnich (Kansas, submitter) stating that this proposal would replace another proposal from this submitter (ABW-16.1) which the submitter is recommending Withdraw. Mr. Minnich recommended an Information or Developing status for this item. Mr. Russ Vires (SMA) stated that the SMA takes no position on this item. Mr. Kevin Schnepf (California Division of Measurement Standards) supports a Developing status for the item.

During the 2021 Interim Meeting work session, the Committee recommended the submitter continue to work with NIST OWM to further develop this item and agreed the item should remain as a Developing status.

At the 2022 NCWM Interim Meeting, the Committee heard from Mr Minnich that he requested the item be withdrawn. Mr. Vires stated they oppose the item and feel it is an application issue. The Committee agreed to withdraw this item.

During the 2022 NCWM Annual Meeting, there was no discussion on this item because item SCL-20.9 was withdrawn at the 2022 Interim Meeting

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearing the following comments were heard:

Mr. Vires remarked this is a carryover item and the SMA opposes item in current form. The potential problem is an application issue and not specification issue. The SMA position is recorded on the NCWM website.

The WWMA S&T Committee recommended the status remain Developmental so that the submitter can continue to work on this as previously stated.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting, Mr. Vires stated that he opposes this item because he believes it's an application issue, not a specifications issue, citing that the submitter has requested it remain developmental.

This S&T Committee recommended this item remain a Developing status.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open Hearings, no comments were heard, and the submitter was not available.

The S&T Committee recommended that this item remain in Developing status.

During the 2022 NEWMA Annual Meeting open hearings no comments were received because this item was withdrawn at the 2022 Interim Meeting.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting Open Hearing, the Committee heard comments from the floor. Mr. Minnich suggested to withdraw the item. Mr. Straub does not support the item. He feels it's an application issue not a specifications item.

CWMA S&T Committee supports the submitter's request to withdraw the item.

During the CWMA 2022 Annual Meeting Open Hearing no comments were received because this item was withdrawn at the 2022 Interim Meeting.

SMA

During the SMA 2021 fall meeting, the SMA opposed this item in its current form. The SMA believed that the potential problem the item is attempting to address is an application issue, not a specification issue.

SCL-22.2 A UR.1. Selection Requirements, UR.1.X. Cannabis

Source: NCWM Cannabis Task Group

Submitter's Purpose and Justification:

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

NIST OWM Executive Summary for SCL-22.2 – UR.1. Selection Requirements, UR.1.X. Cannabis

<p>NIST OWM Recommendation: For these reasons, OWM recommends this item be withdrawn. A much-preferred approach would be to develop a guidance document, taking into account all scale suitability factors thereby continuing to provide officials the discretion they currently possess to making final scale suitability determinations based on the results of their inspection.</p>
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| <ul style="list-style-type: none">• Suitability requirements should be applied independent of the product being weighed. It raises the question, "Why only cannabis and not other products?"• There are many significant factors that need to be considered when determining whether or not a particular scale is suitable for its intended application. For example, the smallest, largest, and average loads to be weighed on the scale; the scale's minimum division value; the various unit prices of commodities weighed and whether or not the scale has tare deduction and/or |
|---|

NIST OWM Executive Summary for SCL-22.2 – UR.1. Selection Requirements, UR.1.X. Cannabis

computing capability; the environment in which the scale will be used; and other factors (not mentioned) should all be a part of that decision making process.

- Because maximum scale division is only one such factor, establishing maximum scale division values in HB 44 may have the unintentional effect of restricting an official's ability to take enforcement action on a scale.
- Unit prices of commodities change over time and new products are continually being brought to market, some of which may have a much higher or lower unit price than products currently offered. For this reason, it is not possible to specify an acceptable maximum scale division value that will render the application of a scale suitable over time.
- NIST HB 44 already provides the necessary resources (in the way of General Code paragraph G-UR.1. Suitability of Equipment and Scales Code paragraph UR.1. Selection Requirements) for officials to be able to enforce scale suitability based on the many factors that need to be considered at time of inspection.
- Although the “old” NIST HB 44 Scales code (i.e., pre-1986) provided maximum scale division values based on scale type or design per Table 7b, Applicable to Devices Not Marked with a Class Designation, the concept of specifying maximum scale division values for different commodities to be weighed on a scale was abolished with the adoption of a new Scales Code in 1986, which bases scale selection on a scale's accuracy class designation.

Item under Consideration:

Amend NIST Handbook 44, Scales Code as follows:

UR.1. Selection Requirements. Equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to, its capacity, number of scale divisions, value of the scale division or verification scale division, minimum capacity, and computing capability.³

UR.1.X. Cannabis. – The scale division for scales weighing Cannabis shall not exceed:

(a) 0.01 g for net weighments up to capacity,

(b) 0.1 g for net weighments greater than 10 g, up to capacity, and

(c) 1 g for net weighments greater than 100 g, up to capacity.

(Added 20XX)

NIST OWM Detailed Technical Analysis:

(Note: The following was copied from OWM's 2022 NCWM Interim Meeting analysis and remains little changed for the 2022 NCWM Annual Meeting)

We believe this proposal is intended to limit the maximum division value (for three specified net load ranges) so that it is sufficiently small that a scale's round-off error and allowable tolerance is insignificant

relative to the load being weighed. Although we can understand why some might be in favor of supporting such a proposal given its simplicity, we don't believe it is possible to designate a tiered set of maximum division values that will remain relevant over time. A potential problem that we see, and several others have already pointed this out in comments made during recent S&T open hearings held during regional weights and measures association meetings, is that there's no way to predict how the use of a scale might change over time with respect to the kinds of products weighed or their prices. Consequently, by adopting such a proposal one runs the risk of having to be boxed in (i.e., having to accept use of a scale) should over time, different products having a much higher unit price be weighed on the scale, or unit prices of products weighed on the scale at time of initial scale certification increase significantly to an amount that causes one to view the scale's application unsuitable.

The value of a scale's minimum increment is but one factor used to determine the suitability of a scale for a particular application, albeit an important one. Other important factors to consider include, but are not limited to:

- the smallest and largest load to be weighed
- the average load to weighed (ideally, the majority of weighing should take place between one-quarter and three-quarters of scale capacity)
- unit prices of commodities weighed and whether or not the scale has computing capability
- dimensions of the load-receiving element
- special application (e.g., prepack versus direct sale, etc.)
- scale accuracy class and the HB 44 tolerance to be applied, etc.
- sufficient tare capability

Each of these factors (and others not mentioned) need to be consider when determining whether or not a scale is suitable for a particular scale application.

NIST HB 44 already provides the necessary tools (in the way of General Code and Scales Code requirements) for officials to be able to enforce suitability. It also provides officials the necessary discretion to decide (at time of inspection), based on the many important factors noted above, whether or not a scale is or is not suitable for its given application. Rather than proposing changes to HB 44, might the Task Group assigned consider developing a scale suitability guide that includes the maximum division value for loads weighed as well as other important factors that need to be considered when selecting a scale and distribute it to all states?

The following are some additional areas of concern that were discussed by members of OWM's Legal Metrology Devices Program in drafting its analysis of this proposal:

- The term "scale division" is specified in the proposed new user requirement paragraph. It is not clear if this term was intended to mean scale division (d) or verification scale division (e). Given that the value of the scale division (d) is typically ten times smaller than the verification scale division (e) on Class I and II scales equipped with different values of (d) and (e), this is a very important consideration.

- We question the rationale used to establish the breakpoints of the three tiers proposed. That is, how does one justify requiring a division value not to exceed 0.01 g for loads up to and including 10 g, and yet allow a scale division value ten times greater (i.e., 0.1 g) once the load is increased beyond a 10 g? The same question can be asked for the loads comprised of the next higher breakpoints (i.e., 0.1 g versus 1 g).
- Suitability requirements should be applied independent of the product being weighed. The argument to specify maximum permissible scale division values, which correspond to different load ranges of cannabis products to be weighed, can be made for other (non-cannabis) commodities.
- It raises the question, “Why cannabis (and not other products)?” We think adoption of the proposal could set a bad precedent in NIST Handbook 44 and possibly lead to additional proposals to establish maximum scale division values for other products (e.g., gems, precious metals, meat products, etc.), which we view as completely unnecessary.

Summary of Discussions and Actions:

During the 2022 NCWM Interim meeting, the Committee received somewhat a wide range of comments during open hearings. Most who commented supported further development of the item, although there were also several questions raised concerning the need for the proposed changes.

Mr. Doug Musick (Kansas) acknowledged that he agreed with the concept of the proposal while noting that the NCWM had failed to adopt strong standards in which NIST Handbook 44 Scales Code, Table 8 specifies “recommended” minimum loads, making them difficult to enforce. He also noted that HB 44 already addresses scale suitability, and that any proposal should address more than just a single commodity; but rather, all products of high cost.

Mr. Evan Foisy (A&D Engineering) read the position statement provided by A&D Engineering to the Committee in advance of the 2022 NCWM Interim Meeting as follows:

A&D opposes this item completely and recommends that it be withdrawn. The addition of such specific user requirements for a commodity is unprecedented for NIST HB 44. We fail to see the rationale for including readability requirements for Cannabis when such requirements have never been required for gold or other precious metals with a higher dollar per gram value.

If the Committee decides that such specifications are warranted, A&D proposes that the requirements be changed to 0.01 g for net weighments up to 100 g capacity. The technology exists and is already in use to not limit the readability to 0.1 g for capacities from 10 g up to 100 g. Having different accuracy requirements for Cannabis consumers who purchase less than 10 g vs. those who purchase more than 10 g is not promoting fairness and equity in the market. The maximum that any state allows for a single user purchase is 2.5 oz (approximately 71 g). By offering 100 g x 0.01 g, the entire range of consumer purchases will be covered equally and consistently.

Example: Deli scales allow the same increment size whether you’re getting 1 slice or 10. Cannabis should be no different.

The SMA supported continue development of the item with the recommendation that NIST Handbook 44 Scales Code Table 8. “Recommended Minimum Load” be considered in its further development.

NIST OWM provided the Committee a high-level summary of its analysis of the item, many of the points of which questioned not only the need for the proposed change, but also the effect the change (if adopted) would have for setting a precedent for producers of other commodities to use in support of making similar changes to HB 44 intended to address products they produce. OWM, in its comments to the Committee, emphasized that HB 44 already provides the necessary tools (in the way of General Code and Scales Code requirements) for officials to be able to enforce scale suitability. It also provides officials the needed discretion to decide (at time of inspection), based on the many important factors needing to be considered, whether or not a scale is or is not suitable for its given application. OWM recommended, as an alternative to the proposal, the development of a scale suitability guide, which should include all important factors (and not just scale division value) that need to be considered when determining scale suitability.

Several who commented before the Committee also questioned use of the term “scale division” in the proposal and whether any maximum increments proposed should, instead, be based on “scale verification division.”

In considering the comments received during open hearings, the Committee agreed to maintain the Assigned status of the item.

The NIST OWM Technical Advisors assigned to the S&T Committee opted to participate virtually in the 2022 NCWM Annual Meeting due to COVID-19. During S&T open hearings, there was an audio problem with the virtual platform being used by the NCWM that prevented those participating virtually to hear much of the open hearing testimony. With regard to this particular item, no testimony could be heard by those attending virtually. A member of the national S&T Committee, who had attended the 2022 NCWM Annual Meeting in person reported that 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 (Towns of Holliston, Hopkinton, Northbridge, Massachusetts) as the Chair, for further development of the item. The Committee agreed that this item will retain an Assigned status.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings, Mr. Josh Nelson (Ex-Officio NCWM S&T Committee) put forward to address some issues for cannabis, recommend developing - still needs work and continue to work forward.

Mr. Matt Douglas (California - DMS) remarked that California supports further development, add non retroactive date - subsection A states up to capacity... lists suitability requirements based on California, however, this info is not a standard.

Mr. Eric Golden (Cardinal Scales) remarked that in Section A, B, and C be better to say 0.1 g for net weighments up to 10 g, then B 10 g to 100 g, then C say over 100 g, etc.

Mr. Kurt Floren (Los Angeles County, California) remarked that Mr. Golden stated perfectly what is lacking. There has to be ranges put in as to where the graduations are appropriate.

Ms. Erin Sullivan (Colorado Department of Agriculture) asked if this pertain to cannabis in any form or concentration.

Mr. Nelson asked if this is what is going into NIST HB44 - each jurisdiction has to define its own. For Oregon, medical is much different than retail. Retail has to abide by this and medical does not. Verbiage in A, B, and C does need additions.

Ms. Sullivan is this grows vs. dispensaries? Different products in processing facilities are weighed with many containers on the scales. Do states determine the regulation?

Mr. Nelson asked if it is up to the states to determine how to apply tares and increments in which the product is weighed.

Mr. Kurt Floren (Los Angeles County, California): cannabis products: later we'll see proposed def. of cannabis and cannabis products, are we anticipating the adoption of the proposed language?

Mr. Nelson remarked it is not limited to flowers or bud. Mentions dabs. Is there a packaging requirement for the label? Oregon does. There must be a legal for trade scale that can prove they are meeting net contents. They must ensure that their process is being executed correctly. He thinks this is not limited to flower/bud.

Mr. Floren this raises the point that further consideration needs to be put into terms. Brownies, cannabis infused pizza... and other items sold by weight. Are we setting the terms for pure cannabis products or are the scales being used for any cannabis-containing product?

Mr. Nelson welcomes written input for this topic from anyone. Mr. Don Onwiler was a big proponent in this; Mr. Nelson will continue to develop this.

Mr. Golden asked for clarification on Mr. Nelson: geared towards net sales, and packaging for the customer. Is this part of the track and trace program for growers or just for retail?

Mr. Nelson remarked this needs to be expanded upon, in Oregon. Even the growers have to do track and trace. Any scale weight that is used for the cannabis tracking system needs to be Weights and Measures compliant. Maybe has to address even a class III scale. They will look more into it.

Mr. Joe Moreo (Ag. Com. Sealer) stated over time we are going to need one level for concentrates, one for food, one for flower, one size fits all will not work.

Mr. Nelson agrees that one size does not fit all. This will start to give limitations as to what a particular weight will be. Not trying to pigeonhole any device into one category, just trying to figure out what works, that's the intent.

The WWMA S&T Committee recommended the item be assigned a Developmental status so that the submitter could continue to work on this as they commented during open hearings.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, Mr. Russ Vires (SMA) stated that they have no position on this item at this time.

Dr. Matt Curran (Florida) stated that he supports this as a Voting item. He also provided comments in support of this item from Mr. Golden. Cardinal offered some changes as well. The suggested changes are as follows:

UR.1.X. Cannabis. – The scale division for scales weighing Cannabis shall not exceed:

- (a) 0.01 g for net weighments ~~up to capacity~~ up to 10 g,
- (b) 0.1 g for net weighments greater than 10 g, up to 100 g, ~~capacity, and~~
- (c) 1 g for net weighments greater than 100 g, up to capacity.

(Added 20XX)

Mr. Rutherford stated that he supports this item moving forward as a Voting item with the changes suggested by Cardinal Scale and Dr. Curran.

This Committee recommended that this item be moved forward as a Voting item if the changes suggested above are made.

During SWMA’s fall 2022 Annual Meeting, Mr. Rutherford stated that Table 1A has been updated in the item. The SWMA S&T Committee recommended this item remain as an Assigned Item.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting, Mr. Golden made suggestions to change the language in this item to the following:

UR.1.X. *Cannabis*

- (a) 0.01 g for net weighments up to 10 g
- (b) 0.1 g for net weighments greater that 10 g , up to 100 g, and
- (c) 1 g for net weighments greater than 100 g, up to capacity

Mr. Lou Sakin (Hopkinton/Northbridge, Massachusetts) commented that he agrees with changes above.

Discussions were heard regarding the agreement with Table 8. in the Scales Code as this requirement is more restrictive than Table 8. parameters.

Mr. Golden commented that national uniformity would be good and many states have informational publications that outline requirements in their state for Cannabis scale requirements. Mr. Jimmy Cassidy (Massachusetts) recommended Voting status with the changes above. Mr. Curran commented that harmonization with Table 8 would be a good idea if possible. Mr. Sakin questioned if Cannabis should be in *italics*. The Committee suggests making the change to italics for *Cannabis*.

The NEWMA S&T Committee recommended that this item be given Voting status with suggested edits.

During the 2022 NEWMA Annual Meeting, Mr. Cassidy commented as the Co-Chair of the NCWM Cannabis Task Group. He supported the Assigned status so the Task Group can continue to develop the

item from comments received at the 2022 Interim. Mr. Russ Vires (SMA) supported continued development and indicated that a user requirement typically does not pertain to a specific commodity. Mr. Vires suggested the words “retail cannabis” should be added to the “Class II” section of Table 7a and the words “bulk cannabis processing and sales” should be added to the “Class III” section of Table 7a.

Mrs. Tina Butcher (NIST OWM) read the following statement: “As a non-regulatory metrology institute, NIST defers to federal agencies with regulatory authority under the Controlled Substances Act (CSA) for the scheduling of drugs or other substances. NIST does not have a policy role related to the production, sale, distribution, or use of cannabis (including hemp and marijuana). While the 2018 Farm Bill removed hemp from the list of controlled substances under Schedule 1 of the CSA, marijuana remains on that list. NIST must respect that distinction even as it exercises its statutory authority to develop and disseminate national weights and measures standards for the production, distribution, and sale of products in the commercial marketplace. NIST remains committed to providing technical assistance to the weights and measures community. OWM has provided key technical points for the community to consider in its deliberations of cannabis-related proposals, and OWM would be happy to provide any necessary clarification. OWM comments are intended to encourage technically sound application of legal metrology laws, regulations, and practices to the measurement and sale of these products.”

After hearing comments from the floor, the Committee recognized the need for further development of the item and recommended that the item retain an Assigned status. The Committee recommends the NCWM Cannabis Task Group work with the SMA and other stakeholders to further develop this item.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting Open Hearing, the Committee heard comments from the floor. Mr. Loren Minnich (Kansas) stated he’s not sure of the intent and that it needs more developing. Mr. Golden agreed with it “e” or “d”, will send notes to Committee. Mr. Ivan Hankins (Iowa) would support item with Mr. Golden’s language. Mr. Golden continued by recommending the following change to which will add clarity to the listed weight ranges in SCL22.2 (in red):

SCL-22.2 UR.1. Selection Requirements, UR.1.X. Cannabis

UR.1.X. Cannabis. – The ~~scale division~~ verification scale interval e, for scales weighing Cannabis shall not exceed:

- (a) 0.01 g for net weighments ~~up to capacity~~ up to 10 g,**
- (b) 0.1 g for net weighments greater than 10 g, up to 100 g, ~~capacity,~~ and**
- (c) 1 g for net weighments greater than 100 g, up to capacity.**
(Added 20XX)

CWMA S&T Committee recommended as Voting Item with the proposed changes from Cardinal Scales.

During the 2022 CWMA Annual Meeting Open Hearings, Mr. Doug Musick (Kansas) welcomed the attempt to define suitability; recommended the following:

UR.1.X. Cannabis. – A retail Cannabis scale shall not be used to weigh net loads smaller than 100 displayed scale divisions “d”,

- (a) 0.01 g for net weighments 10 g or less,
- (b) 0.1 g for net weighments greater than 10 g and up to 100 g, and
- (c) 1 g for net weighments greater than 100 g.
(Added 20XX)

Mr. Vires stated the addition of a User Requirement is not the best approach in this situation; User Requirements do not typically apply to a specific commodity. Supported continuing as Developing and the following proposed changes should be considered instead:

- The words “retail cannabis” should be added to the “Class II” section of Table 7a.
- The words “bulk cannabis processing and sales” should be added to the “Class III” section of Table 7a.

Mr. Charlie Stutesman (Kansas) questioned why only metric units are referenced and not also include inch-pound units. The CWMA S&T Committee recommended this item remain with the NCWM Cannabis Task Group and that the suggested changes are considered.

During the 2022 CWMA Interim Meeting, Mr. Rutherford (ASTM International) remarked the old version is still listed in today’s agenda. Pushing the suitable scales discussion to a later date. The submitter provided updates to Table 7a. which add Cannabis verbiage to the weighing application column for Classes I, II, and III.

The CWMA S&T Committee recommended this item remain Assigned with the NCWM Cannabis Task Group.

Scale Manufacturers Association (SMA)

During the 2021 SMA Fall meeting, the SMA supported the continued development of this item.

During the 2022 SMA Spring meeting, the SMA supported the continued development of this item.

Rationale: The addition of a User Requirement is not the best approach in this situation; User Requirements do not typically apply to a specific commodity. The following proposed changes should be considered instead:

- The words “retail cannabis” should be added to the “Class II” section of Table 7a.
- The words “bulk cannabis processing and sales” should be added to the “Class III” section of Table 7a.

During the 2022 SMA Fall meeting, the SMA supported the continued development of this item.

Rationale: The addition of a User Requirement is not the best approach in this situation; User Requirements do not typically apply to a specific commodity. The following proposed changes should be considered instead:

- The words “retail cannabis” should be added to the “Class II” section of Table 7a.

- The words “bulk cannabis processing and sales” should be added to the “Class III” section of Table 7a.

LMD – Liquid Measuring Devices

LMD-21.1 VC Table S.2.2. Categories of Device and Method of Sealing

(This Item was Adopted.)

Source: Gilbarco, Inc.

Submitter’s Purpose and Justification:

To modify Category 3 requirements under Methods of Sealing to allow electronic copy of event logger for liquid measuring devices. To enhance or have alternate wording to existing Item LMD-20.1 under review for this item.

Current requirement is that category 3 device must have printed copy made available on site for the event logger information. Category 3 devices are fully connected electronic devices here in the modern age and thus we need to move away from the archaic requirement of only allowing a paper copy for this item. The industry fully supports this change. LMD’s have many types of regulatory events that accumulate in the event logger: blend ratio changes, calibration changes for the meters, SW downloads are examples. Often our only available print option is through the device receipt printer. With its tiny width of receipt paper, the event log for an older liquid measuring device will be several feet long and have text that wraps and is difficult to read. Allowing an electronic copy will be more convenient, easily read, and easily saved/retained/shareable.

Wayne Fueling Systems, LLC had a current proposal, Item LMD-20.1 for this item and in discussion with him he has been very supportive of me providing alternate wording above for consideration, or possibly to use in place of his proposal. Hopefully we can hear from Wayne Fueling Systems on this in the upcoming meetings. Also, I am aware of the Electric vehicle charger industry is working on this item to propose allow electronic copy as well.

The submitter requested a Voting status for this item in 2021.

NIST OWM Executive Summary for LMD-21.1 – Table S.2.2. Categories of Device and Method of Sealing
<p>NIST OWM Recommendation: OWM concurs with the direction toward permitting an electronic form of the event log, provided the following key issues that have been raised in discussions are addressed.</p> <ul style="list-style-type: none"> • <i>Event Log Information Accessible During the Inspection.</i> Inspectors need this information in order to assess the disposition of a device during the inspection process, not at a later point in time. • <i>IT Security Concerns with Connection Method.</i> Options suggesting use of a memory stick or wired interface with a mobile device may pose a deterrent since many jurisdictions’ IT

NIST OWM Executive Summary for LMD-21.1 – Table S.2.2. Categories of Device and Method of Sealing

security policies would not permit this method of accessing information on a jurisdiction-owned mobile device.

- **Availability of Mobile Devices.** Not all inspectors are equipped with mobile devices for downloading and viewing information.
- **(Larger) Electronic Display on Site.** Might another alternative be to provide an on-site, inspector-accessible display which meets minimum dimensions? This option might be considered a compromise in which the inspector could easily access and view the information, though it does create a potential problem and disadvantage in not facilitating the recording and retaining of the results as part of the inspection record.
- **Security of Event Logger Data.** A point raised in discussions of this issue was how an inspector can determine if information downloaded electronically is connected with the specific device under inspection. Revisions to the current requirements need to consider including information with any remotely-downloaded log that would enable the inspector to link the log to the specific device.
- It is not clear that the current proposal has addressed all of these items. Should the proposal move forward as written, it will be important at minimum that these items be considered during type evaluation and followed up during field inspection to ensure that the above items are addressed.
- While the ultimate goal is to move in the direction of the electronic form, not all jurisdictions may have the capability of viewing an electronic version of the event log at the time of inspection. Most people seem to be supportive of the concept of electronic versions of the information and want to move in that direction; however, it is essential that inspectors be able to gain the information needed for an inspection in a form accessible at the time of the inspection. An inspector needs to have access to this information on site, for example if the information is transmitted, how will the inspector view the information on site if they do not have electronic capability to do so? The use of General Code requirement G-UR.2.3 Accessibility for Inspection, Testing, and Sealing Purposes and G-UR.4.4. Assistance in Testing Operations may be used but may not be apparent to all inspectors.
- Similar language was adopted into the Electric Vehicle Fueling Systems tentative code.
- As language is adopted in NIST HB 44 to accept an electronic copy of the sealing information, consideration should be given to making appropriate changes to the sealing requirements for other devices in NIST HB 44.

Item under Consideration:

Amend Handbook 44, Liquid Measuring Devices Code as follows:

Table S.2.2. Categories of Device and Methods of Sealing

Categories of Device	Methods of Sealing
<p>Category 1: No remote configuration capability.</p>	<p>Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.</p>
<p>Category 2: Remote configuration capability, but access is controlled by physical hardware.</p> <p>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.</p>	<p>[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.]* [*Nonretroactive as of January 1, 1996]</p>
<p>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password). [Nonretroactive as of January 1, 1995]</p> <p>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. [Nonretroactive as of January 1, 2001]</p>	<p>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. <u>The event logger information shall be available at the time of inspection either as a printed copy or in electronic format. The information may be printed by the device, printed by another on site device, or transmitted electronically.</u> 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.)</p>

[Nonretroactive as of January 1, 1995]

(Table Added 1993) (Amended 1995, 1998, 1999, 2006, and 2015)

NIST OWM Detailed Technical Analysis:

NIST OWM previously provided comments to this item which was a Block item that included LMD 20.1 and LMD 21.1. Both items addressed the allowance of an electronic log in lieu of a printed copy of an audit trail for category three method of sealing in the liquid measuring devices code.

Initially, the submitter of LMD-20.1, Randy Moses, Wayne Fueling Systems, LLC requested this item be withdrawn based on concerns raised during discussions at the 2019 NTEP Measuring Sector Meeting. In January 2020, however, Mr. Moses retracted that request.

During the 2021 NCWM Interim Meeting work session, the Committee agreed to withdraw LMD-20.1 and agreed that the submitter of LMD-20.1, Wayne Fueling Systems, LLC, will work with the Submitter

of LMD-21.1, Gilbarco, to develop one proposal to allow electronic logs for Category 3 sealing requirements. The Committee agreed on a Developing status for LMD-21.1.

OWM met with Gilbarco in 2021 to discuss the proposed changes and concurs with the direction toward permitting an electronic form of the event log, provided the following key issues that have been raised in discussions are addressed.

OWM recognizes the desire to move forward with electronic forms of required information and believes this is an appropriate direction in which to head. A key question the Committee must consider is what alternatives may need to be offered as we move in this direction to ensure that officials have adequate information to make enforcement decisions at the time of an inspection.

- OWM offers no opposition to the proposal but suggests the community revisit past discussions to ensure that the issues raised during those discussions are no longer of concern.
- In assessing this item, although G-S.5.6. refers to printed receipts and tickets, the Committee will want to consider some of the rationale and discussion surrounding the changes made to G-S.5.6. Recorded Representations in 2014 (also referenced by the submitter) to determine whether or not the points raised in the past with regard to providing required information to the official in only an electronic form will meet the needs of the regulators.
- During discussions of G-S.5.6. concerns raised within the regulatory community included the inspector's lack of access to the internet (e.g., when no internet service available in a given area or the inspector has no means to access the internet or is not permitted to insert digital media from an external source into his or her computer. Some comments heard by the Committee during these discussions indicated that inspectors sometimes don't have email or have access to it on site and the information from an event logger is typically needed at the time of inspection in order to make an enforcement decision.
- While the ultimate goal is to move in the direction of the electronic form, not all jurisdictions may have the capability of viewing an electronic version of the event log at the time of inspection. Most people seem to be supportive of the concept of electronic versions of the information and want to move in that direction; however, it is essential that inspectors be able to gain the information needed for an inspection in a form accessible at the time of the inspection. An inspector needs to have access to this information on site.
- At the 2020 Interim Meeting, Mr. Brent Price (Gilbarco) recommended a Voting or Developing status for this item and offered to work with the submitter. Mr. Price noted that the Category 3 devices coming into the market are able to print an event log, but the font is quite small.
- Given the requirement for ensuring event logger information is readable and readily understandable, OWM noted suggestions to use a narrow receipt (such as is provided with "Card Readers in Dispensers") as the means for printing an event log may not meet requirements for clarity and legibility if printed in an extremely small font.
- Some members of industry (LC, FMC) and the regulatory community (Alaska, Oregon, California, New York) support the concept of an electronic version of the required event log on a Category 3 device, but noted the proposal requires additional work.

- Mr. Jim Pettinato (Technip FMC) noted the Software Sector also supports an electronic log and suggested a user requirement may also be warranted.
- OWM concurs with the direction toward permitting an electronic form of the event log, provided the following key issues that have been raised in discussions are addressed:
 - **Event Log Information Accessible During the Inspection.** Inspectors need this information in order to assess the disposition of a device during the inspection process, not at a later point in time.
 - **IT Security Concerns with Connection Method.** Options suggesting use of a memory stick or wired interface with a mobile device may pose a deterrent since many jurisdictions' IT security policies would not permit this method of accessing information on a jurisdiction-owned mobile device.
 - **Availability of Mobile Devices.** Not all inspectors are equipped with mobile devices for downloading and viewing information.
 - **(Larger) Electronic Display on Site.** Might another alternative be to provide an on-site, inspector-accessible display which meets minimum dimensions? This option might be considered a compromise in which the inspector could easily access and view the information, though it does create a potential problem and disadvantage in not facilitating the recording and retaining of the results as part of the inspection record.
 - **Security of Event Logger Data.** A point raised in discussions of this issue was how an inspector can determine if information downloaded electronically is connected with the specific device under inspection. Revisions to the current requirements need to consider including information with any remotely-downloaded log that would enable the inspector to link the log to the specific device.
- OWM also concurs with the Committee's suggestion for the submitter to focus on the format of an electronic display of the event log and any barriers to its access (as noted above).
- OWM further asks jurisdictions to consider whether they are actively inspecting and viewing event counter and event logger information. Experience reviewing event counter and logger information will help regulators make a better-informed decision on any alternatives proposed.
- OWM notes that device types that are activated and/or operated using mobile applications may already be providing some flexibility in this regard (see 5.60 TNMS Code S.2.3. Change Tracking, p.5-104).
- Similar language was adopted into the EVF tentative code.
- As language is adopted in NIST HB 44 to accept an electronic copy of the sealing information, consideration should be given to making appropriate changes to the sealing requirements for other devices in NIST HB 44.

Summary of Discussions and Actions:

The Committee agreed at the 2021 Interim Meeting to withdraw LMD-20.1. The Committee agreed on a Developing status for LMD-21.1 and at this meeting the item was assigned to the following persons for further development. For more information or to provide comment, please contact:

Mr. Brent Price
Gilbarco Inc.
(336) 547-5009 or brent.price@gilbarco.com

And

Mr. Randy Moses
Wayne Fueling Systems, LLC
(215) 257-2759

At the NCWM 2022 Interim Meeting open hearings the submitter of this item noted that this proposal will allow an electronic copy of category 3 event loggers and also noted that this was adopted into the EVF tentative code. The submitter requested a Voting status for this item. Several States were in support of a Voting status for this item. An industry representative was also in support of a Voting status for this item. The Committee agreed to a Voting status for this item.

At the NCWM 2022 Annual Meeting open hearings, Ms. Tina Butcher provided the NIST OWM Technical Analysis of the item as provided in this report. Specifically, she noted that OWM concurs with the direction toward permitting an electronic form of the event log, provided the following key issues that have been raised in discussions are addressed to include: Event log information Accessible during the inspection, IT Security Concerns with Connection Method, availability of mobile devices, (Larger) electronic display on site and Security of event logger data. The submitter, Brent Price gave additional explanation of the item noting that this proposal will allow event loggers to be provided electronically and he mentioned that this is allowed for other devices in NIST HB 44. Several States and industry representatives were in support of the item. One state questioned whether the electronic information is stored in the cloud or at the device and the submitter of the item responded that the electronic information is stored at the device. Many states recognized that the information must be available at the time of inspection as is proposed. Although in agreement, one State shared an issue that occurred where the audit trail information was locked and information was not available until after the inspection and another State noted that there may be issues in rural areas with limited internet access.

During the Committee's work session, the committee agreed to a Voting status for this item and added the item to their voting consent calendar.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Mr. Price stated that this proposal is to modify the event logger for category 3 devices to allow an electronic copy to be available to weights and measures and not just hard copy. Mr. Price worked with Wayne to develop this, and also conferenced with NIST and they are in support of this item. He noted the EVF systems allows for electronic copy of an event logger. Mr. Price requested the LMDs are allowed to

provide electronic copies of event loggers such as EVF systems. Mr. Price also noted that there is support of industry and he requested that this item be given a Voting status.

The WWMA S&T Committee recommended this item be assigned a Voting status.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing, Mr. Price (submitter) stated that the EVF code was recently changed to allow electronic copies of the event logger, and that he supports moving this forward as a Voting Item. Mr. Tim Chesser (Arkansas) supported moving this forward as a Voting Item.

The Committee recommended moving this item forward as a Voting Item.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open Hearing the following comments were heard.

Mr. Jim Willis (New York) and Mr. John McGuire (New Jersey) recommended a Voting status.

The NEWMA Specifications and Tolerances Committee recommended that this item be given Voting status.

During the 2022 NEWMA Annual Meeting Open Hearing Mr. Price and Mr. Willis commented that they support an electronic format of event loggers.

After hearing comments from the floor, the Committee considered the item to be fully developed and recommended that the item retain a Voting status.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting, the Committee heard comments from the floor. Ms. Diane Lee (NIST OWM) stated that this item is ready to move forward as a Voting or remain Developing item. Mr. Charles Stutesman (Kansas) stated that the item is ready for a vote.

CWMA S&T Committee recommended that the item move forward as Voting.

During the 2022 CWMA Annual Meeting Mr. Price stated that on behalf of Gilbarco and industry, we appreciate the support to allow electronic format for event logger. A printed copy on site is difficult when the system does not contain printers. He also noted that Taximeters and EVF systems allow digital versions of event logger.

The CWMA S&T Committee recommended this item to remain a Voting Item.

LMD-22.1 VC Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30

(This Item was Adopted.)

(Note: This item was submitted to the NCWM by the November 1, 2021, deadline for item submission for items submitted directly by NCWM committees and other work groups. However, the item was not

submitted in time for it to be considered at the Fall 2021 Regional Weights and Measures Association meetings.)

Source: NTEP Measuring Sector

Submitter’s Purpose and Justification:

To correct an inconsistency between the application of tolerances to smaller capacity Diesel Exhaust Fluid (DEF) measuring systems and retail motor-fuel dispensers.

During the review of NTEP requirements related to DEF dispensing systems, the NTEP Measuring Sector observed an inconsistency between the application of tolerances for retail motor-fuel dispensers (RMFDs) and for small capacity DEF measuring systems.

Smaller capacity DEF measuring systems use measuring equipment nearly identical to that used for RMFD applications and the NCWM and NTEP have agreed in past discussions that these two applications should be addressed consistently. Changes were made to NIST Handbook 44 in 2019 to more closely align requirements for RMFDs and smaller capacity DEF measuring systems; for example, paragraph N.4.2.2. Retail Motor-Fuel Devices and DEF, which specifies identical special test procedures for both systems. However, Table T.2. Accuracy Classes and Tolerances for Liquid-Measuring Devices Covered in NIST Handbook 44, includes an inconsistency in the application of tolerances for the “special test” for these two applications

It was judged during the Measuring Sector’s review that, based upon the application flow rates, without the note a DEF dispenser would be given a different tolerance for special tests than would RMFDs.

The proposed change to Footnote 1 will correct the oversight made when DEF dispensers were added to requirements in alignment with retail motor-fuel devices.

The submitter requested that this be a Voting Item in 2022.

<p>NIST OWM Executive Summary for LMD-22.1 – Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30</p>
<p>NIST OWM Recommendation: OWM believes this item is ready for a vote as proposed.</p> <ul style="list-style-type: none">• During a review of NTEP requirements related to DEF dispensing systems, the NTEP Measuring Sector observed an inconsistency between the application of NIST Handbook 44 tolerances for retail motor-fuel dispensers (RMFDs) and for small capacity DEF measuring systems.• Smaller capacity DEF measuring systems use measuring equipment nearly identical to that used for RMFDs.<ul style="list-style-type: none">○ Though DEF is not a motor fuel, NCWM and NTEP have agreed in past discussions to treat these systems the same.○ Most inspectors have treated them essentially the same for some years.

NIST OWM Executive Summary for LMD-22.1 – Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30				
<ul style="list-style-type: none"> ○ Given the properties of the product being measured and the capabilities of the dispensing equipment, OWM concurs with this approach. • As presently written, Table T.2. specifies a different tolerance for special tests of DEF dispensers than would be used for RFMDs. <ul style="list-style-type: none"> ○ Without specific clarification in Table T.2, there is a potential for inconsistently applying tolerances to DEF dispensers. • OWM concurs the proposed change to Footnote 1 will: <ul style="list-style-type: none"> ○ correct the oversight made when DEF dispensers were added to requirements; ○ will align the special test tolerances for DEF dispensers with that of RMFDs; and ○ will eliminate the potential which currently exists for inconsistent application of tolerances. • Although this item was submitted too late for the regional associations to review in fall 2021, OWM concurs with the Measuring Sector’s recommendation to designate this as a Voting Item for 2022. This is based on: <ul style="list-style-type: none"> ○ the approach used by NTEP for many years to treat DEF and RMFDs consistently; ○ consistency among current requirements in NIST HB 44 for the two applications; and ○ feedback OWM has had over the years regarding how some weights and measures jurisdictions approach DEF systems relative to RMFDs. • This is further supported by the support of the CWMA and NEWMA at their Spring 2022 annual meetings. 				

Item under Consideration:

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

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

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance¹
0.3	– Petroleum products delivered from large capacity (flow rates greater than 115 L/min or 30 gpm)** devices, including motor-fuel devices	0.2 %	0.3 %	0.5 %

Accuracy Class	Application	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance ¹
	<ul style="list-style-type: none"> – Heated products (other than asphalt) at temperatures greater than 50 °C (122 °F) – Asphalt at temperatures equal to or below 50 °C (122 °F) – All other liquids not shown in the table where the typical delivery is over 200 L (50 gal) 			
0.3A	<ul style="list-style-type: none"> – Asphalt at temperatures greater than 50 °C (122 °F) 	0.3 %	0.3 %	0.5 %
0.5*	<ul style="list-style-type: none"> – Petroleum products delivered from small capacity (at 4 L/min (1 gpm) through 115 L/min or 30 gpm)** motor-fuel devices – Agri-chemical liquids – All other applications not shown in the table where the typical delivery is ≤ 200 L (50 gal) 	0.3 %	0.5 %	0.5 %
1.1	<ul style="list-style-type: none"> – Petroleum products and other normal liquids from devices with flow rates** less than 1 gpm. – Devices designed to deliver less than 1 gal 	0.75 %	1.0 %	1.25 %

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

(a) Maintenance tolerances on normal and special tests shall be 20 mL plus 4 mL per indicated liter or 1 in³ plus 1 in³ per indicated gallon.

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

¹ Special test tolerances are not applicable to retail motor fuel and retail DEF dispensers.

** Flow rate refers to designed or marked maximum flow rate.

(Added 2002) (Amended 2006 and 2013)

NIST OWM Detailed Technical Analysis:

- During a review of NTEP requirements related to DEF dispensing systems, the NTEP Measuring Sector observed an inconsistency between the application of NIST Handbook 44 tolerances for retail motor-fuel dispensers (RMFDs) and for small capacity DEF measuring systems.
- As presently written, Table T.2. specifies a different tolerance for special tests of DEF dispensers than would be used for RFMDs.
- Based on discussions with some weights and measures jurisdictions and discussions at Measuring Sector meetings, OWM is not certain if the tolerances presently specified in Table T.2. for special tests are being consistently applied.

- Smaller capacity DEF measuring systems use measuring equipment nearly identical to that used for RMFDs.
 - Though DEF is not a motor fuel, NCWM and NTEP have agreed in past discussions to treat these systems the same, both in NIST HB 44 requirements and in type evaluation.
 - Given the properties of the product being measured and the capabilities of the dispensing equipment, OWM concurs with this approach.
- OWM concurs the proposed change to Footnote 1 will correct the oversight made when DEF dispensers were added to requirements and align the special test tolerances for DEF dispensers with that of RMFDs.
- Although this item was submitted too late for the regional associations to review in fall 2021, OWM concurs with the Measuring Sector’s recommendation to designate this as a Voting item for 2022. This is based on:
 - the approach used by NTEP for many years to treat DEF and RMFDs consistently;
 - consistency among current requirements in NIST HB 44 for the two applications; and
 - feedback OWM has had over the years regarding how some weights and measures jurisdictions approach DEF systems relative to RMFDs.

Summary of Discussions and Actions:

During the review of NTEP requirements related to DEF dispensing systems, the NTEP Measuring Sector observed an inconsistency between the application of tolerances for retail motor-fuel dispensers (RMFDs) and for small capacity DEF measuring systems.

Smaller capacity DEF measuring systems use measuring equipment nearly identical to that used for RMFD applications and the NCWM and NTEP have agreed in past discussions that these two applications should be addressed consistently. Changes were made to NIST Handbook 44 in 2019 to more closely align requirements for RMFDs and smaller capacity DEF measuring systems; for example, paragraph N.4.2.2. Retail Motor-Fuel Devices and DEF, which specifies identical special test procedures for both systems. However, Table T.2. Accuracy Classes and Tolerances for Liquid-Measuring Devices Covered in NIST Handbook 44, includes an inconsistency in the application of tolerances for the “special test” for these two applications.

It was judged during the Measuring Sector’s review that, based upon the application flow rates, without the note a DEF dispenser would be given a different tolerance for special tests than would RMFDs.

The proposed change to Footnote 1 will correct the oversight made when DEF dispensers were added to requirements in alignment with retail motor-fuel devices.

The submitter requested that this be a Voting Item in 2022.

At the 2022 NCWM Interim Meeting, the Committee recommended the Item under Consideration be given a Voting status with the addition of the word “retail” in front of DEF to add clarity to the code.

At the 2022 NCWM Annual Meeting open hearing Ms. Tina Butcher provided NIST OWM technical comments, Ms. Butcher noted that although DEF is not a motor fuel, NCWM and NTEP have agreed in past discussions to treat these systems the same, both in NIST HB 44 requirements and in type evaluation. Many States supported this item and there was a recommendation to spell out the acronym, DEF, Diesel Exhaust Fluid, in the proposed language.

During the Committee's work session, the committee agreed that the item maintain a Voting status and the item was placed on the voting consent calendar. The Committee also agreed to spell out the acronym, DEF, Diesel Exhaust Fluid, in the proposed language.

Regional Association Reporting:

Western Weights and Measures Association

This item was not submitted to the Fall 2021 Regional Weights and Measures Associations.

Southern Weights and Measures Association

This item was not submitted to the Fall 2021 Regional Weights and Measures Associations.

Northeastern Weights and Measures Association

This item was not submitted to the Fall 2021 Regional Weights and Measures Associations.

During the 2022 NEWMA Annual Meeting, NEWMA heard comments from Mr. Brent Price (Gilbarco) stating he supported the item as it adds clarity for tolerances for DEF. Mrs. Tina Butcher (NIST OWM) commented that this item originated in the Measuring Sector and identified this as a house keeping item as DEF dispensers are often designed and treated as RMFDs. Therefore, the tolerance table for RMFD on special test tolerances will be updated to include DEF.

After hearing comments from the floor, the NEWMA S&T Committee considered the item to be fully developed and recommended that the item retains a Voting status.

Central Weights and Measures Association

This item was not submitted to the Fall 2021 Regional Weights and Measures Associations.

During the CWMA 2022 Annual Meeting, the CWMA heard comments from Mr. Michael Keilty (Endress+Hauser), Chair of NTEP Measuring Sector, who noted the possibility of confusion that would allow retail DEF dispensers to have a different tolerance and recommended moving this forward as a Voting Item. Mr. Price supported the item. When DEF dispensers were built, they built them along the same guidelines as RMFD. This provides clarity.

The CWMA S&T Committee recommended this item remain a Voting Item.

VTM – Vehicle Tank Meters**VTM-18.1 V S.3.1 Diversion of Measured Liquid and S.3.1.1. Means for Clearing the Discharge Hose and UR.2.6. Clearing the Discharge on a multiple-product, single discharge hose.**

(This Item was returned to Committee.)

(NOTE: In NCWM Publication 15 (2020) VTM-18.1. and VTM 20.1. appeared separately. At the 2020 Interim Meeting the Committee agreed to combine both items and the Item now appear as VTM-18.1.)

Source: New York and NIST OWM (Carryover from 2018, VTM 1-B) and Murray Equipment, Inc., Total Control Systems

Submitter’s Purpose and Justification:

Provide specifications and user requirements for manifold flush systems on a multiple-product, single-discharge hose. Recognize that there is a balance between a mechanism that provides an important safety benefit but also, if used incorrectly, facilitates fraud. Ensure that VTM owners understand their responsibilities when installing such a system and ensure uniformity in enforcement throughout the country and clarify the paragraph to protect vehicle motor fuel quality, retain safe operating procedures when handling vehicle motor fuels, and to prevent fraud during delivery of vehicle motor fuels from vehicle tank meters.

NIST OWM Executive Summary for VTM-18.1 – S.3.1 Diversion of Measured Liquid and S.3.1.1. Means for Clearing the Discharge Hose and UR.2.6. Clearing the Discharge on a multiple-product, single discharge hose.

NIST OWM Recommendation: OWM believes the proposed changes represent a reasonable solution that will help minimize the potential for fraud with the use of manifold flush systems while allowing companies access to the safety-related benefits from the use of such systems in distributing products on VTMs. With the most recent version of the Item under Consideration, OWM believes this item is ready for vote.

- A manifold flush system allows liquid to be diverted from the discharge line on single hose multi-product VTMs so that liquid of one product is not mixed with liquid of another in the discharge line.
- NIST Handbook 44 already includes provisions allowing the use of manifold flush systems.
 - However, without appropriate safeguards, these systems represent a significant potential for fraud.
 - OWM believes the current Item under Consideration offers additional safeguards that are not present in the current NIST HB 44 language.

NIST OWM Executive Summary for VTM-18.1 – S.3.1 Diversion of Measured Liquid and S.3.1.1. Means for Clearing the Discharge Hose and UR.2.6. Clearing the Discharge on a multiple-product, single discharge hose.

- These changes will reduce the potential for facilitation of fraud with the design and use of these devices.
- When presented for a vote in 2019, this item (though revised multiple times in response to comments) failed to obtain sufficient votes to “pass” or “fail” and was returned to Committee.
 - Several additional variations to address comments and concerns were subsequently considered.
- In January 2020, this item was combined with a related Item VTM-20.1 (which proposed limits on the use of these systems with specific product types) with the goal of having the submitters of both items work together to reach a reasonable compromise between the two proposals.
- Since January 2020, the submitters of both items have worked to find a compromise that best meets the needs of the community.
- In developing the current proposal, the submitters considered concerns raised regarding the use of these systems, including:
 - the potential for facilitation of fraud with the use of these systems;
 - the potential for cross contamination of products in different tank compartments; and
 - the suitability of using a single meter for multiple product types.
- These concerns were balanced against comments indicating:
 - these same product handling practices have occurred for many years without the use of such systems; and
 - manifold flush systems can offer distinct safety advantages for drivers when flushing product.
- OWM continues to have concerns regarding the safety of delivering products such as gasoline and home heating oil through the same meter (and questions whether a single meter is suitable for such purposes)
 - However, OWM recognizes this is already a widespread practice in the industry and placing a blanket limitation in NIST Handbook 44 may not best serve the community.
- OWM acknowledges the safety advantages of such a systems to the drivers since the drivers do not have to climb on top of the VTM truck to flush product from the line before delivering another product.

<p>NIST OWM Executive Summary for VTM-18.1 – S.3.1 Diversion of Measured Liquid and S.3.1.1. Means for Clearing the Discharge Hose and UR.2.6. Clearing the Discharge on a multiple-product, single discharge hose.</p>
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| <ul style="list-style-type: none"> • OWM notes that such changes do not preclude a jurisdiction from implementing policies regarding the use of a single meter to dispense multiple different product types. |
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Item under Consideration:

Amend Handbook 44, Vehicle-Tank Meters Code as follows:

S.3.1. Diversion of Measured Liquid. – No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the meter or the discharge line thereof. However, two or more delivery outlets may be installed if means are provided to ensure that:

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

This paragraph does not apply to the following:

- Equipment used exclusively for fueling aircraft.
- Multiple-product, single-discharge hose metering systems that are equipped with systems designed to flush the discharge hose, provided the flushing system complies with the provisions of paragraph S.3.1.1. Means for Clearing the Discharge Hose, **Multiple-Product, Single-Discharge Hose Metering Systems.**
(Amended 2018 **and 20XX**)

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

- the discharge hose remains of the wet-hose type;
- the valve and associated piping are approved by the weights and measures authority having jurisdiction over the device prior to commercial use;
- the valve is permanently marked with its purpose (e.g., flush valve);
- the valve is installed in a conspicuous manner and as far from the hose reel as practical;
- the system clearly and automatically indicates the direction of product flow during operation of the flush system; and

- (f) clear means, such as an indicator light or audible alarm, is used to identify when the valve is in use on both quantity indications and any associated recorded representations (e.g., using such terms as “flushing mode” or “not for commercial use”);
[Nonretroactive as of January 1, 2024]
- (g) effective, automatic means shall be provided to prevent passage of liquid through any such flush system during normal operation of the measuring system; and
[Nonretroactive as of January 1, 2024]
- (h) no hoses or piping are connected to the inlet when it is not in use.
(Added 2018) **(Amended 20XX)**

UR.2.6. Clearing the Discharge Hose.

UR.2.6.1. Clearing the Discharge Hose, General. – A manifold flush or similar system designed to accommodate the flushing of product on single-hose, multiple-product systems is not to be used during a commercial transaction. The following restrictions apply:

The inlet valves for the system are not to be connected to any hose or piping (dust covers are permitted) when not in use.

When the flushing system is in operation, the discharge hose is only to be connected to the port for the product type being flushed from the discharge line.

Following the flushing process, indications and recording elements must be reset to zero prior to beginning a commercial delivery.

(Added 20XX)

UR.2.6.2. Minimizing Cross Contamination. – When dissimilar products are dispensed through a single meter, the user shall take steps to ensure the system is properly flushed to minimize the potential for cross contamination of product in receiving tanks on subsequent deliveries. Dispensing products having radically different characteristics (e.g., gasoline and diesel fuel) through a single meter delivery system is not recommended.

(Added 20XX)

UR.2.6.3. Records. Whenever, prior to delivery, a different product is pumped through the discharge hose to avoid contamination, a record including the date, time, original product, new product, and gallons pumped shall be maintained. These records shall be kept for a period of 12 months and available for inspection by the weights and measures authority.

(Added 2018)

NIST OWM Detailed Technical Analysis:

Mrs. Tina Butcher (NIST OWM), Mr. Jim Willis (New York), and Mr. Jim Hathaway (Murray Equipment) met on December 2, 2021, to discuss the proposed changes to VTM-18.1. There were specific concerns raised with VTM-20.1, which was previously included with this proposal that still needed to be addressed which included concerns with contamination, safety, and fraud. It was agreed that in order to further develop a joint proposal, there was a need to resolve the concerns addressed in VTM- 20.1 to the extent possible. Mrs. Butcher, Ms. Diane Lee (NIST OWM), Mr. Willis, and Mr.

Hathaway met again on January 3, 2021. As a result of this meeting all parties agreed with the existing Item under Consideration. In addition, the meeting participants agreed with adding a new User Requirement under UR.2.6. Clearing the Discharge Hose to the Item under Consideration to address the concerns with the use of manifold flush systems with dissimilar fluids as follows:

UR.2.6.2. Minimizing Cross Contamination. – When dissimilar products are dispensed through a single meter, the user shall take steps to ensure the system is properly flushed to minimize the potential for cross contamination of product in receiving tanks on subsequent deliveries. Dispensing products having radically different characteristics (e.g., gasoline and diesel fuel) through a single meter delivery system is not recommended.

UR.2.6.3. Records. – Whenever, prior to delivery, a different product is pumped through the discharge hose to avoid contamination, a record including the date, time, original product, new product, and gallons pumped shall be maintained. These records shall be kept for a period of 12 months and available for inspection by the weights and measures authority.

(Added 2018)

Discuss points during the December 2, 2021, and January 4, 2022 meetings are outlined below:

Contamination and Safety.

- There is no disagreement over concerns about contamination and safety that can come about from inadvertent mixing of products in a storage tank.
- These concerns, however, are not unique to the use of manifold flush systems.
 - Whether product is flushed using a manifold flush system or by flushing into a compartment from the top opening, the risk of contamination is present and is of concern.
- If flushing is to be prohibited and/or the use of single meter/multiple product applications, it should be universally applied and presented as a separate proposed change to NIST Handbook 44, not just to systems equipped with manifold flush systems.
- Establishing minimum flush requirements might also assist with minimizing contamination.
- See recommendations below under “Dissimilar Fluids” and “Minimum Measured Quantity” that might help address these two concerns.
- It might also be acknowledged that the use of manifold flush systems is intended to address a different aspect of safety and that is safety of the driver when conducting a flush operation; the manifold flush system provides a safer way of accomplishing the task than climbing onto the top of a vehicle tank.

Dissimilar Fluids:

- The original proposal in 20.1 (from Murray Equipment) expresses concerns about the use of a single meter to deliver multiple products and suggests language that would limit the use of manifold flush systems only to those systems which have individual meters dedicated to individual products.

- Such concerns would appear to apply to all systems, not just those equipped with manifold flush systems.
- If a prohibition is to be added to NIST Handbook 44 regarding the use of individual meters for multiple products, this should be done as a separate requirement not included as part of paragraph S.3.1.

Minimum Measured Quantity (MMQ):

- The concept of establishing a minimum delivery size would seem to help minimize concerns over possible contamination however it may be problematic to craft a requirement to adequately cover all applications.

Fraud.

- The concerns about potential fraud are quite valid and have been expressed in OWM’s comments from the inception of these requirements.
- The provisions for manifold flush were modified to include various provisions to limit that potential.
- Proposed changes to the existing language in the original Item 18.1 and as shown in the current “Item under Consideration” include additional recommendations to minimize the potential for fraud when installing and using manifold flush systems. If the additional provisions are adopted, this would help reduce that potential.

Additional Points – Mechanical Metering Systems:

- Some manufacturers raised questions regarding whether communication between the manifold flush system and mechanical metering systems is feasible, raising concerns about the newly proposed changes to S.3.1.1. Means for Clearing the Discharge Hose paragraphs (f) and (g).
- Those manufacturers expressed intent to explore this point more carefully.

NIST OWM provided previous comments to this item. Some oppose modifications that will restrict the use of manifold flush systems with only certain products. Some oppose use of manifold flush systems unless there is a restriction placed on the products with which the system can be used. The submitters (including NIST OWM) will need to work together to find a solution amenable to both views.

- As noted by Mr. Willis during the NEWMA meeting, New York, Murray Control Systems, and NIST OWM will work together to finalize a recommendation for this item.
- NIST OWM looks forward to working with the other submitters (New York and Murray Equipment) to find a solution that is more widely supported.
- For reference, OWM has retained the technical comments offered in its original analysis below.

Background to Consider:

- Based on comments at the 2019 NCWM Annual Meeting from the submitters of Item VTM-18.1 (New York & NIST OWM) and with support from the Meter Manufacturers Association, the Committee agreed to modify items (f) and (g) in the proposal and to designate part (g) as nonretroactive as of January 2022 to become retroactive January 2025.
- At the July 2019 meeting, comments from Murray Equipment noted significant problems with fraud in Europe where they are permitted, suggesting the item be withdrawn.
- Comments from Florida at the July 2019 NCWM Annual Meeting suggested limiting the application to only certain products. This issue is addressed in the new Item 20.1 from Murray Equipment, which was subsequently withdrawn and is now included in this item (VTM-18.1).
 - When presented for a vote, the revised item failed to obtain sufficient votes to “pass” or “fail” and was returned to Committee.
 - In reviewing the proposals, one needs to recall that a manifold flush system allows liquid to be diverted from the discharge line on single hose multi-product VTMs so that liquid of one product is not mixed with liquid of another in the discharge line.
 - OWM acknowledges the safety advantages of such a system since the operator does not have to climb on top of the VTM truck to flush product from the line before delivering another product.
 - However, without appropriate safeguards, these systems represent a significant potential for fraud. Concerns have been voiced over this potential at multiple national and regional meetings.

OWM offered the following comments on Item 18.1:

- At its Fall 2019 meeting, NEWMA recommended changes to extend the *nonretroactive* date. OWM recognizes this extension may help move the item forward and, thus, help reduce the potential for fraud when using these systems. OWM would also like to hear from the Meter Manufacturers Association regarding the difficulty designing communications between the metering system and the flushing system and the feasibility of an earlier nonretroactive date.
- At its Fall 2019 meeting, NEWMA also recommended eliminating the *retroactive* date. Given the potential to facilitate fraud and a number of comments received to that effect over the past several years, OWM is concerned with the proposed elimination of the retroactive date. However, if this will allow the item to progress it may represent a viable solution. OWM heard from NY regarding the extensive number of systems already in the field, particularly mechanical ones which may not lend themselves to modification. OWM is also interested in how others view the proposal to eliminate the retroactive date.
- The remaining Regional Associations recommended the item be given Developing status to permit the submitters to address concerns raised during the Annual Meeting.

- Comments from the SWMA voice serious concern about the potential for cross contamination of products. The proposal in Item 20.1 may help to address this by including limitations on the type of products with which these systems can be used.
- OWM believes the term “operational” should be deleted from proposed paragraph UR.2.6.1. since the key point is that the system should not be used when a commercial transaction is in progress.

OWM offered the following comments to consider in addressing the recommendations originally presented in VTM-20.1 and now included as part of this item (VTM-18.1):

- OWM notes that one jurisdiction (New York) in NEWMA specifically opposes the limitation of product types. The S&T Committee will have to consider how to address this.
- After discussing the proposed limitation of using manifold flush systems to only products other than engine fuels with New York W&M, OWM recognizes there may be instances where a VTM is used to transport only engine fuels of different types and grades. OWM recognizes that a blanket limitation may unintentionally impact applications that may not have been considered under Item 20.1.
- While OWM continues to have concerns regarding the safety of delivering products such as gasoline and home heating oil through the same meter (and questions whether a single meter is suitable for such purposes), OWM recognizes this is already a widespread practice in the industry and placing a blanket limitation may not best serve the community. OWM suggests working with the submitter of 20.1 to see if there are ways to resolve specific concerns without impacting other applications.
- In its review of these issues, OWM also noted the need to clarify when paragraph S.3.1.1. applies and suggests the addition of the terms “multiple-product, single discharge hose” to both the title and preamble.

Summary of Discussions and Actions:

Manifold flush systems are typically used on VTM’s with multiple compartments, delivering multiple products through a single hose. The purpose of the system is to allow the driver a means of clearing the hose of product prior to delivery (e.g., clearing the hose of diesel fuel before delivering clear kerosene). These types of systems are often marketed as a safety feature in that it eliminates the need for the driver to climb on top of the truck to clear the hose. Such systems are also useful in helping avoid cross-contamination. Typically, the driver attaches the nozzle to the manifold and pumps product back into the supply tank via the manifold until the previous product is flushed from the hose. There is often a sight gauge which allows the driver to tell when the product is flushed.

The obvious concern is that this makes it very easy for the driver to circulate product through the meter prior to delivery, which goes against S.3.1. It should be noted that it also goes against S.3.1. when the driver climbs on top of the tanker and clears the hose. The submitter has voiced concerns involving the safety of this practice noting that the operator could be subject to falls from the tanker. The distance between the flush system and the hose reel is also a factor in how easy it is for the driver to facilitate fraud.

Manifold flush systems are available from OEMs and can be found in various catalogs. Looking on multiple websites, these systems are being installed across the country and for some manufacturers seem to be standard equipment for new trucks. The submitter of VTM-1 has also seen these systems installed on trucks that are for sale where the seller notes the system as a selling point. He can foresee these systems being mandated in the future as a safety requirement and would like W&Ms to have a clear policy before that happens.

Another concern is with systems fabricated onsite. These systems are often difficult to distinguish and installed in an inconspicuous manner. While the submitter of VTM-1 has ordered many of these systems out-of-service until repaired, it can be frustrating for the owner because the truck was used in another state for years and approved by weights and measures jurisdiction in the other state. This lack of uniformity is problematic for both officials and private industry.

This item was originally submitted by New York Department of Agriculture as a Developing item. The item was intended to encourage uniformity in how manifold flush systems were being designed, installed, and regulated with the goal of minimizing the facilitation of fraud through the use of these systems while realizing the safety benefits provided by such systems.

This item was one of two separate parts of VTM-1 (previously VTM-1A and VTM-1B) considered by the Committee at the 2018 NCWM Annual Meeting. The item voted on at the 2018 Annual Meeting, VTM-1A was adopted and VTM-1B was assigned an Informational status and carried-over to the next cycle.

In the period between 2018 and 2021, the Item under Consideration underwent multiple changes based on feedback received at regional and national meetings and, more recently based on collaborations amongst the submitter of this and other related items, which resulted in the current Item under Consideration. In developing the current proposal, the submitters considered concerns raised regarding the use of these systems, including the potential for facilitation of fraud with the use of these systems; the potential for cross contamination of products in different tank compartments; and the suitability of using a single meter for multiple product types. These concerns were balanced against comments indicating that product handling practices have occurred for many years without the use of such systems and there are distinct safety advantage for drivers when these manifold flush systems are used.

At the 2022 NCWM Interim Meeting, the Committee heard from Mr. Willis and provided an update that contained amended language with modifications to UR.2.6.2 and creating UR.2.6.3. The amendments were agreed upon by the other joint submitters, NIST OWM, and Murray Equipment. Mr. Willis stated that the new proposed language would hold device owners responsible for ensuring there is no cross-contamination of fuels and also allows jurisdictions to prohibit using manifold flush systems or dispensing dissimilar products through a single meter. The Meter Manufacturers Association, Mr. Hathaway, Ms. Cheryl Ayer (New Hampshire), and Mr. John McGuire (New Jersey) also voiced support for the amended language and urged the item be given a Voting status. Mr. Hal Prince (Florida) opposed the entire item, indicating the use of a single meter to dispense different products is not legal in his state and has concerns of cross-contamination of fuel. During the Committee work session, the Committee assigned this item a Voting status with the amended language seen above as the Item under Consideration. The item as presented to the 2022 NCWM Interim Meeting can be seen below the Item under Consideration.

At the 2022 NCWM Annual Meeting, the Committee heard in its open hearings and voting session that some commenters were in favor of making the item retroactive.

Mr. Dmitri Karimov, speaking on behalf of the Meter Manufacturers Association (MMA), commented that the proposed changes are intended to reduce the potential for fraud and increase driver safety and the MMA supports the proposal as written.

Mrs. Butcher reiterated comments presented in the OWM's Executive Summary (as shown earlier in this item). She commented that OWM believes the proposed changes are a reasonable solution to incorporate additional provisions that will help further reduce the potential for fraud when these systems are in use and acknowledges the potential benefits to driver safety during a flushing operation. The proposed changes offer additional safeguards to already existing language. She also shared that the three submitters (NY, Murray Equipment, and NIST) have done a lot of work on this item since January 2020 and have strived to balance the concerns and comments expressed over fraud and cross-contamination with those of the distinct safety advantages for the driver. She also observed that the practice of flushing is already a widespread practice, but additional provisions are needed to limit fraud when manifold flush systems are used.

Mr. Willis shared that these manifold flush systems are already in widespread use in New York. Smaller businesses use them and this provides a safer method for the flushing operation. He believes the item is fully developed and ready for a vote.

Mr. Hathaway stated his support for the item and indicated he agrees with most of the changes made and supports the item as a Voting Item. Contamination is not eliminated entirely with these systems, but is minimized, particularly with the addition of the proposed user requirement UR.2.6.2. Minimizing Cross Contamination. He continues to believe, however, that companies should not dispense dissimilar fuels through a single manifold system. In those cases, there needs to be two sets of meters and two manifold systems.

The Committee also heard comments in opposition to the proposal and original paragraph and also heard questions and concerns regarding the proposed nonretroactive status of some portions of the proposal.

Mr. Hal Prince (Florida) opposed the proposal, noting he cannot endorse a device that can facilitate cross contamination of fuel. He stated that Florida will not allow these systems to be used. His major concern is with systems delivering engine fuels; he believes manifold flush systems should be prohibited on such systems. Mr. Prince also noted the irony of changes made to ASTM standards relative to ensuring high quality fuels and then two weeks later considering the approval of a proposal such as this. He commented that the proposed language in UR.2.6.2. Minimizing Cross Contamination is a bit misleading, noting the act of properly flushing a system can cause contamination.

Mr. Charlie Stutesman (Kansas) observed that product flushing is already being done, but in a less safe manner. He commented that drivers should probably not go to the top of the vehicle tank for safety reasons and, if it's safer to carry out that procedure on the ground, this is the direction to go. Mr. Stutesman also noted his state is starting to see meters equipped with multiple calibration factors and he expects more vehicles will be going to a single meter system so we need something to address this. He questioned whether manifold systems can be retrofitted and asked if the requirements can be made retroactive rather than allowing these systems to operate without the additional safeguards.

Mr. Kevin Schnepf (California) indicated he agrees with the concerns shared by Mr. Prince and Mr. Stutesman. He also opposed the last sentence in the recommended UR.2.6.2. Minimizing Cross Contamination, noting that the word "recommended" is not sufficient for regulatory action. He also observed that the phrase "radically different" is rather subjective making enforcement difficult.

Ms. Angela Godwin (San Bernadino County, California) agreed with the concerns regarding the nonretroactive status of some portions of the proposal and recommended those be made retroactive.

Ms. Ayer supported the item but likes the idea of making the nonretroactive portions of the proposal retroactive.

During the Voting Session, Mr. Willis suggested some changes that might help address Mr. Prince's concern. He offered a proposed change of adding the phrase "at the discretion of the jurisdiction" to portions of the proposal to make it clear that the use of these systems is up to the jurisdiction with regulatory authority and allow decisions to be made within the jurisdiction regarding their use. However, this suggestion did not appear to satisfy the concerns raised.

In its addendum sheets, the Committee also recognized comments from previous meetings that time may be needed to facilitate the changes required. The Committee recommended no change to the Item under Consideration in Publication 16 and presented the item for a vote. At the voting session, the Committee again heard comments opposing the non-retroactive status. However, the Committee presented the item as written based on the rationale shared in its addendum sheets.

This item did not receive sufficient votes to pass or to fail and was returned to the Committee. The Committee hopes the submitters will consider the comments heard during the meeting and continue work on the item.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Mr. Matt Douglas (California - DMS) stated California supports further development. He questioned whether there has been any further development since the Annual Meeting.

The WWMA S&T Committee recommended the status of this item remain Developing. The Committee recommended the submitters (NIST, New York, and Murray Equipment) continue their work together to further develop the item.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearings, no comments were received on this item. NIST requests this item remain Developmental.

This Committee recommended the status remain Developing at the request of the submitter.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting open hearings, comments were heard from Mr. Jim Willis (New York) as submitter of this item. He stated that communication was in process with Murray Controls in regard to changes to this proposal. The flushing "systems" have been around for decades and not just as OEM systems. The driver would climb on top of the truck to flush a line. Now they can flush the hose without the danger of falling off the truck. Some suggestions have been made to limit the products carried on the truck to similar products. New York State does not support such language as the

flush system actually allows for the safe clearing of the hose and minimizes contamination. A flush manifold enables a truck to carry different products at the same time. Mr. Jim Willis recommended further development.

Mr. Lou Sakin (Hopkinton/Northbridge, Massachusetts) asked when development may be finished. Mr. Willis responded that hopefully by the NCWM Interim Meeting. Mr. John McGuire (New Jersey) supported a Developing status.

The NEWMA S&T Committee recommended this item remain in Developing status and encouraged New York, NIST, and Murray Controls to continue working towards full development.

During the 2022 NEWMA Annual Meeting, they heard from Mr. Willis, Mr. McGuire, Mr. Ethan Bogren (Westchester County, New York) and Mrs. Butcher rose in support of the item as Voting.

After hearing comments from the floor, the Committee considered the item to be fully developed and recommended the item retain a Voting status.

Central Weights and Measures Association

During the CWMA 2021 Interim Meeting, the CWMA heard comments from the floor. Ms. Diane Lee (NIST OWM) commented about this item in the NCWM Annual report. Mr. Charles Stutesman (Kansas) asked if the intent of this item was for vehicle motor fuel or for all items such as home heating oil.

CWMA S&T Committee recommended the item be maintained as a Developing item.

During the 2022 CWMA Annual Meeting, the CWMA heard no comments from the floor and recommended this item remain a Voting Item.

VTM-20.2 A Table T.2. Tolerances for Vehicle Mounted Milk Meters.

(NOTE: This item was revised based on changes that were made by the Committee at the 2021 NCWM Interim Meeting.)

(NOTE: The Item under Consideration was removed from the voting consent calendar at the 2021 NCWM Annual Meeting and the S&T Committee made this a Developing item.)

Source: POUL TARP A/S

Submitter's Purpose and Justification:

Change tolerances to accommodate more efficient milk-metering systems.

During the past 20 years, the need for improved efficiency in the collection of milk has resulted in the use of milk pumping equipment being installed on milk tankers.

One of the most obvious places for a modern Dairy to optimize is the amount of time that the milk tanker uses to make a collection. If you can reduce the collection time at each farmer, the Dairy will be able to get a significant reduction in collection and transport cost for the benefit of the Farmer, Consumer and the

Dairy itself. At the same time, you will get an environmental benefit as a result of reduced CO2 in the milk collection process.

The consequence of introducing pump systems on milk tankers is that it causes air to be mixed with the milk which again will influence the accuracy of the magnetic flow-meter mounted in the system. Milk entrains air unlike petroleum liquids which do not. As you know, the flow meter will count anything that passes through the meter – liquid as well as air – and it is therefore essential that as much air as possible is removed from the milk before it reaches the flow-meter. However, it is widely recognized that it is not possible to remove all the air from the milk, which will result in an inaccuracy.

It is therefore essential that the tolerances for vehicle mounted milk pump systems using magnetic flow-meters for determining milk volume reflects today's way of collecting milk. This means that existing Tolerance for milk meters cannot be used when the milk meter is part of a system where different system parts will influence the accuracy of the count. Such milk metering systems will need to be classified with their own tolerances.

Based on our 25 years of experience as a manufacturer of these systems and more than 3000 installations on milk trucks operating in more than 15 countries, we would like to propose that the Tolerance for Vehicle Mounted Milk Metering Systems is changed from 0.3 % to 0.5 % and that the tolerances will be listed and classified separately and not be associated with products from the oil industry. Our proposal is consistent with Weights & Measures tolerances accepted around the world.

We hope that the NCWM will consider our proposal and we will be more than happy to meet with you and answer any questions you may have. We believe that a change of Tolerance is necessary in order for the Handbook 44 to reflect today's milk collection and the technical progress within milk collection.

<p>NIST OWM Executive Summary for VTM-20.2 – Table T.2. Tolerances for Vehicle Mounted Milk Meters.</p>
<p>NIST OWM Recommendation: OWM supports the Assigned status for this item and encourages the task group to continue its review of the proposed OIML tolerances for Vehicle Tank Milk Meters.</p> <ul style="list-style-type: none"> • One of the questions raised concerning the current proposal that includes the OIML tolerances is that the proposal includes tolerances for the system and a separate tolerance for the meter. • NIST OWM observed that a separate tolerance for the meter would apply during OIML type evaluation. However, NIST HB 44 only includes requirements for the entire measurement system and not separate main elements nor does it have separate tolerances for main elements known to be metrologically significant. • NIST OWM will look forward to more discussion of this item during Task Group meetings.

Item under Consideration:

Amend Handbook 44, Vehicle-Tank Meters Code as follows:

T.2. Tolerance Values. – Tolerances shall be as shown in Table 1. Accuracy Classes and Tolerances for Vehicle-Tank Meters Other Than Vehicle-Mounted Milk Meters and Table 2. Tolerances for Vehicle-Mounted Milk Meters.

(Amended 1995 and 20XX)

Table 2. Tolerances for Vehicle-Mounted Milk Meters

Indication (gallons)	Maintenance Tolerance (gallons)	Acceptance Tolerance (gallons)
100	0.5	0.3
200	0.7	0.4
300	0.9	0.5
400	1.1	0.6
500	1.3	0.7
Over 500	Add 0.002 gallon per indicated gallon over 500	Add 0.001 gallon per indicated gallon over 500

~~(Added 1989)~~

Table 2. Tolerances for Vehicle-Mounted Milk Meters

	Acceptance Tolerance	Maintenance Tolerance
Complete Measuring System	0.5 %	0.5 %
Meter Only	0.3 %	0.3 %

(Amended 20XX)

NIST OWM Detailed Technical Analysis:

A Milk Meter Task Group Meeting last met on January 3, 2022 to further discussed the proposed tolerances for Milk Meters. This is a proposal to increase the tolerances for vehicle mounted pump metering systems that measure milk and the proposed tolerance are those used in OIML for milk measuring systems.

Collected volume	Proposed Tolerance		Current NIST Tolerance		Proposed Tolerance		Current NIST Tolerance	
	Maintenance		Maintenance		Acceptance		Acceptance	
	Gallon	Percent %	Gallon	Percent %	Gallon	Percent %	Gallon	Percent %
50 Gallon	0.25	0.5 %			0.25	0.5 %		
100 Gallon	0.5	0.5 %	0.5	0.50 %	0.5	0.5 %	0.3	0.30 %
200 Gallon	1	0.5 %	0.7	0.35 %	1	0.5 %	0.4	0.20 %
300 Gallon	1.5	0.5 %	0.9	0.30 %	1.5	0.5 %	0.5	0.17 %
400 Gallon	2	0.5 %	1.1	0.275 %	2	0.5 %	0.6	0.15 %
500 Gallon	2.5	0.5 %	1.3	0.26 %	2.5	0.5 %	0.7	0.14 %

The submitter (Poul Tarp) explained that use of vehicle mounted pump metering systems to measure milk reduces the amount of time needed to collect and process the milk which reduces the cost and loss of

product that would occur with a slower measurement process. But, with the use of vehicle mounted pump measuring systems, entrained air is produced that cannot be removed and this air is measured as product. As such, with the use of a pump metering system there is an inherent loss to the buyer. Although the system has means for air elimination, not all entrained air can be removed and this is the submitter's reason for requesting that the tolerances currently in the HB be increased.

Poul Tarp also noted that it is recognized by the European Standardization Agencies: Measuring Instrument Directive (MID) and Organization of Legal Metrology (OIML) Recommendation (R) 117 *Dynamic measuring systems for liquids other than water* and the dairy industry in general that it is not possible to remove all the air from milk before measuring it. Poul Tarp notes that the MID and OIML (R) 117 standards specify that measurements of a vehicle mounted milk metering system must not result in inaccuracy of more than 0.5 % at any given amount being collected from a minimum of 50 gallons and up to + 500 gallons. NIST HB 44 Section 3.31 has a designated tolerance table in volume for vehicle-mounted milk meters that was added to the code in 1989 with an acceptance tolerance of 0.3 and maintenance tolerance of 0.5 gallons for the first 100 gals and these tolerances decrease in percent tolerance as the indicated volume increases, as was reported in a presentation from Poul Tarp:

NIST OWM's initial points to consider as the Committee began to deliberate on the proposal were:

Are there other methods that can be employed to remove entrained air from the milk?

- Can the amount of error introduced from entrained air be determined?
- Should NIST HB 44 tolerances be aligned with OIML R 117 less stringent tolerances, as recommended by the submitter.
- Should there be a separate tolerance table to address vehicle mounted pump metering systems?

During the 2019 NCWM Interim Meeting another company stated that they met the current tolerances in NIST HB 44 and were issued an NTEP certificate and believe that the current tolerances are appropriate. Other State regulators commented that the current certificate was limited to testing up to 300 gallons. At that time the S&T Committee assigned a task group to this item and NIST OWM expressed interest in working with the task group.

Mr. Charlie Stutesman (Kansas and Chair of the MMTTG) sent an email to the Milk Meter Tolerance TG providing a list of the TG members and the TG's mission. Mr. Stutesman also informed the Task Group that most communication will be conducted via e-mail and that face-to-face meetings will be planned at Interim and Annual Meetings.

The following list contains the names of members on the Milk Meter Tolerance TG:

Chair – Mr. Charlie Stutesman (Kansas)
 NEWMA Representative – Mr. Jim Willis (New York)
 SWMA Representative – TBD
 WWMA Representative – Mr. Jeff Cambies (California)
 NTEP Technical Advisor – Mr. Mike Manheim
 NIST Technical Advisor – Ms. Diane Lee
 Measurement Canada Technical Advisor – Mr. Luciano Burtini
 Industry Representative – Mr. Carey McMahon (Poul Tarp)
 Industry Representative – Ms. Leigh Hamilton (Piper Systems)
 Industry Representative – Mr. Brandon Meiwes (Dairy Farmers of America)

Industry Representative – Mr. Bob Fradette (Agri-Mark)

Mr. Mitch Marsalis (Los Angeles County, California) has agreed to be the SWMA representative. I am just waiting on formal assignment by the NCWM Chair for Mitch.

Milk Meter TG Mission:

The mission of the Task Group is to review and possibly recommend changes to the tolerances that apply to milk meters, which may include milk measuring systems, in Sections 3.31. Vehicle Tank Meters, Section 3.35. Milk Meters, Section 3.37. Mass Flow Meters, and Section 4.42. Farm Milk Tanks. This TG will consider the tolerances proposed in S&T item VTM-20.2 and the tolerances in OIML R 117-2 “Dynamic measuring systems for liquids other than water” in their discussion.”

Mr. Stutesman provided the Task Group with milk meter tolerances and requirements from OIML-R117-2: 2007, NIST HB 44 Tolerances for Milk Meters that are located in the VTM Code Section 3.31, the Mass Flow Meter Code Section 3.37, and the Farm Milk Code Section 4.42 and Measurement Canada’s tolerances for milk meters and requested feedback from the task group on appropriate tolerances to apply. A Task Group member from Poul Tarp, the original submitter of the item, recommended that the proposal be changed to align NIST HB 44 with the tolerances for milk meters in OIML R-117-2. Mr. Stutesman circulated a proposal for consideration by the task group that would aligns the tolerances in NIST HB 44 Section 3.31 Table 2 with OIML to tolerances. OIML Tolerances seem to apply two different tolerances. 0.5 % tolerance for milk meters in a system and 0.3 % tolerance for a meter outside of a system that is used to measure milk. The proposed tolerances and changes to NIST HB 44 are provided below:

Table 2. Tolerances for Vehicle-Mounted Milk Meters

Indication (gallons)	Maintenance Tolerance (gallons)	Acceptance Tolerance (gallons)
100	0.5	0.3
200	0.7	0.4
300	0.9	0.5
400	1.1	0.6
500	1.3	0.7
Over 500	Add 0.002 gallon per indicated gallon over 500	Add 0.001 gallon per indicated gallon over 500

Table 2. Tolerances for Vehicle-Mounted Milk Meters

Indication (gallons)	Acceptance Tolerance	Maintenance Tolerance
Complete Measuring System	0.5 %	0.5 %
Meter Only	0.3 %	0.3 %

Proposed change to Handbook 44- Simple rewrite of table 2 and paragraph T.4. in 3.31 VTM Code and Table 1 in 3.35. Milk Meter Code.

3.31. Vehicle Tank Meters

T.2. Tolerance Values. – Tolerances shall be as shown in Table 1. Accuracy Classes and Tolerances for Vehicle-Tank Meters Other Than Vehicle-Mounted Milk Meters and Table 2. Tolerances for Vehicle-Mounted Milk Meters.

(Amended 1995, 20XX)

If changes to the product depletion test tolerances in Handbook 44 are made to match OIML R117-1 paragraph 2.10.1:

T.4. Product Depletion Test. – The difference between the test result for any normal test and the product depletion test shall not exceed 0.5 % of the volume delivered in one minute at the maximum flow rate marked on the meter for meters rated higher than 380 Lpm (100 gpm) or 0.6 % of the volume delivered in one minute at the maximum flow rate marked on the meter for meters rated 380 Lpm (100 gpm) or lower. Test drafts shall be of the same size and run at approximately the same flow rate. **For vehicle tank meter measuring systems used to measure milk, the effect due to the influence of the air or gases on the measuring result shall not exceed 1.0 % of the quantity measured.**

Mr. Charlie Stutesman also asked the Task Group if consideration should be given to updating all of the codes pertaining to milk metering devices in NIST HB 44 and if all milk metering requirements should be included in a single code.

The NCWM Milk Meter Tolerance Task Group met virtually on January 7, 2020. During this meeting the Task Group discussed:

- the system of milk collection from farm to processor (seller to buyer),
- the operation of metering systems that measure milk to include discussion of air elimination systems,
- review of the milk measuring tolerances in NIST HB 44 from 1919 to 2020,
- review of the proposal to harmonize the NIST HB 44 VTM code milk metering tolerances with OIML tolerances for single milk meters and milk meter measuring systems, and
- whether or not the task group wanted to consider expanding its scope to include combining all milk metering requirements in NIST HB 44 to a single code.

By consensus the Task Group agreed with harmonizing the VTM milk metering tolerance with OIML R 117 tolerances and that those tolerance be presented during the NCWM 2021 Interim Meeting for discussion. The Task Group also agreed that a request should be made to the S&T Committee to expand the scope of the Task Group to include combining milk meter requirements in NIST HB 44 to a single code.

Mr. Charlie Stutesman (Chair MMTTG) proposed the Task Group visit a location to review Milk Measuring systems in use as its next step. The Task Group last met on July 1, 2021.

NIST OWM is looking forward to gaining additional information on the various systems for milk metering and their capabilities and believes the task groups plans to visit a site will be helpful in determining the best approach for acceptable solution for milk metering systems. In the meantime, harmonizing with OIML tolerances may be an acceptable path forward. OWM reiterates its original questions concerning the operation of milk metering systems. OWM encourages the task group to continue its investigation of these systems.

Summary of Discussions and Actions:

A Milk Meter Tolerance Task Group (MMTTG) was formed and assigned to this item. Please contact the Task Group chair for more information:

Mr. Charlie Stutesman
Kansas Department of Agriculture
(785) 564-6681, charles.stutesman@ks.gov

Existing tolerances are based on the accuracy of the Flow meter itself. The proposed Tolerances are based on Milk Metering Systems where the magnetic flow meter is a part of the Milk Metering system handling milk containing air.

The accuracy of the Flow meter will always be influenced by the way it is used. The only way you can obtain the accuracy described by the manufacture is when the flow meter is operating as a “stand alone” unit and, equally important, only if the product passing through the flow meter is complete air-free. The POUL TARP milk pump system holds an MID approval which is recognized and in accordance with guidelines and standards described in the OIML – International Organization of Legal Metrology. **Flow Computer Regulations in the U.S.:**

DANAK
P100 Page: 100

FORCE
Certification

EC-Type Examination Certificate
Measuring Instrument Directive

Certificate number: **DK-0200-MI005-006**
Issued by FORCE Certification, Denmark
EC-notified body number 0200

In accordance with the Directive 2004/22/EC of the European Parliament and Council of March 31st, 2004 on measuring instruments (MID) with later amendments.

Issued to: **Ingeniørfirmaet Poul Tarp A/S**
Jomfruløkken 4
DK - 8930 Randers NØ
Denmark

Reference No.: 115-24938

Type of instrument: Milk Measuring System on road tankers (or stationary)

Type designation: PT LVMS - Poul Tarp Liquid Volume Measuring System

Type variants: type 2, type 3 and type 4

Valid until: August 10, 2025

Number of pages: 38 including appendix

Date of issue: August 10, 2015


Approved by: *[Signature]*
Lene Sølvstrup Kristensen
Certification Manager

Processed by: *[Signature]*
Lars Parnø
Examiner


The conformity markings may only be affixed to the above type approved equipment. The manufacturer's Declaration of Conformity may only be issued and the notified body identification number may only be affixed on the instrument when the production/product assessment module (D or F) of the Directive is fully complied with and controlled by a written inspection agreement with a notified body. This EC-type examination certificate may not be reproduced except in full, without written permission by FORCE Certification.

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Appendix to
EC-Type Examination Certificate
Measuring Instrument Directive

Number: DK-0200-MI005-006
Issued by FORCE Certification, Denmark
EC-notified body number 0200

Revision	Issue date	Changes
DK-0200-MI005-006	09-01-2015	First issue
DK-0200-MI005-006	10-08-2015	Second issue

The measuring system has the following characteristics

Accuracy class	0,5
Mechanical class	M3
Electromagnetic class	E3
Climatic class	Condensing/open location, H3
Ambient temperature	-25 / +55 °C
Liquid temperature	0 / +50 °C
Liquid pressure max	1 bar
Liquid types	Milk (Raw milk)
Liquid density	1,035 Kg/L at 5 °C +/- 0,02 Kg/L
Liquid conductivity	≥ 5 µS/cm

Flow characteristics for Measuring System, including Minimum Measured Quantity (MMQ), depends on actual flow sensor Procecs Data 340 series in combination with Gas Elimination Device (GED) used:

MS/Meter	GED	Qmax	Qmax	Qmin	Qmin	MMQ	Inlet
Type	Type	[m ³ /h]	[L/m]	[m ³ /h]	[L/m]	[L]	[mm]
Type2+4/C51	PTe355	22,2	600	4	67	300	51
Type3/C63	PTe506	80	1334	5	84/(250)*	300/(100)*	63,5
Type3/C76	PTe506	90	1500	12	200	300	75
Type3/C102	PTe506	90	1500	18	300	300	102

Note: The ratio between Qmax and Qmin of the measuring system, shall be at least 5 (5:1) within the flow rate range of the actual meter sensor in combination with relevant Gas elimination device.
*) MMQ 100 liter only after first delivery on full system.


Primary display on flow computer S12:

Indication:


Maximum capacity	99999 L	or	99999,9 L
Minimum increment of registration	1 L		0,1 L

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Applied documents

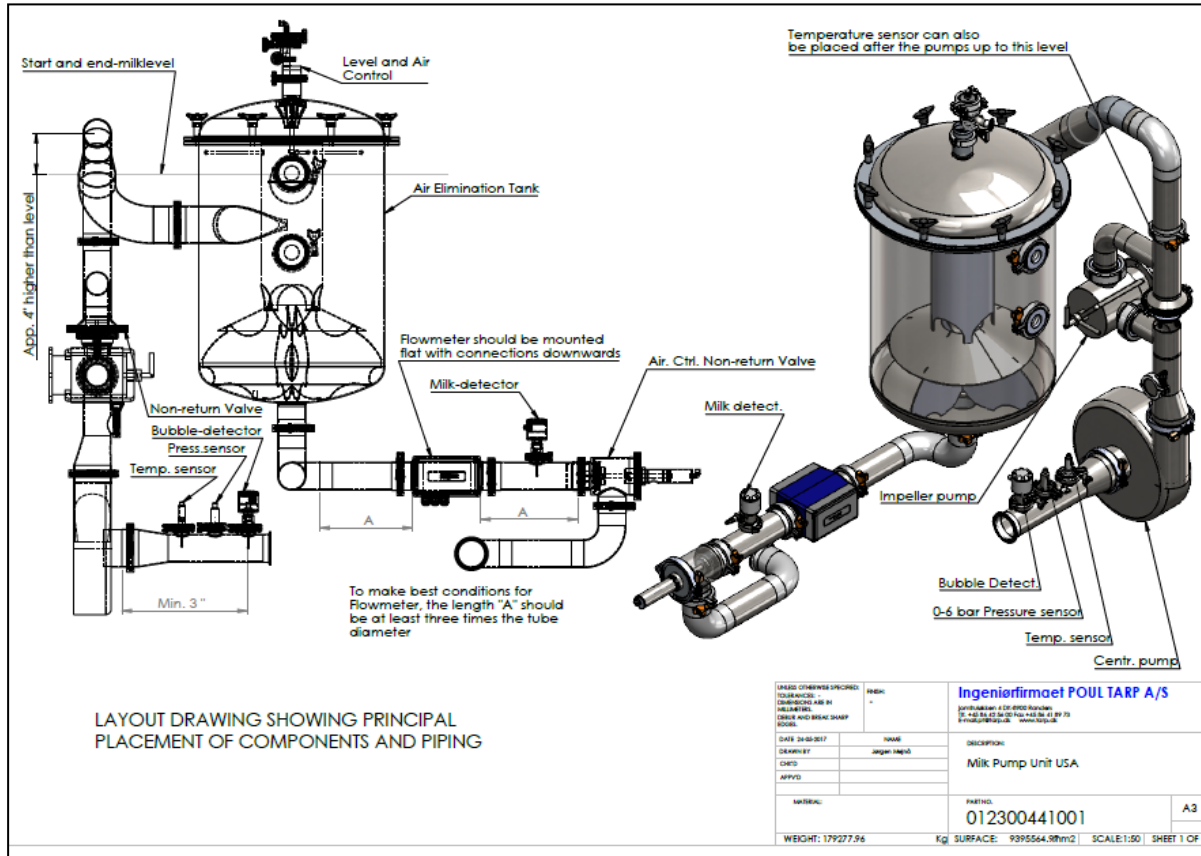
Recommendations	Guides
OIML R117 (1995)	WELMEC Guide 10.5 Marking of fuel dispensers (2006)
OIML R117-1 (2007)	WELMEC Guide 10.6 Sealing of fuel dispensers (2008)
OIML D11 (2004)	
OIML R117-2 Annex – E (CD2)	

Applied Evaluation Certificates belonging to this Type Examination Certificate:

- Evaluation Certificate Force Certification No. 115-24938.05, issued 10.08.2015
- Evaluation Certificate and Description NMI no. TC7204 rev 6, issued 26 august 2014
- Documentation folder NMI no. TC7204-4

Technical documentation
Reference no.: 114-30557.

The standards related to metrological aspects come from OIML R117-1 for liquids (Dynamic measuring systems for liquids other than water, part 1: Metrological and technical requirements) and documents D11 (General requirements for electronic measuring instruments) and D31 (General requirements for software-controlled measuring instruments) from OIML.



At the NCWM 2020 Interim Meeting, Mr. Carey McMahon (Poul Tarp) provided a presentation on his company’s VTM milk metering system advocating for expanding tolerances for these systems.

Ms. Leigh Hamilton (Piper) provided a presentation concerning the piper system and stated in her presentation that piper currently has an approved NTEP certificate for their device that is in service in the U.S. Ms. Leigh opposes this item to increase the tolerances for milk meters and noted in her presentation that there may not be a need to increase the tolerances in order to move forward in allowing innovation in milk measurements.

Mr. Stutesman provided a presentation on research that KDA has done on the history of 3 HB 44 Codes (3.31. VTMs, 3.35. Milk Meters, and 4.42. Farm Milk Tanks) and the issue of Piper’s NTEP Certificate. Mr. Stutesman discussed complications involved in measurement of product using various methods and potential shortcomings of Piper’s NTEP Certificate.

Mr. Doug Musick (Kansas) stated that he does not believe there is enough information presented to change existing tolerances and noted that the Piper system was only evaluated for accuracy up to a measurement of 300 gallons. He also noted that he believes that Piper’s certificate should be amended to

qualify the system for draft sizes up to 300 gallons. Mr. Mike Keilty (Endress + Hauser) commented that he had concerns with Piper's certificate. Ms. Hamilton noted that Piper followed and followed guidelines as provided during the NTEP evaluation. Ms. Diane Lee (NIST OWM) stated that the Committee may want to consider a Developing status for this item and that more information is needed concerning air elimination methods for milk metering systems.

A representative from the Dairy Farmers of America, stated that they oppose the increase in tolerance but supports the use of VTM metering systems. Mr. Carey McMahon (Poul Tarp) pointed out that the Poul Tarp system can be accurate for any size measurement, but the beginning and end of the measurement would not be accurate measures (within tolerance) due to entrained air in the product when the flow is not uniform. Mr. Dmitri Karimov (MMA) stated that the proposal should be further developed and pointed out that due to the tolerance structure becoming more stringent as the volume of the measurement increases, the acceptance tolerance at 500 gallons is unreasonable. Mr. Hal Prince (Florida) stated that he does not agree with expanding the tolerances. Mr. Prince believes that air elimination should be the focus and that the proposal should be assigned to a task group. Mrs. Tina Butcher (NIST OWM) noted that testing should be performed using multiple quantities and flowrates. Mr. Stutesman pointed out that confusion is generated by multiple HB 44 codes addressing the measurement of milk and that the proposal should be assigned to a TG to sort this out. Mr. Stutesman also pointed out there is no requirements in HB 44 for air elimination pertaining to milk metering in these codes. Mrs. Butcher noted that the current HB 44 requirements may not be flexible enough for this new technology and that the existing codes may need to be reviewed and updated.

Ms. Hamilton stated that this is not simply a consideration of only a change in tolerances. There are other requirements (currently in the OIML standard) that should also be considered in making any changes to the existing HB 44 requirements. Mr. Keilty stated that air elimination is a difficult problem to mitigate and noted that he is not sure if it is necessary to expand the existing tolerances or make other amendments. Mr. McMahon stated that using the existing HB 44 tolerances in the VTM Code, at a draft of 5000 gallons, the tolerance value is highly unreasonable. Mr. Stutesman noted that the type evaluation performed on the Piper system was limited to a draft of 300 gallons. If evaluation had included other draft sizes, the Piper system may have failed the testing.

Mr. Ken Ramsburg (Maryland) stated that the proposal should be given a Developing status. Mr. Ramsburg agreed that there is no existing requirement for this type of system addressing air elimination and stated that the flow meter, air eliminator, plumbing, and pumps all need to be considered during evaluation and the evaluation should be conducted on the system.

Mr. Tim Chesser (Arkansas) questioned whether the flow meter used in the system is appropriate and noted that there are many unanswered questions surrounding this issue. Mr. Jim Willis (New York) recommended a Developing status for this item. Mr. Kevin Schnepf (California) stated that although he is opposed to relaxing existing tolerances, he supports the development of this proposal by an assigned task group.

During the Committee's work session, the Committee agreed that this item has merit and should be given an Assigned status. The charge to the assigned task group will be to address three NIST HB 44 codes (VTM, Farm Milk Tanks and Milk meters) to review the requirements and tolerances found in these codes and assess the need for changes.

The NCWM 2020 Annual Meeting, due to the 2020 COVID-19 pandemic, this meeting was adjourned to January 2021, at which time it was held as a virtual meeting. Due to constraint of time, only those items

designated as 2020 Voting Items were addressed. All other items were addressed in the subsequent 2021 NCWM Interim Meeting.

At the NCWM 2021 Interim Meeting, the Committee heard from Mr. Stutesman who gave an update on the task group activities. Mr. Stutesman reported that the Milk Meter Task Group worked via e-mail communication and reviewed and discussed the proposed Milk Meter Tolerances in Agenda item VTM-20.2. The Milk Meter TG also discussed the tolerances that are included in NIST HB 44 for Milk meters in various parts of HB 44 which include the VTM, Section 3.31, Farm Milk Tanks, Section 4.42., Mass Flow Meters, Section 3.37, and Milk Meters, Section 3.35. Mr. Stutesman also reported that the Task Group reviewed OIML tolerances for milk meters. Mr. Stutesman stated that after a review of the various tolerances, the Task Group agreed that the OIML tolerances provide tolerances that encompassed the system of measuring milk and not just a tolerance for the performance of the meter. The Milk Meter TG agreed with proposing the use of the OIML milk meter tolerance as the milk meter tolerances in the VTM code. Mr. Stutesman provided a copy of the proposed changes to VTM-20.2. The proposed tolerances will align the tolerances in the VTM Code for Milk Meters with OIML Milk Meter Tolerances. Mr. Stutesman requested that this item move forward as a Voting Item. The Committee also heard from Mr. Clark Cooney who noted that he supported the items as Developing because one company mentioned meeting the existing tolerances. It was mentioned that the company's testing was only performed over a limited range of volumes.

During the Committee's work session, the Committee agreed with the proposal from the Milk Meter Task Group to adopt OIML tolerances for milk meters in the VTM code, that this item be given a Voting status, and that the Item under Consideration be replaced with the work group's proposal to adopt OIML tolerances. The Committee also agreed with expanding the TG to address other milk meter codes in HB 44. The Item under Consideration above are the tolerances agreed to by the Milk Meter TG and that align with OIML tolerances.

At the NCWM 2021 Annual Meeting Mr. Stutesman provided an update on the Milk Meter TG activities. Mr. Stutesman noted that there was a field trip to observe milk metering systems. He noted that the proposed tolerances will align the milk tolerances with the OIML tolerances for milk meters and Mr. Stutesman noted that the OIML tolerances provides one tolerance for the meter and another tolerance for a milk metering system. He also noted that it may be impractical to perform an air eliminator test on these devices due to comingling of product.

During the Committee's work session, the Committee agreed to a Voting status for this item and added it to its voting consent calendar.

During the Voting Session, Mr. Stutesman asked that consideration be given to adding a non-retroactive date to the proposed tolerances. It was questioned during the discussion that if a non-retroactive date was added to the tolerances, then, what tolerances would apply to existing meters that had been manufactured and tested prior to the non-retroactive date. One of the concerns expressed with having a new tolerance table without a nonretroactive date was whether or not existing devices would be required to be reevaluated in the NTEP. The conference voted against adding the nonretroactive requirement to the proposed tolerance table and the Item under Consideration to change the tolerances failed to receive the 27 votes from the House of State Representatives, so the item failed and went back to the S&T Committee. The S&T Committee agreed to a Developing status for this item.

Note: For reference, the Item under Consideration that was included in the 2021 NCWM Interim Meeting Agenda is provided below:

Table 2. Tolerances for Vehicle-Mounted Milk Meters

Indication (gallons)	Maintenance Tolerance (gallons)	Acceptance Tolerance (gallons)
100	0.5 <u>0.6</u>	0.3 <u>0.5</u>
200	0.7 <u>1.2</u>	0.4 <u>1.0</u>
300	0.9 <u>1.8</u>	0.5 <u>1.5</u>
400	1.1 <u>2.4</u>	0.6 <u>2.0</u>
500	1.3 <u>3.0</u>	0.7 <u>2.5</u>

At the NCWM 2022 Interim Meeting Mr. Stutesman (Chair of the MMMTTG) requested that this item be assigned back to the TG for further development. Mr. Stutesman provided an update on the Task Group meeting in January 2022 in which they discussed tolerances in both 3.31. Vehicle Tank Meters and 3.35. Milk Meters and the need to have the tolerance be applied to both vehicle mounted and station meters as the manufacturers are developing meters that will be capable of being installed in either application. The tolerance tables can be found in the supporting documents. Mr. Stutesman also renewed the Task Group's request to expand its scope to include possibly creating a new code that contains requirements of both vehicle mounted and stationary milk meters and metering systems due to the unique properties of milk as a liquid. Speaking on behalf of himself, Mr. Stutesman (Kansas) stated that he has provided a document in the supporting documents that outlines the four active and five inactive NTEP certified meters and metering systems in terms of test draft size and applicable tolerances. He noted that the active four have a range of 0.12 % to 0.6 %. He also noted that milk meters are the only liquid measuring device where the volume tolerance decreases as the draft size increases and suggests percentages more in line with OIML tolerance would be more appropriate. Mr. Ramsburg suggested combining the two tolerances to be used for field evaluations. Ms. Lee commented that the TG should work toward making all test methods uniform. Ms. Lee also suggested that the TG and Committee look at the comments from various companies concerning different tolerance along the distribution line for milk. Mr. Doug Musick (Kansas) and Mr. Matt Douglas (California) supported assigning this item to the Task Group for further development. During Committee work sessions, the Committee agreed to assign this item back to the Milk Meter Task Group so they may continue to ascertain data. In addition, the Committee agreed to request that NCWM Chair Ivan Hankins expand the scope of the TG to include all reference to milk meters, meter systems and related test methods, specifications and tolerance in an effort to harmonize the codes.

The Committee agreed to an Assigned status for the item.

At the NCWM 2022 Annual Meeting, Chair Stutesman provided a status update of the Milk Meter Task Group activities. He mentioned that the task group continues to support proposed tolerances as provided in the Item under Consideration. He also noted that the goal is consistency of the tolerances for milk meter measuring. He also noted that another representative from the Western is need on the Milk Meter TG.

At the Committee's work session, the Committee agreed to keep an Assign status for this item.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Ms. Diane Lee (NIST OWM) provided information from the MMTTG and noted that the task group is still in the process of reviewing information concerning milk meter tolerances. An item was put forth for a vote but last-minute changes were made to make the item nonretroactive and the item remained Developing. Concerns that were raised concerning nonretroactive tolerances were what would happen to devices that are currently in the field? During the NCWM Annual Meeting this was returned to Developing and NIST supports Developing.

The WWMA S&T Committee recommended the status remain Developmental. During the 2021 S&T Work Session Ms. Lee was asked for further clarification on her testimony. She provided the following clarification: "During the Annual Meeting a proposal was made to add a non-retroactive date. Because questions were raised as to how this would affect existing devices the item was moved from Voting to Developing." The Committee looks forward to hearing from the working group.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing no comments were received on this item.

This Committee would like to see more evidence and reasoning on why these devices should not have to meet the existing tolerances, and why the tolerances listed are appropriate.

This Committee recommended the item remain Developing so that the submitters can gather more evidence about the accuracy of these devices.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open Hearings the following comments were heard.

Mr. Jim Willis (New York) commented as a member of the MMTTG about the field trip that was taken in Rochester, New York just prior to the NCWM meeting in July to witness the truck mounted Milk Meters in action. The MMTTG is asking for recommendations in regard to a tolerance value that people would be comfortable with. Mr. Willis commented that the tolerance of 0.5 % is considered too large by some, but we have 0.4 % in the handbook now in regards to checking a milk tank with a meter.

Mr. Jimmy Cassidy (Massachusetts) asked if any systems currently meet the requirements in the handbook and Mr. Willis replied that currently there is one milk meter system on tank trucks that meets the requirements currently in the handbook.

The NEWMA S&T Committee recommended that this item remain in Developing status.

During the 2022 Annual Meeting Open Hearing Mr. Willis commented as a member of the Milk Meter TG. He indicated that the TG has made strides and hopes for ability to perform additional work on the item.

After hearing comments from the floor, the Committee recognized the need for further development of the item and recommended that the item retain an Assigned status. The Committee recommended the NCWM MMTTG continue to work with stakeholders to further develop this item.

Central Weights and Measures Association

During the 2021 Interim Meeting Open Hearing, the Committee heard comments from the floor. Mr. Stutesman would like to see item be returned to Task Group.

CWMA S&T Committee recommended that the item be assigned to Milk Meter Tolerance Task Group and be an Assigned item.

During the 2022 Annual Meeting Open Hearing Mr. Stutesman (Kansas, Chair MMTTG) – following 2022 NCWM Interim Meeting, this item was sent back to the MMTTG. and recommended moving forward with original tolerances that were proposed. He noted that a request to expand the scope of the task group has been submitted. There will be a MMTTG meeting prior to the July annual meeting. He noted that he is hoping to move forward and elevate to the item to a Voting status for next cycle.

The CWMA S&T Committee recommended this item remain an Assigned item.

LPG – Liquefied Petroleum Gas and Anhydrous Liquid-Measuring Devices

LPG-15.1 D N.3. Test Drafts.

(Note: Previously LPG-4)

(Note: In 2019 this item was combined with Block 1 “Terminology for Testing Standards” and other items that addressed terminology for standards and the use of “master meters.” Based on comments heard during the 2021 Annual Meeting, the S&T Committee recommended that all items that were combined with Block 1 “Terminology for Testing Standards” that originally appeared as a separate item or a separate block of items on the S&T agenda prior to 2019, be removed from Block 1 “Terminology For Testing Standards” and appear as originally presented.

Item LPG-15.1 was removed from Block 1 “Terminology for Testing Standards” and now appears as a separate item on the 2022 Interim Meeting agenda.)

Source: Endress + Hauser Flowtec AG USA

Submitter’s Purpose and Justification:

Amend Handbook 44 to allow field ~~reference~~ standards meters to be used to test and place into service dispensers and delivery system flow meters.

This item has been assigned to the submitter for further development. For more information or to provide comment, please contact:

Mr. Michael Keilty
Endress + Hauser Flowtec AG
(970) 586-2122, michael.keilty@us.endress.com

The use of transfer standards is recognized in Code sections 3.34 Cryogenic Liquid-Measuring Devices Code and 3.38 Carbon Dioxide Liquid-Measuring Devices Code and 3.39 Hydrogen Gas-Measuring Devices – Tentative Code. Transfer standard is only defined for testing cryogenic liquid measuring devices. It has been pointed out that the term transfer standard is not correct and that field reference standard meters may be more appropriate. See new the Item under Consideration, updated on September 8, 2017.

Field evaluation of LPG meters and CNG dispensers and LNG dispensers is very difficult using volumetric and gravimetric field standards and methods. The tolerances for these applications are such that using field reference standard meters are more efficient and safer. With CNG and LNG and LPG applications, the field reference standard meters are placed in-line with the delivery system as it is used to fill tanks and vehicles. The use of field reference standard meters eliminates return to storage issues. The use of field reference standard meters is easier and faster compared to the use of traditional field standards. The cost of using field reference standard meters and transporting them is much less than the cost of traditional field provers and standards.

Recognition in Handbook 44 will enable States to allow field reference standard meters to place systems into service and for field enforcement.

Volumetric field provers and gravimetric field proving are susceptible to environmental influences. The State of Colorado uses a field reference standard meter to test propane delivery truck meters. The State of Nebraska has used a field reference standard meter to test agricultural chemical meters. Other States have asked that there be recognition in HB44 in order for their State to allow the use of field reference standard meters.

In some applications, field reference standard meters are not more accurate than the meters used in the application. For that reason, longer test drafts and possibly more tests may need to be run.

The State of California is purported to have conducted a short study of field reference standard meters in the past. The conclusion did not lead to wide adoption of the practice.

Section 3.37 Mass Flow Meters user requirement U.R.3.8. Return of Product to Storage, Retail Compressed Natural Gas Dispensers requires that the natural gas which is delivered into the test container must be returned to storage. This is difficult and most often not complied with when the test vessel contents are released to atmosphere. States often have difficulties in remote locations finding suitable field reference equipment.

NIST OWM Executive Summary for LPG-15.1 – N.3. Test Drafts.

NIST OWM Recommendation: OWM believes that the purpose for this item, as specified by the submitter, is better addressed from a technical standpoint in Items GEN-23.1 and Block 8.

- State and industry have a need to use various types of field test standards to evaluate commercial devices installed in the marketplace. NIST OWM recognizes the need to use

NIST OWM Executive Summary for LPG-15.1 – N.3. Test Drafts.

various standards to test commercial devices and support the use of these standards when test data supports its use.

- NIST OWM is also supporting the use of various types of field test standards through the purchase of several meters and the collection of data throughout the U.S.
- The purpose statement for Items LPG-15.1 (LPG & Anhydrous Ammonia Liquid-Measuring Devices Code) indicates the goal of this items is:

“to amend Handbook 44 to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters.”
- The proposed changes in Items LPG-15.1 suggest changes to the *test draft criteria* for devices covered under this code, which is not necessary to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters.
- Amongst the concerns raised to the S&T Committee over the proposed changes for LPG-15.1 is that it conflicts with existing test draft criteria and confusion over the application of the proposed requirement.
- As such, given the long debate over multiple iterations of the proposals, OWM proposes that since the purpose of the proposal is to allow field reference standard meters to be used to test and place into service dispensers and delivery system, and the responsibility for allowance of these field test standards are already addressed in the NIST Handbook 44 Fundamental Considerations and Items GEN-23.1 and Block 8 clarifies these responsibilities, that Consideration be given to the proposal in Items GEN-23.1 and Block 8 which clearly states the responsibility for allowance of field standards.
- Block 8 clarifies what has long been recognized in NIST HB 44 concerning the responsibility for acceptance of a standard, making changes to specific codes such as those references in LPG-15.1 unnecessary and confusing.
- Additionally, the Committee is aware that a new Form 15 has been submitted by Seraphin for the 2023 cycle proposing a new General Code paragraph which clearly references the Director’s authority as outlined in the Fundamental Considerations.
 - This not only avoids the need to specifically reference individual test methods in each specific code, it avoids the potential of implying that test methods not specifically referenced in a code would not be appropriate.
 - **G-N.3. Test Methods. – Permissible test methods for verifying compliance of weighing and measuring systems with the provisions of the General Code and Specific Codes include, but are not limited to, test methods and apparatus that have been approved by the State Director of weights and measures as outlined in Appendix A - Fundamental Considerations, Section 3. Testing Apparatus.**

Item under Consideration:

Amend Handbook 44, LPG and Anhydrous Ammonia Liquid-Measuring Devices as follows:

N.3. Test Drafts.

N.3.1. Minimum Test – Test drafts should be equal to at least the amount delivered by the device in 1 minute at its normal discharge rate.

(Amended 1982)

N.3.2. Field Reference Standard Meter Test. – The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the flow rate being tested.

(Added 20XX)

NIST OWM Detailed Technical Analysis:

- Although this item has been on the agenda for a number of years, this item was grouped in a block of other similar items then removed from the block and placed back on the NCWM agenda as it originally appeared on the agenda.
- NIST OWM is working with States using Coriolis meters to collect data on the use of these meters as standards to test liquid measuring devices. This data will be shared with all regulatory officials to assist them with their approval of meters as standards.
- This purpose indicates its intent is to permit the use of field reference standard meters in field testing of commercial measuring systems.
- It is not necessary to reference “field reference standards” in a specific NIST HB 44 code in order to permit their use.
- Criteria for assessing the use of a given type of test standard are outlined in NIST HB 44 Appendix A Fundamental Considerations and clarified Items GEN-23.1 and Block 8 and OWM believes that the purpose for this item, as specified by the submitter, is better addressed from a technical standpoint in Items GEN-23.1 and Block 8.
- The decision on whether or not to accept a particular test method for use in testing commercial weighing and measuring equipment ultimately rests with the regulatory authority.
- NIST OWM and Seraphin developed Block 8 items (GEN-19.1 and OTH-22.1) on the 2022 Annual Meeting Report to help clarify and provide additional information on field standard traceability and specifications, and the regulatory authority’s responsibility for approval of field standards.
- With regard to the proposed addition of a paragraph N.3.2. Field ~~Reference~~ Standard Meter Test., no information or data has been provided to justify that:
 - a different test draft size than that specified in N.3.1. Test Draft is necessary in order to use a “Field ~~Reference~~ Standard Meter.”

- the specific criteria of a minimum quantity of “equal to or greater than the amount delivered in one minute at the flow rate being tested” is appropriate.

NIST OWM believes this item is not supported with data, in that it lacks data to show that one minute of flow would be appropriate. We believe that this data can be collected as data is collected across the country to assess field standard meters or the submitter can provide additional data. Also, since the authority to accept or reject a meter as a field standard is the responsibility of the regulatory authority, this item is inappropriate for its purpose.

- A new Form 15 has been submitted by Seraphin for the 2023 cycle proposing a new General Code paragraph which clearly references the Director’s authority as outlined in the Fundamental Considerations.
 - This not only avoids the need to specifically reference individual test methods in each specific code, it avoids the potential of implying that test methods not specifically referenced in a code would not be appropriate.

G-N.3. Test Methods. – Permissible test methods for verifying compliance of weighing and measuring systems with the provisions of the General Code and Specific Codes include, but are not limited to, test methods and apparatus that have been approved by the State Director of weights and measures as outlined in Appendix A - Fundamental Considerations, Section 3. Testing Apparatus.

Summary of Discussions and Actions:

The Committee initially considered a proposal to modify paragraph N.3. Test Drafts and to add a new paragraph N.3.2. Transfer Standard Test as shown below. Note that, in Fall 2016, Mr. Keilty provided an update to this proposal as shown in the Item under Consideration above.

N.3. Test Drafts. –

N.3.1. Minimum Test – Test drafts should be equal to at least the amount delivered by the device in one minute at its normal discharge rate.

(Amended 1982)

N.3.2. Transfer Standard Test. – When comparing a meter with a calibrated transfer standard, the test draft shall be equal to at least the amount delivered by the device in 2-minutes at its maximum discharge rate.

The submitter recommended that NIST update EPO 28 for CNG dispensers and EPO 26 for LPG Liquid Measuring Systems to include transfer standard meter tests. NIST Handbook 105-4 should also be revised to specifically address the transfer standard meter and the requirements for use.

The S&T Committee might also consider amending Sections 3.30 Liquid-Measuring Devices Code and 3.31. Vehicle-Tank Meters Code to allow transfer standard meters.

The Committee received written comments on all items in Block 4 and Block 5, as well as LPG-4 and MFM-2 emphasizing the need for there to be more study and discussion of the issues to assess the ramifications of all the proposed changes. The Committee also received written comments from the SMA

that it looks forward to further information on these items and stating that it is important to be consistent in our use of terms across multiple sections of NIST Handbook 44. The Committee agreed to carryover this group of items on its 2019 agenda to allow for further discussion and development of these proposals.

At the 2019 NCWM Interim Meeting, the Committee decided to combine the items on the agenda dealing with the issue of transfer standard (including items already combined into blocks) into one block. Block 1 (New) of the Interim Meeting report now includes Gen-3, Block 1 (original items from the 2019 interim agenda that appeared under Block 1), Block 2, LPG-3 and MFM-5, which were all separate items and blocks of items on the S&T Committee's 2019 Interim Meeting agenda (NCWM Publication 15). Agenda items Gen-3, Block 1, Block 2, LPG-3, and MFM-5 are listed separately on the Interim agenda with a note added beneath each individual item referring the reader to the New B1 items. All items under this New B1 have retained the same numbering system for ease in referring to the appendix for discussion on each item.

At the 2019 NCWM Annual Meeting, Mr. Brett Gurney (NCWM Chair) commented regarding the formation of a Task Group assigned to further develop this block proposal. The TG is charged with providing definitions for various types of standards (transfer, field, reference, etc.) as well as the criteria to be met by these types of standards. The completion date given to the TG is July 2021. The Committee agreed to the Assigned status for this block of items and looks forward to hearing updates from the TG. the Chair of the Task Group was:

Mr. Jason Glass
Kentucky Department of Agriculture
(502) 573-0282, jason.glass@ky.gov

At the 2020 NCWM Interim Meeting, Chair Glass reported that the TG met prior to the Interim Meeting and has begun discussion of the items under Block 1. Mr. Glass stated that biweekly teleconference meetings were scheduled and that the group was optimistic but had significant work to accomplish.

Mr. Russ Vires (SMA) supports the Scale item, SCL 18.1; in this block, Mr. Dimitri Karimov (Meter Manufacturers Association) supports the Task Group activities. Mrs. Tina Butcher (NIST OWM) was encouraged with the progress on terminology and provided an update on the Mass Flow Meter testing reporting that field testing was conducted October 28 to November 1, 2019, and that State and Industry participation included Colorado, Florida, Oregon, Emerson, and Tulsa Gas Technology.

Mr. Kurt Floren (Los Angeles County, California) raised concerns with GEN-19.1. regarding the definition of "Standard, Field" and its reference to "stable" standards and how long a standard is expected to be stable, which is typically 1-year, for which he believes should be longer. Mr. Floren also questioned the statement in the definition "tested over a range of environmental and operational conditions that the measuring devices is used..." Mr. Floren noted that he was unsure if all laboratories will have the capabilities to test over this wide range of conditions. Mr. Floren also expressed concerns with the definition "Standard, Transfer" citing that this standard may not meet the fundamental considerations requirement for standards over a long period of time or wide range of environmental conditions.

Mr. Steve Harrington (Oregon) echoed Mr. Floren's comments. Chair Glass responded that these are concerns of the TG and these issues will be discussed and considered as the TG develops these items.

During the Committee's work session, the Committee agreed that this item should remain an Assigned Item.

At the 2021 NCWM Interim Meeting the NCWM Field Standard TG Chair Glass provided an update on the Task Group activities. Chair Glass reported the Task Group is following the activities of the NIST Master Meter Project and that the Task Group reviewed API specifications for use of master meters as a standard and a test protocol that will be used to ensure uniformity in collecting data on master meters used as field standards. He also reported that the TG does not have a recommendation for this item. Mr. Glass also reported that he would be stepping down as the TG Chair. Mr. Keilty thanked Chair Glass and the TG for their work and requested that Block 1, LPG-15.1, N.3. and Block 1 MFM-15.1, N.3 be removed from Block 1 items and to allow those items to move forward separate from the other Block 1 Items. Mr. Keilty stated that similar language was added to the Hydrogen code and that the proposed language in LPG-15.1 N.3. and MFM-15.1, N.3 will allow for the recognition of master meters as field standards. Mr. Henry Oppermann (WM Consulting), stated that data is needed to ensure that master meters can be used over a range of conditions. Mr. Bob Murnane (Seraphin) stated that jurisdictions have the ability to use meters and that Block 1 LPG-15.1, N.3 and Block 1 MM-15.1, N.3 should remain in Block 1 until data is available to support the use of master meters as a standard. Mr. Keilty mentioned that there has been useful dialog regarding master meters in the TG, but that he is concerned that the TG is not close to deciding and he expressed concerns with the TG's focus on the NIST Master Meter Project. Mrs. Tina Butcher (NIST OWM) provided an update on the NIST Master Meter Project and noted that States have the regulatory powers to accept or reject a standard. She also mentioned that NIST is working with States to collect data needed to assess master meters and preliminary testing was conducted and data was collected on CNG at Tulsa Gas Technology's facility in fall 2019. Ms. Diane Lee (NIST OWM) noted that NIST OWM feels that it is premature to add more language to the NIST Handbook 44 on master meters without data to support its use.

During the Committee's work session, the Committee agreed to keep all items in Block 1 and that this item should remain with an Assigned status.

At the 2021 NCWM Annual Meeting, Mr. Glass reported that he would be stepping down as the Field Standard TG Chair. The Committee heard updates from members of the Task Group during open hearings. Mr. Keilty noted that two of the items had been on the agenda since 2015 and requested that they be removed from the block and recommended recognizing the use of master meters. Other comments were to keep the items together until data is analyzed from the NIST Field Reference Standard Work Group to support the use of master meters but that if some items were removed from the block, all items should be removed from the block. Based on comments heard during the 2021 Annual Meeting, the S&T Committee recommended that all items that were included in Block 1 "Terminology for Testing Standards" that originally appeared as a separate item or a separate block of items on the S&T agenda in and prior to 2019, be removed from Block 1 "Terminology for Testing Standards" and appear as originally presented.

At the 2021 Committee work session, the Committee recognized that the Task Group has accomplished all it is able to at this point and is recommending the Task Group be disbanded and will make said recommendation to the NCWM Chairman. The Committee agreed to break all items in Block 1 into individual items and designate them all as Developing. The Committee thanks the Task Group and its members for their work.

At the 2022 NCWM Interim meeting, the Item under Consideration is provided below:

N.3. Test Drafts.

N.3.1. Minimum Test – Test drafts should be equal to at least the amount delivered by the device in 1 minute at its normal discharge rate.

(Amended 1982)

N.3.2. Field Reference Standard Meter Test. – The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the flow rate being tested.

(Added 20XX)

Mr. Keilty shared a presentation on field standard meters during open hearings relevant to both LPG 15.1 and MFM 15.1. The intent of the presentation was to describe initial and ongoing calibration traceability, compare OIML tolerances vs NIST Handbook 44, describe the benefits and show examples of master meters. An abbreviated copy of the presentation is available on the NCWM website in the interim meeting documents archive. Mr. Keilty commented that he believes LPG 15.1 and MFM 15.1 are fully developed and should receive Voting status for the annual meeting. He has updated the proposal to exclude the term “reference” from “field reference standard meter test”, as shown above. He requests that the Committee provide specific guidance if a Developing status is assigned. A comment from industry (Mr. Murnane – Seraphin) stated that N.3.2 in the proposal conflicts with the current code which states normal test drafts must be at least one minute at the maximum discharge flow rate of installation conditions. The current wording allows for a test to be conducted at any flow rate for one minute. There was concern from a regulator (Mr. Charles Stutesman, Kansas) echoing these concerns. Ms. Diane Lee (NIST) requested that more data be made available so that NIST is able to compare worldwide data against test data compiled within the U.S. by NIST. Mr. Mahesh Albuquerque (Colorado) expressed support for this item to receive Voting status. Mr. Marc Butler (Emerson Micro Motion) expressed confusion at the two notes, thinking that perhaps they conflicted with each other; are they both needed or are they independent? Mrs. Tina Butcher (NIST OWM) expressed that she recognizes the use and importance of master meters but is concerned with the purpose of this item. Mrs. Butcher suggested that the statement for use be reworked as test draft criteria is so critical. Mrs. Butcher recommended and offered NIST OWM assistance on this item.

During the S&T Committee work session, the Committee recognized the submitters desire that a Voting status be recommended but determined that there were too many concerns and confusion expressed. The Committee recommends that the submitter develop the item further by aligning language to existing language in Handbook 44, clarifying the purpose to help avoid confusion of the new code on new equipment, and reaching out to NIST OWM or other industry or regulatory officials for feedback.

During the 2022 Annual Meeting Ms. Tina Butcher provided the NIST OWM Technical Analysis for this item and as addressed in this report she pointed out that a new general code requirement will be proposed for the new 2023 cycle that not only avoids the need to specifically reference individual test methods in each specific code, it avoids the potential of implying that test methods not specifically referenced in a code would not be appropriate.

Further comments were provided that OWM believes the purpose for this item, as specified by the submitter, is better addressed from a technical standpoint in Item Block 8. OWM proposes that since the purpose of the proposal is to allow field standard meters to be used to test and place into service dispensers and delivery systems, and the responsibility for allowance of these field test standards are already addressed in the NIST Handbook 44 Fundamental Considerations, and Item Block 8 clarifies

these responsibilities, Consideration be given to the proposal in Item Block 8 which clearly states the responsibility for allowance of field standards along with a 2023 new proposal to add a general code requirement.

Mrs. Butcher also noted that State and industry have a need to use various types of field test standards to evaluate commercial devices installed in the marketplace and that NIST OWM recognizes the need to use various standards to test commercial devices and support the use of these standards when test data supports its use. But the proposed addition of another paragraph N.3.2 in the LPG Code that specifically references test draft for an individual test method (Field Standard Meter Test), potentially implies that test methods not specifically referenced in a code would not be appropriate.

The submitter pointed out that the CWMA recommended that the item move forward as a vote and noted that a presentation was given at the CWMA about using meters to test devices. Also, during open hearings, a weights and measures official spoke on the ease of use of meters to test device. Although NIST, OWM provided comments in support of the use of various standards to test commercial devices when data supports their use, and that the proposed paragraph N.3.2 in the LPG Code for this item would potentially imply that test methods not specifically referenced in a code would not be appropriate, the submitter of this item noted that he failed to understand why there was opposition the use of meters to test in use commercial meters and asked States to support the item.

During the Committee's work session, the committee agreed to a Developing status for this item based on the comments heard on this item.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 Annual Meeting Open Hearings the following comments were heard:

Mr. Keilty stated that in 2014 he submitted a Form 15 to edit content and add N.3.2. and it was assigned a Developing status. He stated that several weights and Measures officials have supported this and asked that this be a Voting Item in 2022.

Mr. Bob Murnane (Seraphin) noted that this proposal addresses field reference standard meter and that currently there is no definition for this term. Mr. Murnane recommended that this be withdrawn so that the definitions can be worked out.

Ms. Diane Lee (NIST OWM) noted that included on the S&T agenda 2015 – with the purpose statement to accept the use of meters to test devices in the field. Ms. Lee noted that it is not necessary to ref. field reference standards in specific code. NIST and States are working to collect data on master meters to assist States with information that they need to access in their decision to accept a standards for use. States have the authority to determine which standards are to be used in their state. The proposed N.3.2 has no information as to justify a different test draft size other than was already specified in NIST HB 44.

Mr. Bruce Swiecicki (National Propane Gas Association) lent support to this discussion (master meters). It would be nice to have something in HB 44 to assist in uniformity.

Mr. Keilty responded to Ms. Lee stating that he agrees and disagrees. He agrees that jurisdiction is responsible for their own equipment, however, he was told by States that they need something in HB 44 to tell them what should be used. Mr Keilty request again that the item be given a Voting status.

The WWMA S&T Committee recommended the status remain Developmental. The Committee recommended that consideration be made that this item be included in Block 5, as they refer the same terminology in NIST HB 44. A letter was submitted to the Committee by Mr. Keilty and will be posted to the NCWM website. NIST OWM also submitted analysis on this item which can be found at the following link on the NCWM website: <https://www.ncwm.com/annual-archive>

Southern Weights and Measures Association

During the 2021 Annual Meeting Open Hearing, Mr. Oppermann (Seraphin) supports the withdrawal of this item because it is unnecessary, as master meters can already be recognized as field standards.

Mr. Keilty (Endress+Hauser), the submitter of this item, supported striking the words “Reference” and “Meter” from “N.3.2. Field Reference Standard Meter Test.” in this proposal and moving it forward as a Voting Item.

This Committee feels that the item is fully developed and is looking forward to seeing more data on the performance accuracy of master meters by the states that are currently using these devices.

This Committee recommended this item move forward as a Voting Item with the editorial changes requested by Mr. Keilty.

Northeastern Weights and Measures Association

During the 2021 Interim Meeting Open Hearing, the following comments were heard.

Mr. Keilty gave a history of the item from 2015 and is recommending Voting status with changes striking text seen below. Mr. Keilty also has submitted comments which are available on the NCWM website.

N.3.2. Field Reference Standard Meter Test. – The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the flow rate being tested. (Added 20XX)

Mr. Henry Opperman (Seraphin) commented that the latest information was not reviewed and changes are immature as data has not been produced to justify this. And he added that NIST OWM is currently undertaking a study to gather data and this data could help provide justification for this item and recommended further development.

Mr. Rick Harshman (NIST OWM) and Mr. Bob Murnane (Seraphin) also recommended further development.

At the 2022 NEWMA Annual Meeting Open Hearings, Mr. Bob Murnane (Seraphin) commented that he does not believe this item is fully developed and recommended that the committee consider withdrawing the item. Mr. Murnane read from submitted comments. Of note, Mr. Murnane indicated that under the Fundamental Considerations in HB 44, the State Director has the authority to evaluate standards for use in certifying meters and the fear is that if this proposal goes through, the handbook would have to be changed for each new technology. Mr. Murnane explained that several states have already evaluated meters to use

as standards and determined them to be accurate to use. If this proposal is adopted, Mr. Murnane believes that it would take powers away from State Directors to evaluate and use these standards. Mrs. Tina Butcher (NIST OWM) commented that the concept of master and reference meter is to use the meter as a standard in place of provers. The authority to use them rests with the State Director, however, there needs to be a method to ensure accuracy. Mrs. Butcher mentioned several alternatives as outlined in the submitted NIST analysis.

During the open hearings, comments were heard from the floor regarding this item and MFM-15.1 at the same time.

After hearing comments from the floor, the Committee does not believe the item is fully developed, even though the item has been on the agenda for several years. The Committee recommended that the item be withdrawn.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting Open Hearings, the Committee heard comments from the floor. Mr. Keilty asked that the item be moved to voting and if not, asks for suggestions from the Committee on how to improve item. Mr. Opperman (Weights and Measures Consultants) did not support the item and said it does not explain mass flow meter as a standard and where is the data that supports this item. Mrs. Butcher agreed with comments from Mr. Opperman. Mr. Charles Stutesman (Kansas) agreed with Mrs. Butcher but understands the submitting of this proposal and should be moved as a Voting Item.

CWMA S&T Committee recommended this item moving forward as a Voting Item.

During the 2022 CWMA Annual Meeting Open Hearing Mr. Keilty presented calibration data at the 2022 NCWM Interim Meeting. No recommendations from NCWM have been released. Recommended a minor change that re-includes the word “meters” because it was confusing how to apply testing requirements. Both items explain the amount of test drafts that differ from other volume standards. Field standard meter provides flexibility for use across many different products and densities. Field Standards are tested against OIML and API standards using gravimetric methods that are NIST traceable. Accuracy and repeatability are long term, it is a maintenance free system with no moving parts. These systems save time and space, contain embedded diagnostics, are easy to use, and easy to maintain. It is easy to train the operator of these systems. NMI has issued a test report on this system. Various setups can be mounted to a rack and easily transported. SWMA and CWMA recommended this item move forward as a Voting Item in the 2021 Interim Meeting. Recommending placing as Voting today and move forward for a vote this week.

Mr. Jan Konijnenburg (NIST OWM) stated that State and industry have a need to use various types of field test standards to evaluate commercial devices installed in the marketplace. NIST OWM recognizes the need to use various standards to test commercial devices and support the use of these standards when test data supports its use. NIST OWM is also supporting the use of various types of field test standards through the purchase of several meters and the collection of data throughout the U.S.

The purpose statement for Items LPG-15.1 (LPG & Anhydrous Ammonia Liquid-Measuring Devices Code) indicates the goal of this items is:

“to amend NIST Handbook 44 to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters.”

The proposed changes in Items LPG-15.1 suggest changes to the test draft criteria for devices covered under this code, which is not necessary to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters.

Amongst the concerns raised to the S&T Committee over the proposed changes for LPG-15.1 is that it conflicts with existing test draft criteria and confusion over the application of the proposed requirement.

As such, given the long debate over multiple iterations of the proposals, OWM proposes that since the purpose of the proposal is to allow field reference standard meters to be used to test and place into service dispensers and delivery system, and the responsibility for allowance of these field test standards are already addressed in the NIST Handbook 44 Fundamental Considerations and Item Block 8 clarifies these responsibilities, that Consideration be given to the proposal in Item Block 8 which clearly states the responsibility for allowance of field standards along with a new proposal to add a general code requirement. (See Item Block 8 of the NIST OWM Analysis for the S&T Annual Meeting.)

Mr. Mike Johnson (Nebraska) supports this item and agrees with Mr. Keilty. Nebraska has had great success over the last 18 years using this method. Nebraska has over 300 mass flow meters and gravimetric testing isn't practical.

Mr. Murnane stated purpose on these proposals to amend Handbook 44 and to allow field standards meters to be used to test and place into service dispensers and delivery system flow meters. The current language adding N.3.2., has nothing to do with the purpose statement nor does have any effect at all on whether meters can be accepted or used as field standards. Handbook 44 under fundamental considerations already allows for the use of field standards and /or equipment, as approved by the Director. There are already numerous meters in the field being used as standards that have been approved by State Directors under these fundamental considerations.

Note: Seraphin has a proposal, item OTH-22.1 that supports the Directors authority.

What is the reason and justification for N.3.2 when we already have a test draft size in N.3.1? What data and analysis has been provided regarding the uncertainties associated with the field standard meters and the sizes of the drafts proposed in N.3.2.? The proposal MFM-15.1., N.3.2 would impose constraints on the capability of the W&M officials to test mass flow meters.

Under the current paragraph N.3., W&M officials can conduct tests at any flow rate for any quantity that is equal to or greater than minimum measured quantity (MMQ) specified by the manufacture of the meter. Under the proposed N.3.2., the minimum size of the test drafts must be greater than or equal to the quantity delivered in one minute at the flow rate at which the test is being conducted. Depending upon the measurement application and the test equipment available, this could substantially increase the size of the required test drafts for almost all flow rates for mass flow meters.

Example: Recently there was CNG testing performed in Colorado. The test drafts were for 1/3 of the capacity of the test cylinder (as specified in the EPO) and it took less than one minute to complete. In this case the proposed change to the size of the test draft on MFM15.1. would have prevented Weights & Measures officials from conducting the tests.

Weights and Measures officials should be able to test mass flow meters using any test draft size, equal to or greater than the MMQ over the range of flow rates. I did not do an extensive review but I did find six NTEP Certificates of Conformance that would not be able to be tested using the proposed MFM-15.1., N.3.2. What happens to them?

If the proposal were adopted with its current purpose statement it could be interrupted that every meter is acceptable for use as a field standard. How do you know which meters are acceptable for use as a field standard and which ones are not? For example, if a meter is brought into the United States from another country, can it be used as a field standard. This proposal will cause confusion for both Weights and Measure officials and testing companies.

Additional Notes:

NIST and Seraphin requested Mr. Keilty's participation in a meeting on these items and he declined. There has been a total of six changes to the wording on these items since they were introduced. Again, I would like to remind the Committee that States are already using meters as field standards and this is permitted by the existing fundamental considerations. There is no need for these proposals. Seraphin Test Measures opposes items LPG-15.1. and MFM-15.1 and asks the Committee to withdraw this item from consideration. Comment: years on an agenda are not part of criteria for deciding if an item should be made a Voting Item.

Mr. Stutesman made statements concerning the Fundamental Considerations noting that states already have the ability to decide what's allowed. It already falls within The Director's authority, but we have other existing codes in HB 44 which reference transfer standards and specifically allowing their use for testing particular devices. The NIST EPOs are still in draft status and are a resource tool only. Flow rate will be more important going forward as gravimetric testing becomes more prevalent. He recommended sending to Voting status. Does this only apply to mass flow meters as the standard? NIST stated they are using Coriolis meters. But the decision to use non-mass flow meters as the field standard rests with The Director. This will apply to any meter technology, not just mass flow meters.

Mr. Keilty stated that other codes in HB 44 contain advice on specific test drafts when using transfer standards. These proposals give test draft advice to handle slow flow devices. The EPO for CNG testing uses small containers but the EPO can be changed.

Mr. Ivan Hankins (Iowa) witnessed these tests using these transfer standards at multiple flow rates and drafts. It took much less time. This technology will allow jurisdictions to test at a quicker pace, using less staff. Supports this proposal.

Mr. Murnane questioned if the draft size is merely a suggestion.

The CWMA S&T Committee recommended this move forward as a Voting Item.

LPG-22.1 VC A.1. General., and Appendix D – Definitions. Liquefied Petroleum Gas Retail Motor Fuel Device.

(This Item was Adopted.)

(**Note:** The Item under Consideration reflects changes that were made at the 2022 Interim Meeting.)

Source: North Carolina Department of Agriculture and Consumer Services

Submitter's Purpose and Justification:

Provide a clearer definition of retail motor fuel device, in relation to LP-Gas, is needed to allow for the continued use of much of the existing dispenser equipment in the field. Those that are for delivery into a vehicle should comply with the appropriate HB 44 requirements, while those that dispense into a portable container, even if later used as a “motor fuel”, can use a non-RMFD dispenser.

By definition in NIST HB 44, LP-Gas (propane) is a motor fuel, however the majority of propane that is sold is not for motor fuel use. Most dispensers in the field are to fill bottles/cylinders/containers, and should be able to continue in that purpose, even if that container may end up fueling a motor, such as a forklift, mower or generator. I think the intent of a “retail motor fuel device” is that the majority of that product is going into vehicles. So, I have purposely chosen to use “licensed vehicles” to help define the appropriate device as “highway” and “non-highway” is a separate road tax issue. I think it is too much to ask locations, such as campground, with a dispenser to primarily fill grill cylinders, to add a retail motor fuel device because they occasionally fill a container that may be used on propane lawn mower, or similar equipment.

I suggest an addition to section A.1. to draw attention to this definition and the applicability of the code in that context. The alternative would be to change all instances of “retail motor fuel dispenser” and “retail motor fuel device” in Section 3.32 to “liquefied petroleum gas retail motor fuel device”.

The problem encountered by our staff is that existing, container filling dispensers later had a “T” installed and another hose was added, which had a K15 nozzle on it, currently required by the *LP-Gas Code* for filling vehicles. At that time, it was determined the equipment was being used, in part, as a retail motor fuel device and the appropriate HB 44 sections applied, which they could not meet (they were installed after the 2017 requirements took effect). I will note the existence of the nozzle alone does not make it an RFMD, as containers can be retrofitted to accept that nozzle, but it is an indication that questions on equipment usage need to be asked.

There are currently several NTEP approved LPG retail motor fuel dispensers in the marketplace and are defined by those manufacturers as such. This would maintain the level playing field for both the manufacturers and the businesses that have already installed LP-Gas RMFDs for the purpose of fueling vehicles.

The submitter acknowledged that This will effectively define devices for use with “vehicles” and “equipment”. Some would suggest that current HB 44 requirements should apply to all dispensers that may result in usage as a “motor fuel”, but this is not practical in terms of cost of equipment given the fraction of that type sale many locations may have. This is not how we typically consider items, but as LP-Gas, a long existing product, and corresponding devices, is moving more into the alternative fuel market, there should be some consideration given to better determine where a RMFD is required. The alternative is to not enforce the requirements at all or selectively enforce them at some locations and not others, which is not equitable to the industry or the customers.

The submitter requested that this be a Voting Item in 2022.

NIST OWM Executive Summary for LPG-22.1 – A.1. General., and Appendix D – Definitions. Liquefied Petroleum Gas Retail Motor Fuel Device.

NIST OWM Recommendation: NIST supports the need to apply NIST HB 44 to devices used commercially as retail motor fuel devices but believes that the current definition for “Retail Motor Fuel
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**NIST OWM Executive Summary for LPG-22.1 – A.1. General., and Appendix D – Definitions.
Liquefied Petroleum Gas Retail Motor Fuel Device.**

Device” already applies to LPG devices use to fuel vehicles with Internal Combustion Engines and may lead to a list of definitions for Retail Motor Fuel dispensers depending on what liquid product is dispensed. This may need further discussion to decide an appropriate direction for addressing retrofitted dispensers and feels that a Developing status may allow additional discussion of this item.

- The proposed definition for LPG RMFD states in the definition that it has the same meaning as retail motor fuel dispenser and retail motor device, as such, we question whether or not another term is needed.
- We questioned the term “**licensed**” in the proposed definition. The term “**licensed**” in the definition was removed and replaced with “**vehicles bearing a state or federal license plate for use on public roads.**” We believe that whether or not the vehicle is “licensed” or “has a state or federal license plate for use of public roads” is not needed to determine whether a device is being used commercially. If the device is used commercially as a retail motor fuel device to measure liquid into any vehicle, it is considered a commercial device and must meet NIST HB 44 requirements.
- Although this proposal is intended to call attention to LPG dispensers retrofitted to dispense as a retail motor fuel device, we believe the current definition for retail motor fuel dispensers is adequate for any liquid device used to fuel internal combustion engines and adding this definition may open the door to creating a list of definitions for different product types and is inconsistent with how we have handled other applications for retail motor fueling.

Item under Consideration:

Amend Handbook 44, Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices Cod as follows:

A.1. General. – This code applies to devices used for the measurement of liquefied petroleum gas and anhydrous ammonia in the liquid state, whether such devices are installed in a permanent location or mounted on a vehicle. **For retail motor fuel devices, see Appendix D, definition of liquefied petroleum gas retail motor fuel device.**

And amend Handbook 44, Appendix D – Definitions as follows:

Liquefied Petroleum Gas Retail Motor Fuel Device. – A device designed for the measurement and delivery of liquefied petroleum gas used as a fuel for internal combustion engines in licensed vehicles bearing a state or federal license plate for use on public roads. The term means the same as “retail motor fuel dispenser” and “retail motor fuel device” as it appears in section 3.32 LPG and Anhydrous Ammonia Liquid-Measuring Devices [3.32]

motor-fuel device or motor-fuel dispenser or retail motor-fuel device. – A device designed for the measurement and delivery of liquids used as fuel for internal-combustion engines. The term “motor-fuel dispenser” means the same as “motor-fuel device”; the term “retail motor-fuel device”

applies to a unique category of device. (Also see ~~definition~~ **definitions of “retail device.” and “liquefied petroleum gas retail motor fuel dispenser”**) [3.30, ~~3.32~~, 3.37]

NIST OWM Detailed Technical Analysis:

Per the review of the background information for this item, this proposal is made to differentiate between LP-Gas dispensers used to fill tanks and those used to fuel internal combustion engines. Field observations in NC revealed installations where a “T” and hose with a K15 nozzle had been installed for filling vehicles. These were being used in part as a retail motor fuel device and the installation did not meet the requirements in NIST HB 44. This item proposes that a definition be added to address LP-Gas RMFD. NIST OWM has the following comments and questions:

- NIST supports the need to apply NIST HB 44 to devices used as retail motor fuel devices.
- The proposed definition for LPG RMFD states in the definition that it has the same meaning as retail motor fuel dispenser and retail motor device, as such, we question whether or not another term is needed. The current definition for retail motor fuel dispensers references the LPG code (Section 3.32) indicating that the definition for retail motor fuel device applies to devices used to measure LPG as a motor fuel as well.
- We questioned the term “**licensed**” in the proposed definition. The term “**licensed**” in the definition was removed and replaced with “**vehicles bearing a state or federal license plate for use on public roads.**” NIST HB 44 is applicable to any weighing or measuring equipment used or employed to establish a weight or measure for which there is a charge or payment rendered on the basis of the weight or measure. Whether or not the vehicle is licensed or an off-road vehicle, if a customer uses the commercial device to fill, in this case, a vehicle with an internal combustion-engine and is charged based on what the device measures it is considered a commercial transaction and has to meet the requirements in NIST HB 44. We believe that considering whether or not the vehicle is licensed or has a state or federal license plate for use of public roads is not needed.
 - The requirements for retail motor fuel devices apply to any device used as a commercial retail motor fuel device and whatever vehicle it fuels whether it be licensed, a vehicle bearing a state or federal license plate for public record or an off-road vehicle, if a customer is using the device to dispense liquid into any vehicle and the device measurement is used to assess a charge, the device is considered commercial and required to meet the requirements of NIST HB 44.
- Although this proposal may call attention to LPG dispensers retrofitted to dispense as a retail motor fuel device, we believe the current definition for retail motor fuel dispensers is adequate for any liquid device used to fuel internal combustion engines and adding this definition may open the door to creating a list of definitions for different product types and is inconsistent with how we have handled other applications for retail motor fueling.
- NIST OWM feels this may need further discussion to decide an appropriate direction for addressing retrofitted dispensers and feels that a Developing status may allow additional discussion of this item.

Summary of Discussions and Actions:

During the 2022 NCWM Interim Meeting the submitter, Mr. Steven Benjamin (North Carolina) explained that Field observations in North Carolina revealed installations where a “T” and hose with a K15 nozzle had been installed on LP Gas dispensers used to fill propane tanks, so that in addition to filling propane tanks, these devices could also be used for filling vehicles. This proposal is intended to provide distinction between LP-Gas dispensers used to fill tanks and those used to fuel internal combustion engines. A concern with the term licensed vehicle was raised by Kansas weights and measures as to what is meant by licensed because there may be different requirements for states as to what vehicles are to be licensed, such as off-road vehicles. It was suggested that maybe registered vehicle may be a better term. During their work session the committee agreed to a Voting status for this item and to changes in the wording to remove “licensed” vehicle and adding the language “vehicles bearing a state or federal license plate for use on public roads”. The Item under Consideration reflects changes from the 2022 Interim Meeting.

During the 2022 Annual Meeting the submitter provided background on the item. The S&T Committee heard from several States and industry representatives who were in support of this item. One State was not in support of the item as written. A question was posed by one state regulator that if some of these devices are considered a retail motor fuel device would they be required to meet the tolerances in Section 3.30. Liquid Measuring Devices Code. It was noted that LPG is exempt from the Liquid Measuring Devices Code.

During the Committee work session, no changes were made to the Item under Consideration and the Committee agreed to present this item for a vote and this item was placed on the voting consent calendar.

Regional Association Reporting:

Western Weights and Measures Association

Ms. Diane Lee (NIST OWM) noted that this is a newer item and NIST OWM will be meeting to discuss this item shortly. Mr. Bruce Swiecicki (National Propane Gas Association) explained that there are three items on the agenda addressing the same problems. and that He is in favor of this item. Mr. Swiecicki submitted item LPG-22.3. He also stated that all of the LPG proposals would be favorable and mentioned that he submitted information and comments on item LPG-22.3. Mr. Dwight Farr (U-Haul Program Manager) mentioned that this item helps clarify definitions and that he has no problem with this item.

The WWMA S&T Committee recommended that this item be assigned a Developing status. The Committee agrees that the proposal has merit. The item’s language needs to be adjusted to provide clarity so that the proposed definition applies only to Retail Motor Fuel – Liquefied Petroleum Gas devices; The use of the term “designed” is vague. The Committee recommended that additional study is needed to assess how the revised definition will affect the application of specific sections of the code.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing Mr. Steven Benjamin (North Carolina) stated that he is seeing businesses add hoses to existing devices, essentially creating a RMFD. He recommended moving this forward as a Voting Item.

Mr. Keilty stated that we could explore adding a RMFD component to LPG to deal with this issue.

This Committee feels this item is fully developed and recommended moving this item forward as a Voting Item.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open Hearing no comments were heard on this item.

The NEWMA Specifications and Tolerances Committee recommended that this item remain in Developing status.

During the 2022 Annual Meeting Open Hearing no comments were heard from the body on this item. There was no recommendation from the region on this item.

Central Weights and Measures Association

During the 2021 Interim Meeting Open Hearing the committee heard comments from the floor. Mr. Loren Minnich (Kansas) had issues with the word “licensed” and questioned the meaning of “licensed”.

CWMA S&T Committee recommended item as Developing.

During the 2022 Annual Meeting Open Hearings, no comments were made from the floor and the Committee recommended this item to remain a Voting Item.

LPG-22.2 W S.2.6. Zero-Set-Back Interlock, for Stationary Customer-Operated Retail Motor-Fuel Devices, Electronic.

(This Item was Withdrawn)

Source: U-Haul International, Inc.

Submitter’s Purpose and Justification:

The proposal will address practical issues that propane marketers encounter when trying to comply with the zero setback requirements for propane stationary and truck-mounted meters in Handbook 44.

Motor fuel, within the context of NFPA 58, refers to any container that has the potential to provide propane to fuel an engine. This can include a multitude of DOT cylinders and ASME containers that are not for the propulsion of an automobile. Current mechanical meter technology utilized in a standard propane dispenser for the filling of portable containers, such as those utilized in NFPA 58 for motor fuel applications or those that do power automobiles, are not capable of being equipped with a zero-set-back interlock and the technology will not be potentially available until 2022, per meter manufacturers.

NFPA 58 currently does not allow the public to refuel its automobiles. All automobiles or other containers must be filled by a specially trained employee. A proposed change has been introduced for consideration in the 2023 edition of NFPA 58 that would permit public refueling of automobiles as long as the dispensing system meets very specific safety requirements, including a specialized nozzle, and is furnished with visible instructions. Upon the acceptance of this new public refueling allowance the propane industry agrees that Zero-Setback-interlocks are needed. These public self-service automotive

dispensing systems will be listed to Underwriters Laboratories Standard 495 and will be dedicated to the filling of motor vehicles.

Most propane dispensed is for purposes other than motor-fuel. Pursuant to NFPA 58, this is accomplished by a trained and certified employee dispensing propane, typically using mechanical meters, into cylinders and tanks. The employee is trained and required to manually reset the meter to zero after each transaction and verify the meter is reset prior to initiating a subsequent transaction. This has been and remains an accepted practice for dispensing propane. This process is the industry standard for approximately 97 % of all propane used in the United States. See U.S. Department of Energy, Alternative Fuels Data Center https://afdc.energy.gov/fuels/propane_basics.html.

Unlike traditional motor-fuel, such as gasoline or diesel, customers cannot currently dispense propane into their vehicles. If NFPA 58 is amended to allow customers to dispense their own propane into their vehicles and the demand for propane as motor-fuel increases, the market will drive retailers to provide electronic customer-operated retail motor-fuel devices to meet the demand and customer expectations for efficient and expedient fueling transactions. At that time, the electronic customer-operated motor-fuel devices will certainly need to incorporate an automatic zero-set-back interlock. It is simply too early in the process to effectively force mechanical retail motor-fuel devices out of the market for such a small percentage of the retail propane market (approximately 3 %).

It is difficult to counter the argument above. Opponents of this proposed change may argue that automatic zero-set-back interlocks are necessary to prevent customers being overcharged for propane.

The submitter requested that this be a Voting Item in 2022.

Item under Consideration:

Amend Handbook 44, Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices Cod as follows:

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

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

[Nonretroactive as of January 1, ~~2017~~ 2023]

(Added 2016) (**Amended 20XX**)

NIST OWM Detailed Technical Analysis:

This proposal provides changes to the title of Zero Set-back Interlock for Stationary Retail Motor-Fuel Devices by adding “Consumer Operated” Retail Motor Fuel Dispenser, “Electronic” in the LP-Gas code. In the submitter’s justification it is noted that a proposed change was introduced in consideration for proposed changes introduced in the 2023 edition of NFPA to permit public refueling of automobiles with LP-Gas, which is currently not allowed; currently automobiles and containers must be filled by a specially trained employee. These public self-service automotive dispensing systems will be dedicated to fueling motor vehicles. As such the industry agrees that zero set-back interlock is needed for these devices.

The current requirement for Zero-Setback Interlock for Stationary Retail Motor Fuel Devices in the 2022 version of NIST HB 44 Section 3.32 LPG and Anhydrous Ammonia Liquid Measuring Devices Code has requirements for electronic stationary meters and for analog stationary retail motor fuel dispensers. Both paragraphs apply to either customer or employee operated. Adding “Customer-Operated” and “Electronic” does not appear to be necessary. Both are covered under the existing requirements.

- It appears that the most current edition (2022 edition) of NIST HB 44 was not used when this proposal was created.
- The paragraph that is numbered S.2.6 in the proposal is S.2.5.2 in the 2022 version of NIST HB 44.
- NIST HB 44 does not typically make a distinction as to who operates the device and currently S.2.5.2 applies to both electronic and analog devices and as such the proposed changes in this item are already addressed in S.2.5.2.
- The proposed change to the paragraph S.2.6 to become a retroactive requirement would require that manufacturers retrofit the equipment or get new equipment for all equipment. This paragraph originally was non-retroactive as of January 1, 2017.
- This proposal appears to be redundant. The requirements for zero-set-back interlock already apply to electronic retail motor fuel devices, regardless of whether or not they are customer or owner operated.

Additional discussion may be needed as to the intent of this proposal.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting some were in support of this item and others suggested that this item be combined with LPG 22.3. NIST OWM provided comments and noted that the proposed changes in this item were not based on the current edition of NIST HB 44 and would need to be updated per the current NIST HB 44 code requirements. Following the 2022 Interim meeting this item, LPG-22.2, was withdrawn and the submitter worked with the submitter of item LPG-22.3 in developing that proposal.

During the 2022 NCWM Annual Meeting no comments were heard on this item because this item was Withdrawn at the 2022 NCWM Interim Meeting.

Regional Association Reporting:**Western Weights and Measures Association**

During the 2021 Annual Meeting Open Hearings the following comments were heard:

Mr. Dwight Farr (U-Haul Program Manager) proposed this amendment. The majority of propane meters are mechanical. This forces them to switch to electronic. He wants this to only pertain to electronic meters. This will affect the infrastructure growth. This will deter alt. fuel options (sites just will not sell LPG as retail fuel instead of switching to electronic). Customer cannot dispense their own LPG - has to be a specially trained associate. Setting back every time a single customer brings in multiple tanks will be detrimental to the customer. This only applies to 3 % of his customers. Wants this to be a Voting item next year.

Mr. Bruce Swiecicki (National Propane Gas Association) supported this proposal as stated. This will go a long way towards fixing the problem. Ms. Cadence Matijevich (Nevada) questioned the submitter on the Retroactive status? Mr. Farr stated retroactive to 2017 law was established at that year.

Ms. Matijevich remarked the way it is written, it will not suffice. Mr. Farr stated if it needs to be changed, so be it.

The WWMA S&T Committee recommended based on testimony heard in open hearings and input from the NIST advisors during the work session that this item be assigned a Developing status. The Committee also recommended that the submitters of LPG-22.2 and LPG-22.3 combine their efforts to develop one of the items with consideration to the 2022 version of NIST HB 44.

Southern Weights and Measures Association

During the 2021 Annual Meeting Open Hearing, Mr. Steven Benjamin (North Carolina) stated that he is opposed to this item, because he feels it will allow device manufacturers to cut corners on “full service” devices.

Mr. Tim Chesser (Arkansas) opposed this item. He stated that it was a bad item, seemed incomplete, and recommended it be withdrawn.

This Committee agreed that the item could allow subpar devices to be put into commerce, that the item itself is incomplete, and recommended this item be Withdrawn.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting, no comments were heard on this item.

The NEWMA S&T Committee recommended that this item remain in Developing status.

During the 2022 NEWMA Annual Meeting, no comments were received because this item was withdrawn.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting Open Hearings, the Committee heard no comments from the floor. The Committee received updated proposal to Sections S.2.5. and S.2.6 from Mr. Bruce Swiecicki (National Propane Gas Association) because technology won't be available till 2022 per manufacturers.

CWMA S&T Committee recommended item move forward as a Developing item.

During the 2022 Annual Meeting no comments were received because this item was withdrawn.

LPG-22.3 D S.2.5. Zero-Set-Back Interlock., S.2.5.2. Zero -Set-Back Interlock for Stationary Customer-Operated Electronic Retail Motor-Fuel Devices.

(**Note:** The Item under Consideration has been updated since the 2022 Interim Meeting. The current item is a combined effort of the National Propane Gas Association and U-Haul International, Inc.

Note: At the 2022 Annual Meeting this item was designated as Developing. During the 2022 Fall Regional Meetings, the submitter requested that this item be Withdrawn and that consideration be given to Item LPG-23.)

Source: National Propane Gas Association

Submitter's Purpose and Justification:

The proposal will address practical issues that propane marketers encounter when trying to comply with the zero setback requirements for propane stationary and truck-mounted meters in NIST Handbook 44.

National Propane Gas Association:

This proposal was developed by the National Propane Gas Association's Technology, Standards and Safety Committee, a volunteer organization comprised of 2500+ members, including propane retail marketers and others providing products or services to the propane industry.

In S.2.5, the removal of the vehicle mounted meters from this two-minute requirement is necessary as the initiation of a vehicle mounted meter is performed at the truck prior to moving the delivery hose to the customer tank, sometimes as far as 150 feet from the meter, or in installations with multiple containers that may require continued adjustment of containers or delivery hose to complete a delivery. This configuration can lead to periods of up to 5 minutes between initial meter engagement and first container filling or between containers being filled on a single delivery.

In revised S.2.6, we are proposing that vehicle mounted meters be allowed periods between meter engagement and product flow of greater than 2 minutes prior to automated time out initiation. A five-minute period is more practical as the initiation of a vehicle mounted meter is performed at the truck prior to moving the delivery hose to the customer tank, sometimes as far as 150 feet from the meter, or in installations with multiple containers that may require continued adjustment of containers or delivery hose to complete a delivery. The configuration on a typical bobtail can lead to periods of up to 5 minutes between initial meter engagement and first container filling or additionally periods of greater than two minutes can transpire between containers being filled on a single delivery.

Addressing proposed new S.2.7, motor fuel, within the context of NFPA 58, refers to any container that has the potential to provide propane to fuel an engine. This can include a multitude of DOT cylinders and ASME containers that are not for the propulsion of an automobile. Current mechanical meter technology utilized in a standard propane dispenser for the filling of portable containers, such as those utilized in NFPA 58 for motor fuel applications or those that do power automobiles, are not capable of being equipped with a zero-set-back interlock and the technology will not be potentially available until 2022, per meter manufacturers.

NFPA 58 does not currently explicitly allow the public to refuel its automobiles. All automobiles or other containers must be filled by a specially trained employee. A proposed change has been introduced for consideration in the 2023 edition of NFPA 58 that would permit public refueling of automobiles as long as the dispensing system meets very specific safety requirements, including a specialized nozzle, and is furnished with visible instructions. Upon the acceptance of this new public refueling allowance the propane industry agrees that Zero-Setback-interlocks are needed. These public self-service automotive dispensing systems will be listed to Underwriters Laboratories Standard 495 and will be dedicated to the filling of motor vehicles.

In view of the above information, existing dispenser systems that may only be utilized by qualified trained employees should be permitted to continue operations with the existing meter technology and should not be required to include Zero-Set-Back Interlocks. This should include when the dispenser is removed from one location and installed in another, as long as the original meter remains functional. Existing cabinetry and controls utilized in a standard dispenser cabinet generally include non-digital meters and no electronic controls with the exception of a single switch that operates the pump. These simplistic designs are still effective and should not be prohibited from use in future (new) installations in which the transfer process is attended by trained personnel. Limiting the scope of this section will allow attended dispenser operations which are primarily utilized for filling of portable containers to remain consistent in design and construction. Current use of this technology has not resulted in any known impact to the consumer or over-charge situations. The term “self-operated” is used in other locations in Handbook 44 and would include electronic dispensing devices and meters, which would then be consistent with the prior two sections that are limited to electronic meters.

It is difficult to counter the arguments above. The sheer difficulties that a service person can encounter when a wet hose must be carried over terrain fairly long distances between receiving containers should be sufficient justification to approve this proposal. The counter argument to new S.2.7 would be that the customer may not be able to view the meter to ensure it is set back to zero. The submitter requested that this be a Voting Item in 2022.

U-Haul International, Inc.

Motor fuel, within the context of NFPA 58, refers to any container that has the potential to provide propane to fuel an engine. This can include a multitude of DOT cylinders and ASME containers that are not for the propulsion of an automobile. Current mechanical meter technology utilized in a standard propane dispenser for the filling of portable containers, such as those utilized in NFPA 58 for motor fuel applications or those that do power automobiles, are not capable of being equipped with a zero-set-back interlock and the technology will not be potentially available until 2022, per meter manufacturers.

NFPA 58 currently does not allow the public to refuel its automobiles. All automobiles or other containers must be filled by a specially trained employee. A proposed change has been introduced for consideration in the 2023 edition of NFPA 58 that would permit public refueling of automobiles as long as the dispensing system meets very specific safety requirements, including a specialized nozzle, and is

furnished with visible instructions. Upon the acceptance of this new public refueling allowance the propane industry agrees that Zero-Set-back interlocks are needed. These public self-service automotive dispensing systems will be listed to Underwriters Laboratories Standard 495 and will be dedicated to the filling of motor vehicles.

Most propane dispensed is for purposes other than motor-fuel. Pursuant to NFPA 58, this is accomplished by a trained and certified employee dispensing propane, typically using mechanical meters, into cylinders and tanks. The employee is trained and required to manually reset the meter to zero after each transaction and verify the meter is reset prior to initiating a subsequent transaction. This has been and remains an accepted practice for dispensing propane. This process is the industry standard for approximately 97 % of all propane used in the United States. See U.S. Department of Energy, Alternative Fuels Data Center https://afdc.energy.gov/fuels/propane_basics.html.

Unlike traditional motor-fuel, such as gasoline or diesel, customers cannot currently dispense propane into their vehicles. If NFPA 58 is amended to allow customers to dispense their own propane into their vehicles and the demand for propane as motor-fuel increases, the market will drive retailers to provide electronic customer-operated retail motor-fuel devices to meet the demand and customer expectations for efficient and expedient fueling transactions. At that time, the electronic customer-operated motor-fuel devices will certainly need to incorporate an automatic zero-set-back interlock. It is simply too early in the process to effectively force mechanical retail motor-fuel devices out of the market for such a small percentage of the retail propane market (approximately 3 %).

NIST OWM Executive Summary for LPG-22.3 – S.2.5. Zero-Set-Back Interlock., S.2.5.2. Zero -Set-Back Interlock for Stationary Customer -Operated Electronic Retail Motor-Fuel Devices.

NIST OWM Recommendation: NIST OWM is not in support of this proposal to change S.2.5.2 requirements in the LPG Code and feel that this creates different requirements for retail motor fuel devices used for other products. Also, a proposal is needed for consideration of changes to timeout for LPG.

- The submitters explained in their justification that only trained operators can dispense propane into a vehicle and that these propane retail motor fuel dispensers do not meet the requirements for Zero-Set-Back Interlock for Stationary Retail Motor-Fuel Devices. As such, the submitters are proposing that since these are not customer operated dispensers, and that the dispensers are operated by trained staff, the requirements in S.2.5.2 Zero-Set-Back Interlock for Stationary Retail Motor Fuel Devices should be revised to only apply to Customer Operated Electronic Retail Motor Fuel Devices. The following are NIST OWM comments to this proposed change.
- If a dispenser is operating as a retail motor fuel device the current requirements for zero-set back interlock apply whether or not it is operated by the customer or trained staff.
- The purpose of the Zero-Set-back Interlock is to ensure that an automatic interlock prevents subsequent delivery until the indicating element is returned to zero.
- With the changes proposed, any propane retail motor fuel device that is operated by trained staff could possibly not be returned to zero at the start the next transaction.

- Propane retail motor fuel devices, that are not customer operated, would not be required to meet S. 2.5.2. in the LPG Code.

Item under Consideration:

Amend Handbook 44, Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices
Cod as follows:

S.2.5. Zero-Set-Back Interlock.

S.2.5.1. Zero-Set-Back Interlock, Electronic Stationary Meters (Other than Stationary Retail Motor-Fuel Dispensers) and Electronic Vehicle-Mounted Meters. – *A device shall be constructed so that after an individual delivery or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating element and, if equipped, recording element have been returned to their zero positions.*
[Nonretroactive as January 1, 2021]

(Added 2019)

(Amended 2021)

S.2.5.2. Zero-Set-Back Interlock for Stationary Customer-Operated Electronic Retail Motor-Fuel Devices. – *A device shall be constructed so that:*

- (a) *after a delivery cycle has been completed by moving the starting lever to any position that shuts off the device, an automatic interlock prevents a subsequent delivery until the indicating elements and recording elements, if the device is equipped and activated to record, have been returned to their zero positions;*
- (b) *the discharge nozzle cannot be returned to its designed hanging position (that is, any position where the tip of the nozzle is placed in its designed receptacle and the lock can be inserted) until the starting lever is in its designed shut-off position and the zero-set-back interlock has been engaged; and*
- (c) *in a system with more than one dispenser supplied by a single pump, an effective automatic control valve in each dispenser prevents product from being delivered until the indicating elements on that dispenser are in a correct zero position.*
[Nonretroactive as of January 1, 2017]

(Added 2016)

NIST OWM Detailed Technical Analysis:

A similar proposal LPG-22.2, submitter U-Haul International, Inc. was withdrawn and both U-Haul International, Inc. and National Propane Gas Association collaborated to further develop LPG-22.3. Initially, the proposed changes, were made to an older version of the handbook. The current Item under Consideration has been edited and changes are being proposed to the current version of NIST HB 44.

Per review of the discussion provided by the submitter, propane dispensed into a vehicle requires a trained operator to dispense the propane. From other proposals on the 2022 Interim Meeting report, it is

NIST OWM understanding that some stationary propane dispensers have been retrofitted to dispense propane as fuel for vehicles. As such these dispensers are now retail motor fuel dispensers and must meet the requirements for these devices in the LPG code.

The submitters explained in their justification that only trained operators can dispense propane into a vehicle and that these propane retail motor fuel dispensers do not meet the requirements for Zero-Set-Back Interlock for Stationary Retail Motor-Fuel Devices. As such, the submitter is proposing that since these are not customer operated dispensers, and that the dispensers are operated by trained staff, the requirements in S.2.5.2. Zero-Set-Back Interlock for Stationary Retail Motor Fuel Devices should be revised to only apply to Customer Operated Electronic Retail Motor Fuel Devices The following are NIST OWM comments to this proposed change.

- If a dispenser is operating as a retail motor fuel device the current requirements for zero-set-back interlock apply whether or not it is operated by the customer or trained staff.
- The purpose of the Zero-Set-back Interlock is to ensure that an automatic interlock prevents subsequent delivery until the indicating element is returned to zero.
- With the proposed changes, any propane retail motor fuel device that is operated by trained staff could possibly not be returned to zero at the start the next transaction.
- Retail motor fuel dispenser such as gasoline dispensers are required to meet these requirements in a self-serve (Customer operated) or full Service (Trained staff operated) locations.
- Propane retail motor fuel devices, that are not customer operated, would not be required to meet S. 2.5.2. in the LPG Code.
- The title of the proposal will need to be updated with the current handbook paragraphs.
- In reference to requirements for a 5-minute timeout, the timeout was discussed by the conference in 2021. During those discussions 2 minutes, 3 minutes and 5 minutes were discussed. The conference adopted a 3- minute timeout which was added to NIST HB 44 in 2021. Although timeout was discussed in the submitter's justification, the revised Item under Consideration did not include a proposal for a change to the timeout requirements for LPG.
- NIST OWM is not in support of this proposal to change S.2.5.2 requirements in the LPG Code and feel that this creates different requirements for retail motor fuel devices used for other products. Also, a proposal is needed for consideration of changes to timeout for LPG.

Summary of Discussions and Actions:

During the 2022 NCWM Interim Meeting, Mr. Bruce Swiecicki (National Propane Gas Association), working in collaboration with U-Haul International, requested the Committee replace the proposal in its 2022 Interim Meeting agenda for this item with the following revised version:

(Editor Note 1: The Item under Consideration was updated to the correct version of the handbook not to what appears below.)

Amend Handbook 44, Liquefied Petroleum Gas and Anhydrous Ammonia Liquid-Measuring Devices Code as follows (see Editor Note 2. below):

S.2.6. Automatic Timeout.

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

[Nonretroactive as of January 1, 2021]

(Added 2021)

S.2.6.2. Zero-Set-Back Interlock, Electronic Vehicle Mounted Meters.— A device shall be so constructed that after an individual delivery or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating element and, if equipped, recording element have been returned to their zero position. For individual deliveries, if there is no product flow for a maximum of five minutes the transaction must be completed before additional product flow is allowed. The 5-minute timeout shall be a sealable feature on an indicator.

[Nonretroactive as of January 1, 2021]

During Committee open hearings, Mr. Swiecicki acknowledge the proposal was based on an earlier version of NIST Handbook 44 and the paragraph numbering had changed. Consequently, the proposal needed modification to correspond to the 2022 version of the handbook. Mr. Swiecicki reported a two-minute time out was difficult to accomplish and suggested this be changed to five minutes.

During the Committee’s work session, members of the Committee reviewed the revised proposal, which includes updated language and paragraph numbering, however, members of the Committee concluded the proposal was still not fully developed. The Committee agreed to amend the proposal as requested by the submitter. The Committee recommended the submitter of this item work with the submitter of LPG-22.2 (U-Haul International) to harmonize the two proposals.

Two officials supported Mr. Swiecicki’s comments and were also in favor of a five-minute time out.

Ms. Diane Lee (NIST OWM) commented the proposal needed to be cleaned up to match the 2022 version of NIST Handbook 44. There was also a suggestion for the submitter to work with NIST OWM to further develop the proposal.

No comments were heard in opposition to the continued development of this item.

Following the 2022 NCWM Interim Meeting, the submitter of this item and Item LPG-22.2 collaborated on a joint proposal as requested and submitted it to the Committee in time that it could be added to the Committee’s agenda for the 2022 NCWM Annual Meeting. See the Item under Consideration for the new joint proposal. Because the submitters combined the two items into one, the Committee was able to withdraw LPG 22.2. from its agenda.

Based on limited notes, during the 2022 NCWM Annual Meeting, comments were heard from the submitters of this item that they opposed the changes as currently written in the Item under Consideration because when LPG is dispensed it should be dispensed by a trained operator not customer operated. The submitters expressed that they do not believe separate requirements are needed for bottle filling and

vehicle fueling. The submitters argued that that LPG dispensed as motor fuel is currently only 3 % of the market and that emphasis should be placed on the predominate use of these dispensers. The updated version that appears in the Item under Consideration is the updated version provided by the submitters to correct the item to the current NIST HB 44 code numbering. The S&T Committee informed the submitters that they can submit updated language to the regions since they have opposed what is currently in the Item under Consideration.

During the Committee working session the Committee agreed that this item would retain a Developing status.

Editor Note 2: Although the submitter of this item appears to have proposed new language at the 2022 Interim Meeting, the language that appears in Interim Meeting write-up combines automatic timeout and zero setback interlock language under the section for Automatic Timeout. A new proposal was submitted separately for the 2023 NCWM review cycle that is the same proposal with the same structure errors (See the 2023 Interim Meeting agenda LPG-23.2). In addition, another proposal was submitted for the 2023 NCWM review cycle that appears to be a replacement for this item LPG-22.3 (See 2023 Interim Meeting agenda item LPG-23.1). If the submitters intend to withdraw LPG-22.3 and replace it with LPG-23.1 they can request that LPG-22.3 be withdrawn.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Mr. Swiecicki noted that this item has to do with zero setback, but we are separating vehicle meters and Timeout. In some situations, such as with a bobtail, there may be several tanks not close to one another and the operator has to carry the long hose. The operator has to walk from tank to tank. Mr. Swiecicki stated they need more time and 5 minutes would be more appropriate. He supports setback interlock but wants to break out the LPG systems that are not used full time for retail motor fuel.

Mr. Dwight Farr (U-Haul Program Manager) supports the NPGA proposal. Mrs. Tina Butcher (NIST OWM) commented to look at the previous verbiage. The Conference did vote on changes with regard to zero setback and time out in 2021. The paragraph number is different than the 2020 version.

The WWMA S&T Committee recommended based on testimony heard in open hearings and input from the NIST advisors during the work session that this item be assigned a Developing status. The Committee also recommended that the submitters of LPG-22.2 and LPG-22.3 combine their efforts to develop one of the items with consideration to the 2022 version of NIST HB 44.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting Mr. Steve Benjamin (North Carolina) supported this Item. The SWMA S&T Committee recommended this item move forward as a Voting Item.

Northeastern Weights and Measures Association

During the 2021 Interim NEWMA S&T Open hearings there were no comments were heard on this item.

The NEWMA Specifications and Tolerances Committee recommended that this item remain in Developing status.

At the 2022 NCWM Interim Meeting, no comments were received on this item and NEWMA made no recommendation to the NCWM.

Central Weights and Measures Association

During the 2021 Interim Meeting Open Hearing, the Committee heard no comments from the floor. Committee received updated proposal to S.2.5. and S.2.6 from Mr. Swieciki because technology will not be available until the 2022 per information from manufacturers.

CWMA S&T Committee recommended the item move forward as a Developing item.

During the CWMA's 2022 Annual Meeting, the CWMA's Committee considered the following comments:

Mr. Konrad Pilatowicz (U-Haul International) provided comments via email prior to the meeting. This proposal was developed by the National Propane Gas Association's Technology, Standards and Safety Committee, a volunteer organization comprised of 2500+ members, including propane retail marketers and others providing products or services to the propane industry.

Addressing proposed S.2.5.2, motor fuel, within the context of NFPA 58, refers to any container that has the potential to provide propane to fuel an engine. This can include a multitude of DOT cylinders and ASME containers that are not for the propulsion of an automobile. Current mechanical meter technology utilized in a standard propane dispenser for the filling of portable containers, such as those utilized in NFPA 58 for motor fuel applications or those that do power automobiles, are not capable of being equipped with a zero-set-back interlock and the technology will not be potentially available until 2022, per meter manufacturers.

NFPA 58 does not currently explicitly allow the public to refuel its automobiles. All automobiles or other containers must be filled by a specially trained employee. A proposed change has been introduced for consideration in the 2023 20 edition of NFPA 58 that would permit public refueling of automobiles as long as the dispensing system meets specific safety requirements, including a specialized nozzle, and is furnished with visible instructions. Upon the acceptance of this new public refueling allowance the propane industry agrees that Zero-Setback-interlocks are needed. These public self-service automotive dispensing systems will be listed to Underwriters Laboratories Standard 495 and will be dedicated to the filling of motor vehicles.

In view of the above information, existing dispenser systems with mechanical registers that may only be utilized by qualified trained employees should be permitted to continue operations with the existing meter technology and should not be required to include Zero-Set-Back Interlocks. This should include when the dispenser is removed from one location and installed in another, as long as the original meter remains functional. Existing cabinetry and controls utilized in a standard dispenser cabinet generally include non-digital meters and no electronic controls with the exception of a single switch that operates the pump. These simplistic designs are still effective and should not be prohibited from use in future (new) installations in which the transfer process is attended by trained personnel.

Limiting the scope of this section will allow attended dispenser operations which are primarily utilized for filling of portable containers to remain consistent in design and construction. Current use of this technology

has not resulted in any known impact to the consumer or over-charge situations. The term “customer-operated” is used in several other locations in Handbook 44.

Mr. Michael Keilty (Endress+Hauser), NTEP Measuring Sector, stated that this is a new item that the NTEP Measuring Sector has not reviewed and would like to discuss at their September 2022 meeting.

Based upon these comments, the CWMA recommended this item as a Voting Item on the NCWM agenda.

MFM – Mass Flow Meters

MFM-15.1 D N.3. Test Drafts.

Previously MFM-2

(**Note:** In 2019 this item was combined with Block 1 “Terminology For Testing Standards” and other items that addressed terminology for standards and the use of “master meters.” Based on comments heard during the 2021 Annual Meeting, the S&T Committee recommended that all items that were combined with Block 1 “Terminology For Testing Standards” that originally appeared as a separate item or a separate block of items on the S&T agenda prior to 2019, be removed from Block 1 “Terminology For Testing Standards” and appear as originally presented.

Item MFM-15.1 was removed from Block 1 “Terminology For Testing Standards” and now appears as a separate item on the 2022 Interim Meeting agenda.)

Source: Endress + Hauser Flowtec AG USA

Submitter’s Purpose and Justification:

Amend Handbook 44 to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters. This item has been assigned to the submitter for further development. For more information or to provide comment, please contact:

Mr. Michael Keilty
Endress + Hauser Flowtec AG USA
(970) 586-2122, michael.keilty@us.endress.com

The use of transfer standards is recognized in Code sections 3.34 Cryogenic Liquid-Measuring Devices Code and 3.38 Carbon Dioxide Liquid-Measuring Devices Code and 3.39 Hydrogen Gas-Measuring Devices – Tentative Code. Transfer standard is only defined for testing cryogenic liquid measuring devices. It has been pointed out that the term transfer standard is not correct and that field reference standard meters may be more appropriate. See new the Item under Consideration, updated on September 8, 2017.

Field evaluation of LPG meters and CNG dispensers and LNG dispensers is very difficult using volumetric and gravimetric field standards and methods. The tolerances for these applications are such that using field reference standard meters are more efficient and safer. With CNG and LNG and LPG applications, the field reference standard meters are placed in-line with the delivery system as it is used to fill tanks and vehicles. The use of field reference standard meters eliminates return to storage issues. The

use of field reference standard meters is easier and faster compared to the use of traditional field standards. The cost of using field reference standard meters and transporting them is much less than the cost of traditional field provers and standards.

Recognition in Handbook 44 will enable States to allow field reference standard meters to place systems into service and for field enforcement.

Volumetric field provers and gravimetric field proving are susceptible to environmental influences. The State of Colorado uses a field reference standard meter to test propane delivery truck meters. The State of Nebraska has used a field reference standard meter to test agricultural chemical meters. Other States have asked that there be recognition in NIST HB 44 in order for their State to allow the use of field reference standard meters.

In some applications, field reference standard meters are not more accurate than the meters used in the application. For that reason, longer test drafts and possibly more tests may need to be run.

The State of California is purported to have conducted a short study of field reference standard meters in the past. The conclusion did not lead to wide adoption of the practice.

Section 3.37 Mass Flow Meters user requirement U.R.3.8. Return of Product to Storage, Retail Compressed Natural Gas Dispensers requires that the natural gas which is delivered into the test container must be returned to storage. This is difficult and most often not complied with when the test vessel contents are released to atmosphere. States often have difficulties in remote locations finding suitable field reference equipment.

NIST OWM Executive Summary for MFM-15.1 – N.3. Test Drafts.

NIST OWM Recommendation: OWM believes that the purpose for this item, as specified by the submitter, is better addressed from a technical standpoint in Item Block 8.

- State and industry have a need to use various types of field test standards to evaluate commercial devices installed in the marketplace. NIST OWM recognizes the need to use various standards to test commercial devices and support the use of these standards when test data supports its use.
- The NIST OWM is also supporting the use of field test standards through the purchase of several meters and the collection of data throughout the U.S.
- The purpose statement for Item MFM-15.1 (Mass Flow Meters Code) indicates the goal of this item is:

“to amend Handbook 44 to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters.”
- The proposed changes in Items MFM-15.1 suggest changes to the *test draft criteria* for devices covered under this code, which is not necessary to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters.

NIST OWM Executive Summary for MFM-15.1 – N.3. Test Drafts.

- Amongst the concerns raised to the S&T Committee over the proposed changes for MFM-15.1, is the inability for an inspector or service company to test devices under their conditions of use and as required elsewhere in the MFM code.
 - Specifically, with the proposed addition of a paragraph N.3.2. Field Reference Standard Meter Test., no information or data has been provided to justify that:
 - a different test draft size than that specified in N.3.1. or the current Mass Flow Meter, NIST HB 44 paragraph N.3 Test Draft is necessary in order to use a “Field Reference Standard Meter.”
 - the current requirements for test draft “one test draft at the maximum flow rate of the installation and one test draft at the minimum flow rate” is appropriate for use when testing with a meter or volume prover.
 - This proposal creates two test draft paragraphs in NIST HB 44. It retains the existing criteria for the test draft and adds a proposal for a second test draft paragraph that states “the test draft shall be equal to or greater than the amount delivered in one minute”
 - It has been observed when testing CNG that some draft will take far less time than one minute. If the proposed test draft paragraph is added the test draft will not be achievable and as stated unable to test under conditions of use.
 - Since this proposal adds another test draft paragraph with the existing paragraph for test draft it also creates confusion as to what paragraph the inspector should apply.

As such, given the long debate over multiple iterations of the proposals, OWM proposes that since the purpose of the proposal is to allow field reference standard meters to be used to test and place into service dispensers and delivery system, and the responsibility for allowance of these field test standards are already addressed in the NIST Handbook 44 Fundamental Considerations and Item Block 8 clarifies these responsibilities, that Consideration be given to the proposal in Item Block 8 which clearly states the responsibility for allowance of field standards along with a new proposal to add a general code requirement.

- Note that Block 8 items clarify what has long been recognized in NIST HB 44 concerning the responsibility for acceptance of a standard making changes to specific codes such as those references in MFM-15.1 and is better addressed Block 8.
- Additionally, the Committee is aware that a new Form 15 has been submitted by Seraphin for the 2023 cycle proposing a new General Code paragraph which clearly references the Director’s authority as outlined in the Fundamental Considerations.
 - This not only avoids the need to specifically reference individual test methods in each specific code, it avoids the potential of implying that test methods not specifically referenced in a code would not be appropriate.

NIST OWM Executive Summary for MFM-15.1 – N.3. Test Drafts.
<ul style="list-style-type: none"> • <u>G-N.3. Test Methods. – Permissible test methods for verifying compliance of weighing and measuring systems with the provisions of the General Code and Specific Codes include, but are not limited to, test methods and apparatus that have been approved by the State Director of weights and measures as outlined in Appendix A - Fundamental Considerations, Section 3. Testing Apparatus.</u>

Item under Consideration:

Amend Handbook 44, Mass Flow Meters Code as follows:

N.3. Test Drafts.

N.3.1. Minimum Test - The minimum test shall be one test draft at the maximum flow rate of the installation and one test draft at the minimum flow rate. More tests may be performed at these or other flow rates. (See T.3. Repeatability.)

(Amended 1982 **and 20XX**)

N.3.2. Field Reference Standard Meter Test. – The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the flow rate being tested.

(Added 20XX)

NIST OWM Detailed Technical Analysis:

- Although this item has been on the agenda for a number of years, this item was group in a block of other similar items then removed from the block and placed back on the NCWM agenda as it originally appeared on the agenda.
- NIST OWM is working with States using Coriolis meters to collect data on the use of these meters as standards to test liquid measuring devices. This data will be shared with all regulatory officials to assist them with their approval of meters as standards.
- This purpose indicates its intent is to permit the use of field reference standard meters in field testing of commercial measuring systems.
- It is not necessary to reference “field reference standards” in a specific NIST HB 44 code in order to permit their use.
- Criteria for assessing the use of a given type of test standard are outlined in NIST HB 44 Appendix A Fundamental Considerations.
- The decision on whether or not to accept a particular test method for use in testing commercial weighing and measuring equipment ultimately rests with the regulatory authority.

- NIST OWM and Seraphin developed Block 8 items (GEN-19.1 and OTH-22.1) on the 2022 Annual Meeting Report to help clarify and provide additional information on field standard traceability and specifications, and the regulatory authority’s responsibility for approval of field standards.
- Specifically, with regard to the proposed addition of a paragraph N.3.2. Field Reference Standard Meter Test, no information or data has been provided to justify that:
 - a different test draft size than that specified in N.3.1. or the current Mass Flow Meter, NIST HB 44 paragraph N.3 Test Draft is necessary in order to use a “Field Reference Standard Meter.”
 - The current requirements for test draft “one test draft at the maximum flow rate of the installation and one test draft at the minimum flow rate” is appropriate is for use when testing with a meter or volume prover.
- This proposal creates two test draft paragraphs in NIST HB 44. It retains the existing criteria for the test draft and adds a proposal for a second test draft paragraph that states “the test draft shall be equal to or greater than the amount delivered in one minute”.
 - It has been observed when testing CNG that some draft will take far less time than one minute. If the proposed test draft paragraph is added the test draft will not be achievable.
 - Since this proposal adds another test draft paragraph with the existing paragraph for test draft it also creates confusion as to what paragraph the inspector should apply.

As such, given the long debate over multiple iterations of the proposals, OWM proposes that since the purpose of the proposal is to allow field reference standard meters to be used to test and place into service dispensers and delivery system, and the responsibility for allowance of these field test standards are already addressed in the NIST Handbook 44 Fundamental Considerations and Block 8 clarifies these responsibilities, that Consideration be given to the proposal in Block 8 which clearly states the responsibility for allowance of field standards along with the proposal to add a general code requirement.

Summary of Discussions and Actions:

In the fall of 2016, Mr. Keilty provided an update to the Item under Consideration. That update appears in the agenda. The previous proposed Item under Consideration was as follows:

N.3. Test Drafts. –

N.3.1. Minimum Test - Test drafts should be equal to at least the amount delivered by the device in one minute at its normal discharge rate.

(Amended 1982)

N.3.2. Transfer Standard Test. – When comparing a meter with a calibrated transfer standard, the test draft shall be equal to at least the amount delivered by the device in 2 minutes at its maximum discharge rate.

The submitter recommends that NIST update EPO 28 for CNG dispensers and EPO 26 for LPG Liquid Measuring Systems to include transfer standard meter tests. NIST Publication R 105-4 should also be revised to specifically address the transfer standard meter and the requirements for use.

The S&T Committee might also consider amending Sections 3.30 Liquid-Measuring Devices Code and 3.31 Vehicle-Tank Meters Code to allow transfer standard meters.

The Committee received written comments on all items in Block 4 and Block 5, as well as LPG-4 and MFM-2 emphasizing the need for there to be more study and discussion of the issues to assess the ramifications of all the proposed changes. The Committee also received written comments from the SMA that it looks forward to further information on these items and stating that it is important to be consistent in our use of terms across multiple sections of Handbook 44. The Committee agreed to carryover this group of items on its 2019 agenda to allow for further discussion and development of these proposals.

At the 2019 NCWM Interim Meeting, the S&T Committee decided to combine the items on the agenda dealing with the issue of transfer standard (including items already combined into blocks) into one block. Block 1 (New) of the Interim Meeting report now includes GEN-3, Block 1 (original items from the 2019 interim agenda that appeared under Block 1), Block 2, LPG-3, and MFM-5, which were all separate items and blocks of items on the S&T Committee's 2019 Interim Meeting agenda (NCWM Publication 15). Agenda items GEN-3, Block 1, Block 2, LPG-3, and MFM-5 are listed separately on the Interim agenda with a note added beneath each individual item referring the reader to the New B1 items. All items under this New B1 have retained the same numbering system for ease in referring to the appendix for discussion on each item.

At the 2019 NCWM Annual Meeting, Mr. Brett Gurney (NCWM Chair) commented regarding the formation of a Task Group assigned to further develop this block proposal. The TG is charged with providing definitions for various types of standards (transfer, field, reference, etc.) as well as the criteria to be met by these types of standards. The completion date given to the TG is July 2021. The Committee agreed to the Assigned status for this block of items and looks forward to hearing updates from the TG. The Chair of the Task Group was:

Mr. Jason Glass
Kentucky Department of Agriculture
(502) 573-0282, jason.glass@ky.gov

At the 2020 NCWM Interim Meeting, Chair Glass reported that the TG met prior to the NCWM Interim Meeting and has begun discussion of the items under Block 1. Mr. Glass stated that bi-weekly teleconference meetings were scheduled and that the group was optimistic but had significant work to accomplish.

Mr. Russ Vires (SMA) supports the Scale Item, SCL 18.1; in this block, Mr. Dimitri Karimov (Meter Manufacturers Association) supports the Task Group activities, Mrs. Tina Butcher (NIST OWM) was encouraged with the progress on terminology and provided an update on the Mass Flow Meter testing reporting that field testing was conducted October 28 to November 1, 2019, and that State and Industry participation included Colorado, Florida, Oregon, Emerson, and Tulsa Gas Technology.

Mr. Kurt Floren (Los Angeles County, California) raised concerns with GEN-19.1. regarding the definition of "Standard, Field" and its reference to "stable" standards and how long a standard is expected to be stable, which is typically 1-year, for which he believes should be longer. Mr. Floren also questioned the statement in the definition "tested over a range of environmental and operational conditions that the

measuring devices is used...”. Mr. Floren noted that he was unsure if all laboratories will have the capabilities to test over this wide range of conditions. Mr. Floren also expressed concerns with the definition “Standard, Transfer” citing that this standard may not meet the fundamental considerations requirement for standards over a long period of time or wide range of environmental conditions.

Mr. Steve Harrington (Oregon) echoed Mr. Floren’s comments. Field Standard TG Chair Glass responded that these are concerns of the TG and these issues will be discussed and considered as the TG develops these items.

During the Committee’s work session, the Committee agreed that this item should remain an Assigned Item.

At the 2021 NCWM Interim Meeting, the NCWM Field Standard TG Chair Glass provided an update on the Task Group activities. Mr. Glass reported that the field standard Task Group is following the activities of the NIST Master Meter Project and that the Task Group reviewed API specifications for use of master meters as a standard and a test protocol that will be used to ensure uniformity in collecting data on master meters used as field standards. Mr. Glass also reported that the TG does not have a recommendation for this item. Mr. Glass also reported that he would be stepping down as the TG Chair. Mr. Mike Keilty (Endress+Hauser AG) thanked Chair Glass and the TG for their work and requested that Block 1, LPG-15.1, N.3. and Block 1 MFM-15.1, N.3 be removed from Block 1 items and to allow those items to move forward separate from the other Block 1 Items. Mr. Keilty stated that similar language was added to the Hydrogen code and that the proposed language in LPG-15.1 N.3. and MFM-15.1, N.3 will allow for the recognition of master meters as field standards. Mr. Henry Oppermann (W&M Consulting) stated that data is needed to ensure that master meters can be used over a range of conditions. Mr. Bob Murnane (Seraphin) stated that jurisdictions have the ability to use meters and that Block 1 LPG-15.1, N.3 and Block 1 MM-15.1, N.3 should remain in Block 1 until data is available to support the use of master meters as a standard. Mr. Keilty mentioned that there has been useful dialog regarding master meters in the TG, but that he is concerned that the TG is not close to deciding and he expressed concerns with the TG’s focus on the NIST Master Meter Project. Mrs. Tina Butcher (NIST OWM) provided an update on the NIST Master Meter Project and noted that States have the regulatory powers to accept or reject a standard. She also mentioned that NIST is working with States to collect data needed to assess master meters and preliminary testing was conducted and data was collected on CNG at Tulsa Gas Technology’s facility in fall 2019. Ms. Diane Lee (NIST OWM) noted that NIST OWM feels that it is premature to add more language to the NIST Handbook 44 on master meters without data to support its use.

During the Committee’s work session, the Committee agreed to keeps all items in Block 1 and that this item should remain with an Assigned status.

At the 2021 NCWM Annual Meeting, Mr. Glass reported that he would be stepping down as the Field Standard TG Chair. The Committee heard updates from members of the Task Group during open hearings. Mr. Keilty noted that two of the items had been on the agenda since 2015 and requested that they be removed from the block and recommended recognizing the use of master meters. Other comments were to keep the items together until data is analyzed from the NIST Field Reference Standard Work Group to support the use of master meters but that if some items were removed from the block, all items should be removed from the block. Based on comments heard during the 2021 Annual Meeting, the S&T Committee recommended that all items that were included in Block 1 “Terminology For Testing Standards” that originally appeared as a separate item or a separate block of items on the S&T agenda in and prior to 2019, be removed from Block 1 “Terminology For Testing Standards” and appear as originally presented.

During the 2021 Committee work session the Committee recognized that the Task Group has accomplished all it is able to at this point and is recommending the Task Group be disbanded and will make said recommendation to the NCWM Chair. The Committee agreed to break all items in Block 1 into individual items and designate them all as Developing. The Committee thanks the Task Group and its members for their work.

At the 2022 NCWM Interim Meeting the Item under Consideration presented at this meeting is provided below.

N.3. Test Drafts.

N.3.1. Minimum Test - The minimum test shall be one test draft at the maximum flow rate of the installation and one test draft at the minimum flow rate. More tests may be performed at these or other flow rates. (See T.3. Repeatability.)

(Amended 1982 **and 20XX**)

N.3.2. Field Reference Standard Meter Test. – The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the flow rate being tested.

(Added 20XX)

During the 2022 Interim Meeting, Mr. Keilty shared a presentation on field standard meters relevant to both MFM 15.1 and LPG 15.1. The intent of the presentation was to describe initial and ongoing calibration traceability, compare OIML tolerances vs NIST Handbook 44, describe the benefits and show examples. An abbreviated copy of the presentation is available on the NCWM website in the interim meeting documents archive. Mr. Keilty commented that he believes MFM 15.1 and LPG 15.1 are fully developed and should receive Voting status for the annual meeting. He has updated the proposal to exclude the term “reference” from “field reference standard meter test”, as shown above. He requests that the Committee provide specific guidance if a Developing status is assigned. A comment from industry (Mr. Bob Murnane (Seraphin)) stated that N.3.2 in the proposal conflicts with the current code which states normal test drafts must be at least one minute at the maximum discharge flow rate of installation conditions. The current wording allows for a test to be conducted at any flow rate for one minute. There was concern from a regulator (Charles Stutesman, Kansas) echoing these concerns. Ms. Diane Lee (NIST OWM) requested that more data be made available so that NIST is able to compare worldwide data against test data compiled within the U.S. by NIST. Mr. Mahesh Albuquerque (Colorado) expressed support for this item to receive Voting status. Mr. Marc Butler (Emerson Micro Motion) expressed confusion at the two notes, thinking that perhaps they conflicted with each other; are they both needed or are they independent? Mrs. Tina Butcher (NIST OWM) expressed that she recognizes the use and importance of master meters but is concerned with the purpose of this item. Mrs. Butcher suggested that the statement for use be reworked as test draft criteria is so critical. Mrs. Butcher recommended and offered NIST OWM assistance on this item.

During the 2022 Interim Meeting, S&T Committee work session, the Committee recognized the submitters desire that a Voting status be recommended but determined that there were too many concerns and confusion expressed. The Committee recommended that the submitter develop the item further by aligning language to existing language in Handbook 44, clarifying the purpose to help avoid confusion of the new code on new equipment, and reaching out to NIST OWM or other industry or regulatory officials for feedback.

During the 2022 Annual Meeting, S&T Committee open hearings Mrs. Tina Butcher provided the NIST OWM technical analysis for this items when she address NIST OWM comments to LPG-15.1 and as addressed in this report she pointed out that a new general code requirement will be proposed for the new 2023 cycle that would not only avoid the need to specifically reference individual test methods in each specific code, it avoids the potential of implying that test methods not specifically referenced in a code would not be appropriate.

Further comments were provided that OWM believes that the purpose for this item, as specified by the submitter, is better addressed from a technical standpoint in Item Block 8 and that OWM proposes that since the purpose of the proposal is to allow field standard meters to be used to test and place into service dispensers and delivery systems, and the responsibility for allowance of these field test standards are already addressed in the NIST Handbook 44 Fundamental Considerations and Item Block 8 clarifies these responsibilities, that Consideration be given to the proposal in Item Block 8 which clearly states the responsibility for allowance of field standards along with a 2023 new proposal to add a general code requirement.

Mrs. Butcher also noted that State and industry have a need to use various types of field test standards to evaluate commercial devices installed in the marketplace and that NIST OWM recognizes the need to use various standards to test commercial devices and support the use of these standards when test data supports its use. But the proposed addition of another paragraph N.3.2 in the MFM Code that specifically references test draft for an individual test method (Field Standard Meter Test), potentially implies that test methods not specifically referenced in a code would not be appropriate.

The submitter of the item pointed out that the Central Weights and Measures Association recommended that the item move forward as a vote and noted that a presentation was given at the CWMA about using meters to test devices. Also, during open hearings, a weights and measures official spoke on the ease of use of meters to test device. Although NIST, OWM provided comments in support of the use of various standards to test commercial devices when data supports their use, and that the proposed paragraph N.3.2 in the MFM Code for this item would potentially imply that test methods not specifically referenced in a code would not be appropriate, the submitter of this item noted that he failed to understand why there was in opposition and asked States to support the item.

During the 2022 Annual Meeting, Committee work session, the committee agreed to a Developing status for this item based on the comments heard on this item.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Mr. Keilty stated that this is a companion item to LPG-15.1. and that this is enabling language to allow the use of field standard meters when testing Mass Flow Meters. Mr. Keilty requested a Voting status in 2022.

Mr. Bob Murnane (Seraphin) stated that he is not familiar with the term “field reference standard meter” and that a definition is needed if this term is used.

Ms. Diane Lee (NIST OWM) agreed with Mr. Keilty, that this is a companion item to LPG-15.1. and provided clarification to both items on the WWMA agenda. Ms. Lee noted that MFM-15.1 in the

WWMA agenda did not include its purpose statement. Ms. Lee noted that justification for the proposed language in MFM-15.1 N.3.2 “... minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the flow rate being tested” is needed because it is in conflict with the minimum measured quantity test in the Mass Flow Meter code when testing CNG. The proposed language in MFM-15.1 N.3.2. states that **any test draft shall be equal to or greater than the amount delivered in one minute** but from on-site field testing NIST OWM observed that the minimum measured quantity test for CNG takes far less time than 1 minute to complete

Mr. Keilty, addressing Ms. Lee, stated in 2016 there was supposed to be a vote and NIST Technical Advisers provided this information. There was a revision to the time to be extended. Mr. Keilty noted that CNG is completely separate, the EPO does say 1/3 but that was when CNG tanks were small (delivered at lower flow rate and shorter time). Mr. Wagner can verify. He further explained that 1 minute was selected because N.3.1 says one test draft at the maximum flow rate and one at the minimum flow rate of installation.

The WWMA S&T Committee recommended the status remain Developmental. The Committee recommended that consideration be made that this item be included in Block 5, as they refer to the same terminology in HB 44. A letter was submitted to the Committee by Mr. Keilty and will be posted to the NCWM website. NIST OWM also submitted analysis on this item which can be found at the following link on the NCWM website: <https://www.ncwm.com/annual-archive>.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing, Mr. Henry Oppermann (Seraphin) stated that this creates a conflict with the Mass Flow Meter code regarding the minimum measured quantity test. He also stated that he believes this item is unnecessary, because Field Standard Tests are already specified.

Mr. Keilty (submitter) suggested an editorial revision to striking the words “Reference” and “Meter” from “N.3.2. Field Reference Standard Meter Test.” in this proposal and moving it forward as a Voting Item.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open Hearing the following comments were heard.

Mr. Keilty commented and recommended a Voting status with the changes below.

N.3.2. Field Reference Standard Meter Test. – The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the flow rate being tested.
(Added 20XX)

Mr. Rick Harshman (NIST OWM) commented that discussions were had regarding states meeting the requirement of flow time that may be less than the one-minute flow in N.3.2. Mr. Keilty responded that new equipment is in place and will meet the requirement in N.3.2. Mr. Henry Oppermann (Weights and Measures Consulting) commented that some NTEP certificates may have been issued that would not meet the N.3.2 in this proposal.

The Committee would like to have clarification on questions regarding the current NTEP certs and test draft sizes that are currently being used.

The NEWMA S&T Committee recommended that this item remain in Developing status.

During the 2022 Annual Meeting open hearings Mr. Bob Murnane (Seraphin) commented that he does not believe this item is fully developed and recommended that the Committee consider withdrawing the item. Mr. Murnane read from submitted comments. Of note, Mr. Murnane indicated that under the Fundamental Considerations in NIST HB 44, the State Director has the authority to evaluate standards for use in certifying meters and the fear is that if this proposal goes through, the handbook will have to be changed for each new technology. Mr. Murnane explained that several states have already evaluated meters to use as standards and determined them to be accurate to use. If this proposal is adopted, Mr. Murnane believes that it would take powers away from State Directors to evaluate and use these standards. Mrs. Tina Butcher (NIST OWM) commented that the concept of master and reference meter is to use the meter as a standard in place of provers. The authority to use them rests with the State Director, however, there needs to be a method to ensure accuracy. Mrs. Butcher mentioned several alternatives as outlined in the submitted NIST analysis.

During open hearings, comments were heard from the floor regarding this item and LPG-15.1 at the same time.

After hearing comments from the floor, the Committee does not believe the item is fully developed, even though the item has been on the agenda for several years. The Committee recommended that the item be withdrawn.

Central Weights and Measures Association

During the 2021 Interim Meeting open hearings the Committee heard comments from the floor. Mr. Keilty asked that the item be moved to Voting and if not, asks for suggestions from the Committee on how to improve item. Mr. Henry Opperman (Weights and Measures Consultants) does not support the item. He stated that it does not explain mass flow meter as a standard and where is the data that supports this item. Mrs. Tina Butcher (NIST OWM) agreed with comments from Mr. Opperman. Mr. Charles Stutesman (Kansas) agreed with Mrs. Butcher but understands the submitting of this proposal and should be moved as a Voting Item.

CWMA S&T Committee recommended this item moving forward as a Voting Item.

At the 2022 CWMA Annual Meeting open hearings, Mr. Keilty explained that he presented calibration data at the 2022 NCWM Interim Meeting. He noted that no recommendations from NCWM have been released. Mr. Keilty Recommended a minor change that retains the word “meters” because it was confused how testing requirements would be applied. Both items explain the amount of test drafts that differ from other volume standards. Field standard meter provides flexibility for use across many different products and densities. Field Standards are tested against OIML and API standards using gravimetric methods that are NIST traceable. Accuracy and repeatability are long term, it is a maintenance free system with no moving parts. These systems save time and space, contain embedded diagnostics, are easy to use, and easy to maintain. It is easy to train the operator of these systems. NMI has issued a test report on this system. Various setups can be mounted to a rack and easily transported. SWMA and CWMA recommended this item move forward as a Voting Item in the 2021 Interim meeting. Recommending placing as voting today and move forward for a vote this week.

Mr. Jan Konijnenburg (NIST OWM) remarked that State and industry have a need to use various types of field test standards to evaluate commercial devices installed in the marketplace. NIST OWM recognizes the need to use various standards to test commercial devices and support the use of these standards when test data supports its use.

The NIST OWM is also supporting the use of field test standards through the purchase of several meters and the collection of data throughout the U.S.

The purpose statement for Item MFM-15.1 (Mass Flow Meters Code) indicates the goal of this item is:

“to amend Handbook 44 to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters.”

The proposed changes in Items MFM-15.1 suggest changes to the test draft criteria for devices covered under this code, which is not necessary to allow field reference standard meters to be used to test and place into service dispensers and delivery system flow meters.

Amongst the concerns raised to the S&T Committee over the proposed changes for MFM-15.1, is the inability for an inspector or service company to test devices under their conditions of use and as required elsewhere in the MFM code.

As such, given the long debate over multiple iterations of the proposals, OWM proposes that since the purpose of the proposal is to allow field reference standard meters to be used to test and place into service dispensers and delivery system, and the responsibility for allowance of these field test standards are already addressed in the NIST Handbook 44 Fundamental Considerations and Item Block 8 clarifies these responsibilities, that Consideration be given to the proposal in Item Block 8 which clearly states the responsibility for allowance of field standards along with a new proposal to add a general code requirement. (See Item Block 8 of the NIST OWM Analysis for the S&T Annual Meeting.)

Mr. Mike Johnson (Nebraska) supports this item and agrees with Mr. Keilty. Nebraska has had great success over the last 18 years using this method. Nebraska has over 300 mass flow meters and gravimetric testing is not practical.

Mr. Bob Murnane (Seraphin) stated purpose on these proposals to amend Handbook 44 and to allow field standards meters to be used to test and place into service dispensers and delivery system flow meters. The current language adding N.3.2., has nothing to do with the purpose statement nor does it have any effect at all on whether meters can be accepted or used as field standards.

Handbook 44 under fundamental considerations already allows for the use of field standards and /or equipment, as approved by the Director. There are already numerous meters in the field being used as standards that have been approved by State Directors under these fundamental considerations.

Note: Seraphin has a proposal, item OTH-22-1 that supports the Director’s authority.

What is the reason and justification for N.3.2 when we already have a test draft size in N.3.1?

What data and analysis has been provided regarding the uncertainties associated with the field standard meters and the sizes of the drafts proposed in N.3.2.?

The proposal MFM-15.1., N.3.2 would impose constraints on the capability of the W&M officials to test mass flow meters.

Under the current paragraph N.3., W&M officials can conduct tests at any flow rate for any quantity that is equal to or greater than minimum measured quantity (MMQ) specified by the manufacture of the meter.

Under the proposed N.3.2., the minimum size of the test drafts must be greater than or equal to the quantity delivered in one minute at the flow rate at which the test is being conducted. Depending upon the measurement application and the test equipment available, this could substantially increase the size of the required test drafts for almost all flow rates for mass flow meters.

Example: Recently there was CNG testing performed in Colorado. The test drafts were for 1/3 of the capacity of the test cylinder (as specified in the EPO) and it took less than one minute to complete. In this case the proposed change to the size of the test draft on MFM15.1. would have prevented Weights & Measures officials from conducting the tests.

Weights and Measures officials should be able to test mass flow meters using any test draft size, equal to or greater than the MMQ over the range of flow rates. I did not do an extensive review, but I did find six NTEP Certificates of Conformance that would not be able to be tested using the proposed MFM-15.1., N.3.2. What happens to them?

If the proposal were adopted with its current purpose statement it could be interpreted that every meter is acceptable for use as a field standard. How do you know which meters are acceptable for use as a field standard and which ones are not? For example, if a meter is brought into the United States from another country, can it be used as a field standard. This proposal will cause confusion for both Weights and Measure officials and testing companies.

Additional Notes:

NIST and Seraphin requested Mr. Keilty's participation in a meeting on these items and he declined. There has been a total of six changes to the wording on these items since they were introduced. Again, I would like to remind the Committee that States are already using meters as field standards and this is permitted by the existing fundamental considerations. There is no need for these proposals. Seraphin Test Measures opposes items LPG-15.1. and MFM-15.1 and asks the Committee to withdraw this item from consideration.

Comment: Years on an agenda are not part of criteria for deciding if an item should be made a Voting Item.

Mr. Charlie Stutesman (Kansas) provided comments regarding the Fundamental Considerations. He noted that States already have the ability to decide what's allowed. It already falls within The Director's authority, but we have other existing codes in HB 44 which reference transfer standards and specifically allowing their use for testing particular devices. The NIST EPOs are still in draft status and are a resource tool only. Flow rate will be more important going forward as gravimetric testing becomes more prevalent. He recommended sending to Voting status. Does this only apply to mass flow meters as the standard? NIST stated they are using Coriolis meters. But the decision to use non-mass flow meters as the field standard rests with The Director. This will apply to any meter technology, not just mass flow meters.

Mr. Keilty stated that other codes in NIST HB 44 contain advice on specific test drafts when using transfer standards. These proposals give test draft advice to handle slow flow devices. The EPO for CNG testing uses small containers but the EPO can be changed.

Mr. Ivan Hankins (Iowa) has witnessed these tests using these transfer standards at multiple flow rates and drafts. It took much less time. This technology will allow jurisdictions to test at a quicker pace, using less staff. He supports this proposal.

Mr. Murnane questioned if the draft size is merely a suggestion.

The CWMA S&T Committee recommended this moves forward as a Voting Item.

MFM-22.1 VC Table T.2. Accuracy Classes and Tolerances for Mass Flow Meters

(This Item was Adopted.)

Source: NIST Office of Weights and Measures

Submitter’s Purpose and Justification:

Currently Handbook 44, Section 3.37 Mass Flow Meters Code paragraph A.2. Vapor (Gases) recognizes measurements of hydrocarbon gases, but the code is silent to this product application in Table T.2 Accuracy Classes and Tolerances for Mass Flow Meters. This proposed modification to Table T.2 clarifies the tolerances the code developers intended to apply to hydrocarbon gas measurements. The amendment of Table T.2. will assist officials and industry by providing the exact tolerances applicable to hydrocarbon gas measurements and eliminate any need to borrow tolerances established and deemed appropriate for similar gas applications in this code (i.e., compressed natural gas) or from other code sections.

NIST OWM Executive Summary for MFM-22.1 – Table T.2. Accuracy Classes and Tolerances for Mass Flow Meters.				
NIST OWM Recommendation: OWM believes this item is fully developed and ready for a vote.				
<ul style="list-style-type: none"> • This is a housekeeping item that clarifies the original tolerances (i.e., 2.0 percent and 1.0 percent) intended to apply in the dynamic measurement of hydrocarbon (HC) vapor products. • Hydrocarbon vapor products application which has been recognized and remains unchanged in Application Section paragraph A.2. Vapor (Gases) of the MFM Code since the code was first adopted in 1991. • The proposal places the family of HC vapor products under an accuracy class designation (i.e., 2.0) which is required marking information specified in paragraph S.5.(e) Markings since January 1, 1995. 				

Item under Consideration:

Table T.2. Accuracy Classes and Tolerances for Mass Flow Meters

Accuracy Class	Application or Commodity Being Measured	Acceptance Tolerance	Maintenance Tolerance	Special Tolerance
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2.0	- Compressed natural gas as a motor-fuel	1.5 %	2.0 %	2.0 %

Accuracy Class	Application or Commodity Being Measured	Acceptance Tolerance	Maintenance Tolerance	Special Tolerance
	<u>- All other hydrocarbon gases and any other hydrocarbon gas/air mix applications not shown in the table</u>			
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NIST OWM Detailed Technical Analysis:

Prior to the NCWM amending the MFM Code in 1994 to introduce a new table format for tolerances, the code recognized maintenance and acceptance tolerances of 0.5 percent and 0.3 percent of the measured quantity for liquid-measuring devices and 2.0 percent and 1.0 percent for vapor-measuring devices, respectively.

The newly formatted table of tolerances did not include the hydrocarbon vapor products application which has been recognized and remains unchanged in Application Section paragraph A.2. Vapor (Gases) of the MFM Code since the code was first adopted in 1991.

This proposal is a housekeeping item that clarifies the original tolerances (i.e., 2.0 percent and 1.0 percent) intended to apply in the dynamic measurement of hydrocarbon (HC) vapor products which should have carried over from the original performance requirements in paragraph format into the table format introduced in 1994. Consistent with the practice for other metered products throughout the MFM Code, the proposal places the family of HC vapor products under an accuracy class designation (i.e., 2.0) which is required marking information specified in paragraph S.5.(e) Markings since January 1, 1995.

During the 2022 CWMA Annual Meeting, industry questioned whether the proposed tolerances would apply to hydrogen mixed with compressed natural gas (CNG). The proposal is intended to address all other hydrocarbon gases and any other hydrocarbon gas/air mix applications envisioned by the developers of this code. The specific blend ratios and the application for the blended product was not stated. Compressed natural gas (CNG)/hydrogen (H2) blended products for vehicle fueling do exist although the applicable tolerances for CNG are 1.5 % and 2.0 %, and those for hydrogen gas (See HB 44 Section 3.39 Hydrogen Gas-Measuring Devices Code) are 5.0 % and 7.0 %, respectively for type evaluation/new equipment and equipment in use. At this time CNG and hydrogen fall into two different product categories. The hydrogen code is intended to apply to hydrogen gas with a hydrogen fuel index above 99.97 % so it appears the MFM Code would be the code that applies to CNG/hydrogen blends. This might be a case where at certain CNG/hydrogen blend ratios (by mass) further examination of data on the meter’s performance might be warranted.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, based on comments in support of this item heard during the open hearings, the Committee recommended this item move forward with Voting status.

At the 2022 NCWM 2022 Annual Meeting, Ms. Tina Butcher (NIST OWM) noted the proposal is a housekeeping item to address the unintended gap in tolerance for hydrocarbon vapor products

applications in the MFM Code. Mr. Dimitri Karimov (MMA), Mr. Kevin Schnepf (California DMS) and Mr. Marc Buttler (Emerson) indicated their support for the proposal as written.

Hearing no opposition or proposed modifications, Agenda Item MFM-22.1 was made part of the Voting Consent Calendar where it was successfully adopted as written.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 Annual Meeting Open Hearings the following comments were heard:

Mr. Matt Douglas (California - DMS): The language is clarifying. CA DMS supports this item. Mr. Keilty stated other gasses (hydrocarbon gasses). Solves issue with blended gasses. He supports this item.

The WWMA S&T Committee recommended that this item be assigned a Voting status. The Committee agreed that this item has merit and is fully developed.

Southern Weights and Measures Association

During the 2021 Annual Meeting Open Hearing Mr. Keilty commented that this item is a simple language cleanup from NIST, and that he supports moving it forward as a Voting Item. This committee recommended moving this item forward as a Voting Item.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting, the following comments were heard. Ms. Juana Williams (NIST OWM) commented that this is a housekeeping item that adds clarification.

Mr. Keilty, Lou Sakin (Hopkinton/Northbridge, Massachusetts), and Jim Willis (New York) agreed with and recommended Voting status for this item.

The NEWMA S&T Committee recommended that this item be moved forward with a Voting status.

During the 2022 NEWMA Annual Meeting the following comments were heard during open hearings.

Mrs. Butcher commented that this is a housekeeping item. The intent of this item is to add reference to all hydrocarbon gasses and mixtures to the tolerance table as they were inadvertently omitted during previous updates to this section of the handbook.

After hearing comments from the floor, the Committee considered the item to be fully developed and recommended that the item retains Voting status.

NEWMA recommended this proposal as a Voting Item on the NCWM agenda.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting open hearing the Committee heard comments from the floor. Mr. Keilty asked that item be moved to a Voting Item.

CWMA S&T Committee recommended this item move forward as a Voting Item.

During the 2022 Annual Meeting Open Hearing the following comments were heard during the open hearing session. Mr. Keilty remarked the proposed table T.2. mentions hydrogen. Hydrogen is a separate section. Would this apply to hydrogen mixed with CNG? Asked for explanation from NIST. Please note that NIST OWM under the “NIST OWM Detailed Technical Analysis” heading shown above addressed several critical points on the dispensing of blended CNG and hydrogen products. Blends would not conform to the fuel quality standards specified in Section 3.39 Hydrogen Gas-Measuring Devices Code. These types of blended products would fall under the MFM Code although extensive data is not available to demonstrate device performance when metering blends that exceed 10 % hydrogen. This data may be necessary to ascertain if the current MFM Code adequately addresses blended products containing greater than 10 % H₂ to CNG by volume given some of the unique properties of hydrogen.

The CWMA S&T Committee recommended this moves forward as a Voting Item.

EVF – Electric Vehicle Fueling Systems

EVF-21.1 D A.1. General

Source: ABB, BTCPower, Electrify America, Edison Electric Institute, EVConnect, EVgo, Greenlots, Rivian, Siemens, Tesla, Tritium

Submitter’s Purpose and Justification:

To provide clarity on how Handbook 44, Section 3.40. tentative code will apply to existing EVSE that are in the ground before it becomes effective by identifying which elements are non-retroactive.

While it is important to ensure that consumers are receiving accurate and transparent information regarding the accuracy of EV charging stations, the cost to retrofit existing stations that often do not include an integrated meter, especially Direct Current Fast Charger (DCFC) where commercial DC metering technology is not readily available today, will be cost prohibitive. In California Initial Statement of Reasons (ISOR) for adopting specifications and tolerances requirement for commercial EVSE, California estimated that it costs approximately \$4,500 to upgrade existing Level 2 stations and \$20,000 to upgrade existing DCFC. To put this into context, California DMS utilized 2015 DOE data stating that the average commercial Level 2 EVSE costs between \$3,000 to \$6,000 and the average DCFC up to \$40,000 or more. The retrofit costs would represent a significant investment amount that does not seem warranted. The ISOR is available here:

https://www.cdfa.ca.gov/dms/pdfs/regulations/EVSE_ISOR.pdf. According to DOE Alternative Fuel Data Center (AFDC) station locator there are 23,000 level 2 station with 66,000 connectors in the U.S. and 3,700 DCFC stations with 14,000 connectors. Being conservative and utilizing just the number of stations, it would cost \$92 million to upgrade the existing Level 2 stations in the U.S. today and \$74 million to upgrade the existing DCFC stations, a number that is expected to grow as more stations are deployed. Placing this excessive upgrade burden on manufacturers and network operators is not feasible and an alternative pathway needs to be explored to ensure consumer transparency and EVSE accuracy for existing stations without requiring extensive retrofits. This number also does not include the amount of public funding across various states that has been invested in these EVSE that would prematurely be ripped out and replaced. It could also have the unintended consequence that the EV industry stops charging for charging services at existing sites or shut them down if the investment in

retrofits is greater than the benefit of continuing to operate. Stranded assets across the country are a valid concern and should not be taken lightly. It is important to not prematurely replace EVSE in the field until the useful life of the system has been obtained. Spending a significant amount of capital to upgrade existing stations rather than investing in new infrastructure does not appear aligned with EV deployment goals. Therefore, it is recommended that there is consideration for making sure requirements are non-retroactive and there is a phase in timeline for existing stations. The language utilized above is similar to what California DMS implemented, which was the first state to adopt a version of NIST Handbook 44 Section 3.40. for EVSE. The date for DC EVSE is set at January 1, 2023, to match California's timeline but also because this is when DC metering technology is expected to be commercially available in the market and integrated into DC EVSE by most EVSE manufacturers that are either working on their own product or with third party meter manufacturers.

In general, it appears that there is some openness to considering how legacy EVSE that are in the ground today should be treated when considering that DC metering technology integrated into the EVSE was not commercially available when many of these stations were developed. The main concern that has been raised is regarding whether there should be an overall exemption for existing EVSE to the measurement provisions in HB 44 Section 3.40. or whether existing EVSE should be exempt from certain requirements in the subsections of Section 3.40. that are not feasible to attain. In reviewing the subsections of Section 3.40., the proposal submitters determined that it would not be feasible to meet most subsections of Section 3.40. with equipment that is in the ground with the exception of paragraphs S.5 Marking (except S.5.2) and S.6 printing requirements. To ensure there is not confusion between which stations were in the ground prior to dates referenced above, EVSE owners and operators will need to work with local weights and measures officials on a self-reporting mechanism or some other mechanism for tracking station service dates. California will be the first state that will need to determine how this process will operate in the field given it has already adopted the exemption noted above and compliance for new AC stations is effective January 1, 2021. On the consumer side, EVSE operators and owners today can provide certain provisions to ensure the accuracy of the commercial transaction that can be facilitated outside of having a meter integrated into the EVSE. For instance, some owners and operators may be able to utilize the accuracy that is traceable via the measurement technology in the EV that accounts for any losses and ensure the consumer is being accurately and fairly billed for what he or she is receiving.

The submitter requested Voting status for this item in 2021.

NIST OWM Executive Summary for EVF-21.1 – A.1. General

NIST OWM Recommendation: OWM believes this item requires further development. Rather than proposing an exemption for all requirements in NIST Handbook 44, Section 3.40. EVFS Tentative Code, OWM recommends the submitters propose modifications to specific requirements to provide for alternative means of compliance. OWM acknowledges the submitters have been diligently working with the NIST USNWG's EVFE Subgroup to identify possible alternatives for the submitters since they requested the Subgroup and the weights and measures community review their proposals.

- The proposal, if adopted as written, would mean an entire generation of devices would be permitted to operate for a 10-year period without having to comply with any HB 44 Section 3.40 requirements for indications, receipts, accuracy, security for metrological features, specific code markings, etc. for what may well be the lifetime of the device.
- To allow such a blanket exemption does a disservice to the electric vehicle refueling industry and would be viewed as competitively unfair to traditional and other alternative vehicle fueling

NIST OWM Executive Summary for EVF-21.1 – A.1. General

applications which are required to comply with similar requirements or EVSE manufacturers who are spending money to comply with current requirements.

- The submitters need to consider that, even if an effective date is added to an entire device-specific code, Section 1.10 General Code requirements will still apply.
- The submitters made alternate proposals available to the EVFE Subgroup in January 2022 and April 2022. These alternate proposals do not include any modifications to paragraph A.1. General as shown in the Item under Consideration.
- The EVFE Subgroup's discussions have been ongoing in their review of the submitters latest proposals which are intended to replace S&T Agenda Items EVF-21.1 and EVF-21.5. The EVFE Subgroup has not reached a consensus on the submitters' latest proposals which were revised to address specific features such as the indicating element, identification/marketing information, as well as general and type evaluation tolerances.

Item under Consideration:

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.1.1. Effective Dates for DC EVSE – All DC EVSE used for commercial purposes and put into service on or before January 1, 2023 are exempt from this standard for a period of 10 years from the date put into service. comply

A.1.2. Effective Dates for AC EVSE – All AC EVSE used for commercial purposes and put into service on or before January 1, 2022 are exempt from this standard for a period of 10 years from the date put into service.

NIST OWM Detailed Technical Analysis:

As the weights and measures community continues to consider proposed new paragraphs A.1.1 and A.1.2 which would exempt EVSEs from all NIST HB 44 Section 3.40 requirements based on the dates these systems were placed into commercial use, NIST OWM would like to note the following concerns:

As worded the proposal is: (1) unclear on the exact type of use that entitles an EVSE to an exemption from all code requirements and also (2) in conflict with General Code paragraph G-A.6. Nonretroactive Requirements.

The proposal, if adopted, would mean an entire generation of devices will be permitted to operate for a 10-year period without having to comply with any HB 44 Section 3.40 requirements for indications, receipts, accuracy, security for metrological features, specific code markings, etc. for what may well be the lifetime of the device.

To allow such a blanket exemption does a disservice to the electric vehicle refueling industry and would be viewed as competitively unfair to traditional and other alternative vehicle fueling applications which are required to comply with similar requirements or EVSE manufacturers who are spending money to comply with current requirements.

The submitters need to consider that, even if an effective date is added to an entire device-specific code, Section 1.10. General Code requirements will still apply.

For jurisdictions that don't automatically adopt the current version on NIST Handbook 44, this window of time during which noncompliant devices can continue to be installed will be even longer.

The USNWG EVF&S that developed the EVFS Code and modified the Timing Device Code (to recognize EVSEs) has been widely advertised and all stakeholders (including EVFS OEMs) encouraged to join. Many companies have been an integral part of the development of these requirements and have expended considerable funds to bring their equipment into compliance at a competitive disadvantage if a large group of competing devices were to be exempted from the requirements.

The proposal describes the marketplace as having "existing stations that often do not include an integrated meter" which might be an indication that available EVSEs placed into commercial use before the proposed enforcement date will have limited or no legal metrology components. In this case a notice is necessary for consumers that purchasing electricity from one site does not provide the same assurance of accuracy that is provided at another site.

If there are concerns about specific provisions in the code, these need to be addressed by making specific sections "nonretroactive" with sunset dates, not by exempting the device from the requirements of the specific code in entirety. Factored into any enforcement dates should be the fact that the EVFS codes have been available for over seven years (and was under development by regulators and industry for three years prior to that).

Throughout 2021 up through June 2022 NIST OWM has recommended the submitters revise their 2021 proposals to address concerns previously expressed by the USNWG EVF&S's EVFE Subgroup and weights and measures community prior to submission of any alternate proposals for a review of the EVFE Subgroup.

The submitters provided updates to the community in July 2021 about their work to revise the proposals in NCWM S&T Committee Agenda Items EVF-21.1 A.1. General and EVF-21.5 T.2. Load Test Tolerances. Their work was completed in early November 2021.

On November 20, 2021, NIST OWM provided input on the submitter's alternate proposal. This revised proposal modifies five NIST Handbook 44 Section 3.40 EVFS requirements (that address indicating elements, sealing, identification/markings, and tolerances). The submitters and NIST OWM met on December 7, 2021 to discuss NIST OWM's preliminary review and adjustments suggested for the alternate proposal. Subsequent revisions by the submitters of their alternate proposals were also made available to the EVFE Subgroup in January 2022 and April 2022. These alternate proposals do not include any modifications to paragraph A.1. General. The EVFE Subgroup's discussions have been ongoing in their review of the submitters latest proposals which are intended to replace S&T Agenda Items EVF-21.1 and EVF-21.5. The EVFE Subgroup had not reached a consensus on the submitters' latest proposals.

NIST OWM is aware of the submitters' November 15, 2022, email sent to the NCWM S&T Committee where the submitters recommend withdrawing Items EVF 21.1 and EVF-21.5 given new proposal EVF-23.6 reflects feedback on these 2021 proposals and the significant changes to the proposals since August 2020 (as well as the EVSE code becoming permanent). The submitters are also supportive of designating EVF-23.6 as a voting item. At this stage, there are a number of points to be considered given the lengthy deliberations over the course of the past three years by the EVFE Subgroup on EVF-21.1 and other alternative proposals developed by the submitters, as well as the significant differences between the enforcement dates and conditions applicable to DC Systems in 2023 Agenda Item EVF-23.6. In contrast to the Subgroup June 2022 alternate proposal for DC tolerances and corresponding marking requirements applicable based simply on a 2024 installation date. The proposed conditions in Item EVF-21.1 for a blanket exemption from the entire code for ten years being replaced by Item EVF-23.6 where a DC system's compliance involves certification/installation/multiple enforcement dates raises the question would any of these latest proposed options be conducive to a straightforward and orderly implementation of the EVFS Code? Possibly the EVFE Subgroup's alternate proposal with some refinement is the most viable option.

Summary of Discussions and Actions:

At the 2021 NCWM Interim Meeting, Mr. Samuel Ferris (California) supported Developing status but noted that an exemption from requirements in the handbook is not common and that the life span of the equipment may only be seven to ten years. Ms. Francesca Wahl (Tesla) and Mr. Keith Bradley (Electrify America) supported Developing status. Ms. Wahl supported this item. Mr. Kevin Miller (Charge Point) expressed concerns with allowing an exemption for 10-years and equipment should be able to meet the requirements and supports a Developing status for this item. Ms. Diane Lee (NIST OWM) noted that the proposal is not clear as written and expressed concerns with an exemption for 10 years.

The Committee assigned Developing status for this item. For more information or to provide comment, please contact:

Ms. Francesca Wahl
Tesla
(650) 435-0422, fwahl@tesla.com

The Committee suggested that the submitters of this item consider the responses to the proposal from the regional meetings, NIST OWM and the EVFE Subgroup and update the Item under Consideration to address the comments and as necessary prepare a revised proposal for the EVFE Subgroup to address the concerns with this item.

At the 2021 NCWM Annual Meeting, Ms. Wahl noted that she will be working to incorporate feedback and will work with the EVFE Subgroup to develop an updated proposal. Ms. Wahl also provided a letter to the S&T Committee concerning the Developing status for this item. Ms. Juana Williams (NIST OWM) stated that the proposal was unclear as to the exact type of use that entitles an EVSE to an exemption to NIST HB 44 requirements. Ms. Williams also pointed out that the exemption would allow a generation of devices to operate for 10-years without having to comply with the requirements and could be viewed as competitively unfair to traditional or other alternative vehicle fueling applications.

At the 2022 NCWM Interim Meeting, a regulator from Nevada supports Developing status. A regulator from New York supports Developing status and looks forward to reasonable modifications of the proposal by the submitter. New York does not favor a 10-year grace period and wishes for a permanent code status. A regulator from California DMS recommended withdrawing the proposal; however, stated a

Developmental status is acceptable. A regulator from New York would like to see a permanent code in the device area of EVFSs and stated the 10-year exempt period is not acceptable. The commentor stated he is supportive of seeing reasonable changes from the joint submitters.

A member of the submitting group recommended Developing status and provided background and stated they are working on revised draft for proposal. The submitters worked with NIST OWM and EVFE Subgroup for feedback. The commentor stated a revised proposal will be developed and noted there are significant modifications from the original proposal. A member of industry representing Electrify America, commented Section 3.40 in Handbook 44 was developed before the company was established. A revised proposal is expected to be submitted. The industry representative recommended the item remain a developing item. A member of industry representing EVgo, a joint submitter of the proposal recommended Developing status. A member of industry representing ChargePoint is not in support of this item and recommended withdrawing the proposal. He stated the proposal signals to the market things are in flux and supports removal of the proposal and tentative code status. The industry member noted the recent passage of the law providing \$7.8 billion in funding to invest in U.S. EV charging infrastructure.

An advisory member representing NIST OWM stated the current proposal conflicts with the NIST HB44 General Code for the term retroactive. The representative stated the submitters of the item discussed an alternative proposal with NIST OWM and they are awaiting a final draft of this alternative proposal.

The Committee maintained the Developing status for this item. The Committee suggested the submitters take into consideration the comments provided during open hearings and prepare a revised draft proposal to NIST OWM, the EVFE Subgroup, etc. to provide a comprehensive proposal to the membership.

NCWM 2022 Annual Meeting, Ms. Wahl indicated the developers of the agenda item are working to address problems encountered with the requirements by the upcoming standards development cycle and before the code gains permanent status. Mr. Kurt Floren (Los Angeles County, California) had a question regarding whether amendments to the code would be entertained prior to the code becoming permanent. A priority item recommending the EVFS Code be upgraded to permanent status was approved late June 2022 and included as a Voting Item on the July 2022 S&T Committee's Agenda. There is already a Voting Item, this proposal and a second unresolved proposal as well as ongoing work and deliberations in the community to further refine specific tentative EVFS code requirements. Adoption of the Priority Item resulted in amending NIST Handbook 44 Section 3.40 Electric Vehicle Fueling Systems – Tentative Code to: (1) change the code's status to permanent effective January 1, 2023, and (2) modification of paragraphs S.2.7. Indication of Delivery, N.5.2.(b) Accuracy Testing; For DC systems, and T.2.1. EVSE Load Test Tolerances to include a statement that makes these three requirements applicable to DC systems on or after January 1, 2028. This agenda item, EVF-21.1 remains unchanged and will carry over to the 2023 standards develop cycle under the development of the submitters.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearing the following comments were heard:

Mr. Justin Wilson (ChargePoint) pointed out that in the notes for 2021 (Interim Meeting) there is an error making the notations incorrect. They recommended withdrawal of this proposal. They think the flexibility should be provided to state officials.

Mr. Kevin Schnepf (California DMS) extended exemptions are not appropriate - this is still a tentative code. This proposal should be withdrawn.

The WWMA S&T Committee recommended this item be withdrawn. The Committee made this recommendation based on testimony heard during the open hearings and previous reports including recommendations from other Regions.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting open hearing, the Committee received no comments on this item. The Committee recommended this item be withdrawn due to the item allowing a 10-year exemption.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open hearings the following comments were heard.

Ms. Wahl speaking on behalf of the submitters group of EVSE companies, asked for time for further development as the submitters work with the national work group to develop language that will satisfy regulators in-regards to time frames of implementation dates. Mr. Alex Beaton (EVgo) supported Ms. Wahl's comments and supports a Developing status.

Ms. Juana Williams (NIST OWM) commented with regard to blanket exemptions that release devices from compliance for such an extended period-of-time seemed too long. (See NIST comments on NCWM website.)

The NEWMA S&T Committee recommended that this item remain in Developing status.

During the 2022 NEWMA Annual Meeting Open Hearing Mrs. Tina Butcher (NIST OWM) commented that this item was originally submitted by a group of manufacturers. The item was provided to the EVFE Subgroup for their input. The submitters received feedback and have been working to address comments from national and regional levels. Mr. Beaton (EVgo) commented as one of the submitters. He indicated that the submitters heard feedback from regulators regarding the originally proposed 10-year exemption for EV meters and has modified the proposal. For DC meters, the submitters are looking to propose that all meters manufactured prior to 2024 will be subject to 5 % accuracy tolerance and those manufactured after 2024 will be subject to a 1 % accuracy tolerance. Both percentages for accuracy have been supported by data. For AC meters, Mr. Beaton indicated that prior changes to the proposal have been removed as the submitters believe with calibration, all meters can meet current code. Mr. Beaton believes the updated proposal will be available prior to the 2022 Annual Meeting.

After hearing comments from the floor, the Committee recognized the need to further develop this item and recommended the item retain Developing status. The Committee suggested that the submitters continue to work with regulatory stakeholders and share data in order to further the development of the item and urges the timely submission of proposals for the Committee to review prior to annual and interim meetings.

NEWMA recommended this proposal as a Developing item on the NCWM agenda.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting Open Hearings, the Committee heard comments from the floor. Mrs. Butcher had not seen a revised proposal from the submitters. The submitters recommended the item stay Developing.

CWMA S&T Committee recommended the item stay Developing.

During the 2022 Annual Meeting open hearings, Ms. Wahl is working with NIST EVFE Subgroup to revamp the proposal and focusing on DC. Ms. Wahl wants the proposal to retain Developing status. Ms. Wahl supports the current NIST HB 44 3.40 tentative code's acceptance in the very near future.

The CWMA S&T Committee recommended this item remain as a Developing item per the request of the submitter.

CWMA recommended this proposal as a Developing item on the NCWM agenda.

EVF-20.1 V S.1.3.2. EVSE Value of the Smallest Unit

(This Item was Adopted)

Source: NIST Office of Weights and Measures

Submitter's Purpose and Justification:

Specify the maximum permissible value of the indicated and/or recorded electrical energy unit by an EVSE. Establish a value for the energy unit of measurement (kilowatt-hour) that is suitable for all commercial transactions and does not significantly lengthen the time (by a factor of 25) to conduct a test of an EVSE.

NIST OWM Executive Summary for EVF-20.1 – S.1.3.2. EVSE Value of the Smallest Unit

NIST OWM Recommendation: OWM believes the USNWG EVFE Subgroup's "Option 3" alternative to the Item under Consideration as outlined in this analysis provides for a more appropriate resolution for AC and DC systems and will help lessen rounding errors and confusion about the transaction.

- Based on findings over the past six years on the actual power capacity ranges EVSEs operate at and other standard practices in fueling EVs the EVFE Subgroups has deliberated to arrive at an alternate proposal to replace the current Item under Consideration in EVF-20.1.
- At minimum the May-June 2022 EVFE Subgroup's proposed modifications that further refine paragraph S.1.3.2. EVSE Value of Smallest Unit should be adopted in July 2022. The Committee is also requested to consider proposed modifications to seven additional paragraphs and elimination of a definition for inclusion in EVF-20.1.
- These latest proposed modifications to paragraph S.1.3.2. are similar to a suggested alternative proposal the NCWM S&T Committee reviewed in January 2022. This alternate rework of

NIST OWM Executive Summary for EVF-20.1 – S.1.3.2. EVSE Value of the Smallest Unit

paragraph S.1.3.2. more appropriately recognizes the differences in AC and DC systems such as power levels.

- The EVFE Subgroup's alternate reworked proposal (OPTION 3 below) includes a higher resolution for the AC system's displayed kWh (0.0001) but maintains the current handbook kWh (0.001) display resolution for a DC system;
 - further refines requirements for the expression of the kWh (as a value of 1) to lessen rounding errors and confusion about the transaction; and
 - The U.S. standard will follow the SI practice of recognizing only the kWh for electrical energy in EV charging, so the megajoule will be no longer recognized in the EVFS Tentative Code.
- NIST OWM concurs with the EVFE SG's findings and its rework of paragraph S.1.3.2. EVSE Value of Smallest Unit (OPTION 3 below) and seven additional EVFS - Tentative Code requirements and elimination of an electrical energy related definition. NIST OWM supports the EVFE SG proposed modifications to paragraphs: S.1.3.1. EVSE Units of Measurement; S.2.5.1. Money-Value Divisions Digital; S.8. Minimum Measured Quantity (MMQ); and removing unwarranted paragraphs N.1. No Load Test; N.2. Starting Load Test; T.5. No Load Test; and T.6. Starting Load..

Item under Consideration:

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, ~~shall be 0.005 MJ or 0.001 kWh:~~

(a) for AC systems shall not exceed 0.0001 kWh;

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

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

(Amended 2022)

The NCWM S&T Committee moved forward for adoption of the EVFE Subgroup's recommendation for also modifying paragraph S.1.3.1. EVSE Units of Measurement to eliminate the use of the megajoule unit of measurement for consistency in the unit recognized in paragraphs S.1.3.1. and S.1.3.2. to read:

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

(Amended 2022)

NIST OWM Detailed Technical Analysis:

In 2020 NIST OWM went forward with the proposed value (i.e., 0.0005 MJ [0.0001 kWh]) because during the 2014 USNWG EVF&S deliberations on the draft code, industry representatives indicated that the size or value of the electrical energy smallest unit of measurement could be inexpensively modified and to align U.S. EVSE design requirements with the EVSE code about to be adopted by California.

NIST OWM notes that the USNWG's EVF&S Electric Vehicle Fueling Equipment Subgroup did not reach a consensus on the proposed or alternate language for this agenda item. On July 7, 2020, the subgroup assigned the proposal to a new subcommittee chaired by Dr. William Hardy to fully address the effect of the EVSE's display resolution and MMQ size on the testing time for AC and DC systems. The proposal remained in subcommittee. Chair Hardy made several preliminary modifications to paragraph S.1.3.2. The EVFE Subgroup requested input from all sectors (OEMs, Regulators, Consumer Associations, Operators) on their perspective from an ease of testing standpoint, transparency, and for easy comparison to other traditional and alternative vehicle fueling applications, what should the maximum or fixed increment size be for sales of electrical energy vehicle fuel (in the XXXX.X kWh)? Beyond California advocating a higher resolution and New York finding the current increment size as workable no further input has been received. By close of 2021 no weights and measures laboratory/agency had conducted testing on DC systems due to the unavailability of test apparatus.

NIST OWM recognized the proposal's status remained developing throughout 2020-2021 but noted that California adopted and is now enforcing its permanent EVFS Code that requires the smallest unit of electrical energy indicated and recorded be in higher resolution increments either equivalent to, but not greater than 0.0001 kWh. As of December 2021, California had issued certificates of type approval to eleven models of EVFSs, eight for systems designed with a 0.0001 kWh and three with a 0.000001 kWh electrical energy unit of measurement. OEMs seeking NTEP and California type approval must design a system that has a fixed 0.001 kWh increment for national approval and for systems in commercial use in California the value of that measurement unit shall not exceed 0.0001 kWh.

Other NIST Handbook 44 measuring devices' codes specify the value of the unit permitted for the display and indication of a delivered or dispensed quantity. In all cases that value shall not be exceeded (i.e., prescribes a maximum numerical value where a lesser value is also permissible) and is suitable for each device-specific application.

After its July 2021 reevaluation of the proposed modifications to this EVSE provision in paragraph S.1.3.2, NIST OWM is renewing its support for the proposal that currently appears in EVF 20.1 Item under Consideration. In that same spirit NIST OWM also has developed an additional recommendation, a proposed new subparagraph S.1.3.2, which is consistent with the language in other code sections' corresponding requirements which prescribe specific values for indicating units. The newly proposed paragraph is a better option for addressing OWM's earlier concerns about value comparisons and clarity of electrical energy sales when computing and rounding transaction information if an EVSE were ever designed with an electrical energy unit value expressed as 3, 7, or 9. Also now in question would be the expression of the unit in any other numerical value that might introduce questions about rounding calculations and the transparency of the transaction. NIST OWM recommends the community reconsider the original proposed modifications of paragraph S.1.3.2 which does not limit the electrical energy unit to being expressed only as a single fixed numerical value but permits a manufacturer to design a display that measures in a numerical value of 0.0005 MJ or 0.0001 kWh or some other numerical value as long as the chosen value does not exceed those MJ or kWh maximum values specified in paragraph S.1.3.2. Whatever, the quantity unit value it would remain unchangeable during the commercial use of the system or dispenser. Also, the test apparatus' display resolution must be suitable and does not use up the

allowable error for the EVSE under test. The current proposal does not specify a different value for the smallest display unit for DC systems. However, the USNWG EVFE Subgroup's Technical Advisor was advised that the handbook's current required value of 0.001 kWh might be more suitable for DC systems. NIST OWM has revised its earlier proposal and recommends an alternate paragraph S.1.3.2 to include two new subparagraphs that requires the EVSE's smallest value indicated or recorded be the equivalent of and shall not exceed 0.0005 MJ (0.0001 kWh) and specify the permissible electrical energy unit value shall only be expressed as either decimal multiples or submultiples of the number 1 when the unit of measurement is the kWh and 5 when the unit of measurement is the MJ as shown below in:

OPTION 1

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, ~~shall be 0.005 MJ or 0.001 kWh;~~

(a) for AC and DC systems shall not exceed 0.0005 MJ or 0.0001 kWh; and

(b) the value in electrical energy units in terms of:

(1) the megajoule (MJ) shall be expressed as a decimal multiple or submultiple of 5; or

(2) the kilowatt hour (kWh) shall be expressed as a decimal multiple or submultiple of 1.

It should be noted that all four regional associations in fall 2021 supported the Item under Consideration as a Voting Item. NIST OWM anticipates the upcoming availability of test data on DC systems may demonstrate that further modifications may be necessary to adequately address DC systems in the code. This may result in modifications to paragraph S.1.3.2 to read in:

OPTION 2

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, ~~shall be 0.005 MJ or 0.001 kWh;~~

(a) for AC systems shall not exceed 0.0005 MJ or 0.0001 kWh;

(b) for DC systems shall not exceed 0.005 MJ or 0.001 kWh; and

(c) the value in electrical energy units in terms of:

(1) the megajoule (MJ) shall be expressed as a decimal multiple or submultiple of 5; or

(2) the kilowatt hour (kWh) shall be expressed as a decimal multiple or submultiple of 1.

NIST OWM supports the May-June 2022 USNWG EVFE Subgroup's alternate proposal shown below that is a rework of EVF-20.1. The USNWG EVF&S's Electric Vehicle Fueling Equipment (EVFE) Subgroup submits the following recommendations for further modification of S&T Committee Agenda Item EVF-20.1 (see Option 3), a proposal to further modify NIST Handbook 44 Section 3.40 Electric Vehicle Fueling Systems Code paragraph S.1.3.2. EVSE Value of Smallest Unit. Additionally, the EVFE Subgroup recommended all seven paragraphs and definition shown below move forward for adoption in July 2022 under EVF-20.1. The recommendation is the result of six years of testing and consultations

with manufacturers, laboratory evaluators, and officials testing EVSEs. At minimum the EVFE Subgroup proposes its recommended modifications to paragraph S.1.3.2. should be adopted in July 2022 because the AC systems' display unit value not greater than 0.0001 kWh are aligned with the national proposal and due to the power levels for DC systems the EVFE Subgroup recommended keeping the value of the kWh unit as it currently appears in the NIST HB 44 design requirement (0.001 kWh or smaller), which is more appropriate. The EVFE Subgroup's recommendation for no change to the value of the DC EVSE smallest display unit is actually less of a change for DC systems than the amendment for DC systems the S&T Committee currently recommended. The 0.0001 kWh resolution for AC EVSE is necessary to conduct testing to determine compliance with accuracy requirements in minimal time. The current resolution of 0.001 kWh required for AC systems would result in 25 % of the EVSE tests being incorrectly evaluated on a pass/fail basis. The EVFE Subgroup also recommended removing all reference in the code to the megajoule (MJ) since this unit of measurement is not recognized for electrical energy in the SI system.

OPTION 3 (May 2022 EVFE Subgroup's rework of paragraph S.1.3.2.)

S.1.3. EVSE Units.

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, ~~shall be 0.005 MJ or 0.001 kWh.;~~

(a) for AC systems shall not exceed 0.0001 kWh;

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

(c) the value of the kWh shall be expressed only as a decimal submultiple of 1 that satisfy

(a) and (b).

(Amended 202X)

The EVFE Subgroup developed recommendations for also modifying ~~following~~ paragraph S.1.3.1. EVSE Units of Measurement and a definition to eliminate the use of the megajoule unit of measurement included in the tentative code's Appendix D Definitions as shown below:

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

(Amended 202X)

~~megajoule (MJ). An SI unit of energy equal to 1 000 000 joules (J). [3.40]~~

The computed total price for the sale of electrical energy shall be based on an EVSE using a quantity interval that does *not* exceed 0.01 kWh, rather than the interval of 0.1 kWh currently required, and not indicate in units of the megajoule. Consequently, the EVFE Subgroup proposes modifying the quantity value and also recommended removing the megajoule unit of measurement from paragraph S.2.5.1. Money-Value Divisions Digital as shown below:

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 shall be based on quantities not exceeding ~~0.5 MJ~~ or 0.01 kWh.

(Amended 202X)

The EVFE Subgroup recommended modifying paragraph S.8. Minimum Measured Quantity (MMQ) to recognize an MMQ of 0.1 kWh which is very common among EVSE that have already been type approved. For ANSI C12 compliant meters meter constants of 0.001 kWh are common. In these meters the meter is expected to be fully accurate at deliveries of only a single watt-hour (i.e., 0.001 kWh). Dispensing a larger amount of energy to determine accuracy is not needed. Additionally, the EVFE Subgroup recommended paragraph S.8 specify an MMQ not to exceed 1.0 kWh as a more appropriate quantity for DC systems and include a new note to encourage a smaller MMQ for EVSEs which in the case of AC systems will result in a shorter time to conduct a test by a factor of five. This proposed modification of paragraph S.8 also resolves the lengthy time required to conduct a proper test of the system; a concern in 2020 that prompted work to modify code requirements that affected the duration of the tests and would read:

S.8. Minimum Measured Quantity (MMQ). – The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

(a) Measuring systems shall have a minimum measured quantity not exceeding ~~2.5 MJ~~ or:

(1) 0.5 kWh for AC EVSE; and

(2) 1.0 kWh for DC EVSE.

Note: To minimize the duration of required testing, manufacturers may want to consider limiting the declared MMQ to the level of 0.1 kWh for AC EVSE.

(Amended 202X)

The EVFE Subgroup also recommended removing the No Load Test and Starting Load Test notes and their corresponding tolerances from the code requirements because these conditions are never encountered by a customer. An EVSE never operates at no load for any significant time. The Starting Load Test should not be required because the EVSE never operates at 0.5A. Consequently, also modify the relevant handbook requirements as follows:

~~**N.1. No Load Test.**— A no load test may be conducted on an EVSE measuring system by applying rated voltage to the system under test and no load applied.~~

~~**T.5. No Load Test.**— An EVSE measuring system shall not register when no load is applied.~~

~~**N.2. Starting Load Test.**— A system starting load test may be conducted by applying rated voltage and 0.5 ampere load.~~

~~**T.6. Starting Load.**— An EVSE measuring system shall register a starting load test at a 0.5 ampere (A) load.~~

Renumber paragraph N.3. Minimum Test Draft (Size) through N.6. Repeatability Tests to become N.1. through N.4., respectively.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, the Committee considered three options provided by the submitter, NIST OWM. Proposal 1, as it appears in Publication 15 and the two alternative proposals published in NIST OWM's written analysis suggesting alternate language for paragraph S.1.3.2. EVSE Value of Smallest Unit. The Committee has considered the three proposals and has agreed the item is fully developed and is supported by current AC EVSEs in commercial use. The Committee understands there may be more data available at the time of the July 2022 vote providing additional information on the value of the smallest unit in DC EVSE systems. The Committee agreed with recommendations that Proposal 1, which appeared in the Item under Consideration in the January 2022 S&T Agenda and shown below, should be further modified to clarify the permissible numerical values for expressing the unit of measurement (i.e., MJ or kWh):

S.1.3. EVSE Units.

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, shall **not** be **greater than** 0.0005 MJ or 0.0001 kWh.

(Amended **2020**)

The Committee assigned a Voting status for the item shown below but the option below would be further modified in July during the 2022 Annual Meeting. This alternate proposal intended to replace Proposal 1 which reads as follows would be further refined before finally moving forward for a vote in July 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, ~~shall be 0.005 MJ or 0.001 kWh.;~~

(a) for AC and DC systems shall not exceed 0.0005 MJ or 0.0001 kWh; and

(b) the value in electrical energy units in terms of:

(1) the megajoule (MJ) shall be expressed as a decimal multiple or submultiple of 5; or

(2) the kilowatt hour (kWh) shall be expressed as a decimal multiple or submultiple of
1.

At the 2022 NCWM Annual Meeting, the Committee received a memo dated June 30, 2022, from the NIST USNWG's EVFE Subgroup requesting the Item under Consideration for paragraph S.1.3.2. be further modified and to consider as part of Agenda Item EVF-20.1 modifications to seven additional paragraphs and a definition in the EVFS Tentative Code during the July 2022 NCWM Annual Meeting. The Committee in its deliberations agreed to the Subgroup's proposed June revisions to paragraph S.1.3.2 and removing the term megajoule from both paragraphs S.1.3.2 and S.1.3.1. EVSE Units of Measurement (shown above in the Item under Consideration); thus, making these two requirements consistent with respect to their recognition of the same unit of measurement. The Committee recommended the other items mentioned in the memo be submitted in the 2023 standards development cycle as part of a new Form 15 process to amend the handbooks because the Committee felt the addition of eight new amendments went beyond the scope of the original item and were technically substantial changes.

Hearing no opposition to the proposed modifications to paragraphs S.1.3.2. EVSE Value of Smallest Unit and S.1.3.1. EVSE Units of Measurement (developed by the USNWG EVFE Subgroup in June 2022), the S&T Committee called for vote on Agenda Item EVF-20.1 which was successfully adopted.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Mr. Kevin Schnepf (California - DMS) supported this item. This was adopted in California and helped in time of testing. It would be beneficial to all (less timely). In support.

Mrs. Tina Butcher (NIST OWM) echoed Mr. Schnepf indicating the proposed change will align with California standards - no alternative suggestions have been made yet. Move to a vote to get in alignment.

The WWMA S&T Committee recommended that this item be assigned Voting status. The Committee agreed that this item has merit and is fully developed.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing the Committee received no comments on this item. The Committee recommended the item move forward as a Voting Item.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open Hearing the following comments were heard.

Mr. Jim Willis (New York) commented with regard to the value of the smallest unit. New York has tested many charging stations that have a resolution to the thousandth place and have not experienced any issues with this. The additional decimal place in New York's opinion is not needed and may place an unneeded requirement for some companies in the industry.

Ms. Juana Williams (NIST OWM) commented that the proposed change aligns the requirement with those already adopted and in use by the California Division of Measurement Standards. This alignment is needed to ensure consistency in inspection and testing of Electric Vehicle Fueling Systems in both type evaluation and field inspection and testing. NIST OWM notes that the NIST U.S. National Work Group's EVFE Subgroup has discussed the possibility that additional changes may be needed to this paragraph; however, no specific recommendations have been suggested to this point and do not appear to be imminent. Thus, to avoid inconsistencies noted above and delays in inspecting and testing this equipment, the Committee may wish to move this item forward for a vote.

Mr. Willis commented that alignment with California is not a reason to change something that is working as intended. And that New York does not believe this change is necessary.

The NEWMA S&T Committee recommended that this item move forward as a Voting Item.

During the 2022 Annual Meeting Open Hearings, Mrs. Butcher commented that the language in the handbook conflicts with what California DMS was applying in the field. The USNWG is still working on the proposal and may have additional changes by the Annual Meeting. Mr. James Cassidy

(Massachusetts) commented that due diligence should be made to properly vet any changes to this proposal.

After hearing comments from the floor, the Committee agreed to recommend this item retain Voting status, however, urges the timely submission of proposals for the Committee to review prior to annual and interim meetings.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting open hearings the Committee heard comments from the floor. Ms. Diane Lee (NIST OWM) and Mrs. Tina Butcher (NIST OWM) recommended this item for Voting status as it is in line with California requirements.

The CWMA S&T Committee recommended this item as a Voting Item.

During the 2022 Annual Meeting open hearing no comments were heard from the floor. The CWMA S&T Committee recommended this proposal move forward as a Voting Item. CWMA recommended this proposal as a Voting Item on the NCWM agenda.

EVF-21.5 D T.2. Load Test Tolerances.

Source: ABB, BTCPower, Electrify America, Edison Electric Institute, EVConnect, EVgo, Greenlots, Rivian, Siemens, Tesla, Tritium

Submitter's Purpose and Justification:

To create separate metering requirements for DC EVSE due to significant technology differences and challenges between AC and DC systems.

Proposed changes to the text to differentiate alternating current (AC) EVSE from direct current (DC) EVSE. Metering for DC architected systems is considerably more complicated and in ways that the original drafting of this provision never contemplated. For example, the tentative code when initially written never contemplated 350kW EVSE or liquid cooled cabling from the charging post to the connector. As such, it is necessary to separate the implementation dates of some of the specifications, tolerances, and other technical requirements. DC metering solutions are still being researched and developed and are not yet commercially available to be integrated into DC chargers at scale and at reasonable cost. While the supply chain for the physical meters themselves is slowly catching up, the metering system in a DC EVSE, particularly high-power DC EVSE that utilize liquid-cooled cables, goes beyond the physical meter itself which is incorporated in the main housing of the EVSE. For example, measurements may also need to be taken at the connector end of the dispenser and software and algorithms must be developed, validated, and integrated into the EVSE system to allow for accurate metering of kWh delivered to the vehicle. Implementing more complex metering systems needed for DCFC requires significant design and manufacturing changes to DC EVSE.

The proposed tolerances account for the fact that these systems are still in development and are untested. The proposed timeline provides the industry with enough time to develop, test, validate, and deploy reliable DC metering system technology. This timeline is also consistent with the timeline approved by

the State of California which accounts for the vast majority of the EVSE market. EVSE manufacturers are working diligently to meet the California timeline and are confident that it can be met.

While it is important to ensure that consumers are receiving accurate and transparent information regarding the accuracy of EV charging stations, it is also important that the technology to deliver high accuracy is available and reliable.

There is concern about both the proposed timeline and the accuracy requirement. Some are concerned that the accuracy specification of 2.5 % acceptance and 5 % maintenance is too high and does not provide sufficient consumer confidence that all charge sessions are equal regardless of provider and station. The proposers would note that this is a new and evolving technology where charging providers place a premium on customer experience as they compete for this growing market. Thus far, customers have not registered complaints about lack of transparency. Some are concerned that the timeline for instituting a metering regime is too far into the future. The proposers acknowledge the few years it will take to have reliable DC metering systems commercially available at scale but are working as quickly as possible to develop and integrate these systems into their chargers. Some are also concerned that the metering requirements have been in a place for several years already and therefore the EVSE community should not need more years to develop solutions. The proposers note that current DC EVSE technology was never contemplated by the existing metering regime and DC technology, particularly high-power DC EVSE, were not in existence at the time the original specifications were set. For example, the first 350° kWh EVSE with liquid cooled cables weren't deployed in the US until 2018.

The submitter requested Voting status for this item in 2021.

NIST OWM Executive Summary for EVF-21.5 – T.2. Load Test Tolerances

NIST OWM Recommendation: OWM believes this item requires further development. OWM acknowledges the submitters have been diligently working with the NIST USNWG EVFE's Subgroup to identify possible alternatives for the submitters to present to the community for review.

- The EVFE Subgroup's discussions have been ongoing in their review of alternate proposals reworked by the submitters for expanding tolerances to 5 % for DC charging equipment manufactured prior to a specific date and maintaining the 1 % acceptance and 2 % maintenance tolerances for equipment manufactured after that date.
 - Proposals discussed recommend these changes be accompanied by a new marking requirement for those devices not capable of meeting the 1 % acceptance and 2 % maintenance tolerances to alert consumers of the difference in performance levels.
- The EVFE Subgroup was balloted June 17, 2022 on a proposed new 5 % tolerance for DC EVSEs installed prior to 2024 and a corresponding new requirement for marking the accuracy of pre-2024 equipment.
 - The results of this ballot will be provided to the submitters to enable them to assess how and if to modify their original proposal to the S&T Committee.
- OWM notes that a sunset date (retroactive enforcement date) ending a dual tolerance structure would encourage uniformity in equipment performance in the marketplace; facilitate value comparisons by consumers; and phase out less accurate equipment.

NIST OWM Executive Summary for EVF-21.5 – T.2. Load Test Tolerances

- According to information provided to the USNWG by the submitters, not all DC chargers (including those manufactured in recent years) manufactured prior to 2024 can be readily or inexpensively upgraded to meet the existing (1 % and 2 %) tolerances.
 - Of the DC chargers manufactured prior to 2024, including those manufactured in recent years, some are capable of being upgraded to meet the existing (1 % and 2 % tolerances) and some are not.
 - Of those DC chargers that can be upgraded, the cost for such upgrades can vary across a rather wide spectrum.
 - While some estimates of impact have been provided, the details seem to represent the broad spectrum of capabilities and cost, making it difficult to assess the impact on manufacturers, businesses, and consumers as a whole.
 - Details regarding the percentage of equipment that falls into these categories would be helpful to the community in assessing the need for a sunset date and, if a sunset date is deemed appropriate, what represents a reasonable time frame for phasing out the less accurate equipment.
 - Information has also been provided to suggest that newer DC devices being manufactured (including those manufactured today) are more robust than older equipment, extending the lifespan beyond that originally reported in past discussions.

Item under Consideration:**T.2. Load Test Tolerances.**

T.2.1. AC EVSE Load Test Tolerances. – The tolerances for AC EVSE load tests are:

- (a) Acceptance Tolerance: 1.0 %; and
- (b) Maintenance Tolerance: 2.0 %.

T.2.2. DC EVSE Load Test Tolerances. – **The tolerances for DC EVSE load tests:**

(a) Devices installed prior to January 1, 2033

(1) Acceptance Tolerance: 2.5 %; and

(2) Maintenance Tolerance: 5.0 %

(b) Devices installed January 1, 2033 or later

(1) Acceptance Tolerance: 1.0 %; and

(2) Maintenance Tolerance: 2.0 %

NIST OWM Detailed Technical Analysis:

As the weights and measures community continues to consider proposed new paragraph T.2.2 which would widen the tolerances for DC systems “installed” prior to January 1, 2033, NIST OWM asks are there existing devices that can meet the current requirements? If there are, what are the justifications for proposing the relaxing of the tolerances, particularly without a sunset date (i.e., a retroactive date)?

From a technical perspective, OWM would be less reluctant to seeing the adoption of a phase-in date that includes an accompanying sunset date (i.e., a retroactive date). OWM asks what concrete issues can be cited by the submitters to counter any opposing arguments for a phase in period for DC systems? It would be important to have statistics on the population of devices not in compliance with requirements as discussion moves forward on this proposal.

This is not a typical practice to be done on an unlimited basis. This would be more palatable from both a competitive and enforcement standpoint if there are specific technical issues, that necessitate and justify relaxing tolerances on an industrywide basis. An additional concern is that companies are spending money to comply with the existing NIST HB Section 3.40 tentative code yet are competing with a population of existing equipment. An additional question is: how big is that population exactly?

NIST OWM also would ask how many devices are out there that would be put into use and competing with AC devices, thus creating a competitive advantage for DC devices?

There will be concerns about a dual tolerance structure since the original proposal didn’t include a corresponding marking or some other type of information requirement to alert consumers that purchasing electricity from one fueling device does not provide the same accuracy assurance as it does from another fueling device. Bottom line multiple tolerance tiers frustrate value comparisons. There is not a lot of data being made available on the accuracy of DC devices. Comments from the EVFE Subgroup representatives from industry and national laboratory indicate the current 1 % acceptance and 2 % maintenance tolerances are achievable by existing DC systems. NIST OWM was made aware in June 2022 that at least one jurisdiction is in possession of a DC standard that has traceability. Several EVFE Subgroup members indicate there is a confidentiality issue that prevents release of any data.

Throughout 2021 up through mid-2022 NIST OWM has recommended the submitters revise their 2021 proposals to address concerns previously expressed by the USNWG EVF&S’s EVFE Subgroup and weights and measures community prior to submission of any alternate proposals for a review of the EVFE Subgroup.

The submitters provided updates to the community in July 2021 about their work to revise the proposals in NCWM S&T Committee Agenda Items EVF-21.1 A.1. General and EVF-21.5 T.2. Load Test Tolerances. Their work was completed in early November 2021.

On November 20, 2021, NIST OWM provided input on the submitter’s alternate proposal. This revised proposal modifies five NIST Handbook 44 Section 3.40 EVFS requirements (that address indicating elements, sealing, identification/markings, and tolerances). The submitters and NIST OWM met on December 7, 2021, to discuss NIST OWM’s preliminary review and adjustments suggested for the alternate proposal. Subsequent revisions by the submitters of their alternate proposals were also made available to the EVFE Subgroup in January 2022 and April 2022. The EVFE Subgroup’s discussions have been ongoing in their review of the submitters proposals for expanding tolerances to 5 % for older equipment in commercial operation and EVSE marking requirements if a dual tier tolerance structure exists. The EVFE Subgroup was balloted June 17, 2022, on a proposed new 5 % tolerance for DC

EVSEs installed prior to 2024 and a corresponding new requirement for marking the accuracy of pre-2024 equipment.

Summary of Discussions and Actions:

At the 2021 NCWM Interim Meeting, several regulatory officials recommended Developing status for this agenda item. Mr. Samuel Ferris (California) recommended a Developing status for this item. Mr. Kevin Miller (ChargePoint) recommended that this item be withdrawn and noted that his devices meet the tolerance in NIST HB 44. Mr. Michael Krauthamer (ATE) and Mr. Keith Bradley (Electrify America) supported the item and recommended Developing status.

During the NCWM 2021 Interim Meeting, the Committee assigned Developing status for this item. For more information or to provide comment, please contact:

Mr. Asaf Nagler
ABB
202-639-4075, asaf.nagler@us.abb.com

At the 2021 NCWM Annual Meeting, the submitters requested the proposal maintain its Developing status.

At the 2022 NCWM Interim Meeting, a regulator from Nevada supports Developing status. A regulator from California DMS recommended the item to be withdrawn. A member of the submitting group recommended the item remain developing. The commentor stated the group will be submitting a revised proposal addressing comments and feedback received. A member of industry representing ChargePoint recommended withdrawal of this item due to no details of the 2022 alternate proposals recently developed by the submitters. An advisory member representing NIST OWM reiterated 2021 comments against blanket exemptions and dual tolerances yet awaits the rework of alternate proposals recently developed by the submitters that would be ready to be revisited in future EVFE Subgroup meetings. One member encouraged the submitters to work with NIST OWM on the final draft of any proposed changes.

During the Committee work session this item was assigned Developing status. The Committee suggests the submitters take into consideration the comments provided during open hearings. The Committee recommended the submitters work with NIST OWM on the final draft of their 2022 alternate proposal for review and comments.

At the 2022 NCWM Annual Meeting, a priority item recommending the EVFS Code be upgraded to permanent status was approved late June 2022 to be included as a Voting Item on the July 2022 S&T Committee's Agenda. There is already a Voting Item, this proposal and a second unresolved proposal as well as ongoing work and deliberations in the community to further refine specific tentative EVFS code requirements. Adoption of the priority item did occur resulting in amendments to the NIST Handbook 44 Section 3.40 Electric Vehicle Fueling Systems – Tentative Code to: (1) change the code's status to permanent effective January 1, 2023 and (2) modify paragraphs S.2.7. Indications of Delivery, N.5.2.(b) Accuracy Testing; For DC systems, and T.2.1. EVSE Load Test Tolerances to include a statement that makes these three requirements applicable to DC systems on or after January 1, 2028. This agenda item, EVF-21.5 remains unchanged and will carry over to the 2023 standards develop cycle under the development of the submitters. This item should be updated to include the new statement that passed adoption July 2022 to reflect the retroactive enforcement date of January 1, 2028, for paragraph T.2.1, that will be applicable to DC systems.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearing the following comments were heard:

Mr. Kevin Schnepf (California DMS) remarked this was adopted in California Regulation. Just this past week (September 23, 2021) a complete analysis was done and clearly identified that they can meet the 1% tolerance. Recommended to be withdrawn.

Mr. Justin Wilson (ChargePoint) recommended to be withdrawn - equipment can meet tolerance as is.

Mr. Keith Bradley (Electrify America) stated there are two questions: 1 - Can devices in near term meet the tolerance? (2) They are concerned with when did this become possible? They are continuing to work on this. They are not urging changes to this item - they are working on it. Wants to leave it in Developing status - more work to be done.

Mr. Kurt Floren (Los Angeles County, California) asked when equipment is out there that is meeting the standards, this is not the time to roll back.

Note: In the voting session, Ms. Cadence Matijevich (Nevada) requested that the recommendation of withdrawal of this item be changed to Developing. The Committee reviewed item EVF 21.5 with consideration to the comment heard during the voting session. It is the position of the Committee based on open hearings and regional input to recommend withdrawal of the item. The testimony provided during open hearings supported that devices can meet the current tolerances.

The Committee's charge is to recommend a status to the National S&T Committee, this will not eliminate the item from the agenda, it is our recommendation.

The WWMA S&T Committee recommended this item be withdrawn. The Committee makes this recommendation based on testimony heard during the open hearings and previous reports including recommendations from other Regions.

Southern Weights and Measures Association

At the 2021 SWMA open hearing the Committee received no comments on this item.

This Committee recommended this item be withdrawn because we believe that current tolerances are attainable.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting open hearings, the following comments were heard.

Ms. Wahl representing the submitting group commented and was supported by Mr. Alex Beaton (EVgo) with regard to a study and follow up WebEx meeting from Argonne National Lab. In-order to follow up on this study, the submitters are asking for a Developing status.

Ms. Juana Williams (NIST OWM) commented below, and comments can also be found on the NCWM website.

1. NIST OWM asks if there are existing devices that can meet the current requirements? If there are, what are the justifications for proposing the relaxing of the tolerances, particularly without a sunset date (i.e., a retroactive date)?
2. From a technical perspective, NIST OWM would be less reluctant to seeing the adoption of a phase-in date that includes an accompanying sunset date (i.e., a retroactive date). OWM asks what concrete issues can be cited by the submitters to counter any opposing arguments for a phase in period for DC systems? It would be important to have statistics on the population of devices not in compliance with requirements as discussion moves forward on this proposal.
3. This is not a typical practice to be done on an unlimited basis. This would be more palatable from both a competitive and enforcement standpoint if there are specific technical issues, that necessitate and justify relaxing tolerances on an industrywide basis. An additional concern is that companies are spending money to comply with the existing NIST HB Section 3.40 tentative code yet are competing with a population of existing equipment.
4. NIST OWM also would ask how many devices are out there that would be put into use and competing with AC devices, thus creating a competitive advantage for DC devices?
5. There will be concerns about a dual tolerance structure since the proposal doesn't include a corresponding marking or some other type of information requirement to alert consumers that purchasing electricity from one fueling device does not provide the same accuracy assurance as it does from another fueling device. Bottom line multiple tolerance tiers frustrate value comparisons.

NEWMA recommended this as a Developing Item on the NCWM agenda.

During its 2022 NEWMA Annual Meeting Open Hearing NEWMA heard from:

Mrs. Tina Butcher (NIST OWM) commented that this item was originally submitted by a group of manufacturers. The item went to the USNWG's EVFE Subgroup, received feedback and the submitters have been working to address comments from national and regional levels.

Mr. Alex Beaton (EVgo) commented as one of the submitters. He indicated that the submitters heard feedback from regulators regarding the originally proposed 10-year exemption for EV meters and has modified the proposal. For DC meters, the submitters are looking to propose that all meters manufactured prior to 2024 will be subject to 5 % accuracy tolerance and those manufactured after 2024 will be subject to a 1 % accuracy tolerance. Both percentages for accuracy have been supported by data. For AC meters, Mr. Beaton indicated that prior changes to the proposal have been removed as the submitters believe with calibration, all meters can meet current code. Mr. Beaton believes the updated proposal will be available prior to the 2022 Annual Meeting.

After hearing comments from the floor, the Committee recognized the need to further develop this item and recommended the item retain Developing status. The Committee suggested that the submitters continue to work with regulatory stakeholders and share data in order to further the development of the item and urges the timely submission of proposals for the Committee to review prior to annual and interim meetings.

NEWMA recommended this proposal as a Developing item on the NCWM agenda.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting Open Hearing the Committee heard comments from the floor. Diane Lee-NIST noted that there were comments regarding this item on the NCWM website.

CWMA S&T Committee recommended this item be withdrawn.

During its 2022 Annual Meeting Open Hearing, the CWMA heard from:

Mr. Keith Bradley (Electrify America) Thanks to NIST for forming the work group. Industry has worked hard to determine compliance for existing devices. DC fast chargers already installed will have a larger retroactive tolerance. Recommended to remain as Developing.

Ms. Francesca Wahl (Tesla): Minor modifications outside of tolerances will still be needed in order for manufacturers to comply with changes to devices already in commercial use.

Mr. Charlie Stutesman (Kansas): HB 44 3.40 tentative code has been in place for 7 years. It needs to become active and enforceable.

The CWMA S&T Committee recommended this item remain as a Developing item per the request of the submitter.

The CWMA recommended the proposal as a Developing item on the NCWM agenda.

EVF-22.1 V Section 3.40. Electric Vehicle Fueling Systems

(This Item was Adopted.)

Source: Craig VanBuren (Michigan), Hal Prince (Florida), Mahesh Albuquerque (Colorado), Marc Paquette (Vermont)

Submitter's Purpose and Justification:

To establish Section 3.40 Electric Vehicle Fueling Systems – Tentative Code as a permanent code.

A notification was first distributed on June 24, 2022, to the NCWM Membership announcing the Specifications and Tolerances Committee and the NCWM Board of Directors had accepted this Priority Item as a Voting Item for the 107th Annual Meeting in July 2022 in accordance with NCWM Policy 3.3.2. Procedures to Modify Handbooks.

In 2012, NIST formed the U.S. National Work Group (USNWG) on Measuring Systems for Electric Vehicle Fueling. Membership opportunities were announced in Federal Register Notice 2012-19285. The chief purpose of the USNWG was to develop national uniform standards and requirements for EVSE. USNWG members included federal, state, and local government, various electrical component and EVSE manufacturers, other EVSE industry representatives, and representatives from nationally recognized testing laboratories. The proposed requirements in this tentative code up to this point in time have been the work product of the USNWG. The requirements have been further refined and vetted over the course of seven years. Although the USNWG has responded to requests to review and consider proposed changes for DC systems' tolerances and accuracy markings as well as refine test procedures in field and

laboratory applications, the submitters deemed the code has been fully developed. Since 2016, EVSE specifications and tolerances have been published in NIST Handbook 44 and made available to the public and the EVSE industry. Industry has had over five years to design and engineer EVSE to meet the published requirements.

We are requesting this be made a priority item. In addition to the code having been published in Handbook 44 since 2016, we believe this would fall under; NCWM Policy 3.3.2. E. Exceptions to Policy for Submission of Items to the NCWM Committee Agenda; Submission of “Priority” Items, Part 1.d. items which could affect health and safety.

As you may be aware, the U.S. Department of Transportation has released the National Electric Vehicle Infrastructure (NEVI) Formula Program which allocates \$5 billion to the states to support EV charging infrastructure. Plans for use of these funds are due August 1, 2022. It is our contention that without national standards in place, there is the opportunity for funds to be disseminated at year’s end to businesses that could manufacture unsafe devices. More information on the NEVI Formula Program is provided in the February 10, 2022 USDOT Federal Highway Administration (FHWA) guidance document available on the FHWA website at:

https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/nominations/90d_nevi_formula_program_guidance.pdf. The submitters believe making this code permanent will ensure the safety of use and testing as more EVSEs are put into service. They also understand that, like every other code in Handbook 44, requirements are continually changed and updated.

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NIST OWM Analysis: Opposition exists for delaying the adoption of the code as a permanent code; however, opposition also exists for upgrading the status of the code without making changes to specific sections.

The proposed changes to specific sections are still under development and have yet to be finalized and fully reviewed and vetted by the weights and measures community; these are presently included on the S&T Committee’s as “Developing” items EVF-21.1 and EVF-21.5.

NIST OWM recommends the NCWM consider some alternative options that allow requirements for electric vehicle fueling systems to be adopted on a timeline sooner than July 2023, but still allows for full vetting of any proposed changes to specific sections. OWM offers some alternatives below to consider.

Both of the options outlined below include the following.

- Accelerates the timeline for voting such that the results would be reflected in the 2023 edition of NIST Handbook 44. The vote would occur fall 2022 or January 2023, rather than July 2023.
- Allows for voting on the upgrading of the tentative code to a permanent status --- with or without additional modifications;
- Allows work to progress on the Developing items on the Committee’s agenda following the July 2022 NCWM Annual Meeting but establishes a compressed timetable and deadline by

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which any recommended modifications would need to be submitted in order to be considered for a vote at same time as the vote on the status of the code.

- Proposes any such modifications to the tentative code to be presented as separate Voting Items. Any items that are adopted would be included in the upgraded code.

Note: Specific timelines for voting and NIST Handbook publication would need to be agreed upon by the Committee and NIST.

Option 1 – Electronic Voting, Fall 2022

- Voting takes place via electronic ballot in late fall 2022.
- Results of the electronic vote will be reflected in the *electronic and hard copy versions* of the 2023 NIST Handbook 44.
 - There will be minimal or no delay in the publishing of the *electronic version*.
 - There may be an approximately one-month delay in the publication of the *hard copy version*.

Option 2 – In-Person Voting, January 2023 NCWM Interim Meeting:

- Voting takes place in person at the January 2023 NCWM Interim Meeting.
- The *electronic version* of the 2023 edition of NIST Handbook 44 is posted in Fall 2022 according to the normal publication schedule. However:
 - A statement is included at the beginning of Section 3.40 that a special vote will take place in January 2023 on the status of Section 3.40 and may include other modifications to Section 3.40 and Appendix D – Definitions.
 - A statement is also included on the NIST website referencing the potential changes to Section 3.40 and Appendix D - Definitions.
- The *hard copy version* of the 2023 edition of NIST Handbook 44 is issued after the January 2023 NCWM Interim Meeting vote.

Key Points for Consideration:

- The urgency for voting on this item at the July 2022 NCWM Annual Meeting *appears* to be driven by the following:
 - (1) The tentative status of the code limits accessibility to federal funding under the NEVI program to only those jurisdictions that have adopted enforceable standards and upgrading the code provides an expedient method for adoption in many states. Although this is an

NIST OWM Executive Summary for EVF-22.1 – Section 3.40. Electric Vehicle Fueling Systems

incorrect premise based on a July 11, 2022 statement from the DOE/DOT Joint Office indicating funding is not predicated on code status.

- (2) Weights and measures jurisdictions need to have enforceable standards in place in order to enable industry to place electric vehicle-fueling systems into commercial service and meet the demands of consumers needing to purchase electrical energy for vehicle fuel.
 - 3) Without the adoption of a permanent code, those states needing to respond to the urgent need may be driven to adopt their own standards, leading to non-uniformity of requirements for EVFS.
 - 4) Further delays in upgrading the status of the tentative code to “permanent” will permit additional equipment that is not capable of meeting the provisions of the tentative code to be installed, continuing to create inequities for those systems that are capable of complying should such equipment be allowed to remain in place indefinitely.
- Support for upgrading the tentative code includes the above factors and the following:
 - The tentative code was widely vetted before its adoption in 2016 and has been available for review for over six years.
 - Comments from multiple sources (industry and regulatory) have indicated interest in the upgrading of the code.
 - At least 15 type evaluation certificates have been issued by the State of CA on EVFSs.
 - Opposition for upgrading the tentative code at the July 2022 NCWM Meeting includes:
 - Concerns were raised in 2020 by a group of industry members about the application of the code to existing and newly manufactured devices.
 - The original proposals did not meet with the approval of the NCWM and regional weights and measures associations.
 - Some proposals were withdrawn, however, the Committee felt some had merit and designated them as Developing on the S&T Committee’s agenda to allow the industry submitters the opportunity to modify the proposals to reflect concerns raised by the community.
 - The submitters of these Developing items have been working with the USNWG to develop proposed revisions.
 - Once complete the revisions will be presented for vetting and review by the weights and measures community.

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- Upgrading the tentative code before these proposed changes can be considered would negatively impact devices that are already installed and some that are in the process of being manufactured.
- The basis for establishing this as a Priority Item is related to concerns over safety. While there is a clause that references other national safety standards, NIST Handbook 44 is not a safety standard.

Item under Consideration:

Amend NIST Handbook 44 Section 3.40 Electric Vehicle Fueling Systems – Tentative Code to change the code’s status to permanent effective January 1, 2023 as follows:

Section 3.40. Electric Vehicle Fueling 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 an Electric Vehicle Supply Equipment (EVSE) or system are advised to see paragraph G A.3. Special and Unclassified Equipment. (Tentative Code Added 2015)~~

The status of Section 3.40. Electric Vehicle Fueling Systems was changed from “tentative” to “permanent” effective January 1, 2023.

(Added 2015) (Amended 2022)

Further amendments were made to the code to modify paragraphs S.2.7. Indications of Delivery, N.5.2.(b) Accuracy Testing; For DC systems, and T.2.1. EVSE Load Test Tolerances to include a statement that makes these three requirements applicable to DC systems on or after January 1, 2028 as shown below:

S. Specifications

S.2.7. Indication of Delivery. – The EVSE shall automatically show on its face the initial zero condition and the quantity delivered (up to the capacity of the indicating elements).

All DC EVSE are exempt from this requirement until January 1, 2028.

(Amended 2022)

N. Notes

N.5. Test of an EVSE System.

N.5.2. Accuracy Testing. – 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.

(b) For DC systems (see note):

- (1) Accuracy test of the EVSE system at a load of not less than 85 % of the maximum deliverable amperes current (expressed as MDA) as determined from the digital communication message from the DC EVSE to the test standard for a total energy delivered of at least twice the minimum measured quantity (MMQ).
- (2) Accuracy test of the EVSE system at a load of not more than 10 % of the maximum deliverable amperes (expressed as MDA) as determined from the digital communication message from the DC EVSE to the test standard for a total energy delivered of at least the minimum measured quantity (MMQ).

All DC EVSE are exempt from this requirement until January 1, 2028.
(Amended 2022)

Note: 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.

T. Tolerances

T.2. Load Test Tolerances.

T.2.1. EVSE Load Test Tolerances. – The tolerances for EVSE load tests for are:

- (a) Acceptance Tolerance: 1.0 %; and
- (b) Maintenance Tolerance: 2.0 %.

All DC EVSE are exempt from this requirement until January 1, 2028.
(Amended 2022)

NIST OWM Detailed Technical Analysis and Executive Summary:

The tentative EVFS code in NIST Handbook 44 has been in place since 2016 after extensive development and vetting with the weights and measures and electrical energy community.

The point of upgrading the status of the code might be argued by the submitters and others anxious to have an enforceable code in place as reasonable with respect to due process since the provisions in the code have been in place and the jurisdictions and industry have had the opportunity to work with the code for six years.

- Comments from multiple sources (industry and regulatory) have indicated interest in the upgrading of the code.
- This is further supported by the fact that 15+ type evaluation Certificates that have been issued by the State of CA indicating there are devices that already comply the requirements as specified in the tentative code.

Those who have concerns with specific sections of the code may disagree with this assessment.

- Some industry members have expressed concerns about specific sections of the tentative code.

- These individuals presented specific proposals to the NCWM in August 2020; some of these proposals were designated as Developing items on the current S&T Committee agenda.
 - These Developing items remain on the Committee’s agenda while the submitters work to address comments received from the NCWM, regional weights and measures associations, and others and modify the proposals to include recommendations acceptable to the weights and measures community.

The urgency for voting on this item at the July 2022 NCWM Annual Meeting seems to be driven by several factors, including the following:

- 1) There is an erroneous perception that the tentative status of the code limits accessibility to federal funding under the NEVI program to only those jurisdictions that have adopted enforceable standards. Upgrading the status of the code to permanent at the July 2022 NCWM Annual Meeting provides a more expedient mechanism for establishing enforceable standards in those states that adopt NIST Handbook 44 by reference than do other legislative mechanisms.
- 2) Weights and measures jurisdictions need to have enforceable standards in place in order to enable industry to place electric vehicle-fueling systems into commercial service and meet the demands of consumers needing to purchase electrical energy for vehicle fuel.
- 3) Without the adoption of a permanent code, those states needing to respond to the urgent need may be driven to adopt their own standards, leading to non-uniformity of requirements for EVFS.
- 4) Further delays in upgrading the status of the tentative code to “permanent” will allow the opportunity for additional equipment that is not capable of meeting the provisions of the tentative code to be installed, continuing to create inequities for those systems that are capable of complying should such equipment be allowed to remain in place indefinitely.

While these are all valid concerns, there are several items on the S&T Committee’s agenda for which some members of industry expressed concerns two years ago over specific sections of the existing code. These items have been assigned a Developing status based on the fact that the proposals as presented to the Committee did not meet with the approval of the regional weights and associations and others who submitted comments, but the submitters indicated a willingness to work with the community to develop alternative recommendations that would address these concerns. The submitters of these Developing items have been working with the NIST U.S. National Work Group EVFE’s Subgroup over the past six months to modify these recommendations and are making steady progress towards alternatives that might be more acceptable to the weights and measures community. Even if the submitters had alternatives ready to present to the Committee, presenting them for adoption at the NCWM July 2022 Annual Meeting would not allow the time for review and comment by many who could be impacted by their adoption.

The weights and measures community needs to find a solution that allows time for the submitters of the Developing items to widely vet any final proposed modifications yet does not inordinately delay the adoption of a code which is desperately needed to help preserve equity in the EVFS marketplace.

The basis for establishing this as a Priority item is related to concerns over safety.

- There is a clause in the “Application” section of the NIST HB 44 Section 3.40 (EVFS Code) notes NTEP will only accept devices for evaluation which have received safety certification from Nationally Recognized Testing Laboratory, making it clear that the assessment for compliance

with safety is not done by W&M (unless the program happens to also have authority to enforce other safety regulations outside of HB 44 in their state).

- However, OWM notes that NIST Handbook 44 is not a safety standard. Devices are already required to comply with safety requirements specified in safety standards such as those applied by UL, state Fire Marshals, NFPA, etc.

Summary of Discussions and Actions:

The Priority Proposal was developed after the January 2022 Interim Meeting. In fact, the Submitter's proposal was first conceptualized as a priority Voting Item in late May 2022. Consequently, this item was not part of the S&T Committee's January 2022 Interim Meeting Report published in March 2022. Likewise, the priority proposal was developed after all regional weights and measures associations had met for the 2022 standards development cycle. Although there was an opportunity for each regional association to provide comments to the NCWM Membership in July 2022 none were expressed.

During the July 2022 NCWM Annual Meeting Open Hearings, a developer of ANSI electric metering standards and EVSE test equipment indicated that the purchase of test equipment will take place once the NCWM adopts an EVSE handbook code with permanent status. The representative also noted the USNWG's EVFE Subgroup has recently considered a 2024 effective date for DC systems and the current installations of 40 000 DCFC systems will become 300 000 by the 2028 enforcement date for being proposed for DC systems in the proposed priority item. Additionally, the developer advised that testing of DC systems is possible with a test standard at the 17 kW power level and the 100 kW level can be achieved using an EV as the test load. Noting also that if the EVSE operates properly at the lower power level then there is an expectation 99 percent of the time that the EVSE also operates properly at the higher power level.

One submitter indicated working on an effective date, but then industry indicated it could meet all but three code requirements. Industry indicated it has been determined that a test standard would be available by August 2023, therefore that date was used to arrive at a 2028 enforcement date for DC display and accuracy test tolerances and test procedure requirements. Which represent the three areas where compliance is not yet achievable for some EVSEs. A representative from the weighing device industry indicated that removing the proposed 2028 enforcement dates might serve as an incentive for the development of test standards and this is a time when there appears to be low numbers of DC systems. One regulator asked what will occur when we reach those future enforcement dates, will tagging or removal of equipment occur, if numbers indicate equipment performing outside of tolerances are significant. One meter manufacturer also noted that the General Code provides clarification while Appendix D defines what constitutes a "nonretroactive" (worded in italic text) and "retroactive" requirement (all upright text); whereas the term "effective" is not addressed in either section of the handbook.

The State of California through its legislative process made the EVFS Code permanent in 2019 and issued its first type approval certification of AC systems based on the code in February 2021. For DC EVSE California will accept applications and evaluate these systems to code tolerances, but until its test standard is recognized in accordance with the traceability requirements in its law, the California Type Evaluation Program will not yet certify the accuracy class of DC systems.

One state director reiterated the proposal to make the EVFS code permanent began as a priority item that was made available for the first time to the NCWM membership two weeks before the July 2022 NCWM Annual Meeting and the item was amended on the eve of the start of the meeting. The Director also

cautioned that there could be unintended consequences in the proposal as a result of the submitter's urgency to also have the opportunity to make amendments to the priority proposal.

One state weights and measures program regulator reminded those participating in the hearing session that it was advocated over six months to provide the states a tool, a permanent code. Even though he noted his jurisdiction does not plan to test EVSEs in his jurisdiction; and while no handbook code is perfect the states have the ability, although not a painless process, to modify the code as we move forward.

The submitters initially proposed changing the tentative code's status to permanent effective January 1, 2023 by amending the code title and preamble as shown below.

Section 3.40. Electric Vehicle Fueling 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 an Electric Vehicle Supply Equipment (EVSE) or system are advised to see paragraph G-A.3. Special and Unclassified Equipment. (Tentative Code Added 2015)~~

The status of Section 3.40. Electric Vehicle Fueling Systems was changed from “tentative” to “permanent” effective January 1, 2023.

(Added 2015) (Amended 2022)

An update was made during the July 2022 open hearings to notify participants that NIST OWM had obtained a statement from the DOE/DOT Joint Office providing clarification that NEVI funding was not conditional on the code's status. The statement provided by the Joint Office to assist the NCWM in its deliberation of this issue and read by Tina Butcher (NIST OWM) on July 11, 2022 was:

- “NEVI does not require states to have metrology regulations in order to apply for or utilize funding per the BIL legislation and formal program guidance issued by FHWA. The proposed NEVI minimum requirements and standards propose that “Chargers would be required to display and base the price of electrical charge in \$/kWh”, noting that “several States restrict the ability to display charge in \$/kWh”, and requests comment for alternative metrics (e.g. \$/minute or \$/mile).*
- “The proposed NEVI minimum requirements and standards also include the following text under 680.106: “States must ensure that all EVSE are certified by an Occupational Safety and Health Administration Nationally Recognized Testing Laboratory and that all AC Level 2 EVSE are ENERGY STAR certified” and “States must ensure that EVSE is maintained in compliance with NEVI standards for a period of not less than 5 years from the date of installation.”

*Note: typically, the issue of resale as \$/kWh has been in the purview of electric utilities and utility regulators.

There remained an urgency to remove the tentative status from this code. However, the Committee heard from stakeholders that DC EVSEs should be exempt for a period of time from a 2023 enforcement dates in the requirements in paragraphs S.2.7. Indication of Delivery, N.5.2. Accuracy Testing, and T.2. Load Test Tolerances to allow time for further development of DC technology and corresponding testing

methods. In the case of any exempted requirements the Commenters were also unsure how the proposed term “effective” in the proposed updates to the code’s preamble would be applied given the terms retroactive and non-retroactive are most commonly used in association with enforcement dates in the handbook. Hearing those comments, the Committee chose to develop and include an additional statement which would clarify the retroactive 2028 enforcement date for paragraphs S.2.7., N.5.2, and T.2, which as originally intended applies to AC systems in 2023 and becomes applicable to DC EVSEs in 2028. The Submitters clarified this point by including the statement “All DC EVSE are exempt from this requirement until January 1, 2028.” in all three paragraphs. The status upgrade and modifications to address DC EVSEs are shown above in the Item under Consideration. Additionally, the upgrade of the code’s status will result in modifications to handbook Section Appendix D Definitions to amend 13 current definitions to include a new reference to the EVFS code designation “3.40” and also to include 38 new electrical energy related terms.

Regional Association Reporting:

The priority proposal was developed after all U.S. regional weights and measures associations had met for the 2022 standards development cycle. The priority proposal was distributed to the NCWM membership in late June 2022. Deliberations by the delegates and representatives from the regional jurisdictions during the July 2022 Annual Meeting did not result in regional positions being taken on the priority proposal.

Western Weights and Measures Association

No report made available from the association on this item.

Southern Weights and Measures Association

No report made available from the association on this item.

Northeastern Weights and Measures Association

No report made available from the association on this item.

Central Weights and Measures Association

No report made available from the association on this item.

TXI – Taximeters

TXI-22.1 VC Table S.5. Categories of Device and Methods of Sealing

(This Item was Adopted.)

Source: NIST Office of Weights and Measures

Submitter’s Purpose and Justification:

To provide additional electronic means of sealing for taximeters and eliminate confusion regarding the use of the term “electronic link” in that HB 44 Code.

NIST OWM Executive Summary for TXI-22.1 – Table S.5. Categories of Device and Methods of Sealing
<p>NIST OWM Recommendation: OWM believes this item is fully developed and ready for a vote. This change will provide the specificity needed for audit trail criteria for taximeters and will allow this method of security for these devices.</p> <ul style="list-style-type: none"> • The proposal recognizes other approved means of security, an audit trail for electronically securing taximeter sealable parameters given the limited size of the taximeter and multiple options for electronically adjustable taximeter components. • Use of an "electronic link" has been recognized since 2000 and remains a means to ensure the taximeter in operation is calibrated to the vehicle. Paragraph S.5.2. Taximeters Calibrated to Specific Vehicles adequately addresses the requirement for this security feature and does not need to remain in Table S.5.

Item under Consideration:

Table S.5. Categories of Device and Methods of Sealing

<i>Categories of Device</i>	<i>Methods of Sealing</i>
<i>Category 1: No remote configuration capability.</i>	<i>Seal by physical seal or <u>two event counters: one for calibration parameters and one for configuration parameters.</u>, for components that may be removed from the vehicle, a combination of physical seals and a physical or electronic link as described in S.5.2. Taximeters Calibrated to Specific Vehicles.</i>

[Nonretroactive as of January 1, 2018]

(Table Added 2017) (Amended 2022)

NIST OWM Detailed Technical Analysis:

The current NIST HB 44 Section 5.54 Taximeters Code Table S.5. Method of Sealing Category 1 taximeters recognizes only a physical seal or electronic link as a means for securing a taximeter’s metrological parameters. Other approved means of security such as the audit trail is appropriate for securing taximeter sealable parameters given the limited size and options for electronically adjustable taximeter components. This proposal modifies Category 1 sealing requirements to recognize the audit trail form of device security.

Since 2000 the use of an “electronic link” has been recognized as an alternative to a physical seal as a form of security for conditions of use where a taximeter is removed temporarily from service and more specifically from the vehicle it was calibrated to.

Requirements for the design and conditions of use for an “electronic link” are already adequately addressed in paragraph S.5.2. Taximeters Calibrated to Specific Vehicles and do not need to remain in Table S.5.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, the Committee agreed that the item has merit and will align this code with other device codes. Based on hearing no opposition and the submitter’s request for Voting status for the item, the Committee has assigned a Voting status to this item and recommended it move forward for adoption at the 2022 NCWM Annual Meeting with the added three parenthetical dates: 2018 nonretroactive enforcement date, 2017 date of the table’s inclusion in the code, and the 2022 amendment date.

At the 2022 NCWM Annual Meeting, Mrs. Tina Butcher (NIST OWM) noted the proposal is fully developed and affords electronic security for taximeters which is warranted but not previously recognized. Additionally, the code will continue to recognize an electronic link security feature for taximeters, which is already addressed in Taximeters Code paragraph S.5.2. Taximeters Calibrated to Specific Vehicles. Mr. Kevin Schnepf (California DMS) indicated support for the proposal as written.

Hearing no opposition or proposed modifications, Agenda Item TXI-22.1 was made part of the Voting Consent Calendar where it was successfully adopted as written.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearing the following comments were heard:

Mrs. Butcher put this forward noting the recommended changes are just to clarify what is already in place for audit trails across other device code sections. This is to fill in the blanks for what is considered the minimum for audit trails is also appropriate for taximeter security. This proposal specifies two event counters for the minimum form of an audit trail.

The WWMA S&T Committee recommended that this item be assigned a Voting status. The Committee agreed that this item has merit and is fully developed.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing, the SWMA S&T Committee heard no comments on this item.

The SWMA recommended this item move forward as a Voting Item.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting open hearing the following comments were heard.

Ms. Juana Williams (NIST OWM) commented in support and feels the item is fully developed and ready for Voting status.

Mr. Jim Willis (New York) and Mr. John McGuire (New Jersey) also supported moving this item forward with a Voting status.

The NEWMA S&T Committee recommended that this item be given a Voting status.

During the 2022 NEWMA Annual Meeting open hearing comments were heard from Mrs. Butcher that the goal of this item is to get specificity into the handbook regarding the minimum standards for event counter, electronic audit trails, and eliminate the appearance that a lack of any reference to this feature appears to prohibit this form of security for taximeter applications.

After hearing comments from the floor, the Committee considered the item to be fully developed and recommended that the item retain Voting status.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting Open Hearings, the Committee heard comments from the floor. Mrs. Butcher recommended that this item move forward to Voting. California has a taximeter in type evaluation right now with this security feature.

CWMA S&T Committee recommended this item move forward as a Voting Item.

During the 2022 CWMA Annual Meeting open hearing no comments were heard from the floor.

The CWMA S&T Committee recommended this proposal move forward as a Voting Item. CWMA recommended the proposal as a Voting Item on the NCWM agenda.

GMA – Grain Moisture Meters 5.56 (a)

GMA-19.1 D Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Method for All Grains and Oil Seeds.

Source: NTEP Grain Analyzer Sector

Submitter's Purpose and Justification:

Reduce the tolerances for the air oven reference method.

NIST OWM Executive Summary for GMA-19.1 – Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Method for All Grains and Oil Seeds.
NIST OWM Recommendation: NIST OWM supports the collection of data to verify that the proposed reduction in tolerances is appropriate for all grains.
<ul style="list-style-type: none">• During the NTEP Grain Analyzer (GA) Sector 2019 meeting, the Sector reviewed data from Arkansas for Long Grain Rough Rice (LGRR) and other grains. The data showed that the proposal to tighten the acceptance and maintenance tolerance may not be appropriate for all grain types. The original data presented and used as a basis for the proposal applied to corn and soybeans. After reviewing the data, the Sector decided to collect inspection data from

NIST OWM Executive Summary for GMA-19.1 – Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Method for All Grains and Oil Seeds.
<p>across the country. An industry representative offered to assist with data analysis and along with the NIST representative will work in producing the inspection data needed for the analysis. A request for State participation will be sent to State weight and measures. The Sector requests this remain a Developing item as they move forward in evaluating additional data.</p> <ul style="list-style-type: none"> • North Carolina submitted the requested grain data for review. • Additional data is expected from other States participating in the grain data submission.

Item under Consideration:

Amend Handbook 44, Grain Moisture Meter Code 5.56 (a) as follows:

T.2.1. Air Oven Reference Method. – Maintenance and acceptance tolerances shall be as shown in Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Reference Method. Tolerances are expressed as a fraction of the percent moisture content of the official grain sample, together with a minimum tolerance.

(Amended 2001)

Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Reference Method

Type of Grain, Class, or Seed	Tolerance	Minimum Tolerance
Corn, oats, rice, sorghum, sunflower	0.05 of the percent moisture content	0.8 % in moisture content
All other cereal grains and oil seeds	0.04 of the percent moisture content	0.7 % in moisture content

Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Reference Method for All Grains and Oil Seeds

<u>Tolerance</u>	<u>Minimum Tolerance</u>
<u>0.03 of the percent moisture content</u>	<u>0.5 % in moisture content</u>

(Amended 2001 and 20XX)

NIST OWM Detailed Technical Analysis:

During the NTEP Grain Analyzer (GA) Sector 2019 meeting, the Sector reviewed data from Arkansas for Long Grain Rough Rice (LGRR) and other grains. The data showed that the proposal to tighten the acceptance and maintenance tolerance may not be appropriate for all grain types. The original data presented and used as a basis for the proposal applied to corn and soybeans. After reviewing the data, the Sector decided to collect inspection data from across the country. An industry representative offered to

assist with data analysis and along with the NIST representative will work in producing the inspection data needed for the analysis. A request for State participation will be sent to State weight and measures. The Sector requests that this remain a Developing item as they move forward in evaluating additional data.

At the 2020 Interim Meeting the S&T Committee agreed to retain this item as Developing in anticipation of additional data that is being collected to assess the proposed tolerances and the appropriateness of the change to tolerances for other grain types. The NIST Technical Advisor is working with the Grain Analyzer Sector and States to collect additional data on the proposed changes to the tolerances with plans to present data at the next NTEP GA Sector Meeting in August 2021. NIST OWM agreed with the S&T Committee that this item should be given a Developing status until additional data is examined.

Ms. Diane Lee (NIST OWM) is working with the Sector to collect data on Unified Grain Moisture Algorithm (UGMA) grain moisture meters and non-UGMA grain moisture meters North Carolina, Arizona, Illinois, and Iowa agreed to provide 2017-2019 inspection data on field meters. The participating States were requested to submit data by December 1, 2021. One state will be unable to participate, and North Carolina has submitted their data.

History

The GA Sector originally forwarded this proposal to the regional weights and measures associations with a proposed Voting status. All regional weights and measures associations agreed to forward the proposal as a Voting Item on the 2019 NCWM Interim Agenda and the Sector appreciates their review and support. However, following the regional meetings additional data was submitted to the sector which indicates a need to consider developing different tolerance for some grain types. Through a subsequent ballot, and a majority vote, the sector agreed to recommend changing the status of the item to developing to provide the Sector time to consider additional data and changes to its original proposal. OWM agrees with the Grain Analyzer (GA) Sector's revised decision to change the status of this item to "developing."

This proposal to change the air-oven method tolerances was developed during the 2018 GA Sector meeting. During the 2018 GA Sector Meeting, Dr. Charlie Hurburgh provided the Sector with an analysis of data for 2-corn and 1-soybeans samples which included the average error for UGMA grain moisture meter technology and the average error of 2 MHz grain moisture meter technology from Iowa State weights and measures inspection data for years 2014 to 2017. Based on the Sectors review of the data, discussion of new tolerances, and the ability of the technologies to meet the new tolerances the Sector agreed to change the tolerances based on the data provided.

During additional discussion of what tolerances to apply to other grains, it was proposed that the same tolerances could apply to all grains, because corn is one of the more difficult grains to test and would likely have one of the largest variations when testing. No objections from States or meter manufacturers were provided during the discussion and voting to forward the item to the State regional weights and measures associations. Following the Sector meeting one State noted that there may be an issue with applying the tolerance to some grain types, specifically long grain rough rice. The GA Sector's technical advisor requested that the State forward field data to review the grain moisture meter results for LGRR and other grains. After review of the data with the proposed tolerances it was determined that a high meter failure rate could result with a change to the tolerances for some grain types.

After the Sector's Technical Advisor discussed the findings with the NTEP laboratory and the Sector members that originally proposed the tolerance change, they agreed with proposing a Developing status for this item, the Sector was officially balloted and also agreed to change the originally proposed Voting

status to Developing to allow the Sector time to review additional data and make changes to its original proposal.

Summary of Discussions and Actions:

At the NCWM 2022 Interim Meeting, the Committee heard comments from Ms. Diane Lee (NIST OWM) who noted that additional data is needed to assess the proposed tolerances. Ms. Lee added that states would be submitting more data. Ms. Lee requested that this item remain Developing.

During the Committee's work session, the Committee agreed to a Developing status for this item.

At the NCWM 2022 Annual Meeting Open Hearings, Mrs. Tina Butcher (NIST OWM) provided updates on the Grain Analyzer Sector's proposal to reduce the tolerance for grain moisture meters. She informed the S&T committee that the Grain Analyzer Sector had originally reviewed data for corn and soybeans. After the proposal for changes to the tolerances were submitted to the NCWM, information was received that reducing the tolerance may be problematic for other grains. As such the Grain Analyzer Sector is collecting additional data on other grain types and request a Developing status and additional time to collect the data.

At the NCWM 2022 Annual Meeting committee meeting, the Committee agreed to a Developing status for this item.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Ms. Lee commented that this item has been on the agenda since 2019 and when it was proposed there was a study conducted that included only corn and soybean samples. The Grain Analyzer Sector considered lowering the tolerances for grain moisture meters based on this data. Subsequent to this testing the Grain Analyzer Sector received a report from a state to look at more data from different grain types and specifically rough rice. As such the Grain Analyzer Sector agreed to collect data, from additional states including other grain types. Notice was sent to participating states to collect more data on additional grains. The Grain Sector is in the process of collecting this data and hopes to have additional data to support the proposed changes. The Grain analyzer sector support this item as a Developing item.

The WWMA S&T Committee recommended the status remain Developmental.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting open hearing the Committee heard no comments on this item.

This Committee recommended this item remain Developing so that more data can be collected and presented in the future.

Northeastern Weights and Measures Association

At the 2022 NEWMA Interim Meeting Open Hearing, no comments were heard. The Committee recommended that this item remain in Developing status.

At the 2022 Annual NEWMA Meeting Open Hearing, Mrs. Butcher commented on background for this item. There had been concerns as to whether or not the current tolerances were too broad. The grain sector was looking into expanding the data set to include additional grains but there has been significant delay due to pandemic.

After hearing comments from the floor, the Committee recognized the need to further develop this item and recommended the item retain Developing status.

Central Weights and Measures Association

During the 2022 CWMA Interim Meeting open hearing the Committee heard comments from Ms. Lee (Technical Advisor to the Grain Analyzer sector) that the sector met in August of this year and four States will be submitting data. Once data is collected, it will be reviewed by the Grain Analyzer Sector to determine appropriate changes to the Grain Moisture Meter Code Tolerances. Mr. Doug Musick (Kansas) questioned if there is old technology that can meet this requirement and has any data been submitted regarding this?

CWMA S&T Committee recommended this item as Developing.

During the 2022 Annual CWMA Meeting open hearing, Mr. Musick noted that some feel that rice will not be able to meet the tighter tolerance. Supports moving to Voting. No data has been submitted regarding the concern, so they can do this at a later date if desired.

The CWMA S&T Committee recommended this moves forward as a Voting Item.

MDM – Multiple Dimension Measuring Devices

MDM-22.1 W S.1.7. Minimum Measurement.

(This Item was Withdrawn.)

Source: Parceltool P/L

Submitter's Purpose and Justification:

Exempt mobile tape based MDMD devices from the 12D minimum measurement.

NIST OWM Executive Summary for MDM-22.1 – S.1.7. Minimum Measurement.
NIST OWM Recommendation: Unless additional information to justify the proposed changes to the MDMD Code is provided to the Committee by the submitter (or submitter's consultant) on or before the 2022 NCWM Annual Meeting, OWM recommends this item be withdrawn.

NIST OWM Executive Summary for MDM-22.1 – S.1.7. Minimum Measurement.

- This is the identical proposal that appeared in the S&T Committee’s 2019 agenda (as S&T Item MDM-2) and was withdrawn by the Committee in 2019.
- The NCWM MDMD Work Group also reviewed the MDM-2 proposal during its spring 2019 meeting and recommended the item be withdrawn.
- We have reviewed our comments and recommendations provided to the 2019 S&T Committee for S&T Item MDM-2 and still find them relevant today. Consequently, we provide them again with only few minor changes in our detailed analysis of this item included below.
- There is no additional information provided in the justification section of this item in the Committee’s current agenda to explain the reason for resubmission or why the Committee should reconsider its earlier action to withdraw the item in 2019.
- We raised all of the above points during the 2022 NCWM Interim Meeting and recommended the Committee withdraw this item. During that same meeting, however, Mr. Darrell Flocken (NCWM) requested the Committee maintain a Developing status based upon a request he had received from the submitter’s consultant who indicated the submitter wished to resurrect the item.

Item under Consideration:

Amend Handbook 44, Multiple Dimension Measuring Devices Code as follows:

S.1.7. Minimum Measurement. – Except for entries of tare **and mobile tape based MDMD devices**, 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 2017 **and 20XX**)

NIST OWM Detailed Technical Analysis:

This very same proposal appeared in the S&T Committee’s 2019 agenda as Item MDM-2 and was withdrawn by the Committee in 2019. Additionally, the first two paragraphs included in the Committee’s current agenda beneath the heading “Original Justification,” are the very same two paragraphs contained in the Committee’s 2019 Interim Meeting Agenda in the Background Discussion section of the item. That is, there is no additional information provided in the justification section of this item in the Committee’s current agenda to explain the reason for resubmission or why the Committee should reconsider its earlier action to withdraw the item in 2019. OWM notes too that the NCWM MDMD work group also reviewed the MDM-2 proposal during its spring 2019 meeting and recommended the item be withdrawn.

We have reviewed our comments and recommendations provided to the 2019 S&T Committee for S&T Item MDM-2 and still find them relevant today. Consequently, we submit them again (shown in the box

below to include a few minor changes that we've made) to the Committee as our analysis for the item "MDM-22.1" in the Committee's current agenda.

OWM recognizes there is a potential for introducing excessive error in measurements when they are performed using a process or instrument that does not provide a sufficient level of resolution in the measurement. Minimum measurement requirements are established in NIST Handbook 44 device codes based on the premise, "rounding of digital values and the allowable error in a device from the application of tolerance creates the potential for large errors at small measurements." This effect decreases proportionately as the measurement size is increased along with the number of increments used in the measurement. To put this principle into perspective as it relates to multiple dimension measuring devices (MDMDs), NIST Handbook 44 maintenance and acceptance tolerances applicable to MDMDs are plus or minus 1 division (See paragraph T.3. Tolerance Values). Considering this tolerance in perspective with this proposal, a 1-division error within a 12-division measurement (i.e., the minimum measurement currently permitted in accordance with paragraph S.1.7.) represents over 8 percent of the measurement value ($1 \div 12 = 0.083 \approx 8.3\%$). If the measurement were to include 50 divisions (or increments), that same 1-division error represents only 2 percent of the measurement value ($1 \div 50 = 0.020$ or 2%).

Compounding the potential for even greater error is the fact that MDMDs are generally used to measure hexahedron-shaped objects by determining values for length, width, and height, and then multiplying these values together to determine the cubic volume occupied by the object. Since there are three measurements needed to determine the volume, the error effect of using a device to make small measurements is multiplied threefold. For example, a 1-division plus error at a 12-division measurement of length, width, and height would result in over a 27 percent error in the volume measurement of the object being measured as illustrated in the table below.

Axis	Measurement (+ 1 d error)	Actual
Length	13 d	12 d
Width	13 d	12 d
Height	13 d	12 d
Volume	2197 x-unit ³	1728 x-unit ³
Difference: Measurement minus Actual	$2197 \text{ x-unit}^3 - 1728 \text{ x-unit}^3 = 469 \text{ x-unit}^3$	
Percent error calculation	$(469 \text{ x-unit}^3 \div 1728 \text{ x-unit}^3) \times 100 = 27.1\%$	

Thus, given the potential that this proposal has for creating such very large measurement errors and the monetary impact those errors can have on commercial transactions, OWM does not believe this item should be advanced.

In addition, OWM also points out the following concerns relating to this item:

- A guiding principle in the development of HB 44 requirements is that the same requirements should apply to devices used in the same application, regardless of technology or design. The proposed change in this item violates the principle by proposing there be an exemption to one of the requirements in the MDMD code for a particular type of MDMD.
- The background/discussion pertaining to this item includes the statement that it is not unusual for measurements to be made of less than 12 divisions. If this is in fact the case, those using these devices commercially to take such measurements are violating the minimum measurement

requirement in HB 44. OWM would hope that the submitter of this item, knowing this to be true, would take necessary steps to educate users so that accurate measurements can be ensured. OWM believes that there may also be a problem caused by the use of a device with too large a division size for use in measuring small objects rendering that device unsuitable for the purpose intended. Another potential problem may be created when two devices with different division values are needed due to the wide linear range of the different axes needing to be measured.

- The background/discussion portion of this item also indicates an accepted practice for this type of device is for the measurement to be rounded up to the nearest whole division. OWM notes such rounding conflicts with the instructions provided on the Federal Express and United States Postal Service websites for determining DIM weight, that specify the measurements are to be rounded to the nearest inch.

The current 12 d minimum measurement specified in HB 44 is uniform with the same in OIML R 129. Thus, a change to HB 44 requirement would cause conflict with OIML requirements.

OWM's Comments and Recommendation for Item MDM-22.1 Copied from its 2019 Analysis of MDM-2

Summary of Discussions and Actions:

During Committee open hearings at the 2022 NCWM Interim Meeting, Mr. Rick Harshman (NIST OWM) reported this very same proposal had appeared in the S&T Committee's 2019 agenda (as S&T Item MDM-2) and was withdrawn by the Committee in 2019. Additionally, the first two paragraphs included in the Committee's current agenda beneath the heading "Original Justification," are the very same two paragraphs contained in the Committee's 2019 Interim Meeting Agenda in the Background Discussion section of the item. That is, there is no additional information provided in the justification section of this item in the Committee's current agenda to explain the reason for resubmission or why the Committee should reconsider its earlier action to withdraw the item in 2019. Mr. Harshman noted too that the NCWM MDMD work group also reviewed the MDM-2 proposal during its spring 2019 meeting and recommended the item be withdrawn. For these reasons, OWM recommended the item be withdrawn.

Mr. Darrell Flocken (NCWM) acknowledged he too was aware that the proposal is identical to the one that the Committee had withdrawn in 2019. He noted, however, that he had been contacted by a representative of the submitter and that this person had advised him the submitter desired to further pursue adoption of the proposal. Mr. Flocken indicated he expected new information to be made available to Committee from the submitter to provide better justification for it.

During the Committee's work session members of the Committee agreed to maintain the item on the Committee's agenda as a Developing item to allow the submitter an opportunity to provide additional information that could justify the proposed changes.

During the 2022 NCWM Annual Meeting, the developer did not provide any comments on this item.

During the Committee's work session members of the Committee agreed to maintain the item on the Committee's agenda as a Developing item.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings, Mr. Russell Vires (Mettler Toledo) is opposed to the change proposed here. No reason to eliminate the minimum measurement.

The WWMA S&T Committee recommended that this item be assigned a Developmental status. The Committee recommended that the submitter provide data to support why the devices are unable to meet the 12-division requirement. The Committee also recommended that the submitter consult the MDMD Working Group.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting Open Hearings, Mr. Vires requested that this item be withdrawn because the justification was invalid.

This Committee recommended this item be Withdrawn due to having no justification provided for the change.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open Hearing the following comments were heard.

Mr. Harshman commented that this is a new item and members of NIST OWM's LMDP have not had opportunity to review/consider it. There's little information provided in the background/discussion of this item. If the device has digital indication, by rounding all values up as is specified in the background/discussion, the device would fail to comply with HB 44 paragraph G-S.5.2.2.(c).

Mr. Lou Sakin (Hopkinton/Northbridge, Massachusetts) commented that this item is in-need of further development.

The NEWMA S&T Tolerances Committee recommended that this item be given Developing Status.

During the 2022 NEWMA Annual Meeting open hearings the following comments were heard:

Mr. Vires rose to oppose the item. He commented that the justification provided by the submitter does not identify the issue that is to be resolved. Mr. Vires suggested that the submitter works with MDM Workgroup for a solution and referenced the workgroup meets in May and will be discussing this proposal.

After hearing comments from the floor, the Committee recognized the need to further develop this item and recommended the item retain Developing status.

Central Weights and Measures Association

During the 2021 Interim Meeting Open Hearing the Committee heard no comments from the floor.

CWMA S&T Committee has no recommendation for this item.

During the 2022 Annual Meeting Open Hearings, the Committee received the following comments:

Mr. Vires stated the SMA opposes this item. The justification provided by the submitter does not adequately identify the issue this item is attempting to resolve, and why mobile tape-based MDMD devices should be exempted compared to all other MDMD devices. The SMA recommended that the submitter work with the MDMD Work Group to develop a suitable solution to this issue.

The CWMA S&T Committee recommends this item to be withdrawn.

Scale Manufacturers Association (SMA)

During the 2021 Fall Meeting the SMA opposed this item. The justification provided by the submitter does not adequately identify the issue this item is attempting to resolve, and why mobile tape-based MDMD devices should be exempted compared to other MDMD devices. The SMA recommended that the submitter works with the MDMD Workgroup to develop a suitable solution to this issue.

During the 2022 Spring Meeting the SMA opposed this item. The justification provided by the submitter does not adequately identify the issue this item is attempting to resolve, and why mobile tape-based MDMD devices should be exempted compared to all other MDMD devices. The SMA recommended that the submitter work with the MDMD Workgroup to develop a suitable solution to this issue.

OTH – Other Items

OTH-16.1 D Electric Watthour Meters Code under Development

Source: NIST Office of Weights and Measures

Submitter's Purpose and Justification:

- 1) Make the weights and measures community aware of work being done within the NIST U.S. National Work Group (USNWG) on Electric Vehicle Fueling and Submetering to develop proposed requirements for electric watthour meters used in submeter applications in residences and businesses;
- 2) Encourage participation in this work by interested regulatory officials, manufacturers, and users of electric submeters.
- 3) Allow an opportunity for the USNWG to provide regular updates to the S&T Committee and the weights and measures community on the progress of this work;
- 4) Allow the USWNG to vet specific proposals as input is needed.

NIST OWM Executive Summary for OTH-16.1 Electric Watthour Meters Code Under Development
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NIST OWM Recommendation: OWM recommends this item be retained on the Committee's agenda as a Developing item while the USNWG EVF&S EWH Subgroup finalizes a draft code for submission in the 2023 standards development cycle.

NIST OWM Executive Summary for OTH-16.1 Electric Watthour Meters Code Under Development

- The USNWG on Electric Vehicle Fueling & Submetering Electric Watthour Meter Subgroup (EWH SG) is charged with developing standards and test procedures utility-type watt hour meters.
- The SG has been developing a draft code for inclusion in NIST Handbook 44 and submitted an early draft in September 2021.
 - The draft was posted on the S&T Committee’s web site for review and comment with a request for comments by March 2022 to allow the SG to address concerns prior to finalizing the code for submission.
- The SG only received comments from California, Department of Measurement Standards (DMS) at the Fall 2021 WWMA meeting and again from the 2022 NCWM Interim Meeting supporting further development of this item. California concerns include:
 - identity marking requirements being on a separate document to satisfy model and serial number prefixes;
 - the current lack of clarification on what constitutes a separate document;
 - electronic versions of this information do not originate from the system;
 - testing capabilities should be easily and readily achievable before and after the installation to facilitate the resolution of accuracy complaints;
 - An additional observation is that the method of sealing for category II and III devices requires a hard copy of audit trail and event logger information whereas codes are considering the allowance of electronic forms of this information.
- The S&T Committee agreed to include this item as a Developing Item on its agenda to keep the weights and measures community informed of progress and facilitate participation by interested parties.
- Mrs. Tina Butcher (NIST OWM) has provided regular updates to the NCWM and regional weights and measures association S&T Committees on this work. Details are found in past Committee reports.
- In the Fall 2021 and Spring 2022 all of the regional weights and measures associations have recommended maintaining this item as a Developing item on the Committee’s agenda as the SG finalizes its draft.
- The SG continues work on the draft; it held eighteen meetings in 2021 and seven meetings thus far in 2022.
- The SG still hopes to resolve the remaining issues regarding the draft code and submit a draft to the NCWM S&T for consideration in the 2022-2023 NCWM cycle under this agenda item

NIST OWM Executive Summary for OTH-16.1 Electric Watthour Meters Code Under Development
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and asks the Committee to maintain this item as Developing on its agenda to facilitate this submission.

Item under Consideration:

This item was added to the NCWM S&T Committee’s agenda as a “Developing item” to allow a forum in which progress of the USNWG can be reported as it develops legal metrology requirements for electric watthour meters and continues work to develop test procedures and test equipment standards.

Mrs. Butcher (Chair of the USNWG on Electric Refueling & Submetering) has continued to provide regular updates to the Committee on this work and to encourage input and participation from the weights and measures community since the addition of this item to the Committee’s agenda in 2016. See the Committee’s 2016 through 2021 Final Reports and 2022 Interim Report for details.

The SG is nearing completion of a draft NIST Handbook code for “Non-Utility Electricity-Measuring Systems.” Work continues on a few sections of the draft code; however, the SG would like to begin getting feedback from the weights and measures community on the draft code. The SG requested that the Committee post an early draft of the code on the NCWM website.

The draft code was posted in Fall 2021 and is available for download at <https://www.ncwm.com/publication-15>.

The Subgroup asks the NCWM S&T Committee to consider (and the regional associations to support) the following.

1. Permitting the item to remain in a Developing status on its agenda to allow for further development and input on the draft Handbook 44 Code.
2. Permitting the SG to post the draft code along with other supporting documents on the NCWM S&T Committee’s web page. Areas under review and development by the SG will be noted in yellow highlighted text.
3. Encouraging weights and measures officials and industry to study the draft code and provide input to the SG, including proposed changes along with rationale for such changes and any indication of support or opposition.

The SG requested comments be submitted to the SG Chair or Technical Advisor by the end of March 2022. The above approach was intended to allow the SG the opportunity to solicit input and incorporate comments from the weights and measures community on the draft code in advance of proposing it for a vote more broadly.

The SG has continued to meet and revise specific areas of the code and still hopes to finalize a draft for submission in the 2022-2023 NCWM cycle.

The Electric Watthour Meter Subgroup (EWH SG) of the USNWG on Electric Vehicle Fueling & Submetering has held multiple in-person and web meetings since the 2017 NCWM Annual

Meeting. This SG has held 15 virtual meetings since January 2021 focused on finalizing a draft code on “Non-Utility Electricity-Measuring Systems.”

Those interested in participating in this work are asked to contact SG Chair, Ms. Lisa Warfield, or Technical Advisor, Mrs. Tina Butcher. Contact information is included in the “Background” section of this item.

NIST OWM Detailed Technical Analysis:

- The USNWG on Electric Vehicle Fueling & Submetering Electric Watthour Meter Subgroup (EWH SG) is charged with developing standards and test procedures utility-type watt hour meters.
- The SG developed a proposed addition to NIST Handbook 130’s Uniform Regulation for the Method of Sale (MOS) of Commodities specifying a method of sale for electrical energy sold through these systems; “Section 2.38. Non-Utility Transactions of Electrical Energy (Other than Vehicle Fueling Applications)” was adopted by the NCWM in July 2019.
- The SG has been developing a draft code for inclusion in NIST Handbook 44 and submitted an early draft in September 2021 which was posted on the NCWM’s web site for review and comment.
 - The SG requested comments by March 2022 to allow the SG to address any concerns in its final recommendations for a draft code.
- The SG received comments from California DMS through the Fall 2021 WWMA meeting and again from the 2022 NCWM Interim Meeting supporting further development of this item. California expressed concerns about identity marking requirements being on a separate document to satisfy model and serial number prefixes, noting the current draft does not clarify what constitutes a separate document (other than specifying a “hard” or “electronic” form) and does not originate from the system. California strongly feels testing capabilities should be easily and readily achievable before and after the installation as well as means for verifying validity of complaints based on inaccuracy. An additional observation is that, as written, the method of sealing for category II and III devices requires a hard copy of audit trail and event logger information; however, other codes are being considered to allow electronic forms of this information.
 - No other comments have been received.
- Mrs. Tina Butcher (NIST OWM) has provided regular updates to the NCWM and regional weights and measures association S&T Committees on this work. Details are found in past Committee reports.
- In September 2021, Mrs. Butcher submitted a request to NCWM S&T Committee Chair, Mr. Brad Bachelder to:
 1. Permit the item to remain in a Developing status on its agenda to allow for further development and input on the draft NIST Handbook 44 Code.
 2. Permit the SG to post the draft code along with other supporting documents on the NCWM S&T Committee’s web page. Areas under review and development by the SG are noted in highlighted text.

3. Encourage weights and measures officials and industry to study the draft code and provide input to the SG, including proposed changes along with rationale for such changes and any indication of support or opposition.
- Chair Bachelder agreed to post a draft of the code on the NCWM S&T Committee's web site.
 - The SG requests this item maintain a Developing status.
 - In their Fall 2021 meetings, all four regional weights and measures associations supported maintaining this item as a Developing item on the Committee's agenda as did the CWMA and NEWMA at their Spring 2022 annual meetings.
 - The S&T Committee agreed to include this item as a Developing Item on its agenda to keep the weights and measures community informed of progress and facilitate participation by interested parties.
 - Work continues on some sections of the draft code.
 - The SG held eighteen meetings in 2021 (February 3; February 4; February 22; March 11; March 25; April 19; April 26; May 26; June 2; June 16; June 24; July 12; July 13; August 23; August 24; November 2; November 16; November 18) and seven meetings thus far in 2022 (February 1, February 17, March 1, April 4, April 13, April 20, May 18, in addition to meetings of small Task Groups focused on specific issues.
 - The SG still hopes to resolve the remaining issues regarding the draft code and submit a draft to the NCWM S&T for consideration in the 2022-2023 NCWM cycle under this agenda item.
 - Those interested in participating in this work please contact:
 - Subgroup Chair, Ms. Lisa Warfield (NIST OWM)
Email: lisa.warfield@nist.gov or phone (301) 975-3308
 - Technical Advisor, Mrs. Tina Butcher (NIST OWM)
Email: tbutcher@nist.gov or phone (301) 975-2196

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, Mr. Matt Douglas (California – DMS) stated that California supports the development of this item but has concerns about identity marking requirements being on a separate document. Also, the devices should be easy to test before and after installation. This device should allow for electronic data logger. Ms. Juana Williams (NIST OWM) commented that the subgroup had provided a draft code that is on the website. Ms. Williams requested comments be submitted to Mrs. Butcher or Ms. Warfield by March 22, 2022. Ms. Williams stated these comments will be used to provide and updated draft for the 2022-2023 submission cycle and the item remain in Developing status. The Committee agreed that the item be given a Developing status.

At the 2022 NCWM Annual Meeting, the Committee heard an update from Mrs. Butcher highlighted the points in the Executive Summary to this item. Mrs. Butcher acknowledged this item has been on the agenda for several years, during which time the SG has been continually working to develop a draft code

for submission to the NCWM for consideration. The SG shared a draft with the Committee in August 2021 and asked that it be posted to the NCWM website. The SG had identified specific sections of the draft code which was still being refined by the SG. The SG had asked that those interested in this work review the remainder of the code and provide input that would allow the SG an opportunity to modify the draft to reflect their comments prior to submitting a final recommendation to the NCWM.

Mrs. Butcher reported that the SG is diligently continuing to work on this item, holding eighteen meetings in 2021 and seven meetings in 2022. She thanked those who provided comments during the regional and national meetings, noting in particular the Committee heard from California Division of Measurement Standards who noted that additional work is needed on the marking requirements. She noted that California and others have raised questions about the provision that would allow required markings to appear on a separate document and asked for clarifications on how this would work. Other concerns raised included making sure that testing capabilities are readily achievable both before and after installation and refining requirements for audit trail requirements to ensure that hard copies of any event loggers are available to the inspector. The SG appreciates this input and is working to resolve the remaining areas of concern identified and hopes to present a draft to the NCWM in the coming fall.

The Committee agreed to retain this item on its agenda with a Developing status while the SG continues its work.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearing the following comments were heard:

Mr. Matt Douglas (California - DMS): California supports further development of this item. Concerns about the identity marking information which allows a separate document to satisfy model and serial number prefixes and doesn't clarify what constitutes a separate document other than hard or electronic and does not originate from the system. We strongly feel that testing capabilities should be easily and readily achievable before and after the installation as well as means for verifying validity of complaints based on inaccuracy. An observation – as written the method of sealing category II and III requires a hard copy of audit trail and event logger information. Other codes are being considered to allow electronic forms of this information.

The WWMA S&T Committee recommended this item remain in a Developing status. The Committee acknowledged that, as referenced in the Committee's agenda, the submitter of the item has asked the item to remain in a Developing status to allow for further refinement and input on the draft NIST HB 44 code. Based upon this information and the comments received during its open hearings, the Committee encourages the NIST USNWG Subgroup to consider the comments provided by California DMS at the WWMA meeting. The Committee also encourages others in the weights and measures community to continue studying the draft code and provide input to the Subgroup as requested in the agenda item.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing the Committee heard no comments on this item.

This Committee recommended this item remain Developing so that more work can continue at the request of the submitter.

Northeastern Weights and Measures Association

During the 2021 Interim Meeting Open Hearing the following comments were heard.

Ms. Williams commented below and recommended Developing status.

- NIST OWM notes that the USNWG Subgroup on Watthour-Type Electric (EWH) Meters is nearing completion of its proposed tentative code for utility-type watthour submeters.
- As noted in the agenda, there are a few sections of the draft code that require additional work by the EWH Subgroup.
 - NIST OWM asks that the item remain in a Developing status while the Subgroup completes these remaining items.
- The Subgroup is asking for feedback on the remaining portions of the draft code thus far.
 - The NCWM S&T Committee has agreed to post the draft on the S&T's website to allow for broader review and comment.
 - NIST OWM encourages review and input on the draft.
 - This input will allow the Subgroup to begin incorporating feedback from the community and better prepare the draft for submission in the 2022-2023 cycle.

The NEWMA S&T Committee recommended that this item be given Developing status.

At the 2022 NEWMA Annual Meeting, NEWMA heard from Mrs. Tina Butcher (NIST OWM) who commented this item pertains to electric submeters. The Subgroup is still working on the proposal and has prepared a draft; however, three or four items need to be resolved with regard to criteria for marking and testing.

After hearing comments from the floor, the Committee recognized the need to further develop this item and recommended the item retain Developing status.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting open hearing the Committee heard comments from the floor. Mrs. Butcher noted the item has been on the agenda for five years. Needs a little more work from subcommittee. She recommended item as Developing and would like public comments.

The CWMA S&T Committee recommended the item as a Developing item.

At the 2022 CWMA Annual Meeting, the CWMA heard from Ms. Warfield who reported that an extensive group of industry and regulators are working to understand each other's roles as this code develops. The NIST Work Group is quite active and making progress. The CWMA S&T Committee recommended this item to remain as Developing.

OTH-22.2 VC Appendix D – Definitions: face

(This Item was Adopted.)

Source: NIST Office of Weights and Measures

Submitter’s Purpose and Justification:

To correct the apparent oversight of *not* referencing the codes that clearly make use of the term “face”; include the missing code section numerical designations of 3.32, 3.37, and 3.39 in the [brackets] following the second meaning definition of the term “face” in NIST Handbook 44 Appendix D. The inclusion of those specific device code designations will clarify the term is applicable to retail devices addressed in the LPG and Anhydrous Ammonia Liquid-Measuring Devices, Mass Flow Meters (MFM), and Hydrogen Gas-Measuring Devices Codes, respectively. The term has special meaning for these types of systems because the “face” of these retail devices is specified as the only permissible location for specific quantity, pricing, and related marking information that provide clarity about the correct computation of each sale by the dispensing system.

NIST OWM Executive Summary for OTH-22.2 – Appendix D – Definitions: face

NIST OWM Recommendation: OWM believes this item is fully developed and ready for a vote. This item corrects an oversight that was made when the term was originally added to NIST Handbook 44 and helps ensure consistency in the application of the term across multiple codes.

- This proposal corrects the inadvertent omission of multiple numerical code designations from the definition of “face” where this unique term is cited in those code’s design and user requirements.
- Including the added reference in the definition to the missing three code sections ensures the manufacturers of these devices has information for the proper placement of transaction information in use by both the buyer and seller and necessary to the regulatory official.
- The current definition of “face” remains broad enough to recognize both customary transaction information as well as the more recent use of nontraditional application-specific information.

Item under Consideration:

Modify the definition for “face” in Appendix D definitions as follows:

face. – That portion of a computing-type pump or dispenser which displays the actual computation of price per unit, delivered quantity, and total sale price. In the case of some electronic displays, this may not be an integral part of the pump or dispenser. [3.30, 3.32, 3.37, and 3.39]

(Added 1987) (Amended 2022)

NIST OWM Detailed Technical Analysis:

This proposal is a housekeeping item intended to correct the omission of multiple numerical designations of applicable code sections from the NIST HB 44 Appendix D definition of the term “face.” Those codes’ numerical designations should have appeared in the definition at the same time as the term “face” was first recognized in each codes’ display and posting requirements.

The consistent and proper placement of specific transaction information on the “face” of the dispenser ensures clear and easy access, selection, and use of that information throughout the entire sale by both the buyer and seller. The appearance of references to those code designations in the definition of the term “face” also benefit the manufacturer designing the device.

The proposal expands the handbook codes referenced in the definition of “face” from one to four code sections. The 15 relevant handbook code paragraphs and their respective code sections that include requirements for specific information to be either indicated, displayed, posted, or automatically shown on the “face” of device types in addition to retail liquid measuring devices (i.e., code section 3.30) are listed below:

(1) 3.32 LPG and NH₃ Liquid-Measuring Devices**S.1.4.1. Indication of Delivery****S.1.5.1. Display of Unit Price and Product Identity****UR.2.7.1. Unit Price and Product Identity**

(2) 3.37 MFM Code, and

S.2.5.1. Unit Price**S.2.6.2. Display of Quantity and Total Price****S.2.8. Indication of Delivery****S.5.2. Marking of Equivalent Conversion Factors for Compressed Natural Gas****S.5.3. Marking of Equivalent Conversion Factor for Liquefied Natural Gas****UR.3.1. Unit Price and Product Identity for Retail Dispensers****UR.3.1.1. Marking of Equivalent Conversion Factors for Compressed Natural Gas****U.R.3.1.2. Marking of Equivalent Conversion Factor for Liquefied Natural Gas**

(3) 3.39 Hydrogen Gas-Measuring Devices

S.2.4.1. Unit Price**S.2.5.2. Display of Quantity and Total Price****S.2.7. Indication of Delivery****UR.3.1. Unit Price and Product Identity for Retail Dispensers**

The wording of the current definition may seem a bit archaic; however, its scope remains broad enough to recognize both customary transaction information as well as the more recent use of nontraditional application-specific computational information such as supplemental fuel conversion units or instances where there is the option for use of either a built-in or remote primary display.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, based on no comments in opposition and the submitter’s request for Voting status, the Committee recommended that this item be voted on during the annual meeting.

At the 2022 NCWM Annual Meeting, Mrs. Tina Butcher (NIST OWM) reiterated the proposal is a housekeeping item and the term “face” is used in retail motor fuel dispenser applications. Mr. Dimitri Karimov (MMA) supported this proposal as a housekeeping item. Mr. Charles Stutesman (Kansas) supported the proposal, and its findings represent good oversight. Mr. Stutesman also noted that the term “master meter” in electrical energy metering applications is not consistent with past use of the term. Technical Advisors Note: NIST Handbook 44 Section Appendix D – Definitions includes multiple meanings for the same term when a term may be applicable to and used in a different context across multiple device-specific codes. Hearing no opposition or proposals for further modification of the definition of “face,” Agenda Item OTH-22.2 was made part of the Voting Consent Calendar where it was successfully adopted as written.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearing the following comments were heard:

Mr. Matt Douglas (California - DMS) remarked this item seems to be a housekeeping issue. CA DMS supports amending this handbook code definition.

The WWMA S&T Committee recommended that this item be assigned a Voting status. The Committee agreed that this item has merit and is fully developed.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting open hearing, the SWMA S&T Committee heard no comments on this item.

The SWMA recommended moving this proposal forward as a Voting Item.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting open hearing the following comments were heard.

Ms. Juana Williams (NIST OWM) commented that this is a housekeeping item and recommended moving forward as a Voting Item.

Mr. Jim Willis (New York) also supported giving this item Voting status.

The NEWMA S&T Committee recommended that this item be moved forward with a Voting status.

During the 2022 NEWMA Annual Meeting open hearing no comments were heard on this item. NEWMA made no recommendation to the NCWM.

Central Weights and Measures Association

During the 2021 Interim Meeting open hearing the Committee heard comments from the floor. Mrs. Tina Butcher (NIST) stated this item is cleaned up and ready to move forward as a Voting Item.

CWMA S&T Committee recommended this item move forward as a Voting Item.

During the 2022 Annual Meeting open hearing no comments were heard from the floor.

The CWMA S&T Committee recommended this proposal move forward as a Voting Item. CWMA recommended this proposal be included as a Voting Item on the NCWM agenda.

Item Block 1 (B1) Terminology for Testing Standards

(This Item was Withdrawn.)

(Original B1 items)

B1: SCL-18.1	W	N.2. Verification (Testing) Standards
B1: ABW-18.1	W	N.2. Verification (Testing) Standards
B1: AWS-18.1	W	N.1.3. Verification (Testing) Standards, N.3.1. Official Tests, UR.4. Testing Standards
B1: CLM-18.1	W	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B1: CDL-18.1	W	N.3.2. Transfer Standard Test, T.3. On Tests Using Transfer Standards
B1: HGM-18.1	W	N.4.1. Master Meter (Transfer) Standard Test, T.4. Tolerance Application on Test Using Transfer Standard Test Method
B1: GMM-18.1	W	5.56(a): N.1.1. Air Oven Reference Method Transfer Standards, N.1.3. Meter to Like-Type Meter Method Transfer Standards and 5.56(b): N.1.1. Transfer Standards, T. Tolerances ¹
B1: LVS-18.1	W	N.2. Testing Standards
B1: OTH-18.1	W	Appendix A: Fundamental Considerations, 3.2. Tolerances for Standards, 3.3. Accuracy of Standards
B1: OTH-18.2	W	Appendix D – Definitions: fifth-wheel, official grain samples, transfer standard and Standard, Field

(**Note:** During the 2019 NCWM Interim Meeting, the S&T Committee considered comments during Opening Hearings and recommended that the following Items appearing on the 2019 Agenda as GEN-3, B1, B2, LPG-3 and MFM-5 be combined and gave these items an Assigned status. Item Block 1 included previously numbered items: GEN-3; Block 1; Block 2; LPG-3; and MFM-5.

Note: Based on comment heard during the 2021 Annual Meeting, the S&T Committee recommended that all items that were combined with Block 1 “Terminology For Testing Standards” and originally appeared as a separate item or separate block of items on the S&T agenda prior to 2019, be removed from Block 1 and appear as originally presented. As such, the items presented in this block are the original items included in Block 1 “Terminology For Testing Standards”.)

Source: NIST Office of Weights and Measures

Submitter’s Purpose and Justification:

To remove the current limited definition and use of the term “Transfer Standard” and eliminate terms “Testing Standards”, “Verification (Testing) Standards”, and instead use the term Field Standard, consistent with its reference in Handbook 44, Appendix A, Fundamental Considerations and its use in several sections of Handbook 44. To correct the broad use of the term Transfer Standard and instead

replace its use with the term Field Standard. To update all use of the term “standard” to use the term “Field Standard”. To remove the current limited definition of Transfer Standard and instead use the term Field Standard.

The term transfer standard is currently defined in NIST HB 44 as only being applicable to the Cryogenic Liquid Measuring Devices Code. This definition should be removed as it is very limited in scope and the item termed a ‘transfer standard’ is in fact a robust working measurement standard used in field conditions, better termed and shortened to Field Standard. All instruments/devices used as a Field Standard in the testing of Weighing and Measuring Devices, regardless of nomenclature, must comply with the requirements of HB 44, Appendix A, Fundamental Considerations Associated with the Enforcement of Handbook 44 Codes, paragraph 3.2 Testing Apparatus, Adequacy. Using the term transfer standard as it is recently being applied in no way negates this requirement of adequacy and confuses the user as to the nature of the field standard being used.

Use of the single word ‘standard’ to signify use of a field standard can be confusing as there are a number of different meanings associated with ‘standard’. It could be a documentary standard, i.e., HB 44; a primary standard used to realize the SI, i.e., Watt Balance; a laboratory reference standard used to ensure traceability of laboratory measurements to the SI, i.e., NIST calibrated laboratory standards; a laboratory check standard used to monitor the laboratory process. Use of the single word ‘standard’ requires that the reader understand completely the context of its use. Instead using the term Field Standard ensures that the reader understands that the item described is a robust working standard used in field conditions to ensure traceability of the subordinate measurements to the SI and leaves no ambiguity in its meaning.

Thus, the recommended changes to HB 44 align that document with the HB 130, removing ambiguity and adding clarity to the use of Field Standards for device testing.

Handbook 130 does NOT contain the term transfer standard in any location and already contains the definition and appropriate use of the term Field Standard in the following locations:

1.12. Standard, Field. – A physical standard that meets specifications and tolerances in NIST Handbook 105-series standards (or other suitable and designated standards) and is traceable to the reference or working standards through comparisons, using acceptable laboratory procedures, and used in conjunction with commercial weighing and measuring equipment.

(Added 2005)

Uniform Weights and Measures Law

Section 3. Physical Standards

Weights and measures that are traceable to the U.S. prototype standards supplied by the Federal Government, or approved as being satisfactory by NIST, shall be the state reference and working standards of weights and measures, and shall be maintained in such calibration as prescribed by the NIST as demonstrated through laboratory accreditation or recognition. All field standards may be prescribed by the Director and shall be verified upon their initial receipt and as often thereafter as deemed necessary by the Director.

(Amended 2005)

Section 12. Powers and Duties of the Director

The Director shall:

...

(h) verify the field standards for weights and measures used by any jurisdiction within the state, before being put into service, tested annually or as often thereafter as deemed necessary by the Director based on statistically evaluated data, and approve the same when found to be correct;

(Amended 2005)

Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices

Section 1. Policy

For the benefit of the users, manufacturers, and distributors of commercial weighing and measuring devices, it shall be the policy of the Director of Weights and Measures, hereinafter referred to as “Director,” to accept registration of (a) an individual and (b) an agency providing acceptable evidence that he, she, or it is fully qualified by training or experience to install, service, repair, or recondition a commercial weighing or measuring device; has a thorough working knowledge of all appropriate weights and measures laws, orders, rules, and regulations; and has possession of, or has available for use, and will use suitable and calibrated weights and measures field standards and testing equipment appropriate in design and adequate in amount. (An employee of the government shall not be eligible for registration.)

The Director will check the qualifications of each applicant. It will be necessary for an applicant to have available sufficient field standards and equipment (see Section 5, Minimum Equipment).

Section 9. Examination and Calibration or Certification of Standards and Testing Equipment All field standards that are used for servicing and testing weights and measures devices for which competence is registered shall be submitted to the Director for initial and subsequent verification and calibration at intervals determined by the Director. A registered serviceperson or registered service agency shall not use in servicing commercial weighing or measuring devices any field standards or testing equipment that have not been calibrated or verified by the Director. In lieu of submission of physical standards, the Director may accept calibration and/or verification reports from any laboratory that is formally accredited or recognized. The Director shall maintain a list of organizations from which the state will accept calibration reports. The state shall retain the right to periodically monitor calibration results and/or to verify field standard compliance to specifications and tolerances when field standards are initially placed into service or at any intermediate point between calibrations.

(Added 1966) (Amended 1984, 1999, and 2005)

NIST OWM Executive Summary for Item Block 1 (B1) Terminology for Testing Standards
NIST OWM Recommendation: The submitter, NIST OWM withdrew this item at the 2022 Interim Meeting. NIST OWM worked with Seraphin on Block 8 items which includes proposed definitions for Standards in NIST HB 44 and these terms and definitions are proposed and being considered.

Item under Consideration:

B1: SCL-18.1 W N.2. Verification (Testing) Standards

Amend Handbook 44, Scales Code as follows:

N.2. Verification (Testing) Field Standards. – Field standard weights used in verifying weighing devices shall comply with requirements of NIST Handbook 105-Series standards (or other suitable and designated standards) or the tolerances expressed in Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).

(Amended 1986 and 20XX)

B1: ABW-18.1 W N.2. Verification (Testing) Standards

Amend Handbook 44, Automatic Bulk Weighing Systems Code as follows:

N.2. ~~Verification (Testing) Field Standards~~. – **Field S**tandard weights and masses used in verifying weighing devices shall comply with requirements of NIST Handbook 105-1 (Class F) or the tolerances expressed in Appendix A, Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).

(Amended 20XX)

B1: AWS-18.1 W N.1.3. Verification (Testing) Standards, N.3.1. Official Tests, UR.4. Testing Standards

Amend Handbook 44, Automatic Weighing Systems Code as follows:

N.1.3. ~~Verification (Testing) Field Standards~~. – Field standard weights shall comply with requirements of NIST Handbook 105-1, “Specifications and Tolerances for Field Standard Weights (Class F)” or the tolerances expressed in Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).

(Amended 20XX)

N.3.1. Official Tests. – Officials are encouraged to periodically witness the required “in house” verification of accuracy. Officials may also conduct official tests using the on-site **testing field** standards or other appropriate standards belonging to the jurisdiction with statutory authority over the device or system.

(Amended 20XX)

UR.4. ~~Testing Field Standards~~. – The user of a commercial device shall make available to the official with statutory authority over the device **testing field** standards that meet the tolerance expressed in Fundamental Considerations, paragraph 3.2. Tolerances for Standards (i.e., one-third of the smallest tolerance applied). The accuracy of the **testing field** standards shall be verified annually or on a frequency as required by the official with statutory authority and shall be traceable to the appropriate SI standard.

(Amended 20XX)

B1: CLM-18.1 W N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards

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

N.3.2. ~~Transfer Field Standard Test~~. – When comparing a meter with a calibrated **transfer field** standard, the test draft shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate, and shall in no case be less than 180 L (50 gal) or equivalent thereof.

When testing uncompensated volumetric meters in a continuous recycle mode, appropriate corrections shall be applied if product conditions are abnormally affected by this test mode.

(Amended 1976 and 20XX)

~~**T.3. On Tests Using 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.**~~

~~(Added 1976)~~

B1: CDL-18.1 W N.3.2. Transfer Standard Test, T.3. On Tests Using Transfer Standards

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

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

(Amended 20XX)

~~**T.3. On Tests Using 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.**~~

B1: HGM-18.1 W N.4.1. Master Meter (Transfer) Standard Test, T.4. Tolerance Application on Test Using Transfer Standard Test Method

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

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

(Amended 20XX)

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

B1: GMA-18.1 W 5.56(a): N.1.1. Air Oven Reference Method Transfer Standards, N.1.3. Meter to Like-Type Meter Method Transfer Standards and 5.56(b): N.1.1. Transfer Standards, T. Tolerances¹

Amend Handbook 44, Grain Moisture Meters Code as follows:

5.56.(a) Grain Moisture Meters

N.1.1. Air Oven Reference Method ~~Transfer~~ Field Standards. – Official grain samples shall be used as the official ~~transfer field~~ field standards with moisture content and test weight per bushel values assigned by the reference methods. The reference methods for moisture shall be the oven drying

methods as specified by the USDA GIPSA. The test weight per bushel value assigned to a test weight transfer standard shall be the average of 10 test weight per bushel determinations using the quart kettle test weight per bushel apparatus as specified by the USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added).

(Amended 1992, 2001, ~~and~~ 2003, and 20XX)

N.1.3. Meter to Like-Type Meter Method Transfer Standards. – Properly standardized reference meters using National Type Evaluation Program approved calibrations shall be used as **transfer field** standards. A reference meter shall be of the same type as the meter under test. Tests shall be conducted side-by-side using, as a comparison medium, grain samples that are clean and naturally moist, but not tempered (i.e., water not added).

(Added 2001) (Amended 20XX)

5.56.(b) Grain Moisture Meters

N.1.1. Transfer Field Standards. – Official grain samples shall be used as the official **transfer field** standards with moisture content values assigned by the reference methods. The reference methods shall be the oven drying methods as specified by the USDA GIPSA. Tolerances shall be applied to the average of at least three measurements on each official grain sample. Official grain samples shall be clean and naturally moist, but not tempered (i.e., water not added).

(Amended 1992 and 20XX)

T. Tolerances¹

¹These tolerances do not apply to tests in which grain moisture meters are the **transfer field** standards.
(Amended 20XX)

B1: LVS-18.1 W N.2. Testing Standards

Amend Handbook 44, Electronic Livestock, Meat and Poultry Evaluation Systems and/or Devices Code as follows:

N.2. Testing Field Standards. – ASTM Standard F2343 requires device or system users to maintain accurate **reference field** standards that meet the tolerance expressed in NIST Handbook 44 Fundamental Considerations, paragraph 3.2. Tolerances for Standards (i.e., one-third of the smallest tolerance applied).

(Amended 20XX)

B1: OTH-18.1 W Appendix A: Fundamental Considerations, 3.2. Tolerances for Standards, 3.3. Accuracy of Standards

Amend Handbook 44, Appendix A: Fundamental Considerations as follows:

3.2. Tolerances for Field Standards. – Except for work of relatively high precision, it is recommended that the accuracy of standards used in testing commercial weighing and measuring equipment be established and maintained so that the use of corrections is not necessary. When the standard is used without correction, its combined error and uncertainty must be less than one-third of the applicable device tolerance.

Device testing is complicated to some degree when corrections to standards are applied. When using a correction for a standard, the uncertainty associated with the corrected value must be less than one-third of the applicable device tolerance. The reason for this requirement is to give the device being tested as nearly as practicable the full benefit of its own tolerance.

(Amended 20XX)

3.3. Accuracy of Field Standards. – Prior to the official use of testing apparatus, its accuracy should invariably be verified. Field standards should be calibrated as often as circumstances require. By their nature, metal volumetric field standards are more susceptible to damage in handling than are standards of some other types. A field standard should be calibrated whenever damage is known or suspected to have occurred or significant repairs have been made. In addition, field standards, particularly volumetric standards, should be calibrated with sufficient frequency to affirm their continued accuracy, so that the official may always be in an unassailable position with respect to the accuracy of his testing apparatus. Secondary field standards, such as special fabric testing tapes, should be verified much more frequently than such basic standards as steel tapes or volumetric provers to demonstrate their constancy of value or performance.

Accurate and dependable results cannot be obtained with faulty or inadequate field standards. If either the service person or official is poorly equipped, their results cannot be expected to check consistently. Disagreements can be avoided, and the servicing of commercial equipment can be expedited and improved if service persons and officials give equal attention to the adequacy and maintenance of their testing

(Amended 20XX)

B1: OTH-18.2 W Appendix D – Definitions: fifth-wheel, official grain samples, transfer standard and Standard, Field

Amend Handbook 44, Appendix A: Fundamental Considerations as follows:

fifth wheel. – A commercially-available distance-measuring device which, after calibration, is recommended for use as a field ~~transfer~~ standard for testing the accuracy of taximeters and odometers on rented vehicles. [5.53, 5.54]

(Amended 20XX)

official grain samples. – Grain or seed used by the official as the official-~~transfer~~ field standard from the reference standard method to test the accuracy and precision of grain moisture meters. [5.56(a), 5.56(b)]

(Amended 20XX)

~~**transfer standard.** – A measurement system designed for use in proving and testing cryogenic liquid measuring devices. [3.38]~~

Standard, Field. – **A physical standard that meets specifications and tolerances in NIST Handbook 105-series standards (or other suitable and designated standards) and is traceable to the reference or working standards through comparisons, using acceptable laboratory procedures, and used in conjunction with commercial weighing and measuring equipment.**

(Added 20XX)

NIST OWM Detailed Technical Analysis:

Seraphin and NIST OWM worked on revisions to GEN-19.1 and OTH-22.1 which is now Block 8. The definitions and terminology proposed in Block 8 are in conflict with the terminology in Block 1. As such, NIST OWM may revisit its work with Seraphin to develop revisions to Block 1 Terminology that would agree with Block 8 currently on the 2022 S&T Interim Meeting agenda, at a later date.

Summary of Discussions and Actions:

The Committee received written comments on all items in Block 4 and Block 5, as well as LPG-4 and MFM-2 emphasizing the need for there to be more study and discussion of the issues to assess the ramifications of all the proposed changes. The Committee also received written comments from the SMA that it looks forward to further information on these items and stating that it is important to be consistent in our use of terms across multiple sections of NIST Handbook 44. The Committee agreed to carryover this group of items on its 2019 agenda to allow for further discussion and development of these proposals.

At the 2019 Interim Meeting the S&T Committee decided to combine the items on the agenda dealing with the issue of transfer standard (including items already combined into blocks) into one block. Block 1 (New) of the Interim Meeting report now includes GEN-3, Block 1 (original items from the 2019 interim agenda that appeared under Block 1), Block 2, LPG-3, and MFM-5, which were all separate items and blocks of items on the S&T Committee's 2019 Interim Meeting agenda (NCWM Publication 15). Agenda items GEN-3, Block 1, Block 2, LPG-3, and MFM-5 are listed separately on the Interim agenda with a note added beneath each individual item referring the reader to the New B1 items. All items under this New B1 have retained the same numbering system for ease in referring to the appendix for discussion on each item.

At the 2019 Annual Meeting, Mr. Brett Gurney (NCWM Chair) commented regarding the formation of a Task Group assigned to further develop this block proposal. The TG is charged with providing definitions for various types of standards (transfer, field, reference, etc.) as well as the criteria to be met by these types of standards. The completion date given to the TG is July 2021. The Committee agreed to the Assigned status for this block of items and looks forward to hearing updates from the TG. The Chair of the task group was:

Mr. Jason Glass
Kentucky Department of Agriculture
(502) 573-0282, jason.glass@ky.gov

At the 2020 Interim Meeting, the Field Standard TG Chair Glass reported that the Task Group met prior to the Interim meeting and has begun discussion of the items under Block 1. Mr. Glass stated that bi-weekly teleconference meetings were scheduled and that the group was optimistic but had significant work to accomplish.

Mr. Russ Vires (speaking on behalf of SMA) supported the Scale item, SCL 18.1; in this block, Mr. Dimitri Karimov (Meter Manufacturers Association) supported the Task Group activities, Mrs. Tina Butcher (NIST OWM) was encouraged with the progress on terminology and provided an update on the Mass Flow Meter testing reporting that field testing was conducted October 28 to November 1, 2019 and that State and Industry participation included Colorado, Florida, Oregon, Emerson, and Tulsa Gas Technology.

Mr. Kurt Floren (Los Angeles County, California) raised concerns with GEN-19.1. regarding the definition of “Standard, Field” and its reference to “stable” standards and how long a standard is expected to be stable, which is typically 1-year, for which he believes should be longer. Mr. Floren also questioned the statement in the definition “tested over a range of environmental and operational conditions that the measuring devices is used...” Mr. Floren noted that he was unsure if all laboratories will have the capabilities to test over this wide range of conditions. Mr. Floren also expressed concerns with the definition “Standard, Transfer” citing that this standard may not meet the fundamental considerations requirement for standards over a long period of time or wide range of environmental conditions.

Mr. Steve Harrington (Oregon) echoed Mr. Floren’s comments. Field Standard TG Chair Glass responded that these are concerns of the TG and these issues will be discussed and considered as the TG develops these items.

During the Committee’s work session, the Committee agreed that this item should remain an Assigned item.

At the 2021 Interim Meeting the NCWM Field Standard TG Chair, Mr. Glass provided an update on the Task Group activities. Mr. Glass reported that the Field Standard Task Group is following the activities of the NIST Master Meter Project and that the Task Group reviewed API specifications for use of master meters as a standard and a test protocol that will be used to ensure uniformity in collecting data on master meters used as field standards. He also reported that the TG does not have a recommendation for this item. Mr. Glass also reported that he would be stepping down as the TG Chair. Mr. Mike Keilty (Endress+Hauser AG) thanked Chair Glass and the TG for their work and requested that Block 1, LPG-15.1, N.3. and Block 1 MFM-15.1, N.3 be removed from Block 1 items and to allow those items to move forward separate from the other Block 1 Items. Mr. Keilty stated that similar language was added to the Hydrogen code and that the proposed language in LPG-15.1 N.3. and MFM-15.1, N.3 will allow for the recognition of master meters as field standards. Mr. Henry Oppermann (WM-Consulting) stated that data is needed to ensure that master meters can be used over a range of conditions. Mr. Robert Murnane (Seraphin) stated that jurisdictions have the ability to use meters and that Block 1 LPG-15.1, N.3 and Block 1 MM-15.1, N.3 should remain in Block 1 until data is available to support the use of master meters as a standard. Mr. Keilty mentioned that there has been useful dialog regarding master meters in the TG, but that he is concerned that the TG is not close to deciding and he expressed concerns with the TG’s focus on the NIST Master Meter Project. Mrs. Tina Butcher (NIST OWM) provided an update on the NIST Master Meter Project and noted that States have the regulatory powers to accept or reject a standard. She also mentioned that NIST is working with States to collect data needed to assess master meters and preliminary testing was conducted and data was collected on CNG at Tulsa Gas Technology’s facility in fall 2019. Ms. Diane Lee (NIST OWM) noted that NIST OWM feels that it is premature to add more language to the Handbook 44 on master meters without data to support its use.

During the Committee’s work session, the Committee agreed to keeps all items in Block 1 and that this item should remain with an Assigned status.

At the 2021 Annual Meeting, Mr. Glass reported that he would be stepping down as the Field Standard TG Chair. The Committee heard updates from members of the Task Group during open hearings. Mr. Keilty noted that two of the items had been on the agenda since 2015 and requested that they be removed from the block and recommended recognizing the use of master meters. Other comments were to keep the items together until data is analyzed from the NIST Field Reference Standard Work Group to support the use of master meters but that if some items were removed from the block, all items should be removed from the block. Based on comments heard during the 2021 Annual Meeting, the S&T Committee recommended that all items that were included in Block 1 “Terminology For Testing Standards” that

originally appeared as a separate item or a separate block of items on the S&T agenda in and prior to 2019, be removed from Block 1 “Terminology For Testing Standards” and appear as originally presented.

During the 2021 Committee work session the Committee recognized that the Task Group has accomplished all it is able to at this point and is recommending the Task Group be disbanded and will make said recommendation to the NCWM Chair. The Committee agreed to break all items in Block 1 into individual items and designate them all as Developing. The Committee thanks the Task Group and its members for their work.

At the 2022 Interim Meeting, Ms. Diane Lee (NIST OWM, submitter) provided written comments recommending withdrawal of the block. Ms. Lee spoke during open hearings to explain that while the items have merit and NIST will continue to be worked on them, they should be withdrawn at this time while the language and terms are aligned with other items in the handbook.

Written comments were received from Mr. Russ Vires, representing the Scale Manufacturers Association (SMA) spoke during the open hearing to express the support for further development. Additional comments were heard from regulatory officials recommending development of the block items.

During the S&T Committee work session, the Committee agreed to recommend this item for withdrawal to allow for the submitter to continue work on this item and allow for alignment as other related items in the Handbook are developed and move forward.

During the 2022 Annual Meeting this item was not discussed because it was withdrawn by the submitter at the 2022 Interim Meeting.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Mr. Vires (Mettler Toledo) commented that there are some conflicts now that GEN-19.1 and OTH-18.1 have been removed from block1. This needs additional work. Mr. Vires Recommended that Block 1 remain developing to give stakeholders the opportunity to properly vet item

Ms. Diane Lee (NIST OWM) noted that Mr. Russ Vires is correct. Previous agenda item OTH-18.1 was listed as a separate item on the agenda but it has always been a part of block 1. The question is what terminology will be used, Master meters, transfer standards etc. Block 1 proposes that the term Field standards be used in all codes. NIST supports Developing status.

Mr. Floren stated that he would not comment on technical specs. Mr. Floren had a question on the status for items SCL-18.1 and OTH-18.3. He noted that these are shown as Assigned items and questioned if they had been assigned to a task force or are they still with the submitter of the item, NIST? He also mentioned that we need to define the terms (field standard and transfer standard).

Mr. Josh Nelson (Ex-Officio NCWM S&T Committee) responded to Mr. Floren and noted that Block 1 had previously been Assigned but the Task Group disbanded to allow NIST to continue their work on field reference meters. The task group is considering participating on the NIST Field Reference Meter work group to gain more understanding. Mr. Nelson also noted that there is an error in the report. The status of the item should be changed to Developing.

Mr. Matt Douglas of California - DMS supported further development.

Mr. Don Onwiler (NCWM) reported that the S&T Committee informed him that the block would be separated. Mr. Onwiler noted that the National S&T Committee will review and edit the proposal as appropriate.1 as an individual item.

Ms. Cadence Matijevich (Nevada) commented that NIST HB 105 may be a useful reference document to reference for definitions to avoid conflict between NIST HB 44 and NIST HB 105.

The WWMA S&T Committee recommended the status remain Developmental.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing Mr. Oppermann (Weights and Measures Consulting, Seraphin) stated that you can't call everything a Field Standard, and that he supports this item remaining Developing so the group can work with OWM to align their terminology.

Mr. Vires (speaking on behalf of SMA) stated they support the Block 1 items for SCL/ABW/AWS because it is important to use consistent terminology across Handbook 44.

Mr. Vires (speaking on behalf of Mettler Toledo) stated that this item conflicts with Gen 19.1, and that he supported this item remaining Developing.

This Committee felt that more work needs to be done on this item regarding consistent terminology.

This Committee recommended this item remain Developing pending the Field Standard Task Group finding a new Chairperson.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting Open Hearing the following comments were heard.

Mr. Henry Opperman (W&M Consulting/Seraphin) commented that this item should remain a Developing item along with continued discussions with NIST OWM.

Mr. Lou Straub (SMA) supported the proposal as it applies to the items SCL-18.1, ABW-18.1, and AWS-18.1 items, and looks forward to further development by the Task Group.

Mr. Opperman (Seraphin) commented that this block originally contained (Gen 19.1) that was separated from the block and recommended further development.

The NEWMA S&T Committee recommended that this item remain in Developing status.

During the 2022 Annual Meeting open hearing this item was not discussed because the item was withdrawn at the 2022 Interim Meeting.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting open hearing, the Committee heard comments from the floor. Ms. Diane Lee (NIST OWM) mentioned that other items have been taken out of this block and that NIST

OWM will be working with Seraphin to come up with better language. It maybe that “Meter” is more suitable. But this item should remain Developing. Mrs. Tina Butcher (NIST OWM) submitted OTH 22.1 and will help develop more. Mr. Lou Straub (SMA) stated that he can support ABW-18.1 and AWS-18.1. Mr. Charles Stutesman (Kansas) expressed issues with the term “master meter”. Mr. Ivan Hankins (Iowa) asked why can’t we use the term “prover” and noted that he does not understand the terms “transfer meter or master meter”.

CWMA S&T Committee recommended item as Developing.

During the 2022 Annual Meeting open hearing this item was not discussed because it was withdrawn at the 2022 Interim Meeting.

Item Block 2 (B2) – Define True Value for Use in Error Calculations

- B2: A SCL-20.3 A S.5.4. Relationship of Minimum Load Cell Verification Interval to the Scale Division
- B2: A SCL-20.4 A Table 3. Parameters of Accuracy Classes.
- B2: A SCL-20.5 A Table S.6.3.a. Marking Requirements, Note 3.
- B2: A SCL-20.6 A T.N.1.2. Accuracy Classes and T.N.1.3. Scale Division.
- B2: A SCL-20.7 A Table 7. Maintenance Tolerances
- B2: A SCL-20.8 A Table 8. Recommended Minimum Load

NOTES:

1. At the 2020 NCWM Interim Meeting the Committee agreed that GEN-20.1, SCL-20.1 and SCL-20.2 should be removed from Block 2 and given individual consideration. The items included in this block 2 are SCL-20.3, SCL-20.4, SCL-20.5, SCL-20.6, SCL-20.7 and SCL-20.8.
2. While this item was carried over from the 2020 Interim Meeting, it was not a Voting Item and therefore not discussed during the continuation of the 2020 Annual Meeting. Instead, it was placed on the 2021 Interim Meeting’s agenda and was discussed during that meeting.

Source: Mr. Ross Andersen (Retired)

Submitter’s Purpose and Justification:

This proposal has four parts:

1. Clarify the concepts in determining error in verification,
2. Correct Code references to ensure correct reference to either e or d, as appropriate,
3. Correct Code references regarding issues of scale suitability Table 8, and
4. Explain why e and d are not connected

NIST OWM Executive Summary for Item Block 2 (B2) – Define True Value for Use in Error Calculations

NIST OWM Recommendation: OWM awaits the further revision of various items in this block by the TG assigned.

- The items in this block represent very significant changes to the Scales Code of NIST HB 44 in that they are an attempt to clarify which value: the value of the scale division (d) or verification scale division (e), are the paragraph requirements to be based. It is important that everyone agree, however, but this has not yet been the case.
- OWM disagrees with several of the changes proposed by the different items in this block as shown in the Committee’s current agenda.
- The proposals in the Committee’s current agenda were never updated, however, to reflect changes that members of the NCWM’s Verification Scale Division (e) Task Group (TG) had agreed upon and included in TG’s second report to the Committee.
- There seemed to be a misunderstanding between the TG and Committee on who would update the different items in this block to reflect the TG’s second report and this effort was never completed.
- It was decided during the 2022 NCWM Interim Meeting that the Block 2 items would be reassigned to the TG for updating to reflect changes decided upon by the TG as indicated in its second report.
- OWM has been asked to continue its participation on the TG following the unexpected passing of Mr. John Barton, who had been serving as OWM’s Technical Advisor to the group. Mr. Rick Harshman and Mr. Jan Konijnenburg plan to provide assistance in this regard.
- OWM looks forward to reviewing the updated versions of the different proposals in this block once they are made available by the TG.

Item under Consideration:

B2: SCL-20.3 A S.5.4. Relationship of Minimum Load Cell Verification Interval to the Scale Division

Amend Handbook 44, Scales Code as follows:

S.5.4. Relationship of Minimum Load Cell Verification Interval Value to the Scale Division – *The relationship of the value for the minimum load cell verification scale interval, v_{min} , to the verification scale division, d e, for a specific scale using National Type Evaluation Program (NTEP) certified load cells shall comply with the following formulae where N is the number of load cells in a single independent¹ weighing/load-receiving element (such as hopper, railroad track, or vehicle scale weighing/load-receiving elements):*

$$(a) \quad v_{min} \leq \frac{d e}{\sqrt{N}} \quad \text{for scales without lever systems; and}$$

$$(b) \quad V_{min} \leq \frac{d e}{\sqrt{N \times (\text{scale multiple})}} \text{ for scales with lever systems.}$$

¹“Independent” means with a weighing/load-receiving element not attached to adjacent elements and with its own A/D conversion circuitry and displayed weight.

~~[*When the value of the scale division, d, is different from the verification scale division, e, for the scale, the value of e must be used in the formulae above.]~~

This requirement does not apply to complete weighing/load-receiving elements or scales, which satisfy all the following criteria:

- the complete weighing/load-receiving element or scale has been evaluated for compliance with T.N.8.1. Temperature under the NTEP;
- the complete weighing/load-receiving element or scale has received an NTEP Certificate of Conformance; and
- the complete weighing/load-receiving element or scale is equipped with an automatic zero-tracking mechanism which cannot be made inoperative in the normal weighing mode. (A test mode which permits the disabling of the automatic zero-tracking mechanism is permissible, provided the scale cannot function normally while in this mode.

[Nonretroactive as of January 1, 1994]

(Added 1993) (Amended 1996, ~~and~~ 2016, and 20XX)

B2: SCL-20.4 A Table 3. Parameters of Accuracy Classes.

Amend Handbook 44, Scales Code as follows:

Table 3. Parameters for Accuracy Classes

Class	Value of the Verification Scale Division e^1 (d or e^1)	Number of Scale ⁴ Divisions (n)	
		Minimum	Maximum
SI Units			
I	equal to or greater than 1 mg	50 000	--
II	to 50 mg, inclusive	100	100 000
	equal to or greater than 100 mg	5 000	100 000
III ^{2,5}	0.1 to 2 g, inclusive	100	10 000
	equal to or greater than 5 g	500	10 000
III L ³	equal to or greater than 2 kg	2 000	10 000
III	equal to or greater than 5 g	100	1 200
U.S. Customary Units			
III ⁵	0.0002 lb to 0.005 lb, inclusive	100	10 000
	0.005 oz to 0.125 oz, inclusive	100	10 000
	equal to or greater than 0.01 lb	500	10 000

Class	Value of the Verification Scale Division e^1 (d or e^1)	Number of Scale ⁴ Divisions (n)	
		Minimum	Maximum
III L ³	equal to or greater than 0.25 oz	500	10 000
	equal to or greater than 5 lb	2 000	10 000
III	greater than 0.01 lb	100	1 200
	greater than 0.25 oz	100	1 200

¹ ~~For Class I 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 “e” is the value of the scale division immediately preceding the auxiliary means. The manufacturer may design a scale such that the verification scale division e does not be equal to the scale division d. To ensure the correct value for e is used, refer to marking requirements in footnotes 3 and 4 to Table S.6.3.a. and Table S.6.3.b.~~

(Amended 20XX)

² A Class III scale marked “For prescription weighing only” may have a verification scale division (e) not less than 0.01 g.

(Added 1986) (Amended 2003)

³ The value of a **the verification** scale division (e) for crane and hopper (other than grain hopper scales shall be not **be** less than 0.2 kg (0.5 lb). The minimum number of scale divisions shall not **be** less than 1000.

(Amended 20XX)

⁴ On a multiple range or multi-interval scale, the number of divisions for each range independently shall not exceed the maximum specified for the accuracy class. The number of scale divisions, n , for each weighing range is determined by dividing the scale capacity for each range by the verification scale division, e , for each range. On a scale system with multiple load-receiving elements and multiple indications, each element considered shall not independently exceed the maximum specified for the accuracy class. If the system has a summing indicator the n_{max} for the summed indication shall not exceed the maximum specified for the accuracy class.

(Added 1997)

⁵ The minimum number of scale divisions for a Class III Hopper Scale used for weighing grain shall be 2000.)

[Nonretroactive as of January 1, 1986]

(Amended 1986, 1987, 1997, 1998, 1999, 2003, **and** 2004, **and** 20XX)

B2: SCL-20.5 A Table S.6.3.a. Marking Requirements, Note 3.

Amend Handbook 44, Scales Code as follows:

- The device shall be marked with the nominal capacity. *The nominal capacity shall be shown together with the value of the scale division “**d**” (e.g., 15×0.005 kg, 30×0.01 lb, or capacity = 15 kg, $d = 0.005$ kg) in a clear and conspicuous manner and be readily apparent when viewing the reading face of the scale indicator unless already apparent by the design of the device. Each scale division value ~~or weight unit~~ **with its associated nominal capacity** shall be marked on multiple range or multi-interval scales. **In the absence of a separate marking of the verification scale division “e” (see Note 4), the value of the verification scale division e shall be equal to the value of the scale division d.***

[Nonretroactive as of January 1, 1983]

(Amended 2005 **and** 20XX)

B2: SCL-20.6 A T.N.1.2. Accuracy Classes and T.N.1.3. Scale Division.

Amend Handbook 44, Scales Code as follows:

T.N.1.2. Accuracy Classes. – Weighing devices are divided into accuracy classes according to the number of scale divisions (n) and the value of the verification scale division (~~d~~) (e).

T.N.1.3. Scale Division. – This Code contains references to two types of scale divisions, the verification scale division (e) and the scale division (d) (see definitions in Appendix D). The tolerance for a weighing device is in the order of magnitude of related to the value of the scale division (d) or the value of the verification scale division (e) and is generally expressed in terms of ~~d~~ **or e. Other technical requirements may reference either the verification scale division (e) or scale division (d) as appropriate. The values of (e) and (d) are chosen by the manufacturer and are marked on the device pursuant to S.6.3., except that d is not used in reference to an analog device, such as an equal-arm balance, where the graduations do not correspond to units of weight.**

B2: SCL-20.7 A Table 6. Maintenance Tolerances

Amend Handbook 44, Scales Code as follows:

Table 6. Maintenance Tolerances

(All values in this table are in <u>verification</u> scale divisions)				
Tolerance in <u>Verification</u> Scale Divisions				
	1	2	3	5
Class	Test Load			
I	0 - 50 000	50 001 - 200 000	200 001 +	
II	0 - 5 000	5 001 - 20 000	20 001 +	
III	0 - 500	501 - 2 000	2 001 - 4 000	4 001 +
III	0 - 50	51 - 200	201 - 400	401 +
III L	0 - 500	501 - 1 000	(Add 1 d e for each additional 500 d e or fraction thereof)	

B2: SCL-20.8 A Table 8. Recommended Minimum Load

Amend Handbook 44, Scales Code as follows:

Table 8. Recommended Minimum Load

Class	Value of Scale Division (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
IIIH	All	10

~~*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 “e” is the value of the scale division immediately preceding the auxiliary means. For Class III and IIIH devices the value of “e” is specified by the manufacturer as marked on the device; “e” must be less than or equal to “d.” Scales manufacturers are permitted to design scales where the value a verification scale division e differs from the displayed scale division d. If the marked value of e is less than the value of d, use e in interpreting the Table. In all other cases use the value of d. Refer to marking requirements for d and e in footnotes 3 and 4 to Table S.6.3.a. and Table S.6.3.b.~~
(Amended 20XX)

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

(Amended 1990) (Amended 20XX)**NIST OWM Detailed Technical Analysis:**

OWM looks forward to reviewing updates to the various items in this block once the NCWM Verification Scale Division (e) Task Group (TG) has completed its work amending the current proposals to reflect the agreed upon changes reported by the TG in its second report. Since there have been no updates to the different items in Block 2 since they were first submitted, OWM’s analysis of this group of items remains unchanged from the 2022 NCWM Interim Meeting as follows:

It remains clear that not everyone agrees with the changes proposed by this block of items given that none of the four regional weights and measures associations, nor the SMA, all of which met in the fall of 2021, could recommend to the national S&T Committee advancement of this block of items to a Voting status. Two of the regional associations recommended the block be reassigned to the Verification Scale Division Task Group. The other two regional associations recommended the block be Developing. The SMA supported further development and the work of the Verification Scale Division (e) Task Group. We too disagree with some of the changes proposed. Consequently, as a group of items considered together, OWM cannot support them.

Although we are aware of the existence of a second draft report from the Verification Scale Division (e) Task Group that we think proposes, or at least suggests, additional changes/updates to the items in this block, we do not believe any of the items in Block 6 have changed since that report was first made available to us. We are hopeful, however, that some of the proposals in this block have been updated (but not yet published) or will be updated in the very near future and those updates will resolve, at least some concerns. We base this hope on comments made by Mr. Henry Oppermann (Weights and Measures Consulting, LLC) during Committee open hearings at the 2021 NEWMA Interim Meeting. Mr.

Oppermann reported during open hearings that he had talked to the submitter of this block of items and the two had reached agreement on some needed changes to the proposals. Mr. Oppermann commented that he thought those agreed upon changes had perhaps already been made. Consequently, the draft of Block 2 items in NEWMA's 2021 S&T Interim Meeting agenda was not, in Mr. Oppermann's opinion, the most recent draft. We are somewhat encouraged by this news because we share at least some of Mr. Oppermann's concerns with respect to the current items in this block.

Further evidence that the proposals in the Committee's 2022 Interim Meeting agenda (i.e., NCWM Publication 15) may have been updated, but not yet published or widely distributed, are comments made by the Chair of the Verification Scale Division (e) Task Group during Committee open hearings at the 2021 CWMA Annual meeting. That is, the CWMA's S&T 2021 Annual Report indicates that Mr. Doug Musick, who was Chair of the Verification Scale Division (e) Task Group during its existence, provided updates from the Task Group and would be providing changes to the item to NCWM S&T Committee before the July NCWM Annual meeting. Based on our review and comparison of the Block 2 items in the CWMA's 2021 S&T Annual Meeting Agenda and the Committee's 2022 Interim Meeting agenda (i.e., NCWM Publication 15) none of the proposals have changed.

If there does, in fact, exist a more current draft of the proposals in Block 2 and that draft gets introduced on or before the 2022 NCWM Interim Meeting, we encourage the Committee to provide adequate time for review and discussion opposed to simply advancing any new draft for vote during the 2022 NCWM Interim Meeting. There are many changes proposed by this block of items (i.e., there are six individual items in all) and their significance should be of great enough concern to warrant, in our opinion, sufficient time for review and discussion, especially in light of the fact there still exists disagreement on the current proposals. As noted in earlier OWM comments and recommendations, the different proposals included in this block present several very significant changes to the Scales code of HB 44 with respect to the application of HB 44 requirements to scales having different values of e and d. Given these two values most often differ by a factor of ten, it is of utmost importance that everyone agree on which value is the application of the different HB 44 requirements to be based.

Summary of Discussions and Actions:

During the 2022 NCWM Interim Meeting, Mr. Rick Harshman (NIST OWM) commented that the items in this block represent very significant changes to the Scales Code of NIST HB 44 in that they are an attempt to clarify which value, the value of the scale division (d), or verification scale division (e), are the paragraph requirements to be based. It is important that everyone agree; however, but this has not yet been the case. Mr. Harshman noted that OWM disagreed with several of the changes proposed by the different items in this block as shown in the Committee's current agenda. Mr. Harshman also reported that the various Block 2 items in the Committee's current agenda fail to reflect changes agreed to by members of the NCWM's Verification Scale Division (e) Task Group (TG) as indicated in its second report to the Committee. That is, the proposals hadn't been updated following the TG's submission of its second report to the Committee. There seemed to be a misunderstanding between the TG and Committee on who would perform this work and it never got done. OWM looked forward to reviewing the proposals once this updating had been completed.

Mr. Doug Musick (Kansas), Chair of the Verification Scale Division (e) TG, acknowledged the accuracy of Mr. Harshman's reporting of the misunderstanding between the TG and Committee. He then requested the Committee either reassign the Block 2 items to the TG, or, if the Committee preferred, the Committee could perform the updating itself based on the TG's most recent report. Mr. Musick also noted that the

TG's second report was included in Appendix A of the Committee's 2022 Interim Agenda (NCWM Publication 15).

Mr. Russ Vires (Mettler Toledo, LLC) speaking on behalf of the SMA stated that the SMA supports the further development of this item and the work of the Verification Scale Division (e) Task Group. The SMA would also like to encourage the use of the terminology "Verification Interval" for "e" and "Scale Division" for "d" in every instance that it appears in this item.

The Committee also received several comments in support of reassigning the block of items to the TG for further revision.

The Committee, in consideration of the comments received, agreed to reassign the block of items to the Verification Scale Division (e) TG for additional updating.

During the 2022 NCWM Annual Meeting, Mr. Doug Musick (Kansas) Chair of the Verification Scale Division (e) TG gave a brief status update. The text of the proposed amendments for Handbook 44 has been ready for a year. It is necessary to coordinate the proposal with the L&R Committee. A joint meeting is requested to discuss this item.

The Committee recommended no changes and to keep the item Assigned to the Verification Scale Division (e) Task Group. The Committee recommended the Task Group work to update the Item under Consideration with the recommended changes included in the task group report.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting open hearing the following comments were heard:

Mr. Matt Douglas (California - DMS): The language is not clear. We recommend that this item (the whole block) to be withdrawn.

Mr. Vires (Scale Manufacturers Association): This is a carryover item. SMA supports further development of this item. The SMA encourages the use of term "Verification Scale Interval" for (e) and "Scale Division" for (d). If necessary, Mr. Russ Vires can provide additional information. He stated that his comments are the same from the Annual meeting.

Ms. Diane Lee (NIST OWM): Stated that the NIST OWM comments on this item are posted on NCWM website.

The WWMA S&T Committee recommended that this item remain Informational with concern given to the comments given during the WWMA open hearings. During the Committee work session, clarification was given regarding Committee member Mr. Douglas' testimony questioned whether or not the item provides assistance to an Inspector in the field in the performance of their job.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting open hearing Mr. Vires supported further development of this item and recommended the descriptive name changes for "e" and "d" as posted on the NCWM website.

This Committee recommended this item move forward with an Assigned status.

Northeastern Weights and Measures Association

During the 2021 Interim Meeting open hearing the following comments were heard:

Mr. Harshman recommended keeping this item in Informational status due to the fact that the National S&T Committee has taken ownership and interpretations have been provided at NTEP and weighing sector meetings. The meeting notes are available on NCWM website.

Mr. Henry Opperman (Weights and Measures Consulting) objected to many of the blocked items and recommended to keep this item in Informational status.

Mr. Lou Staub (SMA) suggested the use of the term “verification scale interval” for “e” and “scale division” for “d”.

Mr. John McGuire (New Jersey) recommended keeping the item in Informational status.

The NEWMA Specifications and Tolerances Committee recommended that this item be kept in Informational status.

During the 2022 Annual Meeting open hearings, Mr. Vires (Mettler Toledo, LLC) speaking on behalf of the SMA, recommended the identical changes to the individual items in Block 2 as shown in the SMA reporting contained within this report for the SMA’s Spring 2022 meeting. Mrs. Tina Butcher (NIST OWM) indicated she believes the latest revisions from the task group have addressed the concerns.

After hearing comments from the floor, the Committee recognized the need to further develop this block and recommended the block remain in Assigned status.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting open Hearing, the Committee heard comments from the floor. Mr. Straub supported the item. The SMA would like to see it written that “scale division” is used for the value of “d” and “verification scale interval” for “e”.

The CWMA S&T Committee recommended that the item is assigned back to the Verification Scale Division Task Group.

During the 2022 CWMA Annual Meeting open hearings, the Committee received the following comments:

Mr. Vires (SMA) supported the further development of this item and the work of the Verification Scale Division (e) Task Group. Recommendation: The SMA would also like to encourage the use of the terminology “Verification Interval” for “e” and “Scale Division” for “d” in every instance that it appears in this item.

Mr. Loren Minich (Kansas) remarked the items shown under consideration are not the items the Task Group has submitted. The SMA recommendations conflict with current task group verbiage.

Mr. Doug Musick (Kansas) stated the proposal got put into the National Committee Agenda Appendix for some reason. He hopes to rebuild the Task Group and get it cleaned up before the 2022 Annual meeting. The “verification interval” should be “verification scale division” (e), and “displayed scale division” (d). Having (d) and (e) in the same original table was confusing to inspectors. The current Task Group changes won’t be in Publication 16 for the 2022 National meeting.

Mr. Minnich prefers the S&T Committee to evaluate the Appendix since it’s more up to date.

The CWMA S&T Committee recommended this item to remain as Assigned.

SMA

During the 2021 Fall Meeting the SMA supported the further development of this item and the work of the Verification Scale Division (e) Task Group. The SMA would also like to encourage the use of the terminology “Verification Interval” for “e” and “Scale Division” for “d” in every instance that it appears in this item. The following changes are recommended to the individual items in this block:

B2: SCL-20.3 S.5.4 Relationship of Minimum Load Cell Verification Interval: No change

B2: SCL-20.4 Table 3. Parameters of Accuracy Classes

Recommendation: The SMA recommended the following change to Table 3, Footnote 1: **The manufacturer may design a scale such that the verification scale division verification interval e does not be equal to the scale division d.**

B2: SCL-20.5 Table S.6.3.A. Marking Requirements, Note e: No Change

B2: SCL-20.6 T.N.1.1. Accuracy Classes and T.N.1.3. Scale Division

Recommendation: The SMA recommended the following change: **“... except that (d) is not used in reference...”**

B2: SCL-20.7 Table 7. Maintenance Tolerances

Recommendation: The SMA recommended the following change: **Table 6. Maintenance Tolerances**

B2: SCL-20.8 Table 8 Recommended Minimum Load

Recommendation: The SMA recommended the following change: **Scales manufacturers are permitted may have to design scales where the value a verification scale interval division e differs not equal to from the displayed scale division d.**

During the 2022 Spring Meeting, the SMA reported that it supported the further development of this item and the work of the Verification Scale Division (e) Task Group. The SMA would also like to encourage the use of the terminology “Verification Interval” for “e” and “Scale Division” for “d” in every instance that it appears in this item.

The SMA recommended the following changes to the individual items in Block 2:

B2: SCL-20.3 S.5.4 Relationship of Minimum Load Cell Verification Interval: No change

B2: SCL-20.4 Table 3. Parameters of Accuracy Classes

Recommendation: The SMA recommended the following change to Table 3, Footnote 1: **Class I and II scales may be designed such that the ~~verification scale division~~ verification interval e does not be equal to the scale division d .**

B2: SCL-20.5 Table S.6.3.A. Marking Requirements, Note 3: No Change

B2: SCL-20.6 T.N.1.2. Accuracy Classes and T.N.1.3. Scale Division

Recommendation: The SMA recommended the following change: **“... except that (d) is not used in reference...”**

B2: SCL-20.7 Table 7. Maintenance Tolerances

Recommendation: The SMA recommended the following change: **Table 6. Maintenance Tolerances**

B2: SCL-20.8 Table 8. Recommended Minimum Load

Recommendation: The SMA recommended striking the following language from the submitter’s proposal: **Scal es manufacturers are permitted to design scales where the value a verification scale division e differs from the displayed scale division d .**

Rationale: When taken with the SMA’s recommendation for SCL-20.4, this will avoid duplication in the HB44 code.

Item Block 2 – Final Report of the Verification Scale Division Task Group

Participants:

Mr. Doug Musick, Chair (Kansas)
Mr. Ross Andersen (New York, Retired and original submitter of the item)
Mr. John Barton (NIST OWM)
Mr. Luciano Burtini (Measurement Canada)
Mr. Anthony Bong Lee (Orange County, California)
Mr. Steve Cook (California, Retired)
Mr. Darrell Flocken (NTEP)
Mr. Eric Golden (Cardinal Scale)
Mr. Jan Konijnenburg (Rice Lake Weighing Systems)
Mr. Richard Suiter (Richard Suiter Consulting)
Mr. Steve Timar (New York)
Mr. Howard Tucker (Florida)

The mission of the task group, as defined by the S&T Committee, is to review Handbook 44, Section 2.20. Scales and relevant portions of OIML R76, using the items included in S&T Agenda Items: Block 2 as a reference point, and recommend changes as necessary to:

1. Clarify how the error is determined in relation to the verification scale division (e) and the scale division (d)

2. Clarify which is the proper reference; the verification scale division (e) or the scale division (d) throughout this section
3. Ensure proper selection of a scale in reference to the verification scale division (e) and the scale division (d)
4. Clarify the relationship between the verification scale division (e) or the scale division (d)

This report is divided into three sections:

1. Clarify the relationship between e and d, i.e., ensure we understand the terms. (Mission items 4 and 1)
2. Propose changes to the Scales Code, if necessary, to ensure the code correctly identifies e or d as appropriate to the code paragraph. (Mission items 2 and 3)
3. Address other issues that arose as potential problems that might require additional investigation beyond the scope of this workgroup.

PART 1. Clarify the Relationship Between e and d.

We begin by looking at current HB 44 definitions. The verification scale division e is used to express tolerance values and it is used in classification. The designations of e and the accuracy class are made by the manufacturer. The scale division d is a function of the actual scale function and display. Note that for weight classifiers, the weighing instrument may never display quantity at the resolution of e, and for ungraduated devices there is no scale division d to permit comparison to e.

verification scale division, value of (e). – A value, expressed in units of weight (mass) and specified by the manufacturer of a device, by which the tolerance values and the accuracy class applicable to the device are determined. The verification scale division is applied to all scales, in particular to ungraduated devices since they have no graduations. The verification scale division (e) may be different from the displayed scale division (d) for certain other devices used for weight classifying or weighing in pre-determined amounts, and certain other Class I and II scales.[2.20]

scale division, value of (d). – The value of the scale division, expressed in units of mass, is the smallest subdivision of the scale for analog indication or the difference between two consecutively indicated or printed values for digital indication or printing. (Also see “verification scale division.”) [2.20, 2.22]

scale division, number of (n). – Quotient of the capacity divided by the value of the verification scale division. [2.20]

$$n = \frac{\text{Capacity}}{e}$$

The values of e and d must be understood as referring to different things. The verification scale refers to the scale of measurement for the reference (or true value), think of the reference standard. The instrument scale refers to the scale of measurement of the instrument under test. Consider this assortment of instruments in the table below. It should be clear that the divisions of the verification scale do not always equal those on the instrument scale and may not even be in the same units. In addition, when we employ

an artifact, like a test weight or slicker plate measure, the divisions of the verification scale are not visible since the artifact represents a single point on the measurement scale of the reference.

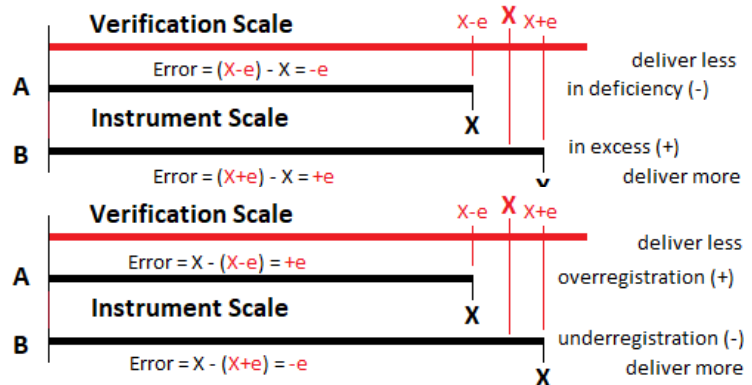
Instrument Scale	Scale div d	Verification "True Value" Scale	Scale div e	Relation e to d
Rule	1/16 in	Standard Rule or Tape	1/16 in	e = d
Taximeter	1/10 mi	Road Course	2 ft	e < d
LMD's	0.1 gal	Prover indication	5 cu in	e > d
Mass Flow Meter	1 lb	Reference Scale	0.01 lb	e < d
Weighing Devices	0.01 lb	Test Weight (artifact)	mfr choice	e < d, e = d, e > d
Test Measure	1 cu in	Slicker Plate (artifact)	?	e ? d

For weighing instruments, it turns out that e and d have no fixed relationship. It is different for weight classifiers (e < d), for most instruments (e = d), and for high resolution instruments (e > d). The critical point is that the instrument scale and the verification scale are independent of each other. Once you have disconnected e (declared by the manufacturer) from d (displayed on the instrument), it may now become evident that much of our confusion arose because we thought of them as connected in some way.

In the graphics below both error and tolerance are always expressed in terms of the divisions (e) of the verification scale. The primary assumption is that the verification scale is constant, and it is the displayed scales of the instruments we test that move. The scales in black are depicted as in error by +1 e or -1 e.

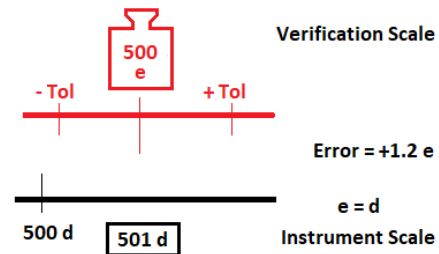
Error of delivery =
 verification scale – instrument scale
 + in excess
 – in deficiency

Error of Indication =
 instrument scale – verification scale
 + overregistration
 – underregistration

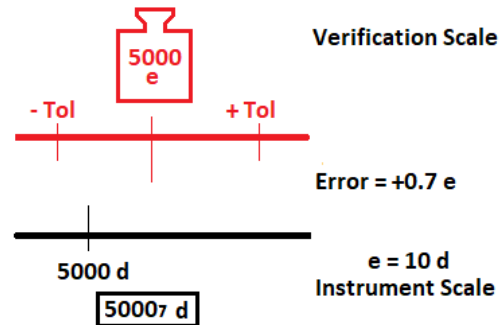


Much of our confusion arises because scales are tested using artifacts with no visible scale divisions. We could mirror this in the test of a fuel dispenser. Normally you stop the test at 5 gallons on the instrument scale and read the error as -3 cu in from the test measure (verification) scale. Now change that procedure and stop the test at the zero mark on the test measure. How would you determine the error? Assume the instrument now reads 5.012 gal. The error is -0.012 gal (-3 cu in), and we calculate it as verification scale – instrument scale. We determined the error from the instrument scale. The verification scale division, however, did not switch from the test measure to the instrument simply because we changed the procedure. The verification scale division remains 1 cu in and is still on the test measure, the reference.

Consider the Class III scale at right where $e = d$. Technically you can't see divisions on either scale since the artifact has no visible divisions and the instrument is digital. The correct instrument indication of 500 d is 1.2 e short of 500 e on the verification scale. You could mirror this by applying 498.8 e of test weights to get indication of 500 d. It is not in tolerance, but only if you apply error weights in your test.



Consider the Class II scale at right where $e = 10 d$. You can't see divisions on either scale because the test weight is an artifact and the instrument are digital. The correct instrument indication of 50,000 d is short of the 5,000 e on the verification scale by 7 d. Thus, we say the error is +0.7 e. Error = instrument scale – verification scale. This instrument is clearly in tolerance. No error weights are necessary to see to finer than 1 e.



The principles of classification are found in the following HB 44 paragraphs. In principle, the manufacturer tells the official what accuracy is to be applied to the instrument.

T.N.1. Principles.

T.N.1.1. Design. – The tolerance for a weighing device is a performance requirement independent of the design principle used.

T.N.1.2. Accuracy Classes. – Weighing devices are divided into accuracy classes according to the number of scale divisions (n) and the value of the scale division (d).

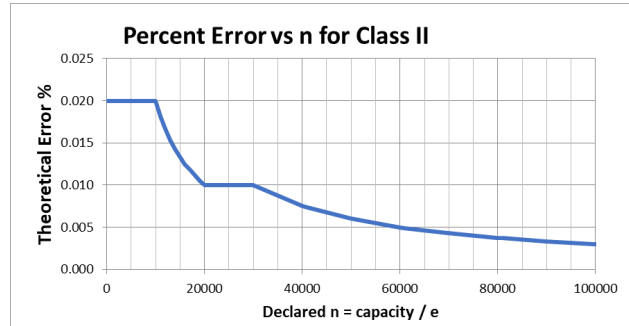
T.N.1.3. Scale Division. – The tolerance for a weighing device is related to the value of the scale division (d) or the value of the verification scale division (e) and is generally expressed in terms of d or e.

Yet, the T.N.1.2. and T.N.1.3. paragraphs conflict with the definitions. According to the definition of e, it is e “by which the tolerance values and the accuracy class applicable to the device are determined.” When the Scales Code was drafted prior to adoption in 1984, it appears some things were lost in translation from the OIML R76 on which it was based. What was lost can be expressed as those things not included in HB44 and those things incorrectly translated in HB 44.

For example, R76 expresses the classification information in four required markings, and one auxiliary marking. R76 requires marking of Class, Max, e, and Min, and requires marking of d if different from e. Those markings describe the maximum and minimum loads and the relative accuracy. In contrast, HB44 requires marking of Class, capacity, and d, and requires marking of e if different from d. HB 44 does not require marking of minimum load. While R76 considers minimum load part of the class structure, HB 44 does not.

It is this switch of e and d that causes confusion because the translation of R76 to HB 44 lost some of the meaning. Much of the second part of this report covers the changes required to rectify the situation. The work group is attempting to ensure the Code states e when the requirement applies to e and d when it applies to d. The work group is also proposing to add important material from R76 that is missing.

Some additional confusion comes from the stepped tolerance structure. For example, it is common to think that the instrument gets 1 division of error over the first tolerance step (maintenance). The correct interpretation of the code requires the instrument maintain a % accuracy based on the number of divisions of load at the break points. The space under the step riser is not supposed to be used by the instrument provided you eliminate the rounding error.



Between 1 division and 10,000 divisions for Class II in R76, this is 0.02 %. At 10,000 e, 0.02 % is 2 e. At 1,000 e, 0.02 % is 0.2 e, and at minimum load of 50 e, 0.02 % is 0.01 e. The principle is: the larger the number of verification scale divisions (n) the more accurate the instrument must be, i.e., relative error. Section 2.2 of R76 makes this clear by stating that e represents absolute accuracy and n represents relative accuracy. The Scales Code has no parallel section. It is the relative accuracy that should be our focus, but that’s not found in HB 44.

PART 2. Proposed changes to the Scales Code (related issues are grouped for convenience)

Group 1. Changes to clarify definitions relating to e.

verification scale division, value of (e). – A value, expressed in units of weight (mass) and specified by the manufacturer of a device, by which the tolerance values and the accuracy class applicable to the device are determined. The verification scale division is applied to all scales, in particular to ungraduated devices since they have no graduations. ~~The verification scale division (e) may be different from the displayed scale division (d) for certain other devices used for weight classifying or weighing in pre-determined amounts, and certain other Class I and II scales.~~[2.20]

(Amended 20XX)

The last sentence is explained fully in the technical requirements in the Code. The work group finds it unnecessary and believe it contributes to confusion.

verification scale division, number of (n). – Quotient of the capacity divided by the value of the verification scale division. [2.20]

$$n = \frac{Capacity}{e}$$

(Amended 20XX)

scale division, number of (n). – See “verification scale division, number of (n)”

The addition of the word “verification” to the definition of n is essential since without it the section refers to the scale division d. The second definition for n was added as a cross reference since the revision will move from the s section to the v section.

Group 2. Changes to ensure proper classification of instruments.

T.N.1.2. Accuracy Classes. – Weighing devices are divided into accuracy classes according to the number of **verification** scale divisions (n) and the value of the verification scale division (~~d~~) (e).

(Amended 20XX)

T.N.1.3. Verification Scale Division. – The tolerance for a weighing device is **related to the value of the scale division (d) or the value of the** in the order of magnitude of the verification scale division (e) and is generally expressed in terms of ~~d or~~ e .

(Amended 20XX)

These changes bring the principles in the T.N. section in agreement with the definitions. Classification is exclusively based on e .

Table 3. Parameters for Accuracy Classes

Class	Value of the Verification Scale Division (d or e^1)	Number of Verification Scale ⁴ Divisions (n)	
		Minimum	Maximum
<i>SI Units</i>			
I	equal to or greater than 1 mg	50 000	--
II	1 to 50 mg, inclusive	100	100 000
III ^{2,5}	equal to or greater than 100 mg	5 000	100 000
	0.1 to 2 g, inclusive	100	10 000
III L ³	equal to or greater than 5 g	500	10 000
	equal to or greater than 2 kg	2 000	10 000
III	equal to or greater than 5 g	100	1 200

The middle section of the table was not included for brevity. Notes continue below:

¹ ***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 “e” is the value of the scale division immediately preceding the auxiliary means. The verification scale division e does not always equal the displayed scale division d. To ensure the correct value for e is used, refer to required markings on the device (see also notes 3 and 4 in Table S.6.3.b.).***

² A Class III scale marked “For prescription weighing only” may have a verification scale division (e) not less than 0.01 g.

(Added 1986) (Amended 2003)

³ The value of a **verification** scale division for crane and hopper (other than grain hopper scales shall be not less than 0.2 kg (0.5 lb). The minimum number of **verification** scale divisions, n , shall be not less than 1000.

⁴ On a multiple range or multi-interval scale, the number of **verification** divisions, n , for each range independently shall not exceed the maximum specified for the accuracy class. **Error! Bookmark not defined.** The number of **verification** scale divisions, n , for each weighing range is determined by dividing the scale capacity for each range by the verification scale division, e , for each range. On a scale system with multiple load-receiving elements and multiple indications, each element considered shall not independently exceed the

maximum specified for the accuracy class. If the system has a summing indicator the n_{max} for the summed indication shall not exceed the maximum specified for the accuracy class.

(Added 1997)

⁵ *The minimum number of **verification** scale divisions, **n**, for a Class III Hopper Scale used for weighing grain shall be 2000.)*

[Nonretroactive as of January 1, 1986]

(Amended 1986, 1987, 1997, 1998, 1999, 2003, ~~and~~ 2004 and 20XX)

The changes to the header of Table 3 ensure the classification is based on e consistent with the definitions and the principles in T.N.1. The scale division d is not involved in classification. This change should reduce confusion. The changes to the notes at the bottom of the table again ensure e is correctly referenced instead of d or the “scale division.” Referencing “n” in notes 3, 4, and 5 ensure that it is referring to e since $n = \text{capacity} / e$.

Table S.6.3.a. Marking Requirements

To Be Marked With ↓	Weighing Equipment				
	Weighing, Load-Receiving, and Indicating Element in Same Housing or Covered on the Same CC ¹	Indicating Element not Permanently Attached to Weighing and Load-Receiving Element or Covered by a Separate CC	Weighing and Load-Receiving Element Not Permanently Attached to Indicating Element or Covered by a Separate CC	Load Cell with CC (11)	Other Equipment or Device (10)
Manufacturer’s ID (1)	X	X	X	X	X
Model Designation and Prefix (1)	X	X	X	X	X
Serial Number and Prefix (2)	X	X	X	X	X (16)
Certificate of Conformance Number (CC) (23)	X	X	X	X	X (23)
Accuracy (17)	X	X (8)	X (19)	X	
Nominal Capacity (3)(18)(20)	X	X	X		
Value of Scale Division, “d” (3 4)	X	X			
Value of Verification Scale Division , “e” (4 3)	X	X			
Temperature Limits (5)	X	X	X	X	

Note: The remainder of the table was not included for brevity.

The changes to column 1 in the 7th and 8th rows simply reverse the references to the notes in Table S.6.3.b. They reflect the primacy of e in classification, which is addressed in parallel changes to notes 3 and 4 in Table S.6.3.b. (see changes to Table S.6.3.b. below).

Table S.6.3.b. Notes for Table S.6.3.a. Marking Requirements

<p>1. Manufacturer's identification and model designation and <i>model designation prefix</i>.* [*Nonretroactive as of January 1, 2003]</p> <p>(Also see G-S.1. Identification.) [<i>Prefix lettering may be initial capitals, all capitals or all lower case</i>] (Amended 2000)</p>
<p>2. <i>Serial number</i> [Nonretroactive as of January 1, 1968] and <i>prefix</i> [Nonretroactive as of January 1, 1986]. (Also see G-S.1. Identification.)</p>
<p>3. The device shall be marked with the nominal capacity. <i>The nominal capacity shall be shown together with the value of the verification scale division, "e" (e.g., 15 × 0.005 kg, 30 × 0.01 lb, or capacity = 15 kg, de = 0.005 kg) in a clear and conspicuous manner and be readily apparent when viewing the reading face of the scale indicator unless already apparent by the design of the device. Each verification scale division value or weight unit with its associated nominal capacity shall be marked on multiple range or multi-interval scales. <u>In the absence of a separate marking of the scale division "d" (see Note 4), the value of the scale division "d" shall be equal to the value of the verification scale division "e."</u> [Nonretroactive as of January 1, 1983] (Amended 2005 and 20XX)</i></p>
<p>4. <u>Required only if different from "d" "e." This does not apply to an ungraduated device (equal arm scale) where the graduations do not refer to a fixed weight value.</u> [Nonretroactive as of January 1, 1986] (Amended 20XX)</p>

The original Scales Code adopted 1984 made d the primary mandatory marking but this resulted in confusion. The changes make e the mandatory marking and now requires d only if different from e.

The changes regarding multiple range and multi-interval scales makes the note say what we have always been applying. The intent was for each range or subrange of the instrument to have marking of capacity and e. The "or weight unit" could refer to lb or kg, but that is clearly not the intent.

There is some concern if this might pose problems for existing equipment. If the marking is of the form "capacity 30 lb x 0.01 lb" the workgroup sees no conflict. However, markings in the form "capacity = 30 lb d = 0.01 lb" would cause a conflict as devices using that form would no longer conform with the proposed changes. The work group decided to refer this to the scale manufacturers to see if there are any devices in the marketplace that would be affected. We also learned that this might cause a conflict with Measurement Canada as they do see devices with markings of capacity= d=. Note this is not an issue when e ≠ d as both markings is already required by the combination of notes 3 and 4. If necessary, a note with qualification "devices manufactured before January 1, 20XX" could be added to accept existing scales marked with d = provided d = e.

S.1.2.2. Verification Scale ~~Interval~~ Division

The magnitude of the verification scale division e relative to the scale division d for different types of devices is given in Table S.1.2.2. Relative Magnitude of e to d.

Table S.1.2.2. Relative Magnitude of e to d

<u>Type of device (see Note)</u>	<u>Relative magnitude of e to d</u>
<u>Graduated, without an auxiliary indicating device</u>	<u>e = d</u>
<u>Graduated, with an auxiliary indicating device</u>	<u>e > d and e is chosen by the manufacturer according to Table 3. and S.1.2.2.1.</u>
<u>Graduated, and marked for use in special applications (weight classifier)</u>	<u>e ≤ d and e is chosen by the manufacturer according to Table 3. and S.1.2.2.4.</u>

Note: Ungraduated devices, e.g. equal arm balances where the scale graduations do not represent a fixed weight quantity, are not included in this table since they have no scale divisions (d) to permit comparison with (e).

S.1.2.2.1. Class I and II Scales and Dynamic Monorail Scales. –If $e \neq d$, the verification scale **interval division** “e” shall be determined by the expression:

$$d < e \leq 10 d$$

If the displayed **scale** division (d) is less than the verification **scale** division (e), then the verification **scale** division shall be less than or equal to 10 times the displayed **scale** division.

The value of e must satisfy the relationship, $e = 10^k$ of the unit of measure, where k is a positive or negative whole number or zero. This requirement does not apply to a Class I device with $d < 1$ mg where $e = 1$ mg. If $e \neq d$, the value of “d” shall be a decimal submultiple of “e,” and the ratio shall not be more than 10:1. If $e \neq d$, and both “e” and “d” are continuously displayed during normal operation, then “d” shall be differentiated from “e” by size, shape, color, etc. throughout the range of weights displayed as “d.”

(Added 1999) (**Amended 20XX**)

S.1.2.2.2. Class I and II Scales Used in Direct Sales. – When accuracy Class I and II scales are used in direct sale applications the value of the displayed division “d” shall be equal to the value of the verification scale interval “e.”

[Nonretroactive as of January 1, 2020; to become retroactive as of January 1, 2023]

(Added 2017)

S.1.2.2.3. Deactivation of a “d” Resolution. – It shall not be possible to deactivate the “d” resolution on a Class I or II scale equipped with a value of “d” that differs from “e” if such action affects the scale’s ability to round digital values to the nearest minimum unit that can be indicated or recorded as required by paragraph G-S.5.2.2. Digital Indication and Representation.

(Added 2018)

S.1.2.2.4. Class III and IIII Scales The value of “e” is specified by the manufacturer as marked on the device. Except for dynamic monorail scales, “e” must be less than or equal to “d.”

(Added 1999)

~~S.5.3. S.1.2.2.5.~~ Multi-Interval and Multiple Range Scales, ~~Division Value.~~ – On a multi-interval scale **and or a** multiple range scale, the value of “e” shall be equal to the value of “d.”

(Added 1986) (Amended 1995 **and 20XX**)

S.1.2.2.6. Class III L Scales. On Class III L scales the value of “e” shall equal the value of “d.”

(Added 20XX)

Add new definition:

auxiliary indicating device. – a means to increase the display resolution of a weighing device, such as a rider or vernier on an analog device, or a differentiated least significant digit to the right of the decimal point on a digital device. [2.20]

(Added 20XX)

Section S.1.2.2. is a key part of understanding application of e and d. The first change was to make references uniform to verification scale “division” as used in all other parts of the code. This section currently uses the term verification scale “interval”. Several additions of the term “scale” were also added to S.1.2.2.1. for clarity. Of note, R76 exempts Class I from the e not greater than 10 d requirement when e = 1 mg or less.

A major addition is the new text and table in T.1.2.2. This would create a parallel section in HB 44 to R76 section 3.1.2 and Table 2. This section describes four types of instruments:

Graduated without an auxiliary indicating device – most instruments e = d

1. Graduated with an auxiliary indicating device – Class I and II with high resolution e > d
2. Graduated & marked for special applications – weight classifiers (round down instruments) e < d
3. Ungraduated – equal arm balances where graduations don’t refer to fixed weight quantities. No d
4. These four types also impact application of minimum load in Table 8.

The current S.5.3. was moved to this section as S.1.2.2.5. to keep these paragraphs dealing with the magnitude of e and d together. A new paragraph S.1.2.2.6. was added to address Class III L where e should always equal d. Now all classes (I, II, III, III L, and III) are covered in S.1.2.2. to clarify relative magnitude of e and d.

The addition of the definition rounds out the expansion of this section.

S.5.4. S.5.3. Relationship of Minimum Load Cell Verification Interval Value to the Verification Scale Division. – *The relationship of the value for the minimum load cell verification scale interval, v_{min} , to the verification scale division, e , for a specific scale using National Type Evaluation Program (NTEP) certified load cells shall comply with the following formulae where N is the number of load cells in a single independent¹ weighing/load-receiving element (such as hopper, railroad track, or vehicle scale weighing/load-receiving elements):*

(a) $v_{\min} \leq \frac{d^* e}{\sqrt{N}}$ for scales without lever systems; and

(b) $v_{\min} \leq \frac{d^* e}{\sqrt{N} \times (\text{scale multiple})}$ for scales with lever systems.

~~*[*When the value of the scale division, d, is different from the verification scale division, e, for the scale, the value of e must be used in the formulae above.]*~~

This requirement does not apply to complete weighing/load-receiving elements or scales which satisfy all the following criteria:

- the complete weighing/load-receiving element or scale has been evaluated for compliance with T.N.8.1. Temperature under the NTEP;
- the complete weighing/load-receiving element or scale has received an NTEP Certificate of Conformance; and
- the complete weighing/load-receiving element or scale is equipped with an automatic zero-tracking mechanism which cannot be made inoperative in the normal weighing mode. (A test mode which permits the disabling of the automatic zero-tracking mechanism is permissible, provided the scale cannot function normally while in this mode.

[Nonretroactive as of January 1, 1994]

(Added 1993) (Amended 1996, ~~and~~ 2016, ~~and~~ 20XX)

The renumbering resulted from the move of S.5.3. to the S.1.2.2. section as S.1.2.2.5. The other changes correctly reference e instead of d in this section. Technically, v_{\min} for load cells corresponds to verification scale division e for weighing instruments. They are accuracy ratings declared by the manufacturer. There is no significant change for the inspector in properly referring to e since for scales where $e = d$ the issue is moot and when $e \neq d$ the section already directed the use of e. With the change the inspector will always use e.

Group 3. Changes to clarify appropriate application of tolerances (Marked Scales)

Table 6. Maintenance Tolerances

(All values in this table are in <u>verification</u> scale divisions “e”)				
Tolerance in Scale Divisions				
	1	2	3	5
Class	Test Load			
I	0 - 50 000	50 001 - 200 000	200 001 +	
II	0 - 5 000	5 001 - 20 000	20 001 +	
III	0 - 500	501 - 2 000	2 001 - 4 000	4 001 +
IIII	0 - 50	51 - 200	201 - 400	401 +
III L	0 - 500	501 - 1 000	(Add 1 d e for each additional 500 d e or fraction thereof)	

The proper reference in this section has always been e, and this is how it has always been interpreted. The current language says “scale divisions” which technically refers to d. This means we weren’t following the Code. The removal of “in Scale Divisions” after Tolerances in the second row was made to provide parallel construction with the header for Test Load. The parenthetical at the top should be sufficient to cover both sections of the table.

The change for Class III L was made since e should be used to specify tolerances and we added S.1.2.2.6. requiring that $d = e$ for this class.

T.N.3.4. Crane and Hopper (Other than Grain Hopper) Scales. – The maintenance and acceptance tolerances shall be as specified in T.N.3.1. Maintenance Tolerance Values and T.N.3.2. Acceptance Tolerance Values for Class III L, except that the tolerance for crane and construction materials hopper scales shall not be less than $1 \leq d$ or 0.1 % of the scale capacity, whichever is less.
(Amended 1986 and 20XX)

T.N.4.3. Single Indicating Element/Multiple Indications. – In the case of an analog indicating element equipped with two or more indicating means within the same element, the difference in the weight indications for any load other than zero shall not be greater than one-half the value of the **verification** scale division **(e)** ~~(d)~~ and be within tolerance limits.
(Amended 1986)

The reference to tolerances in T.N.3.4. and T.N.4.3. should follow the principle of expressing tolerances in e.

Group 4. Changes to clarify appropriate application of tolerances (Unmarked Scales)

T.1. General. – The tolerances applicable to devices not marked with an accuracy class shall have the tolerances applied as specified in Table T.1.1. Tolerances for Unmarked Scales.

Note: When Table T.1.1. refers to T.N. sections it shall be accepted that the scale division d on the unmarked scale always equals the verification scale division e.
(Amended 20XX)

Prior to 1984, tolerances were based on percentage of load for most scales. There was no concept of verification scale division e. In the T.N. section all tolerances are expressed in e. The note is added to clarify that d for the T. section is always equal to e from the T.N. section.

The work group noted that several specific paragraphs in the T. section for unmarked scales refer to tolerances in terms of d. Those sections are shown below. With the addition of the note to T.1. General, it was decided that it was not appropriate or necessary to change the d to e in these paragraphs.

T.2.2. General. – Except for scales specified in paragraphs T.2.3. Prescription Scales through T.2.8. Railway Track Scales: $2 d$, 0.2 % of the scale capacity, or 40 lb, whichever is least.

T.2.4.2. With More Than One-Half Ounce Capacity. – $1 d$ or 0.05 % of the scale capacity, whichever is less.

T.2.7. Vehicle, Axle-Load, Livestock, and Animal Scales.

T.2.7.1. Equipped With Balance Indicators. – 1 d.

T.2.7.2. Not Equipped With Balance Indicators. – 2 d or 0.2 % of the scale capacity, whichever is less.

T.2.8. Railway Track Scales. – 3 d or 100 lb, whichever is less.

Group 5. Changes to clarify appropriate scale selection (reference Table 8)

Table 8. Recommended Minimum Load

Class	Value of <u>Verification</u> Scale Division “e” (d or e*)	Recommended Minimum Load <u>in</u> scale divisions “d” (See notes) (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

***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 “e” is the value of the scale division immediately preceding the auxiliary means. For Class III and III L devices the value of “e” is specified by the manufacturer as marked on the device; “e” must be less than or equal to “d.”**

The displayed scale division d is not always equal to the verification scale division e. To ensure the correct values are used, refer to required markings on the device (see also notes 3 and 4 in Table S.6.3.b.).

For an ungraduated device, the scale division d shall be replaced with the verification scale division e in the last column.

****A minimum load of ~~10 d~~ 5 e is recommended for a weight classifier marked in accordance with a statement identifying its use for special applications.**

In the header, the change in column 2 references e and the change in column 3 references d and directs you to the notes. Currently, the Code references (d or e) in both columns which causes confusion. We’re never sure which one to use. The justification for d in the last column follows below.

It is vital to understand that Table 8. is tied closely to Table 3. You will find that header to the first two columns in both tables, with these changes, will be identical. The work group also revised the * note to remove the * and use parallel text to revised note 1 of Table 3. The notes section contains two special exceptions to the general values in column 3 the table. The first directs you to use e in the last column for ungraduated instruments, as these have no d values. The second directs you to use a minimum load of 5 e for weight classifiers. This aligns the value with R76. Note that the use of d for weight classifiers leads to unusual situations. Two weight classifiers with 100 lb capacity and e of 0.05 lb should have the same minimum load. However, they might have very different d values, say 1 lb and 0.2 lb. Declaring minimum load as 10 d for these result in very large differences of 10 lb minimum load for the first instrument and 2 lb for the second. Since e < d for weight classifiers, the minimum load is correctly expressed in e.

Understanding Minimum Load

In R76, minimum load “Min” is included in the principles of classification, see 2.2. below. There are 4 mandatory markings; Class, Max, Min and e. When R76 was translated into HB 44 a conscious decision was made to remove Min from the classification and make it a user requirement. Thus, HB 44 only has 3 mandatory markings; Class, Capacity, and d. We have already proposed to change the d to e above.

2.2. Principles of the metrological requirements

The requirements apply to all instruments irrespective of their principles of measurement.

Instruments are classified according to:

- the verification scale interval, representing absolute accuracy; and
- the number of verification scale intervals, representing relative accuracy.

The maximum permissible errors are in the order of magnitude of verification scale interval. They apply to gross loads and when a tare device is in operation they apply to the net loads. The maximum permissible errors do not apply to calculated net values when a present tare device is in operation.

The minimum capacity (Min) is specified to indicate the use of the instrument below this value is likely to give rise to considerable relative errors.

In R76, the issue of instrument accuracy is focused on Class, Max and e, parallel to HB 44. Absolute accuracy in terms of e and relative accuracy in terms of n. When the load is very small, i.e. less than Min, it might appear that R76 is addressing the large relative errors resulting in 1 e tolerance for some small number of e in load. However, this is not the case. The distinction is that Min applies to use of the instrument and not to testing of the instrument.

In testing under R76 tolerances, rounding errors are eliminated (see 3.5.3.2.). In practice this usually means error weights are used to resolve the instrument errors to at least 0.2 e (NTEP generally uses 0.1 e). In addition, R76 expects that instrument divisions are relatively uniform throughout the series. In order to get a +1 e error at 1 e load and still meet the requirement that the zero division be +/- 0.5 division wide, would require the 1 e divisions be 0 e wide (i.e. be skipped). To visualize in analog, imagine an indicator that starts at zero and jumps immediately to the 2 graduation. A load of 1 e would indicate 2 e. Likewise a load of 2 e would indicate 3 e and this pattern would repeat until the tolerance breakpoint, a load of 500 e would indicate 501 e. Then the second graduation after the break point would be skipped, i.e. the 502 e graduation. A load of 501 e would indicate 503 e with a +2 e error. All the loads up to 20,000 e would now show a +2 e error. Instruments obviously should not, and DO NOT, operate that way.

If we assume instrument divisions are uniform, as R76 does, then the divisions should be accurate to about the relative % of the accuracy class. For Class II in the first step this is 0.02 %. Thus at 20 e load the maximum expected error (after eliminating rounding) should be in the order of 0.004 e, and not the 1 e permitted in the tolerance structure. So, what relative error can R76 be addressing when dealing with Min?

When an instrument is used in commerce, it is the rounding of the indication to ½ scale division that results in large relative errors. Consider a cannabis sale of 1.05 g when the division size is 0.1 g. The instrument must round off to either 1.0 g or 1.1 g. Either one produces an error in the weight of 0.05 g. That's 4.8 % relative error in the weight (0.05 g / 1.05 g) with an instrument that's supposed to be

accurate to 0.02 %. It is this rounding error “in use” that produces the large relative errors addressed in Min in R76 and the minimum load in HB 44. This rounding error is a function of d, the displayed scale division, and not e. It is not a tolerance issue.

The confusion comes from the presentation of Min in terms of e in the last column of R76 Table 3. The table in R76 has an additional column for Min not found in HB 44. In HB 44 it has been relocated to Table 8. Looking closely at Table 8, you will find that the first two columns correspond to the first two columns in Table 3 in HB 44. So why does R76 express this column in e instead of d? I suspect they did it because all other values in Table 3 are in e. For instruments where $e = d$, the issue is moot. Note however, that R76 reveals the ties to d for the Class I and II instruments with an auxiliary indicating device (differentiated least significant digit). In 3.4.3. R76 directs that d replace e in the Min column of Table 3 for instruments with an auxiliary indicating device.

On an instrument where $e = 10 d$, we can create the same scenario as before but now with a load of 1.005 g. The instrument must now round to either 1.00 g or 1.01 g. The rounding error is now 0.50 % of the weight (0.005 / 1.005). That is 10 times smaller at the same 20 e load.

Returning to the four types of instruments from revised S.1.2.2. and applying revised Table 8.:

- | | |
|--|-------------------|
| 1. Graduated without an auxiliary indicating device: | minimum load in d |
| 2. Graduated with an auxiliary indicating device: | minimum load in d |
| 3. Graduated and marked for special use (weight classifier): | minimum load 5 e |
| 4. Ungraduated (equal arm scales): | minimum load in e |

Group 6. Changes to correctly reference to e or d as appropriate.

S.1.1.1. Digital Indicating Elements.

- (a) A digital zero indication shall represent a balance condition that is within $\pm 1/2$ the value of the **verification** scale division.
- (b) *A digital indicating device shall either automatically maintain a “center-of-zero” condition to $\pm 1/4$ **verification** scale division or less, or have an auxiliary or supplemental “center-of-zero” indicator that defines a zero-balance condition to $\pm 1/4$ of a **verification** scale division or less. A “center-of-zero” indication may operate when zero is indicated for gross and/or net mode(s).*
[Nonretroactive as of January 1, 1993]
- (c) *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, ~~and~~ 2019, and 20XX)

The changes correctly reference e in this section as this is an issue of ensuring the zero indication is accurate to $1/4 e$. Hence it is a tolerance properly expressed in terms of e.

T.N.9. 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 one verification scale division (~~d~~) (e); or the equipment shall:

- (a) blank the indication; or
- (b) provide an error message; or
- (c) the indication shall be so completely unstable that it cannot be interpreted, or transmitted into memory or to a recording element, as a correct measurement value.

The tolerance in T.N.9. Radio Frequency Interference (RFI) and Other Electromagnetic Interference Susceptibility is to be applied independently of other tolerances. For example, if indications are at allowable basic tolerance error limits when the disturbance occurs, then it is acceptable for the indication to exceed the applicable basic tolerances during the disturbance.

(Amended 1997 and 20XX)

This is a tolerance for reaction to a disturbance and is properly expressed in e.

Group 7. Identify appropriate application of code sections (in order of appearance)

When the paragraph references d it is referring to the actual scale division and the concern is how the instrument operates. When the paragraph references e it is referring to the verification scale division and the concern is in classification of the instrument or in accuracy of the displayed values.

The sections in the table below currently correctly reference e or d as appropriate. The text of each section is not included for brevity. The justification may help explain the general rules above.

Code Section	Applies to	Justification
G-S.5.2.2.(c)	d	Rounding is a function of instrument operation not accuracy
G-S.5.2.2.(d)	d	Requires “d” to be an indicated zero and all digits to the left of “d” to be zero when $d < 1$. Requires “d” to be an indicated zero and all digits to the right of “d” to be zero when $d > 5$.
S.1.2.	d	1, 2, or 5 refers to d which is rounded. When $e \neq d$ refer to section S.1.2.2. for value of e.
S.1.2.1	d	Refers to rounded values of d.
S.1.2.3.	e	This is a classification issue. It ensures accuracy of the piece counts.
S.1.7.(b)	e	This is a classification issue addressing maximum indication above capacity.
S.2.1.2.	d	They must be in terms of d since stability of zero setting applies to d.
S.2.1.3.(all)	d	These limit the window for action of AZT. They must be in terms of d since zero setting applies to d.
S.2.3.	d	Tare division must equal smallest increment displayed.
T.N.7.	d	Discrimination requires an instrument to discriminate to the displayed scale division (zone of uncertainty). This relates to the rounding of the smallest increment.

Code Section	Applies to	Justification
UR.3.7.	d	Minimum load is correctly expressed in d. (see Group 5 above)
UR.3.10.	e	As written, this is clearly e. (See issues for additional study)

PART 3. Issues Identified as Requiring Additional Study (outside the scope of this workgroup)

A. The work group was in consensus that we should expand requirements in S.2.1.2. relating to semi-automatic zero to apply to all scales and not just scales used in direct sale. In first place, suitability is a User Requirement and not a specification. Second, correct operation to set zero should be applicable to all digital instruments as it is in R76.

B. The application of tolerances to net loads has always been assumed, even before the Scales Code adoption in 1984. Comparing T.2. for unmarked scales and T.N.2.1. for marked scales reveals important differences particularly regarding net loads. As written, T.N.2.1. exempts calculated net, but it appears to apply to both semi-automatic tare and preset tare. A comparison to R76 shows that OIML limits applicability of tolerances. Their MPE's do not apply to calculated net values or when preset tare (keyboard or programmed tare) is in operation (section 2.2). It appears net loads have MPE's applied only when the net zero is set in compliance with S.1.1.1.(b) which requires accuracy of zero to ¼ division. This cannot be assured with preset tare or when net is based on two gross values. This has further ramifications to any case where all three (gross, tare and net) values are indicated/recorded for a transaction. OIML requires the gross and net weights be accurate but does not apparently require that the equation gross – tare = net be in mathematical agreement due to rounding issues. Note that in most transactions, the customer only gets one or two of the gross, tare or net values. Rounding issues do not arise for this reason. This may impact a current issue before NCWM dealing with printing tare on POS transaction receipts. Consider a POS transaction where the customer saw 1.02 lb on the weight display and sees 1.00 lb net and 0.03 lb tare. These are all accurate weights (and correct per R76) but the numbers don't add up. The customer will claim they were overcharged by 0.01 lb since 1.02 lb – 0.03 lb = 0.99 lb.

C. The resolution of errors in testing scales was identified as an issue. The original proposal included a revision requiring resolution of error to at least 0.2 e. R76 specifically declares that errors be resolved to at least 0.2 e to eliminate rounding error. HB 44 has no such provision and it might appear that rounding error is included in the tolerance. Instead of tolerance steps of 1, 2, etc., it could be argued that the tolerances are 1.5, 2.5, etc. as the result of direct reading. NTEP uses the R76 approach exclusively in testing, but it has no technical basis in the Code. There are obvious issues involved in using error weights in the field. The challenge is that you either eliminate rounding in determining tolerances or you don't. We have two standards at play at present. In addition, it can be argued that Class IIIIL instruments are already high resolution somewhat similar to Class I and II instrument with e > d. Class IIIIL devices have enough resolution to read errors to 0.2 e or 0.1 e of the equivalent Class III instrument without using error weight.

D. The UR.3.10. requirement that transactions from dynamic monorail scales be based on e raises issues. It was discussed since it involves both e and d. The displayed scale divisions equal to e (i.e., 10 d) are not normally rounded. If e = 10 d then the rounding point is not 5 up/4 down, as it is for d, but rather 9.5 up/0.5 down. Does this requirement mean the scale design has to produce a properly rounded value for the transaction that may be different from the display, e.g. 943.7 lb to d of 0.1 lb now must be recorded for the transaction as 944 lb? In addition, in brief discussion, it seemed there were many ways this could be interpreted. The workgroup concluded it would be beneficial to open some discussions with USDA and the manufacturers to explore some of these questions. This also addresses similar issues to the

proposal to delete S.1.2.2.2. where questions of using e or d are impacting high precision scales in cannabis and jeweler's sales.

Item Block 3 (B3) – Tolerances for Distance Testing in Taximeters and Transportation Network Measurement Systems

B3: TXI-20.1 D T. Tolerances

B3: TNS-20.1 D T. Tolerances

Source: New York Department of Agriculture and Markets

Submitter's Purpose and Justification:

Provide the same distance-measurement tolerances for the Taximeters Code and Transportation Network Measurement Systems – Tentative Code.

This item has been assigned to the submitter for further development. For more information or to provide comment, please contact:

Mr. Jim Willis
New York Department of Agriculture and Markets
518-485-8377, james.willis@agriculture.ny.gov

Taximeter manufacturers are submitting devices identical to the devices in the Transportation Network Measurement Systems (TNMS) – Tentative Code; however, they are faced with a tighter tolerance for over-registration. Both devices are typically computer pads or cell phones. Taximeter companies want to take advantage of some of the same technology used by TNMS companies, however, the tolerance for taximeters is much tighter than the tolerance for TNMS meters. During type evaluation, it is common to drive more than 1 mile to incorporate tunnels and valley effect. If the same tolerance was applied, taximeters would have the same chance of passing as TNMS meters.

Some jurisdictions that test taximeters may not want the tolerance for a 1-mile course to be raised given the good history of their test programs. This is the reason I am proposing maintaining the 1% tolerance at 1 mile or less.

Some TNMS companies may be concerned that their device will not pass a 1 % tolerance, but we believe that on a straight, 1-mile course, devices operating properly should have no problem passing.

<p>NIST OWM Executive Summary for Item Block 3 (B3) – Tolerances for Distance Testing in Taximeters and Transportation Network Measurement Systems</p>
<p>NIST OWM Recommendation: OWM concurs with the three regional weights and measures associations that recommended additional development on this item. OWM continues to encourage the submitter to work with the USNWG on Taximeters (along with its TNMS Subcommittee) and others to ensure that the modified proposal fully considers the technology used in TNMS as noted in the summary below.</p>

NIST OWM Executive Summary for Item Block 3 (B3) – Tolerances for Distance Testing in Taximeters and Transportation Network Measurement Systems

- The submitters' March 2022 alternate proposal would permit a dual tolerance structure for vehicles within a single company or operating in the same geographic area.
- Work may need to be stepped up to address issues identified in the areas of design and function of indicating elements, provisions for sealing, and location services signal loss so that these provisions are in the code for properly operating this newer technology in taxis.

Item under Consideration:

Amend Handbook 44 Section 5.54 Taximeters Code as follows:

B3: TXI-20.1 –T. Tolerances

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 when the distance is 1.6 km (1 mile) or less. 2.5 % of the interval under test when the distance is greater than 1.6 km (1 mile).

B3: TNS-20.1 T. Tolerances

Amend Handbook 44, Section 5.60 Transportation Network Measurement Systems – Tentative Code as follows:

T. Tolerances

T.1.1. Distance Tests. – Maintenance and acceptance tolerances shall be as follows:

- (a) On Overregistration: ~~2.5 %~~ 1 % of the interval under test when the distance is 1.6 km (1 mile) or less. 2.5 % of the interval under test when the distance is greater than 1.6 km (1 mile).
- (b) On Underregistration: ~~2.5 %~~ 4 % of the interval under test.

The Submitter presented edits of the original proposal during the January 2022 NCWM Interim Meeting intended for publication in the Interim Meeting Report (i.e., Publication 16). However, these revisions were inadvertently not published in Publication 16 and when presented during the Interim Meeting open hearings, the NCWM membership was unable to view the content due to the projected size on the screen and on online screens. The Submitter stated that many taxis operate with a GPS based system and yet are still categorized as a taximeter due to the nature of their business. The revised proposal would provide the same tolerances for similar technology (i.e., systems that generate distance measurements from

sources not connected to the vehicle). On March 23, 2022, the submitter requested the Committee replace the Item under Consideration shown in the 2022 S&T Interim Report with the following:

Modify NIST Handbook 44 Section 5.54 Taximeters Code as follows:

T.1. Tolerance Values.

T.1.1. On Distance Tests. – Maintenance and acceptance tolerances for taximeters shall be as follows:

T.1.1.1. Meters Using Distance generated from sources physically connected to the vehicle (e.g., OBD sensor).

- (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.1.1.2. Meters Using Distance generated from sources not physically connected to the vehicle (e.g., navigation satellite system such as GPS and /or other location services).

- (a) On Overregistration: 2.5 %**
- (b) On Underregistration: 2.5 %**

The Submitter requests his original modifications recommended for TNMS – Tentative Code paragraph T.1.1. Distance Tests be withdrawn with no amendments to the TNMS code and moving forward with the revised modifications to the Taximeters Code to include new paragraphs T.1.1.1. that maintains current tolerances for onboard metering devices and establishes a 2.5 % tolerance for meters that register distance generated from sources not connected to the vehicle.

NIST OWM Detailed Technical Analysis:

OWM appreciates the efforts of the submitter to harmonize the tolerance requirements in the Taximeters Code and the TNMS – Tentative Code although, we do not believe it is necessary to increase the tolerance allowed since taximeters have been required to comply with the existing tolerances for decades.

OWM also notes that TNMS do not typically assess fare charges based on intervals as do taximeters. Taximeters will accumulate fare charges by summing the number of intervals comprising the trip's distance traveled and time elapsed and multiplying by the appropriate rate. In contrast, TNMS typically base the fare charges on the total distance (and time in some cases) for the trip. For this reason, we do not believe it is necessary to amend paragraphs T.1.1.(a) and (b) to refer to "interval under test" as is shown in the proposal. OWM recommends that this proposal be further developed with the assistance of the NIST USNWG on Taximeters in such a way that will better align the HB 44 Taximeters and TNMS Codes.

The NIST led U.S. National Work Group (USNWG) on Taximeters has held virtual meetings in May, June, and October 2020 and June 2021 to further develop standards for both taximeters and TNMS. The focus of these meetings was the merger of the existing HB 44 Taximeters Code and the tentative TNMS Code. Those members attending these meetings were in general agreement that this is the appropriate

direction the work group should take. The USNWG also began discussions on some of the areas to be addressed in a unified “Transportation-for-Hire Systems” Code that could present challenges in the development of appropriate requirements. Those areas included the design and function of indicating elements, provisions for sealing, and location services signal loss.

The submitter of the proposal has agreed to work with the USNWG to further develop this proposal and is actively participating in those meetings. The submitter explained to the USNWG that some of the more recent systems submitted to the state of New York for type approval have not been able to comply with the existing taximeter tolerances. This failure was seen in systems that attempted to use location services (i.e., GPS) to measure distance. In response to that point, it was noted that other systems have been able to meet those tolerances and to widen the tolerances would be an approach that is not supported by most in the weights and measures community.

Also included as a topic in the meetings was this proposal submitted to the NCWM S&T Committee to amend the HB 44 Taximeters and TNMS Codes. The USNWG agreed that the two HB 44 Codes should be merged and that this could be accomplished by continuing its efforts in the future.

NIST OWM is aware that the developer of the proposal was not able to provide updates to the proposal in January 2022 because of technical difficulties with audio-visual equipment at the NCWM Interim Meeting. The New York alternate proposal modifies only the Taximeter Code tolerances and was made available on March 23, 2022 on the NCWM website. This update was noted in the CWMA and NEWMA Annual Meeting summaries. The New York alternate proposal establishes a new set of taximeter over- and under-registration tolerances at 2.5 % which are equivalent to those applied to TNMS. The current tolerances remain in place when the taximeter source for distance measurements is connected to the vehicle. The proposed new 2.5 % tolerances apply when the taximeter’s source for distance measurement is generated from equipment not physically connected to the vehicle such as a GPS. This mechanism for generating measurement data from sources not physically connected to the vehicle is similar in the operation of a TNMS. Yet use of both types of technology would result in a dual tolerance structure in the marketplace when deployed in vehicles within a single company or operating in the same geographic area.

On March 23, 2022, New York also withdrew the portion of Block 3 designated as B3: TNS-20.1 T. Tolerances, and no longer recommended modifying Transportation Network Measurement Systems - Tentative Code paragraph T.1.1. Distance Tests maintenance and acceptance tolerances for over- and under-registration nor establishing the limits of permissible error of the TNMS under test as a percentage of the interval under test and distance traveled over the test course.

Should the 2022 revised proposal move forward will it be transparent which level of accuracy applies to the fare where a dual tolerance structure is in effect. Work may need to be stepped up to address issues identified in the areas of design and function of indicating elements, provisions for sealing, and location services signal loss so that these provisions are in the code for properly operating this newer technology in taxis.

Summary of Discussions and Actions:

At the NCWM 2020 Interim Meeting, the Committee heard from NIST OWM explaining that the proposal is not technically correct by inserting language that refers to “intervals” in the tentative HB 44 TNMS – Tentative Code. These types of systems do not calculate a charge for fare using intervals (i.e., segments) of the total travel in a trip as do taximeters. TNMS calculate fare charges based on the entire distance/time in a trip. Additionally, these two different systems (taximeters and TNMS) are becoming

more similar and the differences that were used to distinguish them from one another are beginning to fade. OWM noted there is a need for the USNWG on Taximeters that developed the tentative TNMS Code to meet and discuss the potential of a merger of these two HB 44 Codes. Mr. Kurt Floren (Los Angeles County, California) pointed out that taximeters have been and still are meeting existing tolerances and therefore he questions the need to expand those tolerance values.

Mr. Stan Toy (Santa Clara County, California) expressed his belief that the tolerances for taximeters do not need to be expanded and that this item should be withdrawn. Mr. Willis pointed out that New York Weights and Measures has issued its own type approval for taximeters that use location services such as GPS to measure distance. Mr. Willis stated further that New York would support a Developing or Assigned status for the proposal.

During the Committee's work session, it was agreed to assign a Developing status with the understanding the USNWG on Taximeters has offered to assist the submitter in further development of the proposal.

At the 2020 NCWM Annual Meeting, due to the 2020 COVID-19 pandemic, this meeting was adjourned to January 2021, at which time it was held as a virtual meeting. Due to time constraints, only those items designated as 2020 Voting Items were addressed. All other items were addressed in the subsequent 2021 NCWM Interim Meeting.

At the 2021 NCWM Interim Meeting, Mr. John Barton (NIST OWM) stated that OWM noted issues of concern in this proposal during the 2020 NCWM Interim Meeting regarding how tolerances are applied to taximeters in contrast to how they are applied to TNMS. This proposal does not seem to recognize these differences. OWM also noted the many opposing comments made pertaining to the proposed increase of tolerances for taximeters which have complied with existing tolerances for decades. The NIST USNWG on Taximeters has been conducting meetings with a goal of merging the HB 44 Taximeters and TNMS Codes. This work will include a number of modifications to both codes that will affect the specifications, test procedures, user requirements, and possibly the tolerances. The USNWG has offered to work with the submitter of this proposal.

Mr. Willis, representing the submitter of this item, stated a willingness to work the USNWG on Taximeters.

During the Committee's work session, the members noted the submitter's willingness to work with the Taximeter Work Group and agreed to maintain this item's Developing status.

At the 2022 NCWM Interim Meeting, the Committee assigned a Developing status for this item at the 2022 Interim Meeting. The Committee recommended the submitter work with the USNWG on this proposal. As noted in open hearings this is an item on the USNWG agenda and there may be efforts underway to address this issue by other means.

At the 2022 NCWM Annual Meeting, during open hearings, the Committee received an update from submitter Mr. Willis. Based on feedback, Mr. Willis has made language changes which will be updated for the fall meetings. Mr. Willis requested that the item retain its Developing status.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearing the following comments were heard:

Mr. Kurt Floren (Los Angeles County, California): This coincides with previous comments that new technology with GPS tracking and network companies are out. We are now taking age-old technology that's meeting 1 % tolerance and proposing to widen the tolerance (existing equipment has been meeting with no issues). He does not support this item until the data has been evaluated. He recommended this item to remain Developmental until more data is available.

The WWMA S&T Committee recommended the status remain Developmental.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting open hearing the Committee heard no comments on this item.

This Committee recommended this item remain a Developing item so that the parties involved have more time to find a way to align the tolerances in the Handbook.

Northeastern Weights and Measures Association

During the NEWMA 2021 Interim Meeting open hearing the following comments were heard.

Mr. Willis commented to explain the relationship of the two systems. Taximeters vs. Transportation Network Measurement Systems and the different tolerances that are applied. The tolerances are different in the HB 44 device codes; therefore, when a taxi meter using satellite technology is used, the tolerance is tighter as a result the playing field is not level.

Mr. Lou Sakin (Hopkinton/Northbridge, Massachusetts) asked if industry has commented or questioned this procedure. Jim Willis was not aware at the time. Lou Sakin further commented that if the playing field is not level, then he recommended a Voting status.

Ms. Juana Williams (NIST OWM) commented and recommended that the submitter work with the USNWG on Taximeters to fully develop the code.

The NEWMA S&T Committee recommended that this item be given Developing status with continued involvement with the USNWG on Taximeters.

During the NEWMA 2022 Annual Meeting open hearing comments were heard from the floor. Mr. Willis has submitted some updated language and asks that this item continue to be developing.

After hearing comments from the floor, the Committee recognized the need to further develop this block and recommended the block retain Developing status. NEWMA recommended this proposal as a Developing item on the NCWM agenda.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, the Committee heard comments from the floor from Ms. Diane Lee's (NIST OWM). Ms. Lee's comments are included in the report on NCWM website.

The CWMA S&T Committee recommended the item move forward as a Developing item.

During the CWMA 2022 Annual Meeting limited questions were heard as well as an update to the proposal from the submitter. Mr. Charlie Stutesman (Kansas) was interested to know why the tolerance isn't consistent with underregistration and overregistration. The submitter of this item provided an updated proposal on March 23, 2022, which is posted on the NCWM website. This update clarified the tolerances for TXI-20.1 and recommended withdrawal of TNS-20.1.

The CWMA S&T Committee recommended withdrawal of TNS-20.1 per the submitter's request. The Committee recommended that TXI-20.1 proceed to Voting status as presented in the March 23, 2022, updated proposal shown below:

T.1. Tolerance Values.

T.1.1. On Distance Tests. – Maintenance and acceptance tolerances for taximeters shall be as follows:

T.1.1.1. Meters Using Distance generated from sources physically connected to the vehicle (e.g., OBD sensor).

- (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.1.1.2. Meters Using Distance generated from sources not physically connected to the vehicle (e.g., navigation satellite system such as GPS and/or other location services).

(a) On Overregistration: 2.5 %

(b) On Underregistration: 2.5 %

CWMA recommended withdrawal of TNS-20.1 and that TXI-20.1 as modified in 2022 be presented as a Voting Item on the NCWM agenda.

Item Block 4 (B4) – Electronically Captured Tickets or Receipts

(**Note:** The Item under Consideration reflects changes that were received by the committee from the submitter of the item and that the Committee agreed to during its 2021 Interim Meeting work session. The changes are highlighted.)

- B4: GEN-21.2 D G-S.5.6. Recorded Representations.
- B4: LMD-21.2 D S.1.6.5. Money Value Computations., UR.3. Use of a Device.
- B4: VTM-21.1 D S.1.1. Primary Elements., UR.2. User Requirements
- B4: LPG-21.1 D S.1.1. Primary Elements., UR.2. User Requirements
- B4: CLM-21.1 D S.1.4.1. Printed Ticket Recorded Representation., UR.2.6.3. Printed Ticket Recorded Representation.
- B4: MLK-XX-X D S.1.4.2 Printed Ticket Recorded Representation., UR.2.2. Printed Ticket, Recorded Representation.

- B4: MFM-21.2 D S.6. Printer Recorded Representations., UR.2.6. Ticket Printer, Customer Ticket, Recorded Representation., UR.3.4. Printed Ticket. Recorded Representation.
- B4: CDL-21.1 D S.1.4.1. Printed Ticket Recorded Representations., UR.2.4.2. Tickets or Invoices. Recorded Representation.
- B4: HGM-21.1 D S.2.6. Recorded Representations, Point of Sale Systems., S.6. Printer. Recording Element., UR.3.2. Vehicle-mounted Measuring Systems Ticket Printer Recording Element., UR.3.3. Printed Ticket. Recorded Representation.
- B4: OTH-21.2 D Appendix D - Definitions.: recorded representations, recording element.

Source: Kansas Department of Agriculture, Division of Weights and Measures

Submitter’s Purpose and Justification:

Allow recorded values to be captured electronically as an alternative to a printed ticket or receipt.

In 2014 G-S.5.6. was added to Handbook 44 to allow for the issuance of electronic receipts. At that time the use of the term “print”, and all variations on the word “print” was not fully addressed.

The Oxford Dictionary defines print as “a mechanical process involving the transfer of text, images, or designs to paper.”

The Oxford Dictionary defines record as: to “set down in writing or some other permanent form for later reference, especially officially.”

Values that are delivered via electronic means are recorded values and not necessarily printed vales. Printed indicates that a value has been transferred on to a hard document. While the intent of the 2014 amendment was to allow for the use of electronic receipts the terminology used is incorrect. In addition to receipts, there are instances where other information may be transmitted electronically.

When applying G-A.2. to weighing and measuring devices,

G-A.2. Code Application. – This General Code shall apply to all classes of devices as covered in the specific codes. The specific code requirements supersede General Code requirements in all cases of conflict.

(Amended 1972)

Multiple conflicts arise in the implementation of the 2014 Amendment of G-S.5.6. This is to clarify the terminology in Handbook 44 and to recognize the changing technology in how transactions are recorded, and the information is disseminated.

NIST OWM Executive Summary for Item Block 4 (B4) – Electronically Captured Tickets or Receipts

NIST OWM Recommendation: Although NIST OWM feels that all proposed changes would benefit from additional review, NIST OWM believes that the additional changes made to G-S.5.6 provides clarity. NIST OWM believes a Developing status is appropriate so that changes to the B4 specific

NIST OWM Executive Summary for Item Block 4 (B4) – Electronically Captured Tickets or Receipts

codes are carefully reviewed to ensure the proposed changes do not change the original intent of the specific section before moving these items forward for a vote.

- Most of the changes proposed by NIST OWM are included in the proposal, except for the recommendation that “However” be removed from the General Code requirement in this proposal. We recommend that “However” be removed.

Item under Consideration:**B4: GEN-21.2 D G-S.5.6. Recorded Representations.**

Amend Handbook 44, 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 ~~printed-provided~~ **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. **Unless otherwise specified, recorded representations referenced in specific codes shall be made available to the customer as a minimum in hard copy form.** **However**, 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 **and 20XX**)

B4: LMD-21.2 D S.1.6.5. Money Value Computations., UR.3. Use of a Device.

Amend Handbook 44, Liquid Measuring Devices Code as follows:

S.1.6.5. Money-Value Computations

...

S.1.6.5.6. Display of Quantity and Total Price, Aviation Refueling Applications.

(a) The quantity shall be displayed throughout the transaction.

(b) The total price shall also be displayed under one of the following conditions:

- (1) The total price can appear on the face of the dispenser or through a controller adjacent to the device.
- (2) If a device is designed to continuously compute and display the total price, then the total price shall be computed and displayed throughout the transaction for the quantity delivered.

(c) *The total price and quantity shall be displayed for at least five minutes or until the next transaction is initiated by using controls on the device or other customer-activated controls.*

(d) *A **printed** receipt shall be available and shall include, at a minimum, the total price, quantity, and unit price.*

[Nonretroactive as of January 1, 2008]

(Added 2007) (**Amended 20XX**)

S.1.6.7. Recorded Representations. – *Except for fleet sales and other price contract sales and for transactions where a post-delivery discount is provided, a **printed** receipt providing the following information shall be available through a built-in or separate recording element for all transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash:*

(a) *the total volume of the delivery;**

(b) *the unit price;**

(c) *the total computed price;**

(d) *the product identity by name, symbol, abbreviation, or code number;* and*

(e) *the dispenser designation by either an alphabetical or numerical description.***

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

(Added 1985) (Amended 1997, 2012, 2014, 2018 and **20XX**)

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

(a) the product identity by name, symbol, abbreviation, or code number;

(b) transaction information as shown on the dispenser at the end of the delivery and prior to any post-delivery discount(s), including the:

(1) total volume of the delivery;

(2) unit price; and

(3) total computed price of the fuel sale.

(c) an itemization of the post-delivery discounts to the unit price;

(d) the final total price of the fuel sale after all post-delivery discounts are applied; and

(e) *the dispenser designation by either an alphabetical or numerical description.*

[Nonretroactive as of January 1, 2021]

(Added 2012) (Amended 2014, **and 2018, and 20XX**)

...

UR.3. Use of a Device

...

UR.3.3. Computing Device – Any computing device used in an application where a product or grade is offered for sale at one or more unit prices shall be used only for sales for which the device computes and displays the sales price for the selected transaction.

(Became retroactive 1999)

(Added 1989) (Amended 1992)

The following exceptions apply:

- (a) Fleet sales and other price contract sales are exempt from this requirement.
- (b) A truck stop dispenser used exclusively for refueling trucks is exempt from this requirement provided that:
 - (1) all purchases of fuel are accompanied by a **printed** receipt of the transaction containing the applicable price per gallon, the total gallons delivered, and the total price of the sale; and
(Added 1993)
 - (2) unless a dispenser complies with S.1.6.4.1. Display of Unit Price, the price posted on the dispenser and the price at which the dispenser is set to compute shall be the highest price for any transaction which may be conducted.
(Added 1993)
- (c) A dispenser used in an application where a price per unit discount is offered following the delivery is exempt from this requirement, provided the following conditions are satisfied:
 - (1) the unit price posted on the dispenser and the unit price at which the dispenser is set to compute prior to the application of any discount shall be the highest unit price for any transaction;
(Amended 2014)
 - (2) all purchases of fuel are accompanied by a receipt recorded by the system. The receipt shall contain:
 - a. the product identity by name, symbol, abbreviation, or code number;
 - b. transaction information as shown on the dispenser at the end of the delivery and prior to any post-delivery discount including the:
 - 1. total volume of the delivery;
 - 2. unit price; and

- 3. total computed price of the fuel sale prior to post-delivery discounts being applied.
 - c. an itemization of the post-delivery discounts to the unit price; and
 - d. the final total price of the fuel sale.
- (Added 2012) (Amended 2014)
(Added 1989) (Amended 1992, 1993, 2012, and 2014, and 20XX)

UR.3.4. Printed Ticket. Recorded Representation. – The total price the total volume of the delivery; the price per liter or gallon; *and a corresponding alpha or numeric dispenser designation** shall be **shown, either printed recorded by the device or in clear hand script**, on any **printed ticket issued by a device and recorded representation containing any one of these values and shall comply with G-S.5.6.** Establishments where no product grades are repeated are exempt from the dispenser designation requirement.

**[Nonretroactive as of January 1, 2021]*

(Amended 2001, 2018, and 2019, and 20XX)

B4: VTM-21.1 D S.1.1. Primary Elements., UR.2. User Requirements

Amend Handbook 44, Vehicle Tank Meter Code as follows:

S.1.1. Primary Element

S.1.1.1. General. – A meter shall be equipped with a primary indicating ~~element, and may also be equipped with a primary recording element.~~ Except for systems used solely for the sale of aviation fuel into aircraft and for aircraft-related operations, a meter shall be equipped with a primary recording element.

(Amended 1993 and 20XX)

~~Note: Except for systems used solely for the sale of aviation fuel into aircraft and for aircraft-related operations, vehicle tank meters shall be equipped with a primary recording element as required by paragraph UR.2.2. Ticket Printer; Customer Ticket. **Recorded Representation**~~

~~(Amended 1993 and 20XX)~~

...

S.1.4.2. Printed Ticket. Recorded Representation. – If a computing-type device issues a **printed ticket recorded representation** which displays the total computed price, the ~~ticket recorded representation~~ shall ~~also have printed clearly thereon record~~ the total quantity of the delivery, the appropriate fraction of the quantity, and the price per unit of quantity.

(Amended 1989, and 20XX)

...

UR.2. User Requirements.

...

UR.2.2. Ticket Printer, Customer Ticket Recording Element. – Vehicle-Mounted metering systems shall be equipped with ~~a ticket printer which shall be used for~~ means to record all sales where product is delivered through the meter and shall comply with G-S.5.6. A copy of the ticket issued by the device shall be left with provided to the customer at the time of delivery or as otherwise specified by the customer.

(Added 1993) (Amended 1994, and 20XX)

B4: LPG-21.1 D S.1.1. Primary Elements., UR.2. User Requirements

Amend Handbook 44, LPG and Anhydrous Ammonia Liquid-Measuring Devices Code as follows:

S.1.1. Primary Elements.

S.1.1.1. General. – A meter shall be equipped with a primary indicating element and may also be equipped with a primary recording element.

Note: Vehicle-mounted metering systems shall be equipped with a primary recording element as required by paragraph UR.2.6. ~~Ticket Printer; Customer Ticket.~~ Recorded Representation (Amended 20XX)

...

S.1.1.6. ~~Printed Ticket.~~ Recorded Representation – Any ~~printed ticket issued~~ recorded representation created by a device of the computing type ~~on~~ which ~~there is printed~~ includes the total computed price, shall ~~have printed clearly~~ also include thereon the total volume of the delivery in terms of liters or gallons, and the appropriate decimal fraction of the liter or gallon, and the corresponding price per liter or gallon.

(Added 1979) (Amended 1987, and 20XX)

...

S.1.5.5. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided. – Except for fleet sales and other price contract sales, a ~~printed receipt~~ recorded representation providing the following information shall be available through a built-in or separate recording element that is part of the system for transactions involving a post-delivery discount:

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

- (d) the final total price of the fuel sale after all post-delivery discounts are applied.
(Added 2016) (**Amended 20XX**)

...

UR.2. User Requirements.

...

UR.2.6. ~~Ticket Printer, Customer Ticket~~ Recorded Representation. – Vehicle-Mounted metering systems shall be equipped with ~~a ticket printer which shall be used for means to record~~ all sales where product is delivered through the meter **and shall comply with G-S.5.6.** A copy of the **ticket recorded representation** issued by the device shall be **left with provided to** the customer at the time of delivery or as otherwise specified by the customer.

(Added 1993²) (Amended 1994, **and 20XX**)

...

UR.2.7.2. Computing Device. – Any computing device used in an application where a product or grade is offered for sale at one or more unit prices shall be used only for sales for which the device computes and displays the sales price for the selected transaction. The following exceptions apply:

- (a) Fleet sales and other price contract sales are exempt from this requirement.
- (b) A truck stop dispenser used exclusively for refueling trucks is exempt from this requirement provided that:
 - (1) all purchases of fuel are accompanied by a ~~printed receipt~~ **recorded representation** of the transaction containing the applicable price per unit of measure, the total quantity delivered, and the total price of the sale; and
 - (2) unless a dispenser complies with S.1.5.1. Display of Unit Price, the price posted on the dispenser and the price at which the dispenser is set to compute shall be the highest price for any transaction which may be conducted.
- (c) A dispenser used in an application where a price per unit discount is offered following the delivery is exempt from this requirement, provided the following conditions are satisfied:
 - (1) the unit price posted on the dispenser and the unit price at which the dispenser is set to compute shall be the highest unit price for any transaction;
 - (2) all purchases of fuel are accompanied by a receipt recorded by the system for the transaction containing:
 - a. the product identity by name, symbol, abbreviation, or code number;
 - b. transaction information as shown on the dispenser at the end of the delivery and prior to any post-delivery discount including the:
 1. total volume of the delivery;

2. unit price; and
 3. total computed price of the fuel sale prior to post-delivery discounts being applied.
- c. an itemization of the post-delivery discounts to the unit price; and
 - d. the final total price of the fuel sale after all post-delivery discounts are applied.

(Added 2016) (Amended 20XX)

B4: CLM-21.1 D S.1.4.1. ~~Printed Ticket~~ Recorded Representation., UR.2.6.3. ~~Printed Ticket~~ Recorded Representation.

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

S.1.4.1 ~~Printed Ticket~~ Recorded Representation – Any ~~printed ticket~~ recorded representation issued by a device of the computing type on which ~~there is printed~~ includes the total computed price shall ~~have printed clearly thereon~~ also include the total quantity of the delivery, and the price per unit.

(Amended 20XX)

And

UR.2.6.2. ~~Tickets or Invoices~~ Recorded representation– Any ~~written invoice, or printed ticket,~~ recorded representation based on a reading of a device that is equipped with an automatic temperature or density compensator shall have shown thereon that the quantity delivered has been adjusted to the quantity at the NBP of the specific cryogenic product or the equivalent volume of gas at NTP.

(Amended 20XX)

UR.2.6.3. ~~Printed Ticket~~ Recorded Representation. – Any ~~printed ticket issued~~ recorded representation provided by a device of the computing type ~~on~~ which ~~there is printed~~ includes the total computed price, the total quantity of the delivery, or the price per unit, shall also ~~show~~ include the other two values. (either printed or in clear hand script). and shall comply with G-S.5.6.

(Amended 20XX)

B4: MLK-21.1 D S.1.4.2. ~~Printed Ticket~~ Recorded Representation., UR.2.6.3. ~~Printed Ticket~~ Recorded Representation.

Amend Handbook 44, Milk Meter Code as follows:

S.1.4.2. ~~Printed Ticket~~ Recorded Representation – If a computing-type device issues a ~~printed ticket~~ recorded representation which ~~displays~~ includes the total computed price, the ~~ticket~~ recorded representation shall ~~also have printed clearly thereon~~ include the total quantity of the delivery, the appropriate fraction of the quantity, and the price per unit of quantity.

(Amended 1989 and 20XX)

UR.2.2. Printed Ticket. Recorded Representation. – Any printed ticket issued recorded representation created by a device of the computing type ~~on~~ which ~~there is printed~~ includes the

total computed price, the total quantity, or the price per unit of quantity, shall also **show include** the other two values (**either printed or in clear hand script**). **and shall comply with G-S.5.6.**

(Amended 1989 **and 20XX**)

B4: MFM-21.2 D S.6. ~~Printer-Recorded Representations., UR.2.6. Ticket Printer, Customer Ticket, Recorded Representation., UR.3.4. Printed Ticket. Recorded Representation.~~

Amend Handbook 44, Mass Flow Meter Code as follows:

S.6. ~~Printer. Recording Element~~ – When an assembly is equipped with means for **printing recording** the measured quantity, the following conditions apply:

- (a) the scale interval shall be the same as that of the indicator;
- (b) the value of the **printed recorded** quantity shall be the same value as the indicated quantity;
- (c) *the **printed recorded** quantity shall also include the mass value if the mass is not the indicated quantity;*
[Nonretroactive as of January 1, 2021]
- (d) a quantity for a delivery (other than an initial reference value) cannot be recorded until the measurement and delivery has been completed;
- (e) the **printer recording element** is returned to zero when the resettable indicator is returned to zero; and
- (f) the **printed recorded** values shall meet the requirements applicable to the indicated values.
(Amended 2016, **and 20XX**)

S.6.1. ~~Printed Receipt Recorded Representations.~~ – Any When a quantity is delivered, **printed quantity the recorded representation shall include an identification number, the time and date, and the name of the seller. This information may be printed by the device or pre-printed on the ticket.
(Amended 20XX)**

And

UR.3.3 ~~Ticket Printer, Customer Ticket, Recorded Representation.~~ – Vehicle-Mounted metering systems shall be equipped with **a ticket printer which shall be used for means to record** all sales where product is delivered through the meter **and shall comply with G-S.5.6.** A copy of the **ticket recorded representation** issued by the device shall be **left with provided to** the customer at the time of delivery or as otherwise specified by the customer.
(Added 19934) (**Amended 20XX**)

...

UR.3.4. ~~Printed Ticket. Recorded Representation.~~ – The total price, the total quantity of the delivery, and the price per unit shall be **printed-provided** on any **ticket recorded representation** issued by a device of the computing type and containing any one of these values.

(Added 1993) (Amended 20XX)

**B4: CDL-21.1 D S.1.4.1. ~~Printed Ticket Recorded Representations.~~, UR.2.4.2. ~~Tickets or Invoices.~~
Recorded Representation.**

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

S.1.4.1. ~~Printed Ticket. Recorded Representation~~– Any ~~printed ticket~~ **recorded representation** issued by a device of the computing type ~~on~~ which ~~there is printed~~ **includes** the total computed price shall ~~have printed clearly thereon~~ also **include** the total quantity of the delivery and the price per unit.

(Amended 20XX)

UR.2.4.2. ~~Tickets or Invoices Recorded Representation.~~ – Any ~~written invoice or printed ticket~~ **recorded representation** based on a reading of a device that is equipped with an automatic temperature or density compensator shall ~~have shown thereon~~ **include** that the quantity delivered has been temperature or density compensated.

(Amended 20XX)

**B4: HGM-21.1 D S.2.6. Recorded Representations, Point of Sale Systems., S.6. Printer.
Recording Element., UR.3.2. Vehicle-mounted Measuring Systems Ticket
Printer Recording Element., UR.3.3. Printed Ticket. Recorded
Representation.**

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

S.2.6. Recorded Representations, Point of Sale Systems. – A ~~printed~~ receipt shall be available through a built-in or separate recording element for transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash. The ~~printed~~ receipt shall contain the following information for products delivered by the dispenser:

- (a) the total mass of the delivery;
- (b) the unit price;
- (c) the total computed price; and
- (d) the product identity by name, symbol, abbreviation, or code number.

(Amended 20XX)

...

S.6. ~~Printer. Recording Element~~ – When an assembly is equipped with means for ~~printing~~ **recording** the measured quantity, the ~~printed recorded~~ information must agree with the indications on the dispenser for the transaction and the ~~printed-recorded~~ values shall be clearly defined.

(Amended 20XX)

S.6.1. ~~Printed Receipt. Recorded Representation~~ – ~~Any When a quantity is delivered,~~ ~~printed quantity~~ **the recorded representation** shall include an identification number, the time

and date, and the name of the seller. ~~This information may be printed by the device or pre-printed on the ticket.~~

(Amended 20XX)

And

UR.3.2. Vehicle-mounted Measuring Systems ~~Ticket Printer~~ Recording Element.

(Amended 20XX)

UR.3.2.1. ~~Customer Ticket Recording Element~~. – Vehicle-Mounted metering systems shall be equipped with ~~a ticket printer which shall be used for means to record~~ all sales where product is delivered through the device and shall comply with G-S.5.6. A copy of the ~~ticket recorded representation~~ issued by the device shall be ~~left with~~ provided to the customer at the time of delivery or as otherwise specified by the customer.

(Amended 20XX)

...

UR.3.3. ~~Printed Ticket. Recorded Representation~~. – The total price, the total quantity of the delivery, and the price per unit shall be ~~printed provided~~ on any ~~ticket recorded representation~~ issued by a device of the computing type and containing any one of these values.

(Added 1993) (Amended 20XX)

B4: OTH-21.2 D Appendix D - Definitions.: recorded representations, recording element.

Amend Handbook 44, Appendix D - Definitions as follows:

recorded representation. – The printed, embossed, electronic, or other representation that is recorded as a quantity, unit price, total price, product identity or other information required by a weighing or measuring device. [1.10, 2.20, 2.21, 2.22, 2.24, 2.25, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 5.54, 5.55, 5.56(a), 5.56(b), 5.57, 5.58, 5.60]

recording element. – An element incorporated in a weighing or measuring device by means of which its the device's performance relative to quantity or money value is permanently recorded electronically or on a tape, ticket, card, or the like, in the form of a printed, stamped, punched, or perforated representation or recorded electronically in instances where that option is permitted by specific code. [1.10, 2.20, 2.21, 2.22, 2.24, 2.25, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 5.54, 5.55, 5.56(a), 5.56(b), 5.57, 5.58, 5.60]

NIST OWM Detailed Technical Analysis:

Although NIST OWM feels that all proposed changes would benefit from additional review, NIST OWM believes that the additional changes made to G-S.5.6 provides clarity. NIST OWM believes a Developing status is appropriate so that changes to the B4 specific codes are carefully reviewed to ensure the proposed changes do not change the original intent of the specific section before moving these items forward for a vote.

NIST OWM provided the previous comments. The key purpose of this block of proposals is to broaden the requirements by eliminating the term “print/printed” in specific NIST HB 44 codes and clarifying that

providing an electronic recorded representation in lieu of a printed recorded representation is an acceptable option as was adopted in G-S.5.6. Recorded Representations in 2014. NIST OWM provides the following technical points for consideration.

Paragraph G-S.5.6. Recorded Representation addresses multiple points relative to recorded representations:

1. Any NIST Handbook 44 requirement applicable to indicating and recording elements also apply to recorded representations.
2. Recorded values must be printed in a numerical or “digital” form. The reference to the term “digitally” refers to the use of that term as described in the definition for “digital type,” which describes “digitally” as being presented in numbers.
3. Providing the customer with an option of “not receiving a receipt” is acceptable, so long as the *customer* is making that choice to not receive a receipt.
4. For systems that are capable of issuing an electronic receipt, the customer may be given the option of receiving the receipt in an electronic form. However, providing the option for an electronic receipt does not negate any requirement for the system to provide the customer with the option of a hard copy receipt for those specific codes where a hard copy receipt is required. That is, the system may offer additional options beyond the hard copy form; however, the hard copy form must remain an option for the customer to choose. The first part of this also sentence recognizes that not all systems are capable of providing an electronic option (though this would not preclude some codes from requiring such an option), but when such an option is available, the customer may choose that option over other options provided.

The current Item under Consideration presents the recommended changes to G-S.5.6. Recorded Representations as follows:

Current Item under Consideration in 2021 S&T Committee Interim Report:

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 ~~printed provided~~ 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. Unless otherwise specified, recorded representations referenced in specific codes shall be made available to the customer as a minimum in hard copy form. However, 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 and **20XX**)

With regard to the specific changes proposed to G-S.5.6., NIST OWM offers the following technical comments:

- **Sentence 2:** “All recorded values shall be ~~printed provided~~ presented digitally.”

OWM believes the proposed change to the second sentence in G-S.5.6. are appropriate. The original intent of the second sentence was to address the need for a numerical format. As noted

above, the reference in that sentence to the term “digitally” refers to the use of that term as described in the definition for “digital type,” which describes “digitally” as being presented in numbers. The definition from NIST HB 44 Appendix D:

- **digital type.** – A system of indication or recording of the selector type or one that advances intermittently in which all values are presented digitally, or in numbers. In a digital indicating or recording element, or in digital representation, there are no graduations. [1.10]

The word “printed” reflects the technology that was available at the time the requirements were written; the use of the word “printed” was not intended to limit recorded representations to only hard copy form. Thus, the use of the word “presented” in place of “printed” does not change the original intent of that statement and helps to recognize that other forms of recorded representations are now available.

As an editorial comment, OWM notes that the word “provided” is not part of the current language in G-S.5.6. Although the intent of showing the term as struck was to distinguish it from earlier versions of the proposal, this term should be struck from the proposal when presenting it for consideration.

- **Sentence 3:** “In applications where recorded representations are required by a specific code, the customer may be given the option of not receiving the recorded representation.”

OWM believes the proposed change to the third sentence by adding the term “by a specific code” is appropriate and simply emphasizes that individual codes may specify the need for a recorded representation.

- **Sentence 4:** “Unless otherwise specified, recorded representations referenced in specific codes shall be made available to the customer as a minimum in hard copy form.”

OWM believes the addition of this new fourth sentence clarifies that the *customer* must have the option of receiving the recorded representation in hard copy form but recognizes there may be some codes (such as the tentative code 3.40 for Electric Vehicle Fueling Systems) in which offering only an electronic form is acceptable.

- **Sentence 5:** “However, 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.”

OWM believes the addition of the word “However” is unnecessary and may cause confusion. The current form of the sentence is appropriate. Thus, OWM recommends striking the proposed addition of the word “However” at the start of that sentence.

Based on the assessment above OWM recommended the final proposal be modified to recommend the following:

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 **printed 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. **Unless otherwise specified, recorded representations referenced in specific codes shall be made available to the customer as a minimum in hard copy form.** 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 and **20XX**)

These changes are represented in the 2022 Interim Meeting Report, Item under Consideration with the exception of striking “However” as recommended above.

At the 2021 CWMA Annual Meeting, a suggestion was made to simplify G-S.5.6 by removing changes that were added to G-S.5.6 in 2014 to address systems with the capability of issuing an electronic receipt and, instead, specify the electronic receipt option as an acceptable form of receipt in each specific code. Although NIST OWM agrees that the General Code requirement may benefit from a restructuring of the paragraph to improve its use, NIST OWM believes there is value in providing information on options for recorded representation in the general code requirements. The specific intent of the decision made in 2014 to include this language in the General Code was to avoid the need to add specific language to each code. By doing so, this avoids a situation in which a given code is inadvertently overlooked and the potential option for an electronic form of recorded representation may be in question. Thus, OWM does not believe the reference to electronic receipts should be removed from the General Code.

Nevertheless, if there is a desire to streamline the paragraph, the Submitter and the Committee may wish to consider using an alternate format such as sub-paragraphs or bulleted points to help clarify the various sections of the paragraph. For example, G-S.5.6. might be restructured as follows:

G-S.5.6. Recorded Representations. – The following shall apply to recorded representations.

- (a)** Insofar as they are appropriate, the requirements for indicating and recording elements shall also apply to recorded representations.
- (b)** All recorded values shall be **printed presented** digitally.
- (c)** In applications where recorded representations are required **by a specific code**, the customer may be given the option of not receiving the recorded representation.
- (d) Unless otherwise specified, recorded representations referenced in specific codes shall be made available to the customer as a minimum in hard copy form.** 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 and **20XX**)

In addition to its comments regarding the proposed changes to paragraph G-S.5.6. Recorded Representations, NIST OWM also recommends the following editorial changes to this block of items:

- B4: LMD-21.2 - UR.3.4. Printed Ticket. Strike out “Printed Ticket”
- B4: VTM-21.1 - S.1.4.2. Printed Ticket Strike out “Printed Ticket”

These changes are represented in the 2022 Interim Meeting Report, Item under Consideration.

Summary of Discussions and Actions:

At the 2021 NCWM Interim Meeting, Mr. Charles Stutesman (Kansas), submitter of the item, agreed that the item should be Developing and noted that updates to the Item under Consideration were provided to the S&T Committee based on reviews that he had with NIST OWM. Mr. Dmitri Karimov (MMA) commented that the proposed changes to recognize electronically captured tickets are needed, editorial corrections are needed to some parts of the proposal, and he agreed with a Developing status for this item. Ms. Diane Lee (NIST OWM) commented that there are two proposed changes to HB 44, Mass Flow Meter Code, Paragraph U.R.3.3 in the 2021 Interim Agenda. One proposal is Block 4 MFM-21.2 UR.3.3. (Which was incorrectly number as UR.2.6 in the Item under Consideration in the 2021 Interim Meeting agenda) and the other is item MFM-21.1. UR.3.3. on the 2021 Interim Meeting agenda. The submitters should work together to provide one proposed change.

During the Committee work session, the Committee assigned a Developing status to Item Block 4.

At the 2021 Annual Meeting, Mr. Stutesman stated that he looks forward to maintaining Developing status between now and the 2022 Interim. Mr. Stutesman explained that when the electronic receipt provision was added to NIST HB 44 General Code requirements, a change to the specific Codes were needed because the specific Codes supersede the General Code. All the code sections included in this block have printer requirements. As such, it was not the goal to remove printers but to add the option for electronic receipts if customer wants it. Mr. Stutesman would appreciate comments and suggestions for changes to the proposal.

During the Committee work session, the Committee assigned a Developing status to Item Block 4.

At the 2022 Interim Meeting Mr. Stutesman noted that some editing and additional work is needed before forwarding as a Voting Item. Mr. Stutesman recommended that the item remain Developing. California DMS recommended a Developing status for this item. Mr. Karimov (MMA) commented that proposed changes to recognize electronically captured tickets are needed and that editorial corrections are needed to some parts of the proposal. Mr. Dmitri agreed with a Developing status for this item. An SMA representative also commented on support for this item because it recognizes the importance of providing flexible options for recorded representations to customers. SMA sees value in the item and agreed with a Developing status for this item. NIST OWM agreed with the need to address current language in the proposal and supports development.

During the Committee work session, the Committee assigned a Developing status to Item Block 4. The Committee supports the work and recommends the continued work of all stakeholders. For more information or to provide comment, please contact:

Mr. Charles Stutesman
Kansas Department of Agriculture
(785) 564-6683, charles.stutesman@ks.gov

At the 2022 Annual Meeting open hearings Mr. Stutesman commented that he worked with NIST OWM to add changes to the item and he also requested additional feedback from interested parties. Mr. Stutesman requested a Developing status for this item.

During the Committee work session, the Committee agreed to a Developing status for this item to allow for additional comments from interested parties.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearing the following comments were heard:

Mr. Matt Douglas, California - DMS, stated that California supports further development of the block. Mr. Russell Vires (SMA) stated that SMA supports 2 of the items in Block 4, GEN-21.2 and OTH-21.2. Ms. Lee stated that this is a carryover item and that the NIST comments on this item are posted on the NCWM website. Ms. Lee informed the WWMA that NIST OWM supports this item as a Developing item going forward.

The WWMA S&T Committee recommended the status remain Developmental. The Committee recommended that the submitter continue to work with NIST OWM to further develop the item.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting, Mr. Russ Vires (SMA) stated that he supports this item. Mr. Tim Chesser (Arkansas) suggested changing the wording in Gen 21.1. His suggestion is to change “presented” to “available”.

The Committee recommended this item remain Developing, so they have an opportunity to work with the NIST OWM to clarify and clean up the language.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting open hearing the following comments were heard.

Mr. Jim Willis (New York) commented that it is important to recognize that the future will bring us to electronically captured tickets or receipts. Mr. Lou Straub (SMA), John McGuire (New Jersey), and Jim Willis (New York) all recommended to move this item forward as Voting.

The NEWMA S&T Committee recommended that this item be given Voting status.

During the 2022 NEWMA Annual Meeting Open Hearing Mr. Russ Vires (SMA) rose in support of GEN-21.2 and OTH-21.2. He commented that he supports the option for electronic receipts and tickets and recognizes the need to provide options for consumers. No other comments were heard on this block.

After hearing comments from the floor, the Committee recognized the need to further develop this block and recommended the block retain Developing status.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting the Committee heard comments from the floor. Mr. Stutesman mentioned that he hoped to have more information to NCWM Interim Meeting and supported this item staying as Developing. Ms. Lee stated there are comments on this item in the OWM’s Analysis that was sent to the Committee and supports this item as Developing. Mr. Straub (SMA) supports OTH-21.2.

CWMA S&T Committee recommended this item as Developing.

During the 2022 CWMA Annual Meeting Open Hearing, Mr. Stutesman stated that the item should remain as Developing. The item will be ready to present for status upgrade during the 2023 Interim Meeting or will be withdrawn.

Mr. Russ Vires (SMA) remarked the SMA supports this item and they recognized the importance of providing flexible options for recorded representations to the consumer.

The CWMA S&T Committee recommended this item remain as Developing per the submitter's request.

Item Block 5 (B5) – Define “Field Reference Standard”

(This Item was Withdrawn.)

(**Note:** In 2019 this block of items was combined with Block 1 “Terminology For Testing Standards” and other items that addressed terminology for standards and the use of “master meters.” Based on comment heard during the 2021 Annual Meeting, the S&T Committee recommended that all items that were included in Block 1 “Terminology for Testing Standards” that originally appeared as a separate item or a separate block of items on the S&T agenda prior to 2019, be removed from Block 1 “Terminology For Testing Standards” and appear as originally presented.

Item Block 5 “Define “Field Reference Standard”” was removed from Block 1 “Terminology for Testing Standards” and now appears as a separate block of items on the 2022 Interim Meeting agenda.)

B5: CLM-18.2	W	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: CDL-18.2	W	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: HGM-18.2	W	N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method
B5: OTH-18.3	W	Appendix D – Definitions: field reference standard meter and transfer standard

Source: Endress + Hauser Flowtec AG USA (2018)

Submitter's Purpose and Justification:

Add definition field reference standard meter to HB 44. Delete transfer standard definition. Change terms in sections 3.34, 3.38 and 3.39.

Item under Consideration:

B5: CLM-18.2 W N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards

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

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

(Amended 1976 and 20XX)

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

(Added 1976)

B5: CDL-18.2 W N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards

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

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

(Amended 20XX)

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

(Amended 20XX)

B5: HGM-18.2 W N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method

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

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

(Amended 20XX)

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

B5: OTH-18.3 W Appendix D – Definitions: field reference standard meter and transfer standard

Amend Handbook 44, Appendix D as follows:

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

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

NIST OWM Detailed Technical Analysis:

This item Block 5 was removed from Block 1 items of previous agendas and now appears as a separate item Block 5 on the 2022 Interim meeting agenda. NIST OWM provided previous comments in general to all items that were included in Block 1. These comments have been updated to address specific issues concerning this individual item.

The submitter of this item Mr. Keilty recommended that this item be withdrawn. NIST OWM supports the withdraw of this item. This item was submitted when other definitions were submitted and being considered. There were those in opposition to the terms used in this proposal and introducing these new terms in the handbook. The Field task group assigned to developing items concerning the use of field standard meters to test meters in the field discussed these and other terms but did not decide on a term for use.

Summary of Discussions and Actions:

At the 2022 Interim Meeting, Mr. Keilty provided written comments to the Committee requesting that the block of items be withdrawn. Mr. Keilty also requested during the open hearing that these items be withdrawn. Ms. Diane Lee (NIST) agreed with the submitter and recommended that the items be withdrawn.

During the S&T Committee work session, the Committee agreed to recommend this item for withdrawal.

At the 2022 Annual Meeting this item was not discussed because it was withdrawn at the 2022 Interim Meeting.

Regional Association Reporting:**Western Weights and Measures Association**

During the 2021 Annual Meeting Open Hearing the following comments were heard:

Mr. Keilty commented that he submitted these in 2017 in response to NIST comments. NIST provided an agenda item in that same year with the language from Block 1. Mr. Keilty expressed that he had hoped that the task group formed in 2019 would have addressed Block 1 and Block 5 items and that Language in block 5 is in line with LPG-15.1 and MFM-15.1. This Language in documents was copied and inserted. Mr. Keilty asked Committee to look at language specific to the item and not the general block.

Mr. Kurt Floren (Los Angeles County, California) referenced an error in Block 5. Mr. Keilty would like to move from Developing to a Voting status in the 2022 cycle.

Mr. Bob Murnane (Seraphin) commented that the proposal adds new terminology that does not currently exist in HB and that the proposed definition is vague. It does not limit the tolerance for field standard. W/M officials needs to know that enforcement is legally enforceable. HB 44 recognizes use of transfer standards, and their uncertainty exceeds the 1/3. Several companies have proposed that mass flow meters be used. NIST is collecting data to evaluate Coriolis meter to possibly use as a field standard. It would be wrong to recognize Coriolis meter as a field standard (and that is what this is doing) without the proper tests. Mr. Murnane questions the need of this terminology. The existing terms (transfer standard / field standard) should be reviewed and edited. Mr. Murnane recommended that this item be withdrawn.

Mr. Josh Nelson, Ex-Officio NCWM S&T Committee, questioned can he submit his notes to the Committee? He agreed to provide his notes. He also recommended that the entire block be withdrawn. Mr. Murnane agreed with Mr. Nelson to withdraw item block 5.

Mr. Keilty responded to Mr. Murnane and stated that these were not submitted to undermine the 1/3 tolerance. It is just assumed that the device will perform, and the data will be provided, and this is just enabling language.

The WWMA S&T Committee recommended the status remain Developmental. The Committee recommended that items MFM-15.1 and LPG-15.1 be inserted into Block 5 items as they refer to the same terminology in HB 44. A letter was submitted to the Committee by Mr. Murnane and will be posted to the NCWM website.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting, Mr. Keilty stated that he hoped the Field Standard Task Group would have worked on Blocks 1 and 5, but, unfortunately, that was not the case. He recommended this item be withdrawn. Mr. Russ Vires (Mettler Toledo) recommended the Withdrawal of this item. Mr. Oppermann (Weights and Measures Consulting, Seraphin) supported Withdrawal of this item.

This Committee recommended this item be withdrawn at the submitter's request.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting open hearings the following comments were heard.

Mr. Keilty submitted comments and is requesting withdrawal of the items in this block.

Further comments were heard from Ms. Juana Williams (NIST OWM) on the history of the item. Comments were received in support of withdrawal.

The NEWMA S&T Committee recommended withdrawal of this item.

During the 2022 NEWMA Annual Meeting this item was not discussed because it was withdrawn at the 2022 NCWM Interim Meeting.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting, the Committee heard comments from the floor. Mr. Keilty recommended that item be withdrawn. CWMA S&T Committee recommended that the item be withdrawn.

During the 2022 CWMA Annual Meeting this item was not discussed because it was withdrawn at the 2022 NCWM Interim Meeting.

Item Block 6 (B6) – Commercial and Law Enforcement, Axle and Axle Group Weights

B6: SCL-22.1 D S.1.14. Recorded Representation of Axle or Axle Group Weights

B6: SCL-22.3 D UR.3.3. Single-Draft Vehicle Weighing., and UR.3.4. Axle and Axle Group Weight Values.

Source: NIST Office of Weights and Measures

Submitter’s Purpose and Justification:

This proposed change is intended to add clarification regarding the implications of using weighing and measuring devices for transactions that may be considered by some as commercial while there is no clear guidance provided.

NIST OWM Executive Summary for Item Block 6 (B6) –Commercial and Law Enforcement, Axle and Axle Group Weights

NIST OWM Recommendation: The items in this block are in a Developing status. OWM is most interested at this time in receiving additional feedback from the community on each of these items in the block.

- When item SCL-22.1 of this block was originally proposed there was a lag in the publication process for 2020 and 2021; so the numbering of the paragraph in the Item under Consideration has been updated below to S.1.15.
- SCL-22.1 adds two new HB 44 Scales Code specification requirements to address how weight information generated from multi-independent platform vehicle scale systems is to be identified on a weigh ticket.
- The first proposed sub-paragraph of SCL-22.1 (i.e., S.1.15.1) requires the ticket to clearly identify the particular independent scale platform associated with each printed weight value.
- The second proposed sub-paragraph of SCL-22.1 (i.e., S.1.15.2.) requires the summed total of all platforms to be identified as the vehicle’s total weight in instances where all axle and axle groups of the vehicle being weighed fit onto a live portion of the scale system and are weighed simultaneously as a single draft. In instances where the vehicle being weighed cannot be weighed as a single draft (e.g., oversized vehicles that do not fit onto the scale) thus necessitating weighing the vehicle in two drafts, the ticket must provide clear indication that the total weight is “not legal-for-trade” or similar text to make known the gross vehicle weight is not valid for use in commercial transactions.
- SCL-22.3 adds a new HB 44 Scales Code User Requirement to make clear the acceptable use of multi-platform vehicle scale systems to charge a fee for the commercial service of providing customers (usually truckers) axle weights, axle group weights, and total weight of their vehicles to enable them to determine compliance with state and federal legal load limits.
- Since the 2022 NCWM Interim Meeting, OWM has amended the proposal in SCL-22.3. and recommends it replace the current proposal for this item. An electronic copy of the revised proposal has been provided to the S&T Committee and has also been posted on NCWM’s website.

Item under Consideration:

B6: GEN-22.1 – G.A.1. Commercial and Law-Enforcement Equipment.

(NOTE: GEN-22.1 was originally in Block 6. It was removed by the National S&T Committee during the 2022 NCWM Interim Meeting, made a stand-a-lone item, and then was adopted at the 2022 NCWM Annual Meeting. [See the General Code Section in this report for further details on this item.])

B6: SCL-22.1 – Recorded Representation of Axle or Axle Group Weights

S.1.15. Recorded Representations, Multi-Independent Platform¹ Vehicle Scale Systems

S.1.15.1. Axle and Axle Group Loads. - All recorded representations of the different axle and axle group loads of a vehicle weighed on a multi-independent platform vehicle scale system shall be identified by providing indication of either:

- (a) the portion of the vehicle to which they represent (e.g., “axle-group 1, axle group 2, axle group 3,” or if using axle and axle group descriptions, “steering axle, drive axles, trailer axles”), or**
- (b) the particular independent scale platform from which they were obtained (e.g., “Platform 1, Platform 2, Platform 3”).**

S.1.15.2. Total Vehicle Weight. - If a summed total of all axle and axle group loads of a vehicle weighed on a multi-independent platform vehicle scale system is recorded, the recorded value shall be clearly identified as:

- (a) “Total Vehicle Weight,” “Vehicle Weight,” (or other similar terms that clearly identify the value as the vehicle’s total weight) providing all axle(s) and axle groups of the vehicle weighed were positioned on a live portion of the weighing/load-receiving elements and weighed simultaneously when the summed total was determined², or**
- (b) “Not-Legal-For-Trade” unless all axle and axle groups of the vehicle weighed were simultaneously positioned on a live portion of the weighing/load-receiving elements when the summed total was determined, or the vehicle was weighed using the alternative method described in footnote 2 of this paragraph.**

¹ Multi-independent platform means each platform of the scale is a single independent weighing/load-receiving element unattached to adjacent elements and with its own A/D conversion circuitry and displayed weight.

²Alternatively, the individual components of the vehicle being weighed may be uncoupled, positioned completely on the live elements of the scale, weighed separately, and then totaled.

B6: SCL-22.3 D UR.3.3. Single-Draft Vehicle Weighing., and UR.3.4. Axle and Axle Group Weight Values.

Amend Handbook 44, Scales Code as follows:

UR.3.3. Single-Draft Vehicle Weighing – A vehicle or a coupled-vehicle combination shall be commercially weighed on a vehicle scale only as a single draft. That is, the total weight of such a vehicle or combination shall not be determined by adding together the results obtained by separately and not simultaneously weighing each end of such vehicle or individual elements of such coupled combination. However, the weight of:

- (a) a coupled combination may be determined by uncoupling the various elements (tractor, semitrailer, trailer), weighing each unit separately as a single draft, and adding together the results; or
- (b) a vehicle or coupled-vehicle combination may be determined by adding together the weights obtained while all individual elements are resting simultaneously on more than one scale platform.

~~**Note: This paragraph does not apply to highway law enforcement scales and scales used for the collection of statistical data.**~~

~~**(Added 1992)**~~

And

UR.3.4. Axle and Axle Group Weight Values. – Weight values of axles or axle groups of highway motor vehicles are necessary to verify compliance with highway weight limit enforcement. When a fee is charged for the use of an axle-load scale or vehicle scale to determine the weight of axles or axle-groups, the transaction is considered to be “commercial” as defined by General Code paragraph G-A.1. Commercial and Law Enforcement Equipment and the scale shall comply with all applicable requirements for commercial weighing systems.

When weight values for axles or axle groups are obtained using multiple-platform vehicle scales and where all parts of the motor vehicle are simultaneously resting on live elements of the scale, the weight values for axles or axle groups may be summed together to represent a commercial total gross weight of the motor vehicle. Weight values for axles or axle groups may also be summed to represent a commercial total gross weight of the motor vehicle if the individual components are uncoupled, positioned completely on the live elements, and weighed separately on the scale.

Weight values of axles or axle groups obtained from these weighing devices as individual weighing operations where all parts of the motor vehicle are not simultaneously resting on live portions of the scale shall not be used in commercial transactions and may only be used to verify compliance with highway weight limits.

(Renumber existing paragraphs UR.3.4 through UR.3.12.)

NIST OWM Detailed Technical Analysis:

OWM developed the two proposals in SCL-22.1 and SCL-22.3 to address perceived gaps in HB 44 Scales Code requirements pertaining to the design and use of multi-independent platform vehicle scale systems commercially used to charge a fee for the service of providing axle- and axle-group weights, as well as total vehicle weight to those needing them (typically commercial truck drivers). These systems are most often used commercially to verify compliance with federal and state vehicle load limits but at times may

also be used to establish the net loads of products that are bought and sold by weight, establish transportation charges, and for other commercial purposes.

These proposals were developed as the result of an OWM inquiry from a state questioning the permissible use of a multi-independent platform vehicle scale system (each platform having its own A/D conversion circuitry and weight indicator) that printed total vehicle weight from summing the axle- and axle-group loads of vehicles weighed when not all parts of those vehicles were able to fit onto a live portion of the scale and be weighed simultaneously. That is, the scale was being used on occasion to “split weigh” in two different drafts the different axle and axle groups of “over-sized” coupled-vehicle combinations because not all axle and axle groups would fit onto a live portion of the scale at the same time, which thus necessitated weighing those particular vehicles in multiple drafts. Even though the printed ticket for those weight determinations provided clear indication that the total vehicle weight value recorded was “non certifiable,” it is questionable whether or not a scale system is permitted to record this weight since HB 44 Scales Code paragraph UR.3.3. Single-Draft Vehicle Weighing currently requires a vehicle or coupled-vehicle combination to be commercially weighed on a vehicle scale only as a single draft. Note: The manufacturer of this particular scale system advised us that most vehicles and coupled-vehicle combinations that are weighed on the scale can be weighed as a single draft. That is, all axle and axle groups can be positioned onto a live portion of the scale to be weighed simultaneously. It is only the occasional oversized vehicle or coupled-vehicle combination that exceeds the length of the scale that must therefore be split weighed.

We purposely chose to simplify these proposals to only address multi-independent platform vehicle scale systems. These systems have been installed at truck stops (and perhaps other locations) throughout the US for many years and are used primarily to determine axle loads, axle-group loads, and total vehicle weight of vehicles and coupled-vehicle combinations for a fee. Although we recognize that single-platform vehicle scales may also sometimes be used for this same purpose, we don't view them as being suitable for the application. This is because the approach requirements for vehicle scales and axle-load scales in NIST HB44 are very different and few vehicle scales in commercial service have approaches that comply with the approach requirements for axle-load scales. Axle-load scales are required to have a straight paved approach in the same plane as the platform on each end of the platform. The approaches must be the same width as the platform and of sufficient length to ensure the level positioning of vehicles during weight determinations. If vehicles aren't level when the different axle and axle groups are weighed, a portion of the force of the load transfers to other axle and axle groups that aren't positioned on the scale resulting in false indication. It is important to recognize that not all multi-independent platform vehicle scale systems may be installed with approach requirements meeting the HB 44 approach requirements for an axle-load scale. Many do, but we are unable to confirm that all do. We view this somewhat of an important concern given that these proposals, if adopted, would make it permissible to split weigh vehicles and coupled-vehicle combinations for a fee providing the only use of the weighing results from doing so is to verify whether or not the different axle-, axle-group loads, and total vehicle weight are compliant with highway weight limits.

Another reason we elected to limit these proposals to only address multi-independent platform vehicle scale systems is that we do not believe it to be a very common practice to use single-platform vehicle scales to determine axle loads and axle-group loads of vehicles and coupled-vehicle combinations to verify compliance with federal and state vehicle load limits. Those that are using them for this purpose usually don't charge a fee, i.e., the weighing is usually done as a complimentary service.

NIST HB 44 does not currently require a multi-independent platform vehicle scale system to be equipped with a ticket printer and whether or not one should be required, is something to be considered. We have not proposed it, but perhaps others will conclude this would be an important HB 44 addition. We believe

most (perhaps all) of the multi-independent platform vehicle scale systems currently in commercial service have been equipped with a ticket printer and this is likely because the few scale manufacturers of these systems recognize the need for the multiple indications displayed by these systems to be made available in printed form to the operator and customer. We also believe most of the systems currently in service comply with both newly proposed sub-paragraphs of S.1.14. We developed these two new sub-paragraphs (S.1.14.1. and S.1.14.2.) because it is important for scale operators, customers, and enforcement officials to be able to clearly identify from a weigh ticket the different scale platforms utilized at the time a vehicle was weighed and their corresponding scale indications so that the accuracy of those values (including the summed total) can be verified. It is also important to clearly specify on a weigh ticket generated from one of these scale systems that any recorded total vehicle weight value determined from summing the different axle- and axle-group loads of a vehicle or coupled-vehicle combination weighed in multiple drafts (i.e., split weighed) is “Not-Legal-For-Trade.”

Paragraph UR.3.3. needs to be amended to address the current use of multi-independent vehicle scale systems to split weigh oversized vehicles for a fee. The current paragraph does not take into consideration both the past and present use of these scales to provide a total vehicle weight that’s most often only used to verify compliance with maximum legal load limits and safe distribution of the load. These systems have been in existence at truck stops for many years and their primary commercial use is to provide axle weights, axle group weights, and total vehicle weight to commercial haulers for a fee so that those haulers are able to determine whether or not their loads are distributed safely and within legal load limits. Years ago, (prior to the existence of multi-independent platform vehicle scale systems) axle-load scales served this same purpose at truck stops throughout the US and summing of the different axle and axle groups to determine total vehicle weight was undoubtedly done to ensure total vehicle weight didn’t exceed maximum legal load limits when using those scales. It is also important to recognize that the weight values corresponding to the different axle- and axle-group loads of vehicles weighed on a multi-independent platform vehicle scale system are not constant; but rather fluctuate/change depending on the position of those axles and axle groups on the different platforms of the system when the vehicle is weighed. That is, a change of the scale indication of one platform is offset by a change in the opposite direction of the indication from one or both of the other platforms if the position of a vehicle being weighed is changed slightly forward or backwards from its initial position. It is only the summed total of all indications that is constant; although it too changes minimally since not all sections of all platforms are typically adjusted the same. For these reasons, OWM has provided the Committee an updated proposal to amend Scales Code paragraph UR.3.3., which would make it permissible to weigh in multiple drafts (i.e., split weigh) a vehicle or coupled-vehicle combination and charge a fee for the service of providing weights of the different axle- and axle-group loads when the only use of those values is to determine compliance with highway legal load limits.

Summary of Discussions and Actions:

During the 2022 NCWM Interim Meeting, Mr. Rick Harshman (NIST OWM) provided the Committee a high-level summary of its analysis of the two items in Block 6, which included much of background information that had led OWM to submit the two proposals in Block 6 as well as the GEN-22.1 G.A.1. Commercial and Law-Enforcement Equipment item. Mr. Harshman reported that OWM had recently provided the Committee an updated version of the proposal in SCL-22.1 and requested the Committee replace the version of SCL-22.1 in its current agenda with the updated version recently received. Mr. Harshman also reported that OWM planned to revise the proposal in SCL-22.3 and would later (sometime following the 2022 NCWM Interim Meeting) submit the revised version to the Committee in hopes it could be reviewed by one or more of the regional weights and measures associations meeting in the

Spring and/or Fall of 2022. Mr. Harshman recommended both items remain in a Developing status to allow stakeholders time to review and recommend any changes they felt necessary.

Mr. Russ Vires (Mettler Toledo LLC) speaking on behalf of the SMA reported that the SMA recommended Block 6 be broken apart into three individual items (i.e., GEN-22.1 Commercial and Law-Enforcement Equipment, SCL-22.1 Recorded Representation of Axle or Axle Group Weights, and SCL-22.3 UR.3.3. Single-Draft Vehicle Weighing and UR.3.4. Axle and Axle Group Weight Values). Mr. Vires then provided the SMA's position and rationale for each of these items speaking verbatim from the SMA's November 2, 2021 report titled "SMA Positions on the NCWM Specification and Tolerances Committee Report (For the NCWM Interim Meeting, January 2022, Developed November 2, 2021). *NIST Technical Advisors note: Refer to the subheading shown below titled, "Scale Manufacturers Association (SMA-Fall 2021 Meeting)" to view the different positions and rationales provided by Mr. Vires on behalf of the SMA for the items in Block 6.* Mr. Vires also reported that the SMA had had the opportunity during its Fall 2021 meeting to review the updated version of the proposal in SCL-22.1 that OWM had provided the Committee for replacement of the one in its current agenda and that the SMA supported the changes OWM had made.

There were several officials who spoke in support of further development of the two items in Block 6.

Mr. Lou Straub (Fairbanks Scale) reported that Fairbanks Scale had been manufacturing the multi-platform "CAT" vehicle scale system for over forty years and the systems had been installed in approximately 2,000 locations. He also reported that he fully supported the GEN-22.1 item that the Committee had earlier removed from Block 6. Referencing the proposal in SCL-22.1, Mr. Straub stated he agreed that the recorded representation of weights from individual axle or axle groups need to be clearly identified as "not-legal-for-trade" on the printed ticket unless the entire vehicle is positioned on live elements of the vehicle scale system and all axles/axle groups are weighed simultaneously. He voiced disagreement with the second sentence proposed in paragraph S.1.14. noting that when one considers a truck with six to eight axle groups that cannot fit onto the different independent platform and be weighed simultaneously, identifying which platform weighed each of these axle and axle groups becomes unnecessary.

The Committee, in consideration of the comments received during open hearings, agreed to replace the Block 6 SCL-22.1 proposal in its Interim Meeting agenda (2022 NCWM Publication 15) with the updated version provided by OWM just prior to the 2022 NCWM Interim Meeting and maintain a Developing status on the two remaining items in Block 6. The following proposal represents the Block 6 SCL-22.1 item appearing in the 2022 version of NCWM Publication 15 that the Committee agreed to replace with the Item under Consideration now shown in SCL-22.1:

Item under Consideration:

Amend Handbook 44, Scales Code as follows:

S.1.14. Recorded Representation of Axle or Axle Group Weights. – The recorded representation of weights from individual axle or axle group weights shall clearly be identified as "not legal for trade" or "non-commercial" weight values unless the entire vehicle is positioned on live elements of a multiple-platform vehicle scale and where all axles/axle groups are weighed simultaneously. All recorded weights of axles/axle groups shall be identified as representing only a portion of the vehicle's total gross weight (e.g., by axle groupings such as: "axle group 1," "axle group 2," "axle group 3," or by individual axle description such as: "steering axle," "drive axles," "trailer axles").

Any total gross weight of the vehicle included in the recorded representations determined by summing axle weights shall be clearly identified as “not-legal-for-trade” or “non-commercial” unless those axle weights were recorded when all parts of the vehicle rested simultaneously on live portions of the scale, or the individual components were uncoupled, positioned completely on the live elements, and weighed separately on the scale.

[subsequent requirements to be renumbered as appropriate]

On May 19, 2022, OWM provided S&T Committee Chair Mr. Bradford Bachelder an electronic file containing the following revised version of the B6: SCL-22.3 proposal as replacement for the current proposal in 2022 NCWM Publication 16. OWM requested he share it with the Committee to be considered as replacement for the current proposal in the Committee’s agenda.

OWM’s Revised Replacement Proposal for B6: SCL-22.3 UR.3.3. Single-Draft Vehicle Weighing, and UR.3.4. Axle and Axle Group Weight Values.

Amend NIST Handbook 44, Scales Code as follows:

UR.3.3. Single-Draft Vehicle Weighing. – A vehicle or a coupled-vehicle combination shall be commercially weighed on a vehicle scale only as a single draft. That is, the total weight of such a vehicle or combination shall not be determined by adding together the results obtained by separately and not simultaneously weighing each end of such vehicle or individual elements of such coupled combination. However, the weight of:

- (a) a coupled combination may be determined by uncoupling the various elements (tractor, semitrailer, trailer), weighing each unit separately as a single draft, and adding together the results; or
- (b) a vehicle or coupled-vehicle combination may be determined by adding together the weights obtained while all individual elements are resting simultaneously on more than one scale platform.

Note: This paragraph does not apply to highway-law-enforcement scales, **and scales used for the collection of statistical data, or scales used to charge a fee for the service of providing weights of the different axle-, axle-group loads, and total weight of vehicles and coupled-vehicle combinations when the only use of those values is to determine compliance with highway legal load limits and safe distribution of the load.**

(Added 1992)

UR.3.4. Weighing of Axle- and Axle-Group Loads – Establishing weight values for the different individual axle- and axle-group loads of a vehicle or coupled-vehicle combination is oftentimes necessary to verify compliance with state and federal highway load limits. When a fee is charged for the use of an axle-load scale or vehicle scale to determine such values, the transaction is considered “commercial” under the provisions of the General Code paragraph G-A.1. Commercial and Law Enforcement Equipment and the scale shall comply with all applicable NIST Handbook 44 requirements for commercial weighing systems.

When weight values for axle- and/or axle-group loads are obtained using multiple-independent platform vehicle scales systems where all parts of the vehicle or coupled-vehicle combination

being weighed are simultaneously positioned on live elements of the scale, the values for the different axle- and axle-group loads may be summed to establish the commercial gross weight.

In no case, however, shall a summed result of the different axle- and axle-group loads of a vehicle or coupled vehicle combination weighed in multiple drafts be used for commercial purposes except as provided in subparts (a) and (b) of paragraph UR.3.3. Single-Draft Vehicle Weighing

Renumber existing paragraphs UR.3.4 through UR.3.12.

During the 2022 NCWM Annual Meeting, Mrs. Tina Butcher provided an update on the progress of the development of the items in this block. She suggested the Committee maintain the two items in Block 6 as “developing” to allow additional time for feedback on them. She also reported that the paragraph reference numbers in item B6: SCL-22.1. Recorded Representation of Axle or Axle Group Weights had been upgraded and that OWM had submitted a revised version of the proposal for B6: SCL-22.3 UR.3.3. Single-Draft Vehicle Weighing, and UR.3.4. Axle and Axle Group Weight Values to the national S&T Committee and requested the Committee replace the existing proposal with that which had been submitted.

For unknown reasons, the Committee failed to replace the original B6: SCL-22.3 proposal with the revised proposal OWM had e-mailed to the Committee Chair on May 19, 2022 (and which had been posted on NCWM’s website prior to the 2022 NCWM Annual meeting) as requested by OWM. Consequently, it is not known if the revised B6: SCL-22.3 proposal was considered during the 2022 NCWM Annual Meeting or if open hearing comments received on this particular item during the meeting pertained to the original proposal or the revised proposal. The Committee did agree to maintain a Developing status on both items in Block 6 and OWM plans to address what it believes was simply an oversight by the Committee not to replace the proposal. That is, OWM will again request the Committee replace the original proposal that was carried over onto its 2023 agenda with the revised proposal submitted by OWM in May of 2022.

Regional Association Reporting:

Western Weights and Measures Association

Note: At the time of the 2021 WWMA Annual Meeting, there were three items in Block 6, including item GEN.22.1, which the national S&T Committee later agreed to remove from this block during the 2022 NCWM Interim Meeting and make it a stand-alone item. Refer to item GEN.22.1 of this report to view the comments received by the WWMA on item GEN.22.1. The following are the open hearing comments received on items SCL-22.1 and SCL-22.3:

During the 2021 WWMA Annual Meeting, Mr. Lou Straub (Fairbanks Scale-which is one manufacturer of multi-independent platform vehicle scale systems) provided the following comments (edited) with respect to SCL-22.1: It is rather pointless to require the different axle and axle groups of a vehicle to be identified on a weigh ticket or to specify on the ticket which independent platform weighed those axles or axle groups for vehicles that cannot be weighed as a single draft, (i.e., “over-sized” coupled-vehicle combinations that must be “split weighed” in two different drafts because not all axle and axle groups can fit onto a live portion of the scale and be weighed at the same time, which thus necessitates weighing those particular vehicles in multiple drafts).

Mr. Straub noted that when such vehicles are weighed on the Fairbanks vehicle scale system the ticket generated from the scale specifies the weights are not-legal-for-trade. He requested the proposal be

amended to exclude requiring the different axles or axle groups or scale platforms be identified on scale tickets that specify the recorded weights are “not-legal-for-trade. He noted too that preprinted labels/tickets don’t contain enough space to accomplish this unnecessary identification.

A few members voiced support of maintaining a Developing status on the two items in this block.

The WWMA recommended that the items in this block remain in a Developmental status. The Committee notes that SCL-22.1 (UR.3.3.) item was reassigned as SCL-22.3.

Southern Weights and Measures Association

During the 2021 SWM Annual Meeting open hearing Mr. Russ Vires (Mettler Toledo) stated that this item needs work on the wording and further review by stakeholders. Its current language could have unintended consequences, and recommended it continue with a Developing status.

This Committee would like clarification on the purpose and use of axle weight scale values allowed by this proposal beyond law enforcement use.

This Committee recommended that this item move forward with a Developing status.

Northeastern Weights and Measures Association

Note: At the time of the 2021 NEWMA Interim Meeting, there were three items in Block 6, including item GEN.22.1., which the national S&T Committee later agreed to remove from this block during the 2022 NCWM Interim Meeting and make it a stand-a-lone item. (See GEN-22.1 in the General Code Section of this report for additional reporting on this item.)

During the 2021 NEWMA Interim Meeting open hearings, Mr. Eric Golden (Cardinal Scale) suggested striking “non-commercial” from the SCL-22.3 proposal and suggested additional wordsmithing to align the proposal with paragraph UR3.4.

An additional NEWMA member voiced support in keeping the two items in the block in a Developing status.

NEWMA recommended that the two items in the block move forward as Developing items.

During NEWMA’s 2022 Annual Meeting open hearings, the Committee heard the following comments:

Mr. Russ Vires (Mettler Toledo, LLC), speaking on behalf of the SMA, recommended Block 6 be broken into two separate items. Mr. Vires indicated his support of this item with the following language change: S.1.14.1. Axle and Axle Group Loads. - All recorded representations of the different axle and axle group loads of a vehicle when weighed in a single draft on a multi-independent platform vehicle scale system shall be identified by providing indication of either. Mrs. Tina Butcher (NIST OWM) commented that this item needed additional development.

After hearing comments from the floor, the Committee recognized the need to further develop this block and recommended the block retain Developing status.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting, the Committee took comments from the floor on all three items that were originally in Block 6 to include GEN-22.1, SCL-22.1, and SCL-22.3. The comments received on item GEN.22.1 are included in the GEN-22.1 item of this report. The following comments were heard on SCL-22.1 and SCL-22.3:

Mr. Eric Golden (Cardinal Scales) recommended striking out the words, “or “non-commercial” weight” in proposed paragraph S.1.14. of item SCL-22.1. He stated that by leaving the “non-commercial” language in the proposal, it defeats its purpose, which is to officially clarify what a non-commercial transaction is. Mr. Lou Straub (Fairbanks) agreed with Mr. Golden on SCL 22.1.

The CWMA S&T recommended GEN 22.1 be withdrawn and SCL-22.1 and SCL 22.3 remain Developing.

During the 2022 CWMA Annual Meeting open hearing the Committee heard the following comments:

Mr. Russ Vires (Mettler Toledo, LLC), speaking on behalf of the SMA, reported that the SMA recommended Block 6 be broken apart into two (2) individual items. Each of these items deals with a separate topic that needs to be discussed individually. Regarding SCL-22.1: The SMA supports this item with the following changes: “**S.1.14.1. Axle and Axle Group Loads. - All recorded representations of the different axle and axle group loads of a vehicle when weighed in a single draft on a multi-independent platform vehicle scale system shall be identified by providing indication of either:**”

Identifying the recorded weight values for the axle/axle groups as required in S.1.14.1.(a) is only necessary when the vehicle can be weighed in a single draft.

The CWMA agreed to recommend further development of this block of items.

Scale Manufacturers Association (SMA-Fall 2021 Meeting)

Note: At the time of SMA’s Fall 2021 Meeting there were three items in Block 6, including item GEN.22.1., which the national S&T Committee later agreed to remove from this block during the 2022 NCWM Interim Meeting and make it a stand-a-lone item.

The SMA recommended that Block 6 be broken apart into three (3) individual items.

Rationale: Each of these items deals with a separate topic that needs to be discussed individually.

B6: GEN-22.1 – G.A.1. Commercial and Law-Enforcement Equipment

Position: The SMA supports this item.

Rationale: The proposed item provides clarity to define what constitutes a “commercial transaction”.

B6: SCL-22.1 – S.1.14. Recorded Representation of Axle or Axle Group Weights

Position: The SMA supports this item with the following changes:

S.1.14. Recorded Representation of Axle or Axle Group Weights. – The recorded representation of weights from individual axle or axle group weights shall clearly be identified as “not legal for trade” or “non-commercial” weight values unless the entire vehicle is positioned on live elements of a multiple-platform vehicle scale and where all axles/axle groups are weighed simultaneously. All recorded weights of axles/axle groups shall be identified as representing only a portion of the vehicle’s total gross weight (e.g., by axle groupings such as: “axle group 1,” “axle group 2,” “axle group 3,” or by individual axle description such as: “steering axle,” “drive axles,” “trailer axles”).

Any total gross weight of the vehicle included in the recorded representations determined by summing axle weights shall be clearly identified as “not-legal-for trade” or “non-commercial” unless those axle weights were recorded when all parts of the vehicle rested simultaneously on live portions of the scale, or the individual components were uncoupled, positioned completely on the live elements, and weighed separately on the scale.

Rationale: The item attempts to define what constitutes a “commercial transaction”, but the words “non-commercial” reduces its clarity. Secondly, it is not necessary to label each weight value of axle/axle group weights as “not legal for trade”; putting the words “not legal for trade” on the recorded representation once is adequate.

B6: SCL-22.3–UR.3.3. Single-Draft Vehicle Weighing, and UR.3.4. Axle and Axle Group Weight Values

Position: The SMA supports this item.

SMA-Spring 2022 Meeting

The SMA recommended that Block 6 be broken apart into three (3) individual items.

Rationale: Each of these items deals with a separate topic that needs to be discussed individually.

B6: SCL-22.1 D S.1.14. Recorded Representation of Axle or Axle Group Weights

Position: The SMA supports this item with the following changes:

S.1.14.1. Axle and Axle Group Loads. All recorded representations of the different axle and axle group loads of a vehicle when weighed in a single draft on a multi-independent platform vehicle scale system shall be identified by providing indication of either:

Rationale: identifying the recorded weight values for the axle/axle groups as required in S.1.14.1.(a) is only necessary when the vehicle can be weighed in a single draft.

B6: SCL-22.3 D UR.3.3. Single-Draft Vehicle Weighing., and UR.3.4. Axle and Axle Group Weight Values

Position: The SMA supports the intent of this item and believes that additional work is necessary.

Item Block 7 (B7) Tolerances on Tests Using Transfer Standards

B7: CLM-22.1 D T.3. On Tests Using Type 2 Transfer Standards
B7: CDL-22.1 D T.3. On Tests Using Type 2 Transfer Standards
B7: HGM-22.1 D T.4. Tolerance Application on Tests Using Type 2 Transfer Standard Test Method

(Note: The Item under Consideration was revised by the submitter based on comments from the 2022 Interim Meeting.)

Source: Seraphin Test Measure Company, A Division of Pemberton Fabricators, Inc.

Submitter's Purpose and Justification:

The purpose of these proposals is to change the language in the tolerance paragraphs to provide consistency with the changes in the combined amended proposals of 2022 S&T Agenda Item Block 8 (GEN-19.1. and OTH-22.1). In the codes mentioned below, the current language of Handbook 44 states that when transfer standards are used, the basic tolerances to be applied to the devices under test are to be increased by the uncertainty of the transfer standard (i.e., two times the standard deviation of the transfer standard). The proposed language simply states that the formula given in the General Code (the proposed G-T.5.) be used, rather than repeat the formula in each of the specific codes listed below.

NIST OWM Executive Summary for Item Block 7 (B7) – Tolerances on Tests Using Transfer Standards

NIST OWM Recommendation: When the S&T Committee presents Block 8 for a vote, OWM agrees that Block 7 should also go forward for a vote.

- Block 7 Items are proposed changes to NIST HB 44 Codes that have transfer standard tolerance requirements.
- Because of the larger uncertainties associate with the use of transfer standards, the current Code requirement increases the tolerance to account for the uncertainties in the tolerance.
- The proposal is to revise the transfer standard tolerance requirements with an equation to calculate the tolerances for Type 2 Transfer standards and to clarify that these standards are considered Type 2 standards.
- The equation places an upper limit on how large the uncertainty associated with the transfer standard can be.

Item under Consideration:**B7: CLM-22.1 D T.3. On Tests Using Type 2 Transfer Standards.**

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

T.3. On Tests Using Type 2 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.~~ **When commercial meters are tested using a Type 2 transfer standard, the tolerance applied to the meter under test shall be calculated using the formula specified in the General Code Tolerance section.**

(Amended 202X)

B7: CDL-22.1 D T.3. On Tests Using Type 2 Transfer Standards.

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

T.3. On Tests Using Type 2 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.~~ **When commercial meters are tested using a Type 2 transfer standard, the tolerance applied to the meter under test shall be calculated using the formula specified in the General Code Tolerance section.**

(Amended 202X)

B7: HGM-22.1 D T.4. Tolerance Application on Tests Using Type 2 Transfer Standard Test Method.

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

T.4. Tolerance Application on Tests Using Type 2 Transfer Standard Test Method. – ~~To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.~~ **When commercial meters are tested using a Type 2 transfer standard, the tolerance applied to the meter under test shall be calculated using the formula specified in the General Code Tolerance section.**

(Amended 202X)

NIST OWM Detailed Technical Analysis:

Seraphin proposed Block 7 Items to address the changes that are proposed in Block 8 concerning transfer standards. Block 7 items in the Interim Meeting Report were revised based on comments heard during the 2022 Interim Meeting.

Transfer standards are address in the Cryogenic Liquid-Measuring Devices Code, the Carbon Dioxide Liquid-Measuring Devices Code and the Hydrogen Gas-Measuring Devices Code. These codes already specify that a larger tolerance be used when transfer standards are used to account for the higher uncertainty associated with these types of standards and the fact that they will not likely meet the fundamental considerations paragraph 3.2 tolerances for Standards.

The proposed changes in Block 8 define the different types of standards (Field Standard, Type 1 Transfer Standard and Type 2 Transfer Standard). Block 8 also proposes to add a General code requirement with an equation that should be used to determine the tolerance for type 2 transfer standards because Type 2 transfer standards will not likely meet the fundamental considerations concerning the error and uncertainty. The equation places an upper limit on how large the uncertainty associated with the transfer standard can be.

Block 7 makes changes to the aforementioned codes to reference the General Code requirement with the equation that will be used to calculate the tolerance when using type 2 transfer standards in these codes.

When the S&T Committee presents the combined item GEN-19.1 and OTH-22.1, Block 8 item for a vote, then this item, Block 7 may also go forward for a vote.

Summary of Discussions and Actions:

At the 2022 Interim Meeting the Committee recommended that this item be given a Developing status for further development by the submitter based on comments heard during the 2022 Interim Meeting. Since the 2022 Interim Meeting, the submitter made additional changes to the items under consideration which are currently reflected in Block 7 above. These changes add “Type 2” to clarify the type of transfer standard and references the revised equation in the proposed Block 8 item of this report.

At the 2022 Annual Meeting the submitter provided no comments and as a Developing item no additional comments were heard on this this item.

During the Committee work session, the Committee agreed to maintain a Developing status for this item.

Regional Association Reporting:

Western Weights and Measures Association

During the 2021 WWMA Annual Meeting Open Hearings the following comments were heard:

Mr. Bob Murnane (Seraphin), submitter of this item, stated that this item is linked to GEN-19.1 which addresses tolerances on test when transfer standards are used and provides definitions for field and transfer standards.

Mr. Marc Buttler (Emerson Micro Motion) restated his earlier comment on GEN-19.1 concerning the equations for calculating the tolerance. Mr. Butler suggested that changes be made to the equation.

Mr. Murnane stated that they have looked at original comments in GEN 19.1 and they will have info for us shortly.

A letter was submitted to the Committee by Mr. Buttler and will be posted to the WWMA website.

The WWMA S&T Committee recommended that this Block be assigned a Developmental status. The Committee recommended that item GEN-19.1 be inserted into Block 7.

Southern Weights and Measures Association

During the 2021 SWMA Annual Meeting Open Hearing, Mr. Oppermann (Seraphin) stated that this item is related to Gen 19.1. and should not move forward unless Gen 19.1 moves forward as well.

This Committee recommended this item be assigned Developing status.

Northeastern Weights and Measures Association

During the 2021 NEWMA Interim Meeting open hearing the following comments were heard.

Mr. Opperman commented with clarification from Mr. Murnane that this item is in conjunction with Gen-19.1 and with the changes outlined in Gen-19.1 (see comments). He recommended this item to be forwarded as a Developing item.

The NEWMA S&T Committee recommended that this item be given a Developing status.

During the 2022 Annual Meeting open hearing no comments were heard from the body on this item, however, the Committee recognized the need to further develop this block.

Central Weights and Measures Association

During the 2021 CWMA Interim Meeting open hearing the Committee heard comments from the floor. Mr. Henry Opperman (Weights and Measures Consultants) stated that if GEN 19.1 were to pass then CLM-22.1 and CDL-22.1 would need to be voted on as well. Mrs. Tina Butcher (NIST OWM) thinks original formula is correct, whereas modified formula would not be limited. Believes it needs more work. Mr. Robert Murnane (Seraphin) recommended that the item stay as Developing and be combined with GEN 19.1.

CWMA S&T Committee recommended that the item be Developing.

During 2022 Annual Meeting open hearing, Mr. Bob Murnane (Seraphin) commented that it should remain Developing and cannot move to Voting Item unless GEN-19.1 moves to Voting.

The CWMA S&T Committee recommended this moves forward as a Voting Item, with the understanding

Item Block 8 (B8) – G-T.5. Tolerances on Tests When Transfer Standards are Used., Appendix A, Section 3.2. Tolerances for Standards., and Appendix D – Definitions: standards, field., transfer standard. and standard, transfer. Appendix A: Fundamental Considerations, 3. Testing Apparatus

B8: GEN-19.1 D G-T.5. Tolerances on Tests When Transfer Standards are Used., Appendix A, Section 3.2. Tolerances for Standards., and Appendix D – Definitions: standards, field., transfer standard. and standard, transfer.

B8: OTH-22.1 D Appendix A: Fundamental Considerations, 3. Testing Apparatus

(Note: These proposals are a combined modification of the 2021 S&T Agenda Block 1 Items GEN-19.1 and OTH-22.1. Since the S&T Committee has changed item GEN-19.1 from “assigned” to “developing,” the submitter has worked with NIST OWM to revise and combine the original proposals of GEN-19.1 and

OTH-22.1 to address discussions within the NCWM Field Standards Task Group and other comments received at the regional weights and measures meetings on the proposals. These items are related, so they are presented together. These OWM and Seraphin proposals were submitted to the S&T Committee just before the 2022 Interim Meeting.

Note: The joint OWM and Seraphin proposals submitted to the S&T Committee just before the 2022 Interim Meeting were updated with two changes at the request of the Submitters following the 2022 Interim Meeting. The first change is in the definition of “Standard, Field.” The words “(typically one year)” were replaced with “(as determined by the Director)”. The second change was to add the words “to the International System of Units (SI)” in the section 3.1.3. of the Fundamental Considerations. These two changes are reflected in the items below.)

Note: In 2021 NCWM Publication 15, Items GEN-19.1 and OTH-20.1 appeared separately at the 2021 Interim Meeting. The Committee Agreed to combine both items and the items now appear as Item Block 8.)

Source: NIST Office of Weights and Measures and Seraphin Test Measure Company have combined their previously separate proposals into a single proposal.

Submitter’s Purpose and Justification:

- (a) Add a tolerance statement to the General Code that applies whenever a Type 2 transfer standard is used;
- (b) Clarify in the Fundamental Considerations (Appendix A of Handbook 44) that the authority to approve field test standards rests with the regulatory official and that specific types of field test standards need not be identified in the body of a Handbook 44 Code in order to be approved by the weights and measures director;
- (c) Add text to Section 3.2. Tolerances for Standards of the Fundamental Considerations (Appendix A of Handbook 44) to recognize the wide range of transfer standards already recognized in Handbook 44, explain the critical differences between field standards and transfer standards, and to specify the formula to be used to calculate the device tolerance when the uncertainty of the transfer standard exceeds the one-third requirement; and
- (d) Add definitions to Appendix D of Handbook 44 for field standard and Type 1 and Type 2 transfer standards that identify the critical characteristics for field and transfer standards.

Footnote 2 in the Fundamental Consideration of NIST Handbook 44 already provides a statement regarding the authority of the Director to approve field test standards or equipment, OWM believes including additional information regarding the essential elements of traceability and a reference to specific measurement practices would be helpful to both emphasize that authority and provide guidance to Directors and industry regarding the selection of appropriate field test standards.

NIST OWM recommends the guidance originally included in Footnote 2 along with the additional references to the “Essential Elements” described above are best included in the body of Section 3 for clarity and ease of use. Consequently, OWM recommends deleting the existing Footnote 2 and incorporating its contents into the body of Section 3.

OWM also believes that some may erroneously believe that field test standards must be specifically listed within a NIST Handbook 44 code in order to be used in the inspection and testing of devices covered by that code. Providing a clear statement that this is not the case along with a reference to the required criteria may help alleviate this misunderstanding.

A tolerance statement is added to the general code that addresses uncertainties of Type 2 Transfer standards

since they do not meet the NIST Handbook 44 Fundamental Consideration that state “When the standard is used without correction, its combined error and uncertainty must be less than one-third of the applicable device tolerance”. Several equations were considered to include an OIML equation. After discussion an alternative equation was agreed upon. An assessment of the two equations, the 2/3 Formula: Increased MPE = $(2/3 \times \text{MPE} + U)$ with an upper limit of $U_{\text{MAX}} = 2/3 \text{ MPE}$ and the OIML Formula: Reduced MPE = $(4/3 \times \text{MPE} - U)$ are provided below:

The OIML formula and the 2/3 formula are similar, but they take different approaches to establish the tolerances for the device under test. The 2/3 formula is more logical, more technically consistent with the Handbook 44 concept of Type 2 transfer standards, and it is easier to understand. The 2/3 formula combines the tolerance that remains to be used by the commercial device with the growing uncertainty of the T2TS into one total tolerance value, whereas the OIML Reduced MPE calculates only the tolerance applied to test of the commercial meter under test. When Type 2 transfer standards are used in the field, the uncertainties associated with the T2TS should be recorded on the report form or a copy of the calibration certificate should be left with the test report, so the uncertainty values are available on site and can be used in an analysis should the tests with another T2TS generate different results.

The most accurate reference standard that is available should always be used for any field test. However, when the only practical option for a field test that is available is a Type 2 transfer standard, the 2/3 formula will err in favor of the commercial device to avoid failing a device that should have passed. Conversely, the OIML Reduced MPE might result in failing a commercial device that would have passed had a more accurate (e.g., Type 1 transfer or field) reference standard been available to use for the test.

Field standards are intended to have an error and uncertainty less than or equal to 1/3 of the tolerance applied to the commercial device under test. When a Type 2 transfer standard has an uncertainty slightly greater than 1/3 of the tolerance, then, using the 2/3 formula, the total tolerance applied to the device under test increases above the H44 tolerance by the amount that the uncertainty associated with the Type 2 transfer standard exceeds the 1/3 limit, thereby establishing a total tolerance slightly greater than the NIST Handbook 44 tolerances specified in the applicable codes and keeping the portion of the tolerance that remains allocated to the device under test at a constant level equal to 2/3 of the NIST Handbook 44 tolerance.

Type 2 Transfer Standards: Uncertainty is Added to the Tolerance

When the uncertainty associated with a T2TS exceeds 1/3 of the tolerance applied to the device under test, the uncertainty of the T2TS is recognized in the field test result by increasing the tolerance that is applied to the device under test. The OIML formula and the 2/3 formula take different approaches to increasing the tolerance for the device under test.

	Field Standard	Field Standard	OIML Formula	OIML Formula	2/3 Formula	2/3 Formula
Uncertainty of Standard (as % of Tolerance)	% of MPE (Tolerance) Applied to the Device	% MPE (Tolerance) Allocated to Device	% of MPE Applied to the Difference in the Test Results Using a T2TS	OIML Reduced MPE and Uncertainty of T2TS (%)	% of Combined Tolerance and Uncertainty Applied to the Device	% of Combined Tolerance and Uncertainty Allocated to the Device
0%	100	100				
10%	100	90				
20%	100	80				
30%	100	70				
33%	100	67				
34%			99	133	101	67
40%			93	133	107	67
50%			83	133	117	67
60%			73	133	127	67
67%			67	133	133	67
70%			63	133	137	67
80%			53	133	147	67
90%			43	133	157	67
100%			33	133	167	67

NIST OWM Executive Summary for Item Block 8 (B8) – G-T.5. Tolerances on Tests When Transfer Standards Are Used, Appendix A, Section 3.2. Tolerances for Standards., and Appendix D – Definitions: Standards, Field., and Standard, Transfer. Appendix A: Fundamental Considerations, 3. Testing Apparatus

NIST OWM Recommendation: The submitters agree that these items, GEN-19.1 and OTH-22.1 are fully developed and requested that this S&T committee consider that Block 8 item be a Voting Item in 2023.

- State and industry have a need to use various types of test standards to evaluate commercial devices installed in the marketplace. NIST OWM recognizes the need to use various standards to test commercial devices and support the use of these standards when test data supports its use.
- Block 8 clarifies the use and definition of three types of standards to be included in NIST HB 44: (1) Fields Standards, (2) Type 1 Transfer Standards and (3) Type 2 Transfer Standards; it provides an equation that should be used to calculate the tolerances when Type 2 transfer standards are used; provides definitions for Field Standards, Type 1 Transfer Standards and Type 2 Transfer Standards, and provides clarification that the State Director has the authority to approve the use of standard and that specific requirements in NIST HB 44 code are not necessary to approve a standard for use.
- Two items, LPG-15.1 and MFM-15.1 in the NCWM Interim Meeting Report (Publication 16), include a purpose statement that the proposals are added to allow field standard meters to be used

NIST OWM Executive Summary for Item Block 8 (B8) – G-T.5. Tolerances on Tests When Transfer Standards Are Used, Appendix A, Section 3.2. Tolerances for Standards., and Appendix D – Definitions: Standards, Field., and Standard, Transfer. Appendix A: Fundamental Considerations, 3. Testing Apparatus

to test and place into service dispensers and delivery system flow meters. Block 8 items clarify what has always been recognized in NIST HB 44 concerning the responsibility for acceptance of a standard and notes that specific code changes are not necessary for a field standard to be adequate for use. If Block 8 is adopted it accomplishes the same goal as LPG-15.1 and MFM-15.1. and the objectives of Mr. Micheal Keilty are met with Block 8. The adoption of Block 8 would not only accomplish the same goal it also provides for a broad criteria and provide for the acceptance of other standards.

- In addition to the changes in Block 8, a new form 15 for the 2023 cycle, which is not included in the 2022 Publication 16 and has not been addressed separately in the 2022 NIST OWM Technical Analysis, has been circulated to the Spring 2022 Regional Associations (NEWMA and CWMA)
- This new Form 15 adds a General Code requirement so that rather than revising a specific code in Handbook 44 every time a new field or transfer standard is proposed or developed, an overall statement in the General Code recognizes the use of other field and transfer standards that meet the requirements for use as field or transfer standards. The proposal is as follows:
- G-N.3. Test Methods. – Permissible test methods for verifying compliance of weighing and measuring systems with the provisions of the General Code and Specific Codes include, but are not limited to, test methods and apparatus that have been approved by the State Director of weights and measures as outlined in Appendix A - Fundamental Considerations, Section 3. Testing Apparatus.
- NIST OWM also observed that the definitions in Block 8 should include appropriate references to the NIST HB 44 codes.

Item under Consideration:

B8: GEN-19.1 D G-T.5. Tolerances on Tests When Transfer Standards are Used., Appendix A, Section 3.2. Tolerances for Standards., and Appendix D – Definitions: standards, field., transfer standard. and standard, transfer.

Amend Handbook 44, General Code as follows:

G-T.5. Tolerances on Tests When Type 2 Transfer Standards Are Used. – When Type 2 transfer standards are used, the following formula shall be used to compute the tolerance applicable to the device under test:

$$\text{Increased MPE} = (2/3 \times \text{MPE} + U)$$

with an upper limit of $U_{\text{MAX}} = 2/3 \text{ MPE}$

Where MPE is the basic tolerance that applies when using a basic reference standard; and

U = uncertainty associated with the Type 2 transfer standard.

The increase in the applied tolerance when using a Type 2 transfer standard applies only to the basic tolerances for devices as defined in Handbook 44; that is acceptance, maintenance and minimum tolerances. Note that the repeatability tolerance and the special test tolerances are NOT increased.

Codes 5.56.(a) Grain Moisture Meters, 5.56.(b) Grain Moisture Meters, and 5.57. Near-Infrared Grain Analyzers are exempt from this requirement because NIST Handbook 159 has requirements for monitoring and retesting grain samples to ensure adequate stability and the tolerances for the devices under test already incorporate the uncertainty associated with the use of grain samples as transfer standards. The code 2.21. Belt-Conveyor Scale Systems Code is also exempt because relative and absolute tolerances are included in the code.

Amend Handbook 44 Appendix D – Definitions as follows.

Standard, Field. – A physical artifact, static or dynamic measurement device or a reference material that (a) meets the requirements of the Fundamental Considerations, Section 3.2., (b) is stable (accurate and repeatable) over an extended period of time (as determined by the Director), (c) is valid (corrections that may be used) over the range of environmental and operational parameters in which the commercial measuring devices are used, and (d) is traceable to the reference or working standards through comparisons, using acceptable laboratory procedures. [3.34, 3.38, 3.39, X.XX, X.XX...]

(Added 202X)

transfer standard. – A measurement system designed for use in proving and testing cryogenic liquid-measuring devices. [3.38]

Standard, Transfer, Type 1 and Type 2. – A physical artifact, static or dynamic measurement device or a reference material that is proven to be stable (accurate and repeatable) for a short time under the limited environmental and operational conditions during which the transfer standard is used. A Type 1 transfer standard is a transfer standard that meets the one-third accuracy requirement for a short time over a limited range of environmental conditions and/or a limited range of operating conditions in which it is used. A Type 2 transfer standard is one that does not meet the one-third requirement and may not be stable or valid over an extended time period or over wide ranges of environmental or operating conditions. (3.34, 3.38, 3.39, X.XX, X.XX...]

(Added 202X)

B8: OTH-22.1 D Appendix A: Fundamental Considerations, 3. Testing Apparatus

Amend Handbook 44, Appendix A: Fundamental Considerations as shown below. Delete Footnote 2 referenced in Section 3. Testing Apparatus of NIST Handbook 44 Appendix A, Fundamental Considerations, moving portions of the footnote into Section 3.1 as part of the proposed changes to Section 3.1 shown above. Note that no changes are proposed to Footnote 1.

² Recommendations regarding the specifications and tolerances for suitable field standards may be obtained from the Office of Weights and Measures of the National Institute of Standards and Technology. Standards will meet the specifications of the National Institute of Standards and Technology Handbook 105-Series standards (or other suitable and designated standards). This

section shall not preclude the use of additional field standards and/or equipment, as approved by the Director, for uniform evaluation of device performance.

3.1. Adequacy.² – Tests can be made properly only if, among other things, adequate testing apparatus is available. Testing apparatus may be considered adequate only when it is properly designed for its intended use, when it is so constructed that it will retain its characteristics for a reasonable period under conditions of normal use, when it is available in denominations appropriate for a proper determination of the value or performance of the commercial equipment under test, and when it is accurately calibrated.

3.1.1. Essential Elements of Traceability. To ensure that field test standards and test methods provide for measurements that are traceable to the International System of Units (SI), through NIST or other National Metrology Institutes, they must satisfy the “Essential Elements of Traceability.” As explained in NIST IR6969 GMP-13 Good Measurement Practice for Ensuring Metrological Traceability, these elements include the following.

- **Realization of SI Units**
- **Unbroken Chain of Comparisons**
- **Documented Calibration Program**
- **Documented Measurement Uncertainty**
- **Documented Measurement Procedure**
- **Accredited Technical Competence**
- **Measurement Assurance**

3.1.2. Specifications for Standards. Standards will meet the specifications of the National Institute of Standards and Technology Handbook 105-Series standards or other appropriate designated documentary standards (e.g., ASTM, ASME, etc.). Recommendations regarding the specifications and tolerances for suitable field standards may be obtained from the Office of Weights and Measures of the National Institute of Standards and Technology.

3.1.3. Authority for Approving Field Test Standards and/or Equipment. This section shall not preclude the use of additional field standards and/or equipment, as approved by the Director, for uniform evaluation of device performance. Specific types of field test standards are not required to be identified in a NIST Handbook 44 code in order to be considered suitable. Provided the standards meet the “Essential Elements of Traceability” (described in Section 3.1.1. above) that help ensure the standards are suitable and capable of supporting measurements traceable to the International System of Units (SI) through NIST or other National Metrology Institutes, they need only be approved by the Director.

3.2. Tolerances for Standards. – Except for work of relatively high precision, it is recommended that the accuracy of **field** standards used in testing commercial weighing and measuring equipment be established and maintained so that the use of corrections is not necessary. When the **field** standard is used without correction, its combined error and uncertainty must be less than one-third of the applicable device tolerance.

Device testing is complicated to some degree when corrections to standards are applied. When using a correction for a standard, the uncertainty associated with the corrected value must be less than one-third of the applicable device tolerance. The reason for this requirement is to give the device being tested as nearly as practicable the full benefit of its own tolerance.

Whenever possible and practical, field standards should be used to test commercial devices. However, where it is impractical or unduly cumbersome to use field standards, transfer standards may be used. There are two categories of transfer standards. The critical criteria that distinguish between these standards are: (1) the accuracy and uncertainty of the standard; (2) the stability as a standard over an extended period; and (3) proven validity or performance of the standard over the range of environmental and operational conditions in which the standard may be used.

A “field standard” is one that meets the one-third requirement mentioned earlier in this section. Additionally, the field standard maintains its validity or stability as a standard over an extended period (defined based on data of the standard’s stability by an authorized metrology lab or as specified by the Director) and is known to maintain its value as a standard over the full range of environmental conditions and the range of operating conditions in which the standard may be used to test commercial weighing and measuring devices. Corrections, as documented by an authorized metrology laboratory, may be used.

Transfer standards do not meet one or more of these critical criteria. One category of transfer standards, which is referred to here as a “Type 1 transfer standard,” is a transfer standard that meets the one-third accuracy requirement for a short time, under a limited range of environmental conditions and/or a limited range of operating conditions. The accuracy of a Type 1 transfer standard may have to be verified through testing each time it is used to verify that the desired accuracy and performance can be achieved when the Type 1 transfer standard is used under the limited environmental and operating conditions. When a Type 1 transfer standard is used, the basic tolerances specified for the commercial measuring devices are applied as specified in the applicable codes.

The second category of transfer standard, which is referred to here as a “Type 2 transfer standard,” is one that does not meet the one-third requirement. The Type 2 transfer standard must be stable and valid under the environmental or operating conditions in which it is used. The performance characteristics must be confirmed with sufficient data to properly characterize the uncertainty associated with the Type 2 transfer standard. When a Type 2 transfer standard is used, the tolerances applicable to the commercial weighing and measuring device must be increased to recognize the large uncertainty or corrections associated with the Type 2 transfer standard. When commercial meters are tested using a Type 2 transfer standard, the tolerance applied to the meter under test shall be determined as specified in the General Code.

(Added 202X)

3.3. Accuracy of Field Standards. – Prior to the official use of testing apparatus, its accuracy should invariably be verified. Field standards should be calibrated as often as circumstances require. By their nature, metal volumetric field standards are more susceptible to damage in handling than are standards of some other types. A field standard should be calibrated whenever damage is known or suspected to have occurred or significant repairs have been made. In addition, field standards, particularly volumetric standards, should be calibrated with sufficient frequency to affirm their continued accuracy, so that the official may always be in an unassailable position with respect to the accuracy of his testing apparatus. Secondary field standards, such as special fabric testing tapes, should be verified much more frequently

than such basic standards as steel tapes or volumetric provers to demonstrate their constancy of value or performance.

Accurate and dependable results cannot be obtained with faulty or inadequate field standards. If either the service person or official is poorly equipped, their results cannot be expected to check consistently. Disagreements can be avoided and the servicing of commercial equipment can be expedited and improved if service persons and officials give equal attention to the adequacy and maintenance of their testing apparatus.

NIST OWM Detailed Technical Analysis:

State and industry have a need to use various types of test standards to evaluate commercial devices installed in the marketplace. NIST OWM recognizes the need to use various standards to test commercial devices and support the use of these standards when test data supports its use. Several proposals for changes to NIST HB 44 have been considered to address the use of these standards. Some were to address terminology for various types of standards in NIST HB 44. Other proposals were to provide specific requirements for some codes in NIST HB 44 for the purpose of recognizing these standards in the handbook, but the responsibility for recognition of standards is already address in the fundamental consideration section in NIST HB 44. These proposals also included varying terms used to describe these standards and were subsequently all combined as a Block item and assigned to a task group. With limited success as a block item, it was decided to separate these items into their original block and individual items for consideration, some of the items were withdrawn. Block 8 items are a combined modification of the 2021 S&T Agenda Block 1 Item GEN-19.1 and OTH-22.1. With the S&T Committee changes to the status of item GEN-19.1 from “assigned” to “developing,” the submitter, Seraphin and NIST OWM seeing the need to add clarification to NIST HB 44 for the different terms used to address standards that are used to test commercial devices and the need to provide clarification as to what is needed for States to accept various types of standards, worked together to develop Item Block 8. These proposals were revised to address discussions within the NCWM Field Standards Task Group and other comments received at the regional weights and measures associations meetings and the 2022 Interim Meeting. There is also a companion item Block 7 that helps to clarify the use of the term transfer standards in NIST HB 44.

Block 8 clarifies the use and definition of three types of standards to be included in NIST HB 44: (1) Fields Standards, (2) Type 1 Transfer Standards and (3) Type 2 Transfer Standards; it provides an equation that should be used to calculate the tolerances when Type 2 transfer standards are used; provides definitions for Field Standards, Type 1 Transfer Standards and Type 2 Transfer Standards, and provides clarification that the State Director has the authority to approve the use of standard and that specific requirements in NIST HB 44 code are not necessary to approve a standard for use.

Although 3 types of standards are to be specified in NIST HB 44, language has been added in Block 8 such that whenever possible and practical, field standards should be used to test commercial devices. Definitions are provided for the three different types of standards. Separating the standards into 3 types helps to determine what specifications should be used for the standards combined error and uncertainty or whether the tolerances should be increased to account for the error in the standard. Both Field Standards and Type 1 Transfer standards must comply with the current Fundamental Considerations in NIST HB 44 that state “When a Standard is used without correction, its combined error and uncertainty must be less than one-third of the applicable device tolerance”. This allows the device under test to have more than 2/3 of the tolerance associated with the test. Type 2 Transfer Standards do not meet the one-third requirement and may not be stable or valid over an extended time-period or over wide ranges of

environmental or operating conditions. With the inability to meet the one-third requirements for the uncertainty in the standard that Field Standards and Type 1 Transfer Standard are required to meet, an equation was added to the general code for all Type 2 Transfer Standards in NIST HB 44 to multiply the basic tolerance (the applicable tolerance, maintenance, acceptance, or special test tolerances by 2/3 and adding the uncertainty of the standard. This increases the total tolerance when using a Type 2 transfer standard to account for the uncertainty of the standard.

Although a larger tolerance is used to account for the uncertainty in Type 2 standards, allowing an unlimited amount of uncertainty to be added to the tolerance adds an open-ended amount of uncertainty to the tolerance and the larger the tolerance that is allowed the more lead way is given to the device under test and the more disadvantage to the customer. As such a stipulation was added that the maximum limit for the uncertainty of type 2 standards must be 2/3 of the MPE. The proposed equation provides a uniform method for considering the uncertainties associated with Type 2 Standards. An example of calculating the equation is provided below.

$$\text{Increased MPE} = (2/3 \times \text{MPE} + U)$$

with an upper limit of $U_{\text{MAX}} = 2/3 \text{ MPE}$

Example Calculation

$$\text{Increased MPE} = (2/3 \times 0.01 + 0.005)$$

$$= 0.01166$$

In this example the U_{MAX} does not exceed 2/3 MPE which = 0.007

Mr. Henry Oppermann (Seraphin) provided an analysis of the equation which is provided in the Justification of this Technical Analysis.

This Block also helps to clarify that the Director has the authority to approve Standards for use within a jurisdiction. This information is already included in a footnote in the Fundamental Considerations but has been moved to Section 3 in the Fundamental Considerations. Language was also added to clarify that specific language is not needed in various NIST HB Codes in order that these standards be accepted. Two items, LPG-15.1 and MFM-15.1 in the Interim Meeting Report (Publication 16), include a purpose statement that the proposals are added to allow field standard meters to be used to test and place into service dispensers and delivery system flow meters. Block 8 items clarify what has always been recognized in NIST HB 44 concerning the responsibility for acceptance of a standard and notes that specific code changes are not necessary for a standard to be adequate for use. Please see additional NIST OWM concerns with items LPG-15.1 and MFM-15.1 in the NIST OWM Technical Analysis for these items.

In addition to the changes in Block 8, a new Form 15 for the 2023 cycle which is not included in the 2022 Publication 16 and has not been addressed separately in the 2022 NIST OWM Technical Analysis, has been circulated to the Spring 2022 Regional Associations (NEWMA and CWMA) that will also impact LPG-15.1 and MFM-15.1 and Block 7 items. This proposal adds a General Code requirement so that rather than revising a specific code in Handbook 44 every time a new field or transfer standard is proposed or developed, an overall statement in the General Code recognizes the use of other field and transfer standards that meet the requirements for use as field or transfer standards is proposed as follows:

G-N.3. Test Methods. – Permissible test methods for verifying compliance of weighing and measuring systems with the provisions of the General Code and Specific Codes include, but are not limited to, test methods and apparatus that have been approved by the State Director of weights and measures as outlined in Appendix A - Fundamental Considerations, Section 3. Testing Apparatus.

For those who believe a specific statement in Handbook 44 is needed to recognize additional field and transfer standards, the proposed addition of G-N.3. will provide the reference they want without the need to change individual codes on a regular basis to recognize each particular field or transfer standard.

The submitters agree that these items, GEN-19.1 and OTH-22.1 are fully developed and requested that this S&T Committee consider that this combined item be a Voting Item in 2023.

Summary of Discussions and Actions:

At the 2022 Interim Meeting there was discussion concerning specifying a 1-year length of time for the stability of a field standard. The concern was whether or not this was an appropriate length of time and how a specific length of time for a standards stability could change due to many factors. Some expressed concerns with more time needed to review the latest edition of the proposal. NIST and Seraphin agreed to further develop the item and NIST OWM requested that both GEN-19.1 and the OTH-22.1 be combined. During their work session, the Committee agreed to combine both GEN-19.1 and OTH-22.1 and agreed to a Developing status for this item. For more information or to provide comment, please contact:

Mr. Robert Murnane
Seraphin Test Measure Company
A Division of Pemberton Fabricators, Inc.
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or

Ms. G. Diane Lee
NIST Office of Weights and Measures
diane.lee@nist.gov

At the 2022 Annual Meeting Open hearings the Committee heard comments for Mrs. Tina Butcher (NIST OWM) who provided the NIST OWM Technical Analysis for this item as provided in the executive summary of the report. Ms. Butcher noted that this item is ready to move forward as voting for the 2023 NCWM cycle.

During the Committee work session since the item status was Developing it remained Developing.

Regional Association Reporting:

Western Weights and Measures Association

B8: GEN-19.1

At the 2021 WWMA Open Hearings the following comments were heard:

Mr. Marc Buttler (Emerson Micro Motion) complimented the fine work of the work group and authors of form 15 and stated that he found it useful and helpful by augmenting the existing wording to add clarity as we work forward to more practical testing. He commented on the underlying principle of affording additional tolerance to standards not capable of meeting the 1/3 requirements in the fundamental considerations. In the language there is an equation for a reduced MPE. This is intended to penalize the tolerance of the device and not give additional leeway. Further into the justification it references an established principle that says that additional tolerance is afforded when complex. A better equation would be to take the $MPE \times 2/3$ PLUS and not minus. This avoids jurisdictions having different uncertainty testing to different tolerances. He stated that he will prepare a written summary of his comments and will send to us.

Mr. Murnane (submitter) stated that there is a lack of definitions, such as terms listed in Block 5. This item was proposed to clarify and give definitions to field and transfer standards. Mr. Murnane stated that he hopes this clarifies multiple items on the agenda.

Mr. Russell Vires (Scale Manufacturers Association) stated that this item has been around for a while and was part of Block 1. It has been pulled out and changed. The SMA has made comments in the past to support this item, but at this point they will meet in November and review; they have not been able to review the substantial changes yet. They have no position as of now. This needs to remain developing to allow stakeholders the opportunity to review.

Ms. Diane Lee (NIST OWM) expanded on Mr. Vires' comments. This was included in a block with terminology for standards, (master meter, transfer standard or field standard) and stated the issue for transfer standards is whether or not they could meet the 1/3 requirement in the fundamental considerations. NIST has an analysis from the Annual Meeting that will address some of the issues; however, they have not met as a group yet to review the changes in detail. Ms. Lee stated that the existing NIST OWM comments are on the NCWM website and additional comments to this item will be provided.

Mr. Kurt Floren (Los Angeles County, California) commented on the proposed definition of field standard in Item Block 7. He thinks it is better, but it raises an issue that there is a distinction between volumetric and gravimetric. The existing language spoke to the calibration and certification in the laboratory. Field standards are tested under all environmental conditions and range of operating conditions. In a laboratory setting, there are conditions that need to be very strict. Mr. Floren is concerned with "known to maintain" and questioned if we are thinking more from a volumetric standpoint (temperature changes, etc.) which is not really a concern with a mass standard. Mr. Floren stated that he thinks that there will be challenges in the future on pass/fail, and question all of the environmental criteria that the standards were tested to. Mr. Floren requested that what should be taken into consideration is the environmental factors (laboratory or field) and how this would relate to an enforcement action.

The WWMA S&T Committee recommended that this item should remain Developmental in status. The Committee recommended that the submitter works with NIST OWM and commentators above to resolve issues presented. A letter was submitted to the Committee by Mr. Buttler and will be posted to the NCWM website. The Committee also recommended that consideration be made that this item be included in Block 7.

B8: OTH-22.1

During the 2021 Annual Meeting Open Hearing the following comments were heard:

Mr. Keilty referenced 3.1.1 in S&T Item Block 8 OTH-22.1. and noted that the statement “likely through NIST” is not appropriate. He referenced 3.1.2 in Item Block 8 OTH-22.1 where it states “standards will meet the NIST HB 105... or other appropriate.... ASTM ASME” and noted that these are not consensus standards and that these should not be referenced. Mr. Keilty also stated that traceability can be to other entities other than NIST and he mentioned international traceability (Switzerland, Canada, etc.). Mr. Keilty recommended a Developing status for this item.

Mrs. Tina Butcher (NIST OWM), submitter of this item, stated that NIST is not the only source for traceability and the key here is making sure that there is due diligence to ensure that the essential elements of traceability have been addressed. The authority rests with the Weights and Measures director. In reference to Item 3.1.2 and the question about HB105, Mrs. Butcher stated that this requirement is simply taking the already existing language and moving it up into the main body. This is to clarify that the authority rests with the Weights and Measures director and clarifies what is needed to achieve traceability.

Mr. Matt Douglas (California – DMS) supports this item.

Mr. Randy Jennings (Retiree Tennessee), representing himself, supported comments made by Mr. Keilty. He stated that he wants to be careful about bringing forward anything that can take away options.

Ms. Cadence Matijevich (Nevada) requested clarification from Mrs. Butcher on traceability and distinction between SI and NIST, as provided in 3.1.1. We say traceable to international system, but in 3.1.3 it says traceable to NIST. She questioned why there is a discrepancy in traceability verbiage. Is there a specific reason to limit traceability to NIST in 3.1.3?

Mrs. Butcher stated that we tried to preserve the language already in footnote 2 and just bring it up into the body and to emphasize that the director has the authority and provide a link between 3.1.1 and 3.1.3. Mrs. Butcher suggested that it could be changed to “traceable to SI likely through NIST.”

Mr. Keilty stated that a statement “traceability through national standards” would cover it all.

The WWMA S&T Committee recommended that this be assigned a Developmental status.

Southern Weights and Measures Association**B8: GEN-19.1**

During the 2021 Annual Meeting Open Hearing, Mr. Henry Oppermann (Seraphin) explained the differences between Field Standards, Type 1 and Type 2 Transfer Standards, and expressed support for a proposed change that originated in the Western.

Mr. Tim Chesser (Arkansas) questioned what “sufficient data” would be, once a device, is placed into service as a Standard, and how often it would need to be reverified.

Mr. Oppermann responded to Mr. Chesser stating that the Master Meter Task Group must evaluate the performance of these devices and create calibration and performance requirements in the future.

Mr. Vires, speaking on behalf of the Scale Manufacturers Association, stated that they have no position at this time.

Mr. Vires, speaking on behalf of Mettler Toledo, stated that he believes this is in conflict with Block 1, and would recommend it continue with a Developing status.

Mr. Keilty assured Mr. Chesser that any devices used as a Field Standard would have a traceable chain of metrology.

This Committee recommended that this item remain Assigned pending the Workgroup finding a new Chairperson.

B8: OTH-22.1

During the 2021 Annual Meeting Open Hearing, Mr. Keilty stated that this item is a proposal by NIST to change some language in Appendix A of Handbook 44. The changes suggested are to strike “likely through NIST,” in section 3.1.1., “the National Institute of Standards and Technology Handbook 105-Series standards or other” in section 3.1.2., as well as to strike “NIST” in section 3.1.3. and replace it with “International System of Units (SI)”. He does not feel that Handbook 105 is a consensus document.

Mr. Oppermann stated that he would like to work with NIST to combine this item with GEN 19.1 and recommended moving it forward with a Developing status.

This Committee agreed that this item should be reworded or possibly combined with Gen 19.1 and recommended this item be assigned a Developing status.

Northeastern Weights and Measures Association

B8: GEN-19.1

During the 2021 Interim Meeting open hearings, the following comments were heard: Mr. Henry Opperman (W&M Consulting/Seraphin) commented that they are updating the formula in the proposal due to the feedback received from the Western Weights and Measures Association and recommended a Developing status. Updates can be found on the NCWM website.

Mr. Lou Straub, representing the SMA, agreed with a Developing status and reminded us that SMA positions have been posted on the NCWM website.

The NEWMA Specifications and Tolerances Committee recommended that this item be given a Developing status.

B8: OTH-22.1

During the 2021 NEWMA Interim Meeting open hearing the following comments were heard. Ms. Juana Williams (NIST OWM) provided the following comments:

- NIST OWM submitted this item to:
 - Further emphasize the statement currently in the Fundamental Considerations that authority rests with the Director to approve standards.
 - Provide additional details to assist in the assessment and approval of a standard for use in testing commercial weighing and measuring systems.
 - This includes recognizing the need to verify that certain essential elements of traceability have been met and a listing of those elements.

Based on comments heard at the WWMA, NIST would like to modify the language in the proposed 3.1.3. Authority for Approving Field Test Standards and/or Equipment to align the language with that in the proposed 3.1.1. Essential Elements of Traceability; the proposed change will mirror the statement in 3.1.1. that that traceability to the SI can be establish through entities other than NIST.

3.1.3. Authority for Approving Field Test Standards and/or Equipment. This section shall not preclude the use of additional field standards and/or equipment, as approved by the Director, for uniform evaluation of device performance. Specific types of field test standards are not required to be identified in a NIST Handbook 44 code in order to be considered suitable. Provided the standards meet the “Essential Elements of Traceability” (described in Section 3.1.1. above) that help ensure the standards are suitable and capable of supporting measurements traceable to the SI, likely through NIST, they need only be approved by the Director.

- OWM notes that work underway in the NIST USNWG on Field Reference Meters may result in additional input to this section of the Handbook and possibly, though not necessarily, other sections. In the meantime, the proposed changes to this section will clarify that test standards need not be specified by name in specific codes, unless there is language that would otherwise impact their use.

Mr. Keilty commented that he is suggesting the removal of yellow highlighted portions that are referencing NIST and the change reflected in 3.1.3.in blue highlighted. He believes that NIST is relevant, but not the only avenue for traceability.

3.1.1. Essential Elements of Traceability. To ensure that field test standards and test methods provide for measurements that are traceable to the International System of Units (SI), likely through NIST, they must satisfy the “Essential Elements of Traceability.” As explained in NIST IR6969 GMP-13 Good Measurement Practice for Ensuring Metrological Traceability, these elements include the following.

- **Realization of SI Units**
- **Unbroken Chain of Comparisons**
- **Documented Calibration Program**

- Documented Measurement Uncertainty
- Documented Measurement Procedure
- Accredited Technical Competence
- Measurement Assurance

3.1.2. Specifications for Standards. Standards will meet the specifications of the National Institute of Standards and Technology Handbook 105-Series standards or other appropriate designated documentary standards (e.g., ASTM, ASME, etc.). Recommendations regarding the specifications and tolerances for suitable field standards may be obtained from the Office of Weights and Measures of the National Institute of Standards and Technology.

3.1.3. Authority for Approving Field Test Standards and/or Equipment. This section shall not preclude the use of additional field standards and/or equipment, as approved by the Director, for uniform evaluation of device performance. Specific types of field test standards are not required to be identified in a NIST Handbook 44 code in order to be considered suitable. Provided the standards meet the “Essential Elements of Traceability” (described in Section 3.1.1. above) that help ensure the standards are suitable and capable of supporting measurements traceable to NIST the International System of Units (SI), they need only be approved by the Director.

Mr. Lou Sakin (Hopkinton/Northbridge, Massachusetts) commented that he believes NIST OWM has a responsibility that is authorized by the Federal Dept. of Commerce.

Mr. Murnane recommended Developing status. Mr. Opperman stated that NIST is relevant to this portion and Ms. Juana Williams (NIST OWM) commented that NIST is indeed charged with responsibility from the Dept. of Commerce.

The NEWMA S&T Committee recommended that this item be given Developing status with consideration given to the new language above.

B8: GEN-19.1

During the 2022 NEWMA Annual Meeting open hearing, Mr. Murnane commented that the purpose of this proposal was to define Type 1 and Type 2 Transfer Standards. Originally the proposal had the OIML formula, but the formula only calculates the meter-to-meter tolerance and as the uncertainty associated with the transfer standard increases, the tolerance allocated to the commercial device gradually decreases. The submitter is now proposing a “2/3 Formula” where the calculation includes all the uncertainty associated with the transfer standard and the tolerance allocated to the commercial meter never drops below 2/3 of the normal tolerance. Mr. Murnane requested that this proposal be given a Voting status.

After hearing comments from the floor, the Committee recognized the need to further develop this block and recommended the block retain Developing status.

B8: OTH-22.1

Mr. Vires (SMA) commented the SMA supports this item as Developing. He urged stakeholders to review the item and make comments available to submitter.

After hearing comments from the floor, the Committee recognized the need to further develop this block and recommended the block retain Developing status.

Central Weights and Measures Association

B8: GEN-19.1

During the 2021 CWMA Interim Meeting open hearing the Committee heard comments from the floor. Mrs. Tina Butcher, NIST OWM, about working together with Seraphin to develop more. Mr. Robert Murnane Seraphin Test Measure agreed with Mrs. Butcher and looked forward to working together and agreed the item remain Developing. Mr. Lou Straub (SMA) has not had the chance to review but would be meeting in two weeks.

CWMA S&T Committee recommended item move forward as a Developing item.

B8: OTH-22.1

During the 2021 Interim Meeting open hearing the Committee heard comments from the floor. Mrs. Butcher stated that the item is ready to move forward as a Voting Item but proposed a slight modification to the language based on comments heard at the WWMA. Mrs. Butcher requested the last sentence in the proposed 3.1.3. Authority for Approving Field Test Standards and/or Equipment be modified to add the statement “to the International System of Units (SI), likely through NIST” immediately before the term “NIST.” This would align section 3.1.3. with the reference in proposed section 3.1.1. Essential Elements of Traceability and maintain the reference to NIST as is currently referenced by many jurisdictions’ weights and measures jurisdictions’ laws and regulations. The revised sentence in 3.1.3. would read as follows:

Provided the standards meet the “Essential Elements of Traceability” (described in Section 3.1.1. above) that help ensure the standards are suitable and capable of supporting measurements traceable to the International System of Units (SI), likely through NIST, they need only be approved by the Director.

Mr. Keilty would like to see the comment Section 3.1.1. in the first sentence, strike “likely through NIST. Section 3.1.2. in the first sentence, strike “the National Institute of Standards and Technology Handbook 105-Series standards or other. Section 3.1.3. in the last sentence strike “NIST” and insert “International System of Units (SI)”. He recommended that this agenda item be revised as recommended and moved forward as a Voting Item.

CWMA S&T Committee recommended that this item move forward as a Voting Item with Mr. Keilty’s recommendations.

B8: GEN-19.1

During the 2022 Annual Meeting Open Hearing, Mr. Murnane stated that transfer standard is already included in NIST HB 44, but it isn’t defined. This doesn’t preclude the ability for The Director to approve transfer standards. NIST HB 44 doesn’t specify the frequency of testing intervals; cast iron vs stainless steel weights as an example. G.UR.4.1 already states the owner or operator must maintain the equipment, which includes the accuracy. States have different interval requirements. Recommended moving to a Voting Item.

Mr. Jan Konijnenburg (NIST OWM) - State and industry have a need to use various types of test standards to evaluate commercial devices installed in the marketplace. NIST OWM recognizes the need to use various standards to test commercial devices and support the use of these standards when test data supports its use.

Block 8 clarifies the use and definition of three types of standards to be included in NIST HB 44: (1) Fields Standards, (2) Type 1 Transfer Standards and (3) Type 2 Transfer Standards; it provides an equation that should be used to calculate the tolerances when Type 2 transfer standards are used; provides definitions for Field Standards, Type 1 Transfer Standards and Type 2 Transfer Standards, and provides clarification that the State Director has the authority to approve the use of standard and that specific requirements in NIST HB 44 code are not necessary to approve a standard for use.

Two items, LPG-15.1 and MFM-15.1 in the NCWM Interim Meeting Report (Pub. 16), include a purpose statement that the proposals are added to allow field standard meters to be used to test and place into service dispensers and delivery system flow meters. Block 8 items clarify what has always been recognized in NIST HB 44 concerning the responsibility for acceptance of a standard and notes that specific code changes are not necessary for a field standard to be adequate for use.

In addition to the changes in Block 8, a new form 15 for the 2023 cycle which is not included in the 2022 Publication 16 and has not been addressed separately in the 2022 NIST OWM Technical Analysis but has been circulated to the Spring 2022 NEWMA and CWMA Regional Associations.

This new Form 15 adds a General Code requirement so that rather than revising a specific code in Handbook 44 every time a new field or transfer standard is proposed or developed, an overall statement in the General Code recognizes the use of other field and transfer standards that meet the requirements for use as field or transfer standards. The proposal is as follows:

G-N.3. Test Methods. – Permissible test methods for verifying compliance of weighing and measuring systems with the provisions of the General Code and Specific Codes include, but are not limited to, test methods and apparatus that have been approved by the State Director of weights and measures as outlined in Appendix A - Fundamental Considerations, Section 3. Testing Apparatus.

NIST OWM also observed that the definitions in Block 8 should include appropriate references to the NIST HB 44 codes.

OWM Recommendation: The submitters agreed that these items, GEN-19.1 and OTH-22.1 are fully developed and requested that this S&T Committee consider that Block 8 item be a Voting Item in 2023.

Mr. Charlie Stutesman (Kansas) suggested that GEN-19.1 line 29 – strike “as determined by the Director” and stated that “short term” and “extended term” are ambiguous phrases.

Mr. Loren Minnich (Kansas) referenced Page 277 line 41 regarding a Type 2 transfer standard not being stable or valid over extended time, but OTH-22.1– page 279 line 28 says the Type 2 standard must be stable and valid. Mr. Minnich would like to keep as Developing.

Mr. Doug Musick (Kansas) referenced Page 277 definitions and stated that having the 1/3 rule in the code and not in an appendix is helpful. He also suggested that Type 2 should go away and just have a single “transfer standard” definition.

Mr. Keilty stated that “short term”, “extended period of time”, “short period of time”, “stable”, “valid” are arbitrary and questioned who defines this? Who is going to establish this time period and qualifications of devices? Are we establishing a program for that? API chapter 4.8 dictates GMM LNG5-year calibration intervals for small volume provers, for example.

The CWMA S&T Committee recommended this move forward as a Voting Item.

B8: OTH-22.1

During the 2022 Annual Meeting Open Hearing Mr. Vires (SMA) supports Item Block 8, OTH-22.1 as Developing and noted that stake holders need to review and provide input to the submitter.

The CWMA S&T Committee recommended this moves forward as a Voting Item.

References:

- [1] NIST OWM Analysis and Executive Summary reports <https://www.nist.gov/pml/weights-and-measures/publications/owm-technical-analysis>
- [2] National Conference on Weights and Measures Publication 15 (2023) and 16 (2022) <https://www.ncwm.com>
- [3] 1905-2022 NCWM Annual Conference reports <https://www.nist.gov/pml/owm/publications/ncwm-annual-reports>

Appendix A. S&T Supplemental Documents:

N/A

NIST Office of Weights and Measures (OWM) Laws and Regulations (L&R) 2022 Final Report

This NIST OWM final report contains recommendations to amend the National Institute of Standards and Technology (NIST) Handbook 130 (2021), Uniform Laws and Regulations in the Areas of Legal Metrology and Fuel Quality and NIST Handbook 133, Checking the Net Contents of Packaged Goods (2020). The National Conference on Weights and Measures (NCWM), Specification and Tolerances Committee addressed the following agenda items listed in the table of contents in NCWM Publications 15 and 16 during the 2022 NCWM Interim and Annual Meetings.

This report is based on the NIST OWM Technical Analysis, NCWM “Committee Reports,” testimony at public hearings, supplemental documents, comments received from the regional weights and measures associations and other parties, the addendum sheets issued at the NCWM Annual Meeting, and actions taken by the membership at the voting session of the Annual Meeting.

The status of each item contained in the report is designated as one of the following: (D) Developing Item: the Committee determined the item has merit; however, the item was returned to the submitter or other designated party for further development before any action can be taken at the national level; Informational (I) Item: the item is under consideration by the Committee but not proposed for Voting; (V) Voting Item: the Committee is making recommendations requiring a vote by the active members of NCWM; (W) Withdrawn Item: the item has been removed from consideration by the Committee.

Table B. Voting Results provides a summary of the results of the voting on the Committee’s items and the report in its entirety. The Committee established which items were to be voted on individually and voting-ready items to be grouped together on the consent calendar. Approval of the entire group of consent calendar items occurs as the result of one vote by active membership. Typically, items placed on the consent calendar although important have been without opposition and appear to require no further discussion.

Suggested revisions are shown in bold-face print by striking out information to be deleted and underlining information to be added.

Appendix A. Supplemental Documents contains additional letters, presentations, and data that have been part of the analysis performed by NIST OWM and the NCWM Laws and Regulations Committee. Committee for items under consideration.

For additional information or assistance please contact a NIST OWM Technical Advisor:
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Mr. David Sefcik, L&R Committee, david.sefcik@nist.gov or (301) 975-4868

Subject Series List for the Laws and Regulations Committee

Handbook 130 – General..... GEN Series

 Uniform Laws

 Uniform Weights and Measures Law WAM Series

 Uniform Weighmaster Law WMR Series

 Uniform Fuels and Automotive Lubricants Inspection Law FLL Series

 Uniform Regulations

 Uniform Packaging and Labeling RegulationPAL Series

 Uniform Regulation for the Method of Sale of CommoditiesMOS Series

 Uniform Unit Pricing Regulation UPR Series

 Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies
 for Commercial Weighing and Measuring Devices RSA Series

 Uniform Regulation for National Type EvaluationNTP Series

 Uniform Fuels and Automotive Lubricants Regulation FLR Series

 Examination Procedure for Price Verification..... PPV Series

 NCWM Policy, Interpretations, and GuidelinesPOL Series

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Other Items..... OTH Series

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A. Block 3. WAM-22.2 – Section 11. Powers and Duties of the Director and Block 3.
Cannabis: Florida Department of Agriculture – Re: Cannabis Agenda Items Submitted by the
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Table B. Voting Results

<i>Reference Key Number</i>	<i>House of State Representatives</i>		<i>House of Delegates</i>		<i>Results</i>
	<i>Yeas</i>	<i>Nays</i>	<i>Yeas</i>	<i>Nays</i>	
Consent Calendar					
PAL-22.3	38	0	39	0	Adopted
MOS-22.3					Adopted
MOS-22.5					Adopted
B4: MOS22.1, FLR-22.1MOS22.1					Adopted
WAM 22-2	27	3	33	5	Adopted
MOS-22.4	37	0	40	0	Adopted
MOS-20.5	26	11	33	7	Returned to Committee
Item Block 1 B1:PAL-19.1, NET-19.1, NET-19.2, NET 19.3, NET-19.4	36	1	39	1	Adopted
Item Block 2 B2: WAM-22.1, NTEP-22.1	38	0	41	0	Adopted
Item Block 3 B3: PAL-22.1, PAL-22.1, MOS-22.2	25	2	34	2	Returned to Committee
NET-22.2 (to Amend)	37	0	38	2	Amended
NET-22.2 (as Amended)	20	7	25	9	Returned to Committee
To Accept the Report	Voice Vote				Adopted

Details of All Items
 (in order by Item Number)

WAM – Uniform Weights and Measures Law

WAM-22.2 V Section 11. Powers and Duties of the Director

(This Item was Adopted.)

Source: Northeastern Weights and Measures Association

Submitter’s Purpose and Justification:

Many of the states’ weights and measures laws may not give the state director authority to regulate the types of Cannabis labeling. Amended language will be required to the Uniform Weights and Measures Law to add the needed authority.

<p>NIST OWM Executive Summary for WAM-22.2. Section 11. Powers and Duties of the Director</p>
<p>NIST OWM Recommendation: OWM recommends this be Assigned to the Cannabis Task Group to obtain additional information which OWM has recommended in the analysis.</p> <p>“Cannabis” Statement:</p> <p>In contrast to hemp, marijuana remains a Schedule I substance under the Controlled Substances Act. NIST does not have a policy role related to the production, sale, distribution, or use of cannabis (including hemp and marijuana). NIST participates in the National Conference of Weights and Measures (NCWM) as part of NIST’s statutory mission to promote uniformity in state laws, regulations, and testing procedures.</p> <ul style="list-style-type: none"> • NCWM Bylaws for procedures to modify or add requirements to an existing publication, states “provide evidence of consistency with federal laws and regulations.” Cannabis is a Schedule I substance under the Controlled Substances Act. Schedule 1 substances are considered illegal under federal law. • This regulation is written for permissive language in a regulation. Section 11. Powers and Duties of the Directors is authoritative, and we recommend the permissive language be removed replaced with language similar to “For those states that have authority to regulate Cannabis and Cannabis-containing Products the Director shall...” In addition, the formatting would align with the formatting but continuing with next alphabetical character. • If states want to have authority consideration should be given to add a provision to the uniform code and restrict water activity regulation to cannabis. If a legislature adopts that section, they will then have the authority. States cannot expand their authority by simply adopting a regulation. • Within the section in the previous bullet there are sections that are already specified with Section 11. Power and Duties and do not need to be mentioned a second time. If there is a duplication of language it should be stricken from any newly created section. In some states

NIST OWM Executive Summary for WAM-22.2. Section 11. Powers and Duties of the Director

cannabis is not be legalized for recreation or medicinal purposes. If this is adopted, would it create an issue, if a state adopts a regulation in its entirety?

- The language provides for areas and procedures for the measurement of potency, and measurement of water activity. Currently there are no documented test procedures in NIST HB 133 that provide inspectors with procedures for both of these areas. As addressed in our Technical Analysis, in general, weights and measures inspectors do not enforce ingredient, potency, drug content, safety labeling, and water activity on other products in the marketplace. The Cannabis TG should develop language on the measurement of cannabis potency and water activity for inclusion into NIST HB133.
- If the Weights and Measures law does not give the state director authority to regulate the types of cannabis labeling, amended language will be required adding the needed authority.
- We stated a number of reasons within our NIST OWM Detailed Technical Analysis for the Committee to survey the states and due to the high importance of this item, we encourage the states to promptly respond. As noted in the Florida letter dated December 2021, they had a 57-question survey that was prepared and sent to the states. With the share of Florida's survey information, we believe this can expedite the process in obtaining the necessary information that is needed to change a Weights and Measures Law.
- There has been little indication that Directors have sought advisement from their legal counsel that their state's weights and measures law provide the state director with authority to regulate cannabis labeling. We believe this should be done prior to the adoption of any cannabis related item.

Item under Consideration:

Section 11. Powers and Duties of the Director

The Director shall:

...

(r) for those jurisdictions which have the specific authority to regulate *Cannabis* and *Cannabis*-containing products shall establish by regulation:

- (1) reasonable variations in quantity caused by the unavoidable loss or gain of moisture during current good manufacturing and distribution practices and procedures for moisture determinations;**
- (2) labeling requirements for, and defining reasonable variations in water activity that occur in current good manufacturing and distribution practices, and procedures for the measurement of water activity;**
- (3) labeling requirements for, and defining reasonable variations in levels of cannabinoid that occur in current good manufacturing and distribution practices, and procedures for the measurement of potency; and**

- (4) **packaging and labeling requirements that may include, among other requirements, the characteristics of the packaging (e.g., color) and type of packaging (e.g., tamper evident, childproof, product stabilization), requirements for identity, ingredients, product lot code and date of packaging, contact information of the packer, special symbols or warnings, and potency. The requirements may also include prohibitions on packaging that may be misleading or confusing.**
- (5) **the Director may prescribe by regulation, programs that utilize accredited testing laboratories and may enter into agreements to utilize conformity assessment programs and other technical services to ensure compliance with any of the prescribed requirements.**
(Added 2022)

NIST OWM Detailed Technical Analysis:

(NOTE: This language was provided in the Fall 2021 OWM Technical Analysis for Block 3 Cannabis Items. NEWMA extracted this and created a new Item. Portions of the 2021 Fall Analysis that are specifically related to this Item appear below.)

As of February 3, 2022, there are 37 states, four territories and the District of Columbia allow the medical use of cannabis products. As of May 27, 2022, there were 19 states, two territories and the District of Columbia have enacted measures to regulate cannabis for adult non-medical use.

Survey to the States

In the Fall of 2021, OWM had requested the NCWM survey the state directors prior to the 2022 NCWM Interim Meeting to obtain additional information. The survey questions should be prepared to obtain feedback on the following issues:

- Have Directors consult with their department's attorney to determine if adding the definition and other cannabis proposed requirements to the Uniform Packaging and Labeling Regulation or Method of Sale for Commodities Regulation will cause a conflict with their state laws or regulations.
- Establishing the method of sale by weight and establishing minimum load requirement to NIST Handbook 44 are of course within weights and measures authority. States should determine if any of the labeling and method of sale requirements may not be within their current regulatory authority.
- The most significant question is if state's weights and measure law authorize the director to adopt rules and regulations that require ingredient labeling, safety warnings, potency declarations and if they allow the director to establish and enforce water activity limits and verify potency labeling.

The L&R Committee should use these findings to determine how to proceed with the cannabis proposals on this agenda.

Current Authority in Weights and Measures Law

The survey may also reveal that a director has advisement from legal counsel that the State's weights and measures law does not give the state director authority to regulate the types of cannabis labeling. If the Committee determines this is the case, regardless of the number of states, amended language will be

required to the Uniform Weights and Measures Law to add the needed authority. OWM had drafted a new subsection (r) to add appropriate regulatory authority to promulgate a variety of cannabis requirements to the Uniform Weights and Measures Law. The drafted language provides authority to the Director to set variations for potency, ingredients, warning labels, water activity and moisture loss or gain permitted when current good manufacturing and distribution practices are followed.

At the 2021 NEWMA Interim and 2022 NCWM Interim Meetings both Committees agreed to use this draft and add additional areas of responsibilities in this emerging area of weights and measures regulation.

The OWM draft language omits references to “intrastate commerce” because this UPLR provision in Section 12.1.2. “Variations Resulting from Exposure” states:

12.1.2. Variations Resulting from Exposure. – Variations from the declared weight or measure shall be permitted when caused by ordinary and customary exposure to conditions that normally occur in current good distribution practice and that unavoidably result in change of weight or measure, but only after the commodity is introduced into intrastate commerce, provided the phrase “introduced into intrastate commerce” as used in this paragraph shall be construed to define the time and the place at which the first sale and delivery of a package is made within the state, the delivery being either:

- (a) directly to the purchaser or to his/her agent; or
- (b) to a common carrier for shipment to the purchaser,

and this paragraph shall be construed as requiring that so long as a shipment, delivery, or lot of packages of a particular commodity remains in the possession or under the control of the packager or the person who introduces the package into intrastate commerce, exposure variations shall not be permitted.

If packages are in the control of the packager or person, who introduces the packages into intrastate commerce, that reasonable variations in net quantity caused by the loss or moisture loss or gain shall not be recognized, which likely conflicts with the Federal Food, Drug and Cosmetic Act and FDA regulations. This is a complex legal issue that debated in 1981-1985 by the L&R Committee. The consensus among officials was that all packaged products should be treated the same regardless of whether they are in “intrastate” or “interstate commerce.”

OWM is trying to foresee potential problems with these proposals and is offering solutions that may allow for the adoption at the 2022 NCWM Annual Meeting. OWM recommends adding another Section which would allow the director to utilize accredited laboratories to perform testing when the states weights and measures laboratory does not have the capabilities. It also grants the director authority to employ a conformity assessment program. This could be a program where companies are inspected and accredited by a competent party, such as ASTM, who maintain accreditation and are subject to random audits to ensure compliance. This would allow the director to rely on alternative approaches instead of having their state metrology laboratory to obtain equipment and testing expertise they may not possess.

OWM believes that in the future weights and measures inspections will also need to employ increased interstate cooperation among weights and measures programs as well as conformity assessment, and accreditation programs to supervise the new ways commercial measurements are utilized. We see an increase of goods being delivered to homes directly from remote shipping facilities. The testing of prepackaged goods for testing will decline and that may lead to the need for states to reach out for assistance from other jurisdictions to investigate complaints. Assistance will be required to go into

distribution points or point of pack to test packaged goods or assist in evaluating whether current good manufacturing practices are in place or to help in resolving moisture loss (or gain) issues.

Utilizing accreditation programs to ensure products compliance are currently in use around the world. An example of this is the U.S. Consumer Product Safety Commission (CPSC) having oversight of toys sold in the U.S. marketplace. The use of such systems would empower programs to focus on supervising the marketplace and using risk assessments and audits to oversee far more than is possible with today's resources. OWM often hears weights and measures plays catch-up instead of actively participating in the development of new areas of commercial weighing and measurement. One way to take a larger step in any field of weighing and measurement is to be able to provide leadership and marketplace supervision using new approaches and looking for opportunities in the emerging areas of legal metrology regulations (e.g., electric vehicle charging systems and GPS transportation systems). Recognizing these options would be a good first-step for cannabis.

OWM also recognizes that regulation of cannabis packaging is different than other packaged products in the marketplace. Current authority for weights and measures regulations typically cannot prescribe the type and color of packaging, the use of production codes, manufacture date, warning labels cannabis symbols, or other requirements. UPLR regulations cannot dictate whether the product can look like candy or baked goods or whether labels can display a picture of a cartoon character. But those aspects are part of the regulatory powers given to cannabis regulatory agencies in many states, and those local requirements vary depending on whether the state legislature allows recreational use or only medicinal use cannabis. In most jurisdictions only the state legislature can grant enforcement authority to regulatory agencies and sometimes there is overlap.

There are numerous examples from the past that show conflicting requirements and inspection procedures can be avoided through cooperation. Most states that have a Department of Agriculture have a state chemist and seed control laboratory, that have regulatory authority to prescribe net quantity of contents requirements. They work closely with the weights and measures division for guidance and assistance in ensuring that labeling regulations are consistent. The inspectors who carry out inspections have the authority as well as the training and equipment to perform the inspections and tests properly and uniformly. A similar solution is for weights and measures agencies to work collaboratively with the state agencies, that have authority to prescribe cannabis labeling, and to ensure any other agency's labeling requirements for legal metrology (which relate to declaration of identity, net quantity and responsibility and type size etc.) are consistent with the UPLR.

Regulatory Authority

It is understood that state legislature establishes the boundaries of regulatory authority for state agencies and if those limits are exceeded the regulations will likely be invalidated, and any enforcement actions taken under those regulations will be void. A similar issue over authority to regulate in a new area of enforcement was addressed by the NCWM in 1995 during the development of the Examination Procedure Outline (EPO) for Price Verification. At that time several states were advised by their legal counsel that unless state laws were amended by the legislature to allow for the EPO, it could not be used for enforcement purposes, and inspectors did not have the authority to conduct inspections related to scanner accuracy.

In response, the NCWM L&R developed subsection (r) for inclusion in Section 11. "Powers and Duties of the Director" in the Uniform Weights and Measures Law which gives weights and measures the authority to verify prices and take enforcement action using the EPO.

OWM has developed draft language for consideration that would provide authority for cannabis regulation.

Section 11. Powers and Duties of the Director

The Director shall:

...

(r) for Cannabis and Products Containing Cannabinoid(s)

(1) Prescribe by regulation:

- i. **reasonable variations in quantity caused by the loss or gain of moisture during current good distribution practice or by unavoidable deviations in current good manufacturing practice and procedures for moisture determination;**
- ii. **labeling requirements for and defining reasonable variations in water activity that occur in current good manufacturing practice and current good distribution practice and procedures for the measurement of water activity;**
- iii. **labeling requirements for and define reasonable variations in levels of cannabinoid: delta-9 THC, delta-8 THC (potency) that occur in current good manufacturing practice and current good distribution practice and procedures for the measurement of potency; and**
- iv. **packaging and labeling requirements that may include, among other requirements, the characteristics of the packaging (e.g., color) and type of packaging (e.g., tamper evident, childproof), requirements for identity, ingredients, product lot code and date of packaging, contact information of the packer, special symbols or warnings, and potency. The requirements may also include prohibitions on packaging that may be misleading or confusing.**

(2) The Director may prescribe by regulation, programs that utilize accredited testing laboratories and may enter into agreements to utilize conformity assessment programs and other technical services to ensure compliance with any of the prescribed requirements.

Water Activity

For reasons presented below, OWM does not agree with the statements that having the authority to recognize moisture loss or gain or test fuel quality allows weights and measures directors to establish water activity limits. Other commenters argue that fuel quality specifications serve as justification for setting specific product qualities, but states that establish fuel quality requirements do so under the specific authority granted by their state legislatures to regulate fuel quality and not under an interpretation of their weights and measures laws (see for example the Uniform Fuels and Automotive Lubricants Inspection Law in NIST Handbook 130). In most states the authority to promulgate the types of labeling and method of sale requirements included among these proposals is delegated by legislatures to state health departments or created cannabis regulatory agencies (e.g., Colorado Cannabis, or the Maryland Medical Cannabis Commission.)

OWM recommends that state directors consult with their legal counsel to ensure their law provides explicit authority to regulate cannabis and extends to regulating water activity. If a state director determines that their authority does not extend to the requirements for water activity or cannabis labeling requirements, OWM has developed draft language for consideration that would provide authority for cannabis regulation.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, Mr. Tim Chesser (Arkansas) asked if “unavoidable variations”. Within the language was necessary. Discussion ensued as to whether the language should be permissive and use the term “may.” This would also assist states that will not have legal authority over cannabis.

Several regulators spoke in favor of the item, including Florida which has already adopted regulations for cannabis in their state. In addition, Ms. Holly Bell (Director of Cannabis with Florida Department of Agriculture) submitted comments on the OWM Fall 2021 Analysis. They expressed a need for clear authority to regulate cannabis if the authority of weights and measures officials to regulate is challenged and for those without current authority. NEWMA and other state regulators had no problem with changing “shall” to “may.” The Arizona Dispensaries Association and CPR Squared, Inc., representing the cannabis industry supported this item citing the need for regulation to protect the consumer and ensure a level playing field for industry. Mr. Kenneth Ramsburg (Maryland) opposed the language and for a national document it stated that it does not hold true across the nation, and requested it be withdrawn. Mr. Kurt Floren (Los Angeles County, California) stated that “reasonable variation” is within existing federal regulations, and this is for moisture that is a loss or gain.

Due to multiple open hearing statements in favor of adding a "may" distinction in this section, the Committee created a new section (2) to distinguish that all references to duties of the Director in reference to Cannabis and Cannabis containing products are permissive. Various other technical and grammatical edits were made to further clarify the new section. The Committee assigned Voting status to this item at the 2022 NCWM Interim Meeting.

At the 2022 NCWM Annual Meeting, Dr. Curran commented that authority is provided through state statutes, and this item does not provide authority. States have had ample time to consult with their attorneys. OWM remarked that there are no documented test procedures for potency and water activity. In general, weights and measures does not enforce ingredient, safety, safety labeling and water activity on other products in the marketplace. OWM expressed concern that placing into authority Cannabis products may create issues by conflicting with state laws. The Committee made the language authoritative changing “may” to “shall” for those jurisdictions which have specific authority to regulate *Cannabis* and *Cannabis-Containing Products*. This item was adopted at the 2022 NCWM Annual.

Regional Association Reporting:

Note: At the 2022 CWMA and NEWMA Annual Meetings the following statement was read by the NIST OWM Technical Advisor to address all cannabis related items.

“As a non-regulatory metrology institute, NIST, defers to federal agencies with regulatory authority under the Controlled Substances Act (CSA) for the scheduling of drugs or other substances. NIST does not have a policy role related to the production, sale, distribution, or use of cannabis (including hemp and marijuana).

While the 2018 Farm Bill removed hemp from the list of controlled substances under Schedule 1 of the CSA, marijuana remains on that list. NIST must respect that distinction even as it exercises its statutory authority to develop and disseminate national weights and measures standards for the production, distribution and sale of products in the commercial marketplace.

NIST remains committed to providing technical assistance to the weights and measures community. OWM has provided key technical points for the community to consider in its deliberations of cannabis-related proposals, and OWM would be happy to provide any necessary clarification. OWM comments are intended to encourage technically sound application of legal metrology laws, regulations, and practices to the measurement and sale of these products.”

Western Weights and Measures Association

This item was not presented to the WWMA at their 2021 Annual Meeting.

Central Weights and Measures Association

This item was not presented to the CWMA at their 2021 Interim Meeting.

At the 2022 CWMA Annual Meeting, Ms. Lisa Warfield (NIST OWM) recommended this item be downgraded to Developing status or Assigned to the Cannabis Task Group to obtain additional information that OWM has recommended in their analysis. Ms. Warfield stated that this regulation is written with permissive language in Section 11. Powers and Duties of the Directors. The permissive language should be replaced with language such as “For those states that have authority to regulate cannabis and cannabis-containing products the Director shall (as opposed to “may”)”. Finally, this language provides for areas and procedures for the measurement of potency, and measurement of water activity for which there are no documented test procedures in NIST HB133. As addressed in the NIST OWM’s Technical Analysis, in general, weights and measures inspectors do not enforce ingredient, potency, drug content, safety labeling, and water activity on other products in the marketplace. Mr. Doug Musick (Kansas) commented that weights and measures does enforce ingredients in fuel. Mr. Konrad Crockford (North Dakota) does not have the experience within their weights and measures program to regulate quality and recommended this item be withdrawn. Ms. Warfield further commented that states’ packaging and labeling regulations already cover labeling and net contents. The Committee recommended this item be withdrawn because it is unnecessary to be explicit for cannabis and state agencies have authority through the current powers and duties within state regulations.

Southern Weights and Measures Association

This item was not presented to the SWMA at their 2021 Annual Meeting.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, this item was developed based upon a suggestion by NIST OWM. NEWMA supported the item and recommended it as a Voting status.

At the 2022 NEWMA Annual meeting, there were no additional comments were received during open hearings.

PAL – Uniform Packaging and Labeling Regulation**PAL-22.3 V Section 8.2. Calculation of Area of Principal Display Panel for Purposes of Type Size.**

(This Item was Adopted)

Source: NIST Office of Weights and Measures**Submitter’s Purpose and Justification:**

This section is being updated clarify through wording and graphic illustrations as to how to properly calculate the area of a principal display panel for purposed of type size.

The submitter requested that this be a Voting Item in 2022.

NIST OWM Executive Summary for PAL-22.3 – Section 8.2. Calculation of Area of Principal Display Panel for Purposes of Type Size.

<p>NIST OWM Recommendation: OWM believes this language is fully developed and recommends it as a Voting Item.</p> <p>There are minor formatting issues:</p> <ul style="list-style-type: none"> • Under Section 8.2. subsections (a), (b), and (c) are reflected as new (bold/underscore). These subsections currently appear in NIST Handbook 130. • Under Section 8.2.(b). the calculation should read 25 cm (10 in) × 5 cm (2 in) = 125 cm (20 in²) × 0.40 = 50 cm² (8 in²) <u>5 cm (2 in) × 25 cm (10 in) = 125 cm² (20 in²) × 0.40 = 50 cm² (8 in²)</u> • On page 46 of NCWM Publication 16 the language reflected in (c) (lines 22-23) the language “Determination of the principal display panel shall exclude tops, bottoms, flanges at tops and bottoms of cans, and shoulders and necks of bottles or jars” should not be reflected as new language. The language that is being added is “See Figure 5. Other Shaped Containers.”

Item Under Consideration:

8.2. Calculation of Area of Principal Display Panel for Purposes of Type Size. – The area of the principal display panel shall be:

- (a)** in the case of a rectangular container, one entire side that properly can be considered the principal display panel, the product of the height times the width of that side;

For Figure 3 **Calculation of the Area of the Principal Display Area of a Rectangular Container**, the area of the principal display panel is 20 cm (8 in) × 15 cm (6 in) = 300 cm² (48 in²).

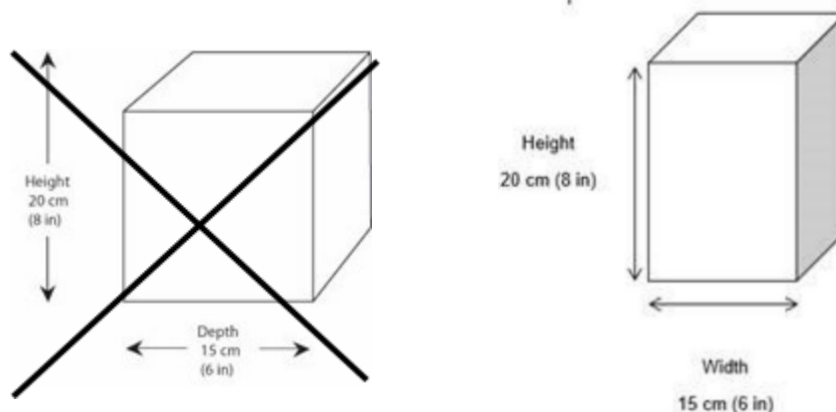


Fig. 3. Calculation of the Area of the Principal Display Area of a Rectangular Container

in the case of a cylindrical or nearly cylindrical container, **40 %** of the product of the height of the container times the circumference; **times 40 %**.

For Figure 4 Calculation of the Area of the Principal Display Area of a Cylindrical Container, the area of the principal display panel is:

$$\underline{25 \text{ cm (10 in)} \times 5 \text{ cm (2 in)} = 125 \text{ cm}^2 (20 \text{ in}^2) \times 0.40 = 50 \text{ cm}^2 (8 \text{ in}^2) - 5 \text{ cm (2 in)} \times 25 \text{ cm (10 in)} = 125 \text{ cm}^2 (20 \text{ in}^2) \times 0.40 = 50 \text{ cm}^2 (8 \text{ in}^2)}$$

(See also Section 10.7. Cylindrical Containers)

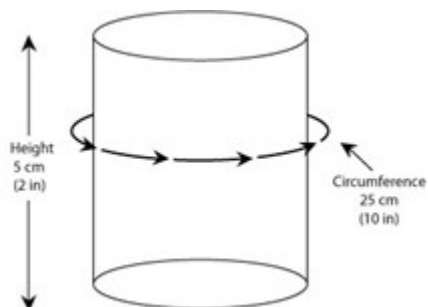


Fig. 4. Calculation of the Area of the Principal

Display Area of a Cylindrical Container

~~The area of the principal display panel is the same in both examples. The declaration of net quantity of contents must be of the same height in both cases. It is not the size of the label that is used to determine the minimum type size of the quantity statement, but the size of the surface of the package exposed to view to the customer. The package on the right side of the figure has a spot label (see Section 2.12. Spot Label and Section 11.29. Spot Label); and~~

- (b)** in the case of any other shaped container, 40 % of the total surface of the container, unless such container presents an obvious principal display panel (e.g., the top of a triangular or circular package of cheese, or the top of a can of shoe polish), in which event the area shall consist of the entire such surface. **Determination of the principal display panel shall exclude tops,**

bottoms, flanges at tops and bottoms of cans, and shoulders and necks of bottles or jars.
See Figure 5. Other Shaped Containers.

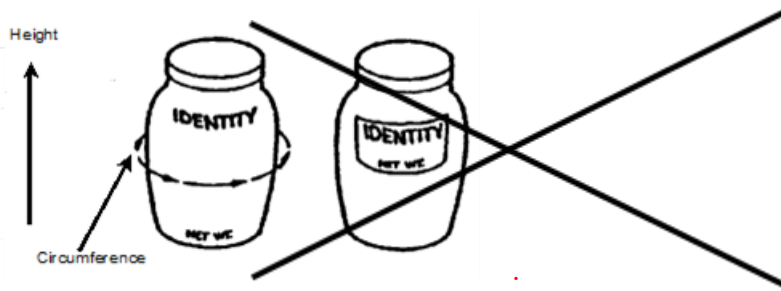


Figure 5. Other Shaped Containers.

Determination of the principal display panel shall exclude tops, bottoms, flanges at tops and bottoms of cans, and shoulders and necks of bottles or jars.

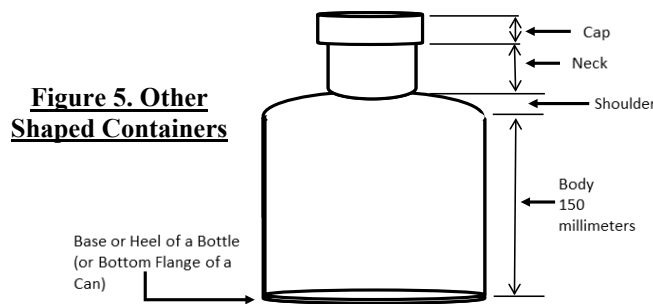


Figure 5. Other Shaped Containers

(d) In the case of a spot label, it is not the size of the label that is used to determine the minimum type size of the quantity statement, but the size of the surface of the package exposed (panel) viewable to the customer. The declaration of net quantity of contents must be of the same height in both cases. In Figure 6. Spot Labels, the package on the right side of the figure has a spot label. The area of the principal display panel is the same in both examples. (see Section 2.12. Spot Label and Section 11.29. Spot Label).

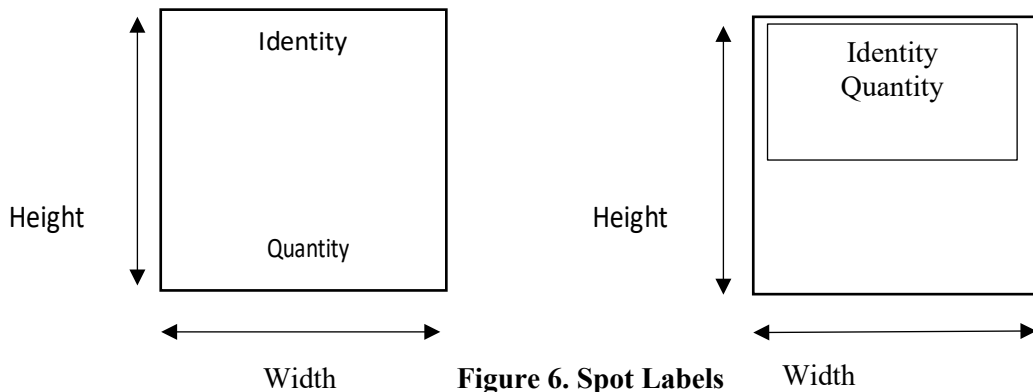


Figure 6. Spot Labels

NIST OWM Detailed Technical Analysis:

These amendments will help clarify the procedures for determining the area of the principal display panel and correct errors and make improvements in several graphics that appear in this regulation.

There are minor formatting issues:

- Section 8.2. the subsections should not be reflected in bold/underscore. These subsections currently appear in NIST HB 130.
- Section 8.2.(b) the calculation should read: ~~**25 cm (10 in) × 5 cm (2 in) = 125 cm (20 in²) × 0.40 = 50 cm² (8 in²)**~~ **5 cm (2 in) × 25 cm (10 in) = 125 cm² (20 in²) × 0.40 = 50 cm² (8 in²)** (See also Section 10.7. Cylindrical Containers)
- On page 46 the new language on lines 22-23 exist within the handbook. The only new language being added to this subsection is the sentence that references “See Figure 5. Other Shaped Containers.”

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, several states spoke in support of this item and moving forward as a Voting Item. The Committee made some formatting changes to this item and recommended it as a Voting Item.

The Committee assigned Voting status to this item because it heard only favorable comments during the open hearings and believes the item is fully developed.

At the 2022 NCWM Annual Meeting, the Committee corrected the centimeter squared within the formula by replacing it with $5\text{ cm (2 in)} \times 25\text{ cm (10 in)} = 125\text{ cm}^2\text{ (20 in}^2) \times 0.40 = 50\text{ cm}^2\text{ (8 in}^2)$. The Committee considered this language to be fully developed.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, Ms. Lisa Warfield, (NIST OWM) (submitter) provided testimony that OWM submitted this item to clarify equations and update graphics. Mr. Matt Douglas (CDFA-DMS) provided testimony that the item is fully developed and supports with minor editorial changes to equations and graphics. The Committee recommended this as a Voting Item with editorial formatting changes.

Central Weights and Measures Association

At the CWMA 2021 Interim Meeting, Ms. Warfield commented that this is an update of the language and graphics for this item, and it is fully developed. Based on the supporting documents submitted by NIST, the Committee believes this item is fully developed and ready for Voting status.

At the 2022 CWMA Annual Meeting, Ms. Warfield believed this item to be fully developed but there are some minor formatting errors as follows:

- Under Section 8.2. subsections (a), (b), and (c) are reflected as new (bold/underscore). These subsections currently appear in NIST Handbook 130.
- On page 46 the new language reflected in Subsection C (lines 22-23) that starts with “Determination of the principal display panel shall...”) is language that currently exists within the handbook. The language that is being added is “See Figure 5. Other Shaped Containers.”

The Committee recommended this item remain a Voting Item with the above editorial changes.

At the 2021 SWMA Annual Meeting, no comments were received from the floor during open hearings. The Committee believes this item has merit and is fully developed. The Committee recommended this item as a Voting Item.

At the 2021 NEWMA Interim Meeting, several regulators supported this item moving forward with a Voting status. The Committee recommended the item be given Voting status. At the 2022 NEWMA Annual meeting, no comments were received during open hearings.

MOS – Uniform Regulations for the Method of Sale of Commodities

MOS-22.3 V Section 2.4. Fireplace and Stove Wood

(This Item was Adopted.)

Source: New Hampshire Division of Weights and Measures

Submitter’s Purpose and Justification:

To correct Part B. Uniform Regulation for the Method of Sale of Commodities and keep it consistent with federal requirements and to recognize products sold in the market that are not represented in current regulations. Also, to fix a couple unit representations.

2.4.3. Quantity. (b) Artificial compressed or processed logs.

Compressed firewood bricks are a popular product and are sold as a cleaner and more efficient alternative to cordwood. Since the regulation for artificial compressed or processed logs was added to the Handbook in 1976, compressed wood products, other than logs, have entered the market.

Compressed firewood bricks are generally sold in multipacks. There are some manufacturers that provide a net weight declaration on the multipack but there are several manufacturers that provide no declaration. Bulk sales have been advertised and sold by the pallet or skid (no weight representation), by the number of multipacks on a pallet (no weight representation), by the ton, or with a representation that a pallet equals 1 cord of firewood. When compressed firewood bricks are sold by the pallet, by the number of multipacks per pallet, or by the representation that it equals (1) cord (or a portion thereof), the consumer has no way to determine value from one manufacturer to another and no way of knowing what they are purchasing, except through a visual representation. Unless the consumer knows both the weight of each multipack and the total weight representation of the “pallet” of compressed firewood bricks, they would have a very hard time determining whether a bulk purchase is a better value than purchasing a single multipack. Also, if manufacturers are selling bulk products in different ways, it makes it difficult for businesses to compete.

The proposed update will give clarification and direction on how compressed firewood bricks shall be sold. This handbook change will help 1) sellers to compete with other brands on the same playing field, 2) buyers with value comparison, and 3) regulators to know how to enforce the advertising and selling of this type of commodity.

2.4.3. Quantity. (a) Packaged natural wood. (1) and (d) Flavoring chips. (1)

The change to the units in these paragraphs is to represent “like for like”, “liters are to feet” as “a liter is to a foot” (plural and singular representations)

The submitter acknowledges the following:

- “Artificial compressed and processed logs” could be understood to include other compressed products used for heating fuel.
- As for the units change, this part of the code was amended in 2019 and included both regulators and industry, so individuals may question why it needs to be changed.

The submitter requested that this be a Voting Item in 2022.

NIST OWM Executive Summary for MOS-22.3 – Section 2.4. Fireplace and Stove Wood
NIST OWM Recommendation: OWM believes that the National and Regional Meetings have addressed all concerns of the submitter and this Item is fully developed. OWM appreciates Mrs. Ayers for identifying and getting these issues addressed through the Conference.

Item Under Consideration:

2.4. Fireplace and Stove Wood. – For the purpose of this regulation, this section shall apply to the sale of all wood, natural and processed, for use as fuel or flavoring.

(Amended 1999)

2.4.1. Definitions.

2.4.1.1. Fireplace and Stove Wood. – Any kindling, logs, boards, timbers, or other wood, natural or processed, split, or not split, advertised, offered for sale, or sold for use as fuel.

(Amended 1991)

2.4.1.2. Cord. – The amount of wood that is contained in a space of 128 ft³ when the wood is ranked and well stowed. For the purpose of this regulation, “ranked and well stowed” shall be construed to mean that pieces of wood are placed in a line or row, with individual pieces touching and parallel to each other, and stacked in a compact manner.

2.4.1.3. Representation. – This shall be construed to mean any advertisement, offering, invoice, or the like that pertains to the sale of fireplace or stove wood.

2.4.1.4. Flavoring Chips. – Any kindling, logs, boards, timbers, or other natural or processed, split or unsplit wood that is advertised, offered for sale, or sold for flavoring smoked or barbecued foods.

(Added 1999)

2.4.2. Identity. – A representation may include a declaration of identity that indicates the species group (for example, 50 % hickory, 50 % miscellaneous softwood). Such a representation shall indicate, within 10 % accuracy, the percentages of each group.

2.4.3. Quantity. – Fireplace and stove wood shall be advertised, offered for sale, and sold only by measure, using the term “cord” and fractional parts of a cord or the cubic meter, except that:

(a) **Packaged natural wood.** – Natural wood offered for sale in packaged form in quantities less than 0.45 m³ (1/8 cord or 16 ft³) shall display the quantity in terms of:

(1) liters, ~~to include~~ including fractions or multiples of the liter. A net quantity of contents declaration and may also include a ~~declaration of~~ quantity in units terms of cubic foot ~~or feet to include~~ fractions or multiples of a cubic foot (i.e., cubic feet).

(Amended 2010, ~~and 2016,~~ and 2022)

NOTE: Implementation for the requirement for use of the liter in (1); packages may continue to show the cubic decimeter (dm³) instead of liters (L) for four years after the effective date of this regulation to allow for the use of current packages inventories.

Effective date of enforcement shall be January 1, 2021.

(Added 2016) (Amended 2019)

(b) **Artificial compressed or processed logs products.** – ~~A single fireplace log shall be sold by weight, and packages of such individual logs~~ Logs, bricks, or other shaped products greater than 15 cm (6 in) in any dimension shall be sold by weight plus count.

(Amended 2022)

(c) **Stove wood pellets or chips.** – Pellets or chips not greater than 15 cm (6 in) in any dimension shall be sold by weight. This requirement does not apply to flavoring chips.

(Amended 1976 and 1991)

(d) **Flavoring chips.** – Flavoring chips offered for sale in packaged form in quantities less than 0.45 m³ (1/8 cord or 16 ft³) shall display the quantity in terms of:

(1) liters, ~~to include~~ including fractions or multiples of the liter. A net quantity of contents declaration and may also include a ~~declaration of~~ quantity in units terms of cubic foot ~~or feet to include~~ fractions or multiples of a cubic foot (i.e. cubic feet).

(Added 1998) (Amended 2010 ~~and 2016~~ and 2022)

***Note:** In determining the appropriate Method of Sale, a clear distinction must be made as to*

whether the wood is being sold primarily as fuel (some wood is sold as fuel but flavoring is a byproduct) or strictly as a wood flavoring.

(Added 2010)

(Amended 1976, 1991, 1998, 2010, ~~and~~ 2016 and 2022)

2.4.4. Prohibition of Terms. – The terms “face cord,” “rack,” “pile,” “truckload,” or terms of similar import shall not be used when advertising, offering for sale, or selling wood for use as fuel.

2.4.5. Delivery Ticket or Sales Invoice. – A delivery ticket or sales invoice shall be presented by the seller to the purchaser whenever any non-packaged fireplace or stove wood is sold. The delivery ticket or sales invoice shall contain at least the following information:

- (a) the name and address of the vendor;
- (b) the name and address of the purchaser;
- (c) the date delivered;
- (d) the quantity delivered and the quantity upon which the price is based, if this differs from the delivered quantity;
- (e) the price of the amount delivered; and
- (f) the identity, in the most descriptive terms commercially practicable, including any quality representation made in connection with the sale.

(Added 1975)

NIST OWM Detailed Technical Analysis:

OWM agrees that adoption of this proposal to recognize shapes of manufactured firewood products other than logs and with some minor revisions the changes will clarify the use of permitted units. When units of measure are used in packaging and labeling regulations multiples of that unit or fractions of the unit are also permitted. When a regulation reads the net quantity of contents declaration must be in terms of the cubic foot it is defined as meaning that both fractions of a cubic foot (0.75 cubic foot) and multiples of a cubic foot may be used in conjunction with a quantity declaration (2 cubic feet). This is correct even if the term “feet” is not mentioned in the regulation.

The Committee should be reminded, that packages of firewood are subject only to State regulation in the areas of legal metrology requirements (i.e., the Federal Fair Packaging and Labeling Act [FPLA] does not apply). Therefore, these packages may be labeled in only metric units (i.e., the liter). Under the UPLR packers have the option of including a declaration of quantity in terms of the U.S. customary system of units under the exemption in NIST HB130 Section 11.33. U.S. Customary Units, Exemptions – Consumer Commodities.

Packers must have the flexibility to offer packages with a varying quantity of contents (package sizes). If a method of sale or packaging or labeling regulation requires a commodity to be sold by the pound, fluid ounce or gallon the intent of the regulation must be understood that it is not restricted to only 1 pound, 1 fluid ounce or 1-gallon quantities may be offered or exposed for sale. Such a reading of the requirement would unintentionally impose package size or other restrictions on packers.

In the 1990s, NCWM all but eliminated package size restrictions in method of sale of commodities regulations in response to court cases, which found that package size restrictions, among imposing other burdens on businesses, and interfered with interstate commerce. International Dairy Foods Association (IDFA), which includes the Milk Industry Foundation and the International Ice Cream Association, supported the elimination of package size requirements for dairy products so that consumers can have more choice. Any remaining package size requirement found in the uniform regulations today are there because they are included in Federal laws.

OWM recommends the following revised language for (d)(1) to help clarify the regulation.

(d) **Flavoring chips.** – Flavoring chips offered for sale in packaged form in quantities less than 0.45 m³ (1/8 cord or 16 ft²) shall display the quantity in terms of:

(1) liters, including ~~to include~~ fractions or multiples of the liter. A net quantity of contents declaration may also include a declaration of quantity in ~~terms~~ units of the cubic foot ~~or feet to include~~ fractions or multiples of the a-cubic foot (i.e., cubic feet).

(Added 1998) (Amended 2010, ~~and~~ 2016, and 2022)

With the OWM recommended revision to the language we recommend that this proposal be a Voting Item.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, several states spoke in favor of this item as a Voting Item. NEWMA supported it as a Voting Item and provided some editorial changes for consideration. Ms. Warfield concurred with the NEWMA editorial changes. The Committee assigned Voting status for this item at the 2022 NCWM Interim Meeting. The Committee heard support from membership for the item based upon the language proposed in the 2021 NEWMA Interim report and made changes based upon the NEWMA report. The Committee also made editorial changes to the item.

At the 2022 NCWM Annual Meeting, submitter Mrs. Ayer stated she had proposed these changes due to the product type in the marketplace. She appreciates the support from NIST and the regions on this proposal. Mr. Schnepf (California) believes this accommodates products in the marketplace and supports this item.

Regional Association Reporting:

At the 2021 WWMA Annual Meeting, Ms. Lisa Warfield (NIST OWM) provided testimony to include a declaration of quantity in terms of cubic feet, to include fractions of a cubic foot. Mr. Kevin Schnepf (California Div. of Food and Agriculture, Department of Measurement Services) provided testimony the item is well developed and supported this with minor editorial changes.

The Committee recommended this as a Voting Item with the following changes for 2.4.3.(a)1 to be added and modified language to 2.4.3.(d):

2.4.3. Quantity. – Fireplace and stove wood shall be advertised, offered for sale, and sold only by measure, using the term “cord” and fractional parts of a cord or the cubic meter, except that:

(a) **Packaged natural wood.** – Natural wood offered for sale in packaged form in quantities less than 0.45 m³ (1/8 cord or 16 ft³) shall display the quantity in terms of:

- (1) liters, ~~to include~~ **including** fractions **or multiples of the** of ~~the~~ liter. ~~and~~ **A net quantity of contents declaration** may also include a declaration of quantity in ~~terms~~ **units of the** cubic foot ~~or feet~~ **to include** fractions **or multiples** of ~~the~~ cubic foot **i.e., cubic feet**.

(Amended 2010, ~~and~~ 2016, **and 2022**)

NOTE: Implementation for the requirement for use of the liter in (1); packages may continue to show the cubic decimeter (dm³) instead of liters (L) for four years after the effective date of this regulation to allow for the use of current packages inventories.

(Added 2016) (Amended 2019 **and 2022**)

- (d) **Flavoring chips.** – Flavoring chips offered for sale in packaged form in quantities less than 0.45 m³ (1/8 cord or 16 ft³) shall display the quantity in terms of:

- (1) liters, including ~~to include~~ fractions **or multiples of the liter.** **A net quantity of contents declaration** may also include a declaration of quantity in ~~terms~~ **units** of the cubic foot ~~or feet~~ **to include** fractions **or multiples** of **a** cubic foot **(i.e., cubic feet)**.

(Added 1998) (Amended 2010, ~~and~~ 2016, **and 20XX**)

At the 2021 CWMA Interim Meeting, Ms. Lisa Warfield (NIST OWM) commented that there is additional language she would like the committee to consider in the NEWMA and WWMA reports. Based on review of the revisions recommended in the 2021 NEWMA Interim L&R Report, the Committee supports the revisions and believes this item is fully vetted and ready for Voting status with revisions.

At the 2022 CWMA Annual Meeting no comments were heard on this item. The Committee believes this item is fully developed and should remain as a Voting Item.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting there were no comments received from the floor during open hearings. Ms. Warfield provided written analysis suggesting some language changes from the original proposal. The Committee recommended this item as a Voting Item with the original language as submitted by New Hampshire Division of Weights and Measures.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mrs. Ayer commented there were issues with the way compressed fire bricks and logs were being sold. NIST Handbook 130 does not clarify and include all processed and compressed products and this item clarifies and includes more of the types of products and clarifies volume statements. Mr. David Sefcik (NIST OWM) commented that OWM agrees with the changes and provided some minor clarifications in their analysis report. He further stated that the language changes in Section (d)(1) needs to be mirrored in Section (a)(1) and the Item would be ready for Voting status. Ms. Ayer believes the item is fully developed and ready for Voting status. Mr. Jim Cassidy (Massachusetts) supported this proposal and believes it is ready for Voting status. Mrs. Ayer accepts OWM's proposed changes as shown below. Mrs. Ayer also provided an editorial change in (b) changing the word "larger" to greater". The Committee recommended the item as ready for Voting status as amended.

- 2.4. Fireplace and Stove Wood.** – For the purpose of this regulation, this section shall apply to the sale of all wood, natural and processed, for use as fuel or flavoring.

(Amended 1999)

...

2.4.3. Quantity. – Fireplace and stove wood shall be advertised, offered for sale, and sold only by measure, using the term “cord” and fractional parts of a cord or the cubic meter, except that:

(a) **Packaged natural wood.** – Natural wood offered for sale in packaged form in quantities less than 0.45 m³ (1/8 cord or 16 ft³) shall display the quantity in terms of:

(1) liters, including ~~to include~~ fractions or multiples of the liter. A net quantity of contents declaration may also include a declaration of quantity in ~~terms units~~ of the cubic foot ~~or feet to include~~ fractions or multiples of a cubic foot (i.e., cubic feet).

(Amended 2010, ~~and~~ 2016, ~~and~~ 20XX)

NOTE: Implementation for the requirement for use of the liter in (1); packages may continue to show the cubic decimeter (dm³) instead of liters (L) for four years after the effective date of this regulation to allow for the use of current packages inventories.

Effective date of enforcement shall be January 1, 2021.

(Added 2016) (Amended 2019 ~~and~~ 20XX)

(b) **Artificial compressed or processed logs products.** – ~~A single fireplace log shall be sold by weight, and packages of such individual logs~~ Logs, bricks, or other shaped products larger greater than 15 cm (6 in) in any dimension shall be sold by weight plus count.

(Amended 20XX)

(c) **Stove wood pellets or chips.** – Pellets or chips not greater than 15 cm (6 in) in any dimension shall be sold by weight. This requirement does not apply to flavoring chips.

(Amended 1976 and 1991)

(d) **Flavoring chips.** – Flavoring chips offered for sale in packaged form in quantities less than 0.45 m³ (1/8 cord or 16 ft³) shall display the quantity in terms of:

(1) liters, including ~~to include~~ fractions or multiples of the liter. A net quantity of contents declaration may also include a declaration of quantity in ~~terms units~~ of the cubic foot ~~or feet to include~~ fractions or multiples of a cubic foot (i.e., cubic feet).

(Added 1998) (Amended 2010, ~~and~~ 2016, ~~and~~ 20XX)

NOTE: In determining the appropriate Method of Sale, a clear distinction must be made as to whether the wood is being sold primarily as fuel (some wood is sold as fuel but flavoring is a byproduct) or strictly as a wood flavoring.

(Added 2010)

(Amended 1976, 1991, 1998, 2010, ~~and~~ 2016 ~~and~~ 20XX)

...

At the 2022 NEWMA Annual Meeting there were no comments received during open hearings.

MOS-22.4 V Section 2.16. Compressed or Liquefied Gasses in Refillable Cylinders

(This Item was Adopted.)

Source: NIST OWM

Submitter's Purpose and Justification:

Update the Method of Sale Commodities Regulation, Section 2.16. Compressed or Liquefied Gases in Refillable Cylinders to align with new federal requirements, with the exception of the allowable differences for tare weight, which will be addressed pending the outcome of the 2022 NCWM National LPG Survey. In addition, update and clarify terms of unit representations and how to determine volumes of compressed or liquified gases.

The submitter does not believe there will be opposition to this proposal since it is aligning with Federal regulations. The submitter requested that this be a Voting Item in 2022.

NIST OWM Executive Summary for MOS-22.4. – Section 2.16. Compressed or Liquefied Gasses in Refillable Cylinders
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<p>NIST OWM Recommendation: OWM recommends this as a Voting item</p>

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| <ul style="list-style-type: none">• OWM believes the Item as written is ready for Voting. OWM is recommending the “Purpose” statement be updated to read, “Update the Method of Sale of Commodities Regulation, Section 2.16. Compressed or Liquified Gases in Refillable Cylinders to align with new federal requirements, with the exception of the allowable differences for tare weight, which will be addressed pending the outcome of the 2022 NCWM National LPG Survey. In addition, update and clarify terms of unit representations and how to determine volumes of compressed or liquified gases.• The NCWM National Survey on 20 lb LPG Cylinders was completed at the end of April. Reports received from states/counties have been sent to our NIST statistician is analyzing and summarizing the data. A final report is expected to be available by the end of the summer.• DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) is discussing with their Chief Counsel’s office whether they believe DOT’s allowable difference between the stamped tare weight and actual tare will preempt current NIST HB130 Method of Sale requirements. Based on the outcome of DOT decision, NIST OWM is working with NCWM to prepare a petition from NCWM to DOT to have the allowable differences reconsidered based on NCWM National Survey results and current states laws that have been in effect for over 30 years. |
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Item Under Consideration:

2.16. Compressed or Liquefied Gases in Refillable Cylinders.

2.16.1. Application. – This section does not apply to disposable cylinders of compressed or liquefied gases.

2.16.2. Net Contents. – The net contents shall be expressed in terms of **cubic volume or weight. meters or cubic feet, kilograms, or pounds and ounces. For liquefied petroleum gas (LPG),** see Section 2.21. Liquefied Petroleum Gas for permitted **units of measure expressions of for declarations** for net **quantity of** contents ~~for liquefied petroleum gas~~. A standard cubic foot of gas is defined as a cubic foot at a temperature of 21 °C (70 °F) and a pressure of 101.35 kilopascals (14.696 psia), except for liquefied petroleum gas as stated in Section 2.21. Liquefied Petroleum Gas.

2.16.3. Cylinder Labeling. – Whenever cylinders are used for the sale of compressed or liquefied gases by weight, or are filled by weight and converted to volume, the following shall apply:

2.16.3.1. Tare weights.

- (a) **Stamped or Stenciled** – For safety purposes, the tare weight shall be legibly and permanently stamped or stenciled on the cylinder. All tare weight values shall be preceded by the letters “TW” or the words “tare weight.” The tare weight shall include the weight of the cylinder (including paint), valve, and other permanent attachments. The weight of a protective cap shall not be included in tare or gross weights. The 49 CFR 178.35 “General Requirements for Specification Cylinders” requires the maker of cylinders to retain test reports verifying the cylinder tare weight accuracy ~~to a tolerance of 1 %~~.
- (b) **Tare Weight for Purposes of Determining the Net Contents.** – The tare weight used in the determination of the final net contents may be either:
 - (1) the stamped or stenciled tare weight; or
 - (2) the actual tare determined at the time of filling the cylinder. If the actual tare is determined at the time of filling the cylinder, it must be legibly marked on the cylinder. ~~or on a tag attached to the cylinder at the time of filling.~~
- (c) **Allowable Difference.** – If the stamped or stenciled tare is used to determine the net contents of the cylinder, the allowable difference between the actual tare weight and the stamped (or stenciled) tare weight, or the tare weight on a tag attached to the cylinder for a new or used cylinder, shall be **within:**
 - (1) $\frac{1}{2}$ % for tare weights of 9 kg (20 lb) or less; or
 - (2) $\frac{1}{4}$ % for tare weights of more than 9 kg (20 lb).

Note: Failure of a cylinder tare weight to be within the required allowable difference is considered a Method of Sale violation. The cylinder shall be removed from use until the tare weight is corrected.

- (d) **Average requirement.** – When used to determine the net contents of cylinders, the stamped or stenciled tare weights of cylinders at a single place of business found to be in error predominantly in a direction favorable to the seller and near the allowable

difference limit shall be considered to be not in conformance with these requirements.

- (e) **Tare Determination.** – **The stamped or stenciled tare without applying the allowable difference in (c) above shall be used for purposes of verifying the net contents unless the actual tare weight is determined, then the actual tare weight shall be used for purposes of net content verification. The removable protective cap and label are not included in the stamped or stenciled tare but must be included in the total tare determinations.**

2.16.3.2. Water Capacity by Weight. – **The water capacity by weight of the cylinder, used to determine the maximum filling level of a cylinder, must be marked on the cylinder at the time of manufacture. The water capacity shall be abbreviated WC. The water capacity for a cylinder 11.34 kg (25 lb) water capacity or less, shall be allowed an allowable difference of – 1 % and no plus allowance; or for a cylinder exceeding 11.34 kg (25 lb) water capacity, an allowable difference of – 0.5 % and no plus allowance.**
(Added 2022)

2.16.3.23. Acetylene Gas Cylinder Tare Weights. – Acetone in the cylinder shall be included as part of the tare weight.

2.16.3.34. Acetylene Gas Cylinder Volumes. – The volumes of acetylene shall be determined from the product weight using **NIST Standard Reference Database 23 “Reference Fluid Thermodynamic and Transport Properties Database” (REFPROP)** (see **www.nist.gov/srd/refprop**) (Note: **Weights and measures officials should contact the NIST Office of Weights and Measures at (301) 975-4004 or owm@nist.gov for access to the database.**) and **supplemented by additional procedures approved tables such as those published by in NIST Handbook 133** or those developed using 70 °F (21 °C) and 14.7 ft³ (101.35 kPa) per pound at 1 atmosphere as conversion factors.

2.16.3.45. Compressed Gases such as Oxygen, Argon, Nitrogen, Helium, and Hydrogen. – The volumes of compressed gases such as oxygen, argon, nitrogen, helium, or hydrogen shall be determined using NIST Standard Reference Database 23 “Reference Fluid Thermodynamic and Transport Properties Database” (REFPROP) (see **www.nist.gov/srd/refprop**) (Note: **Weights and measures officials should contact the NIST Office of Weights and Measures at (301) 975-4004 or owm@nist.gov for access to the database.**) and supplemented by additional procedures **and tables in NIST Handbook 133.**

(Added) 1981) (Amended 1990 **and 2022**)

NIST OWM Detailed Technical Analysis:

OWM submitted these proposed amendments to avoid conflicts between the tare weight and other labeling requirements for compressed gas cylinders in the Method of Sale of Commodities Regulation and similar Federal regulations published by the U.S. Department of Transportation (DOT). If the conflicting provisions in NIST Handbook 130 are not revised before December 28, 2022, it is likely that conflicting requirements in the Method of Sale of Commodities Regulation will be found by a court of law to be preempted by the DOT regulations. This is due to Congress giving DOT the exclusive authority to regulate in this area of law (e.g., safety and interstate commerce).

OWM recommends this proposal to be a Voting item and that an effective date of these amendments be December 28, 2022, so they are effective on the same date as the new DOT regulations.

This was vetted at the 2021 Fall Regional Associations Meetings. The NCWM National Survey on 20 lb Cylinders of Liquefied Petroleum Gas (Propane) will not have results until early Fall 2022, therefore OWM is recommending the purpose statement be modified to read “Update the Method of Sale of Commodities Regulation, Section 2.16. Compressed or Liquefied Gases in Refillable Cylinders to align with new federal requirements, with the exception of the allowable differences for tare weight, which will be addressed pending the outcome of the 2022 NCWM National LPG Survey. In addition, modifications are being done to update and clarify the terms of unit representations and how to determine volumes of compressed or liquified gases.

NIST has been assisting NCWM by coordinating, collecting, and analyzing data submitted by the states in order to support petitioning DOT in challenging the new allowable differences published by the DOT in a final rule entitled “Hazardous Materials: Miscellaneous Amendments Pertaining to DOT Specification Cylinders”, which has been implemented in **49 CFR § 178.35**. The survey data collection was completed in April 2022. All data has been sent to the NIST Statistical Department for analysis and summarization. A final report is expected to be available by the end of the September 2022.

DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) is discussing with their Chief Counsel’s office whether they believe DOT’s allowable difference between the stamped tare weight and actual tare will preempt current NIST HB130 Method of Sale requirements. Based on the outcome of DOT decision, NIST OWM is working with NCWM to prepare a petition from NCWM to DOT to have the allowable differences reconsidered based on NCWM National Survey results and current states laws that have been in effect for over 30 years.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, Dr. Curran (Florida) questioned why the language referred the user to NIST OWM for the approved tables and was opposed to incorporating them into NIST Handbook 133. Dr. Curran requested having them in the NIST Handbook. Ms. Warfield (NIST OWM) remarked that URL to the Refprop database is already within the current handbooks. Part of the modified language is updating the URL. She also noted that States should contact NIST OWM to obtain access to the database free of charge. Some regulators expressed concern with the Tare Weight tolerances recommended by the DOT and the unavailability of data to support them. The Committee heard comments that substantial increases in those tolerances not only conflict with current ones adopted by the NCWM, but that they also bring uncertainty about the impact they may have in the market for both the industry and consumers, and possible safety issues like appropriate cylinder filling levels. Mr. Sefcik (NIST OWM) remarked that DOT failed to consider existing state tare weight allowances outlined in NIST HB130 which provides economic protections for consumers and businesses by providing a “reasonable tolerance.” Mr. Sefcik also had concern with the economic impact the new DOT regulations may have, because the tolerances were more relaxed and can potentially cause product to be short weight or cause packers to overpack. Overpacking creates a loss to businesses.

Mr. Sefcik provided an updated to the L&R Committee on the NCWM National LPG Survey. He expressed that the data results from this survey will warrant whether DOT should be petitioned to reconsider changes to their requirements. Based upon this information, the Committee kept the existing tare weight allowances as written in the current handbook to remain “as is” until the data is finalized from the survey.

The Committee assigned Voting status to this item at the 2022 NCWM Interim Meeting since no one spoke in complete opposition to the item.

At the 2022 NCWM Annual Meeting, Dr. Curran expressed concerns with Section C. Allowable Differences pertaining to the tag on the cylinder and does not consider the tare violation a method of sale violation. Dr. Curran recommended that before we move toward adopting DOT tolerance, if accurate, we petition DOT to adopt ours. He requested this item be deescalated.

Mr Sefcik addressed Dr Curran that the DOT regulations do not reflect a tag requirement. It was also clear that membership does not support the DOT proposal for tare weight tolerances and NCWM is prepared to submit data to DOT to support the NCWM standard. DOT's Chief Counsel is reviewing whether the allowable difference preempts our standards, they are not convinced that it did. We anticipate a ruling on this within a few weeks, then determine how to proceed.

Mr. Floren remarked that DOT is concerned about safety and wonders why they did not consult DOC. He suggested on the leading sentence for "Stamped or stenciled tare, be revised to state "Tare weight as stamped or stenciled" and remove the allowable difference. He also recommended that the term "water capacity" also include the word "weight" throughout this section.

The Committee modified the following:

- Title to 2.16.3.2. to read "Water Capacity by Weight" and first sentence, "The water capacity **by weight** of the cylinder, used to determine the maximum filling level of a cylinder, must be marked on the cylinder at the time of manufacture.
- Section 2.16.3.1.(c) Allowable difference the words "on a tag attached to the cylinder was stricken.
- Section 2.16.3.2.(e) Tare Determination had the first sentence modified to eliminate the words "without applying the allowance difference in (c) above."
- Accepted the submitters modified purpose statement for the item under consideration.

During the Voting session a motion was made to strike the word "cubic" in the first sentence within Section 2.16.2. Net Contents. The item passed with the amendments.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, Ms. Lisa Warfield (NIST OWM) provided testimony that these proposed amendments are to avoid conflicts between the tare weight and other labeling requirements for compressed gas cylinders in the Method of Sale of Commodities Regulation and similar Federal regulations published by the U.S. Department of Transportation (DOT). If the conflicting provisions in NIST Handbook 130 are not revised before December 28, 2022, it is likely that the conflicting requirements in the Method of Sale of Commodities Regulation will be found by a court to be preempted by the DOT regulations. This is due to Congress giving DOT the exclusive authority to regulate in this area of law (e.g., safety and interstate commerce).

The Committee recommends this as a Voting item with the language as it appears in the agenda, and have an effective date of December 28, 2022

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, Ms. Warfield commented that OWM submitted these items to avoid conflicts between various federal entities and the method of sale section of the handbook. OWM recommended this proposal be a Voting item, and the implementation date be December 2022 to align with the U.S. DOT. Mr. Doug Musick (Kansas) commented that under tare weights, **item section (C)(1) the words “an empty” be added to improve the proposed language**. He also asked if this requirement for marking a cylinder is the responsibility of the inspector or the entity selling the cylinder. Mr. Charlie Stutesman (Kansas) asked for clarification on this item. Ms. Warfield responded that aligning the language in the handbook with U.S. DOT is important, and if U.S. DOT is asked to revise their language related to the sale of LP, it would likely be an arduous and time-consuming process. Mr. Ivan Hankins (Iowa) commented that NIST and U.S. DOT are discussing this issue and would like input from states. Mr. Stutesman further commented that he believes that while the DOT rules are posted for comment, he is unsure how many states have read the proposed regulation and how it affects their specific jurisdictions. He asked the L&R Committee to move cautiously on this item. Ms. Warfield commented that there is additional information in the NIST analysis submitted to NCWM and the regions for each item on the agenda. Based on the time-sensitive nature of this item, the Committee believes the item is ready for Voting status with the proposed change to section C.1.

At the 2022 CWMA Annual Meeting, Ms. Warfield recommended the purpose statement be updated to read, “Update the Method of Sale of Commodities Regulation, Section 2.16. Compressed or Liquefied Gases in Refillable Cylinders to align with new federal requirements except for the allowable differences for tare weight, which will be addressed pending the outcome of the 2022 NCWM National LPG Survey. In addition, update and clarify terms of unit representations and how to determine volumes of compressed or liquefied gases.

Ms. Warfield commented that the NCWM National Survey on 20-lb LPG Cylinders was completed at the end of April 2022. Reports from states/counties have been sent to a NIST statistician, who are analyzing and summarizing the data. A final report is expected to be available by the end of the summer. DOT is in discussion with their Chief Counsel’s office as to whether they believe DOT’s allowable difference between the stamped tare weight and actual tare will preempt current NIST HB130, Method of Sale requirements. Based on the outcome, NCWM is prepared to submit a petition to DOT to have the allowable differences reconsidered based on data from the NCWM National Survey and the current state laws that have been in effect for over 30 years.

The Committee concurred that the purpose statement be updated to read, “Update the Method of Sale of Commodities Regulation, Section 2.16. Compressed or Liquefied Gases in Refillable Cylinders” to align with new federal requirements except for the allowable differences for tare weight, which will be addressed pending the outcome of the 2022 NCWM National Survey. In addition, it will also have modifications to update and clarify terms of unit representations and how to determine volumes of compressed or liquefied gases.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, Mr. Steve Benjamin (North Carolina) provided an informational update of this item. Mr. Don Onwiler (NCWM) solicited survey participation and requested that those interested provide their contact information to NCWM. Mr. Tim Chesser (Arkansas) expressed his disagreement with the statement “Failure of a cylinder tare weight to be within the required allowable difference is considered a Method of Sale violation.” In his opinion this is not a method of sale violation and would not apply in Arkansas. NIST OWM provided written analysis recommending this proposal to

be a Voting item and that an effective date of these amendments be December 28, 2022, so they are effective on the same date as the new DOT regulations.

The Committee believes this item has merit and is fully developed. The Committee recommended this item as a Voting item and take into consideration the effective date as recommended by NIST OWM.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. Sefcik commented that this proposal was submitted to reflect new DOT requirements regarding the allowable difference between the stamped tare on an LPG cylinder and the actual tare. This new requirement takes effect December 28, 2022. This language will ensure that the method of sale in NIST HB130 for compressed or liquified gases in refillable cylinders does not conflict with these new federal requirements. Mr. Jim Willis (New York) asked to clarify how the tare weights would be tested without evacuating the cylinder during the test. Mr. Sefcik commented that to verify the stamped or accuracy statement of a tare weight, it should be done in the lab or at the plant with the assistance of a trained professional, rather than in the field. The Committee recommended the item as a Voting status.

At the NEWMA 2022 Annual Meeting, Mr. Sefcik commented, the purpose statement needs to be revised to accurately reflect the intent of this item. The current purpose statement remains vague and needs additional clarification. Recommended language to update the “Purpose” statement:

Update the Method of Sale Commodities Regulation, Section 2.16. Compressed or Liquefied Gases in Refillable Cylinders. ~~The justification that was submitted with the initial proposal stated, “Add language to update and to align with Department of Transportation (DOT) Final Rule [Federal Register Volume 85, Number 248 (Monday, December 28, 2020)] [Rules and Regulations] (See 2020-26264.pdf (govinfo.gov)) [Pages 85380-85437] regarding new requirements for the sale of LPG cylinders which is enforceable after December 28, 2022.”~~ to align with new federal requirements, with the exception of the allowable differences for tare weight, which will be addressed pending the outcome of the 2022 NCWM National LPG Survey. In addition, update and clarify terms of unit representations and how to determine volumes of compressed or liquified gases.

No additional comments received during the open hearing. The NEWMA L&R Committee recommended this item move forward as a Voting item with the above change to the purpose statement.

MOS-20.5 Section 2.21. Liquefied Petroleum Gas

(This Item was returned to Committee)

Source: Arizona Department of Agriculture, Weights and Measures Services Division

Submitter’s Purpose and Justification:

Provide clarity and consistency regarding the method of sale (MOS) for liquefied petroleum gas (LPG) through a meter that has a maximum rated capacity of 20 gal/min or less.

There appears to be a lack of clarity and consistency regarding the method of sale (MOS) for liquefied petroleum gas (LPG) through a meter that has a maximum rated capacity of 20 gal/min or less. The Uniform Regulation for the Method of Sale of Commodities, Section 2.2. Liquefied Petroleum Gas specifically exempts these meters from the use of automatic temperature compensation but defines a

gallon as 231 in³ at 60 °F [15.6 °C]. With this definition, it can be interpreted that, while automatic temperature compensation is not required, the sale of LPG shall be temperature compensated through manual means (or alternatively sold by weight). Temperature compensation manually requires the use of temperature readings and a chart to manually perform conversions to determine the volume sold.

When discussing potential implementation of these requirements, propane industry officials in Arizona noted that other states do not require sale of LPG through these smaller meters to be temperature compensated or sold by weight and cited numerous problems with manual calibration or changing the MOS to sell by weight. An informal survey of western states appears to support that most do not enforce this requirement to sell LPG through these smaller meters by weight or temperature compensated.

Due to the inconsistency with the method of sale between various states and interpretation of this section, it is being proposed to exempt the sale of LPG through these smaller meters from temperature compensation. The item is proposed developing to allow for discussion and submittal of supporting cost analysis and impact to consumers and businesses that supports a requirement to sell LPG through these small meters as temperature compensated (or by weight).

The submitter noted that the sale of propane that is not temperature compensated can vary in quantities dispensed, which may provide a business or consumer with more or less product than stated.

NIST OWM Executive Summary for MOS-20.5 – Section 2.21. Liquefied Petroleum Gas

NIST OWM Recommendation: OWM recommends this as a Voting Item.

- OWM recognizes that this proposal did not garner enough votes at the 2021 NCWM Annual Meeting and was returned to the Committee.
- OWM recommends that the Committee consider delaying the effective date in Section 2.21.2.(b).

Item Under Consideration:

2.21. Liquefied Petroleum Gas.

2.21.1. Method of Sale. – All liquefied petroleum gas, including, but not limited to propane, butane, and mixtures thereof, shall be kept, offered, exposed for sale, or sold by the following methods of sale:

- (a) Weight:** by the kilogram or pound; or by,
- (b) Gaseous Volume:** by the metered cubic meter of vapor (defined as 1 m³ at 15 °C); or metered cubic foot of vapor (defined as 1 ft³ at 60 °F) ^[See Section 2.21. Note]; or by,
- (c) Liquid Volume:** by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in³ at 60 °F). ~~All metered sales by the or gallon, except those using meters with a maximum rated capacity of (20 gal)/min or less, shall be accomplished by use of a meter and device that automatically compensates for temperature.~~

2.21.2. Metered Sales by Liquid Volume. – All metered sales by liquid volume shall be accomplished using metering systems as follows:

- (a) Sales using metering systems with a maximum rated capacity greater than 20 gal/min shall be accomplished using a metering system that automatically compensates for the effects of temperature.**
- (b) Sales using metering systems with a maximum rated capacity equal to or less than 20 gal/min that were placed into service after January 1, 2026 shall be accomplished by use of a metering system that automatically compensates for the effects of temperature.**
- (c) Effective January 1, 2030, all metered sales (through all capacities of metering devices, regardless of installation and service date) shall be accomplished by use of a metering system that automatically compensates for temperature.**

Section 2.21. NOTE: Sources: ~~American National Standards Institute, Inc., ANSI B109.1 (20082000), "American National Standard For Diaphragm-Type Gas Displacement Meters (14.16 Cubic Meters fUnder 500 Cubic Feet} Per Hour Capacity and Under),"~~ and NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices."
(Added 1986) (Amended 20XX)

NIST OWM Detailed Technical Analysis:

The requirement for selling LPG based on a 60 °F gallon is already stated in this regulation and applies to all sales. The current language in the regulation is vaguely written and has resulting in conflicting interpretations. Some officials read the requirement that automatic temperature compensation be provided on metering systems delivering more than 20 gal/ min as also exempting sales of LPG in other applications from being sold and delivered using automatic temperature compensation.

OWM recognizes that this proposal did not garner enough votes at the 2021 NCWM Annual Meeting and was returned to the Committee. OWM believes this proposal is fully developed and consideration should be given to delaying the effective date.

Summary of Discussions and Actions:

At the 2020 NCWM Interim Meeting, Mr. Tim Chesser (Arkansas) felt that the current proposal conflicts with language in NIST Handbook 44. Mrs. Tina Butcher (NIST OWM) responded the current language in Handbook 44 does not conflict with the language in this item, referencing language from NIST Handbook 44 stating "If a device is equipped with an automatic temperature compensator." This suggests that language in NIST Handbook 44 does not require modification to accommodate devices with automatic temperature compensation capabilities. Mr. Constantine Cotsoradis (Flint Hill Resources) questioned if this proposal would have any benefit for consumers. Representing the submitter, Mr. Vince Wolpert (Arizona) stated that temperature in the state ranges from 32 °F to 100 °F and volume delivered for LP sales varies accordingly. As a result of the lack of consistency with volume delivered the state receives a lot of complaints concerning LP sales. Several regulators commented that the most equitable way to address the issue is to require automatic temperature compensation for all sales. The original submitter received feedback from the fall regions and modified the language (dated January 24, 2020). The submitter, Ms. Wilson recommended this modified language be vetted through the regional meetings and industry for consideration. Currently, the Committee concurs with the recommendation and moved this item forward as the Item Under Consideration as Informational.

On the 2020 NCWM Interim Agenda the item under consideration appeared as:

2.21. Liquefied Petroleum Gas. – All liquefied petroleum gas, including, but not limited to propane, butane, and mixtures thereof, shall be kept, offered, exposed for sale, or sold by the pound, metered cubic foot [^{NOTE 7, page 132}] of vapor (defined as 1 ft³ at 60 °F [15.6 °C]), or the gallon (defined as 231 in³ at 60 °F [15.6 °C]). All metered sales by the gallon, except those using meters with a maximum rated capacity of 20 gal/min or less, shall be accomplished by use of a meter and device that automatically compensates for temperature. **Metered sales using a meter with a maximum rated capacity of 20 gal/min or less is exempt from temperature compensation requirements.**

(Added 1986 **Amended 20XX**)

At the 2021 NCWM Interim Meeting, the language within NCWM Publication 15 appeared as:

2.21. Liquefied Petroleum Gas. – All liquefied petroleum gas, including, but not limited to propane, butane, and mixtures thereof, shall be kept, offered, exposed for sale, or sold by the pound, metered cubic foot [^{NOTE 7, page 132}] of vapor (defined as 1 ft³ at 60 °F [15.6 °C]), or the gallon (defined as 231 in³ at 60 °F [15.6 °C]). ~~All metered sales by the gallon, except those using meters with a maximum rated capacity of 20 gal/min or less, shall be accomplished by use of a meter and device that automatically compensates for temperature.~~

- (a) **All metered sales by the gallon using a meter with a maximum rated capacity greater than 20 gal/min, shall be accomplished using a meter and device that automatically compensates for temperature.**
- (b) **For equipment placed in service on or after January 1, 2023, all metered sales using a meter with a maximum rated capacity of 20 gal/min or less shall be accomplished by use of a meter and device that automatically compensates for temperature.**
- (c) **Effective January 1, 2030, all metered sales shall be accomplished by use of a meter and device that automatically compensates for temperature.**

(Added 1986 **Amended 20XX**)

Mr. Chesser commented his concern with conflicts between the method of sale and NIST Handbook 44 requirements. Mrs. Butcher addressed questions that were stated within the reporting for this item. Mrs. Butcher also provided an in-depth background and discussion on this item. It was noted that NIST OWM submitted modified language that was posted under the NCWM L&R supporting documents.

Some of the bullet points that were in the NIST analysis of this item were:

- The existing language references a value of “15.6 °C” for temperature determinations in metric units, according to the current industry practice for sales of petroleum products, the reference temperature for sales in metric are based on 15 °C rather than the exact conversion from 60 °F (which is 15.6 °C). Thus, the temperature reference in metric should be 15 °C.
- The current method of sale for LPG requires sales based on a specified reference temperature because of the significant effects of temperature on the volume of LPG. This helps ensure equity for buyer and seller; facilitate value comparisons among competing applications; and deter those who would take advantage of the effects of temperature on volume from using these effects to their advantage during sales under given temperature conditions.
- There is some concern that including effective dates as shown in the Item Under Consideration does have the effect of rescinding the original requirement for certain categories of sales. Additionally, specifying such dates may possibly lead to future extensions of these date or

permanent exceptions. However, if this proposal will allow the community to progress toward more uniform implementation of temperature compensation in the commercial measurement of LPG, this approach may prove to be a valuable tool for accomplishing this goal and improve understanding and consistent application of the requirements, and we believe the submitter is to be commended for striving to achieve this clarity and uniformity in application.

- The second clause of the current Item Under Consideration addresses equipment put into service as of January 1, 2023. The generic reference to “equipment placed into service” implies that only newly installed equipment with flow rates of 20 gpm or less needs to include automatic temperature compensation capabilities. This could be misconstrued as negating the first clause in the proposal. We believe the intent of the submitter was to simply expand the requirement for “automatic” temperature compensation capability for metering systems above 20 gpm to include those systems below this flow rate point. Thus, a recommended alternative is included in the suggested changes.

Formatting Changes:

- By formatting the language into sub-sections, it makes the method of sale requirement easier to follow and apply and facilitates consideration of the Item Under Consideration.
- For the 2022 edition of NIST HB130, NIST OWM will be reformatting the references to “Notes” and their associated page numbers and replacing these with notes formatted as “Section ##. Note.”

Mr. Scott Simmons (Colorado) led a discussion regarding some of the issues that his state has faced regarding LPG sales. Mr. Simmons and many other regulators expressed support for this Item. It was expressed that many were unaware of the NIST modified proposal. NCWM L&R Chair McGuire encouraged membership to review the NIST proposal. During the Committee work session both the original and NIST proposals were discussed. A Committee member expressed concern that industry may be unaware of this agenda item. Several Committee members commented that they would reach out to their industry contacts to alert them. The Committee heard many comments that they supported the NIST proposal. The Committee was appreciative that NIST had reformatted the structure to make the language easier to read and recommended this move forward as a Voting item.

At the 2021 NCWM Annual Meeting, Mr. Swiecicki (NPGA) expressed concern with the language for temperature compensation and how the mechanical devices have a lag in correcting the temperature. Mr. Swiecicki did request that the date in Section 2.21.2.(b) be moved to 2025, or at least another year added. Mr. Schnepf (California) remarked that in Section 2.21.2.(a) the language should read “equal to or greater than” to align with NIST HB44 language. Mr. Allen (Arizona) was supportive of the changes from Mr. Schnepf. Mr. Willis (New York) rose to oppose this item and believes this item is detrimental to the propane industry. Mr. Willis remarked that they are done by weight and the temperature compensation is an issue with the smaller tanks. Mr. Ramsburg (Maryland) asked the committee to withdraw the item.

Based on testimony during open hearings and reviewing the documents from the regional meetings, the Committee changed the effective date in Section 2.21.2.(b) from January 1, 2023, until January 1, 2024. In Sections 2.21.2. (a), (b) and (c) replaced the words “meter and device” with “metering system.” The Committee concurred with Mr. Schnepf’s recommendation to modify the language in Section 2.21.2.(a) to replace the words “greater than or equal to” with “equal to or greater than”. This item did appear as a Voting Item at the 2021 NCWM Annual Meeting but did not garner enough votes, it was therefore returned to the Committee.

At the 2022 NCWM Interim Meeting, there were several regulators that spoke in favor of moving the item forward as voting. NGA also supported this change with a modify effective date. A regulator opposed the item stating that the small variance in gross and net quantities makes it unnecessary. This was challenged by another regulator who stated that the variances due to temperature variations in his state made it necessary. Another regulator suggested requiring an interlock mechanism.

The Committee assigned Voting status for this item at the 2022 Interim Meeting and extended the effective dates to address concerns expressed during the open hearings.

At the 2022 NCWM Annual Meeting, Mr. Floren (Los Angeles County, California) commented that Section 2.21.1.(c) should read “Liquid Volume.” This item was returned to the Committee due to a split vote. This is the second time this item has been presented for a vote before membership and returned to the Committee. Membership is split between whether there is a need for a temperature compensator on meters of 20 gallons or less. The Committee believes this item is fully developed and no addition work is needed.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, Mr. Bruce Swiecicki (NPGA) provided testimony that highlighted concerns from the background information in the agenda. He commented that with meters dispensing at less than 20 gallons per minute, automatic temperature compensation would have a minimal effect on small deliveries. Mr. Swiecicki also commented on the financial burden that would be placed on industry to convert to automatic temperature compensation. Mr. Matt Douglas (CDFA-DMS) provided testimony that they support the item and there is redundant language that requires editing.

The Committee recommended this as a Voting item with the following editorial changes and a change in effective date from January 1, 2024, to January 1, 2025:

2.21. Liquefied Petroleum Gas.

2.21.1. Method of Sale. – All liquefied petroleum gas, including, but not limited to propane, butane, and mixtures thereof, shall be kept, offered, exposed for sale, or sold by in accordance with the following methods of sale and conditions. If kept, offered, exposed for sale, or sold by:

(a) Weight: by the kilogram or pound; ~~or by,~~

(b) Gaseous Volume: by the metered cubic meter of vapor (defined as 1 m³ at 15 °C); or metered cubic foot of vapor (defined as 1 ft³ at 60 °F) [See Section 2.21. Note]; ~~or by,~~

(c) Liquid: by the liter (defined as 1 liter at 15 °C) or the gallon (defined as 231 in³ at 60 °F). All metered sales by the or gallon, except those using meters with a maximum rated capacity of (20 gal)/min or less, shall be accomplished by use of a meter and device that automatically compensates for temperature.

2.21.2. Metered Sales by Liquid Volume. – All metered sales by liquid volume shall be accomplished using metering systems as follows:

- (a) Sales using metering systems with a maximum rated capacity equal to or greater than 20 gal/min shall be accomplished by the use of a metering system that automatically compensates for temperature.**
- (b) Sales using metering systems with a maximum rated capacity less than 20 gal/min that were placed into service after January 1, 2025 shall be accomplished by use of a metering system that automatically compensates for the effects of temperature.**
- (c) Effective January 1, 2030, all metered sales (through all capacities of metering devices, regardless of installation and service date) shall be accomplished by use of a metering system that automatically compensates for temperature.**

Section 2.21. NOTE: Sources: ~~American National Standards Institute, Inc., ANSI B109.1 (20082000), "American National Standard For Diaphragm-Type Gas Displacement Meters (14.16 Cubic Meters Under 500 Cubic Feet Per Hour Capacity and Under),"~~ and NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices."

(Added 1986, **Amended 20XX**)

WWMA L&R Committee believes this item is fully developed, the Committee has the following concerns:

- The potential lack of effectiveness of automatic temperature compensation on short deliveries.
- The financial burden on device operators that would be affected by the proposed changes.
- Would like to hear reasons for lack of supporting votes

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, Mr. Ivan Hankins (Iowa) commented that the WWMA and SWMA are recommending this item to be a Voting item which allows for temperature compensation on 20 or less gpm meters. Mr. Charlie Stutesman (Kansas) commented that he believes the 2025 date is a more appropriate date for new meters rather than 2024, and all other devices be switched by 2030. He further commented that he supports getting compensators on the meters, particularly at retail sites where staff may not be properly trained on how to figure the compensated volume. The Committee believes that if this item is passed in 2022, the proposed 2024 date is a sufficient time to implement changes for new meters. The Committee believes this item is fully vetted and ready for Voting status.

At the 2022 CWMA Annual Meeting, Ms. Lisa Warfield (NIST OWM) commented that a typical packaging change is adopted with a three-year lead time from the date of adoption. The Committee believes this item is fully developed and should remain as a Voting status item and recommended the three-year implementation suggestion.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, NIST OWM provided a written analysis that this proposal is fully developed, and consideration should be given to delaying the effective date until January 1, 2025. Mr. Tim Chesser (Arkansas) spoke in support of this item if the language is amended to an effective date of January 1, 2025. The Committee believes this is fully developed and recommended this as a Voting item with an effective date of January 1, 2025.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. Jim Willis (New York) commented that he spoke to the submitter regarding the equivalency comparison to the gallon. Mr. Willis does not support this change. Mr. McGuire commented that those opposed to the item should indicate alternative options to verify volume. Mr. McGuire believes the item is ready for Voting status and believes that all metered sales by liquid volume should be sold by temperature compensation. Mr. Bruce Sweicicki (NPG) agreed that this item is unnecessary and the meters being used to determine volume are mechanical in nature and not precise enough for grill containers. Mrs. Tina Butcher (NIST OWM) commented the method of sale statement does not exclude automatic temperature compensation and it is simply in the second or alternative method of sale that appears after the original method of sale statement. L&R Chair Sakin commented that this item should have explicit clarity to avoid unintended consequences for small cylinders under 20 pounds. The Committee concurs that this be recommended as a Developing Item.

At the NEWMA 2022 Annual Meeting, Mr. Willis stated that New York has continued to voice their opposition due to it being too burdensome for regulators and industry NEWMA recommends this item move forward as a Voting item.

MOS-22.5 V Section 2.31.2.1. Labeling of Grade Required. And 2.31.2.2. EPA Requirements Also Apply.

(This Item was Adopted.)

Source: National Biodiesel Board (NBB)

Submitter's Purpose and Justification:

To correct Part B. Uniform Regulation for the Method of Sale of Commodities and keep consistent with federal and industry requirements. The Committee assigned Voting status for this item at the 2022 Interim meeting. Sulfur regulations have changed so that ONLY ultra-low sulfur fuels (maximum 15 ppm sulfur) are allowed for sale at retail dispensers. S500 biodiesel is no longer allowed to be sold at retail. Likewise, biodiesel blends must meet the ASTM D7467 Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20). The limits and allowances in ASTM D7467 Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20) do not include Grades 1-D, 2-D, or 4-D. The reference to **40 CFR 80.570** was only applicable for retail diesel fuels from 6/1/2006 until 11/30/2010.

The submitter requested that this be a Voting item in 2022.

NIST OWM Executive Summary for MOS-22.5 – Section 2.31.2.1. Labeling of Grade Required. And 2.31.2.2. EPA Labeling Requirements Also Apply.
<p>NIST OWM Recommendation: OWM believes that this has been fully developed through FALS and recommends this as a Voting item. All four Fall Regional Associations agreed this should be a Voting item.</p> <ul style="list-style-type: none"> The Item under Consideration has incorrect formatting applied to it. The following words should appear in bold and underscore format in Section 2.31.2.1. “<u>Biodiesel and biodiesel blends shall be identified in accordance with EPA and FTC requirements.</u>”

NIST OWM Executive Summary for MOS-22.5 – Section 2.31.2.1. Labeling of Grade Required. And 2.31.2.2. EPA Labeling Requirements Also Apply.

- At the 2022 CWMA Annual Meeting, Mr. Corr proposed modifications based off information from 15 CFR § 306.0 Definitions and § 306.5 Automotive Fuel Rating. It was unclear if his modifications were considered more than editorial (see Appendix C.)

Item Under Consideration:

~~2.31.2.1. Labeling of Grade Required. – Biodiesel shall be identified by the grades S15 or S500. Biodiesel blends shall be identified by the grades No. 1-D, No. 2-D, or No. 4-D. Biodiesel and biodiesel blends shall be identified in accordance with both EPA and FTC requirements. (Amended 2022)~~

~~2.31.2.2. EPA Labeling Requirements Also Apply. – Retailers and wholesale purchaser-consumers of biodiesel blends shall comply with EPA pump labeling requirements for sulfur under 40 CFR 80.570.~~

NIST OWM Detailed Technical Analysis:

OWM suggests that when regulations are under revision that consideration be given to making them useable and easier for regulated businesses to comply and for inspectors to understand and enforce. The purpose statement for this proposal is to provide for a method of sale to ensure consistency with Federal and industry requirements. However, there are no industry standards included within the proposed language. For regulations to provide due process they must be written so they provide adequate notice to regulated businesses as to what they are required to do, to comply with the law. Finding specific requirements in the Code of Federal Regulations (CFR) is much easier if the citations are provided in a format as OWM proposes below for Item Block B4: MOS-22.1. “Section 2.20.2. Documentation for Dispenser Labeling Purposes. and 2.20.3. EPA Labeling Requirements.”

For example, OWM searched the CFR and found:

- The Federal Trade Commission regulations in Title 16 CFR “Commercial Practices” Part 306 – “Automotive Fuel Rating, Certification and Posting” and there are specific labeling requirements for Biodiesel found in Appendix A. “Summary of Labeling Requirements for Biodiesel Fuels.”
- The Environmental Protection Agency regulations in Title 40 CFR “Protection of the Environment” Part 1090 “Regulation of Fuels, Fuel Additives, and Regulated Blendstocks” Subpart P – “Retailer and Wholesale Purchaser-Consumer Provisions” in §1090.1515 “Diesel Sulfur Labeling Provisions”

OWM recommends that the Committee make it easier for regulated businesses to search the CFR in order to find the requirements and facilitate voluntary compliance. OWM recommends the proposal include the citations for the regulations for EPA and FTC product identity (and any specific industry standards as well if that is the submitter’s intent). OWM recommends with these changes that the Committee make this a Voting item.

For the convenience of the Committee, the URL for the Code of Federal Regulations (CFR) is: <https://www.ecfr.gov/>.

In the 2022 NCWM Publication 16, the Item Under Consideration has incorrect formatting applied. The following words should appear in Section 2.31.2.1. of the Item under Consideration shall appear in bold and underscore format “**Biodiesel and biodiesel blends shall be identified in accordance with EPA and FTC requirements.**”

At the 2022 CWMA Annual Meeting, Mr. Corr proposed modifications based upon information in **15 CFR § 306.0 Definitions and § 306.5 Automotive Fuel Rating**. The CWMA was not clear whether these modifications were editorial or technical in nature. The CWMA had included his modifications as a supporting document (see Appendix C of this report). OWM believes his modifications have merit and recommend that the L&R Committee, FALS, and membership review them.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, FALS Chair Striejewske stated that this should be a Voting item and it was developed from a review of regulations. The Committee recommended this as a Voting status.

At the 2022 NCWM Annual Meeting, Mr. Corr remarked that there are other areas within the handbook that require attention and he will be submitting a new proposal that is related to this subject matter (see Appendix C of this report). FALS Chair Striejewske concurs with Mr. Corr’s assessment, and but was firm this item should remain Voting. NIST OWM remarked that the change as it appears in the agenda was not properly formatted, and the EPA and FTC requirements should appear in a bold and underscore format to reflect new language. The Committee made a formatting change by bolding and underlining “Biodiesel and biodiesel blends shall be identified in accordance with both EPA and FTC requirements.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, Mr. Russ Lewis (Marathon, representing API) stated he supported this proposal. The Committee recommended this as a Voting item. The Committee also recommended that the FALS Subcommittee look at the OWM analysis supporting documentation for possible formatting of the citation to the Code of Federal Regulations throughout NIST Handbook 130.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, Mr. Randy Jennings (representing the National Biodiesel Board) explained that the information currently in the handbook is not accurate and is outdated. He further commented that there are no requirements for labeling diesel in NIST Handbook 130, and more work needs to be done when referencing federal regulations in the handbook. Mr. Doug Musick (Kansas) supports removing the irrelevant information. He has concerns that if there are specific EPA and FTC requirements, the relevant references should be included in the handbook. Mr. Charlie Stutesman (Kansas) commented that he supports the initial action of striking the inaccurate information, but he would also like to see citation references to EPA and/or FTC. He believes grade information should appear in the Fuels and Automotive Lubricants Regulation rather than the Method of Sale. Ms. Moore (Growth Energy) commented that she is unsure if Section 3.1 applies to all fuels, and then subsequent sections are specified by fuel type, and sought clarification. Mr. Chuck Corr (Iowa Renewable Fuels Association) commented that this item as well as items appearing in the Method of Sale section need further work. Based on comments during open hearings the Committee believes this item is fully developed and ready for Voting status.

At the 2022 CWMA Annual Meeting, Mr. Corr submitted amended language for consideration. Ms. Warfield asked if these changes were truly editorial in nature. Information submitted by Mr. Corr is found within Appendix C of this report. The Committee supports this item as it appeared on the agenda and acknowledges Mr. Corr's presentation on amended changes. There were concerns as to whether or not the new language presented was proposed amended language is included as a supporting document to this report.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, Mr. Prentiss Searles (API) spoke in support of this item. NIST OWM provided a written analysis that recommended this as a Voting item and the NCWM L&R should consider including specific EPA and FTC product identity citations (and any other specific industry standards). The Committee believes this item has merit and is fully developed. The Committee recommended this item as a Voting item.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. Chuck Corr (Iowa Renewable Fuels Association) believes this item needs additional development and provided comments:

1. The requirements in questions seem applicable to all diesel fuels.
2. The current wording in section 2.31.2.2. EPA Labeling Requirements Also apply, begins with the phrase "Retailers and wholesale purchaser-consumers ...". The proposal correctly states that all retail diesel has the same sulfur limit.
 - (a) There are some wholesale purchaser-consumer applications that could have higher sulfur limits for these fuels. I believe there is an EPA required sulfur labeling statement for these applications.
3. If this section is only applicable to retail fuels that requirement should be clearly stated. Now is the time to incorporate language for renewable diesel content in the fuels.
4. Question- there is a subsection deleted in the proposal. Is the remaining subsection automatically renumbered or should there be a statement to indicate that remaining subsections would be renumbered? I think the latter would be more transparent.

Mr. Randy Jennings (retired Tennessee) commented that the submitter, Mr. Fenwick submitted this to update this provision of NIST Handbook 130 which includes obsolete language related to sulfur labeling. Mr. Jennings commented that diesel fuel regulations does not include grade labeling, so why should other fuels be required to do the same? Chair Sakin asked if this was an item meant to harmonize NIST HB 130 with federal language. The Committee concurs and recommended Voting status.

At the NEWMA 2022 Annual Meeting, there were no comments received during the open hearing.

NET – Handbook 133: Checking the Net Content of Packaged Goods

NET-20.2 W Section 4.5. Polyethylene Sheeting, Bags and Liners.

(This Item was Withdrawn.)

Source: New York State Weights and Measures

Submitter’s Purpose and Justification:

Remove antiquated terminology used for test equipment to test the thickness of polyethylene sheeting, bags, and liners.

Item Under Consideration:

4.5. Polyethylene Sheeting, Bags, and Liners

Most polyethylene products are sold by length, width, thickness, area, and net weight. Accordingly, this procedure includes steps to test for each of these measurements.

(Amended 2017)

4.5.1. Test Equipment

- A scale that meets the requirements in Section 2.2. “Measurement Standards and Test Equipment.”
- Steel tapes and rulers. Determine measurements of length to the nearest division of the appropriate tape or ruler.
- Metric units:

For labeled dimensions 400 mm or less, linear measure: 300 mm in length, 1 mm divisions; or a 1 m ruler with 0.1 mm divisions, overall length tolerance of 0.4 mm.

For labeled dimensions greater than 400 mm, 30 m tape with 1 mm divisions.

- U.S. customary units:

For labeled dimensions 25 in or less, use a 36 in ruler with $\frac{1}{64}$ in or $\frac{1}{100}$ in divisions and an overall length tolerance of $\frac{1}{64}$ in.

For dimensions greater than 25 in, use a 100 ft tape with $\frac{1}{16}$ in divisions and an overall length tolerance of 0.1 in.

- Deadweight dial micrometer (or equal) equipped with a flat anvil, 6.35 mm or ($\frac{1}{4}$ in) diameter or larger, and ~~a 4.75 mm ($\frac{3}{16}$ in) diameter~~ flat ~~surface on the head of the spindle head with a diameter between 3.20 mm ($\frac{1}{8}$ in) and 12.70 mm ($\frac{1}{2}$ in).~~

Note: Electronic or other instruments that provide equivalent accuracy are also permitted.

- **The mass of the probe head (total of anvil, weight 102 g or [3.6 oz], spindle, etc.) must total 113.4 g (4 oz). The pressure exerted by the instrument should not exceed 70 kPa (10 psi).**
- The anvil and spindle head surfaces should be ground and lapped, parallel to within 0.002 mm (0.0001 in), and should move on an axis perpendicular to their surfaces.
- The dial spindle should be vertical, and the dial should be at least 50.8 mm (2 in) in diameter.
- The dial indicator should be continuously graduated to read directly to 0.002 mm (0.0001 in) and should be capable of making more than one revolution. It must be equipped with a separate indicator to indicate the number of complete revolutions. The dial indicator mechanism should be fully jeweled.
- The frame should be of sufficient rigidity that a load of 1.36 kg (3 lb) applied to the dial housing, exclusive of the weight or spindle presser foot, will not cause a change in indication on the dial of more than 0.02 mm (0.001 in).
- The indicator reading must be repeatable to 0.001 2 mm (0.000 05 in) at zero.
- The micrometer should be operated in an atmosphere free from drafts and fluctuating temperature and should be stabilized at ambient room temperature before use.

Note: Other instruments are commercially available that utilize different methods of measuring thickness. Instruments of this nature are acceptable provided they meet or exceed the precision requirements noted within the latest version of ASTM D6988 “Guide for Determination of Thickness of Plastic Film Test Specimens” and the requirements of the applicable material or product specification or applicable test standards.

- Gage blocks covering the range of thicknesses to be tested should be used to check the accuracy of the micrometer
- None

NIST OWM Detailed Technical Analysis:

OWM continues to support the development of this proposal. OWM had recommended that the submitter also contact Ms. Alyson Flick (ASTM Staff Manager aflick@astm.org (610) 832-9710) for ASTM Technical Committee D20.19 “Film, Sheeting, and Molded Products.” The D20.19 Technical Committee is responsible for standard guide ASTM D6988 “Standard Guide for Determination of Thickness of Plastic Film Test Specimens.” ASTM standards and its technical committees are from industry will provide the needed clarification or guidance on how the test method was intended to be used.

Summary of Discussions and Actions:

This item has been assigned to the submitter for further development. For more information or to provide comment, please contact:

Mr. Mike Sikula
New York Department of Agriculture and Markets
(518) 457-3452, mike.sikula@agriculture.ny.gov

This will update the test equipment to allow for the use of other type of instruments to perform the test procedure. In addition, it aligns the test equipment within the latest version of ASTM D6988 “Guide for Determination of Thickness of Plastic Film Test Specimens”

At the 2021 NCWM Interim Meeting, Mr. Kurt Floren (Los Angeles County, California) had concern with the spindle head having a diameter of 3.20 mm and 12.70 mm, due to the type of product being tested as this may create inconsistencies within the thickness. Mr. Floren would like to see data that justified this range. In addition, there are many other instruments that are available in the marketplace to do testing. Mr. Floren had concerns with this item proceeding as currently written. What is the current industry practice with this type of procedure? The Committee would like the submitter to review the recommendations that came out of the fall regional meetings. The submitter should also address any procedural differences between the current procedure and use of an electronic instrument. The Committee recommended this item as a Developing item. Mr. Kevin Schnepf (California) noted that ASTM D6988 has a maximum pressure of 70 kPa (10 psi) for thinner films and for thicker films, a pressure range between 160 and 185 kPa (23 and 27 psi). Mr. Floren also expressed concerns with the variability in plastics and the striations occur in plastics. The Committees did not have any supporting data or repeatability test and asked that the developer review all the comments within this item by Fall Regional Association Meetings.

At the 2021 NCWM Annual Meeting, Mr. Willis provided an update that they are planning to do testing to provide data as requested by the Committee and regional associations. Mr. Schnepf further support the development of language and request that it be harmonized with ASTM D6988 for the thicker densities. The Committee continues to encourage the submitter with developing this item by the 2022 NCWM Interim Meeting.

At the 2022 NCWM Interim Meeting, Mr. Willis understood the concerns expressed about issues with the proposal, but he does not have time to further develop to address the issues. In addition, regulators had concern with the lack of data that was submitted. The Committee assigned Withdrawn status based upon the submitters wishes of Mr. Willis. The Committee did encourage Mr. Willis to submit a proposal when he was able to get it fully developed.

Regional Association Reporting:**Western Weights and Measures Association**

At the 2021 WWMA Annual Meeting, Mr. Kurt Floren, (Los Angeles County, California) continued to have concerns about this item. Proposing to change specifications for the micrometer used to test, anvil shape and size, spindle size, and the properties of the material being tested. Data has not been supplied to support the requested changes. Mr. Floren has recommended keeping this in Developmental status pending supplemental data from submitter. Mr. Floren specified that if data was not provided by the submitter, the Item should be withdrawn. Mr. Kevin Schnepf (California) continued to have concerns about different pressure variables and consistency with ASTM D6988.

The Committee recommended that this item be withdrawn as the supporting documentation was not proved. The WWMA L&R Committee recommended that supporting data that addresses concerns regarding repeatability in tests and variability in tested polyethylene materials be submitted before the 2022 NCWM Interim. In addition, they would like to see data regarding the use of different spindle sizes being proposed and how the varying sizes of spindles affect the reading of the polyethylene thickness with comparative tests on the same sheet of polyethylene and repeatability of these tests.

Central Weights and Measures Association

At the 2021 CWMA Annual Meeting, Ms. Warfield further commented that the developer requested any comments or recommendations be provided by the Fall Regional Meetings. CWMA believes this item should remain a Developing item until additional data is collected by the NCWM 2021 Interim Meeting.

At the 2021 CWMA Interim Meeting, no comments were heard. The submitter of this item provided additional supporting data. Based on the submission of some data, but the need for more, the Committee believes this item should remain on the agenda as a Developing item.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, no comments were heard during open hearings. NIST OWM provided a written analysis that stated their continued support of the development of this proposal. OWM recommended that the submitter also contact ASTM to provide clarification and/or guidance on how the test method was intended to be used. The SWMA L&R Committee did receive supporting data from the submitter. The Committee recommended the item remain as a Developing item.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. Willis commented he submitted data from a field test and encourages everyone to review it. The current procedure has testing equipment which used in the testing methodology is antiquated and not available to most inspectors. Mr. Jim Cassidy (Massachusetts) suggested training on polyethylene testing for the 2022 NEWMA Annual Meeting. Chair Sakin commented that the 2021 WWMA L&R Annual Report suggested the item be withdrawn. Mr. Willis commented that WWMA didn't have the field test results and believes that is why WWMA recommended a Withdrawn status. Chair Sakin asked if more testing could be completed, and more data collected. Mr. Cassidy recommended the item remain as a Developing item for additional data to be collected. Mr. McGuire concurs as does the Committee which recommended continuing Developing status.

At the 2022 NEWMA Annual Meeting, no comments were heard during open hearings.

NET-22.1 A HB133, Section 1.2.6. Deviations Caused by Moisture Loss or Gain and Section 2.3.8. Table 2-3 Moisture Allowances.

(Note: At the 2022 NCWM Annual Meeting, the Committee removed this item from Block 3 (Cannabis). All background information pertaining to this Item appears below)

Source: NCWM Cannabis Task Group

Submitter's Purpose and Justification:

Establish an acceptable Net Weight allowance for Cannabis, which is related to the MOS Form 15 related to water activity and the Packaging and Labeling Form 15 Sections 2 and 10.

Since *Cannabis* and *Cannabis*-containing products were first legalized by various states, the industry has undergone an unprecedented expansion. Even though these products haven't received Federal approval at this time, more and more states have supported *Cannabis* and *Cannabis*-containing products for medicinal or adult use under their own laws. This has resulted in boutique markets developing across the country with restrictive state boundaries for lack of clarity and uniformity in commercialization of these products.

Cannabis and *Cannabis*-containing products are unique in many aspects; they have a niche as medicine, have resulted in the development of adult use markets, and have an incredible array of different manufacturing and industrial applications. Some of these products contain controlled substances which presents a special concern for the safety and welfare of consumers if misused or mishandled. Further, they are subject to strict regulations by multiple government agencies. *Cannabis* and *Cannabis*-containing products and applications range from non-food to food products for human and animal consumption through inhalation, ingestion, and/or topical or dermal application. They can be used as ingredients in other commodities, changing in most cases the product identity to *Cannabis* products. Some *Cannabis* is very susceptible to environmental conditions easily losing or gaining moisture with consequences impacting net quantity, degradation of active cannabinoids, and/or microbial proliferation depending on the situation. These are just some of the reasons there are many concerns and uncertainty surrounding the moisture allowance of *Cannabis*.

In the retail *Cannabis* trade, insufficient attention and guidance is given to moisture migration in or out of some *Cannabis* packaging and as a result, the contents of some *Cannabis* flower packaging have been found to be underweight, resulting in the patient/consumer paying for weight that they are not receiving. For instance, underweight complaints are the #1 consumer complaint in Oregon. See attached table for data from multiple stores of four brands and the incidence of underweight contents. **Preview:** If you were shopping any one of 3 stores of a popular brand, you'd have a 71 % chance of buying a supposedly 1.75 g package that is 21.6% underweight, meaning you have a 71 % chance of being ripped off by \$5 (assuming a \$10/g price). The lowest incidence of underweight? 54 %. The lowest percent underweight? 2.75 %.

For the fairness and safety of *Cannabis* consumers, a 3 % \pm weight variance based on enforcement of acceptable moisture range needs to be established. A 3 % allowance aligns with other known commodities and with California regulations that outline \pm 3 %.

Why 3 %? Consistent with other items in NIST handbook, aligns with California. If the boundaries are too wide, it exposes the program to diversion.

Is underweight really an issue? I filed Public Records requests with every state that allows *Cannabis* flower commerce. Each of them told me they keep no official records on underweight complaints. However, Oregon went on record telling me underweight is one of their largest complaints (attached). As for one other state, see attached data from Colorado that recorded 69 separate container purchases from 18 separate stores within four brands.

The submitter asked that this be a Voting item in 2022.

NIST OWM Executive Summary for HB133, Section 1.2.6. Deviations Caused by Moisture Loss or Gain and Section 2.3.8. Table 2-3 Moisture Allowances.

NIST OWM Recommendation: OWM recognizes the importance of this work and the progress the TG has made thus far. However, there are some significant issues that need to be addressed before this block of items is ready for adoption.

OWM recommends this block be designated “Assigned” to the Cannabis TG in order for them to obtain additional information and further develop. OWM has outlined a number of areas requiring additional work in the OWM Executive Summary and OWM Detailed Technical Analysis (below) and states may have additional areas that need to be addressed.

“Cannabis” Statement:

In contrast to hemp, marijuana remains a Schedule I substance under the Controlled Substances Act. NIST does not have a policy role related to the production, sale, distribution, or use of cannabis (including hemp and marijuana). NIST participates in the National Conference of Weights and Measures (NCWM) as part of NIST’s statutory mission to promote uniformity in state laws, regulations, and testing procedures.

- OWM continues to encourage the Cannabis TG reach out to State Cannabis Commissions, Medicinal Programs, Health Departments, and other State Cannabis Regulatory authorities to work collaboratively to develop language that is acceptable to all stakeholders. There are approximately 22 states that have labeling laws or regulations.
- To inform stakeholders of any developments by the TG, OWM recommends the TG provide a summary to appear in the NCWM Publications. It should be clarified if this TG reports to the NCWM L&R Committee or NCWM Board of Directors.
- “W&M does not regulate quality. To the extent establishing an acceptable water activity range is monitoring quality, this is a positive by-product of monitoring equitable transactions, promoting health and safety and preventing diversion.”

OWM Comment: Weights and measures strives for equity in the marketplaces but has not been involved with the health and safety side of commodities.

- OWM does not concur with adding a 3 % weight variance.
- The 3 % was assigned by the Cannabis TG; the TG based this value on other known commodities stated within NIST HB 133 Table 2-3 Moisture Allowance and to align with California regulations. The Moisture Loss WG has not shared any moisture allowance data with the Cannabis TG or L&R Committee.
- OWM recognizes that there was only one member of the Cannabis TG Moisture Loss WG. We encourage those other members to join this group, submit data, and reach consensus on bringing language forward to the L&R Committee. In 1988, NCWM Task Force developed the Guidelines for NCWM Resolution of Requests for the Recognition of Moisture Loss in Other Packaged Foods in NIST Handbook 130 NCWM Policy, Interpretations and Guidelines Section 2.5.6. we encourage the Cannabis Moisture Allowance WG to follow this guidance.

NIST OWM Executive Summary for HB133, Section 1.2.6. Deviations Caused by Moisture Loss or Gain and Section 2.3.8. Table 2-3 Moisture Allowances.

- The form 15 submitted by the Cannabis TG states “For the fairness and safety of Cannabis consumers, a 3 % ± weight variance based on enforcement of acceptable moisture range needs to be established. A 3 % allowance aligns with other known commodities and with California regulations that outline ± 3 %. There has been no data reviewed from the California regulations to ensure the accuracy of this number. It is believed the 3 % was a number that California is using only to initiate inspections and obtain data before finalizing their number.
- Section 2.XX.X. Water Activity speaks about “unprocessed” Cannabis but does not define what this means and there is no reference within ASTM D8197. With the Water Activity incorporated within the Method of Sale the sentence should have the terms “kept, offered, or exposed, sold, bartered, or exchanged, or ownership transfers” stricken from the proposal.
- Water Activity is not related to Moisture Allowance. Water Activity should not be placed into the Moisture Allowance Table 2-3 within NIST HB 133. Doing so will only cause confusion.
- Water Activity is used to measure the growth of microbes using ASTM D8196-20, Standard Practice for Determination of Water activity (a_w) in Cannabis, helping to ensure its safety. It is also used to identify the potency (THC level). In many states water activity testing would be conducted by an agency, other than weights and measures. Outside of fuel quality most weights and measures programs do not inspect and enforce quality and safety of most consumer commodities.
- The Committee should consider the development of a NIST HB133 – Chapter 5 Test Procedure for Determining Moisture Allowance if the MOS is adopted with criteria for Water Activity.

Item under Consideration**1.2.6. Deviations Caused by Moisture Loss or Gain**

Deviations from the net quantity of contents caused by the loss or gain of moisture from the package are permitted when they are caused by ordinary and customary exposure to conditions that normally occur in good distribution practice and that unavoidably result in change of weight or measure. According to regulations adopted by the U.S. Environmental Protection Agency, no moisture loss is recognized on pesticides. (see Code of Federal Regulations **40 CFR 156.10.**)

1.2.6.1. Applying a Moisture Allowance

Some packaged products may lose or gain moisture and, therefore, lose or gain weight or volume after packaging. The amount of moisture loss depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. Moisture loss may occur even when manufacturers follow good distribution practices. Loss of weight “due to exposure” may include solvent evaporation, not just loss of water. For loss or gain of moisture, the moisture allowances may be applied before or after the package errors are determined.

To apply an allowance before determining package errors, adjust the Nominal Gross Weight (see Section 2.3.6. “Determine Nominal Gross Weight and Package Errors”), so the package errors are

increased by an amount equal to the moisture allowance. This approach is used to account for moisture loss in both the average and individual package errors.

It is also permissible to apply the moisture allowances after individual package errors and average errors are determined.

Example:

A sample of a product that could be subject to moisture loss might fail because the average error is minus or the error in several of the sample packages are found to be unreasonable errors (i.e., the package error is greater than the Maximum Allowable Variation (MAV) permitted for the package's labeled quantity).

You may apply a moisture allowance after determining the package errors by adding the allowance to the Sample Error Limit (SEL) and then, comparing the average error to the SEL to determine compliance. The moisture allowance must be added to the MAV before evaluating sample errors to identify unreasonable minus errors.

(Amended 2010)

This handbook provides “moisture allowances” for some meat and poultry products, flour, pasta, **Cannabis (this only includes plant material but does not include products containing Cannabis)** and dry pet food. (See Chapter 2, Table 2-3. “Moisture Allowances”) These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or more information must be collected before deciding lot compliance or noncompliance.

Test procedures for flour, some meat, and poultry are based on the concept of a “moisture allowance” also known as a “gray area” or “no decision” area (see Section 2.3.8. “Moisture Allowances”). When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the “gray area,” the lot is said to be in the “gray” or “no decision” area. The gray area is not a tolerance. More information must be collected before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the “moisture allowance” or “gray area.”

(Amended 2002)

Table 2-3. Moisture Allowances

Verifying the labeled net weight of packages of:	Moisture Allowance is:	Notes
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Pasta products	3 %	Pasta products means all macaroni, noodle, and like products packaged in kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.
Borax	see Section 2.4. Borax	
Cannabis	3 %	<i>Cannabis</i> means plant material only, and not products containing <i>Cannabis</i> , whether containing more than 0.3 % Total Delta-9 THC (also known as cannabis, Marijuana or Marihuana) or containing 0.3 % or less Total Delta-9 THC (also known as Hemp).
Wet Tare Only ¹		
Fresh poultry	3 %	Fresh poultry is defined as poultry above a temperature of – 3 °C (26 °F) that yields or gives when pushed with the thumb.
Franks or hot dogs	2.5 %	
Bacon, fresh sausage, and luncheon meats	0 %	For packages of bacon, fresh sausage, and luncheon meats, there is no moisture allowance if there is no free-flowing liquid or absorbent material in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Used Dried Tare are equivalent.
¹ Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4 th edition of NIST Handbook 133 by reference in 2008 but not the “Wet Tare” method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).		

NIST OWM Detailed Technical Analysis:

When the current moisture allowances for many other under consideration by the NCWM there was no discussion or intent to establish water activity limits or specific moisture content limits for flour (typically 12 to 14 percent), pasta (31 to 32 percent during its plastic state when under production) or even meat and poultry products which may contain between 60 to 73 percent water. In part this is because weights and

measures laws do not typically grant the director the authority to establish the moisture content limits for foods, drugs, or cosmetics. OWM recommends that Committee clearly state that weights and measures inspections to be conducted under this proposed regulation will be limited to only cannabis and that there is no intent to expand it to foods. This statement of intent early in the consideration process may be helpful to future readers of the historical record.

For the reasons provided OWM does support the development of this proposal. As an interim measure the Committee can provide the values as guidance for state inspectors to use in their net quantity of contents inspections. OWM has provided similar guidance in the past for other products based on information from FDA.

- Since the 1980's, OWM has worked with NCWM on moisture loss studies beginning with the creation of the NCWM Task Force on Commodity Requirements. The NCWM Task Force developed the Guidelines for NCWM Resolution of Requests for the Recognition of Moisture Loss in Other Packaged Foods (see NIST Handbook, NCWM Policy, Interpretations and Guidelines Section 2.5.6. in VI at **00-20-h130-vi-final-4.pdf**) which the NCWM adopted in 1988. Since its adoption, industry who contacts OWM for advice on how moisture allowance is developed is advised to follow the NCWM guidance. The rice industry and bar soap manufacturers approached OWM for information and were provided this advice. The pet food industry and pasta industries have both followed the NCWM guidance for moisture loss recognition and have been successful with proposal for moisture allowances being adopted by NCWM. In the interest of due process, interest of its own guidelines, and the precedents it has followed for more than 33 years, OWM recommends the Committee advise the cannabis industry to apply the same NCWM guidance. They would need to conduct a nationwide scientifically valid study that reflects regional environment and seasonal changes in humidity. Any studies should also consider the different types of packaging into consideration.
- It does not appear that any supporting data based on any nationwide scientifically valid moisture loss and moisture gain studies on packaged cannabis was submitted with this proposal. Test procedures or limits on moisture loss or gain which are not based on scientifically established data, that occur during current good distribution practices, must be avoided as they likely violated due process (among other cases see especially *Cook Family Foods, Ltd. v. Voss*, 781 F. Supp. 1458 [C.D. Cal. 1991]). OWM is concerned that adding the proposed moisture allowances to NIST Handbook 133 without valid studies will make it difficult for the states to reduce or remove them in the future, if data from field testing or later research, indicates that they were either too large or too small.
- This proposal involves limits on moisture loss and moisture gain, and it is likely that two studies will be required. In the past, NCWM focused on moisture loss but with this is an area where limits on moisture gain will be established therefore different test conditions will need to be considered and test protocols developed. Typically, desiccating products regain moisture at a slower rate than they lose moisture, but that rate depends on several variables. A moisture gain study may take longer and be carried out in controlled environmental conditions. Regardless both studies must encompass the typical shelf life of the packaged product. If the studies are not done in a way that is scientifically valid, which represents real world conditions, and reflects the typical packaging and shelf-life of products, they will NOT protect consumers or packers. They will also not ensure inventory or taxes are accurately maintained. In fact, if the proposed limits are too small or too large, they could impose unjustifiably higher costs on packers and those costs will be passed onto consumers.

- A modification to NIST Handbook 133 procedures will need to be submitted for consideration. Current procedures are written to guide inspectors only on applying a moisture allowance when a sample has a negative average error.
- Enforcement of net weight regulations where a moisture allowance is in question, requires the inspector to obtain additional information on the sample and may involve seizing samples for testing and contacting the packer to obtain production records for review. This is in part as to why they are sometimes treated as tolerances which can facilitate fraudulent packaging practices. If an unscrupulous packer underfills packages 1 % when there is an overly generous 3 % moisture allowance that results in the packer's filling practice not being verified. Typically, officials will invest the time and effort into moisture loss (and here gain) investigations when they receive consumer or competitor complaints. Even more frequently when a reseller believes that a supplier has repeatedly shipped them underweight packages. Complaints from business owners will also arise when a particular shipment of expensive products and the complainant suspects, unreasonably underweight packages. Inspectors also pursue these types of investigations if they suspect, based on past testing, that a packer has repeatedly delivered underweight packages that fall within a specified moisture allowance.
- As noted above, it is important to stress that plus and minus values for moisture allowance are not tolerance limits. Under this moisture allowance approach inspectors will not be able to take enforcement actions as they currently do when using NIST Handbook 133.
- Since the 1970s, weights and measures has treated overweight and overfilled packages as being acceptable because overpacking is limited by the packer for economic reasons. Inspectors do not take action on samples when the average error is positive (or when a minus error falls with the Sample Error Limit). Under this proposal inspectors will not be permitted to approve lots with positive average errors that fall within the 3 percent limit (for a 2 g package this 3 percent value = + 60 mg). Inspectors will not remove products from sale for being underweight within the 3 percent limit (– 60 mg) (unless the value is treated as a tolerance), until they take additional steps to find out more about the moisture content of the cannabis by consulting the packer to obtain production records, date of pack and inspection. They will also determine if the packer is following current good manufacturing and distribution practices and makes a determination that the overfilling or underfilling was reasonable or not. During this stage of the process the packaged goods are placed under a stop-sale-hold order and cannot be removed from the point of inspection until released.
- OWM recommends that the state directors be surveyed (see OWM general comments on Block 3) to determine if they intend to have their inspectors take enforcement action on overweight packages of cannabis. If they do not implement this type of enforcement action for the reason, they doubt that the public or courts would find those cases justify prosecution, then the approach should probably not be added to NIST Handbook 133 and remain as guidance.
- The importance of limiting moisture gain could be well documented and presented as meriting enforcement action but any arguments would need to be persuasive. Taking enforcement action does occur when overpacking is used as an unfair trade practice (states have taken action against an ice packer who put 10 lb of ice in a bag and then labeled it 8 lb, and then advertises that the 8 lb bag lasts as long as a competitor 10 lb bag).
- This proposal raises another question for the Committee is when there are no Maximum Allowable Variations (MAV) for plus package errors. OWM recommends that the Committee

study the idea of changing this approach and have the MAV values apply to both positive and negative package errors when packaged cannabis is being tested.

- OWM encourages the Committee to consider conducting a broad long-term study in cooperation with the cannabis industry to determine if the 10 percent MAV packages under 36 g is an appropriate for application to cannabis packages.
- Cannabis is packaged on modern high precision weighing instruments and variations in packaging fill that occur in current good manufacturing practice are likely to be much less than they were when the 10 percent MAV's for packages under 36 g was established in the early 1970s and at that time the data used was collected at both the point of pack and retail stores and included data for both small packages of foods and other consumer products. (Note: for a 2 g package of cannabis the MAV is 200 mg)
- A reference to an acceptable moisture test procedure must be developed included in this proposal. The moisture loss approach in NIST Handbook 133 anticipates that samples may need to be taken and tested if there is a significant enforcement action contemplated. If an inspector repeatedly finds minus package errors within the 3 percent limits (for a 2 g package of cannabis this is ± 60 mg) the inspector will collect a sample and compare the moisture content as found along with the moisture content at time of pack information provided by the packer. If there is a dispute the inspector can share a sample with the packer for testing and the two values can be intercompared to ensure the labs are in agreement. This may occur in a situation where the product is consistently found to be underweight, between 1 to 3 percent, on lots that were just delivered from the packer or where the inspector suspects someone is packing shortweight and claiming it is moisture loss. Procedures need to be known in advance, so the state metrology laboratory has the necessary test equipment and trained personnel available to perform the test promptly.
- In addition, adding a recognized moisture test procedure a detailed set of instructions for selecting and handling the moisture samples will need to be provided. If an inspector seizes samples for testing, they will need to follow good sampling procedures and handling practices to ensure the samples are protected and stored properly prior to and after testing. If there are legal or other restrictions that apply to the seizure, handling, storage, or transportation of cannabis samples then these can be included in the instructions to assist the inspector.
- Water activity is not unique to Cannabis. Many (e.g., food) products have water activity that is needed to ensure quality and maximize shelf life. Water activity helps minimize texture changes, chemical reactions, and microbial spoilage. Throughout the history of state weights and measures, it has not been under the authority of weights and measures to ensure compliance of commodities to ensure quality (texture changes, chemical reactions, and microbial spoilage). When a Cannabis product spoils, is the intent to call weights and measures in to investigate?
- The role, authority, and ability to carry out compliance by state weights and measures needs to be considered before adoption. Will proactive compliance testing be done, audit testing or will this be done on complaint only basis? It is clear to W&M as to the purpose. Consideration also needs to be given to how sampling will occur, how the lot is determined and whether a sample or the entire lot will fail. What are weights and measures protecting consumers and businesses from?

Summary of Discussions and Actions:

Dr. Lippa (NIST OWM) responded to general comments and answered questions that were posed to OWM was too what OWM can do with language within the NIST Handbooks. Dr. Lippa stated that OWM is in discussion with NIST Office of Chief Counsel regarding the cannabis agenda items at NCWM.

There are a few things for NIST related work: development to standards materials, high and low THC, and standards. There needs to be a distinction of the THC level that is regulated by the Farm Bill and the Controlled Substance Act (CSA).

According to the CSA, high THC marijuana is an illegal drug and NIST cannot support guidance, training, and standards Recognizing this issue, NIST will be able to publish NIST Handbook 130 with this item, but they will have to provide a disclaimer citing the CSA. OWM is in communication with NIST legal counsel on this matter and will continue to work and advice with NIST legal.

At the 2022 NCWM Interim Meeting, request was made to the Cannabis TG for information and data supporting their proposed moisture loss allowance, but it was not received. The Committee did not believe this item was ready for a Voting status and removed it from Block 3 and created a standalone item. This is assigned back to the NCWM Cannabis TG for additional development and to conduct a study relative to moisture loss allowance for Cannabis. They should establish data supporting the moisture loss allowance that the TG recommended. The Committee heard concerns that should the current moisture loss allowance be accepted without a study, the NCWM would be setting a precedence for future moisture loss allowance requests. The Committee considered comments urging the Committee to move forward with the ± 3 % moisture loss allowance but believes it would be imprudent to accept a moisture loss allowance without supporting data. The Committee request that the NCWM Cannabis TG follow NIST Handbook 130, NCWM, Interpretations and Guidelines Section 2.5.6. "Guidelines for NCWM Resolution of Requests for Recognition of Moisture Loss in Other Packaged Products" to establish the moisture allowances (loss and gain). In addition, a.

At the NCWM 2022 Annual Meeting, the Committee heard from the Cannabis TG Co-chair Rutherford that work on studying moisture loss had begun with the State of Michigan, a packaging company, and a Cannabis provider to study moisture loss.

The Committee considered the written NIST, OWM Analysis published on the NCWM website prior to the NCWM 2022 Annual Meeting.

Regional Association Reporting:**Western Weights and Measures Association**

At the 2021 WWMA Annual Meeting, Ms. Hahn expressed concern with percentages of THC were of a more qualitative nature and not necessarily within the purview of weights and measures. Mr. Kurt Floren (Los Angeles County, California) addressed the comments and concerns on quality issues as a general matter is not our purview in weights and measures. He mentioned how quality issues are a purview of weights and measures in matters of fuel with octane levels and viscosity of oils that must meet standards. He mentioned that this would be similar in Cannabis, in that THC levels are a part of the identity of the product, and that it is an important component in determining the value and allowing for value comparison. Mr. Floren stated that States are in different stages of regulation, and there is going to be a need for uniform standards. Mr. Joe Moreo (Trinity County, California) provided testimony that different species including Cannabis indica and Cannabis ruderalis should also be provided in the definition. Ms.

Lisa Warfield (NIST OWM) provided testimony that was based on the OWM Analysis that was submitted as the supporting documentation.

NET 22.1- The agenda item title should be corrected to read: B3: NET-22.1. HB133, Section 1.2.6. Deviations Caused by Moisture Loss or Gain and Section 2.3.8. Table 2-3 Moisture Allowances.

The WWMA Committee recommended that this item be further developed. The Committee recommended reviewing the OWM analysis supporting documentation and addressing the concerns with testing procedure, testing equipment, and the need for technical studies regarding moisture loss and gain.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, there was no discussion related to this item. Mr. Ivan Hankins (Iowa) supports the item moving forward with Voting status and suggests the development of a handbook for states who regulate cannabis. Based on comments during open hearings, supporting documents and discussions, the Committee believes this item is fully developed and ready for Voting status.

At the 2022 CWMA Annual Meeting, Ms. Warfield recommended this as a Developing item or Assigned to the Cannabis Task Group to obtain additional information that OWM has recommended in their analysis.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting the Committee believes this Item is fully developed and recommended it to go to the NCWM L&R Committee with a Voting status. The Committee recommended the Cannabis TG take into consideration recommendations from the OWM analysis, i.e., the survey to State Directors, this could help identify the need for development of items in other sections of the Handbooks, i.e., Powers and Duties of the Director.

Northeastern Weights and Measures Association

Mr. Sefcik commented that this item seeks to set a moisture allowance (loss or gain) and to his knowledge no work has been done or data provided to determine support the proposed plus or minus allowance. It appears to be arbitrary. Mr. Sikula concurs with Mr. Sefcik and questioned if water activity and moisture content are the same thing? Dr. Curran commented that water activity is free water available in the product. Moisture content measures the content of water in the product. Ms. Ayer asked if it is necessary for the lower-case cannabis to be used in parenthesis. Dr. Curran suggested it was a way to clarify terms. Mr. Rutherford commented that the TG believes the item is developed “enough” to be granted Voting status to have something in place to combat consumer fraud. Ms. Warfield recommended removal of the allowance in Table 2.3 and that it be placed in its own table and who would be responsible for training. The Committee recommended that NET 22.1 only be given Assigned. The Committee recommended that the TG review the OWM analysis for this item and address the need for technical studies (data) for moisture loss and gain.

At the 2022 NEWMA Annual Meeting, Mr. McGuire noted that the NCWM Cannabis TG, NCWM L&R Committee, and the NEWMA L&R Committee recommended removing this block and making them individual items to ensure each item is fully considered.

Mr. Cassidy noted the TG continues to work on dealing with moisture content and moisture in the case of cannabis is the opposite of what weight and measures is familiar with (moisture loss vs. moisture content). He related an analogy as to how a humididor operates to protect cigars, so cannabis needs to have

a certain moisture content to be a viable product and needs to be tested that way. Mr. Cassidy questioned NIST's role in publishing these items. Mrs. Butcher responded, "once the NCWM votes and passes specific language, it is NIST's intent to publish the content, subject to legal review, reflecting that NIST does not have a policy role as to marijuana's status as a Schedule 1 controlled substance." NEWMA L&R Committee recommended this item continues to be an Assigned item.

NET-22.2 Section 3.1.1. Test Methods and 3.X. Gravimetric Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter.

(Item was returned to Committee)

Source: Mr. Ronald Hayes (retired)

Submitter's Purpose and Justification:

Allow the use of digital density meters for package checking testing of viscous and non-viscous liquids.

The submitter requested that this be a Voting item in 2022.

NIST OWM Executive Summary for NET-22.2 – Section 3.1.1. Test Methods and 3.X. Gravimetric Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter.

NIST OWM Recommendation: With the OWM recommended revision to the language, OWM recommends this as a Developing or Assigned to a Task Group.

- OWM has provided a revised copy of the Item Under Consideration with NIST comments and proposed changes in its detailed analysis. OWM has engaged its Lab Metrology program to provide input and feedback in determining and assessing any technical gaps. A copy is also available on the NCWM website under supporting documents.
- The use of this equipment has great potential to facilitate package testing for many viscous and non-viscous liquids, as well as other weights and measures inspection areas. OWM will continue to assist the L&R Committee and the weights and measures community as it works to support the use of this equipment in official inspections.
- Like any standards or test equipment such as test weights, volumetric standards, temperature sensing devices that will be used in regulatory action, it is essential for a weights and measures jurisdiction to validate the traceability of measurements made using the equipment. Results must be "beyond a reasonable doubt." It is OWM's opinion this has not been met. Very limited testing has been conducted by the submitter.
- Significant changes have been made to the current item under consideration but only made available to membership one day prior to the start of the 2022 NCWM Interim. Although significant improvements have been made to the test procedure, OWM believes that moving the item forward as a Voting Item was premature. NIST OWM recommends that more time be provided for OWM and membership to properly review and vet the item.
- One of the greatest concerns is the limited testing analysis provided by the submitter comparing the digital density meter to the current NIST Handbook 133 volumetric test procedure. Data on only five products were submitted which is insufficient to statistically

NIST OWM Executive Summary for NET-22.2 – Section 3.1.1. Test Methods and 3.X. Gravimetric Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter.

validate results to ensure the test procedure will be defensible for use in official inspections. The NIST OWM Detailed Technical Analysis provides for an in-depth analysis.

- The title to this section is incorrect, it should read 3.X. **Gravimetric Volumetric** Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter.
- The Committee removed the Table X.1. Density Coefficient Factor (Alpha) due to the factors not being validated. The Alpha correction must now be calculated manually using the formula provided in the test procedure. OWM believes adding this table back into the test procedure, with validated correction factors would benefit officials by eliminating manual calculations and simplifying the test procedure.
- The term “viscous” needs to be clearly defined by a numerical value. Adding a step for using a Viscometer to determine the viscosity in before determining the density should be considered. The number of products listed are somewhat exhaustive. OWM recommends that a select few items be targeted that are most likely to be tested by this method. Testing data must be sufficient for each commodity listed.
- Many questions need to still be answered such as the level of accuracy required based on study, calibration methods including certified reference materials, limitations of the devices use, the number and type of samples that should be tested in order to validate results as compared to current NIST HB 133 procedures, proper procedures for validating a device. and whether adding a step for using a Viscometer to determine viscosity before determining the density is needed.
- OWM recommends that this test procedure be changed from an enforcement test to an audit test procedure. Consideration should be given making this an audit procedure, but additional data and analysis must be done. Before this is determined for use as an enforcement procedure clearer guidance needs to be provided regarding the limitations of these devices as stated in the body of our NIST OWM Detailed Technical Analysis.

Item Under Consideration:

Amend Handbook 133, Checking the Net Contents of Packaged Goods, as follows:

3.1.1. Test Methods

...

Notes:

(2) When checking liquid products using a volumetric or gravimetric procedure, the temperature of the samples must be maintained at the reference temperature ± 2 °C (± 5 °F), **except when 3.X. Gravimetric Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter is used.**

3.X. Gravimetric Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter

This test procedure can be used to determine the net contents of most package goods labeled in fluid volume. Manufacturer’s instructions must be reviewed prior to use, to determine if the meter is suitable for testing the intended product.

This procedure is also useful for ensuring product quality for commodities (e.g., DEF, antifreeze) that have a density requirement in their respective specifications.

This test procedure is suitable for measuring the density of homogenous liquids including dairy products such as milk and half & half; petroleum products such as fuel, motor oil, transmission fluid, paint thinner, brake fluid, diesel exhaust fluid, automotive coolant; pulp-free juices, wine, distilled spirits, water, mouth wash, alcohol, syrups, cooking oils, solvents, cleaning supplies, chemicals, as well as other viscous and non-viscous liquids. All products tested shall be free of suspended gas, air, sediment, suspended matter.

This test procedure may be used as a substitute for testing non-viscous liquids gravimetrically using a flask (refer to 3.2. Gravimetric Test Procedure for Non-Viscous Liquids), the volumetric flask test procedure (refer to 3.3. Volumetric Test Procedure for Non-Viscous Liquids) or testing viscous fluids by the volumetric headspace procedure (refer to 3.4. Volumetric Test Procedures for Viscous Fluids – Headspace).

Note: This shall not be used for liquids with suspended solids such as orange juice with pulp, buttermilk, liquids requiring “shake before use”, paint, or carbonated products (soda, beer, etc.) or substances not approved by the digital density meter manufacturer.

Prior to using for compliance testing, the official’s metrological laboratory should perform a comparison between the densities obtained between Sections 3.2. Gravimetric Test Procedure for Non-Viscous Liquids or 3.3. Volumetric Test Procedure for Non-Viscous Liquids, and the digital density meter.

This test procedure can also be a time saver for screening products for proper fill and for quality control purposes.

3.X.1. Test Equipment

- **A scale that meets the requirements in Chapter 2, Section 2.2. “Measurement Standards and Test Equipment.”**

Note: To verify that the scale has adequate resolution for use, it is first necessary to determine the density of the liquid. Using the density, convert the labeled volume to weight. Based on the labeled volume, determine the MAV using Table 2-6 “Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume” found in Appendix A. Using the density, convert the MAV from volume to weight. Next verify that the scale division is no larger than MAV/6 for the package size under test. The smallest graduation on the scale must not exceed the weight value for MAV/6.

Example:

Assume the inspector is using a scale with 1 g (0.002 lb) increments to test packages labeled 1 L (33.8 Fl oz) that have an MAV of 29 mL (1 Fl oz). Also, assume the inspector finds that the weight of 1 L of the liquid is 943 g (2.078 lb).

Density: 1 L = 943 g (2.078 lb)

MAV: 29 mL (1 Fl oz)

➤ **Convert Density into mL and Fl oz:**

$$943 \text{ g} \div 1000 \text{ mL} = 0.943 \text{ g/mL} \quad (2.078 \text{ lb} \div 33.8 \text{ Fl oz} = 0.0614 \text{ lb/Fl oz})$$

➤ **Convert MAV from Volume (mL/Fl oz) to Weight:**

$$29 \text{ mL} \times 0.943 \text{ g/mL} = 27.347 \text{ g} \quad (1 \text{ Fl oz} \times 0.0614 \text{ lb/Fl oz} = 0.064 \text{ lb})$$

MAV in Weight/6

$$27.347 \text{ g} \div 6 = 4.557 \text{ g} \quad 0.064 \text{ lb} \div 6 = 0.010 \text{ lb}$$

In this example, the 1 g (0.002 lb) scale division is smaller than the MAV/6 value of 4.557 g (0.010 lb) so the scale is suitable for making a density determination.

- **Low pressure air pump– (e.g., an aquarium air pump)**
- **Syringe (glass or plastic with Luer fitting 5 mL or larger)**
- **Note: Plastic syringe should be free of any lubricating substances**
- **Distilled or deionized water**
- **Cleaning agents (See Table 3.X4. Cleaning Agents)**
- **Waste container**
- **Barometer for obtaining the prevailing barometric pressure, with an accuracy of ± 3.0 mmHg**
- **Thermometer for measuring air temperature with a tolerance of $\pm 1^\circ\text{C}$ (2°F)**
- **Portable digital density meter meeting a minimum requirement of:**

<u>Measuring Range</u>	
<u>Density</u>	<u>0 – 3 g/cm³</u>
<u>Temperature</u>	<u>0 – 40 °C (32 – 104 °F)^a</u>
<u>Viscosity</u>	<u>0 – 1000 mPa·s</u>
<u>Accuracy^b</u>	

<u>Density</u>	<u>0.001 g/cm³</u>
<u>Temperature</u>	<u>0.2 °C (0.4 °F)</u>
<u>Repeatability s.d.</u>	
<u>Density</u>	<u>0.0005 g/cm³</u>
<u>Temperature</u>	<u>0.1 °C (0.1 °F)</u>
<u>Resolution</u>	
<u>Density</u>	<u>0.0001 g/cm³</u>
<u>Temperature</u>	<u>0.1 °C (0.1 °F)</u>
<u>Sample Volume</u>	<u>2 mL</u>
<u>Sample Temperature</u>	<u>max. 100 °C (212 °F)</u>
<u>Footnotes</u>	
<u>a Filling at higher temperatures possible.</u>	
<u>b Viscosity < 100 mPa·s, density < g/cm³</u>	

3.X.2. Test Procedure

1. Follow Section 2.3.1. “Define the Inspection Lot.” Use a “Category A” sampling plan in the inspection. Select a random sample.
2. Bring the sample packages and their contents to a temperature between the reference temperature and ambient temperature.
3. Packages may be gently rolled to mix contents. Avoid shaking liquids. Shaking some products such as flavored milk will entrap air that will affect density measurements.
4. The digital density meter must at ambient temperature. Avoid causing condensation within the unit. Condensation could cause instrument malfunction and harm.
5. Using distilled or deionized water, validate the digital density meter per the manufacturer’s calibration instructions. The digital density meter shall calibrate within allowable density range ($\pm 0.0005\text{g/cm}^3$). The digital density meter shall be validated once each day prior to usage.
6. Ensure the digital density meter is clean prior to testing. Any residual liquid should be drained, and the unit should be flushed with a small amount of the sample to be tested. Flush and discard the sample two times before taking a measurement.
7. Follow the manufacturer’s instructions to select the correct method, when using a meter with built in correction factors, and measure the density of the sample using the built-in pump or syringe. Fill the sample slowly and gently. If gas or air bubbles are present drain sample and refill.

Note: Use of a syringe may be desirable to allow sample specimen to achieve ambient temperature prior to introduction of specimen into testing cell and for viscous specimens.

- 8. Once the digital density meter has stabilized (maintained reading ± 0.2 °C (± 0.5 °F) for 10 seconds) record density and temperature as indicated on instrument.**
- 9. Apply density coefficient of expansion (Alpha) also known as the density correction factor (DCF), to correct to the reference temperature. See Table X.1. Reference Temperatures of Liquids. If the Alpha correction is not known, then factor can be calculated using the below formula.**

Note: Some digital density meters may be programmed to automatically apply this correction.

Calculating the Temperature Coefficient Alpha

$$\text{Temperature coefficient Alpha} = \frac{|\rho_1 - \rho_2|}{|T_1 - T_2|}$$

ρ_1 density at temperature T_1

ρ_2 density at temperature T_2

T_1 temperature at initial measurement

T_2 temperature at second measurement

Note: If the density correction factor is not known but the volume correction factor (VCF) is known, the DCF can be calculated from the VCF using the following formula.

Density Temperature Factor Alpha = Absolute Value of Beta \times Density.

- 10. Apply viscosity correction if viscosity > 85 centipoise at 21 °C (70 °F) by subtracting the value in Table X. Density Measurement to your density measurement. After this correction, this value is the density of the substance in in the vacuum at the prescribed reference temperature.**

Note: Some digital density meters may be pre-programmed to automatically apply. (See Table X. Viscosity Corrections of Common Materials)

- 11. Apply the apparent density correction by applying one of the following steps:**
 - (1) multiplying the density by 0.999; or**
 - (2) multiplying the density by the Apparent Mass Factor from Table X.3.; or**
 - (3) calculate apparent density by using the following.**

Converting True Density into Apparent Density

The apparent density P_{aap} is defined as:

$$P_{aap} = \frac{P_{true, sample} - P_{air}}{1 - \frac{P_{air}}{8.0 \text{ g/cm}^3}}$$

Where:

P_{aap} = apparent density of the sample

$P_{steel} = 8.0 \text{ g/cm}^3$

P_{air} = true density of air

$P_{true, sample}$ = true density of the sample

The apparent density is smaller than the true density and can be calculated from the true density considering the buoyancy of the sample in air and the weight and density of a reference weight in steel.

P_{air} = true density of air as calculated from equation in Table X.0.

After application of this factor or calculation, the new value is density of the substance in air.

- 12. Drain the instrument and repeat Steps 6–10 on a second specimen of the same package for verification of first measurement.**
- 13. Compare the two readings, they must agree within 0.0003 g/cc. Calculate the average density of the two specimens from the sample. If the difference of two readings is greater than 0.0003 g/cc, discard results and repeat testing of sample. Air or undissolved gas will cause erroneous measurement errors. The user of the test procedure shall always visually inspect for undissolved gas in the measurement tube for a valid test.**
- 14. Repeat testing for the second (or subsequent) package(s) of the lot.**
- 15. Calculate the Average Product Density of sample 1 and sample 2. The two results must agree within 0.0005 g/cc. If the difference between the densities of the two packages exceeds 0.0005 g/cc, use the volumetric procedure in Section 3.3. “Volumetric Test Procedure for Non-Viscous Liquids.”**
- 16. Determine the Average Used Dry Tare Weight of the sample according to provisions of Section 2.3.5. “Procedures for Determining Tare.”**
- 17. Calculate the “nominal gross weight” using the following formula:**

Nominal Gross Weight = (Average Product Density [in weight units]) × (Labeled Volume) + (Average Used Dry Tare Weight)
- 18. Weigh the remaining packages in the sample.**

19. Subtract the nominal gross weight from the gross weight of each package to obtain package errors in terms of weight. All sample packages are compared to the nominal gross weight.

20. To convert the average error or package error from weight to volume, use the following formula:

$$\text{Package Error in Volume} = \frac{\text{Package Error in Weight}}{\text{Average Product Density Per Volume Unit of Measure}}$$

21. The digital density meter must be stored clean. After final use of the day or extended period of time, the instrument shall be drained and cleaned following the manufacturer’s recommended cleaning procedures and using two cleaning agents. The first cleaning agent removes sample residue, and the second cleaning agent removes the first cleaning agent. (see Table X.4. Cleaning Agents for examples of cleaning agents recommended by a digital density meter manufacturer.)

Note: If the unit will be immediately used to measure another sample of similar composition, the unit may be drained and flushed with new sample three times before the next analysis.

22. Connect digital density meter to a low-pressure air source, such as an aquarium air pump, to dry the unit’s measurement cell.

3.X.3. Evaluation of Results

Follow the procedures in Chapter 2, Section 2.3.7. “Evaluate for Compliance” to determine lot conformance.

Table X.1. Density Measurement

<u>Calculate the density of air at the temperature of test using the following equation</u>		
$\rho_{\text{air, g/mL}} = 0.001293 \left[\frac{273.15}{T} \right] \left[\frac{P}{760} \right]$		
<u>where:</u>		
<u>T = temperature, K, and</u>		
<u>P = barometric pressure, torr.</u>		
<u>°C</u>	<u>mmHg</u>	<u>d_{air}, g/mL</u>
<u>15.56</u>	<u>760</u>	<u>0.001223314</u>

Table X.2 Viscosity Corrections of Common Materials

<u>Material</u>	<u>Viscosity in Centipoise</u>	<u>Correction g/cc</u>
<u>Water</u>	<u>1 cP</u>	
<u>Milk</u>	<u>3 cP</u>	
<u>SAE 10 Motor Oil</u>	<u>85–140 cP</u>	<u>0.0003</u>

<u>Material</u>	<u>Viscosity in Centipoise</u>	<u>Correction g/cc</u>
<u>SAE 20 Motor Oil</u>	<u>140–420 cP</u>	<u>0.0006</u>
<u>SAE 30 Motor Oil</u>	<u>420–650 cP</u>	<u>0.0007</u>
<u>SAE 40 Motor Oil</u>	<u>650–900 cP</u>	<u>0.0007</u>
<u>Castrol Oil</u>	<u>1,000 cP</u>	<u>0.0008</u>
<u>Karo Syrup</u>	<u>5,000 cP</u>	<u>0.0008</u>
<u>Honey</u>	<u>10,000 cP</u>	<u>0.00085</u>

Table X.3. Apparent Mass Factor

<u>Elevation, ft</u>	<u>sea level</u>	<u>1500</u>	<u>3000</u>	<u>4500</u>	<u>6000</u>
<u>Barometer, mmHg</u>	<u>760</u>	<u>720</u>	<u>680</u>	<u>640</u>	<u>600</u>
<u>density, g/cc</u>	<u>Apparent Mass Factor</u>				
<u>0.500</u>	<u>0.9977</u>	<u>0.9979</u>	<u>0.9980</u>	<u>0.9981</u>	<u>0.9982</u>
<u>0.600</u>	<u>0.9981</u>	<u>0.9982</u>	<u>0.9983</u>	<u>0.9984</u>	<u>0.9985</u>
<u>0.700</u>	<u>0.9984</u>	<u>0.9985</u>	<u>0.9986</u>	<u>0.9987</u>	<u>0.9988</u>
<u>0.800</u>	<u>0.9986</u>	<u>0.9987</u>	<u>0.9988</u>	<u>0.9989</u>	<u>0.9989</u>
<u>0.900</u>	<u>0.9988</u>	<u>0.9989</u>	<u>0.9989</u>	<u>0.9990</u>	<u>0.9991</u>
<u>1.000</u>	<u>0.9989</u>	<u>0.9990</u>	<u>0.9991</u>	<u>0.9991</u>	<u>0.9992</u>
<u>1.100</u>	<u>0.9991</u>	<u>0.9991</u>	<u>0.9992</u>	<u>0.9992</u>	<u>0.9993</u>
<u>1.200</u>	<u>0.9991</u>	<u>0.9992</u>	<u>0.9992</u>	<u>0.9993</u>	<u>0.9993</u>
<u>1.300</u>	<u>0.9992</u>	<u>0.9993</u>	<u>0.9993</u>	<u>0.9993</u>	<u>0.9994</u>
<u>1.400</u>	<u>0.9993</u>	<u>0.9993</u>	<u>0.9994</u>	<u>0.9994</u>	<u>0.9994</u>
<u>1.500</u>	<u>0.9993</u>	<u>0.9994</u>	<u>0.9994</u>	<u>0.9994</u>	<u>0.9995</u>
<u>Elevation or prevailing barometric pressure at the location of measurement.</u>					

Table X.4. Cleaning Agents

<u>Commodity</u>	<u>Cleaning Liquid 1</u>	<u>Cleaning Liquid 2</u>
<u>Petroleum products</u>	<u>Toluene, petroleum naphtha, petroleum ether, n-nonane, cyclohexane</u>	<u>Ethanol</u>
<u>Battery acid</u>	<u>Tap water</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>
<u>Liquid soap and detergent, shampoo</u>	<u>Tap water</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>
<u>Salad dressing, mayonnaise</u>	<u>Petroleum naphtha, dish washing agent in water</u>	<u>Ethanol</u>
<u>Suntan lotion</u>	<u>Tap water</u>	<u>Ethanol</u>

<u>Commodity</u>	<u>Cleaning Liquid 1</u>	<u>Cleaning Liquid 2</u>
<u>Spirits</u>	<u>Tap water</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>
<u>Grape juice, syrup</u>	<u>Warm tap water</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>
<u>Milk*</u>	<u>Tap water, enzymatic lab cleaner</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>

***Note: Do not introduce ethanol or other alcohols into instrument without first flushing all milk products from instruments.**

NIST OWM Detailed Technical Analysis:

Portable Digital Density Meters are in widespread use in the verification of the net quantity of contents by legal metrology programs in other countries to test a wide range of liquids including chemicals and oils. These devices are also widely used in industry laboratories and their performance with many viscous and non-viscous products is proven.

OWM agrees with the submitter that these devices may be used in audit testing and screening of packaged commodities for accurate quantity determinations. Inspectors should use the current procedures in NIST HB 133 for enforcement purposes. This practice should continue until studies provide sufficient evidence that these devices can provide density values equivalent to those measured found using existing test methods.

OWM encourages that inspectors considering the use of these devices in determining product density to follow the guidance provided in Section 3.X. Scope to have these devices compared to current test procedures in a calibration laboratory. If that is not practical, it is important that inspectors using these devices in the field, also determine the product density using NIST HB 133 Chapter 3. “Test Procedures – For Packages Labeled by Volume.” An inspector should perform several comparisons of two density values to ensure they are identical before using any value from a density meter to take enforcement action on packaged goods.

OWM also encourages users to share their test-method comparison data with the Committee and/or Task Group if formed so that it can be collected and analyzed as part of the national process for recognizing these devices for use in a future edition of NIST HB 133.

The use of this equipment has great potential to facilitate testing in package checking as well as other weights and measures inspection areas. OWM looks forward to assisting the L&R Committee and the weights and measures community as it works to support the use of this equipment in official inspections.

As the Committee is aware, the current Item Under Consideration was completed and provided to the Committee by the submitter one day before the Interim started. OWM and others need additional time to adequately consider the most recent version of the proposal and to continue assessing technical gaps previously identified. OWM lab metrology staff is assisting the OWM L&R Advisors with a review of this proposal and OWM will be providing additional technical feedback to assist the Committee in assessing this proposal.

- Like any standards or test equipment such as test weights, volumetric standards, temperature sensing devices that will be used in regulatory action, it is essential for a weights and measures jurisdiction to validate the traceability of measurements made using the equipment. Results must be “beyond a reasonable doubt.” It is OWM’s opinion this has not been met. Limited testing has been conducted by the submitter.

- The data provided thus far looks promising but is insufficient to ensure it will be defensible for use in official inspections. Data is insufficient in *quantity* to be statistically significant. Data collected is limited in *scope*. It does not address the range of proposed product types and applications.
- A wide variety of density meters with variable applications and accuracies are available. The cost of a Portable Digital Density Meter is approximately \$5000. Costs vary according to specific safety, security, and accuracy issues that must be met. Portable density meters, when purchased, are typically for specific commodity types, and not a wide range of commodities as outlined in the proposal.
- OWM recommends the L&R Committee consider the following actions.
 - ***Refine the Proposed Language.*** Additional modifications are needed to the proposal in specific areas to better define use.
 - ***Limit the Scope of the Current Proposal.*** Consider limiting the proposed procedure to use in AUDIT testing rather than in enforcement action.
 - Such a limitation was previously included in the proposal.
 - It is highly recommended that the test procedure be very limited in scope until further validation is completed. For example:
 - Limit the scope to non-viscous, water-based liquids only and add products and product categories as data collection and validation is done by a task group or individual jurisdictions.
 - There may be a possibility for some semi-viscous petroleum products (light oils and fuels), but a thorough review of the associated ASTM procedures and documents must be completed before moving into that measurement area.
 - ***Establish a Task Group under the L&R Committee.*** Assign this group the responsibility of collecting data to validate the use of density meters for specific product types and categories. Additional tasks might include the following:
 - Prioritize the product types and categories of highest interest to regulators and industry for validation.
 - Clearly define the uncertainty and an allowable difference or tolerance between the digital density meter and the current NIST HB 133.
 - Define the lower limits on density (example: $> 0.5 \text{ g/cm}^3$ to 2 g/cm^3) defined. Under the current proposal scenarios can occur where mathematically calculated volume values will not be sufficiently accurate.
 - Products of higher viscosities are a concern. “Viscous” needs to be clearly defined (with a value).
 - Criteria for determining an appropriate density meter (like range and minimum resolution) needs to be defined.

- Reference material of known (liquid) quantities needs to be better conveyed in the procedure.
- Clear guidance needs to be provided regarding the limitations of these devices, particularly with regard to their use in audit testing vs. enforcement action.
- “Critical steps” needed to avoid enforcement errors need to be identified and clearly communicated.
- The source of alpha values needs to be verified and cited in the procedure. An analysis of the likely uncertainty of locally calculated alpha values must be completed to verify impact on final calculated volumes.
- Correction factors used with equipment need to be validated and means for security provided.
- The current language/procedure needs to be improved for cleaning the device between uses; a critical step that will affect results if not properly done and could vary by manufacturer.
- The use and limitations of an air pump needs to be qualified.
- ***Develop Guidance Documents.***
 - ***High-Level Steps for Validating Test Equipment.***
- NIST OWM can provide guidance and prioritization on key steps needed to validate such test equipment.
- Such guidelines can be used by individual Directors, work groups, or industry to conduct data collection and analysis to validate specific equipment and product types.
- ***NIST Field Manual.*** Determine the need for a NIST Field Manual to support and facilitate the use of Digital Density Meters for official inspections and testing.

The proposal previously included a barometer in equipment requirement and then explains that a barometer or other means of ascertaining atmospheric pressure may be used. It goes on to say the inspector’s smart phone can be used if it has a pressure sensor.

- **Barometer (optional), or other device for obtaining the prevailing barometric pressure, with an accuracy of ± 3.0 mmHg – Note: Smartphones with a barometer application that uses the phone’s pressure sensor, have a typical accuracy of ± 0.2 mmHg (Comment: barometer is not necessary if prevailing barometric pressure or altitude is known)**

OWM recommends that the Committee avoid the practice of allowing measuring sensors or unverified applications on state or inspector owned smartphones in testing and enforcement actions. Any measuring device involved the verification of the net quantity of contents of packaged goods should be evaluated for suitability and tested and calibrated by the state’s metrology laboratory (or an accredited 3rd party testing laboratory.) There are other concerns as well but, if the inspector can obtain the current local barometric pressure as shown on the National Weather Service website at **National Weather Service** (NWS), which provides local weather conditions including barometric pressure by zip code search, that should be a more reliable and defensible resource than an unverified smartphone application that may have been dropped and damaged. If the Committee finds the NWS website does not provide the needed pressure reading within the required accuracy, then OWM recommends that the procedure be modified to require the

inspector have a certified barometer available for use during the inspection. Removing reference to use of barometer was agreed upon by the submitter and removed.

Another important question is if the manufacturers provide adequate means for ensuring the accuracy and traceability of the built-in thermometers. This is because accurate temperature determinations are especially critical in making density determinations using a 2 mL sample. Detailed guidance on taking samples is also needed to assure accuracy. It is important that the sample be collected from the package using good measurement practice and that once collected it be measured promptly to ensure that the temperature does not vary outside of the prescribed range.

Section 3.X.2. Test Procedure highlights the importance of bringing the sample packages to a stable reference temperature. When OWM performed comparison tests years ago, the researcher found that the packages of product under test had to “soak” in a stable temperature environment for up to 24-hours before a sample was taken. This is because the larger the quantity and container type (wall thickness and material for example) the longer the “soak” is required for product temperature to stabilize. When collecting sample packages from a location and transporting them to a laboratory for testing it is a good practice to carry them in a cooler to keep the samples from getting too hot (or too cold in the winter). For products that are too warm the use of a refrigerator or soaking watertight packages in a sink of cool water reduces the soak time but, those conveniences, may or may not be readily accessible in field locations. It is also essential that both the sample and the product temperature are representative of the total volume of product in the container not just the upper levels of the package near the container’s opening. Temperatures near the opening of the package can vary because warm room air enters the headspace and liquids in the neck of a thin plastic bottle often warm or cool a little quicker than the large volume of liquid lower in the package. Temperatures near the bottom of a package can also vary slightly due to the transfer of heat from the surface on which they are placed for testing. While these variations in temperature are minor and likely do not have a significant impact on volume, they do show that good measurement practices. inspectors will need to “soak” the packages at or near the reference temperature for an adequate period, take representative samples and temperature readings of the product in the package and ensure that measurements of density are taken promptly. These comments are provided to help the Committee in its consideration of this proposal. It also reflects the need for the development of guidance on sample collection and handling.

OWM joins with the submitter in highlighting the limitations of the types of liquids that can be tested using these devices. The submitter provided the following in Section 3.X. Scope:

This test procedure is suitable for measuring the density of homogenous liquids including dairy products such as milk and half & half; petroleum products such as fuel, motor oil, transmission fluid, paint thinner, brake fluid, diesel exhaust fluid, automotive coolant; pulp-free juices, wine, distilled spirits, water, mouth wash, alcohol, syrups, cooking oils, solvents, cleaning supplies, chemicals, as well as other viscous and non-viscous liquids. All products tested shall be free of suspended gas, air, sediment, suspended matter.

This was confirmed in testing that OWM had previously performed, it which recognized that most devices would not provide acceptable results if, the liquid had entrained air, the product was carbonated, or if it contained solids (e.g., flavored milks or juices, especially where shaking is recommended to mix the solids). Manufacturer’s instructions should be reviewed to determine if the meter under consideration is suitable for testing the products that the official intends to examine. Today’s meters will likely provide more accurate determinations of density over a wider range of products, but OWM recommends their performance be verified against NIST HB 133 method to ensure both accuracy and repeatability. OWM also recommends that if these devices are to be evaluated comparisons should start with testing various products including viscous products listed in the proposal. Portable Digital Density meters could be

accepted where their availability may provide the greatest return on the investment. OWM recommends anyone using these meters for use in package control read Guide 14 “Density Measurement” published in 2011 by the Organization of International Legal Metrology (OIML) [g014-e11.pdf \(oiml.org\)](#).

The submitter of this proposal had a Table X.1 “Viscosity Corrections of Common Materials”. What is the source of these values and what uncertainties are associated with the values?

In a separate comment the submitter reports that the “Current method in Section 3.4. Volumetric Test Procedures for Viscous Fluids – Headspace” does not work for oblong plastic bottles often used for motor oil.” OWM was either not aware of this issue or overlooked this statement in previous submittal of this proposal that came before the L&R Committee. OWM encourages the Committee to request that the submitter provide information, pictures, and test data on this issue to allow the Committee and OWM to investigate this type of problem. When OWM was developing training courses on package control several oblong paint containers were tested using the headspace methods in NIST HB133 and those tests worked well and provided good test results. OWM does not dispute the submitter’s statement but wishes to express the belief it merits further inquiry. Perhaps some amendments to the current headspace test methods can be made to make them more appropriate for use with oblong motor oil containers. OWM believes this effort will be justified because many jurisdictions will likely not purchase digital density meters for their inspectors due to their cost. Ensuring the existing test procedures are valid for use with different package designs and containers is essential.

Viscous and Non-Viscous Liquids

OWM encourages the Committee to solicit comments and suggestions to provide clearer terms and examples to identify product types which fall under the classification of a viscous and non-viscous liquid. Packaging and labeling regulations typically require that viscous liquids (such as ketchup, mustard) be sold by net weight not fluid measure so devices may have a narrower range of application in testing of packages typically inspected by weights and measures. The question of whether a product is viscous is a frequent question that we address in packaging and labeling inquiries. Over the years OWM has also received several requests from the food industry for help in better defining the range of products that fall under the definitions. Such an effort would help inspectors and packers alike. It would certainly help others to see the types of products that these instruments may be most suitable for use in testing. If the terms were better defined or a listing of typical products were provided to illustrate a consensus opinion on these categories, it could be added to the Interpretations and Guidelines Sections of NIST Handbook 130 and become a valuable reference in the future by ensuring the same product is labeled by the same units of measure for all manufacturers.

Demonstration before the NCWM Laws and Regulations Committee

After a test procedure has been fully develop, the Committee may want to initiate a practice of having submitters demonstrate the complete procedure before the Committee (either in-person or video). This would allow for the procedure to be evaluated and better understood. OWM has found that several of the procedures adopted into NIST Handbook 133 at times omitted steps in the package inspection process, while others included specifications for test equipment that had to be fabricated. OWM also found there may not have been a design specification or drawings available for utilization by the states for ordering the equipment. In addition, we recommend that submitters refrain from creating active software spreadsheets. Some inspectors may not have the software, knowledge in using it, or availability of a computer at an inspection site.

Below is a listing of recommended changes from OWM to the Item Under Consideration. OWM recommends a number of changes to the proposal as reflected in Appendix X. OWM justification for the changes can be found in outlined boxes below the change.

NET-22.2 –Section 3.1.1 Test Methods and 3.X. Gravimetric Audit Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter.

Title within NCWM Publication 16

OWM recommends the following change to the title within NCWM Publication 16.

Current title: Section 3.X Volumetric Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter.

Corrected title: Section 3.1.1 Test Methods and 3.X. Gravimetric Audit Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter, as shown above.

The corrected title includes the proper section number; changes volumetric to gravimetric; and specifies this as an audit test.

Preamble under the Item Under Consideration:

Amend NIST Handbook 133, Checking the Net Contents of Packaged Goods, to modify Note 2 in Section 3.1.1. Test Methods and Section 3.X. Gravimetric Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter. Add an audit test procedure for 3.X. Gravimetric Test Procedure for Viscous and Non-Viscous Liquids by Portable Density Meter as follows:

OWM proposes modifying the preamble to the Item under Consideration as shown above, to change this from a compliance test procedure to an audit test procedure.

3.1. Scope

3.1.1. Test Methods

Notes:

- (2) When checking liquid products using a volumetric or gravimetric procedure for **density determination**, the temperature of the samples must be maintained at the reference temperature ± 2 °C (± 5 °F), **except when using Section 3.X. Gravimetric Audit Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter, where a correction factor is used to correct the density to the reference temperature.**

OWM proposes to:

- Add the term “density determination” to clarify that “temperature only” applies when performing density determinations.

- Add language “where a correction factor is used to correct the reference temperature” to clarify a portable digital density meter uses correction factors to correct the reference temperature.
- Add the language “density to the” reference temperature for clarification.
- Correct the title to new Section 3.X. that is referenced in Note 2.

OWM believes additional data and analysis is essential before proposing any such language for inclusion in NIST Handbook 130, even as an “audit procedure.”

OWM believes this additional data collection and analysis is best done by a TG. Based on that work, the TG can assess any limitations such as whether or not the procedure can be recommended for audit or compliance testing and proposed restrictions on product types.

3.X. Gravimetric Audit Test Procedure for Viscous and Non-Viscous Liquids by Portable Digital Density Meter

Use the following procedure for packages labeled in fluid volume.

Most portable digital density meters are suitable for measuring the density of homogenous liquids free of suspended gas, air, sediment, and suspended matter.

The suitability of a given meter for use with specific product types is determined based upon the specifications of the manufacturer, the intended application, and verification by a recognized laboratory.

Prior to using for audit testing for a specific commodity, the official’s metrology laboratory must perform a comparison between the densities obtained between Sections 3.2. Gravimetric Test Procedure for Non-Viscous Liquids or 3.3. Volumetric Test Procedure for Non-Viscous Liquids, and the digital density meter to demonstrate repeatable, reliable, results.

The portable digital density meter shall be verified and approved in accordance with the manufacturer’s and other recognized calibration procedures before being put into service. The portable digital density meter must only be used in a manner for which it was designed and calibrated. This device must be routinely recertified according to your agency’s measurement assurance policies. Refer to NIST HB 130 Section 11 (h) of Weights and Measures Law and NIST HB 133 Chapter 1, Section 1.7. Good Measurement Practices for additional guidance.

Rather than listing specific product types, OWM recommends the language specify that the user needs to assess the suitability of a meter for use with a given product type based upon the manufacturer’s specifications and testing by an authorized laboratory.

If viscous products are deemed suitable for use by the manufacturer, a maximum viscosity value needs to be defined and the viscosity of the product to be used with the density meter, the viscosity of the product must be verified. Currently the test procedure does not have steps for determining the viscosity of a product. Steps should be developed for using a viscometer.

OWM added language to clarify that before each use the official's metrology laboratory or recognized testing lab shall perform a comparison between the densities of the portable digital density meter and the current NIST HB 133 test procedures to demonstrate repeatable, and reliable results. This is a critical step and is similar to verifying the accuracy of an inspector's scale before each use. Language was added referring the user to NIST HB 130 Section 11 (h) of Weights and Measures Law and NIST HB133 Chapter 1, Section 1.7. Good Measurement Practices to emphasize that field standard must be verified before being put into service.

Guidance needs to be provided in the procedure describing how testing by the lab is to be conducted (e.g., number of samples, variation allowed, documenting, and saving records of results...) and when and how to deem the device "calibrated and standardized".

Reorganized the language in 2022 NCWM Publication 16 for clarity; L&R-72 lines 36-39. Which currently states,

"This test procedure may be used as a substitute for testing non-viscous liquids gravimetrically using a flask (refer to 3.2. Gravimetric Test Procedure for Non-Viscous Liquids), the volumetric flask test procedure (refer 38 to 3.3. Volumetric Test Procedure for Non-Viscous Liquids) or testing viscous fluids by the volumetric headspace procedure (refer to 3.4. Volumetric Test Procedures for Viscous Fluids – Headspace)

Remove in its entirety L&R-72 lines 26 – 39 which states:

"This test procedure can be used to determine the net contents of most package goods labeled in fluid volume. Manufacturer's instructions must be reviewed prior to use, to determine if the meter is suitable for testing the intended product. This procedure is also useful for ensuring product quality for commodities (e.g., DEF, Antifreeze) that have a density requirement in their respective specifications.

This test procedure is suitable for measuring the density of homogenous liquids including dairy products such as milk and half & half; petroleum products such as fuel, motor oil, transmission fluid, paint thinner, brake fluid, diesel exhaust fluid, automotive coolant; pulp-free juices, wine, distilled spirits, water, mouth wash, alcohol, syrups, cooking oils, solvents, cleaning supplies, chemicals, as well as other viscous and non-viscous liquids. All products tested shall be free of suspended gas, air, sediment, suspended matter.

This test procedure may be used as a substitute for testing non-viscous liquids gravimetrically using a flask (refer to 3.2. Gravimetric Test Procedure for Non-Viscous Liquids), the volumetric flask test procedure (refer 38 to 3.3. Volumetric Test Procedure for Non-Viscous Liquids) or testing viscous fluids by the volumetric headspace procedure (refer to 3.4. Volumetric Test Procedures for Viscous Fluids – Headspace)

and L&R-73 lines 1-3.

"NOTE: This shall not be used for liquids with suspended solids such as orange juice with pulp, buttermilk, 2 liquids requiring "shake before use", paint, or carbonated products (soda, beer, etc.) or substances not 3 approved by the digital density meter manufacturer."

This audit test procedure may be used as an alternative audit test procedure for the following Sections:

- **Section 3.2. Gravimetric Test Procedure for Non-Viscous Liquids.**
- **Section 3.3. Volumetric Test Procedure for Non-Viscous Liquids.**
- **Section 3.4. Volumetric Test Procedures for Viscous Fluids – Headspace.**

OWM restructured the layout of this paragraph to make it clearer to the user as to which sections within NIST HB 133 this audit test procedure can be used.

OWM removes several areas within the Item under Consideration that have a density requirement in their respective specifications. The procedure is a package checking procedure and it is not relative to the scope of this procedure. However, there is potential to be used in other others such as, determining density for “quality” and “the volume of bulk oil”.

This test procedure can also be a timesaver for screening products for proper fill and for quality control purposes.

3.X.1. Test Equipment

- **A scale that meets the requirements in Chapter 2, Section 2.2. “Measurement Standards and Test Equipment.”**

To verify the scale has adequate resolution, use the following steps.

- **Determine the density of the liquid.**
- **Using the density, convert the labeled volume to weight.**
- **Based on the labeled volume, determine the MAV using Table 2-6 “Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume” found in Appendix A.**
- **Using the density, convert the MAV from volume to weight.**
- **Next verify that the scale division is no larger than MAV/6 for the package size under test.**
- **The smallest graduation on the scale must not exceed the weight value for MAV/6.**

Example:

Assume the inspector is using a scale with 1 g (0.002 lb) increments to test packages labeled 1 L (33.8 fl oz) that have an MAV of 29 mL (1 fl oz). Also, assume the inspector finds that the weight of 1 L of the liquid is 943 g (2.078 lb).

Density: 1 L = 943 g (2.078 lb)

MAV: 29 mL (1 fl oz)

➤ Convert the Density into mL and Fl oz:

$$\underline{943 \text{ g} \div 1000 \text{ mL} = 0.943 \text{ g/mL}}$$

$$\underline{(2.078 \text{ lb} \div 33.8 \text{ Fl oz} = 0.0614 \text{ lb/fl oz})}$$

➤ Convert MAV from Volume (mL/fl oz) to Weight:

$$\underline{29 \text{ mL} \times 0.943 \text{ g/mL} = 27.347 \text{ g}}$$

$$\underline{(1 \text{ Fl oz} \times 0.0614 \text{ lb/fl oz} = 0.064 \text{ lb})}$$

$$\underline{\text{MAV in Weight/6: } 27.347 \text{ g} \div 6 = 4.557 \text{ g} \quad 0.064 \text{ lb} \div 6 = 0.010 \text{ lb}}$$

In this example, the 1 g (0.002 lb) scale division is smaller than the MAV/6 value of 4.557 g (0.010 lb) so the scale is suitable for making a density determination.

- Low pressure air pump (small) – (e.g., an aquarium air pump)
- Syringe (glass or plastic with a Luer fitting 5 mL or larger). The syringe should be free of any lubricating substances)
- Distilled or deionized water
- Cleaning agents (See Table 3.4. Cleaning Agents)
- Waste container
- Barometer for obtaining the prevailing barometric pressure, with an accuracy of ± 3.0 mmHg
- Thermometer for measuring air temperature with a tolerance of ± 1 °C (2 °F)
- Portable digital density meter meeting a minimum requirement of:

<u>Measuring Range</u>	
<u>Density</u>	<u>0 – 3 g/cm³</u>
<u>Temperature</u>	<u>0 – 40 °C (32 – 104 °F)^a</u>
<u>Viscosity</u>	<u>0 – 1000 mPa·s</u>
<u>Accuracy^b</u>	
<u>Density</u>	<u>0.001 g/cm³</u>
<u>Temperature</u>	<u>0.2 °C (0.4 °F)</u>
<u>Repeatability s.d.</u>	
<u>Density</u>	<u>0.0005 g/cm³</u>

<u>Temperature</u>	<u>0.1 °C (0.1 °F)</u>
<u>Resolution</u>	
<u>Density</u>	<u>0.0001 g/cm³</u>
<u>Temperature</u>	<u>0.1 °C (0.1 °F)</u>
<u>Sample Volume</u>	<u>2 mL</u>
<u>Sample Temperature</u>	<u>max. 100 °C (212 °F)</u>
<u>Footnotes</u>	
a. <u>Filling at higher temperatures possible.</u>	
b. <u>Viscosity < 100 mPa·s, density < g/cm³</u>	

OWM recommends that the lower limits on density (example: > 0.5 g/cm³ to 2 g/cm³) be defined. Under the current proposal scenarios can occur where mathematically calculated volume values will not be sufficiently accurate.

OWM also added the density and temperature of the “Resolution” as shown above.

3.X.2. Test Procedure

1. **Follow Section 2.3.1. “Define the Inspection Lot.” Use a “Category A” sampling plan in the inspection. Select a random sample’**
2. **Bring the packages and their contents to a temperature, between the reference and ambient temperatures**

OWM removed Step 3 which stated “packages may be gently rolled to mix contents. Avoid shaking liquids. Shaking some products such as flavored milk will entrap air that will affect density measurements”. The OWM language removes any reference to product types.

3. **The portable digital density meter must be at ambient temperature or warmer to avoid causing condensation within the unit. If the density meter is warmer than the ambient temperature, condensation is not likely to occur. Condensation must be avoided and could cause digital density meter to malfunction and cause potential damage.**

OWM added language to clarify the conditions needed to avoid condensation for the digital density meter. Additional language is needed describing how to equilibrate the digital density meter to ambient temperature and how to determine when there is a temperature difference.

4. **Using distilled or deionized water, validate the digital density meter per the manufacturer’s calibration instructions. The portable digital density meter shall be validated and if necessary calibrated prior to each unique commodity. The digital density meter shall be calibrated using a standard sample, within an allowable density range of ± 0.0005 g/cm³.**

OWM recommends using reference materials of known liquids to validate and calibrate the performance of the digital density meter with each product which the meter will be used to measure. This implies that only distilled or deionized water can or should be used. OWM added language that the portable digital density meter shall be “validated and if necessary calibrated” prior to use with each unique commodity. Calibrating and validating should be done prior to each use “not once a day” until sufficient data can determine otherwise. This is similar to the approach that is used to maintain control over other test standards.

- 5. Ensure the portable digital density meter is clean prior to testing. Any residual liquid should be drained, and the unit should be flushed with a small amount of the sample to be tested. Flush and discard the sample two times before taking a measurement.**

OWM recommends that it be stated or noted that testing these products can result in significant coating of any surface that they contact. Verified cleaning to get back to the original verified calibration values between each sample test will be incredibly important. It needs to be emphasized that this is a critical step.

- 6. Follow the manufacturer’s instructions to select the correct method, when using a meter with built in correction factors, and measure the density of the sample using the built-in pump or syringe. Fill the sample slowly and gently. If gas or air bubbles are present drain sample and refill. If the correction factor is not known, refer to step 9.**

Note: Use of a syringe may be desirable to allow sample specimen to achieve ambient temperature prior to introduction of specimen into testing cell and for viscous specimens.

OWM recommends that guidance and a step should be added on how to determine and verify the accuracy of any built-in stored values. This is critical in that these values will directly impact the measurement result. Correction factors used with the equipment need to be validated and means for security provided.

Transferring the product via a syringe can be a source of error. Language should be added to the “Note” as to how to transfer the product from the syringe to the portable digital density meter.

- 7. Once the portable digital density meter has stabilized (maintained reading ± 0.2 °C (± 0.5 °F) for 10 seconds) record density and temperature as indicated on instrument.**

OWM recommends that it be clarified what is being stabilized, the density value, temperature, or both. The statement above reads seems to imply that only temperature is important. Both the density value and temperature must be stable within “some” window.

- 8. Apply the density coefficient of expansion (Alpha) also known as the density correction factor, to correct to the reference temperature. See Table X.2. Viscosity Corrections of Common Materials. if the Alpha correction is not known, then the factor can be calculated using the below formula.**

OWM recognizes that the NCWM Publication 15 (2022) contained Table X.1. titled “Density Coefficient Factor (Alpha)” which was removed by the L&R Committee due to the values within the table not being validated. The use of this table would be useful to assist an inspector in saving time by not having to calculate the value. Prior to adding such a table, the source of alpha values must be verified and cited in the procedure.

OWM changed the title of Table X.2. “Reference Temperatures of Liquids” to correct the title name to “Table X.2. Viscosity Corrections of Common Materials

The source of alpha values needs to be verified and cited in the procedure. An analysis of the likely uncertainty of locally calculated alpha values must be completed to verify impact on final calculated volumes.

OWM moved the “Note” stating “Some digital density meters may be programmed to automatically apply this correction” to Step 10.

Calculating the Temperature Coefficient Alpha

$$\text{Temperature coefficient Alpha} = \frac{|\rho_1 - \rho_2|}{|T_1 - T_2|}$$

ρ_1 density at temperature T_1

ρ_2 density at temperature T_2

T_1 temperature at initial measurement

T_2 temperature at second measurement

Notes:

- If the density correction factor is not known but the volume correction factor is known, the density correction factor can be calculated from the volume correction factor using the following formula.
 - Density Temperature Factor Alpha = Absolute Value of Beta × Density.
9. Apply the viscosity correction if viscosity > 85 centipoise at 21 °C (70 °F) by adding the value in Table X.1. Density Measurement to your density measurement. After this correction, this value is the density of the substance in in the vacuum at the prescribed reference temperature.

OWM recommends stating that these alpha values must be verified and provide guidance on how to do so. This applies to steps 10 and 11. We need to understand what the source of the uncertainty of these values are, their traceability, and the impact small errors will have on the final measurement.

OWM recommends the accuracy of the alpha value be better defined. If the alpha value is determined using this method, to what uncertainty/accuracy must it be measured? It should be

clarified that an average of no less than three measurements should be used with an uncertainty sufficiently small than the resulting error in the sample density is less than the MAV/6.

Note: Some digital density meters may be pre-programmed to automatically apply the viscosity. See Table X.2. Viscosity Corrections of Common Materials

10. Apply the apparent density correction by applying one of the following steps:

(1) multiplying the density by 0.999; or

(2) multiplying the density by the Apparent Mass Factor from Table X.3.; or

(3) calculate apparent density by using the following:

Converting True Density into Apparent Density

The apparent density is defined as:

$$\mathbf{Paap} = \frac{P_{true, sample} - P_{air}}{1 - \frac{P_{air}}{8.0 \text{ g/cm}^3}}$$

Where:

***Paap* = apparent density of the sample**

***Psteel* = 8.0 g/cm³**

***Pair* = true density of air**

***Ptrue, sample* = true density of the sample**

The apparent density is smaller than the true density and can be calculated from the true density considering the buoyancy of the sample in air and the weight and density of a reference weight in steel.

*** Pair = true density of air as calculated from equation in Table X.1. Density Measurement.**

After application of this factor or calculation, the new value is density of the substance in air.

11. Drain the instrument and repeat Steps 6–10 on a second specimen of the same package for verification of first measurement.

OWM would like to emphasize that in Step 3 where the portable digital meter is cleaned, you are starting from the same zero condition for the vibrating tube. If a new sample is introduced without ensuring that the last sample tested is completely gone, any remaining deposits in the tube WILL impact the measurement of the new sample. This will be especially true for viscous materials but will be true for even liquids with low viscosity. The remaining material

will just be less impactful for the low viscosity liquids. Either way, errors will exist unless you return to the completely clean condition. This is a critical step which must be emphasized.

- 12. Compare the two readings, they must agree within 0.0003 g/cm³. Calculate the average density of the two specimens from the sample. If the difference of two readings is greater than 0.0003 g/cm³, discard results and repeat testing of sample. Air or undissolved gas will cause erroneous measurement errors. The user of the shall always visually inspect for undissolved gas in the measurement tube for a valid test.**
- 13. Repeat testing for the second (or subsequent) package(s) of the lot.**
- 14. Calculate the Average Product Density of sample 1 and 2. The two results must agree within 0.0005 g/cm³. If the difference between the densities of the two packages exceeds 0.0005 g/cm³, use the volumetric procedure in Section 3.3. “Volumetric Test Procedure for Non-Viscous Liquids.”**
- 15. Determine the Average Used Dry Tare Weight of the sample according to provisions of Section 2.3.5. “Procedures for Determining Tare.”**
- 16. Calculate the “nominal gross weight” using the following formula:**

Nominal Gross Weight = (Average Product Density [in weight units]) × (Labeled Volume) + (Average Used Dry Tare Weight)
- 17. Weigh the remaining packages in the sample.**
- 18. Subtract the nominal gross weight from the gross weight of each package to obtain package errors in terms of weight. All sample packages are compared to the nominal gross weight.**
- 19. To convert the average error or package error from weight to volume, use the following formula:**

Package Error in Volume = Package Error in Weight ÷ Average Product Density Per Volume Unit of Measure
- 20. The digital density meter must be stored clean. After final use of the day or extended period of time, the instrument shall be drained and cleaned following the manufacturer’s recommended cleaning procedures and using two cleaning agents. The first cleaning agent removes sample residue, and the second cleaning agent removes the first cleaning agent. See Table X.4. Cleaning Agents for examples of cleaning agents recommended by a digital density meter manufacturer.**

Note: If the unit will be immediately used to measure another sample of similar composition, the unit may be drained and flushed with the new sample three times before the next analysis.

OWM recommends that language be added on how to verify the unit is “clean”. Cleaning is a critical step. The current language and procedure will need to be improved for cleaning the device between uses; a critical step that will affect results if not properly done and recognize

that this could vary by manufacturer. It should also be noted that the instruments instruction manual provides guidance as well.

- 21. Periodically, connect the portable digital density meter to a low-pressure air source after a thorough cleaning, such as an aquarium air pump, to dry the unit's measurement cell. This step is a better way to ensure no buildup of deposits in the measuring cell and no long-term drift of the instrument calibration. Bypassing the internal pump may be necessary to dry measuring cell. See instrument instruction manual.**

OWM added language provided clarification to this step by providing the following additional language:

“Periodically, connect digital density meter to a low-pressure air source after thorough cleaning, such as an aquarium air pump, to dry the unit's measurement cell. This step is a better way to ensure no buildup of deposits in the measuring cell and no long-term drift of the instrument calibration. Bypassing the internal pump maybe necessary to dry measuring cell. See manufacturers instrument instruction manual.”

Language should also be added to clarify that at the end of use, the unit must be thoroughly cleaned before being stored.

3.X.3. Evaluation of Results

Follow the procedures in Chapter 2, Section 2.3.7. “Evaluate for Compliance” to determine lot conformance.

Table X.1. Density Measurement

Calculate the density of air at the temperature of test using the following equation

$$\rho_{\text{air, g/mL}} = 0.001293[273.15/T][P/760]$$

Where:

T = temperature, K, and

P = barometric pressure, torr.

°C	mmHg	d _{air} , g/mL
15.56	760	0.001223314

Table X.2. Viscosity Corrections of Common Materials

<u>Material</u>	<u>Viscosity in Centipoise</u>	<u>Correction g/cc</u>
<u>Water</u>	<u>1 cP</u>	
<u>Milk</u>	<u>3 cP</u>	
<u>SAE 10 Motor Oil</u>	<u>85–140 cP</u>	<u>0.0003</u>
<u>SAE 20 Motor Oil</u>	<u>140–420 cP</u>	<u>0.0006</u>
<u>SAE 30 Motor Oil</u>	<u>420–650 cP</u>	<u>0.0007</u>

<u>Material</u>	<u>Viscosity in Centipoise</u>	<u>Correction g/cc</u>
<u>SAE 40 Motor Oil</u>	<u>650–900 cP</u>	<u>0.0007</u>
<u>Castrol Oil</u>	<u>1,000 cP</u>	<u>0.0008</u>
<u>Karo Syrup</u>	<u>5,000 cP</u>	<u>0.0008</u>
<u>Honey</u>	<u>10,000 cP</u>	<u>0.00085</u>

Table X.3. Apparent Mass Factor

<u>Elevation, ft</u>	<u>sea level</u>	<u>1500</u>	<u>3000</u>	<u>4500</u>	<u>6000</u>
<u>Barometer, mmHg</u>	<u>760</u>	<u>720</u>	<u>680</u>	<u>640</u>	<u>600</u>
<u>density, g/cc</u>	<u>Apparent Mass Factor</u>				
<u>0.500</u>	<u>0.9977</u>	<u>0.9979</u>	<u>0.9980</u>	<u>0.9981</u>	<u>0.9982</u>
<u>0.600</u>	<u>0.9981</u>	<u>0.9982</u>	<u>0.9983</u>	<u>0.9984</u>	<u>0.9985</u>
<u>0.700</u>	<u>0.9984</u>	<u>0.9985</u>	<u>0.9986</u>	<u>0.9987</u>	<u>0.9988</u>
<u>0.800</u>	<u>0.9986</u>	<u>0.9987</u>	<u>0.9988</u>	<u>0.9989</u>	<u>0.9989</u>
<u>0.900</u>	<u>0.9988</u>	<u>0.9989</u>	<u>0.9989</u>	<u>0.9990</u>	<u>0.9991</u>
<u>1.000</u>	<u>0.9989</u>	<u>0.9990</u>	<u>0.9991</u>	<u>0.9991</u>	<u>0.9992</u>
<u>1.100</u>	<u>0.9991</u>	<u>0.9991</u>	<u>0.9992</u>	<u>0.9992</u>	<u>0.9993</u>
<u>1.200</u>	<u>0.9991</u>	<u>0.9992</u>	<u>0.9992</u>	<u>0.9993</u>	<u>0.9993</u>
<u>1.300</u>	<u>0.9992</u>	<u>0.9993</u>	<u>0.9993</u>	<u>0.9993</u>	<u>0.9994</u>
<u>1.400</u>	<u>0.9993</u>	<u>0.9993</u>	<u>0.9994</u>	<u>0.9994</u>	<u>0.9994</u>
<u>1.500</u>	<u>0.9993</u>	<u>0.9994</u>	<u>0.9994</u>	<u>0.9994</u>	<u>0.9995</u>
<u>Elevation or prevailing barometric pressure at the location of measurement.</u>					

OWM questions why the table stops at density 1.500. An earlier a statement was made that the process is good for density values from 0 to 3 g/mL. There should be a note to address this difference and instructions about what to do if a value greater than 1.5 is measured.

Table X.4. Cleaning Agents

<u>(Examples of cleaning agents recommended by digital density meter manufacturers. Verify the proper cleaning agent for the digital density meter used.)</u>		
<u>Commodity</u>	<u>Cleaning Liquid 1</u>	<u>Cleaning Liquid 2</u>
<u>Petroleum products</u>	<u>Toluene, petroleum naphtha, petroleum ether, n-nonane, cyclohexane</u>	<u>Ethanol</u>
<u>Battery acid</u>	<u>Tap water</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>

<u>(Examples of cleaning agents recommended by digital density meter manufacturers. Verify the proper cleaning agent for the digital density meter used.)</u>		
<u>Liquid soap and detergent, shampoo</u>	<u>Tap water</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>
<u>Salad dressing, mayonnaise</u>	<u>Petroleum naphtha, dish washing agent in water</u>	<u>Ethanol</u>
<u>Suntan lotion</u>	<u>Tap water</u>	<u>Ethanol</u>
<u>Spirits</u>	<u>Tap water</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>
<u>Grape juice, syrup</u>	<u>Warm tap water</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>
<u>Milk*</u>	<u>Tap water, enzymatic lab cleaner</u>	<u>Ultra-pure (bi-distilled or deionized) water</u>
<u>*NOTE: Do not introduce ethanol or other alcohols into instrument without first flushing all milk products from instruments.</u>		

OWM added the following parenthetical to the title: “(Examples of cleaning agents recommended by digital density meter manufacturers. Verify the proper cleaning agent for the digital density meter used.)”

This table should be verified for all known digital density meter manufacturers’ however, some meters may not be compatible with some solvents so compatibility must be verified before use.

OWM recommends that this proposal be Developing or Assigned to a Task Group that is created to develop this item for many of the reasons cited above.

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, the Committee assigned Voting status for this item. The Committee believes the latest proposal is fully developed, addressed previous concerns and is therefore ready for a vote. Additionally, the Committee believes this item will provide a tool to Weights and Measures Officials that will improve efficiency during inspections while maintaining current testing accuracy levels.

Note: The Committee removed Table X.1. Density Coefficient Factor (Alpha) because it has not been validated. The Committee spoke to the original submitter, and they agreed that the proposal can still go forward as a Voting item without the table; it is not necessary for it to be included for field use.

The Committee received additional information on this item from NIST OWM after the Interim Meeting stating the item is being reviewed by NIST OWM. NIST OWM submitted proposed changes and comments to the Committee for their consideration. These proposed changes and comments will be provided online to membership before the 2022 NCWM Annual meeting.

At the 2022 NCWM Annual Meeting, new information was presented to the Committee by the submitter that recommended the following changes:

- Change “Volumetric” to “Gravimetric” in the title
- 3.X.1. Testing Equipment for portable digital density meter, add additional requirements
 - Insert “**Resolution**” which includes **Density of 0.0001 g/cm³** and **Temperature of 0.1 °C (0.1 °F)**, which was inadvertently left out in prior publications.
- Correct an error to the viscosity formula by removing the word “adding” and inserting the word “subtracting” 3.X.2. Test Procedure.

The submitter stated he would also support item moving forward as an audit procedure. Mr. Sefcik clarified that even as an audit procedure additional time is needed to properly evaluate the procedure, to ensure the audit procedure that will provide accurate results.

The Committee had removed Table X.1. Density Coefficient Factor (Alpha) from the proposal at the 2022 NCWM Interim Meeting due to the data not being validated. The Committee recommended that the submitter validate Table X.1. Density Coefficient Factor (Alpha) and reinsert it into the proposal for reconsideration.

The Committee also reviewed the NIST **OWM Analysis** and their comments during open hearings. OWM noted that use of this equipment has great potential to facilitate package testing for many viscous and non-viscous liquids, as well as other weights and measures inspection areas. Some concerns with the item under consideration is the limited testing analysis provided by the submitter comparing the digital density meter to the current NIST Handbook 133 volumetric test procedure. Data on only five items were submitted which is insufficient to statistically validate results to ensure the test procedure will be defensible for use in official inspections. Before this procedure can be determined for use as an Enforcement procedure, the proper calibration and validation methods of the device, limitations of the devices use, and whether adding a step for using a viscometer to determine viscosity before determining the density would need to be considered. It was also noted that none of the four Regions moved the item forward as a Voting item.

Based on the above information, the Committee deescalated the item to Informational status with the intent of forming a TG to further develop the item.

During the Voting Session the Committee was strongly urged to escalate this back into Voting status, based upon comments heard from members and the submitter. After Committee deliberations, Chair McGuire provided membership with the following list of items as to why they did not feel the item was fully developed.

- The NIST, OWM analysis identified areas that needed to be addressed before the item should be used for regulatory purposes.
- Adding Table X.1. Density Coefficient Factor (Alpha) back into the procedures was a substantive change requiring time for membership to review before voting.
- Concern that proceeding with the test procedure without addressing the NIST OWM concerns could negatively impact regulatory actions.

The Committee did agree to have membership vote on the amended proposal. This item neither passed or failed and was returned to the Committee.

Regional Association Reporting:**Western Weights and Measures Association**

At the 2021 WWMA Annual Meeting, Mr. Hayes provided testimony for support of this Item, it is resubmitted from a past Item with updated language. Mr. Hayes indicated there are three volunteers who are testing this procedure for validation. He believes the process and technology are sound and is twice as accurate as the current method for some products. If approved this method would significantly decrease inspection times. Mr. Ivan Hankins (Iowa) asked for clarification on how this will replace the way tests are currently conducted. Mr. Hayes responded saying this method will reduce tests times which would be better for field personnel. Mr. Hayes expanded that he has tested this in dairies, with the new method taking minutes and the old method taking hours. Mr. Kevin Schnepp (CDFA-DMS) supported the continuing development of this Item but asked to see the aggregated data that supported the proposal. He also asked how often the unit needed to be calibrated, for the different products outlined in the proposal. Mr. Hayes responded that the data is being compiled into a report and provided information on the procedures on how to validate the calibration. Mr. Hayes clarified on how to calibrate the equipment. Ms. Lisa Warfield (NIST OWM) supports the development of this test procedure and applauds Mr. Ronald Hayes for working on this. OWM submitted an analysis and agrees these devices may be used in audit testing. Ms. Warfield made statements that highlighted items provided in the OWM analysis supporting documentation. Mr. Hayes responded to items in the OWM analysis, particularly barometric pressure by stating that this can be corrected for by using a correction factor listed in the agenda item. Ms. Lisa Warfield stated that the word approximate must be removed from all tables. Mr. Hayes replied that he believed that this had been accomplished but it is still documented in Table X.2. Approximate Viscosities of Common Materials. Mr. Hayes also replied that he is looking for collaboration and continued support from NIST in this matter.

The Committee recommended that this Item be Assigned. The Committee recommended that L&R National Chair create a Task Group headed by Mr. Hayes that can work on gathering and assessing data to advance this proposal for use as an audit tool and eventually an enforcement tool.

Central Weights and Measures Association

At the CWMA 2021 Interim Meeting, Mr. Hayes commented that he rewrote the method from its original version, and Table X.1. (untitled) which list the product, $\alpha/^\circ\text{C}$, Typical Density at 20°C , g/cm^3 , and reference temperature is currently under review. He also mentioned the ASTM test methods that have been in the marketplace for several years, and he believes with the changes in Table X.1. and a few additional changes, he believes the item will be ready for Voting status. He is asking for volunteers to collect data using this instrument. Ms. Lisa Warfield (NIST OWM) commented that the NIST analysis captures areas for improvement and supports the development of this item as an audit procedure. Mr. Mike Harrington (Iowa) commented that he supports this as a voting item rather than be assigned to a task group to collect data. The Committee believes the item is fully developed by the original submitter and supports further testing by states and recommended Voting status.

At the 2022 CWMA Annual Meeting, Mr. Hayes believes this proposal is fully developed and has been working with NIST to address their suggestions and concerns. Ms. Warfield commented that the item should be deescalated to Developing status or as an Assigned item to a task group through NCWM to collect data to verify accuracy and consistency of measuring devices. She stated that the use of this equipment has great potential to facilitate testing in package checking as well as other weights and measures inspection areas but that for it to be used in regulatory action it is essential to validate the traceability of measurements made using the equipment. Lastly, Ms. Warfield stated that the title to this section is incorrect and should read 3.X. Gravimetric Test Procedure for Viscous and Non-Viscous

Liquids by Portable Digital Density Meter. Mr. Charlie Stutesman (Kansas) commented that if the item is deescalated, the Committee should recommend what still needs developed. The Committee discussed this item at length and believes digital density meters are currently and will continue to be useful devices in weights and measures inspections. The Committee believes this item can be strengthened by increasing data for validation and thinks assigning the item to a task group could be beneficial to finish development of this item.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting no comments were heard during open hearings. NIST OWM provided a written analysis documenting their support of the development of this item. The Committee recommended this as a Developing item. Studies should continue until such time that sufficient evidence can be provided showing that these devices provide density values equivalent to those measured found using existing test methods.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. Hayes commented that this is a complete rewrite of a previously submitted proposal that the NCWM L&R Committee withdrew. This method, which has been used for several years in the liquid fuels and lubricants industry. He indicated the item is ready for Voting status. He will continue to communicate with OWM to work through the comments they included in their analysis of the item and will have all the edits and additions completed by the 2022 NCWM Interim Meeting. Mr. David Sefcik (NIST OWM) commented that NIST supports continued development of this item and to work with Mr. Hayes to resolve any remaining questions. Mr. Sefcik further commented that these devices are being widely used in other countries in the verification of the net quantity of contents by legal metrology programs, but the U.S. has been slow to adopt them. He believes it would be valuable for states to do additional testing to provide sufficient evidence that these devices can provide density values equivalent to those found using existing NIST HB 130 test methods. This will also help move this from an audit test procedure to an actual test procedure. The Committee recommends the item be given Assigned status to an NCWM Task Group to elevate this to a Voting item. Ms. Warfield commented that Mr. McGuire should request the NCWM L&R Chair form a TG to develop this item. The Committee concurs that development of this item should be done through a TG.

At the NEWMA 2022 Annual, Mr. Sefcik noted that the current item under consideration was provided to the National L&R one day before the NCWM Interim and significant updates and changes were done on this item. OWM asked its lab metrology staff to assist with a review of the proposal to help determine and assess any technical gaps. There is limited testing analysis provided by the submitter comparing the digital density meter to the current NIST Handbook 133 volumetric test procedure. Data on only four items were submitted which is insufficient to statistically validate results to ensure the test procedure will be defensible for use in official inspections. He reminded the NEWMA L&R Committee they had recommended previously a task group be formed for further development and OWM echoes this recommendation. Many regulators found it confusing when reading the proposed item. NEWMA L&R Committee recommended this item be Assigned to a newly formed portable digital density meter TG.

FLR – Uniform Fuels and Automotive Lubricants Regulation

FLR-20.5 W Section 2.1.2.(a). Gasoline-Ethanol Blends

(This Item was Withdrawn)

Source: American Petroleum Institute**Submitter's Purpose and Justification:**

More comprehensively align NIST Handbook 130 Uniform Fuels and Automotive Lubricants Regulations with the U.S. EPA's rule that grants a 1 psi vapor pressure waiver to E15 for summertime (June 1 to September 15) and to help ensure consumers receive a consistent E15 blend. The proposed changes to HB 130 reflect the important information that an inspector will need to ensure that E15 is properly blended and that the potential harm to the consumer and the environment will be minimized.

Aligning Handbook 130 with the important parts of the U.S. EPA rule that grants a 1-psi vapor pressure waiver during the summer months for E15 is important to ensure that E15 has the correct vapor pressure during these months and provides comprehensive information to aid in ensuring compliant E15 gasoline is provided to consumers. FLR Sections 2.1.2. Gasoline-Ethanol Blends. and 1.23. Ethanol Flex Fuel are modified to address these issues.

Amendments to FLR paragraph 2.1.2.(a), specify that the range of ethanol in the gasoline-ethanol blends qualifying for the 1-psi waiver shall only be from 9 to 15 volume percent as per 40 CFR 80.27(d). The change is unambiguous and does not require the inspector to access the federal rule to understand the applicable range of the waiver.

EPA Final rule, "Modifications to Fuel Regulations To Provide Flexibility for E15; Modifications to RFS RIN Market Regulations" June 10, 2019, www.govinfo.gov/content/pkg/FR-2019-06-10/pdf/2019-11653.pdf.

U.S. EPA "**Modifications to Fuel Regulations to Provide Flexibility for E15; Modifications to RFS RIN Market Regulations: Response to Comments.**" June 10, 2019. Added in total with an example provided below.

p. 53 (Response to comments) E15 is allowed to be blended at blender pumps as long as **only certified components** are used (sic) Cases where blender pumps introduce uncertified components into gasoline continue to be illegal and may result in fuel that exceeds gasoline quality standards. Parties that blend uncertified components into previously certified gasoline are considered fuel manufacturers under the regulations at 40 CFR part 79 and refiners under 40 CFR part 80.

[emphasis added]

The following quotes from the U.S. EPA proposal provide additional information:

EPA provided the following comments in its final rule on the recent E15 1-psi waiver related to Section G, 2.1.2. and 1.23.:

“[U.S. EPA] note that for E15 produced at blender pumps using E85 made with natural gas liquids, **use of the deemed to comply provision to demonstrate compliance would not be available.** This is because the RVP of natural gas liquids can be as high as 15.0 psi and even a small amount of natural gas liquids could cause the gasoline portion of the blend to not comply with the applicable RVP limitations established under CAA sec. 211(h), which is required under CAA sec. 211(h)(4)(A) to be deemed in compliance. Parties that make E15 at a blender pump using **E85 made with previously certified gasoline can take advantage of the ‘deemed to comply’ provision** and associated affirmative defense at 40 CFR 80.28 if all applicable requirements in 80.28 are met.” (84 FR 27008)

(emphasis added)

- “As discussed in the [U.S. EPA] proposal, E15 made at blender pumps is often made with certified E10 (or CBOB) and E85 (made with denatured fuel ethanol and uncertified hydrocarbon blendstocks, i.e., natural gas liquids). While data is limited, we believe that approximately 50 percent of stations offering E15 make E15 in this manner. (84 FR 27010)
- **40 CFR 80.27(d)** Special provisions for alcohol blends.
 - (a) Any gasoline which meets the requirements of paragraph (d)(2) of this section shall not be in violation of this section if its Reid vapor pressure does not exceed the applicable standard in paragraph (a) of this section by more than one pound per square inch (1.0 psi).
 - (b) In order to qualify for the special regulatory treatment specified in paragraph (d)(1) of this section, gasoline must contain denatured, anhydrous ethanol. **The concentration of the ethanol, excluding the required denaturing agent, must be at least 9 % and no more than 15 % (by volume) of the gasoline.** The ethanol content of the gasoline shall be determined using one of the testing methodologies specified in § 80.47. The maximum ethanol content shall not exceed any applicable waiver conditions under section 211(f) of the Clean Air Act.
 - (c) **Each invoice, loading ticket, bill of lading, delivery ticket and other document which accompanies a shipment of gasoline containing ethanol shall contain a legible and conspicuous statement that the gasoline being shipped contains ethanol and the percentage concentration of ethanol.**

(emphasis added)

- 40 CFR 80.28(g) *Defenses*.
 - (8) In addition to the defenses provided in paragraphs (g)(1) through (6) of this section, in any case in which an ethanol blender, distributor, reseller, carrier, retailer, or wholesale purchaser-consumer would be in violation under paragraph (b), (c), (d), (e), or (f) of this section, as a result of gasoline which contains between 9 and 15 percent ethanol (by volume) but exceeds the applicable standard by more than one pound per square inch (1.0 psi), the ethanol blender, distributor, reseller, carrier, retailer or wholesale purchaser-consumer **shall not be deemed in violation if such person can demonstrate, by showing receipt of a certification from the facility from which the gasoline was received or other evidence acceptable to the Administrator, that:**
 - i. The gasoline portion of the blend complies with the Reid vapor pressure limitations of § 80.27(a); and
 - ii. The ethanol portion of the blend does not exceed 15 percent (by volume); and
 - iii. No additional alcohol or other additive has been added to increase the Reid vapor pressure of the ethanol portion of the blend.

In the case of a violation alleged against an ethanol blender, distributor, reseller, or carrier, if the demonstration required by paragraphs (g)(8)(i), (ii), and (iii) of this section is made by a certification, it must be supported by evidence that the criteria in paragraphs (g)(8)(i), (ii),

and (iii) of this section have been met, such as an oversight program conducted by or on behalf of the ethanol blender, distributor, reseller or carrier alleged to be in violation, which includes periodic sampling and testing of the gasoline or monitoring the volatility and ethanol content of the gasoline. Such certification shall be deemed sufficient evidence of compliance provided it is not contradicted by specific evidence, such as testing results, and provided that the party has no other reasonable basis to believe that the facts stated in the certification are inaccurate. **In the case of a violation alleged against a retail outlet or wholesale purchaser-consumer facility, such certification shall be deemed an adequate defense for the retailer or wholesale purchaser-consumer, provided that the retailer or wholesale purchaser-consumer is able to show certificates for all of the gasoline contained in the storage tank found in violation,** and, provided that the retailer or wholesale purchaser-consumer has no reasonable basis to believe that the facts stated in the certifications are inaccurate.

(emphasis added)

Item Under Consideration:

2.1. Gasoline and Gasoline-Oxygenate Blends

2.1.1. Gasoline and Gasoline-Oxygenate Blends (as defined in this regulation). – Shall meet the latest version of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel” except for the permissible offsets for ethanol blends as provided in Section 2.1.2. Gasoline-Ethanol Blends.

- (a) The maximum concentration of oxygenates contained in gasoline-oxygenate blends shall not exceed those permitted by the EPA under Section 211 of the Clean Air Act and applicable waivers.

(Added 2009) (Amended 2018)

2.1.2. Gasoline-Ethanol Blends. – When gasoline is blended with denatured fuel ethanol, the denatured fuel ethanol shall meet the latest version of ASTM D4806, “Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel,” and the blend shall meet the latest version of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel,” with the following permissible exceptions:

- (a) The maximum vapor pressure shall not exceed the latest edition of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel,” limits by more than 1.0 psi for blends **containing at least 9 and not more than 15 volume percent ethanol** from June 1 through September 15 as allowed by EPA per 40 CFR 80.27(d).

(Amended 2016, ~~and~~ 2018, 2019 **and 20XX**)

Section 2.1. NOTE: The values shown above appear only in U.S. customary units to ensure that the values are identical to those in ASTM standards and the Environmental Protection Agency regulation.

(Added 2009) (Amended 2012 and 2016)

NIST OWM Detailed Technical Analysis:

No comment by the Office of Weights and Measures.

Summary of Discussions and Actions:

On January 17, 2020, Mr. Prentiss Searles (API) submitted modified language for Section 2.1.2.(a). Gasoline-Ethanol Blends. There were over ten letters received in opposition for MOS-20.2. Documentation for Dispenser Labeling Purposes and FLR 20.3. Section 1.23. Ethanol Flex Fuel language. Many were opposed due to its duplication with the EPA compliance program for this subject.

At the 2020 NCWM Interim Meeting, Mr. Searles did provide a presentation and requested from the floor that Section 2.1.2.(a) Gasoline-Ethanol Blends be considered as a Voting item and he volunteered to chair a workgroup to further develop the remaining items. Many rose in support and opposition of this block of items. It was addressed by Ms. Warfield (NIST) that FALS was tasked by the Committee in July 2019 to review the EPA language and its impact on the regulations within the Fuels Regulations within Handbook 130. FALS Chair Mr. Bill Striejewski remarked that he has created a focus group but needs additional clarification from the Committee on what specifically they should address.

During Committee work session they concurred that Section 2.1.2.(a). Gasoline-Ethanol Blends will proceed as a Voting item. All the remaining items will be merged into Block 4 and be assigned to FALS for further development.

At the 2020 NCWM Annual Meeting, several comments were heard both in opposition and supporting the item from both industry and regulators. Those opposed included Mr. Mike Harrington (Iowa), Mr. Charlie Stutesman (Kansas), Mr. Jim Willis (New York), Mr. Doug Rathbun (Illinois), Mr. Chuck Corr (Corr Consulting), Ms. Kristy Moore (Growth Energy), and Mr. Kevin Adlaf (ADM). Those opposed voiced concern over the newly implemented EPA streamlining rules. Questions were raised if the changes would affect this item or if the item is now necessary? Other concerns were heard that the language would be moving backwards, that having the percentages listed could cause issues in the future if the EPA changes them again. The current language is effective, and this type of work is done in a lab not the field where the requirements could easily be looked up. Those supporting the item included Mr. Searles, Mr. Joe Sorena (Chevron), and Mr. Russ Lewis (Marathon Petroleum). The supporting comments included that this just adds back what was not included during the emergency amendment for the 2020 Handbook. Mr. Harrington (Oregon) supporting as a Voting item or leave it on the agenda for another cycle. It was decided that further review was needed, and the item was downgraded to Informational status.

At the 2021 NCWM Interim Meeting, the Committee was informed that after a multiyear process the EPA Streamlining Rule was signed in late 2020. The rule has drawn considerable interest and discussion with various stakeholders. Many would like to wait for the streamlining rules and a review of the NIST Handbook regulations. Some believe that language is specified in the CFR and the streamlining rule does not affect this. Some felt this item should be withdrawn in its entirety. A few comments were heard that were like those from annual meeting hearings in both support and opposition to of the item. A neutral comment was heard from Mr. Elliott (Washington) challenging for theoretical examples showing the harm of having or not having the proposed language added back in. The Committee deemed this item to be fully developed and felt this should be voted on its own merit.

At the 2021 NCWM Annual Meeting, FALS Chair Striejewski provided an overview report to the Committee stating this item was discussed at some length during yesterday's FALS meeting. FLR-20.5 added language to Section 2.1.2(a) relevant to the summertime 1 psi vapor pressure waiver for E15. However, on July 2, 2021, the Washington, District of Columbia Court of Appeals offered an opinion which struck down the waiver, saying in brief that the US EPA had overstepped their authority in granting the waiver in 2019. There were varying views within FALS members as to how this Item should proceed at the Conference. Mr. Corr spoke on behalf of a Developing status, as work is required to

addressing RBOB limitations. The FALS did recommend to the Committee to de-escalating this item from its current Voting status but did not have a consensus recommendation for a new status.

Mr. Searles requested that this item be deescalated until the court matter is sorted out. Mr. Searles informed membership that on July 2, 2021, the U.S. Court of Appeals for the D.C. Circuit issued an opinion that ruled on EPA's rule in 2019 that extended the E10 Reid Vapor Pressure (RVP) waiver to 15 percent volume ethanol blends (E15) during the summer driving season (June 1 - September 15). The court determined that the Clean Air Act does not authorize the RVP waiver to be extended to E15 and vacated the portion of the rule asserting that E15 is substantially similar to E10. In short, the court overturned EPA's rule on the E15 waiver. Consequently, by the time the court procedures take place they will not have a mandate to vacate until after the summer driving season is over. Mr. Searles recommend this get assigned back to FALS to keep them engaged. Ms. Moore and Mr. Harrington recommended this item be withdrawn. An industry member and NEWMA recommended this be deescalated to an Assigned status.

The Committee deescalated this item from Voting status to Informational and will be responsible for this Item. The Committee will review any court actions on this item and determine a status at the 2022 NCWM Interim Meeting.

At the 2022 NCWM Interim Meeting, no one spoke in favor the item and several Industry Associations spoke against the item, supporting its withdrawal. Several regulators stated that the language as it appears in the handbook is correct requested this item be withdrawn. The Committee withdrew this item under consideration in its entirety.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, the Committee heard comments in support of keeping this Item Informational pending the outcome of litigation. The Committee also heard comments to update the CFR references to 40 CFR 1090.215(b). The Committee recommended this item remain Informational pending the outcome of litigation, with the following language change:

2.1.2. Gasoline-Ethanol Blends. – When gasoline is blended with denatured fuel ethanol, the denatured fuel ethanol shall meet the latest version of ASTM D4806, “Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel,” and the blend shall meet the latest version of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel,” with the following permissible exceptions:

- (a) The maximum vapor pressure shall not exceed the latest edition of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel,” limits by more than 1.0 psi for blends **containing at least 9 and not more than 15 volume percent ethanol** from June 1 through September 15 as allowed by EPA per ~~40 CFR 80.27(d)~~. **40CFR1090.215(b)**.

(Amended 2016, ~~and~~ 2018, 2019 **and 20XX**)

Section 2.1. NOTE: The values shown above appear only in U.S. customary units to ensure that the values are identical to those in ASTM standards and the Environmental Protection Agency regulation. (Added 2009) (Amended 2012 and 2016)

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, several regulators recommended this item be withdrawn. Ms. Moore concurs that the language as it appears in the Handbook today is accurate and the proposal is misleading. Ms. Tamara Paik (Marathon) commented that API asks that this item be kept as an informational item and allows it to move forward depending on the outcome of the court determination. After considering the comments during open hearings, the Committee believes this item should be withdrawn.

At the 2022 CWMA Annual Meeting, there were no comments heard. The Committee recommended this as a Voting item.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, Mr. Searles provided a brief update and recommended this item to remain Informational pending the outcome of litigation. NIST OWM provided written analysis recommending the item remain Informational. The Committee recommended this item to remain Informational.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. Corr (Iowa Renewable Fuels Association) stated he is opposed to the content statement related to ethanol in this section and stated a citation reference only is more appropriate. Mr. Mike Sikula (New York) commented that he is unsure of the purpose of this item. Mr. John McGuire (New Jersey) commented that this proposal appeared on the 2021 NCWM Annual L&R Agenda as an Informational item and the Committee is awaiting a determination from the U.S. Court of Appeals. The Committee recommends this item remain on the agenda as an Informational item until the legal process is finished.

At the 2022 NEWMA Annual Meeting, there were no comments made during open hearings.

OTH – Other Items

OTH-22.1 A Uniform Regulation for E-commerce Products

Source: NCWM Packaging and Labeling Subcommittee (PALS)

Submitter's Purpose and Justification:

Provide an update of the activities of PALS which works on direction from and reports to the L&R. This is to propose a new regulation for NIST Handbook 130 covering sites and products which are sold through e-commerce.

While e-commerce continues to grow and evolve, most people, entities and regulators are trying to extrapolate existing requirements to these sites and products involved with e-commerce – with varying degrees of success. This regulation is intended to be a foundation for e-commerce regulation, focusing just on basic requirements such as the name of the item the net quantity of the item, and the price of the item.

Some may argue that existing regulations are good enough and NCWM should wait for other Federal Agencies to take the lead. Companies may need time in order to change their websites or products to comply.

NIST OWM Executive Summary for OTH-22.1 – Uniform Regulations for E-commerce Products

NIST OWM Recommendation: OWM concurs that this item has merit and should be assigned to PALS for further development.

- OWM supports the continued work and development of this item through PALS. OWM had submitted suggestions, edits, formatting changes, and clarifications on May 24, 2022, to PALS for this item including development of a table of contents, clarification of application and purpose of the regulation, a suggestion to provide more uniformity in like terms used, suggestions to provide relevant examples in certain sections for clarification, revisiting the requirements for bulk sales, among others. These have not been reviewed by PALS and not reflected in the Item Under Consideration.
- OWM also recommends PALS consider revising the title of the regulation so that it is reflective of the content of the regulation beyond labeling (e.g., pricing, unit pricing, graphic illustrations.)
- OWM agrees that stakeholder outreach is needed. OWM will assist PALS in reaching out to stakeholders once they are determined by PALS. PALS Chair submitted an updated proposal dated April 12, 2022, which can be found on the NCWM website under supporting documents.

Item Under Consideration:

A. Uniform Labeling Regulation for E-commerce Products

1. Background

The Uniform Labeling Regulation for E-commerce Products Regulation was adopted during the 1XXth Annual Meeting of the National Conference on Weights and Measures (NCWM) in 20XX. Reporting to the Conference, the Packaging and Labeling Subcommittee stated:

The National Conference has adopted a model e-commerce labeling regulation for guidance to those states authorized to adopt such a regulation under provisions of their weights and measures laws. Since so much of the work of weights and measures officials in the field concerns consumer commodities and food, drug and cosmetic products, uniformity between the Federal (FDA and FTC) regulations, the Uniform Packaging and Labeling Regulation and any model regulations to be adopted by this Conference would provide significant benefit to both the U.S. consumer and manufacturer. The consumer benefit of having clear and consistent information on all product descriptions would allow for easier and more informed comparisons between similar and different products. The manufacturer benefit would be less complexity in ensuring labeling meets the Federal regulations.

The process of amending and revising this Regulation will be a continuing one in order to keep it current with practices in the e-commerce industry and make it compatible with appropriate federal regulations.

Nothing contained in this regulation should be construed to supersede any labeling requirement specified in federal law.

2. Status of Promulgation

(Table of Contents will be developed)

Uniform Labeling Regulation for E-commerce Products

Preamble

The purpose of this regulation is to provide accurate and adequate information for consumer products subject to FPLA requirements sold via e-commerce as to the identity and quantity of contents so that purchasers can make price and quantity comparisons.

Section 1. Application

This regulation shall apply to products and transactions which occur when purchasers are not present to purchase a consumer or non-consumer product in person.

This regulation specifically establishes requirements for websites, phone applications and other sites/programs which offer products for sale and permit consumers to make purchases without being physically present to inspect and select individual products and commodities in-person.

This regulation also applies to the product information which must accompany the products the purchaser receives after purchase from a website, phone application or site from which the purchase occurred.

This regulation shall not apply to:

- (a) inner wrappings not intended to be individually sold to the customer;**
- (b) shipping containers or wrapping used solely for the transportation of any commodities or products.**
- (c) shipping containers and inner wrappings for products or commodities purchased in quantity by manufacturers, packers, or processors in industrial proportions, or to wholesale or retail distributors who subsequently distribute or offer for sale products and commodities.**
- (d) auxiliary containers or outer wrappings used to deliver packages of such commodities to retail customers if such containers or wrappings bear no printed matter pertaining to any particular commodity.**

Section 2. Definitions

The following definitions apply to this regulation:

2.1. E-commerce – The process of offering for sale and transacting sales of one or more consumer commodities or non-consumer products when the customer is not physically present at the point of purchase. e-commerce includes the sale of consumer commodities or non-consumer products on-

line through websites and phone applications, catalog sales and sales transacted through 3rd parties to select and/or deliver consumer commodities to consumer residences.

2.2. E-commerce Product – A consumer commodity or non-consumer product offered for sale through e-commerce.

2.3. E-commerce Site – The site, program or interface through which customers make product purchases. An E-commerce Site may allow users to choose between similar products/commodities or provide a purchase option. Product comparisons may be permitted on a single e-commerce site or may require the purchaser to make product comparisons between one or more e-commerce sites. An e-commerce site may be a manufacturer website, a retail website, a delivery service site, phone applications offered by manufacturers, retailers, delivery services, 3rd party providers or other interface in which the customer is physically not present to inspect and select products.

2.4. Customer – A person or entity purchasing an e-commerce product for their own use, the use of another person, or a business.

2.5. Package. – Except as modified by Section 1, the term “package,” whether standard package or random package, means any consumer commodity or non-consumer product which is:

- (a) enclosed in a container or wrapped in any manner in advance of wholesale or retail sale; or**
- (b) whose weight, measure or count has been determined in advance of wholesale or retail sale. An individual item or lot of any commodity or non-consumer product on which there is marked a selling price, or for which there is represented to be a pre-determined selling price, based on an established price per unit of weight, count or measure shall be considered a package (or packages).**

2.6. E-commerce Package – Any consumer commodity or non-consumer product with a defined net quantity been which is sold through e-commerce and is:

- (a) enclosed in a container or wrapped in any manner in advance of on-line sale; or**
- (b) not enclosed prior to on-line sale and wrapped or packaged for shipment or delivery after sale, or**
- (c) not enclosed prior to on-line sale and does not require wrapping or packaging for delivery after sale.**

2.7. E-commerce Standard Package – A consumer commodity sold or offered for sale via e-commerce where lots or shipments of the same commodity have identical net content declarations.

2.8. E-commerce Random Quantity Package – A consumer commodity or non-consumer product sold or offered for sale via e-commerce wherein lots or shipments have varying net contents. The net quantity of contents for a random quantity package is fully defined once the consumer’s order is fulfilled by the seller or distributor.

2.9. Sale from Bulk. – The term “sale from bulk” means the sale of commodities when the quantity is determined at the time of sale.

2.10. E-commerce Bulk Product – A consumer commodity or non-consumer product sold or offered for sale via e-commerce and the product is not packaged at time of purchase. An e-commerce bulk product may or may not be wrapped upon its sale to facilitate shipment or delivery.

2.11. Consumer Commodity – An article, product or commodity offered for sale in packaged or bulk form in terms of weight, measure or count that is customarily produced or distributed for consumption or use by individuals for the purpose of consumption, personal care or personal use in services ordinarily in or around the household or for personal possessions.

2.12. E-commerce Consumer Commodity – A consumer commodity or product sold or offered for sale in bulk or packaged form via e-commerce which is an article, product or commodity intended for use by, produced for or customarily used by an individual or individuals for purposes of consumption or performance of services ordinarily rendered within a household.

2.13. E-commerce Non-Consumer Product – A product sold or offered for sale via e-commerce which is not a consumer commodity and is intended for use by a business or institution for industrial use or wholesale distribution. An E-commerce Non-Consumer product is typically sold by one business to another business.

2.14. E-commerce Non-Consumer Package – An e-commerce non-consumer product that is sold or offered for sale which has been packaged prior to sale on an e-commerce site.

2.15. E-Commerce Package Label. – Any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or contained within a package containing any consumer commodity, for purposes of branding, identifying, or giving any information with respect to the commodity or to the contents of the package.

2.16. E-commerce Receipt. – A complete record of a transaction involving the purchase of one or more e-commerce products purchased at the same time from the same e-commerce site. e-commerce receipts may be either electronic or paper as described in this regulation.

2.17. SI or SI Units – SI or SI Units means the International System of Units as established in 1960 by the General Conference on Weights and Measures (CGPM) and interpreted or modified for the United States by the Secretary of Commerce

2.18. U.S. Customary Units – Units based upon the inch, foot, gallon, and the pound commonly used in the United States of America. US Customary units include units for weight, liquid measure, linear measure, area measure, volume measure and dry measure. The NIST Handbook 130 Uniform Packaging and Labeling Regulation details use of U.S. Customary units for consumer packages.

2.19. Person – The term “person” means either singular or plural and shall include any individual, partnership, company, corporation, association, or society engaged in e-commerce activity.

Section 3. Required Declarations for E-commerce Sites Offering E-commerce Consumer Commodities and E-commerce Non-Consumer Products for Sale

Consumer commodities are being purchased through e-commerce sites whereby the customer makes purchase decisions based upon the product information provided on the website, phone application or other remote means. Because customers make e-commerce purchase decisions based

on available information provided on these sites or venues, customers should expect the information provided to be sufficiently complete in order to make informed purchase decisions and accurate value comparisons. To that end, certain price and FPLA-required label information must be provided to purchasers on the E-commerce site where a product is offered for sale. The elements of the FPLA information required by this regulation are also present in regulations promulgated by other Federal agencies such as EPA, FTC and the Department of Agriculture.

Non-Consumer Products are also purchased through use of e-commerce sites. In order for a site user to make value comparisons and a purchase decision, certain product information must be present for a purchaser to make informed product selections and purchases.

3.1. E-commerce Site Requirements for Standard Packages. – The following shall apply to e-commerce sites on which standard packages are offered for sale:

- (a) Declaration of Identity. – The product declaration of identity shall appear on the e-commerce site in a conspicuous and prominent location. Wherever applicable, the product brand name shall be combined with the declaration of identity. This information shall be provided separately from and in addition to any picture or image of the product.**
- (b) Declaration of Net Quantity. – The declaration of net quantity shall appear on the e-commerce site in a prominent location and in a conspicuous manner which clearly communicates the package net quantity. This information shall be provided separately from and in addition to any picture or image of the product. This information shall be provided in both U.S. customary and SI units unless the product is exempt from the Fair Packaging and Labeling Act requirements and meets existing labeling requirements for that product.**
- (c) Product Price. – The price of the product shall appear on the e-commerce site in a conspicuous and prominent location. Added cost information (if any) for shipping, delivery, taxes, and other services shall be provided to the customer prior to the completion of check-out and payment.**
- (d) Product Photo or Product Representation. – The e-commerce site shall provide a photo or visual representation of the product to help consumers confirm the identity of the item they intend to purchase. While a product photo or representation may depict certain required information, required information shall appear separately from the picture/representation. Any information provided in the picture/product representation shall not conflict with information required by this regulation.**
- (e) Brand Name or Product Manufacturer. – The e-commerce site shall provide the name of the manufacturer, distributor or the brand of any product offered for sale, where applicable.**

3.2. E-commerce Site Requirements for Random Quantity Packages. – The following shall apply to e-commerce sites on which random content packages are offered for sale:

- (a) Declaration of Identity. – The product declaration of identity shall appear on the e-commerce site in a conspicuous and prominent location. Wherever applicable, the product brand name shall be combined with the declaration of identity. This information shall be provided separately from and in addition to any picture or image of the product.**

- (b) Unit Price.** – **The unit price of the product shall appear on the e-commerce site in a conspicuous and prominent location. This information shall be provided separately from and in addition to any picture or image of the product.**
- (c) Net Quantity Information.** – **For each product offered for sale in random quantity packages, a range of potential product net quantities and an estimated maximum possible item net weight shall be displayed to customers on the e-commerce site in a conspicuous and prominent location.**
- (d) Product Price** – **For each product offered for sale in random quantity packages, a range of potential product prices and an estimated maximum possible item price shall be displayed to customers on the e-commerce site in a conspicuous and prominent location. Added cost information (if any) for shipping, delivery, taxes, and other services shall be provided to the customer prior to the completion of check-out and payment.**
- (e) Product Photo or Product Representation.** – **The e-commerce site shall provide a photo or representative visual representation of the product to help customers confirm the identity of the item they intend to purchase. While a product photo or representation may depict certain required information, required information shall appear separately from the picture/representation. Any information provided in the picture/product representation shall not conflict with information required by this regulation.**
- (f) Brand Name or Product Manufacturer.** – **The e-commerce site shall provide the name of the manufacturer, distributor or the brand when it is different from the person or entity responsible for the website.**

3.3. Bulk Product E-commerce Site Requirements. – **The following shall apply to e-commerce sites on which products from bulk are offered for sale:**

- (a) Declaration of Identity.** – **The bulk product declaration of identity shall appear on the e-commerce site in a conspicuous and prominent location. Brand name (if applicable) may be combined with the declaration of identity. This information shall be provided separately from and in addition to any picture or image of the bulk product.**
- (b) Unit Price.** – **The unit price of the product shall appear on the e-commerce site in a conspicuous and prominent location. This information should be provided separately from and in addition to any picture or image of the bulk product.**
- (c) Net Quantity Information.** – **An estimated minimum and/or maximum possible product net quantity, if applicable to any product offered for sale from bulk, shall be provided on the e-commerce site in a conspicuous and prominent location.**
- (d) Product Price** – **For products offered for sale limited to minimum and/or maximum per-order quantities, an estimated minimum or maximum possible product price, where applicable, shall be provided to the customer on the e-commerce site in a conspicuous and prominent location. Added cost information (if any) for shipping, delivery, taxes, and other services shall be provided to the customer prior to the completion of check-out and payment.**
- (e) Product Photo or Product Representation.** – **The e-commerce site shall provide a photo or visual representation of the bulk product to help customers confirm the identity of the item**

they intend to purchase. While a product photo or representation may depict certain required information, required information shall appear separately from the picture/representation. Any information provided in the picture/product representation shall not conflict with information required by this regulation.

3.4. Non-Consumer Product E-commerce Site Requirements. – The following shall apply to e-commerce sites on which non-consumer products are offered for sale:

- (a) Packaged Non-Consumer E-commerce Products. – If the non-consumer product is packaged as a standard package, the requirements of Section 3.1. E-commerce Site Requirements for Standard Packages shall apply. If the non-consumer product is packaged as a random content package, the requirements of Section 3.2. E-commerce Site Requirements for Random Quantity Packages shall apply.**
- (b) E-commerce Products Purchased from Bulk. – If the non-consumer product is not packaged at the time of purchase, the requirements for Section 3.3. Bulk Product E-commerce Site Requirements shall apply.**

Section 4. Required Information Upon Product Delivery: Requirements for Standard or Random Quantity Packages Purchased from an E-commerce Site

4.1. Standard Package E-commerce Delivery Requirements. – The information below shall be provided within, upon or together with each standard package delivered to / received by a customer in an e-commerce transaction. Products which are labeled to be compliant with the ULPR meet the requirements for Declaration of Identity, Net Quantity and Responsibility. Products which are not labeled for retail sale as prescribed by the UPLR must provide the following:

- (a) Declaration of Identity. – The product declaration of identity shall be prominently placed on the product or package or on written materials attached to or within the package. Where multiple products are delivered concurrently, it shall be clear which information applies to each product. Although the declaration of identity may also appear on a receipt or invoice, a receipt or invoice alone is not an adequate means to provide this information.**
- (b) Declaration of Net Quantity – The declaration of net quantity must be prominently placed on the product or package or on written materials attached to or within the package. Where multiple products are delivered concurrently, it must be clear which information applies to each product. Although the declaration of net quantity may also appear on a receipt or invoice, a receipt by itself is not an adequate means to provide this information.**
- (c) Declaration of Responsibility. – The declaration of responsibility, including name and address, must be prominently placed on the product or package or on written materials provided attached to or within the package. Where multiple products are delivered concurrently, it must be clear which information applies to each product.**
- (d) Product Price. – The total price of the product shall be provided to the customer, either on a receipt or invoice or by appearing upon, within, or with the delivered standard package.**

4.2. Random Quantity Package E-commerce Delivery Requirements. – The following shall apply to the information provided within, upon, or together with each random quantity package delivered to/received by a customer in an e-commerce transaction:

- (a) Declaration of Identity.** – **The product declaration of identity shall be prominently placed on the product or package or on written materials attached to or within the package. Where multiple products are delivered concurrently, it shall be clear which information applies to each product. Although the declaration of identity may also appear on a receipt or invoice, a receipt or invoice alone is not an adequate means to provide this information.**
- (b) Unit Price.** – **The unit price of the product shall be provided to the customer, either on a receipt or invoice, by marking or labeling upon the package(s) or by other written documentation included with the delivered product and must be in the same units of measure as displayed on the website.**
- (c) Net Quantity Information.** – **The actual net quantity of the product shall be prominently marked or displayed on the product or on written materials attached to or within the package and must be in the same units of measure as displayed on the website. Where multiple products are delivered concurrently, it shall be clear which information applies to each product. Although the declaration of net quantity may also appear on a receipt or invoice, a receipt or invoice alone is not an adequate means to provide this information.**
- (d) Product Price.** – **The actual charged price for the product must be prominently marked upon the product or be recorded and displayed on documentation within the package. Where multiple products are delivered concurrently, it shall be clear which information applies to each product. The product receipt shall provide the purchaser with cost information including the cost of the product and any applicable additional charges. Although the price information may also appear on a receipt or invoice, it must also be provided as specified above with the product package.**
- (e) Declaration of Responsibility.** – **The declaration of responsibility, including name and address, shall be prominently marked upon the product or package or recorded and displayed on documentation within the package. Where multiple products are delivered concurrently, it shall be clear which information applies to each product. Although the declaration of responsibility may also appear on a receipt or invoice, a receipt or invoice alone is not an adequate means to provide this information.**

4.3. Bulk Product E-commerce Delivery Requirements – **The following shall apply to the information provided on or with bulk products delivered to / received by a customer in an e-commerce sale:**

- (a) Declaration of Identity.** – **The bulk product declaration of identity shall be provided to the customer on a transaction receipt. A Declaration of Identity may also be marked upon or on written documentation attached to the bulk product, but this does not preclude it from being displayed on the receipt.**
- (b) Unit Price.** – **The unit price of the product shall be provided to the customer on the transaction receipt. The Unit Price may also be displayed upon the product or its packaging, but this does not preclude it from being recorded on the receipt.**
- (c) Declaration of Net Quantity.** – **The actual net quantity of the product delivered shall be provided to the customer on the transaction receipt. Actual net quantity shall be documented for the transaction as the customer was not present when the product(s) was selected. The Declaration of Net Quantity may be displayed upon the product or its packaging, but this does not preclude it from being recorded on the receipt.**

(d) Product Price. – The total price charged for the product shall be provided to the customer on the transaction receipt.

4.4. Non-consumer Product E-commerce Delivery Requirements. – The following shall apply to the information provided on or with a non-consumer product delivered to / received by a customer in an e-commerce sale:

(a) Packaged Non-Consumer E-commerce Products. – If the non-consumer product is packaged as a standard package, the requirements in Section 4.1. Standard Package E-commerce Delivery Requirements shall apply. If the non-consumer product is packaged as a random quantity package, the requirements of Section 4.2. Random Quantity Package E-commerce Delivery Requirements apply.

(b) E-commerce Products Purchased from Bulk – If the non-consumer product is not packaged at the time of purchase, the requirements for Section 4.3. Bulk Product E-commerce Delivery Requirements shall apply.

Section 5. Unit Pricing Requirements on E-Commerce Sites for Products Offered for Sale

5.1. Unit Pricing for E-commerce Products – A unit price is required for bulk and random weight products offered for sale on e-commerce sites.

5.2. Unit Price information for standard packages offered for e-commerce is optional.

When providing required or optional unit pricing information, the following requirements apply:

(a) The unit price must be consistent with the required method of sale for the product.

(b) Units of Measure. – The declaration of the unit price of a particular commodity in all package sizes offered for sale in a retail establishment shall be uniformly and consistently expressed in terms of:

(1) Price per kilogram or 100 g, or price per pound or ounce, if the net quantity of contents of the commodity is in terms of weight.

(2) Price per liter or 100 mL, or price per dry quart or dry pint, if the net quantity of contents of the commodity is in terms of dry measure or volume.

(3) Price per liter or 100 mL, or price per gallon, quart, pint, or fluid ounce, if the net quantity of contents of the commodity is in terms of liquid volume.

(4) Price per individual unit or multiple units if the net quantity of contents of the commodity is in terms of count.

(5) Price per square meter, square decimeter, or square centimeter, or price per square yard, square foot, or square inch, if the net quantity of contents of the commodity is in terms of area.

(c) Exemptions – The following exemptions from unit pricing requirements above are permitted:

- (1) Small Packages. – Commodities shall be exempt from these provisions when packaged in quantities of less than 28 g (1 oz) or 29 mL (1 fl oz) or when the total retail price is 50 cents or less.**
- (2) Single Items. – Commodities shall be exempt from these provisions when only one brand in only one size is offered for sale in a particular retail establishment.**
- (3) Infant Formula. – For “infant formula,” unit price information may be based on the reconstituted volume. “Infant formula” means a food that is represented for special dietary use solely as a food for infants by reason of its simulation of human milk or suitability as a complete or partial substitute for human milk.**
- (4) Variety and Combination Packages. – Variety and Combination Packages as defined in Section 2.9 and Section 2.10 in the Uniform Packaging and Labeling Regulation ^{[Section XX}
^{NOTE]} shall be exempt from these provisions.**

Section XX NOTE: See “Uniform Packaging and Labeling Regulation

5.4. The unit price must be in consistent units for similar products. For unit pricing to facilitate effective consumer cost comparison, similar products must be unit priced in the same manner (unit of measure). If different brands or package sizes of the same consumer commodity are expressed in more than one unit of measures, the e-commerce site must unit price the items consistently. For example, some juices may be labeled by the fluid ounce, pint, quart and gallon. Unit pricing similar liquid products by the fluid ounce, others by the pint and still others by the gallon does not facilitate value comparison. E-commerce sites must determine the most effective units for ensuring value comparison of similar products with varying product sizes.

5.5. When unit pricing, the e-commerce site must be to the nearest cent when a dollar or more. If the unit price is under a dollar, it must be listed to the tenth of a cent or the whole cent, but both methods cannot be used simultaneously. The e-commerce site must accurately and consistently use the same method of rounding up or down to compute the unit price to the whole cent.

5.6. The unit price information must be presented adjacent to the product price information. When present, unit price information is to be provided in a manner so that it is adjacent to all other product pricing information.

Section 6. Declaration of Quantity– E-commerce Products

6.1. E-commerce Site Requirements – Any e-commerce package offered for sale on an e-commerce site shall be displayed or represented on the e-commerce site with a separate Declaration of Quantity statement which details the quantity of product that the package contains in metric (SI) and US Customary units of measure and/or in count consistent with the requirements for packages intended for retail sale prescribed in the Uniform Packaging and Labeling Regulation (Reference appropriate UPLR section(s)). The Declaration of Quantity must be accurately displayed in relevant units to facilitate value comparison. The declaration shall not be misleading or deceptive.

6.2. E-commerce Package Requirements – E-commerce standard, random quantity packages, and pre-packaged non-consumer packages delivered to customers shall have an accurate Declaration of Net Quantity on the package label. In the event one of these e-commerce packages does not have a label, the Declaration of Net Quantity shall appear upon or in documentation within the package.

6.3. E-commerce Bulk or Unpackaged Product Requirements – E-commerce bulk and non-consumer products which are not packaged prior to purchase, at the time of delivery to the customer, must be accompanied by an accurate Declaration of Net Quantity on a printed transaction receipt. This printed receipt shall include the product identity, unit price, net quantity, and actual charged price in a clear and non-misleading manner for all bulk or non-packaged products. Electronic receipts may be used in place of paper receipts if the information required for a paper receipt is printed upon or contained in each individual bulk and/or non-packaged product. Electronic receipts may be provided in place of printed receipts if the customer specifies an electronic receipt is preferred.

6.4. Measurement Systems – The International System of Units (SI), known as the metric system and the U.S. customary system of weights and measures are recognized as proper systems to be used in the declaration of quantity for e-commerce products. Units of both systems may be combined in a dual declaration of quantity. Numerical count is permitted for products when the product statement of identity and numerical count are fully informative of the product’s contents.

6.5. Largest Whole Common Unit. – This regulation requires that the quantity declaration for similar types and sizes of products be in terms of the largest whole common unit. With respect to a particular product offered for sale, the declaration shall be in terms of the largest common whole unit of weight or measure with any remainder expressed:

(a) SI Units. – in decimal fractions of such largest whole unit.

(b) U.S. Customary Units. –

(1) in common or decimal fractions of such largest whole unit; or

(2) where appropriate, the next smaller whole unit or units with any further remainder in terms of common or decimal fractions of the smallest unit present in the quantity declaration.

6.6. Terms: Weight, Liquid Measure, Dry Measure, or Count. – The declaration of the quantity of a particular E-commerce product shall be expressed in terms of liquid measure if the commodity is liquid, in terms of dry measure if the commodity is dry, in terms of weight if the commodity is solid, semisolid, viscous, or a mixture of solid and liquid, or in terms of numerical count. However, if there exists a firmly established general consumer usage and trade custom with respect to the terms used in expressing a declaration of quantity of a particular commodity, such declaration of quantity may be expressed in its traditional terms if such traditional declaration gives accurate and adequate information as to the quantity of the commodity.

6.7. SI Units: Mass, Measure. – A declaration of quantity for an e-commerce product or package shall be expressed in units according to the provisions of the UPLR (add appropriate reference), the applicable Method of Sale Regulation (add appropriate reference) or the applicable regulation(s) of another regulatory agency. Generally, declarations are to follow the requirements detailed below:

(a) in units of mass shall be in terms of the kilogram, gram, or milligram;

(b) in units of liquid measure shall be in terms of the liter or milliliter, and shall express the volume at 20 °C, except in the case of petroleum products or distilled spirits, for which the declaration shall express the volume at 15.6 °C, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the

volume at the frozen temperature, and except also in the case of malt beverages or a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at 4 °C;

- (c) in units of linear measure shall be in terms of the meter, centimeter, or millimeter;
- (d) in units of area measure shall be in terms of the square meter, square decimeter, square centimeter or square millimeter;
- (e) in units of volume other than liquid measure shall be in terms of the liter and milliliter, except that the terms cubic meter, cubic decimeter, and cubic centimeter will be used only when specifically designated as a method of sale;
- (f) Shall be expressed in units so that the numerical declaration is greater than the number one “1” and less than number one thousand “1000”. While a common unit is required for similar products of similar size, when the product size range results in numerical declarations which are less than one or exceed 1000, then added units are permitted.

Examples:

500 g, not 0.5 kg

1.96 kg, not 1960 g

750 mL, not 0.75 L

750 mm or 75 cm, not 0.75 m

- (g) SI declarations should be shown in three digits except where the quantity is below 100 grams, milliliters, centimeters, square centimeters, or cubic centimeters where it can be shown in two digits. In either case, any final zero appearing to the right of the decimal point need not be shown; and the declaration of net quantity of contents shall not be expressed in mixed units.

Example:

1.5 kg, not 1 kg 500 g

- (h) Only those symbols as detailed in Section 6.5. Largest Whole Common Unit may be employed in the quantity statement on a package of commodity.

6.8. U.S. Customary Units: Weight, Measure. – A declaration of quantity for an e-commerce product or package shall be expressed in units according to the provisions of the UPLR (add appropriate reference), the applicable Method of Sale Regulation (add appropriate reference) or the applicable regulation(s) of another regulatory agency. Generally, declarations are to follow the requirements detailed below

- (a) in units of weight shall be in terms of the avoirdupois pound or ounce;
- (b) in units of liquid measure shall be in terms of the United States gallon of 231 cubic inches or liquid quart, liquid pint, or fluid ounce subdivisions of the gallon and shall express the volume at 68 °F, except in the case of petroleum products or distilled spirits, for which the declaration shall express the volume at 60 °F, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of a commodity that is normally sold in the refrigerated state, for which the declaration shall express the volume at

40 °F, and except also in the case of malt beverages, for which the declaration shall express the volume at 39.1 °F;

- (c) in units of linear measure shall be in terms of the yard, foot, or inch;**
- (d) in units of area measure shall be in terms of the square yard, square foot, or square inch;**
- (e) in units of volume measure shall be in terms of the cubic yard, cubic foot, or cubic inch; and**
- (f) in units of dry measure, shall be in terms of the United States bushel of 2150.42 in³, or peck, dry quart, and dry pint subdivisions of the bushel.**
- (g) Any generally accepted symbol and abbreviation of a unit name may be employed in the quantity statement on a package of commodity**

Section 7. Declaration of Identity: E-commerce Products

7.1. E-commerce Site Requirements – Any e-commerce package offered for sale on an e-commerce site shall be represented or displayed on the e-commerce site with a separate Declaration of Identity statement which details the specific product that the package contains in ordinary terms expressed in the English language. The declaration of identity needs to be specific enough to distinguish between similar types and varieties of products. A manufacturer brand name is not a statement of identity. The declaration shall not be misleading or deceptive.

7.2. The identity declaration shall be in terms of:

- (a) the name specified in or required by any applicable federal or state law or regulation or, in the absence of this;**
- (b) the common or usual name or, in the absence of this;**
- (c) the generic name or other appropriate description, including a statement of function (such as “cleaning powder”).**

7.3. E-Commerce Package Requirements – The same Declaration of Identity shall appear on the product label, on the product, attached to the product or within the product package in a clear and non-misleading fashion when delivered to the purchaser.

Section 8. Declaration of Responsible Party: E-commerce Products

8.1. E-commerce Packages. – Any e-commerce package offered for sale on an e-commerce site which is not owned or operated by the person responsible for the manufacture, packaging, labeling or distributing of the e-commerce package shall specify conspicuously either 1) on the label of the e-commerce package or 2) on documentation within the e-commerce package if there is no label, marking of the name and address of the product manufacturer, packer, or distributor. The name shall be the actual corporate name, or, when not incorporated, the name under which the business is conducted. The address shall include street address, city, state (or country if outside the United States), and ZIP Code (or the mailing code, if any, used in countries other than the United States); however, the street address may be omitted if it is listed in any readily accessible, well-known, widely published, and publicly available resource, including but not limited to a printed directory, electronic database, or website.

If a person manufactures, packs, or distributes a commodity at a place other than his principal place of business, the label may state the principal place of business in lieu of the actual place where the commodity was manufactured or packed or is to be distributed, unless such statement would be misleading. Where the commodity is not manufactured by the person whose name appears on the label, the name shall be qualified by a phrase that reveals the connection such person has with such commodity, such as “Manufactured for and packed by _____,” “Distributed by _____,” or any other wording of similar import that expresses the facts.

8.2. E-commerce Bulk Products and Select Random Quantity Packages. – All responsibility for bulk e-commerce products and e-commerce random quantity packages bearing no Declaration of Responsible Party information shall be that of the person or entity responsible for the e-commerce site.

8.3. E-commerce Site Requirements. – The operator of an e-commerce site offering products for sale shall comply with at least one of the following requirements regarding each product offered for sale:

- (a) The e-commerce site shall provide the name and address of the product manufacturer, packer or distributor.**
- (b) The e-commerce site shall provide the name and website address of the product manufacturer, packer, or distributor.**
- (c) The e-commerce site shall provide the product brand name or the name of the product manufacturer, distributor, or packer, when product manufacturer, distributor or packer address information is displayed on the package label at the time the product is delivered to the purchaser.**
- (d) When the e-commerce site owner or operator is the also the product manufacturer, packer or distributor, the e-commerce site shall clearly and conspicuously display its name, address and contact information on both the e-commerce site and on the transaction receipt.**

Section 9. Product Photograph or Accurate Product Depiction/Representation: E-commerce Site Requirements

9.1. E-commerce Packages. Any e-commerce package offered for sale on an e-commerce site shall be represented on the site with a current photograph of the package offered for sale. As an alternative, a detailed and accurate photographic depiction or representation of the package may be displayed. This picture or graphical representation shall be sufficiently sized, detailed and clear to enable the customer to distinguish this package or product from similar packages including varying sizes, varieties and product functions.

9.2. E-commerce Random Weight Packages. – E-commerce random weight products offered for sale on an e-commerce site shall be accompanied on the site by a representative picture or photographic depiction of product (packaged or unpackaged) which is being offered for sale. This picture or photographic depiction shall be sufficiently sized, detailed, and clear to enable the customer to see the product and the pictured item shall be representative of the product being offered for sale.

9.3. E-commerce Bulk Products and Select Random Quantity Packages. – Bulk products offered for sale on an E-commerce site shall be accompanied on the site by a representative picture or

photographic depiction of the unpackaged product which is being offered for sale. Products packaged in random quantity packages shall be displayed on the site with a representative depiction of a representative package, a clear and conspicuous statement explaining that packaged products are of random quantity, and instructions to customers regarding the means to specify a maximum or minimum package quantity in ordering and purchasing the product. The picture(s) or photographic depiction(s) shall be sufficiently sized, detailed, and clear to enable the customer to see the product and the pictured item shall be representative of the product being offered for sale.

9.4. E-commerce Non-Consumer Packages. – Non-consumer products offered for sale on an e-commerce site shall be accompanied on the site by a representative picture or photographic depiction of the product which is being offered for sale. This picture or photographic depictions shall be sufficiently sized, detailed, and clear to enable the customer to see the product and the pictured item shall be representative of the product being offered for sale.

9.5. Pictures on Receipts: Transaction receipts are not required to provide pictures or photographic depictions.

Section 10. Prominence and Placement of Required Information on E-commerce Sites: Offering E-commerce Products for Sale

10.1. General. – All information required to appear on the e-commerce site which offers products for sale shall appear thereon in the English language and shall be prominent, definite, plain, and conspicuous as to size and style of letters and numbers and as to color of letters and numbers in contrast to color of background. Any required information that is either in hand lettering or hand script shall be entirely clear and equal to printing in legibility.

10.1.1. Location. – The required e-commerce site declarations below must be present in the top 50% the screen in which the product is offered for sale:

- (a) identity,**
- (b) net quantity,**
- (c) product price,**
- (d) brand or manufacturer name and**
- (e) package picture or photographic representation/depiction.**

10.1.2. Style of Type or Lettering – The required e-commerce site declarations shall be in such a style of type or lettering as to be boldly, clearly, and conspicuously presented with respect to other type, lettering, or graphic material on the screen.

10.1.3. Color Contrast. – The required e-commerce site declarations shall be in a color that contrasts conspicuously with its background.

10.1.4. Package Picture or Photographic Representation. – The product picture or photographic depiction shall be in the actual colors of the package or product. Slight variations in color shading are acceptable.

10.2. Combined Declarations of Required Information. – One or more of the required e-commerce site declarations can be combined if the resulting statement is clear and not misleading. This shall not apply to product photograph or photographic representation. Combined declarations shall be of a consistent size same size and font, excepting the product price which may be in a larger size and a different font.

10.2.1. Combined Declarations of Required Information – The declarations of identity, net quantity, product price and/or brand or manufacturer name can be combined into a single statement on an e-commerce site provided the information is clear and not misleading. A combined statement may appear on a single line or multiple lines as illustrated below:

Examples:

1 kg (2.2 lb) Brand X Laundry Detergent \$4.99

Brand X

Laundry Detergent

1 kg (2.2 lb)

\$4.99

10.2.2. Free Area – The area surrounding a required individual or combined declaration on an e-commerce site shall be free of printed information:

(a) above and below, by a space equal to at least the height of the lettering in the declaration; and

(b) to the left and right, by a space at least equal to twice the width of the letter “N” of the style and size of type

10.3. Alternate Languages. – An e-commerce site may provide product information in one or more languages in addition to English. When an e-commerce site does provide any required product information in an additional language, all the required information specified in this regulation must be provided in that additional language or languages.

Section 11. Prominence and Placement: Delivered E-commerce Packages, Products and Receipts

11.1. General. – All information required to appear on an e-commerce package, product, or receipt shall appear thereon in the English language and shall be prominent, definite, plain, and conspicuous as to size and style of letters and numbers and as to color of letters and numbers in contrast to color of background. Any required information that is either in hand lettering or hand script shall be entirely clear and equal to printing in legibility.

11.2. Packages Intended for Sale in Retail Locations–A package properly labeled to comply with the retail shelf requirements of the UPLR will also comply with the e-commerce package label requirement.

11.3. Orientation of Required Declarations. – The required declarations on packages, products, or receipts shall be presented in such a manner as to be generally consistent to the orientation of the label or package.

Section 12. Effective Date

This regulation shall become effective on _____.

Given under my hand and the seal of my office in the City of _____ on this _____ day of _____.

Signed _____

NIST OWM Detailed Technical Analysis:

OWM recommends that the Committee request that PALS develop a strategy to reach out to other stakeholders. OWM recommends that the following organizations and others be invited to participate in the development of this proposed regulation:

- Federal Agencies (especially FTC and FDA)
- Major E-commerce retailers (Amazon, Etsy, Walmart, Target, Home Depot).
- Smaller E-commerce retailers (E-Bay)
- Trade Associations (Consumers Brands Association, Food Industry Association, National Retail Federation, Retail Industry Leaders Association (RILA))
- Consumer Groups (Consumer Reports, National Consumers League)

OWM would be able to publish a Federal Register Notice (FRN) requesting comments about the proposed rule for the NCWM. OWM will assist PALS in these outreach efforts above upon request.

- OWM recommends that PALS consider developing a presentation which illustrates how to apply the requirements to a mockup of different e-commerce websites. Which should include graphical illustrations in showing how the requirements are applied. This would assist readers to understand this proposal as it moves forward for adoption. Later these graphics could be used as a training webinar to assist weights and measures administrators and inspectors as to how to implement an enforcement program. The presentation could also be modified for use as an educational webinar for designers and developers of e-commerce websites.
- OWM supports the PALS proposal to develop a “best practices” guide for web designers and developers.
- OWM recommends PALS consider revising the title of the Regulation so that it better reflects the content which includes labeling (IRQ for website, product itself, and information accompanying the product), pricing, unit pricing, and graphic illustrations.)
- OWM also recommends PALS develop an Examination Procedure Outline (EPO) similar to the EPO for Price Verification. This would provide administrators and inspectors with detailed guidance on application of the regulation. This would allow for illustrations and examples of acceptable presentations and formats of required information. It may be worthwhile for States to start performing mock inspections of specific types of websites during the development of the regulation. This would allow for both the regulation and EPO to be developed simultaneously, and lessons learned in the mock inspections can be used to refine the regulation and answers any questions that arise. The primary reason for this proposal is to provide the states with a regulation that can be uniformly enforced across all websites. It is essential to provide uniformity so that

you do not have a website owner told by one state to present information in a specific fashion, only to have a different state (or even the same state) reject the website.

- OWM recommends that PALS develop a proposed amendment to Section 11 “Powers and Duties of the Director” in the Uniform Weights and Measures Law to authorize the Director to adopt regulations that encompass the various aspects necessary to ensure e-commerce websites and other regulated sales outlets comply with legal metrology requirements. Broaden the definition of current section 2.12. E-commerce Consumer Commodity to include all commodities sold online. The definition should say “any commodity offered or exposed for sale by weight, measure or count from bulk or in packaged form” is subject to this regulation.
 - Language to modify the Weights and Measure Law, Section 11. Powers and Duties of the Director” was submitted by PALS to the Committee. NCWM Executive Director Onwiler informed the L&R Chair McGuire that PALS could not provide new language at the Interim but would be required to submit a Form 15.
- Consider making the suggested amendments to Section 5 “Unit Pricing Requirements for Products Offered for Sale on an E-commerce Site” outlined in the OWM analysis supporting documentation. (This was addressed by PALS in the current 2022 Agenda).
- Consider adding an effective date to the regulation to provide sufficient time for online retailers to prepare for regulation.
- PALS Chair Guay submitted a revised proposal on April 12, 2022, which can be is located under the NCWM L&R supporting documents. OWM and PALS has not had sufficient time to review the changes that were submitted.
- OWM has submitted additional suggestions, edits, formatting changes, and clarifications on May 24, 2022, to PALS for this item including development of a table of contents, clarification of application and purpose of the regulation, a suggestion to provide more uniformity in like terms used, suggestions to provide relevant examples in certain sections for clarification, revisiting the requirements for bulk sales, among others.
- OWM also recommends PALS consider revising the of title of the Regulation so that it is more reflective of the content of the regulation beyond labeling (e.g., pricing, unit pricing, graphic illustrations).

Summary of Discussions and Actions:

The Committee gave an Assigned status to this item at the 2022 Interim Meeting and believes that more outreach to online retailers is needed. The Committee is uncertain that the impacted industry has had an opportunity to review and engage in the process.

The Committee also considered adding an effective date to the proposal to address this concern but determined it would be better for PALS to reach out to retailers first and then consider the need for an effective date based on the feedback received.

The Committee replaced the original proposal with modified language provided by PALS on January 9, 2022. The new language also includes a new section, “Section 11. Powers and Duties of the Director.”

Additional recommendations include:

- Reach out to all stakeholders including online retailers, producers, consumer groups, trade associations, and engage them in the PALS work.
- Consider comments submitted in January by NIST OWM to the PALS Chair and L&R Committee.
- Reach out to other federal agencies with authority to regulate online retailers.
- Broaden the definition of current section 2.12. E-commerce Consumer Commodity.
- Conduct mock inspections of these e-commerce websites to help develop the item.
- Prepare a presentation which illustrates how to apply the requirements.
- Consider making the suggested amendments to Section 5 “Unit Pricing Requirements for Products Offered for Sale on an E-commerce Site” outlined in the OWM analysis supporting documentation. (this was addressed by PALS in the 2022 Item Under Consideration)
- Develop an EPO, develop a best practice guide for web design, develop a presentation on how to apply the requirements for E-commerce websites and add a section for unit pricing requirements.
- Consider adding an effective date to provide sufficient time for online retailers to prepare for regulation.

At the 2022 NCWM Annual Meeting, the Committee heard from PALS Chair Guay on the plan to address the recommendations the L&R Committee made at the 2022 NCWM Interim Meeting. The L&R Committee encouraged PALS to address the Committee’s concerns that is stated within the writeup. PALS had submitted modification to the Weights and Measures Section 11. Powers and Duties of the Director” to address states authority to enforce ecommerce regulations as adopted in the Handbook. PALS was instructed by Mr. Onwiler, that in accordance with NCWM policies, they must be submitted the WAM proposal on a NCWM Form 15 to be considered.

At the 2022 Annual Meeting, the Package and Labeling Committee continued work on the primary challenges for the e-commerce proposal related to maximizing its review prior to adoption and where and how it should be published upon completion. Many expect that reaching Informational status on the agenda will promote discussion of the item by encouraging businesses and consumers to speak at NCWM and regional meetings, educating the membership on e-commerce and building greater confidence in the proposal. Prior to Informational status, PALS will initiate outreach prior to the 2023 NCWM Interim Meeting, encouraging feedback prior to and at the 2023 NCWM Interim Meeting in January. PALS is also debating whether the e-commerce proposal should be an NCWM standard published by NCWM, should be a standard published in NIST Handbook 130, and/or published as an NCWM Guidance/Recommended Practice Document once that mechanism is established by NCWM.

Regional Association Reporting:

At the 2021 WWMA Annual Meeting, PALS Chair Guay gave a presentation on this item and recommended this be Developing. Mr. Kurt Floren (Los Angeles County, California) pointed out several editorial changes, and suggested that this be a Voting item. Mr. Kevin Schnepf (CDFA-DMS) also suggested editorial changes. Ms. Lisa Warfield (NIST OWM) recommended that PALS reach out to other stakeholders. She also suggested that a broader definition of section 2.12:

“any commodity offered or exposed for sale by weight, measure or count from bulk or in packaged form.”.

Ms. Warfield also suggested mock inspections of these e-commerce websites to help develop the item and recommended that PALS consider developing a presentation which illustrates how to apply the requirements to a mockup of different ecommerce websites.

The Committee recommended that this Item be Assigned to the PALS Subcommittee. The Committee recommended that PALS develop a proposed amendment to Section 12 “Powers and Duties of the Director” in the Uniform Weights and Measures Law to authorize the Director to adopt regulations that encompass the various aspects necessary to ensure ecommerce websites and other regulated sales outlets comply with legal metrology requirements. The Committee also recommended that PALS consider making the suggested amendments to Section 5 “Unit Pricing Requirements for Products Offered for Sale on an E-commerce Site” outlined in the OWM analysis supporting documentation. The Committee recommended that PALS provides stakeholder outreach to Federal agencies, major e-commerce retailers, smaller e-commerce retailers, trade associations and consumer groups. The Committee also recommended that PALS consider Ms. Warfield’s comments to develop material for e-commerce websites and conduct practical applications of the regulation, to develop a presentation which illustrates how to apply the requirements to different e-commerce websites.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, PALS Chair Guay commented that this is a new effort that was originally intended as a guidance document but has evolved into a stand-alone model regulation. He reviewed the main components of the proposed language. PALS recommended this item move to Informational status for further input. Ms. Warfield commented recommended that PALS develop a strategy to reach out to stakeholders and invite them to participate in the development of this item. She asks the Committee to consider the NIST analysis for this item which was submitted to NCWM and CWMA L&R Committee members. The Committee recommended this item be given Informational status for stakeholder input.

At the 2022 CWMA Annual, Chair Guay, commented that the item is fully developed, and he believed the item needs to be reclassified as Informational because the item has Assigned status and no one from industry has been able to comment on it during open hearings. Mr. Charlie Stutesman (Kansas) commented that he believes the item should be escalated as a Voting item so it can be discussed and vetted throughout the fall regional meetings. Chair Guay commented that he believes the item should be made Informational rather than voting because there has not been the opportunity for companies to come forward and speak to the model regulation.

The Committee recommended this item be classified as an Informational item to allow input from industry, particularly during open hearings.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, PALS Chair Guay gave a presentation of the work done by the group. Dr. Matthew Curran (Florida) commented on the need for these regulations for accountability and enforcement. NIST OWM provided written analysis that suggested this item be developing and recommended reaching out to other stakeholders, amend the powers and duties of state Directors, develop an EPO, develop a best practice guide for web design, develop a presentation on how to apply the requirements for e-commerce websites and add a section for unit pricing requirements.

The Committee recommended this item be Assigned to PALS for further development using the guidance from NIST OWM written analysis.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, PALS Chair Guay commented that this item was originally developed as a guidance document rather than model language for regulation. As the work has progressed on this item and the demand in the marketplace continues to grow, it has become apparent there needs to be model regulation for e-commerce. Mr. Guay commented that PALS has fully developed the Item and welcomes comments from the regions. Mr. Mike Sikula (New York) recommended this item move forward as an Informational item to allow industry members time to vet and to attend future meetings and comment on the model language. Mr. David Sefcik (NIST OWM) reviewed the NIST analysis comments and stated that a copy has been provided to PALS for review. Mrs. Cheryl Ayer (New Hampshire) expressed her appreciation to PALS and supports the item moving forward. Mr. John McGuire (New Jersey) expressed his appreciation to Mr. Guay for his long and hard work on this item. He concurs the item should move forward with Informational status. The Committee recommended this item move forward with Informational status.

At the 2022 NEWMA Annual Meeting, Mr. McGuire (Acting NEWMA L&R Chair and New Jersey) noted that NCWM website has new information posted on this item under the NCWM L&R supporting documents. He has yet to review the material to determine what changes, if any, were made. Mr. Sefcik stated that NIST OWM supports the work being done by PALS. Mr. Jason Flint (New Jersey) stated that Section 5.2., Unit Pricing should be mandatory not voluntary. NEWMA L&R Committee recommended this item continue to be Assigned to PALS. NEWMA L&R requests that PALS revisit or re-review and discuss whether Unit Pricing should be mandatory or voluntary.

OTH-07.1 D Fuels and Lubricants Subcommittee

Source: NCWM Fuels and Lubricants Subcommittee (FALS)

Submitter's Purpose and Justification:

For more information or to provide comment, please contact the FALS Chair:

Dr. Bill Striejewski
Nevada Department of Agriculture, Division of Measurement Standards
(775) 353-3792, wstriejewski@agri.state.nv.us

Provide an update of the activities of this Subcommittee which works on direction from and reports to the L&R Committee. The mission of FALS is to assist the L&R Committee in the development of agenda items that affect Handbook 130, Uniform Fuels and Automotive Lubricants Inspection Law and Uniform Fuels and Automotive Lubricants Regulation. The Subcommittee consists of regulators and associate members who have subject matter expertise in fuels and lubricants. The Subcommittee will be called upon to aid in the development, provide guidance, and help establish NCWM position on items concerning fuels and lubricants.

Summary of Discussions and Actions:

This item is to provide a report on the activities of the Fuels and Lubricants Subcommittee (FALS) which reports and provides recommendations to the Laws and Regulations Committee.

FALS met on Sunday, January 9, 2022, at the 2022 NCWM Interim Meeting in a hybrid fashion, with attendees both in-person and via zoom at the 2022 NCWM Interim Meeting in Tampa, Florida, to review items related to fuel and automotive fluid standards that appear on the L&R agenda. FALS discussed the Item Block 6 that has been assigned to the FALS, with a report and comments from members of the Focus Group working on the block. There was also discussion of one item block that had been submitted by FALS following the 2022 NCWM Annual Meeting and two items of interest to the Subcommittee. Finally, two issues were raised as New Business. Those issues and the existing FG will be discussed below.

FALS met on Sunday, July 10, 2022, at the 2022 NCWM Annual Meeting to review items related to fuel and automotive fluid standards that appear on the L&R Agenda. FALS discussed Item Block 6 Transmission Fluid, which has been assigned to the FG with a brief update and comments from members of the FG. This is discussed in more detail below. There were also brief discussions of Item Block 4 EPA CFR Reference Updates, which had been submitted by FALS, as well as MOS-22.5 Section 2.31.2.1. Labeling of Grade Required and 2.31.2.2. EPA Requirements Also Apply, an item concerning biodiesel labeling that is of interest to the Subcommittee. Finally, two issues initially discussed during the FALS meeting at the 2022 Interim Meeting were discussed.

Item Block 6 Transmission Fluid Focus Group (B6: MOS-21.1. Section 2.36.2. Labeling and Identification of Transmission Fluid and B6: FLR-21.2. Section 3.14.1. Labeling and Identification of Transmission Fluid): The FG was originally formed because while the model regulation in NIST Handbook 130 is sufficient, there is no licensing system for transmission fluid as there is with engine oils. Chair Striejewske read an update from FG Chair Johnson (Automotive Oil Change Association), as she was not able to attend the 2022 NCWM Annual Meeting. In summary, the FG has reached agreement that (1) designating transmission fluid “obsolete” is impractical for a variety of reasons, including lack of a comprehensive and consistent standards setting organization mechanism, and therefore the original amendment approach should no longer be pursued; and (2) that they should switch focus to developing other potential consumer protection language for labels. The latter, for instance, may involve exploring general references to checking one’s owner’s manual for transmission fluid recommendations. This summary was supported by FG members who attended the FALS meeting.

NIST Recommendation for Citing Federal Regulations: During the New Business portion of the FALS agenda, Ms. Warfield (NIST Technical Advisor for L&R) brought up a recommendation from the NIST OWM L&R Analysis, a supporting document for the Fall, 2021 regional meetings and was included on the NCWM Publication 15 web page under “Additional Letters, Presentations, and Data” for the L&R Committee. Ms. Warfield suggested formalizing citations from federal language to include the full title with the CFR number to increase clarity for the reader. There was some discussion during the FALS meeting, but as many were not familiar with the document or the recommendation, this will be discussed further later.

Request for Assistance Crafting a Form 15: Mr. Allan Morrison (California) mentioned that ASTM has completed an updated specification on CNG and LPG (ASTM D8080 Standard Specification for Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) (Used as a Motor Vehicle Fuel) and was hoping for assistance in getting these updates into NIST HB 130. There was some discussion and offers to assist Mr. Morrison prepare one or more Form 15’s for the next cycle.

The Committee heard comments from Mr. Corr on Items MOS-22.1 and FLR-22.1 and recommended FALS review and address these concerns within NIST HB130. These comments have been provided to the Chair of FALS for consideration.

Additionally, the Committee recommended that FALS review all EPA and FTC title citations throughout NIST HB 130.

Regional Association Reporting:

At the 2021 WWMA Annual Meeting, the Committee heard a report from the FALS Chair Striejewske. The Committee supports the work of FALS.

At the 2021 SWMA Annual and the 2021 CWMA and NEWMA Interim Meetings, the Committee heard comments from Mr. Randy Jennings (FALS Vice Chair) pertaining to items on the FALS agenda, and on the FALS adopted Standard Operating Procedure that will guide its work moving forward. The Committee supports the work of FALS.

OTH-11.1 D Packaging and Labeling Subcommittee

Source: NCWM Packaging and Labeling Subcommittee (PALS)

Submitter's Purpose and Justification:

Provide an update of the activities of this Subcommittee which reports to the L&R Committee. The mission of PALS is to assist the L&R Committee in the development of agenda item, NCWM positions and new standards related to packaging and labeling. The Subcommittee will also be called upon to provide important and much needed guidance to the regulatory and consumer packaging communities on difficult questions. PALS will report to NCWM L&R Committee. The Subcommittee is comprised of a Chair, eight voting members, and anyone interested in packaging and labeling standards.

This item is to provide a report on the activities of the PALS which reports and provides recommendations to the Laws and Regulations Committee.

Summary of Discussions and Actions:

At the 2020 NCWM Interim Meeting, PALS Chair Guay reported that PALS is continuing to draft a proposed regulation and accompanying "Best Practice" document regarding products sold via e-commerce. The focus of this document is to help provide more clarity on the information necessary for consumers to make informed product choices on-line and for consumers to confirm receipt of the products ordered. PALS currently believes certain information is better included in a regulation while other information is better provided as guidance or Best Practice document. PALS will work on development of this proposed regulation and proposed guidance in the spring of 2020 with a target to have a draft proposal prepared by the 2020 NCWM Annual meeting. Separately, PALS believes the text of "Recommended Best Practice" for quantity expressions is complete. PALS is developing an illustrative appendix with graphics support being provided by the NCWM office. PALS is planning to have the "Recommended Best Practice" Document for quantity related expressions appearing on a principal display panel and the proper declaration of net quantity completed by the summer of 2021. The document has been completed and the work continues as an illustrative appendix.

PALS reviewed the framework for a proposed NIST Handbook 130 regulation regarding products sold through e-commerce. This regulation would focus on ensuring buyers have sufficient information to make an accurate product selection and value comparison at the time of purchase, while also ensuring the

buyer can confirm the product purchased is the product they receive. PALS plans to make this proposal its priority for 2021.

At the 2021 NCWM Annual Meeting, PALS reviewed a developing draft regulation pertaining to websites which offer products for sale through e-commerce, and to products which are sold and delivered because of an e-commerce purchase. PALS received comments from those in attendance at the PALS work session and they believe the next step should be to forward this proposal to regions for broader stakeholder review and comment. PALS plans to submit a proposal for this item to obtain comments at the 2021 Fall Regional Association Meetings.

At the NCWM 2022 Annual Meeting, the Committee heard from PALS Chair Guay who gave an overview on the plan to address the recommendations the Committee made at the 2022 Interim Meeting. The Weights and Measures Law, Section 11. Powers and Duties was added to the original proposal, but in accordance with NCWM policies, PALS was informed it must be submitted on a NCWM Form 15 to be considered. PALS continued their work on the following items:

Federal Tobacco and Tax Bureau (TTB) – PALS is drafting NCWM comments for submission to the Federal Tobacco and Tax Bureau (TTB) regarding a May 2022 Federal Register Notice regarding prescribed sizing, dual unit labeling and package fill accuracy for certain alcohol-containing beverages. The comment cut-off date was in late July 2022. PALS will draft comments and share with the NCWM Board and L&R Chair prior to submission.

Recommended Best Practice – PALS will be working to finalize a “Recommended Best Practice” document for quantity expressions appearing on the principal display panel (PDP) in addition to the required statement of net quantity as a Recommended Practice Guidance document in the next few months. The document has been mostly complete except for finalization of two appendices which we hope to complete in the next six months.

Regional Association Reporting:

Western Weights and Measures

At the 2021 WWMA Annual Meeting, the Committee heard a report from the PALS Subcommittee Chair Guay. The Committee supports the work of PALS.

Central Weights and Measures

At the 2021 CWMA Interim Meeting, Mr. Chris Guay (Chair of PALS) invited participation from CWMA members interest in packaging and labeling.

Southern Weights and Measures

At the 2021 SWMA Annual Meeting, Mr. Chris Guay (PALS) stated that they continue to work on PALS and will present their findings to the FDA for food safety as it relates to e-commerce. He also requested more involvement from stakeholders in their meetings to receive input as PALS moves forward on e-commerce regulation. The Committee recognizes and supports the work of PALS.

Northeastern Weights and Measures

At the 2021 NEWMA Interim Meeting, Mr. Chris Guay (PALS Subcommittee Chair) commented that he will be speaking on behalf of the Committee at an upcoming FDA hearing on e-commerce.

At the 2022 NEWMA Annual Meeting, no comments were made during open hearing.

Item Block 1 (B1) HB 130, UPLR, SEC. 2.8. Multiunit Package. HB 133 Modify “Scope” for Chapters 2 – 4, Add a Note following Sections 2.3.7.1. AND 2.7.3., Create a Chapter 5. Specialized Test Procedures and HB133 Appendix F. Glossary

(This Item was Adopted)

- B1: PAL-19.1 V Section 2.8. Multiunit Package
- B1: NET-19.1 V Section 1.2.4. Maximum Allowable Variation
- B1: NET-19.2 V Modify “Scope” for Chapters 2 – 4, and a note following Section 2.3.7.1. Maximum Allowable Variation (MAV) Requirement and 2.7.3. Evaluation of Results –Compliance Determinations
- B1: NET-19.3 V Create a Chapter 5, Specialized Test Procedures
- B1: NET-19.4 V Appendix F. Glossary

(Note: B1:NET-19.3, “Handbook 133, Create a Chapter 5. Specialized Test Procedures” must be adopted in order for the remainder of Item Block 1 to proceed.)

Source: NIST Office of Weights and Measures

Submitter’s Purpose and Justification:

This item was originally submitted and developed by:

Ms. Lisa Warfield
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When current test procedures in NIST Handbook 133 are used and an MAV is applied to the total quantity declaration on some multiunit and variety packages the MAV allowed for the individual inner packages can indirectly be reduced as much as 50 % or more, depending on the number of individual items in the package. This proposal modifies Handbook 133 to add language regarding the total quantity declaration on multiunit or variety packages, when the MAV may need to be recalculated based on the Total Quantity MAV.

When a total quantity declaration on a multiunit or variety package is verified, it will require the inspector, except when the MAV is based on a percentage of the labeled quantity, to calculate and use a “Total Quantity MAV.” This calculation will determine if minus package errors are unreasonable (an unreasonable error is a minus package error that exceeds an MAV specified in the proper table of MAVs in Handbook 133, Appendix A. “Tables”) A “Total Quantity MAV” is calculated by multiplying the number of individual inner packages by the MAV value, which is based on the declared quantity of the individual inner packages. It is found by looking up the MAV for the individual inner package quantity (See HB 133, Appendix A. “Tables”) and then calculating the “Total Quantity MAV.” This test procedure will be used to assist inspectors with their inspection.

NIST OWM Executive Summary for Item Block 1 (B1)–HB 130, UPLR, Sec. 2.8. Multiunit Package. HB 133 Modify “Scope” for Chapters 2 – 4, Add a Note following Sections 2.3.7.1. AND 2.7.3., Create a Chapter 5. Specialized Test Procedures and HB133 Appendix F. Glossary

NIST OWM Recommendation: OWM believes these items are fully developed and recommends this as a Voting item. We do encourage that states perform inspections using this Specialized Test Procedures and share any of their concerns with NCWM and OWM.

Item Under Consideration:

B1: PAL-19.1 V Section 2.8. Multiunit Package

2.8. Multiunit Package. - A package containing two or more individual packages of the same commodity, in the same quantity, intended to be sold as a multiunit package., ~~but where the component packages are labeled individually in full compliance with all requirements of this regulation.~~

B1: NET-19.1 V Section 1.2.4. Maximum Allowable Variation

1.2.4. Maximum Allowable Variation

The limit of the “reasonable minus variation” for an under filled package is called a “Maximum Allowable Variation” (MAV). An MAV is a deviation from the labeled weight, measure, or count of an individual package beyond which the deficiency is considered an unreasonable minus error. Each sampling plan limits the number of negative package errors permitted to be greater than the MAV.

Packages may be offered for sale individually or offered for sale in multiunit packages or variety packages which contain two or more individual inner packages.

When packages are tested whether individual, multiunit, or variety packages, the MAV is applied to each package in the sample which has a minus package error.

When a total quantity declaration on a multiunit or variety package is being verified, and the MAV is not determined in terms of a percent of the labeled quantity, a “Total Quantity MAV” is compared to each minus Total Quantity Package Error(s) to determine if it is unreasonable.

(Amended 2010 and 2022)

Before determining the MAV and proceeding with tests of the quantity of contents in any multiunit or variety package, calculate the sum of the labeled quantity statements of all individual inner packages and verify that the labeled Total Quantity Statement reflects the accurate sum. If an error exists between the sum of the labeled quantity statements of individual inner packages and the Total Quantity Statement, the package is not in compliance and shall be deemed in violation of labeling requirements of NIST Handbook 130, Uniform Packaging and Labeling Regulation, requiring an accurate summing and statement of total quantity. Do not test for net quantity determination.

1.2.4.1. Total Quantity MAV for Multiunit and Variety Packages (See Chapter 5. “Specialized Test Procedures”)

a. Multiunit Package. – In verifying a total quantity declaration that appears on a multiunit package compare a Total Quantity MAV to each minus Total Quantity

Package Error to determine if the error is unreasonable. Calculate the Total Quantity MAV using the following formula:

$$\textit{Total Quantity MAV} = \textit{Number of Individual Inner Packages} \times \textit{MAV for Individual Inner Package Quantity}$$

Terms are defined as:

Number of Individual Inner Packages. – The total number of individual inner packages having a uniform labeled weight, measure and/or count.

MAV for Individual Inner Package Quantity. – The MAV for the labeled quantity for the individual inner packages specified in the proper table of MAVs in Appendix A. “Tables.”

b. Variety Package. – In verifying a total quantity declaration that appears on a variety package, compare a Total Quantity MAV to each minus Total Quantity Package Error to determine if the error is unreasonable. Calculate the Total Quantity MAV using the following formula:

$$\textit{Total Quantity MAV} = \textit{The sum of the applicable MAVs for all Individual Inner Packages}$$

Variety packages include commodities that may be generically similar, but differ in weight, measure, volume, or design variation (e.g., color, flavor, scent, etc.) For these packages a Total Quantity MAV is calculated for each product type within the variety package and the results are added to obtain a Total Quantity MAV for comparison to each minus Total Quantity Package Error.

Terms are defined as:

Number of Individual Inner Packages. – The total number of similar but not identical individual inner packages with differing and/or uniform labeled weight or measure.

MAV for Individual Inner Package Quantity. – The MAV for the quantity declared for the individual inner packages specified in the appropriate MAV table in Appendix A. “Tables.”

(Added 2022)

B1: NET-19.2 V Sections 2.1. Scope, 3.1. Scope, 4.1. Scope, 2.3.7.1. Maximum Allowable Variation (MAV) Requirement, and Section 2.7.3. “Evaluation of Results – Compliance Determinations”

Add a Note to Handbook 133, Chapter 2, Section 2.1. “Scope;” Section 3.1. “Scope;” and Section 4.1 “Scope” that refers users to the Chapter 5. “Specialized Test Procedures” for these types of packages.

Note: If Multiunit or Variety Packages are to be inspected, refer to Chapter 5. “Specialized Test Procedures” for guidance in testing.

If a total quantity declaration is being verified and the MAV to be applied is not based on a percentage of the labeled quantity, refer to Section 1.2.4.1. “Total Quantity MAV for Multiunit and Variety Packages.”

(Added 2022)

Add the following note to NIST HB 133, Chapter 2, Section 2.3.7.1 “Maximum Allowable Variation (MAV) Requirement” and Section 2.7.3. “Evaluation of Results – Compliance Determinations.”

Note: If a total quantity declaration on a multiunit or variety package is being verified, and the MAV applied is not based on a percent of the labeled quantity see Section 1.2.4.1. “Total Quantity MAV for Multiunit and Variety Packages.

(Added 2022)

B1: NET-19.3 V Create a Chapter 5. Specialized Test Procedures

5.1. Scope

The following procedures are used in either verifying the net quantity of contents of retail multiunit packages with individual inner packages of the same commodity that have identically labeled quantities or in verifying retail variety packages with individual inner packages that may differ in labeled weight, measure or volume.

1. The procedure used is determined by using the labeled net contents.

- **Use Section 5.2. “Individual Package Quantity” if a total net quantity of contents is not declared on the label of a multiunit or variety package of food for human consumption or meat or meat products from a USDA official establishment (see explanation in Section 5.2. for specific exemptions to requirement for a total net quantity statement.)**
- **Use Section 5.3. “Total Quantity” if a total net quantity of contents is declared on the package.**

Note: If the packages are labeled with additional quantity statements (i.e., dry volume, area, length, width, or thickness), added steps or, when proper, additional Total Quantity MAVs may be required in testing the accuracy of additional quantity statements.

5.2. Individual Package Quantity

This procedure is used only for verifying the total quantity statement of open or transparent-wrapped multiunit packages of foods for human consumption or meat or meat products under the authority of FDA or USDA, respectively. Under USDA-FSIS regulations (9 CFR 317.2 [h][12]) and FDA regulations (21 CFR 101.7 Chapter I [s]), such open multiunit packages that do not obscure the number of individual inner packages or the labeling of each individual inner package (compliant with all other location, type size, and applicable requirements) are not required to bear a total net quantity statement on the outside of the package (see Figure 1. Open or Transparent Multiunit Package with Fully Visible Individual Quantity Declarations).

Cereal	Cereal	Cereal	Cereal	Cereal
Net Wt.	Net Wt.	Net Wt.	Net Wt.	Net Wt.
100 g (3.5 oz)	100 g (3.5 oz)	100 g (3.5 oz)	100 g (3.5 oz)	100 g (3.5 oz)

Figure 1. Open or Transparent Multiunit Package with Fully Visible Individual Quantity Declarations

5.2.1. Test Procedure for Multiunit Packages Exempt from Total Quantity Statement (see Section 5.2.)

- 1. Follow Section 2.3.1. “Define the Inspection Lot.” The inspection lot is defined as the total number of individual inner packages in the multiunit packages (e.g., 120 packages × 12 individual inner packages = Inspection Lot size is 1440). Select “Category A” or “Category B” sampling plan in the inspection (depending on location of test) and select a random sample (See Section 2.3.4. “Random Sample Selection”).**
- 2. Determine an average tare weight according to Section 2.3.5. “Procedures for Determining Tare and Average Tare Weight.” Follow Section 2.3.6. “Determine Nominal Gross Weight and Package Errors” to determine package errors.**
- 3. Determine the net quantity of each individual inner package in the sample.**
 - **If a count declaration is declared on the multiunit packages, verify using Section 4.2. “Packages Labeled by Count” and apply the appropriate MAV using Appendix A. Table 2- 7. MAV for Packages Labeled by Count applied.**
- 4. If minus package errors are found in the sample, the value of the MAV to be applied is determined by matching the labeled net quantity for the individual inner packages to the applicable quantity range in the appropriate MAV table using Appendix A “Tables”.**

Compare the MAV for the labeled quantity to each minus package error in the individual inner packages to determine if any are unreasonable using Section 2.3.7.1. “MAV Requirement”. If the number of unreasonable errors exceeds the amount allowed for the sample size (see Appendix A. Tables 2-1. “Sampling Plans for Category A” or Table 2-2. “Sampling Plans for Category B.” Column 4), the sample fails. If the sample passes, go to Step 5.

- 5. Apply Section 2.3.7.2. “Average Requirement.” Follow the procedures in Section 2.3.7. “Evaluation for Compliance.”**

5.3. Total Quantity

Use this procedure to test multiunit packages labeled with a total count and/or total net quantity declaration. This procedure can be used to verify the total net quantity declared on open or closed multiunit packages or multiunit packages with transparent or opaque packaging. If the quantities

of the individual inner packages vary (which is allowed in Variety Packages) or, if the quantity of the individual inner packages is not declared, see Section 5.4. “Exceptions”.

Before determining the MAV and proceeding with tests of the quantity of contents in any multiunit package, calculate the sum of the labeled quantity statements of all individual inner packages and verify that the labeled Total Quantity Statement reflects the accurate sum. If an error exists between the sum of the labeled quantity statements of individual inner packages and the Total Quantity Statement, the package is not in compliance and shall be deemed in violation of labeling requirements of NIST Handbook 130 Uniform Packaging and Labeling Regulation, requiring an accurate summing and statement of total quantity. Do not test for net quantity determination.

5.3.1. Test Procedure for Multiunit Packages

- 1. Follow Section 2.3.1. “Define the Inspection Lot” to define the inspection lot (number of multiunit packages). Use the inspection lot size and select a “Category A” or “Category B” sampling plan (see Appendix A. “Tables”) in the inspection plan and select a random sample. (see Section 2.3.2. “Select Sampling Plans” and Section 2.3.4. “Random Sample Selection”).**
- 2. For packages labeled by weight, determine the tare weight and nominal gross weight. Follow Section 2.3.5. “Procedures for Determining Tare” through Section 2.3.6. “Determine Nominal Gross Weight and Package Error” to determine package errors in the quantity of the individual inner packages as compared to the total package quantity declaration.**
- 3. Determine the net quantity of each multiunit package and calculate the Total Quantity Package Error for each multiunit package.**

$$\textit{Total Quantity Package Error} = \textit{Sum of Individual Inner Package Errors}$$

If applicable, verify the count declaration of the individual inner packages. To determine the MAV for count, use Appendix A. Table 2-7. “MAV for Packages Labeled by Count.”

- 4. If minus Total Quantity package errors are found in the sample, use the MAV for the individual inner package labeled quantity. (see Section 1.2.4.1. “Total Quantity MAV for Multiunit and Variety Packages” and the appropriate MAVs in Appendix A “Tables”). Calculate the Total Quantity MAV to be applied to the total quantity of contents declaration as follows:**

$$\textit{Total Quantity MAV} = \textit{Number of Individual Inner Packages} \times \textit{MAV for Individual Inner Package Quantity}$$

Note: A Total Quantity MAV is not required when the MAV to be applied is based on a percent of a labeled quantity of a multiunit or variety package.

- 5. The Total Quantity MAV is compared to each minus Total Quantity Package Error to determine if any errors are unreasonable (See Section 2.3.7.1. “MAV Requirement”).**

If the number of unreasonable errors exceeds the number allowed for the sample size the lot fails. (See Section 2.3.1. “Define the Inspection Lot” and Tables 2-1 or 2-2, Column 4).

5.4. Exceptions for Multiunit Packages

5.4.1. Multiunit Packages with Only a Total Quantity Declaration

NIST Handbook 130, Uniform Packaging and Labeling Regulation (UPLR), Section 10.4. “Multiunit Packages” states that unlabeled individual packages not intended for individual retail sale are only required to declare a total quantity declaration (see Figure 2. Multiunit Package [three packages] with only a Total Quantity Declaration). While not required, UPLR, Section 10.4. “Multiunit Packages” does allow for multiunit packages to include an optional statement for the count of the individual inner packages despite their not being fully labeled or intended for individual retail sale.

<u>Floor Cleaner</u>	<u>Floor Cleaner</u>	<u>Floor Cleaner</u>
	<u>NET WEIGHT</u> <u>15 kg (33 lb)</u>	

Figure 2. Multiunit Package (three packages) with only a Total Quantity Declaration

5.4.1.1. MAV Application

When multiunit package label does not include a quantity statement for each individual inner package (e.g., only a total quantity appears) a Total Quantity MAV cannot be applied because the quantities in the individual inner packages are unknown. In this case, the MAV value for the total quantity declaration as listed in the MAV tables (See Appendix A, Tables) is compared to the Total Quantity Package Error to determine if any package errors are unreasonable (see Section 2.3.7.1. “MAV Requirement”).

5.4.2. Variety Packages: Non-Uniform Quantity Declarations

UPLR, Section 10.6. “Variety Packages” states that a variety package is required to have total quantity declaration. The commodities may be generically similar; however, they can differ in weight, measure, volume, or style variation (e.g., color, flavor, scent, etc.). When the labeled weight, measure, or count varies, the value of the applicable MAV can also vary.

When variety packages are tested, the procedure used to calculate a Total Quantity MAV requires the summing of the MAV values over the number of inner packages of all types. An example is shown in Figure 3. Variety Package – Four Similar but Different Products with Varying Net Weights) to illustrate a total quantity declaration, count, and the weight of the individual inner packages.)

30 Candy Bar – Variety Pack Total Net Weight 1.33 kg (2.9 lb)	
10 – 55 g (1.9 oz) Peanut Butter Cups	6 – 30 g (1.1 oz) Dark Chocolate Bars
6 – 46 g (1.6 oz) Milk Chocolate Bars with Almonds	8 – 41 g (1.5 oz) Milk Chocolate Bars

Figure 3. Variety Package – Four Similar but Different Products with Varying Net Weights

5.5. Test Procedure for Variety Packages Containing Individual Packages with Varying Net Weights

Before determining the MAV and proceeding with tests of the quantity of contents in any variety package, calculate the sum of the labeled quantity statements of all individual inner packages and verify that the labeled Total Quantity Statement reflects the accurate sum. If an error exists between the sum of the labeled quantity statements of all individual inner packages and the Total Quantity Statement, the package is not in compliance and shall be deemed in violation of labeling requirements of NIST Handbook 130 Uniform Packaging and Labeling Regulation, requiring an accurate summing and statement of total quantity. Do not test for net quantity determination.

- 1. When a variety package with individual inner packages with varying net weights is tested, the average tare weight (e.g., packaging from the individual inner packages and the outer package combined) is determined and a nominal gross weight is used to determine the error in the total quantity declaration.**

Note: Example is based on Weight (see Figure 3. Variety Package – Four Similar but Different Products with Varying Net Weights)

$$\textit{Nominal gross weight} = \textit{average tare weight} + \textit{labeled weight}$$

$$\textit{Package error} = \textit{gross weight} - \textit{nominal gross weight}$$

MAVs used in calculating the Total Quantity Package MAV are based on the respective labeled quantities of each product type and are calculated for each product type within the variety package. The calculated MAVs for each of the product types are summed to obtain the Total Quantity MAV (See example shown in Table 1. Steps in Calculating a MAV for a Variety Package).

5.6. MAV Application

A Total Quantity MAV must be applied because the labeled quantities and MAVs of the individual inner packages vary. For example, based on the quantity of the total net weight (as shown in Figure 3. Variety Package- Four Similar but Different Products with Varying Net Weights) the MAV for 1.33 kg (2.9 lb) is 42.6 g (0.094 lb) but the “Total Quantity MAV” to be applied is 122.4 g (4.261 oz) (0.27 lb) (See example shown in Table 1. Steps in Calculating a MAV for a Variety Package).

Table 1. Steps in Calculating a MAV for a Variety Package (Based on Figure 3. Variety Package – Four Similar but Different Products with Varying Net Weights)				
<u>Product</u>	<u>Number of Inner Packages</u>	<u>Labeled Net Weight (each individual inner package)</u>	<u>MAV for each Individual Inner Package Based on the Labeled Net Quantity (see MAV Table 2-5)</u>	<u>Total MAV</u>
<u>Peanut Butter Cups</u>	<u>10</u>	<u>55 g (1.94 oz)</u>	<u>5.4 g (0.1875 oz)</u>	$\frac{10 \times 5.4 = 54 \text{ g}}{(10 \times 0.1875 \text{ oz} = 1.875 \text{ oz})}$
<u>Dark Chocolate Bars</u>	<u>6</u>	<u>30 g (1.06 oz)</u>	<u>10 % of labeled quantity</u>	$\frac{6 \times (0.1 \times 30) = 18 \text{ g}}{6 \times (0.1 \times 1.06 \text{ oz}) = 0.636 \text{ oz}}$
<u>Milk Chocolate Bars</u>	<u>8</u>	<u>41 g (1.45 oz)</u>	<u>3.6 g (0.125 oz)</u>	$\frac{8 \times 3.6 = 28.8 \text{ g}}{(8 \times 0.12 \text{ oz} = 1 \text{ oz})}$
<u>Milk Chocolate Bars with Almonds</u>	<u>6</u>	<u>46 g (1.62 oz)</u>	<u>3.6 g (0.125 oz)</u>	$\frac{6 \times 3.6 = 21.6 \text{ g}}{(6 \times 0.125 \text{ oz} = 0.75 \text{ oz})}$
			<u>Total Quantity MAV</u>	$\frac{122.4 \text{ g}}{(4.261 \text{ oz}) (0.27 \text{ lb})}$

(Added 2022)

B1: NET-19.4 V Appendix F. Glossary

Amend Handbook 133, Appendix F as follows:

Multiunit Package. – **A package containing two or more individual packages of the identical commodity, in the same quantity, intended to be sold as a multiunit package.**

(Added 2022)

Variety Package. – **A package intended for retail sale, containing two or more individual packages or units of similar, but not identical, commodities. Commodities that are generically alike, but that differ in weight, measure, volume, or style variation (e.g., color, flavor, scent, etc.) are considered similar, but not identical.**

(Added 2022)

Total Quantity MAV. – **A calculated value used to determine if any minus Total Quantity Package Error found in a multiunit or variety packages is unreasonable. A Total Quantity MAV is based on the declared quantity and count of the individual inner packages. It is determined by obtaining the applicable MAV for each individual inner package quantity from the appropriate MAV table (refer to Appendix A. “Tables” and then calculating the “Total Quantity MAV” as follows:**

- **Multiunit Package: Total Quantity MAV = Number of Individual Inner Packages × MAV for Individual Inner Package Quantity**
- **Variety Package: Total Quantity MAV = The sum of the applicable MAVs for all Individual Inner Packages.**

Note: A Total Quantity MAV is not used when the MAV applied is based on a percentage of the labeled quantity on a multiunit or variety package

(Added 2022)

NIST OWM Detailed Technical Analysis:

This Block of Items have been on the L&R Agenda since 2019. OWM has gradually modified these items based upon comments received at Regional and NCWM meetings. There have been very limited comments with the exception of editorial changes. A concern at several of the Regional Association Meetings requested that OWM simplify the steps within the test procedure. At this time, we do not believe members have had ample time to apply the test procedure in the inspection work. In OWM's 2021 Analysis, OWM stated it would like an opportunity to simplify the steps in the test procedure to provide better clarity to the inspectors. This would also allow us time to use this in our OWM training courses with inspectors that use NIST HB133 on a consistent basis. After we have received additional testing data and feedback, we will resubmit through NCWM for consideration. At this time OWM is requesting that Block 1 be withdrawn in its entirety. OWM will also have this as a resource guidance document that the states will be able to obtain from our office.

Summary of Discussions and Actions:

At the 2019 NCWM Interim Meeting comments were heard recognizing the merit of this item. Several regulators and an industry member made comments that some areas within the test procedure are too confusing. Due to the Federal Government furlough, NIST OWM was not in attendance, so concerns could not be addressed at the meeting. The Committee would like the submitter to review formatting, clarifying label quantity, and modifying language for additional clarity. The Committee would like to see the above issues reviewed by the submitter and encourages further development.

At the 2019 NCWM Annual Meeting, Ms. Warfield stressed to membership that this item is fully developed and a technical document and supporting data was submitted that supports these proposals. The document also provides for examples that inspectors found pertaining to multiunit and variety packages during inspections.

At the 2020 NCWM Interim Meeting, Ms. Warfield provided an update on the last language submitted for this item on December 27, 2019. Ms. Warfield remarked the work done to develop the proposal and clarify the procedure language. Ms. Warfield reminded the audience NET-19.3 creates a Chapter 5, "Specialized Test Procedures" must be approved for the rest of the items in the block to proceed. This block of items was submitted by OWM after some states requested assistance inspecting these types of packages. Mr. Chris Guay (Procter and Gamble Co.) gave merit to the item but requested review of the definition of "multiunit package" and referred to the definition in CFR 21. The L&R Committee recommended the Item Block 1 be Informational to allow the submitter to do an additional review.

At the 2021 NCWM Interim Meeting, Mr. Floren expressed concerns that the language in certain areas of B1: NET-19.1 and B1: NET-19.3 could use some clarity. Mr. Floren also recommends that the Committee consider adding in additional information directing the user to the federal regulations for USDA/FSIS and FDA for packaged foods for human consumption.

Ms. Warfield remarked there is a supporting document that provides the varying definitions for multiunit from FTC, FDA, and USDA regulations. Ms. Warfield suggested that if the Committee is unable to elevate this to Voting status, they should withdraw it and NIST would incorporate this procedure in the NIST HB 133 training courses.

The following recommendations that reflected with either a double underscore or double strikethrough:

B1: NET-19.1. changes:

1.2.4. Maximum Allowable Variation

The limit of the “reasonable minus variation” for an underfilled package is called a “Maximum Allowable Variation” (MAV). An MAV is a deviation from the labeled weight, measure, or count of an individual package beyond which the deficiency is considered an unreasonable minus error. Each sampling plan limits the number of negative package errors permitted to be greater than the MAV.

Packages may be offered for sale individually or offered for sale in multiunit packages or variety packages, which contain two or more individual inner packages.

When ~~individual~~ packages are tested whether individual, multiunit, or variety packages, the MAV is applied to each package in the sample which has a minus package error.

Add a paragraph to make it clear to the inspector how to handle a package that is not in compliance and due to a Packaging and Labeling Regulation violation

Before determining the MAV and proceeding with tests of the quantity of contents in any multiunit or variety package, calculate the sum of the labeled quantity statements of all individual inner packages and verify that the labeled Total Quantity Statement reflects the accurate sum. If an error exists between the sum of the labeled quantity statements of individual inner packages and the Total Quantity Statement, the package is not in compliance and shall be deemed in violation of labeling requirements of NIST Handbook 130, Uniform Packaging and Labeling Regulation, requiring an accurate summing and statement of total quantity. Do not test for net quantity determination.

1.2.4.1. Total Quantity MAV for Multiunit and Variety Packages (See Chapter 5. “Specialized Test Procedures”)

- a. Multiunit Package. – In verifying a total quantity declaration that appears on a multiunit package, compare a Total Quantity MAV to each minus Total Quantity Package Error to determine if the error is unreasonable. Calculate the Total Quantity MAV using the following formula:**
- b. Variety Package. – In verifying a total quantity declaration that appears on a variety package, compare a Total Quantity MAV to each minus Total Quantity Package Error to determine if the error is unreasonable. Calculate the Total Quantity MAV using the following formula:**

Total Quantity MAV = The sum of the applicable MAVs for all Individual Inner Packages

Variety packages include commodities that may be generically similar, but differ in weight, measure, volume, or ~~appearance~~ design variation (e.g., color, flavor, scent, etc.). For these packages, a Total Quantity MAV is calculated for each product type within the variety package and the results are added to obtain a Total Quantity MAV for comparison to each minus Total Quantity Package Error.

Changes to B1: NET-19.3 are reflected below:

5.1. Scope

The following procedures are used in either verifying the net quantity of contents of retail multiunit packages with individual inner packages of the same commodity that have identically-labeled quantities or in verifying retail variety packages with individual inner packages that differ in labeled weight, measure or volume.

1. The procedure used is determined by using the labeled net contents.

- **Use Section 5.2. “Individual Package Quantity” if a total net quantity of contents is not declared on the label of a multiunit or variety package of food for human consumption or meat or meat products from a USDA official establishment (See explanation in Section 5.2. of specific exemptions to requirement for a total net quantity statement).**
- **Use Section 5.3. “Total Quantity” if a total net quantity of contents is declared on the package.**

Note: If the packages are labeled with additional quantity statements (i.e., dry volume, area, length, width, or thickness), added steps or, when proper, additional Total Quantity MAVs may be required in testing the accuracy of such additional quantity statements.

Changes to Section 5.2. will add additional language to clarify how to inspect packaged foods for human consumption. The CFR links are hyperlinked to provide inspectors direct access to the CFR information if they are using an online handbook.

5.2. Individual Package Quantity

This procedure is used only for verifying the total content statement of open or transparent-wrapped multiunit packages of foods for human consumption or meat or meat products under the authority of FDA or USDA, respectively. Under USDA FSIS regulations (9 CFR 317.2 [h][12]) and FDA regulations (21 CFR 101.7 Chapter I [s]), such open multiunit packages that do not obscure the number of individual inner packages or the labeling of each individual inner package (compliant with all other location, type size, and applicable requirements) are not required to bear a total net quantity statement on the outside of the package (see Figure 1. Open or Transparent Multiunit Package with Fully Visible Individual Quantity Declarations).

The capture for Figure one should be clarified to read, Figure 1. Open or Transparent Multiunit Package (containing two rows of packages) with Fully Visible Individual Quantity Declarations

5.2.1. Test Procedure for Multiunit Packages Exempt from Total Quantity Statement (See Section 5.2)

Step 4 in this section should be clarified to read: **If minus package errors are found in the sample, the value of the MAV to be applied is determined by matching the labeled net quantity for the individual inner packages to the applicable value in the appropriate MAV table (see Appendix A “Tables”).**

Add a statement to Section 5.3. Total Quantity to make it clear to the inspector how to handle a package that is not in compliance and due to a Packaging and Labeling Regulation violation

Before determining the MAV and proceeding with tests of the quantity of contents in any multiunit package, calculate the sum of the labeled quantity statements of all individual inner packages and verify that the labeled Total Quantity Statement reflects the accurate sum. If an error exists between the sum of the labeled quantity statements of individual inner packages and the Total Quantity Statement, the package is not in compliance and shall be deemed in violation of labeling requirements of NIST Handbook 130 Uniform Packaging and Labeling Regulation, requiring an accurate summing and statement of total quantity. Do not test for net quantity determination.

5.4. Exceptions for Multiunit Packages

5.4.1. Multiunit Packages with Only a Total Quantity Declaration

NIST Handbook 130, Uniform Packaging and Labeling Regulation (UPLR), Section 10.4. “Multiunit Packages” states that when containing unlabeled individual packages and not intended for individual retail sale, the multiunit package only requires a total quantity declaration (see Figure 2. Multiunit Package [three packages] with only a Total Quantity Declaration). While not required, UPLR, Section 10.4. “Multiunit Packages” does allow for multiunit packages to include an optional statement for the count of the individual inner packages despite their not being fully labeled or intended for individual retail sale even when the UPLR, Section 10.4. “Multiunit Packages” regulations do not require such a statement.

5.5. Test Procedure for Variety Packages Containing Individual Packages with Varying Net Weights

When a variety package with individual inner packages of varying net weights is tested, the average tare weight (e.g., packaging from the individual inner packages and the outer package combined) is determined and a nominal gross weight is used to determine the error in the total quantity declaration.

Changes for B1: NET-19. 4 appear below

Multiunit Package. – A package containing two or more individual packages of the identical commodity, in the same quantity, intended to be sold as a multiunit package

Variety Package. – A package intended for retail sale, containing two or more individual packages or units of similar, but not identical, commodities. Commodities that are generically alike, but that differ in weight, measure, volume, appearance or style variation (e.g., color, flavor, scent, etc.) or quality, are considered similar, but not identical.

Total Quantity MAV. – A calculated value used to determine if any minus Total Quantity Package Error found in a multiunit or variety package is unreasonable. A Total Quantity MAV is based on the declared quantity and count of the individual inner packages. It is determined by obtaining the applicable MAV for each individual inner package quantity from the appropriate MAV table (refer to Appendix A. “Tables”) and then, calculating the “Total Quantity MAV” as follows:

➤ **Multiunit Package:**

$Total\ Quantity\ MAV = Number\ of\ Individual\ Inner\ Packages \times MAV\ for\ Individual\ Inner\ Package\ Quantity$

➤ **Variety Package:**

Total Quantity MAV = The sum of the applicable MAVs for all Individual Inner Packages

During the Committee approved the recommendations addressed by Mr. Floren and NIST and will be incorporated into the Item under Consideration. The Committee is also recommending the language remain in Informational status to obtain feedback from the Regional Associations.

At the 2021 NCWM Annual Meeting, Mr. Floren provided a few minor editorial changes within the entire block; with those changes he does support. The current Item under Consideration was modified to include editorial changes and clarity to the equation under Section 5.5.1.

At the 2022 NCWM Interim Meeting, the Committee assigned Voting status to these items at the 2022 Interim meeting due to no opposition and they believe the block is fully developed.

At the 2022 NCWM Annual Meeting the Committee heard from the floor during open hearings regarding Mr. Floren (Los Angeles County, California) supported Item PAL 19.1. with no changes and made additional comments on:

NET 19.1. Mr. Floren supports with the following change, striking the calculation “total quantity package error = sum of individual inner package errors.” This section refers to the Total Quantity MAV, not the Total Quantity Package Error.

NET 19.2. Mr. Floren fully supported

NET 19.3. supported with a modification to Section 5.3.1. step 3, “Total Quantity Package Error” recommending that it read, “Total Quantity Package = Gross Weight – Nominal Gross Weight”. Also, in Section 5.5. step 1, the calculation for “Total Quantity Package Error” should be removed, as it is not needed.

NET 19.4. stated that the second “note” pertaining to the definition of “Total Quantity Package Error” is in conflict with previous statements in this section and recommended striking the note.

Mr. Floren reasoning for these selected changes is that the applied MAV based on multiunit packages result in MAVs being twice (for instance) what would be applied to a single package of the same weight. Has there been statistical analysis to support this change? Mr. Sefcik responded that OWM published a white paper in 2018 which is within the NCWM Supporting documents. OWM found it is unreasonable to apply the MAV from the current MAV tables for multi-unit and variety packages in that it will indirectly reduce the MAV by as much as 50 % or more. This was confirmed with NIST’s Statistical Engineering Division (SED). NIST SED stated that the methodology used in the proposed test procedure is a statistically valid method and approach.

The Committee concurred with the following changes

NET-19.1 – Section 1.2.4. Maximum Allowable Variation – The Committee deleted “Total Quantity Package Error = Sum of Individual Inner Package Errors”

Net 19.3. – Create a Chapter 5 Specialized Test Procedures – The Committee deleted the following from section 5.3.1. Section 3: The Total Quantity Package Error is the sum of the errors found in the individual inner packages and added Total Quantity Package Error = Gross Weight – Nominal Gross Weight.

The Committee removed “Total Quantity Package Error = Sum of Individual Inner Package Errors from section 5.5. Step 1.

NET-19.4 – Appendix F. Glossary – The Committee removed “Note: Total Quantity Package Error = Sum of Individual Inner Package Errors.”

Regional Association Reporting:

At the 2021 WWMA Annual Meeting, Ms. Warfield provided testimony that language needs to be clarified to make it useful and simple for inspectors. NIST OWM intends to use the procedure for training programs to continue the improvement of the procedure and to provide clarity for all levels of inspectors. Mr. Floren believed he had some ideas on condensing this item and feels it would serve as great training material.

The Committee recommended that the NCWM National L&R Committee consider withdrawing this Item to allow NIST OWM to further refine this procedure, and vet the language for future inspector use.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, Ms. Warfield commented that when this issue was originally submitted it was only a test procedure, but in developing that item realized that additional sections of handbook need to be addressed. She is suggesting that the item be withdrawn, and instead they would use a revised version as a resource document. The Committee recommended this item be withdrawn.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, there were no comments received from the floor during open hearings. Ms. Warfield requested from their written analysis that the National L&R withdraw this item to allow NIST OWM time to simplify the steps in the test procedure to provide better clarity to the inspectors. NIST does not think believe that states have had ample time to test apply the test procedure. NIST will work on this as they develop training courses and will keep this as a resource document, until it gets resubmitted. The Committee recommended Withdrawing this item.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. David Sefcik (NIST OWM) recommended the entire block be withdrawn due to a concern that steps within the test procedure need to be simplified. Mr. Sefcik indicated that the procedure is sound and factual, but this would give OWM time to use the procedure in training courses which provides valuable feedback and additional testing. Several regulators recommended the status of Withdrawn and allow time for simplification of the procedure. Ms. Warfield commented that this is an Informational item that the L&R Committee has ownership of it, therefore NCWM Chair McGuire needs to agree to downgrading the status to Withdrawn. The Committee concurs that this block be withdrawn.

At the 2022 NEWMA Annual Meeting, Mr. McGuire (Acting L&R Chair) noted he believes the Block 1 of items is fully vetted and ready to be voted on.

No additional comments during the open hearing.

Item Block 2 (B2) Commercial and Law-Enforcement Equipment

(This Item was Adopted)

B2: WAM-22.1 V Section 1.11. Commercial and Law-Enforcement Equipment
B2: NTP-22.1 V Section 2.15. Commercial and Law-Enforcement Equipment

Source: NIST Office of Weights and Measures

Submitter's Purpose and Justification:

Add clarification regarding the implications of using weighing and measuring devices for transactions that may or may not be considered commercial transactions. OWM has noted several inquiries submitted to our office for explanation on the many and various issues involved with the use of weighing or measuring devices as commercial devices when there is charge for doing so.

The submitter added that there seems to be a difference in opinions regarding this practice constitutes a commercial transaction.

The submitter requested that this be a Voting Item in 2022.

NIST OWM Executive Summary for Item Block 2. Commercial and Law Enforcement Equipment
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NIST OWM Recommendation: OWM commends the L&R and S&T Committees for working in a collaborative effort to address memberships concerns. OWM believes this Item is fully developed and recommends this as a Voting item.
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Item Under Consideration:

B2: WAM-22.1 V Section 1.11. Commercial and Law-Enforcement Equipment.

Amend Handbook 130, Uniform Weights and Measures Law as follows:

1.11. Commercial Weighing and Measuring Law-Enforcement Equipment. – The terms “commercial weighing and measuring equipment” **and “law-enforcement equipment” refer to are defined as follows:**

(a) “Commercial Weighing and Measuring Equipment” means weights and measures and weighing and measuring devices ~~commercially~~ used or employed ~~in:~~

(1) in establishing the size, quantity, extent, area, **composition (limited to meat and poultry)**, constituent values (limited to grain), or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award;

(2) when assessing a fee for the use of the equipment to determine a weight or measure;

(3) in determining the basis of an award using count, weight, or measure; or

(4) in computing any basic charge or payment for services rendered on the basis of weight or measure.

(Amended 2008 **and 2022**)

(b) ~~To~~ “Commercial Weighing and Measuring Equipment” includes any accessory attached to or used in connection with a commercial weighing or measuring device when such accessory is so designed that its operation affects the accuracy of the device.

(Added 2022)

(c) “Law-Enforcement Equipment” means ~~To~~ weighing and measuring equipment in official use for the enforcement of law or ~~for~~ the collection of statistical information by government agencies.

(These requirements should be used as a guide by the weights and measures official when, upon request, courtesy examinations of noncommercial equipment are made.)

(Added 1995) (Amended **2022**)

B2: NTP-22.1 V Section 2.15. Commercial and Law Enforcement Equipment.

Amend Handbook 130, Uniform Regulation for National Type Evaluation as follows:

2.15. Commercial and Law-Enforcement Equipment. – The terms “commercial weighing and measuring equipment” and law-enforcement equipment refer to:

(1) Commercial weighing and measuring equipment; that is:

(a) ~~a weights and measures and~~ weighing and measuring ~~devices equipment~~ commercially used or employed in:

- 1.** establishing the size, quantity, extent, area, **composition (limited to meat and poultry), constituent values (limited to grain)**, or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award;
- 2. when assessing a fee for the use of the equipment to determine a weight or measure;**
- 3. in determining the basis of an award using count, weight, or measure; or**
- 4. in** computing any basic charge or payment for services rendered based on weight or measure.

(Amended 2008 **and 2022**)

(b) To any accessory attached to or used in connection with a commercial weighing or measuring device when such accessory is so designed that its operation affects the accuracy of the device.

(2) Law-enforcement equipment; that is:

- (a) weighing and measuring equipment in official use for the enforcement of law or ~~for the~~ collection of statistical information by government agencies. ^[see Section 2.15. Note]

(Amended 2022)

(These requirements should be used as a guide by the weights and measures official when, upon request, courtesy examinations of noncommercial equipment are made.)

(Added 2022)

Section 2.15. NOTE: ~~The~~This section is identical to G-A.1. Commercial and Law-Enforcement Equipment, Section 1.10. General Code, NIST Handbook 44 for definition of “commercial” and “law enforcement equipment.”

NIST OWM Detailed Technical Analysis:

OWM receives inquiries from states requesting assistance in interpreting this definition. This proposal was an outcome of the inquiries, and OWM believes this proposal will make it easier for the reader to distinguish between commercial and non-commercial transactions and provides the necessary clarifications and amendments.

Within the Uniform Weights and Measures Law, the term “equipment” is used in Section 1.11 that definition and “devices” is used in this regulation. OWM is recommending harmonizing this definition across all the regulations and handbooks. In addition, consideration should be given to determining if changing the title of the regulation to “equipment” from “devices” is justified but, if that word is changed, the regulation’s title will also need to be revised in Section 8 of the Uniform Weights and Measures Law.

Upon OWM reviewing the L&R and S&T’s agenda we recognize that minor change is needed to harmonize the language across NIST Handbook 130 and 44 to provide for consistent terminology. Within Item B2: WAM-22.1. there is a duplication of language that OWM will need to address. OWM also recognizes that within the Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices, Section 2.3. a definition exists for Commercial and Law Enforcement Weighing and Measuring Devices. We apologize for not having these changes done prior to the start of the WWMA.

This graphic illustrates how the definition may be applied in several different examples of commercial transactions:

Transactions that Use this Equation
are Examples of Commercial Transactions

Quantity × **Unit Price** = **Total Price**

<p style="font-size: small; transform: rotate(-90deg); transform-origin: left top;">Must be in Units of Measurement Traceable to the International System of Units (SI)</p> <ul style="list-style-type: none"> • Weight • Measure <ul style="list-style-type: none"> • Volume <ul style="list-style-type: none"> • Dry or Liquid • Cubic • Length, Width, Area, Thickness • Time • Count 	<ul style="list-style-type: none"> • Per gram, kilogram or ounce or pound • Per liter, fluid ounce, or gallon • Per cubic meter, cubic foot or cubic yard • Per sq meter, foot, yard or acre or thickness by mil or micrometer. • Per minute or hour • Price per each 	<ul style="list-style-type: none"> • For Buying • For Selling • For Service Charges • For mineral royalties and state and Federal Taxes
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This slide is not all inclusive and is for illustration purposes only – other units, unit pricing and applications will also fall under this definition

Summary of Discussions and Actions:

At the 2022 NCWM Interim Meeting, the Committee assigned Voting due to the support heard support for this block. The L&R and S&T Committee will convene to harmonize all related items to the extent possible due to inherent differences in the scope of NIST Handbooks 44 and 130.

At the 2022 NCWM Annual Meeting the Committee heard from Dr. Matt Curran (Florida) remarked on B2: WAM-22.1 under section 1.11. not to strike out the terms “weighing” and “measuring”. Within 1.11.(c) he would like that to specify that this applies to police only. Mr. Frank Greene (Connecticut) asked that clarity be given to the type of “law-enforcement”. Mr. Floren (Los Angeles County, California) remarked that in 1.11.(a) that last word “in” should be stricken and added to subsections 1-4 as the first word. He also noted that in Section 2.15 the term law-enforcement should be enclosed in quotations. The Committee was encouraged by membership to work in collaboration with the S&T Committee with their companion item. The Committee made editorial changes and also hyphenated the term “law-enforcement” throughout the proposal.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, Ms. Warfield, provided testimony as to the purpose of the proposal, which is to harmonize NIST Handbook 130 and NIST Handbook 44 regulations pertaining to determining commercial and noncommercial use of devices. The Committee received comments from Mr. Kurt Floren (County of Los Angeles, California) indicating that the block is factually correct and that it would provide guidance for inspectors. He suggested continuous work is needed. He also recommended that the L&R and S&T Committee work together to mirror language.

The Committee recommended this as a Developing item. The Committee sees merit in this item but wants to ensure language is harmonized with any changes made to GEN 22.1 NIST Handbook 44 General Code G.A.1.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, Mr. Loren Minnich (Kansas) commented he has submitted a suggested language change in Part A.2 (see below). Ms. Lisa Warfield (NIST OWM) commented that there was an accidental duplication in part of the item as well as an issue in Section 2.3 that needs to be addressed. She recognizes there is additional work to be done to this item. Mr. Charlie Stutesman (Kansas) commented that he is unclear if this item is necessary and believes the language in the Handbook is appropriate as it currently reads. Ms. Warfield clarified that this item is intended to merely clarify the language across handbooks. Mr. Ivan Hankins (Iowa) commented that he does not believe this item is necessary. Mr. Doug Musick (Kansas) commented that there is ambiguity with the term “other”. He believes the language is unclear. Mr. Minnich further commented that he is undecided as to whether this item will provide further clarification or not but is not opposed to the attempt. Mr. Konrad Crockford (North Dakota) commented he understands the effort to clarify this section of the handbook but is not sure about the flow of the proposed content. He also made the point that it is the inspector who needs to understand how to implement the language and attempting to clarify an item does not always accomplish that. The Committee recommended this item be given Developing status.

a. To other commercial weighing and measuring equipment:

- i. when there is a fee assessed for the use of the equipment to determine a weight or measure;**
- i. used to determine the bases of an award using count, weight, or measure when using weight, measure, or count as the basis to determine an award; or**
- iii. used in computing any basic charge or payment for services rendered based on weight or measure.**

At the 2022 CWMA Annual Meeting, there were no comments heard. The Committee is recommending this as a Voting item.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, Ms. Lisa Warfield (NIST OWM and submitter) had provided the Committee a written analysis as to the purpose of the proposal and requested this item be given a Developing status. No comments were received from the floor. The Committee recommended this as a Developing item. The Committee sees merit in this item and wants to ensure language is harmonized across all affected sections of the Handbooks.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. David Sefcik (NIST OWM) commented that NIST has provided an analysis on all items on the agenda and asks the members to review their analysis. He further commented that this item clarifies and harmonizes these items between NIST Handbook 130 and Handbook 44. Mrs. Tina Butcher (NIST OWM) commented that there are still some inconsistencies in language proposed for this item and the related item in the S&T Committee. She believes the items need to be reconciled by the NCWM Interim Meeting in January 2022. Mr. Jim Willis (New York) asked if this item would include scales that are used to judge a fishing derby, wrestling scales, etc.? Mrs. Butcher commented that it would include these two examples. She commented that “award” has been in the handbooks for a long time. Chair Sakin commented that the scope and use of the NIST Handbook 44 is referenced in Section GA.1. Mr. John McGuire (New Jersey) asked for clarification as to this block being incorporated for harmonization of WAM 22.1, NTP-22.1, S&T GEN 22.1 Handbook 44 G.A-1 to provide mirror language and incorporate NIST Handbook 130 Uniform Regulation for the Voluntary Registration of Serviceperson and Service Agencies for Commercial Weighing and Measuring Devices. Mrs. Butcher stated that was correct and NIST OWM does expect to have fully developed language that will address all references to NIST Handbook 130 and Handbook 44 – General Code. There were no objections to assigning a Developing status for now with the intent to upgrade to Voting status. Mr. McGuire and Mr. Walt Remmert (Pennsylvania) both supports a Developing status. The Committee recommended this item be given Developing status.

At the 2022 NEWMA Annual Meeting, Mr. McGuire noted that this block is intended to harmonize these items across handbooks for uniformity. Mrs. Tina Butcher (NIST OWM) stated this item overlaps with the S&T agenda. This item addresses ambiguities in fees for services. OWM believes this item is ready for a vote and would align corresponding language regarding the definition for the word ‘commercial’ in NIST Handbooks 130 and 44. No additional comments received during the open hearing. NEWMA L&R Committee recommended this continues to be a Voting item.

Item Block 3 (B3) Cannabis

(This Item was returned to Committee)

(*Note:* At the 2022 NCWM Interim Meeting, the Committee heard testimony on each individual item in Block 3: B3 (Cannabis). The comments heard are reported for each item within the block, but the Committee kept PAL-22.1 PAL 22.2 and MOS-22.2 together as a block. At the 2022 NCWM Annual Meeting, NET-22.1 HB 133, Section 1.2.6. HB133, Section 1.2.6. Deviations Caused by Moisture Loss or Gain and Section 2.3.8. Table 2-3 Moisture Allowances was removed from the block and was considered separately.)

B3: PAL-22.1 V Section 2. Definitions 2.XX. *Cannabis* and *Cannabis-Containing* Products.

B3: PAL-22.2 V Section 10. Requirements, 10.XX. *Cannabis* and *Cannabis-Containing* Products.

B3: MOS-22.2 V Section 1.XX. *Cannabis* and *Cannabis-Containing* Products and 2.XX. *Cannabis* and *Cannabis-Containing* Products.

Source: NCWM Cannabis Task Group**Submitter's Purpose and Justification:****B3: PAL-22.1 Section 2. Definitions 2.XX *Cannabis* and *Cannabis-Containing* Products.**

Establish a clear definition of Cannabis and Cannabis-containing products for use in Handbook 130 Uniform Packaging and Labeling Requirements.

Since *Cannabis* and *Cannabis*-containing products were first legalized by some states, the industry has undergone an unprecedented expansion. Even though these products haven't received Federal approval at this time, more and more states have supported *Cannabis* and *Cannabis*-containing products for medicinal or adult-use under their own laws. This has resulted in boutique markets developing across the country with restrictive state boundaries for lack of clarity and uniformity in commercialization of these products.

Cannabis and *Cannabis*-containing products are unique in many aspects; they have a niche as medicine, have resulted in the development of adult use markets, and have an incredible array of different manufacturing and industrial applications. Some of these products contain controlled substances which presents a special concern for the safety and welfare of consumers if misused or mishandled. Further, they are subject to strict regulations by multiple government agencies. *Cannabis* and *Cannabis*-containing products and applications range from non-food to food products for human and animal consumption through inhalation, ingestion, and/or topical or dermal application. They can be used as ingredients in other commodities, changing in most cases the product identity to *Cannabis* and *Cannabis*-containing products. Some *Cannabis* and *Cannabis*-containing products are very susceptible to environmental conditions easily losing or gaining moisture with consequences impacting net quantity, degradation of active cannabinoids, and/or microbial proliferation depending on the situation. These are just some of the reasons there are many concerns and uncertainty surrounding the method of sale and commercialization of *Cannabis* and *Cannabis*-containing products.

Many states have already, or are in the planning stages of, codified packaging and labeling regulations that may differ from those proposed here. They may change yet again once the federal government establishes regulations for *Cannabis* and *Cannabis*-containing products. However, unifying the

packaging and labeling requirements nationally through this proposal will eliminate the boutique markets currently developing. Much of industry has expressed the desire for uniformity and this will align with their needs in this regard.

The submitter requested that this be a Voting item in 2022.

B3: PAL-22.2 Section 10. Requirements, 10.XX Cannabis and Cannabis-Containing Products.

Establish uniform packaging and labeling requirements for Cannabis and Cannabis-containing products. In addition to the justification statement in PAL 22.1 this section is specific to Cannabis is being introduced as an ingredient into many commodities, having a statement on the principal display panel will allow consumers to be informed as to its contents. The amount and type of cannabinoids are a deciding factor to consumers when purchasing Cannabis and Cannabis-containing products. This would also provide regulators with the information necessary to ensure consumers are not being defrauded as these products carry a hefty price tag. A declaration of marketed cannabinoids and their respective concentration will allow consumers to compare like products for value comparison. Both requirements will also act as a safety mechanism to alert consumers of the contents and aid them in selecting the desired product.

B3: MOS-22.2 Section 1.XX. Cannabis and Cannabis-Containing Products and 2.XX. Cannabis and Cannabis-Containing Products.

Create a new section in the Uniform Regulation for the Method of Sale of Commodities in Handbook 130 for *Cannabis* and *Cannabis-Containing Products*. Given the nature of these products, they need to be included in both, the Food and Non-Food sections of this regulation.

This proposal was drafted by the Method of Sale Focus Group within the NCWM Cannabis Task Group.

The ASTM International D37 Cannabis Committee has more than 900 members, the vast majority of which are industry stakeholders. The first two D37 standards passed through the consensus process related to water activity, one of which used all available data to establish an ideal range of 0.55 to 0.65 for *Cannabis* plant material. The proposal to the Method of Sale herein includes a water activity of 0.60 +/- 0.05. While industry has indicated they will reiterate their support for this water activity standard through the NCWM process it is important for the Committee and Membership to be made aware that approximately 900 industry members have already weighed in on and given their consensus support to this standard. Since *Cannabis* and *Cannabis-Containing* products were first legalized by some states, the industry has undergone an unprecedented expansion. Even though these products haven't received Federal approval at this time, more and more states have supported *Cannabis* and *Cannabis-Containing* products for medicinal or recreational use under their own laws. This has resulted in boutique markets developing across the country with restrictive state boundaries for lack of clarity and uniformity in commercialization of these products.

Cannabis and *Cannabis-Containing* products are unique in many aspects; they have a niche as medicine, have resulted in the development of adult use markets, and have an incredible array of different manufacturing and industrial applications. Some of these products contain controlled substances which presents a special concern for the safety and welfare of consumers if misused or mishandled. Further, they are subject to strict regulations by multiple government agencies. *Cannabis* and *Cannabis-Containing* products and applications range from non-food to food products for human and animal consumption through inhalation, ingestion, and/or topical or dermal application. They can be used as ingredients in other commodities, changing in most cases the product identity to *Cannabis* and *Cannabis-*

Containing products. Some *Cannabis* and *Cannabis*-Containing products are very susceptible to environmental conditions easily losing or gaining moisture with consequences impacting net quantity, degradation of active cannabinoids, and/or microbial proliferation depending on the situation. These are just some of the reasons there are many concerns and uncertainty surrounding the method of sale and commercialization of *Cannabis* and *Cannabis*-Containing products.

As a new and rapidly developing industry and given the level of uncertainty and lack of uniformity, *Cannabis* and *Cannabis*-Containing products need a clear and consistent method of sale to provide equity and fairness in the marketplace. Uniformity throughout the method of sale of *Cannabis* and *Cannabis*-Containing products would harmonize regulations across states so these products are not limited by their borders. Further, this would ensure clear and fair competition in the marketplace and provide accurate quantity information for consumers to make informed price and quantity comparisons.

Cannabis has proven to be susceptible to environmental changes, a source of controlled substances, of a high dollar value, and a safety risk for consumers if misused or mishandled. As a result, *Cannabis* and *Cannabis* products require a water activity standard that shall be maintained throughout the entire distribution process from extraction to retail sale.

Water activity is a measure of “free” water available in the plant material to fuel microorganism growth. It is reported on a scale from 0 to 1. The optimal water activity range for *Cannabis* has been determined through scientific studies to be 0.55 - 0.65 and correlates to an environment that is least conducive to the growth of destructive and harmful microorganisms (e.g., molds). If *Cannabis* was to be sold with as little water content as possible the product would not remain viable (i.e., loss or destruction of desired components, such as cannabinoids and terpenes) for as long and could subject the public to increased health and safety concerns. It would not be feasible to have a moisture allowance close to zero but a product viability and safety moisture content within the optimal water activity range. A water activity between 0.55 and 0.65 in *Cannabis* typically correlates to a moisture content of 10 % to 12 %. (See attached Colorado MED report showing 14 % of all flowers failed initial mold/yeast testing before being allowed on the market).

On the *Cannabis* cultivation side, recall that *Cannabis* flower is one of the most valuable materials in the U.S. after precious metals or gems. Between the highest safe water activity (0.65) and the lowest possible water activity (0.04), *Cannabis* flower can fluctuate about 5 % in weight. This means that a jurisdiction not having the ability to test water activity through the supply chain stays exposed to bad actors who could manipulate water activity at key points to divert about 5 % of any harvest in a way that will completely evade every track and trace system. In a world where oversight agencies are concerned about tracking every gram, leaving thousands of pounds at risk of diversion and the related tax loss to the much more lucrative black market is a hole that needs to be plugged.

In the retail *Cannabis* trade, Insufficient attention and guidance is given to moisture migration in or out of some *Cannabis* packaging and as a result, the contents of some *Cannabis* flower packaging have been found to be underweight, resulting in the patient/consumer paying for weight that they are not receiving. For instance, underweight complaints are the #1 consumer complaint in Oregon. For the fairness and safety of *Cannabis* consumers, a 3 % ± weight variance Containing on enforcement of acceptable moisture range needs to be established. As has been learned in other industries in which W&M has jurisdiction, if something can get out of a retail package during distribution, it can also get in. The ability to test packaged *Cannabis*-Containing products at retail for water activity becomes a safety and equity concern.

Solution: ASTM D8197-20 (1) establishes the ideal moisture range for *Cannabis* flower in terms of water activity of 0.60 ± 0.05 . (Exclusive free access to that ASTM D8197 and to an ASTM water activity

eLearning course can be accessed by reaching out to **charlie@cprsquaredinc.com**). This correlates to a moisture content of 10 % to 12 %, which narrows the range of weight variation that must be addressed in dealing with moisture loss.

More than 800 ASTM D37 members concluded that the ideal range for cannabis and hemp flower is 0.55 to 0.65 (the equivalent to 55 % to 65 % Relative Humidity). This was affirmed by the U.S. Pharmacopeia's Expert Cannabis Panel in their Cannabis Paper (2) to mitigate mold growth and maintain the quality attributes.

Consumers/patients buying *Cannabis* products are looking for a desired effect. Those effects are in part determined by the presence of terpenes, which have different scents and provide various therapeutic effects. The presence of these terpenes is diminished as the plant dries and the effects the patient/consumer is expecting are also diminished from what is shown on the label (terpene testing). The U.S. Pharmacopeia has determined the same water activity of 0.60 ± 0.05 to be ideal for maintaining these quality attributes (e.g., cannabinoid and terpene content) of *Cannabis* flower (attached).

The submitter mentioned the following possible opposing arguments:

- Patients and Consumers don't want to buy water when purchasing *Cannabis*. When it comes to *Cannabis*, they want to buy the right amount of water. The right amount of water (or moisture) helps safeguard the quality and integrity of the *Cannabis* components consumers are purchasing. These active components would degrade in overdried plant material. It could also be argued that by providing a constant moisture content through establishment of a water activity standard for the proper sale of unprocessed *Cannabis* there is a measure of ensuring proper quantity during purchase.
- W&M doesn't regulate quality. To the extent establishing an acceptable water activity range is monitoring quality, this is a positive by-product of monitoring equitable transactions, promoting health and safety and preventing diversion. Oversight of motor fuels is analogous in the sense that the attributes of motor fuel are a function of quality and samples are sent to a lab for testing these attributes.
- Equipment cost. The additional cost of water activity meter(s) should not be prohibitive. It could be easily offset by the revenue that would be saved by preventing over drying and diversion and/or by fees collected. This could be accomplished by random testing of *Cannabis* flower throughout the manufacturing and distributions processes. It should also be noted that setting a water activity standard in the MOS does not establish testing requirements nor frequency of testing requirements.
- Illegal activity. Not every state has legalized the sale and distribution of *Cannabis*, whether it contains more or less than 0.3 % THC. However, there are many states (and federal agencies) that have legalized the sale of *Cannabis* in some form or fashion or another. There are strong indication that federal and other state agencies are working to establish requirements for the sale of *Cannabis* and *Cannabis*-products.
- Some have expressed concern over this water activity applying to *Cannabis*-containing products, which resulted from confusion. The water activity proposed herein would not apply to *Cannabis*-containing products, rather it would only apply to *Cannabis* plant material. Traditional water activity levels applied to food products would not be altered or affected by this proposal.

NIST OWM Executive Summary for Block 3. Cannabis

NIST OWM Recommendation: OWM recognizes the importance of this work and the progress the TG has made thus far. However, there are some significant issues that need to be addressed before this block of items is ready for adoption.

OWM recommends this block be designated “Assigned” to the Cannabis TG in order for them to obtain additional information and further develop. OWM has outlined a number of areas requiring additional work in the OWM Executive Summary and OWM Detailed Technical Analysis (below) and states may have additional areas that need to be addressed.

“Cannabis” Statement:

In contrast to hemp, marijuana remains a Schedule I substance under the Controlled Substances Act. NIST does not have a policy role related to the production, sale, distribution, or use of cannabis (including hemp and marijuana). NIST participates in the National Conference of Weights and Measures (NCWM) as part of NIST’s statutory mission to promote uniformity in state laws, regulations, and testing procedures.

- OWM continues to encourage the Cannabis TG reach out to State Cannabis Commissions, Medicinal Programs, Health Departments, and other State Cannabis Regulatory authorities to work collaboratively to develop language that is acceptable to all stakeholders. There are approximately 22 states that have labeling laws or regulations.
- To inform stakeholders of any developments by the TG, OWM recommends the TG provide a summary to appear in the NCWM Publications. It should be clarified if this TG reports to the NCWM L&R Committee or NCWM Board of Directors.

Form 15’s submitted by the Cannabis TG include the following statements. OWM comments are included with each point.

- “W&M does not regulate quality. To the extent establishing an acceptable water activity range is monitoring quality, this is a positive by-product of monitoring equitable transactions, promoting health and safety and preventing diversion.”

OWM Comment: Weights and measures strives for equity in the marketplaces but has not been involved with the health and safety side of commodities.

- “Equipment cost. The additional cost of water activity meter(s) should not be prohibitive. It could be easily offset by the revenue that would be saved by preventing over drying and diversion and/or by fees collected. This could be accomplished by random testing of Cannabis flower throughout the manufacturing and distributions processes. It should also be noted that setting a water activity standard in the MOS does not establish testing requirements nor frequency of testing requirements.”

OWM Comment: Many states’ package inspection activities are not fee-supported and would not be generating income by charging fees for services.

B3: PAL-22.1. – Section 2. Definitions, 2.XX. Cannabis and Cannabis-Containing Products

NIST OWM Executive Summary for Block 3. Cannabis

- Section 2 Definitions define terms as they are used in the UPLR; these are not intended to define commodities in the marketplace. The Committee would not want to set a precedent to defining commodities.
- “Cannabis” has a known standard of identity; it is not necessary to add a definition to the handbook.
- Definitions should have the proper terminology used for delta-9 by including the term tetrahydrocannabinol followed by (THC) (delta-9 tetrahydrocannabinol (THC))

B3: PAL-22.2. – Section 10. Requirements, 10.XX. *Cannabis* and *Cannabis*-Containing Products

- OWM had previously noted our concerns with “*Cannabis*” being italicized. Is it a requirement that this term “Cannabis” appear an italics style for packaging and labeling requirements? If so, OWM recommends the Committee add the statement to (a)(2); “the term *Cannabis* shall appear in capitalization and italics style.” If it is not a requirement the capitalization and italics format must be removed to avoid confusion in labeling requirements.
- OWM recommends the following formatting change to provide clarity to make it easier to follow and apply.

These recommendations also correct grammar (i.e., line 14 states “less that” rather than “less than” and subsection (b) uses the term “marketed” rather than “labeled”).

10.XX. *Cannabis* and *Cannabis*-Containing Products – A *Cannabis* or *Cannabis*-containing product that is intended for human or animal consumption or application, the following information shall appear on the outside of the package:

(a) On the principal display panel

(1) a statement “Contains *Cannabis*”;

(2) a statement with either “contains less than 0.3 % total delta-9 THC” or “contains 0.3 % or more total delta-9 THC”; and

(b) On the back or side panel

(1) a declaration of the labeled cannabinoid per serving or application; and

(2) the quantity declaration shall be in terms of milligrams.

B3: MOS-22.2 – Section 1.XX *Cannabis* and *Cannabis*-Containing Products and 2.XX *Cannabis* and *Cannabis*-Containing Products

OWM does not concur that a method of necessary for this commodity. The Weights and Measures Law, Section 16. Method of Sale which specifies:

Section 16. Method of Sale

NIST OWM Executive Summary for Block 3. Cannabis

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)

- If the Committee proceeds with language for a method of sale it is not necessary to list example of product types for each unit of measure. These examples should be stricken from the language

The Committee should consider the development of a NIST HB133 – Chapter 5 test procedure for determining moisture allowance if the MOS is adopted with criteria for Water Activity.

Item Under Consideration:**B3: PAL-22.1 V Section 2. Definitions 2.XX *Cannabis* and *Cannabis*-Containing Products.**

2.XX. *Cannabis* and *Cannabis*-Containing Products – Cannabis is a genus of flowering plants in the family Cannabaceae, of which *Cannabis sativa*, *indica*, *ruderalis* are species., and any hybridization thereof This definition includes products that contain 0.3 percent or less of Total Delta-9 Tetrahydrocannabinol (THC) (also known as Hemp) and products that contain more than 0.3 percent of Total Delta-9 THC (also known as cannabis, marijuana or marihuana). (Added 20XX)

B3: PAL-22.2 V Section 10. Requirements, 10.XX *Cannabis* and *Cannabis*-Containing Products.

10.XX. *Cannabis* and *Cannabis*-Containing Products – Any *Cannabis* or *Cannabis*-containing products intended for human or animal consumption or application, shall bear on the outside of the package the following:

(a) On the principal display panel

- (1) The statement “Contains *Cannabis*.” The word “Cannabis” shall be capitalized and italicized; and**
- (2) The statement “Contains 0.3 % or less Total Delta-9 THC” or “Contains more than 0.3 % Total Delta- 9 THC”; and**

(b) On back or side panel

- (1) a declaration of the labeled cannabinoid per serving or application; and**
- (2) the quantity declaration shall be in milligrams.**
(Added 20XX)

B3: MOS-22.2 V Section 1.XX. *Cannabis* and *Cannabis*-Containing Products and 2.XX. *Cannabis* and *Cannabis*-Containing Products.

Section 1. Food Products.

1.XX. *Cannabis* and *Cannabis*-Containing Products – *Cannabis* is a genus of flowering plants in the family Cannabaceae, of which *Cannabis sativa*, *indica*, *ruderalis* are species and any hybridization thereof. This definition includes products that contain 0.3 percent or less of Total Delta-9 Tetrahydrocannabinol (THC) (also known as Hemp) and products that contain more than 0.3 percent of Total Delta-9 THC (also known as cannabis, marijuana or marihuana).

1.XX.X. Unit

- (a) Volume – Products offered for sale in liquid form shall be sold by volume.**
- (b) Weight- Products offered for sale in non-liquid form shall be sold by weight. These products may also have a supplemental declaration of count or measure.**

1.XX.X. Sale from Bulk

- (a) When sold from bulk, all sales shall be based on net weight or net volume.**
- (b) When liquids are offered for sale from bulk, the reference temperature for measurement shall be 20 °C (68 °F). Products shall be delivered at a temperature within ± 2 °C (5 °F). Artificially heating liquids to temperatures higher than the specified limits is prohibited.**

1.XX.X. Water Activity-When unprocessed *Cannabis*, is kept, offered, or exposed for sale, sold, bartered, or exchanged, or ownership transfers, the water activity shall be 0.60 (± 0.05) in accordance with latest version of ASTM D 8197, Standard Specification for Maintaining Acceptable Water Activity (a_w) Range (0.55 to 0.65) for Dry *Cannabis* Flower Intended for Human/Animal Use.

The procedure for determining the water activity in *Cannabis* flower can be found in the latest version of ASTM D 8196 Standard Practice for Determination of Water Activity (a_w) in *Cannabis* Flower.

(Added 20XX)

And

Section 2. Non-Food Products.

2.XX. *Cannabis* and *Cannabis*-Containing Products – *Cannabis* is a genus of flowering plants in the family Cannabaceae, of which *Cannabis sativa*, *indica*, *ruderalis* are species, and any hybridization thereof. This definition includes products that contain 0.3 percent or less of Total Delta-9 Tetrahydrocannabinol (THC) (also known as Hemp) and products that contain more than 0.3 percent of Total Delta-9 (THC) (also known as cannabis, marijuana or marihuana).

2.XX.X. Unit

(a) Volume – Products offered for sale in liquid form shall be sold by volume.

(b) Weight – Products offered for sale in non-liquid form shall be sold by weight. These products may also have a supplemental declaration of count or measure.

2.XX.X. Sale from Bulk

(a) When sold from bulk, all sales shall be based on net weight or net volume.

(b) When liquids are offered for sale from bulk, the reference temperature for measurement shall be 20 °C (68 °F). Products shall be delivered at a temperature within ± 2 °C (5 °F). Artificially heating liquids to temperatures higher than the specified limits is prohibited.

2.XX.X. Water Activity – When unprocessed *Cannabis*, is kept, offered, or exposed for sale, sold, bartered, or exchanged, or ownership transfers, the water activity shall be 0.60 (± 0.05) in accordance with latest version of ASTM D 8197, Standard Specification for Maintaining Acceptable Water Activity (a_w) Range (0.55 to 0.65) for Dry Cannabis Flower Intended for Human/Animal Use.

(Added 20XX)

NIST OWM Detailed Technical Analysis:

WATER ACTIVITY (additional comments are in Item B3: MOS-22.2)

OWM's comments are based in part on the following:

- “Water activity is different from water content (or moisture content), which is a measure of the total amount of moisture in a material and is usually expressed as a percentage of the total amount (% of total weight).”¹
- Water activity is a primary concern in food safety. While water activity has a relationship to moisture content but “moisture content does not correlate as well as water activity with microbial growth, chemical stability, or physical stability.”² However, “water activity and moisture content are related through the moisture sorption isotherm.”¹
- The only reason weights and measures officials are concerned with moisture content is in determining whether variations in the net weight of packaged goods due to the loss or gain of moisture are reasonable. Weights and Measures has not historically enforced product quality. If product quality is going to be enforced, then it is likely the additional requests will be made by industry for Weights and Measures to enforce water activity in other commodities as well.

¹ See pccarx.com/Blog/why-water-activity-matters-in-pharmacy-compounding-rssid (Accessed 6/17/2022). Providing this URL to this commercial website does not mean that NIST endorses any product or service advertised on that website. This information is provided to assist the Committee in its consideration of this proposal.

² See: “[The What, How, and Why of Water Activity in Cannabis \(cannabissciencetech.com\)](https://cannabissciencetech.com)” (Accessed 6/17/2022). Providing this URL to this commercial website does not mean that NIST endorses any product or service advertised on that website. This information is provided to assist the L&R Committee in its consideration of this proposal.

- To define water activity and put the proposed water activity limits within context with other products (here the proposal requires the water activity of unprocessed cannabis to be 0.6 ± 0.05 whenever it is sold, or ownership transferred) OWM presents the following. The FDA defines the “water activity of a food is the ratio between the vapor pressure of the food itself, when in a completely undisturbed balance with the surrounding air media, and the vapor pressure of distilled water under identical conditions. A water activity of 0.80 means the vapor pressure is 80 percent of that of pure water.”³ FDA further explains that “most foods have a water activity above 0.95 and that will provide sufficient moisture to support the growth of bacteria, yeasts, and mold. The amount of available moisture can be reduced to a point which will inhibit the growth of the organisms.” FDA explains that if the water activity of food is controlled to 0.85 or less in the finished product, it is not subject to the FDA regulations (see **21 CFR § 108 “Emergency Permit Control,” § 113 “Thermally Processed Low-Acid Foods Packaged in Hermetically Sealed Containers,”** and **§ 114 “Acidified Foods.”**)³)
- It should also be noted that all states that have regulations regarding Cannabis require that the water activity may not exceed 0.65. On the contrary, none of these states require a minimum of 0.55 in their regulations. This implies that states are only concerned with mold growth and its potential safety affects, and not dehydration.

OWM recommends that the Committee or Cannabis TG provide a document that includes specific citations to the studies and references or to the industry standards (e.g., ASTM) and the recommendations of the U.S. Pharmacopeia as these important references will be needed for the foreseeable future to allow for the development for use in developing training and in assisting the states in adopting enforcement policies and even test equipment requirements.

It is important to note the FDA statement “water activity increases with temperature.”¹ Since there is a strong connection between these two factors OWM recommends that the proposal be amended to include suitable storage temperature and humidity limits wherever unprocessed cannabis is sold or ownership transferred. Further, consideration should be given to requiring sellers and processors to maintain and share this type of data with inspectors during inspections because it may prove invaluable to the inspector in determining if the variations in water activity and quantity due to the loss or gain of moisture are reasonable. Many other factors including the product’s natural moisture content and consistency impact moisture content and time and air flow also impact the rate of moisture loss (as do temperature and humidity) but none of those factors are typically subject to regulation by weights and measures regulations. However, OWM acknowledges that for cannabis, especially if water activity limits are adopted into regulation storage area humidity and temperature may be justified and critical in helping the cannabis industry to avoid violations. It appears these would fall within “Current Good Distribution Practices” which must be met under both Federal and State packaging laws for other package requirements when reasonable variations must be allowed.

When the current moisture allowances for many other under consideration by the NCWM there was no discussion or intent to establish water activity limits or specific moisture content limits for flour (typically 12 percent to 14 percent), pasta (31 percent to 32 percent) during its plastic state when under production) or even meat and poultry products which may contain between 60 percent to 73 percent water. In part this is because weights and measures laws do not typically grant the director the authority to establish the moisture content limits for foods, drugs, or cosmetics. OWM recommends that Committee clearly state that weights and measures inspections to be conducted under this proposed regulation will limited to only

³ [Water Activity \(a w\) in Foods | FDA](#) (accessed 6/17/2022)

cannabis that there is no intent to expand it to foods. This statement of intent early in the consideration process may be helpful to future readers of the historical record.

“When unprocessed *Cannabis* is sold, or ownership transferred”

OWM recommends that the Cannabis TG or Committee clarify how the language shown above is to apply in the real world that inspectors work in. OWM also recommends that the Cannabis TG or Committee provide examples of how an inspector is to enforce the water activity requirement without interfering with a commercial transaction. This may not be the submitter’s intent but as written and inspector cannot perform a water activity inspection of the cannabis until it is sold, or ownership transferred. That appears to put the inspector in a position of waiting until a commercial transaction is completed before compliance with this requirement is determined. Dependent on the time between the sale and inspection it raises potential challenges for the inspector because the buyer may have exposed the cannabis to mishandling or high temperatures. The water activity violation may be the fault of the buyer not the seller.

Enforcement problems like this arose frequently in the early years of package control when some legislatures passed similar legislation where the requirement for accurate net weight only applied to packages that had been sold. Under the laws written that style many states were left without the authority to inspect and test packages that were kept, offered for exposed for sale or sold until their legislatures amended these types of laws.

To ensure that inspectors have the authority to inspect products kept, offered, or exposed for sale or sold OWM recommends that the Committee consider amending this requirement as follows:

2.XX.X. Water Activity-When unprocessed *Cannabis*, is kept, offered, or exposed for sale, sold, bartered, or exchanged, or ownership transfers, the water activity shall be 0.6 (\pm 0.05). Unprocessed *Cannabis* is in compliance with this requirement unless the water activity is less than 0.55 or greater and 0.65.

This language will ensure consistency with that in the NIST Handbook 130, Uniform Weights and Measures Law under Section 11 “Powers and Duties of the Director” and will help ensure that this requirement can be effectively enforced at all levels of cannabis distribution and in any of the described transactions. OWM also recommends that the accuracy statement be clarified to clearly state the plus or minus values that must be exceeded for a violation to occur.

Conflict in Law or Regulation

The potential for conflict may be highest in states that have separate agencies with authority to regulate all aspects of cannabis sales. Directors in these jurisdictions may be concerned about the possibility of a conflict in law if cannabis definitions and other regulations are added to either of the uniform regulations. This would be especially true if the regulations were not identical to other state agency’s regulations already in effect. Another potential problem may arise if a State’s law does not allow cannabis to be sold for either recreational or medical purposes where the addition of requirements, for example a method of sale or label regulation, may be mistaken by a reader to permit cannabis to be sold because it is now included in state regulations. To avoid this situation a state director may use the state’s administrative rulemaking procedure to “reject or modify” the conflicting provisions of the uniform regulations but that process may take several months. If the survey reveals that adoption of some of the cannabis regulations may create these types of conflicts, OWM believes a simpler approach of removing the conflicting laws or regulations may be worth considering. One option is to have a note placed at with each cannabis regulation so that the enforcement of any conflicting requirement found in a uniform regulation would

automatically be permanently suspended. Below is a drafted language based upon NIST Handbook 44, General Code G-N.1. Conflict of Laws and Regulations which establishes the specifications, tolerances, and other technical requirements for weighing and measuring devices and where occasionally conflicts arise where safety or other regulations are in effect:

NOTE: Conflict of Laws and Regulations. – If any particular provision of the requirements in this section or subsection (include the section or subsection here for exactness) are found to conflict with existing federal or state laws or regulations (i.e., sale of cannabis is prohibited) or local ordinances relating to the definition, labeling, potency or other requirements for cannabis or cannabis containing products, the enforcement of such provisions shall be permanently suspended. Such suspension shall not affect the validity or enforcement of the remaining provisions of any other requirement in this regulation.

Current Authority in Weights and Measures Law

The survey may also reveal that a director has advisement from legal counsel that the State’s weights and measures law does not give the state director authority to regulate the types of cannabis labeling. If the Committee determines this is the case, regardless on the number of states, amended language will be required to the Uniform Weights and Measures Law to add the needed authority. OWM has drafted a new subsection (r) to add the appropriate regulatory authority to promulgate a variety of cannabis requirements to the Uniform Weights and Measures Law as was done for the price verification procedure in 1995. The following draft has language to reflect that the Director has the authority to set variations for potency, ingredients, warning labels, water activity and moisture loss or gain permitted when current good manufacturing and distribution practices are followed. If the Committee uses this draft, it could then add additional areas of responsibilities in this emerging area of weights and measures regulation.

Be advised that OWM draft language omits references to “intrastate commerce” because when that provision is applied in conjunction with the terms and definitions in Section 12.1.2. “Variations Resulting from Exposure” in the UPLR, which reads that “so long as” the packages are in the control of the packager or person who introduces the packages into intrastate commerce that reasonable variations in net quantity caused by the loss or moisture loss or gain shall not be recognized, likely conflict the Federal Food, Drug and Cosmetic Act and regulations published by the FDA. This is a complex legal issue and would require too much space to fully explain but the issue was discussed in the NIST Handbook 133 Working Group many years ago and the consensus at the time among officials was that all packaged products should be treated the same regardless of whether they are in “intra-state” or “interstate commerce.”

OWM is trying to foresee potential problems with these proposals and is offering solutions that may allow for the adoption at the 2022 NCWM Annual Meeting. OWM recommends adding another Section in (2) which would allow the director to utilize accredited laboratories to perform testing when the states weights and measures laboratory does not have the capabilities. It also grants the director authority to employ a conformity assessment program. This could be a program where companies are inspected and accredited by a competent party, such as ASTM, who maintain accreditation and are subject to random audits to ensure compliance. This would allow the director to rely on alternative approaches instead of having their state metrology laboratory to obtain equipment and testing expertise they may not possess.

OWM believes that in the future weights and measures inspections will also need to employ increased interstate cooperation among weights and measures programs as well as conformity assessment, and accreditation programs to supervise the new ways commercial measurements are utilized. We see an increase of goods being delivered to homes directly from remote shipping facilities. The testing of prepackaged goods for testing will decline and that may lead to the need for states to reach out for

assistance from other jurisdictions to investigate complaints. Assistance will be required to go into distribution points or point of pack to test packaged goods or assist in evaluating whether current good manufacturing practices are in place or to help in resolving moisture loss (or gain) issues.

Utilizing accreditation programs to ensure products compliance are currently in use around the world. An example of this is the U.S. Consumer Product Safety Commission (CPSC) having oversight of toys sold in the U.S. marketplace. The use of such systems would empower programs to focus on supervising the marketplace and using risk assessments and audits to oversee far more than is possible with today's resources. OWM often hears weights and measures plays catch-up instead of actively participating in the development of new areas of commercial weighing and measurement. One way to take a larger step in any field of weighing and measurement is to be able to provide leadership and marketplace supervision using new approaches and looking for opportunities in the emerging areas of legal metrology regulations (e.g., electric vehicle charging systems and GPS transportation systems). Recognizing these options would be a good first-step for cannabis.

OWM also recognizes that regulation of cannabis packaging is different than other packaged products in the marketplace. Current authority for weights and measures regulations typically cannot prescribe the type and color of packaging, the use of production codes, manufacture date, warning labels cannabis symbols, or other requirements. UPLR regulations cannot dictate whether the product can look like candy or baked goods or whether labels can display a picture of a cartoon character. But those aspects are part of the regulatory powers given to cannabis regulatory agencies in many states, and those local requirements vary depending on whether the state legislature allows recreational use or only medicinal use cannabis. In most jurisdictions only the legislature can grant enforcement authority to regulatory agencies and sometimes there is overlap.

There are numerous examples from the past that show conflicting requirements and inspection procedures can be avoided through cooperation. Most states that have a Department of Agriculture also have a state chemist and seed control laboratory, that have regulatory authority to prescribe net quantity of contents requirements. They work closely with the weights and measures division for guidance and assistance in ensuring that labeling regulations are consistent. The inspectors who carry out inspections have the authority as well as the training and equipment to perform the inspections and tests properly and uniformly. A similar solution is for weights and measures agencies to

Cannabis Formatted as Italicized Text

Within the proposed section title, the term *Cannabis* is italicized. When label designers see terms presented in italics in a regulation, they may interpret that to mean the same text also has to appear on the package label in italics. It may reduce the chance for confusion if the Committee makes it clear whether the term *Cannabis* must appear on the package label in italics or not.

This type of issue occurred in the 1960s when the Federal Trade Commission (FTC) published their first regulations under the FPLA. FTC submitted the regulations to the Government Printing Office (GPO) with the symbol and abbreviations for units without periods. To address the concerns of the packers on limited package spacing the drafters felt that excluding the "period" would provide packers additional space they required. The misstep was the GPO editors applied government publication formatting and applied the period on all the symbols for units as abbreviations. The rules were published, and periods were added to labels because of how they were expressed within the regulation, even though a separate section stated "periods" were optional. A lesson learned that if you put a term in a regulation in "italics" lawyers, label designers, and inspectors may interpret the regulation as it "shall" be shown on the label in that formatting style.

OWM recommends this proposal as modified and that the requested survey of states be included as part of the Committee report. OWM recommends survey questions be presented to state directors promptly. This will allow adequate time for them to consult with legal counsel and provide their responses to the NCWM prior to the 2022 Interim Meeting. With all of the information identified above and the OWM recommended modifications, we recommend it as a Voting item, if not we recommend it as either Developmental or Informational.

PALS -22.1. Section 2. Definitions 2.XX Cannabis and Cannabis-Containing Products.

OWM recommends that the definition in 2.X.X. **Cannabis and Cannabis-Containing Products** be reordered to provide clarity and readability so that the 0.3 percent or less value wording appears first and the more than 0.3 percent wording appears second. OWM recommends also that the word “percent” and not the symbol be used; that the word “definition” be substituted for section; and that “contains” be used instead of containing.

OWM proposed rewording for the definition of Cannabis found within the UPLR:

2.XX. Cannabis and Cannabis-Containing Products – Cannabis is a genus of flowering plants in the family Cannabaceae, of which Cannabis sativa is a species. This definition includes products that contain 0.3 percent or less of Total Delta-9 THC (also known as Hemp) and products that contain more than 0.3 percent of Total Delta-9 THC (also known as Cannabis, Marijuana or Marihuana).

OWM recommends that consideration be given for the OWM proposed language in B3: PAL-22.1 and recommend it as a Voting item.

B3: PAL-22.2 Section 10. Exemptions, 10.XX Cannabis and Cannabis-Containing Products

The application of this section is clearly stated that it only applies to products that contain cannabis, so no exceptions need be included. OWM recommends that 10.XX be revised as shown below.

10.XX. Cannabis and Cannabis-Containing Products- Any Cannabis or Cannabis-containing products, with the exception of commodities listed under Section 10.9 Textile Products, Threads and Yarns and other non-food products not intended for human or animal application, shall bear on the outside of the package the following:

OWM submits the following questions to the Committee about how this regulation is to be interpreted and enforced:

“Shall Bear on the Outside of the Package...”

Weights and measures regulations for declaration of identity and net quantity of contents require specified information to appear on the principal display panel. The declaration of responsibility may appear anywhere on the package. On this proposal the “declarations” are required to appear “on the outside of the package.” This is a new placement requirement, and for future reference, it would be helpful if the submitter provide a complete explanation as to why it requires a placement outside the requirement. OWM assumes this is a specific prohibition against putting any of the required information on the package, where it is in anyway obscured (on inner wrappings or behind a peel-up label such as you see on bottles of pain medication is not allowed). Are we correct in understanding this requirement to mean that no exemption will be allowed? If that is the intent, it would help if the Committee added that to the historical record of the conference reports. They should indicate the submitter did not intend to allow any

of information required under this section to be obscured in any way or presented on “easily” accessible inner labeling? We are asking for clarification because a similar question came up in a meeting with a cannabis packager who wanted to know some of the other information required under the UPLR information could be placed inside the package where it was still “easily” accessible like the peel-up labels consumers see on bottles of aspirin.

“Contains Cannabis”

In trying to understand how the requirement in Section 10. Exemptions, 10.XX Cannabis and Cannabis-Containing Products will interact with other requirements within the UPLR we referred to Section 3.1. “Declaration of Identity – Consumer Package” which requires a package to have a product identity on the principal display panel. The name for the product must be as listed in federal or state law, or the common or usual name or a generic name. The proposal reflects an ingredient labeling requirement that requires the words “Contains *“Cannabis”* to be shown somewhere on the principal display panel. As the area of the label on small packages is already limited OWM asks the Committee if any consideration would be given to making this ingredient statement optional, if the product identity includes the term “*Cannabis*”?

Will placing the Delta-9 THC potency information on the bottom of the package or bottle be permitted?

One frequently asked question in labeling compliance is “may the declaration of responsibility (or other) information appear on the bottom of the box or bottle?” If it is acceptable for the potency or mg/serving information to appear on the bottom of the box or bottle the current language certainly permits that. If the Committee does not intend to permit any of the required information to appear on the bottom of the box or bottle OWM recommends that a specific prohibition to the regulation be added.

It is not clear as to what this proposal is trying to accomplish with regard to the exemption, making it difficult to assess the proposal. If the exemption is intended to apply to non-food products, then simply exempting non-food products would be sufficient. Without any other rationale to justify including it, referencing Section 10.9 adds unnecessary complexity to the requirement., making it difficult to assess the proposal. If companies are claiming or referencing clothing or other products has having “cannabis” in it/them, what is the intent of doing so? Are companies trying to imply some advantage or benefit? If so, how is the consumer to assess that benefit or advantage? Without such assessment criteria, might such claims be considered misleading?

We question how an inspector, or a company know when the exemption would/would not apply? It is not clear what is mean by the reference to “application.” This term needs to be better defined or explained. Does this include consumption? If so, might a better reference be “consumption or application?” If the intent is to only apply the requirement to “products for human consumption or application” then a simpler alternative might be to simply limit the paragraph accordingly. For example, “Cannabis and Cannabis-Containing Products Intended for Human Consumption or [Application].

Possibly the submitter can provide an additional background information or a justification explaining the rationale. Is this is needed in order for officials and industry to make an informed decision on the proposed requirement?

OWM does offer up an example with removing the exemption language:

10.XX. Cannabis and Cannabis-Containing Products – Any Cannabis or Cannabis-containing products, shall bear on the outside of the package the following:

(a) On the principal display panel

(i) The statement “Contains *Cannabis*.”

(b) On any panel or surface of the package

(i) The statement “Contains more than 0.3 % Total Delta-9 THC” or “Contains 0.3 % Total Delta-9 THC or less.”

(ii) A declaration of the number of milligrams of each marketed cannabinoid per serving or application.

Some additional comments and suggestions.

- In the proposal the term *Cannabis* is italicized. As mentioned in the OWM comments on Block 3, when readers see terms presented in italics in a regulation, they may interpret that to mean the same text also has to appear on the package label in italics. It may help to reduce confusion if the Committee makes it clear whether the term must appear on the package label in italics or not.
- The mg/serving statement should also be rewritten to use the term “quantity” instead of “number.” For example:

(ii) A declaration of the quantity in milligrams (mg) of each marketed cannabinoid per serving.

Test Methods

When adopting a regulation that requires packers to have the THC levels displayed on their packages it is essential that the Committee provide information on the acceptable test methods to be used for enforcement. When placing any regulation of this type, the States (as well as the cannabis industry), must be able to test and verify the labeled claim or the regulation will not provide the intended protections. OWM agrees this is an essential labeling requirement for this commodity and believes enforcement will be critical for use in ensuring safety and preventing fraud and unfair competition. To see why this regulation is justified the Committee should review the type of problems FDA is finding with CBD labeled products and strength claims at **Warning Letters and Test Results for Cannabidiol-Related Products | FDA**.

After reviewing the 2022 Interim L&R Report OWM is recommending formatting changes that is easier to follow and apply. These changes also correct grammar within the current proposal (e.g., line 14 states “less than”).

OWM has previously noted the term *Cannabis* being italicized. Is a requirement that it this term appear an italics style? If so, OWM recommends that the Committee add a statement to (a)(2). The word *Cannabis* shall appear in capitalization and italics style. If it is permissive the term “shall” could be replaced with “may”

10.XX. Cannabis and Cannabis-Containing Products – A Cannabis or Cannabis-containing product that is intended for human or animal consumption or application, the following information shall appear on the outside of the package:

(a) On the principal display panel

- i. a statement “Contains Cannabis”;**
 - ii. a statement with either “contains less than 0.3 % total delta-9 THC” or “contains 0.3 % or more total delta-9 THC”; and**
- (b) On the back or side panel**
- i. a declaration of the labeled cannabinoid per serving or application; and**
 - ii. the quantity declaration shall be in terms of milligrams.**

B3: MOS-22.2 – Section 1.XX. Cannabis and Cannabis-Containing Products and 2.XX. Cannabis and Cannabis-Containing Products.

OWM recommends that the Committee move only partial sections of this proposal forward as a Voting Item. The Committee will need additional time to address the requirements for limits on water activity, in additional answers to whether the state director’s authority under the State’s weights and measures law extends to promulgating the labeling requirements (e.g., warning statements, potency, ingredients and water activity) (see NIST OWM Comments in B3: PALS -22.1. Section 2. Definitions 2.XX Cannabis and Cannabis-Containing Products.”.)

As noted in the OWM comments on Block 3, we also highlighted below Item B3: PAL-22.1, water activity is associated with product quality and must be controlled by the packer of foods, drugs, and cosmetics to maintain product consistency and quality, and to avoid mold or product spoilage. These are health, safety, and other quality characteristics. The fundamental purpose of weights and measures laws is to ensure that declarations of **quantity** are accurate so consumers can make price and quantity comparisons which ensures equity and fair competition in the marketplace. Both Federal and State packaging and labeling laws require that reasonable variations in **quantity** caused by the loss or gain of moisture must be allowed if they increase or decrease the **quantity** of a desiccating product. Weights and measures law do not define how much moisture a product must contain but only how the loss or gain of moisture changes the **quantity** beyond reasonable limits. The laws were written to prevent economic fraud and typically do not to give weights and measures directors authority to expand inspection programs into other areas of regulation such as food safety or quality. Therefore, in general, weights and measures inspectors do not enforce ingredient, potency, drug content, safety labeling, and water activity on other products in the marketplace solely under labeling authority granted under their current weights and measures laws.

The Committee should request the NCWM Cannabis TG and the cannabis industry, and trade associations provide scientific studies and other information to justify and validate the limits of water activity requirements stated within the proposal. The Committee can have the data evaluated by a qualified panel of experts who could also assist in developing the justifications and technical language in the regulations. It is important to have due process and that growers, packers, distributors, retailers, and other stakeholders have adequate notice and an opportunity to comment on the water activity limits especially when violations of any regulations promulgated by the state may involve civil or criminal penalties including imprisonment. In developing of any law or regulation, it is important to balance the risks to consumers against the potential penalties. Consideration should be given for alternative approaches in addressing the problems caused by water activity, in lieu of criminalizing violations to control product potency or prevent spoilage. In all scientific procedures there are measurement uncertainties that should be consideration before a person is exposed to criminal or civil prosecution. For these reasons, OWM recommends that the Committee seek out expert advice and establish reliable tolerances for water activity measurements to ensure both due process and fairness.

The Committee should also seek expert assistance in developing the inspection and sampling procedures necessary to carry out enforcement, in addition to providing guidance to the States on appropriate test procedures. If field testing is contemplated, guidance on test equipment specifications and tolerances must be developed. When setting equipment specifications and tolerances, consideration should be given to NIST Handbook 44, Appendix A. Fundamental Considerations, Section 3. "Testing Apparatus." In addition, the state metrology laboratory will need to be training and equipped to certify the devices used in field inspection. These important components should be developed and included with the water activity proposal before it is submitted for consideration to the NCWM. When a water activity limit is adopted, the states will be then be prepared to implement inspections and enforcement.

OWM commends the NCWM Cannabis Task Group for its outstanding work on developing these proposals. If these proposals move forward and the NCWM Cannabis Packaging and Labeling Subcommittee is disbanded, OWM recommends that Committee establish a Cannabis Packaging and Labeling Work Group within the Packaging and Labeling Subcommittee (PALS). This will allow the work to be closely integrated with the L&R Committee and allow the Committee to better lead in its development of the water activity and moisture loss and gain projects. This will also allow for coordination in the development of the field inspection sampling and laboratory testing programs that will be required.

- In addition, adding a recognized moisture test procedure a detailed set of instructions for selecting and handling the moisture samples will need to be provided. If an inspector seizes samples for testing, they will need to follow good sampling procedures and handling practices to ensure the samples are protected and stored properly prior to and after testing. If there are legal or other restrictions that apply to the seizure, handling, storage, or transportation of cannabis samples then these can be included in the instructions to assist the inspector.
- **Water activity is not unique to Cannabis. Many (e.g., food) products have water activity that is needed to ensure quality and maximize shelf life. Water activity helps minimize texture changes, chemical reactions, and microbial spoilage.** Throughout the history of state weights and measures, it has not been under the authority of weights and measures to ensure compliance of commodities to ensure quality (texture changes, chemical reactions, and microbial spoilage). When a Cannabis product spoils, is the intent to call weights and measures in to investigate?
- The role, authority, and ability to carry out compliance by state weights and measures needs to be considered before adoption. Will proactive compliance testing be done, audit testing or will this be done on complaint only basis? It is clear to W&M as to the purpose. Consideration also needs to be given to how sampling will occur, how the lot is determined and whether a sample or the entire lot will fail. What are weights and measures protecting consumers and businesses from?
- The Item Under Consideration 1.XX.X. only specifies an upper limit of 0.65. Water activity contains a lower limit of 0.55 as well. If water activity is of concern, both the upper and lower limit should be addressed.
- Water activity can change and any point during the supply chain, typically due to improper storage. Ultimately, it must be considered who will be held as the responsible party... the packers, distributor, seller, and whether specific requirements be added to ensure proper storage (e.g., relative humidity controls)?

Summary of Discussions and Actions:

At 2022 Interim some members expressed support for this block to be Voting status. They remarked that without this language, people were creating fraud in the marketplace by ripping consumers off with short-weight sales.” The Arizona Dispensary Association supported moving this item forward as a Voting item and stated that it is a 1.4 billion-dollar to 1.5-billion-dollar industry in Arizona. Mr. Charles Rutherford (CPR Squared and, co-Chair of the NCWM Cannabis TG) supported moving this item forward as a Voting item. He further stated that bad actors can manipulate the drug and sell underweight flowers. He also indicated that education and training was needed, and that regulation was critical to ensure that consumers were not being shorted. The American Trade Association for Cannabis and Hemp (ATACH) stated it was an important next step for regulating the industry.

Dr. Lipka (NIST OWM) responded to general comments and answered questions that were posed as to what OWM can do with language within the NIST Handbooks. Dr. Lipka stated that OWM is in discussion with NIST Office of Chief Counsel regarding the cannabis agenda items at NCWM.

There are a few things for NIST related work: development to standards materials, high and low THC, and standards. There needs to be a distinction of the THC level that is regulated by the Farm Bill and the Controlled Substance Act (CSA).

According to the CSA, high THC marijuana is an illegal drug and NIST cannot support guidance, training, and standards Recognizing this issue, NIST will be able to publish NIST Handbook 130 with this item, but they will have to provide a disclaimer citing the CSA. OWM is in communication with NIST legal counsel on this matter and will continue to work and advice with NIST legal.

The Committee assigned Voting status for this item at the 2022 NCWM Interim meeting.

The Committee heard unanimous support for this item from Regulators and Industry who shared the need for it.

At the 2022 NCWM Annual Meeting, the Committee heard support for PAL-22.1 from the Mr. Rutherford (co-Chair of the Cannabis Task Group) and Dr. Matt Curran (Florida). The Committee considered testimony from Mr. Sefcik and the OWM written analysis for this item. The Committee also received changes from Mr. Joe Moreo (Trinity County, California) who requested that the proposal be amended to include additional species of Cannabis. This concurred with Mr. Moreo and added “*indica*, *ruderalis* species and any “hybridization thereof” to the definition of Cannabis and Cannabis-Containing Products. The Committee also removed the capitalization of cannabis, marijuana, and marihuana. The Committee also provide the term Tetrahydrocannabinol (THC) and noted it is the acronym for “THC

On PAL 22.2 the Committee removed the italicization of letter “C” in word “Containing” and made an editorial change to the language specifying the level of Total Delta-9 THC to harmonize with other sections. Mr. Sefcik also commented on PAL-22.2 that OWM still had concerns with “*Cannabis*” being italicized and capitalized. It is still not clear in the language whether this is a requirement that the term “Cannabis” appear in italics and capitalization style for packaging and labeling requirements as stated in the proposal. As it is written, it could easily be implied that italics and capitalization is required on all packages, and if required as part of labeling, is should explicitly say so. If not, it should clearly be stated that italics format is not required, or remove the italics format from the proposal, as to not cause confusion. As currently written, it can easily be implied capitalization and italics of the word cannabis is required on labeling. Lastly, the Committee corrected the grammar which stated, “less that” and replaced with “less than” and replaced the term “labeled” with “marketed”.

Dr. Matthew Curran (Florida) supported the editorial change of italicizing and capitalizing “Cannabis”. Mr. Austin Shepard (San Diego County) supported the change to “Contains 0.3 % or less Total Delta-9 THC” or “Contains more than 0.3 % Total Delta- 9 THC.” The Committee changed the roman numerals to numerical and separated out paragraph (b) into 1 and 2.

On MOS-22.2 – the Committee replaced the definition for “water activity” and referenced ASTM D 8197 was replaced with a reference to ASTM D 8197 Standard Specification for Maintaining Acceptable Water Activity (aw) Range (0.55 to 0.65) for Dry Cannabis Flower Intended for Human/Animal Use. The Committee also felt it was unnecessary to provide examples of product types and removed them from the language. Other changes included replacing the word “quantity” to “volume” in Sections 1.XX.X (a) and 2.XX.X.(a) Sale from Bulk. In 2.XX.X Water Activity was changed from 0.6 to 0.60.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, Ms. Hahn expressed concern with percentages of THC were of a more qualitative nature and not necessarily within the purview of weights and measures. Mr. Kurt Floren (Los Angeles County, California) addressed the comments and concerns on quality issues as a general matter is not our purview in weights and measures. He mentioned how quality issues are a purview of weights and measures in matters of fuel with octane levels and viscosity of oils that must meet standards. He mentioned that this would be similar in Cannabis, in that THC levels are a part of the identity of the product, and that it is an important component in determining the value and allowing for value comparison. Mr. Floren stated that States are in different stages of regulation, and there is going to be a need for uniform standards. Mr. Charlie Rutherford (Co-Chair of Cannabis TG, CPR²) that cannabis is a industry with a high black-market value and that it is unique with regards to water activity and that are needed to help avoid manipulation. Ms. Cadence Matijevich (Nevada) provided testimony that the State of Nevada’s Department of Agriculture does not have authority over cannabis packaging and labeling regulations, that it is under the purview of the Nevada Cannabis Commission. Mr. Joe Moreo (Trinity County, California) provided testimony that different species including Cannabis indica and Cannabis ruderalis should also be provided in the definition. Ms. Lisa Warfield (NIST OWM) provided testimony that was based on the OWM Analysis that was submitted as the supporting documentation.

The Committee recommended this Item be Assigned to the Cannabis Task Group. We recommend the National NCWM L&R Committee consider the following:

- The need to establish an authority in the Uniform Weights and Measures law to provide jurisdictions with authority to enforce the proposed regulations.
- Conduct outreach to state authorities and the industry groups to gain a deeper understanding of the issues pertaining to this item.
- Conduct a survey of the jurisdictions, where the following items are addressed:
- Have Directors consult with their department’s attorney to determine if adding the definition and other Cannabis proposed requirements to the uniform packaging and labeling regulation or method of sale for commodities regulations will cause a conflict with other state laws or regulations.
- Establishing the method of sale by weight and establishing minimum load requirement to NIST Handbook 44 are of course within weights and measures authority but some of the labeling and

method of sale requirements may not be within the current regulatory authority of some weights and measures programs.

- The most significant question is if state’s weights and measure law authorize the director to adopt rules and regulations that require ingredient labeling, safety warnings, potency declarations and if they allow the director to establish and enforce water activity limits and verify potency labeling.

Many of the State’s weights and measures laws may not give the state director authority to regulate the types of Cannabis labeling. Amended language will be required to the Uniform Weights and Measures Law to add the needed authority. The following proposed language from the OWM analysis supporting documentation is recommended by the Committee:

Section 11. Powers and Duties of the Director

The Director shall:

(c) for Cannabis and Products Containing Cannabinoid(s)

(1) Prescribe by regulation:

- i. **reasonable variations in quantity caused by the loss or gain of moisture during current good distribution practice or by unavoidable deviations in current good manufacturing practice and procedures for moisture determination;**
- ii. **labeling requirements for and defining reasonable variations in water activity that occur in current good manufacturing practice and current good distribution practice and procedures for the measurement of water activity;**
- iii. **labeling requirements for and define reasonable variations in levels of cannabinoid: delta-9 THC, delta-8 THC (potency) that occur in current good manufacturing practice and current good distribution practice and procedures for the measurement of potency; and**
- iv. **packaging and labeling requirements that may include, among other requirements, the characteristics of the packaging (e.g., color) and type of packaging (e.g., tamper evident, childproof), requirements for identity, ingredients, product lot code and date of packaging, contact information of the packer, special symbols or warnings, and potency. The requirements may also include prohibitions on packaging that may be misleading or confusing.**

(2) The Director may prescribe by regulation, programs that utilize accredited testing laboratories and may enter into agreements to utilize conformity assessment programs and other technical services to ensure compliance with any of the prescribed requirements.

PAL 22.1-: The agenda item title should be corrected to read: **B3: PALS -22.1. Section 2. Definitions 2.XX Cannabis and Cannabis-Containing Products.**

The Committee recommended that the TG consider altering the definition of “Cannabis and Cannabis Containing Products” utilizing the minor edits presented in the OWM Analysis supporting documentation. The Committee also recommended including the comments from Mr. Joe Moreo during

open hearing testimony that other species of the Cannabaceae family such as, *Cannabis indica* and *Cannabis ruderalis* may need to be included in the definition.

2.XX. Cannabis and Cannabis-Containing Products – Cannabis is a genus of flowering plants in the family Cannabaceae, of which *Cannabis sativa*, *Cannabis indica*, *Cannabis ruderalis* ~~is~~ are a species. This definition includes products that contain 0.3 percent or less of Total Delta-9 THC (also known as Hemp) and products that contain more than 0.3 percent of Total Delta-9 THC (also known as Cannabis, Marijuana or Marihuana).

PAL 22.2-: The agenda item title should be corrected to read: Section 10. Exemptions, 10.XX Cannabis and Cannabis-Containing Products.

The Committee recommend that the Cannabis TG consider altering the proposed language for this item. The intent of the item and the language is unclear, and the Committee recommended that the Cannabis TG review the language and the questions posed in the OWM analysis supporting documentation, to clarify intent and comprehensively address exemptions.

MOS 22.2- The Committee feels that this item is mostly developed but has concerns regarding the parts that address water activity. The Committee recommended that Cannabis TG review the OWM analysis supporting documentation and address questions regarding water activity including test procedures.

NET 22.1- The agenda item title should be corrected to read: B3: NET-22.1. HB133, Section 1.2.6. Deviations Caused by Moisture Loss or Gain and Section 2.3.8. Table 2-3 Moisture Allowances.

The WWMA Committee recommended that this item be further developed. The Committee recommended reviewing the OWM analysis supporting documentation and addressing the concerns with testing procedure, testing equipment, and the need for technical studies regarding moisture loss and gain.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, Mr. Doug Musick (Kansas) commented **CFR 990.1** defines total delta 9 THC. Mr. Loren Minnich (Kansas) commented that Kansas defines Cannabis in a way that allows the sale of a different compounds similar to cannabis, and he thinks it should be considered in the development of this item. Dr. Matt Curran (Florida regulator and member of the NCWM Cannabis TG) commented that the USDA CFR reference of total delta 9 applies to growth of crops only. Dr. Curran further commented that the term cannabinoids reference a broader group of products since states vary. Ms. Warfield commented that there are already regulations that can apply to the sale of any item, but each product is not listed. There are also package and labeling regulations currently in the handbook. OWM requests that states provide input to NCWM as to whether adding definitions would be problematic or conflicting within their states. Ms. Warfield further commented that new language was submitted through WWMA and NEWMA, and that the CWMA L&R Committee consider these changes. She asked that the Committee move the water proposal out of Block 3 and consider it separately. Dr. Curran clarified that this item refers to the plant itself – not as an ingredient. He also commented that it is important for the regulatory community to remain relevant in the marketplace by developing code in a timely manner. Mr. Charlie Stutesman (Kansas) commented that he believes waiting on further development puts us even farther behind where commerce currently is. Mr. Ivan Hankins (Iowa) supports the item moving forward with Voting status and suggests the development of a handbook for states who regulate cannabis.

Based on comments during open hearings, supporting documents and discussions, the Committee believes this item is fully developed and ready for Voting status.

At the 2022 CWMA Annual Meeting, Ms. Warfield recommended this as a Developing item or Assigned to the Cannabis Task Group to obtain additional information that OWM has recommended in their analysis. She read the following statement from NIST OWM.

Ms. Warfield commented on the following:

PAL 22.2 Section 10. Requirements 10.XX Cannabis and Cannabis Containing Products

After reviewing the 2022 Interim L&R Report OWM is recommending formatting changes that are easier to follow and apply. This also corrected some of the grammar (e.g., line 14 states “less that”). In (b) is uses the term “marketed”, a proper term would be “of the labeled cannabinoid.”

The Committee discussed Ms. Warfield’s suggested changes and recommended the item remain a Voting item with the following revisions to the version appearing on the current agenda:

10.XX. Cannabis and Cannabis-Containing Products – Any Cannabis or Cannabis-containing products intended for human or animal consumption or application, shall bear appear on the outside of the package the following information:

(a) On the principal display panel

- (1) ~~(i)~~The a statement “Contains *Cannabis*”;**
- (2) ~~(ii)~~The a statement with either “contains less than 0.3 % total delta-9 THC” or “contains 0.3 % or more total delta-9 THC”; and**

(b) On the back or side panel

- (1) a declaration of the marketed labeled cannabinoid per serving or application; and**
- (2) the quantity declaration shall be in terms of milligrams.**

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting the Committee recommended the block proceed with the following language changes:

PAL-22.1

The committee wants to consider the suggestion from the OWM to change from the symbol for percent (%) to the written word percent. In addition, change the word “section” to “definition”. The suggested language would read as follows:

2.XX. Cannabis and Cannabis-Containing Products – Cannabis is a genus of flowering plants in the family Cannabaceae, of which Cannabis sativa is a species. This definition includes products containing more than 0.3 percent Total Delta-9 THC (also known as Cannabis, Marijuana or Marihuana) and products containing 0.3 percent or less Total Delta-9 THC (also known as Hemp).

PAL-22.2

10.XX. Cannabis and Cannabis-Containing Products- Any Cannabis or Cannabis-containing products, with the exception of commodities listed under Section 10.9 Textile Products, Threads and Yarns and other non-food products not intended for human or animal application, shall bear on the outside of the package the following:

(a) On the principal display panel

(i) The statement “Contains Cannabis.”

(b) On any panel or surface of the package

(i) The statement “Contains more that 0.3 % Total Delta-9 THC” or “Contains 0.3 % Total Delta-9 THC or less.”

(ii) A declaration of the number of milligrams of each marketed cannabinoid per serving or application.

MOS-22.2

1.XX.X. Water Activity-When unprocessed Cannabis, is kept, offered, or exposed for sale, sold, bartered, or exchanged, or ownership transfers, the water activity shall be 0.6 (± 0.05).

2.XX.X. Water Activity-When unprocessed Cannabis, is kept, offered, or exposed for sale, sold, bartered, or exchanged, or ownership transfers, the water activity shall be 0.6 (± 0.05).

The Committee believes this Item Block 3 (B3) is fully developed and recommended it to go to the NCWM L&R Committee with a Voting status. The Committee recommended the Cannabis TG take into consideration recommendations from the OWM analysis, i.e., the survey to State Directors, this could help identify the need for development of items in other sections of the Handbooks, i.e., Powers and Duties of the Director.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. Jim Cassidy (NCWM Cannabis WG Co-chair) commented that these items are fully developed and ready for Voting status. Mr. David Sefcik (NIST OWM) commented that the NIST analysis is comprehensive and was provided to address potential problems with some of the items. Dr. Curran commented that much work has already been done by ASTM and numerous comments have been received to develop these items for model regulation. Mr. Charlie Rutherford (CPR Squared and Co-Chair – NCWM Cannabis WG) commented that the answers to several of NIST’s questions and comments have already been addressed and he has sources that can provide additional information.

Ms. Warfield commented that there are typographical errors in the title of these block items. The Committee recognizes and supports the corrections as they appear in the WWMA Report. Ms. Warfield also expressed concern that there are additional areas that appear in the NIST analysis in this block of items that should not be overlooked. Dr. Curran reviewed the recommended changes in the NIST analysis and is agreeable to NIST’s proposed changes. Ms. Warfield suggested adding a Section 11. Powers and Duties of the Director, in the Uniform Weights and Measures Laws. Mr. Marc Paquette (Vermont) and Ms. Cheryl Ayer (New Hampshire) have no objections to the proposed changes in the NIST analysis. Mr. Sefcik asked if Section 11 should be its own proposal because it does not fall under UPLR subject matter. Mr. Sefcik further suggested that the word “number” be changed to “quantity” in

PAL 22.2.(b) (ii). Mr. McGuire proposed that Section 10.XX. along with the revised wording from Dr. Curran from Section B; Section C wording be changed from “number” to “quantity”; and adding a new Section 11 from the NIST analysis all be revised. Mr. Mike Sikula (New York) expressed concern for states who do not have a cannabis program and do not recognize it yet as a legal substance for commercial sale. He wondered if adding this section to the Method of Sale in Handbook 130 would somehow unintentionally require them to enforce a substance not legal for commerce in their states.

In PAL 22.1, OWM recommended that the definition in 2.X.X. Cannabis and Cannabis Containing Products be reordered to provide clarity. The proposed wording below is recommended by the Committee:

2.XX. Cannabis and Cannabis-Containing Products – Cannabis is a genus of flowering plants in the family Cannabaceae, of which Cannabis sativa, Cannabis indica, Cannabis ruderalis is are a species. This definition includes products that contain 0.3 percent or less of Total Delta-9 THC (also known as Hemp) and products that contain more than 0.3 percent of Total Delta-9 THC (also known as Cannabis, Marijuana or Marihuana.

NEWMA recommended the following new language for PAL-22.2.:

Section 10. Requirements: Specific Consumer Commodities, Non-Consumer Commodities, Packages and Containers

10.XX. Cannabis and Cannabis-Containing Products – Any Cannabis or Cannabis-containing products, shall bear on the outside of the package the following:

(a) On the principal display panel

(i) The statement “Contains Cannabis.”

(b) On any panel or surface of the package

(i) The statement “Contains more that 0.3 % Total Delta-9 THC” or “Contains 0.3 % Total Delta- 9 THC or less.”

**(ii) A declaration of the quantity of milligrams of each marketed cannabinoid
(Added 20XX)**

MOS 22.2

Mr. Sefcik commented that there were questions raised regarding water activity and product quality and believes these items should be further considered. Dr. Matt Curran commented that not only is water activity a quality issue, but also a quantity issue just as moisture content is in many other commodities. He commented that ASTM has developed a standard (D8917) for moisture content and water activity and these block items only apply to the cannabis product itself, but not as an ingredient in another item such as brownies, etc. Mr. Sefcik commented that laws and regulations have been written to prevent economic fraud rather than to address quality and safety issues. He believes that water activity could fall under the same quality-related category. He stated that there needs to be test equipment, procedures, and reliable tolerances for water activity measurements for enforcement purposes. The Committee believes this item is fully vetted and ready for Voting status.

NET 22.1

Mr. Sefcik commented that this item seeks to set a moisture allowance (loss or gain) and to his knowledge no work has been done or data provided to determine support the proposed plus or minus allowance. It appears to be arbitrary. Mr. Sikula concurs with Mr. Sefcik and questioned if water activity and moisture content are the same thing? Dr. Curran commented that water activity is free water available in the product. Moisture content measures the content of water in the product. Ms. Ayer asked if it is necessary for the lower-case cannabis to be used in parenthesis. Dr. Curran suggested it was a way to clarify terms. Mr. Rutherford commented that the TG believes the item is developed “enough” to be granted Voting status to have something in place to combat consumer fraud. Ms. Warfield recommended removal of the allowance in Table 2.3 and that it be placed in its own table and who would be responsible for training. The Committee recommended that NET 22.1 only be given Assigned. The Committee recommended that the TG review the OWM analysis for this item and address the need for technical studies (data) for moisture loss and gain.

At the 2022 NEWMA Annual Meeting, Mr. McGuire noted that the NCWM Cannabis TG, NCWM L&R Committee, and the NEWMA L&R Committee recommended removing this block and making them individual items to ensure each item is fully considered. Considering these comments, each item in the block was opened individually for comments.

PAL 22.1. Section 2. Definitions 2.XX *Cannabis* and *Cannabis*-Containing Products.

Mr. Jim Willis (New York) stated he believes this item is fully developed and many members have seen these items. These are generally accepted numbers for THC. No additional comments received during the open hearing. NEWMA L&R Committee recommended this item continues to be a Voting item.

PAL 22.2. Section 10. Requirements Section 10. Requirements, 10.XX *Cannabis* and *Cannabis* Containing Products

No additional comments received during the open hearing. NEWMA L&R Committee recommended this item continues to be a Voting item.

MOS 22.2. Section 1.XX. *Cannabis* and *Cannabis*-Containing Products and 2.XX. *Cannabis* and *Cannabis*-Containing Products

Mr. Jason Flynn (New Jersey) noted that on page 129 of the NEWMA L&R Committee submission, Section 1.XX.X. Water Activity, line 16, language describes the latest version of water activity. In reference to ASTM D8197, questions whether we should reference the ASTM standard or include the verbiage since ASTM standards are regularly updated. NEWMA L&R Committee believes to be consistent with the rest of the NIST Handbook 130, referencing the ASTM standard is the appropriate. No additional comments received during the open hearing. NEWMA L&R Committee recommended this item continues to be a Voting item.

NET 22.1. HB133, Section 1.2.6. Deviations Caused by Moisture Loss or Gain and Section 2.3.8. Table 2-3

Mr. Cassidy noted TG continues to work on dealing with moisture content and moisture in the case of cannabis is the opposite of what weight and measures is familiar with (moisture loss vs. moisture content). He related an analogy as to how a humidifier operates to protect cigars, so cannabis needs to have a certain moisture content to be a viable product and needs to be tested that way. Mr. Cassidy questioned NIST’s role in publishing these items. Mrs. Butcher responded, “once the NCWM votes and passes

specific language, it is NIST's intent to publish the content, subject to legal review, reflecting that NIST does not have a policy role as to marijuana's status as a Schedule 1 controlled substance." NEWMA L&R Committee recommended this item continues to be an Assigned item.

Item Block 4 (B4) EPA CFR Reference Updates

- B4: MOS-22.1 V Section 2.20.2. Documentation for Dispenser Labeling Purposes. and 2.20.3. EPA Labeling Requirements.
- B4: FLR-22.1 V Section 2.1.2. Gasoline-Ethanol Blends., 3.2.5. Documentation for Dispenser Labeling Purposes, and 3.2.6. EPA Labeling Requirements.

Submitter's Purpose and Justification:

Provide current references to CFR regulations to maintain alignment with Federal EPA regulations.

EPA has changed the location of 40 CFR Part 80 fuel requirements currently referenced in NIST HB 130 to a new location, 40 CFR Part 1090. Beginning January 1, 2021, the references in 40 CFR Part 80 became obsolete. In addition, the Government Printing Office will be removing the text of the old references to the expired 40 CFR Part 80 sections beginning January 1, 2022. For NCWM to have the correct references in the Handbook, these citations must be updated to the new citation. Failure to do so in NIST Handbooks can cause regulatory confusion. In addition, certain states are already considering revising their state laws and regulations to update these expired citations.

On December 4, 2020, the U. S. Environmental Protection Agency published a Final Rule, Fuels Regulatory Streamlining, (85 FR 78412). The purpose of the rule was to update and modernize EPA's existing gasoline, diesel, and other fuel regulations and remove inconsistencies. Under the EPA Fuels Regulatory Streamlining Rule, the majority of fuels provisions were relocated from 40 CFR Part 80 to a new 40 CFR Part 1090.

FALS formed an EPA Streamlining Focus Group in January 2021 in response to the EPA Fuels Regulatory Streamlining Rule. The purpose of the Focus Group was to review Handbook 130 and determine what updates are necessary to align NIST Handbooks with the new EPA Streamlining Rule. The Focus Group analyzed all of EPA's new Fuels Streamlining regulation and what changes were needed in Handbook 130 and concluded that the only items needing to be updated were to correct obsolete references to the Code of Federal Regulations.

Because NIST HB 130 is not "EPA centric", there are only 3 individual references that need to be updated in HB 130. Since these 3 references are repeated in different sections and Chapters of HB 130, there are only a total of 7 references needing to be corrected for all of Handbook 130 to align with EPA's Fuels Streamlining regulation. There are no other revisions necessary currently.

The recommendations of the FALS Focus Group were submitted by the EPA Streamlining Focus Group to the FALS Chair and were widely disseminated. They were also discussed at the FALS meeting during the Annual Meeting and were approved during the meeting for submission to the Laws and Regulations Committee.

The text of the actual red-line changes and proposed revisions are provided below. NCWM voted to adopt by reference these specific sections of EPA fuel requirements several years ago with the intent to maintain consistency between these EPA regulations and Handbook 130 without the need for additional action by NCWM.

In updating the reference to the correct number, the Conference would merely be continuing its decision to adopt these referenced sections by correcting the individual citations. The three sections of 40 CFR Part 80 that were renumbered to 40 CFR Part 1090 by EPA and incorporated by reference into Handbook 130 are as follows:

- 40 CFR Part 80.27(d) which grants a 1.0 psi RVP waiver for gasoline containing specific percentages of ethanol is now found in 40 CFR 1090.215(b)
- 40 CFR Part 80.1501 which covers EPA labeling requirements for certain ethanol blends is now found in 40 CFR Part 1090.1510
- 40 CFR Part 80.1503 which covers requirements for product transfer documents is now found in 40 CFR Part 1090.1110

These references occur in the following sections of NIST Handbook 130:

- NIST Handbook 130 “Uniform Fuels and Automotive Lubricants Regulation” Sections:
 - Gasoline-Ethanol Blends
 - Documentation for Dispenser Labeling Purposes
 - EPA Labeling Requirements
- NIST Handbook 130 “Uniform Method of Sale of Commodities” Sections:
 - Documentation for Dispenser Labeling Purposes
 - EPA Labeling Requirements

The obsolete fuel quality regulations contained in **40 CFR Part 80** are currently published on the Electronic Code of Federal Regulations (www.ecfr.gov) website. The replaced references in 40 CFR Part 80 will be removed from the Code of Federal Regulations and will no longer be accessible on January 1, 2022.

The proposed updates were presented to the Fuels and Lubricants Subcommittee (FALS) by its EPA Streamlining Focus Group during the FALS meeting held at the July 2021 meeting of the National Conference on Weights and Measures. During that meeting, FALS endorsed sending the proposed revisions forward for adoption and inclusion in HB 130. That action was summarized in the Report of FALS to the Laws and Regulations Committee. While there was a question as to whether to revise terminology, that was determined by FALS to be outside of the scope of these EPA streamlining changes.

The submitter requested that this be a Voting item in 2022.

NIST OWM Executive Summary for Item Block 4. EPA CFR Reference Updates.

NIST OWM Recommendation: OWM is recommending a minor editorial change that was raised at the 2022 CWMA Annual Meeting to the title of Section 2.20.

- This does not reflect the full language of Section 2.20. The title of Section 2.20. Gasoline-Oxygenate Blends. Mr. Corr is recommended at the CWMA 2022 Annual Meeting that the title read, “Gasoline and Gasoline-Oxygenate Blends (see Appendix D in this report).”

Item Under Consideration:**B4: MOS-22.1 – Section 2.20.2. Documentation for Dispenser Labeling Purposes. and 2.20.3. EPA Labeling Requirements.**

2.20.2 Documentation for Dispenser Labeling Purposes. – The retailer shall be provided, at the time of delivery of the fuel, on product transfer documents such as an invoice, bill of lading, shipping paper, or other documentation:

- Information that complies with 40 ~~CFR 80.1503~~ 1090.1110 when the fuel contains ethanol.
- For fuels that do not contain ethanol, information that complies with 40 CFR ~~80.1503~~ 1090.1110 and a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygen content of at least 1.5 mass percent in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase “contains MTBE or other ethers.”
- Gasoline containing more than 0.15 mass percent oxygen from methanol shall be identified as “with” or “containing” methanol.
(Added 1984) (Amended 1985, 1986, 1991, 1996, ~~and~~ 2014, and 2022)

2.20.3. EPA Labeling Requirements. – Retailers and wholesale purchaser-consumers of gasoline shall comply with the EPA pump labeling requirements for gasoline containing greater than 10 volume percent (v%) up to 15 volume percent (v%) ethanol (E15) under 40 CFR ~~80.1504~~ 1090.1510. (For additional information, refer to Section 2.30.2. FTC Labeling Requirements.)
(Added 2018) (Amended 2022)

B4: FLR-22.1 V Sections 2.1.2. Gasoline-Ethanol Blends., 3.2.5. Documentation for Dispenser Labeling Purposes, and 3.2.6. EPA Labeling Requirements.

2.1.2. Gasoline-Ethanol Blends. – When gasoline is blended with denatured fuel ethanol, the denatured fuel ethanol shall meet the latest version of ASTM D4806, “Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel,” and the blend shall meet the latest version of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel,” with the following permissible exceptions:

- The maximum vapor pressure shall not exceed the latest version of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel,” limits by more than 1.0 psi for

blends from June 1 through September 15 as allowed by EPA per 40 CFR ~~80.27(d)~~
1090.215(b).

(Amended 2016, 2018, ~~and 2019~~, **and 2022**)

3.2.5. Documentation for Dispenser Labeling Purposes. – For automotive gasoline, automotive gasoline-oxygenate blends or racing gasoline, the retailer shall be provided, at the time of delivery of the fuel, on product transfer documents such as an invoice, bill of lading, shipping paper, or other documentation:

- (a) Information that complies with 40 CFR ~~80.1503~~**1090.1110** when the fuel contains ethanol.
(Added 2014) (**Amended 2022**)
- (b) For fuels that do not contain ethanol, information that complies with 40 CFR ~~80.1503~~**1090.1110** and a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase “contains MTBE or other ethers.”
(Added 2014) (**Amended 2022**)
- (c) Gasoline containing more than 0.3 % by volume methanol shall be identified as “with” or “containing” methanol.
(Added 2014) (Amended 2018)

(Amended 1996, 2014, and 2018)

3.2.6. EPA Labeling Requirements. – Retailers and wholesale purchaser-consumers of gasoline shall comply with the EPA pump labeling requirements for gasoline containing greater than 10 volume percent (v%) up to 15 volume percent (v%) ethanol (E15) under 40 CFR ~~80.1501~~**1090.1510**. (For additional information, refer to Section 3.8.2. FTC Labeling Requirements.)

(Added 2012) (Amended 2018 **and 2022**)

(Amended 2018 **and 2022**)

NIST OWM Detailed Technical Analysis:

OWM believes the adoption of these amendments will ensure that references to Federal regulations in the Method of Sale of Commodity and Uniform Engine Fuels and Automatic Lubricants Regulations are updated are cited with accurate references. OWM recommends that this proposal be made a Voting item.

OWM suggests that when regulations are under revision that consideration be given to making them useable and easier for regulated businesses to comply and for inspectors to understand and enforce. The purpose statement for this proposal is to provide for a method of sale to ensure consistency with Federal and industry requirements. However, there are no industry standards included within the proposed language. For regulations to provide due process they must be written so they provide adequate notice to regulated businesses as to what they are required to do, to comply with the law. Finding specific requirements in the Code of Federal Regulations (CFR) is much easier if the citations are provided in a format as OWM proposes below for Item Block B4: MOS-22.1. “Section 2.20.2. Documentation for Dispenser Labeling Purposes. and 2.20.3. EPA Labeling Requirements.”

For example, OWM searched the CFR and found:

- The FTC regulations in Title 16 CFR “Commercial Practices” Part 306 – “Automotive Fuel Rating, Certification and Posting” and there are specific labeling requirements for Biodiesel found in Appendix A. “Summary of Labeling Requirements for Biodiesel Fuels.”
- The EPA regulations in Title 40 CFR “Protection of the Environment” Part 1090 “Regulation of Fuels, Fuel Additives, and Regulated Blendstocks” Subpart P – “Retailer and Wholesale Purchaser-Consumer Provisions” in §1090.1515 “Diesel Sulfur Labeling Provisions”

OWM recommends that the Committee make it easier for regulated businesses to search the CFR in order to find the requirements and facilitate voluntary compliance. OWM recommends the proposal include the citations for the regulations for EPA and FTC product identity (and any specific industry standards as well if that is the submitter’s intent). OWM recommends with these changes that the Committee make this a Voting item.

For the convenience of the Committee, the URL for the Code of Federal Regulations (CFR) is: <https://www.ecfr.gov/>.

At the 2022 CWM Annual Meeting, Mr. Corr cited specific regulations within the Item Under Consideration. In addition to the changes cited by Mr. Corr, OWM recommends some additional formatting changes be included considered.

2.20.2. Documentation for Dispenser Labeling Purposes. – The retailer shall be provided, at the time of delivery of the fuel, on product transfer documents such as an invoice, bill of lading, shipping paper, or other documentation:

- (a) Information that complies with 40 CFR ~~80.1503~~ **§ 1090.1110 Product Transfer Documents, Requirements for Gasoline, Gasoline Additives, and Gasoline Regulated Blendstocks** ~~the fuel contains ethanol.~~
- (b) For fuels ~~that do not contain ethanol~~-containing oxygenates other than ethanol, information that complies with 40 CFR ~~80.1503~~ **§ 1090.1110 Product Transfer Documents Requirements for Gasoline, Gasoline Additives, and Gasoline Regulated Blendstocks** and a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygen content of at least 1.5 mass percent in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase “contains MTBE or other ethers.”
- (c) Gasoline containing more than 0.15 mass percent oxygen from methanol shall be identified as “with” or “containing” methanol.

(Added 1984) (Amended 1985, 1986, 1991, 1996, and 2014, **and 20XX**)

2.20.3. EPA Labeling Requirements. – Retailers and wholesale purchaser-consumers of gasoline shall comply with the EPA pump labeling requirements for gasoline containing greater than 10 volume percent (v%) up to 15 volume percent (v%) ethanol (E15) under 40 CFR ~~80.1501~~ **§ 1090.1510 E15 Labeling Provisions**. (For additional information, refer to Section 2.30.2. FTC Labeling Requirements.)

(Added 2018) (**Amended 20XX**)

B4: FLR-22.1 – Sections 2.1.2. Gasoline-Ethanol Blends, 3.2.5. Documentation for Dispenser Labeling Purposes, and 3.2.6. EPA Labeling Requirements.

2.1. Gasoline and Gasoline-Oxygenate Blends.

2.1.2. Gasoline-Ethanol Blends. – When gasoline is blended with denatured fuel ethanol, the denatured fuel ethanol shall meet the latest version of ASTM D4806, “Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel,” and the blend shall meet the latest version of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel,” with the following permissible exceptions:

- (a) The maximum vapor pressure shall not exceed the latest version of ASTM D4814, “Standard Specification for Automotive Spark-Ignition Engine Fuel,” limits by more than 1.0 psi for blends from June 1 through September 15 as allowed by EPA per 40 CFR ~~80.27(d)~~ § **1090.215(b) Gasoline RVP Standards.**

(Amended 2016, 2018, ~~and~~ 2019, and 20XX)

3.2. Automotive Gasoline and Automotive Gasoline-Oxygenate Blends (Including Racing Gasoline).

...

3.2.5. Documentation for Dispenser Labeling Purposes. – For automotive gasoline, automotive gasoline-oxygenate blends or racing gasoline, the retailer shall be provided, at the time of delivery of the fuel, on product transfer documents such as an invoice, bill of lading, shipping paper, or other documentation:

- (a) Information that complies with 40 CFR ~~80.1503~~ § **1090.1110 Product Transfer Documents, Requirements for Gasoline, Gasoline, Gasoline Additives, and Gasoline Regulated Blendstocks when the fuel contains ethanol.**

(Added 2014) (**Amended 20XX**)

- (b) For fuels containing oxygenates other than ethanol ~~that do not contain ethanol~~, information that complies with 40 CFR ~~80.1503~~ § **1090.1110 Product Transfer Documents, Requirements for Gasoline, Gasoline, Gasoline Additives, and Gasoline Regulated Blendstocks** and a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygenate content of at least 1.0 % by volume in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or alternatively, use the phrase “contains MTBE or other ethers.”

(Added 2014) (**Amended 20XX**)

- (c) Gasoline containing more than 0.3 % by volume methanol shall be identified as “with” or “containing” methanol.

(Added 2014) (Amended 2018)

(Amended 1996, 2014, ~~and~~ 2018, **and 20XX**)

3.2.6. EPA Labeling Requirements. – Retailers and wholesale purchaser-consumers of gasoline shall comply with the EPA pump labeling requirements for gasoline containing greater than 10

volume percent (v%) up to 15 volume percent (v%) ethanol (E15) under 40 CFR ~~80.1501~~ § **1090.1510 E15 Labeling Provisions**. (For additional information, refer to Section 3.8.2. FTC Labeling Requirements.)

(Added 2012) (Amended 2018 **and 20XX**)

(Amended 2018)

Summary of Discussions and Actions:

FALS Chair Striejewske provided some background information to how this item was developed through FALS. This item was submitted by the FALS EPA Streamline FG to recommend replacement language for an obsolete reference.

Mrs. Marilyn Herman (President Herman Associates and FALS Streamline FG Chair) believes this item is fully developed and will correct out of date references in NIST Handbook 130. EPA's promulgation of the EPA streamlining rule occurred and the history is within the background information. This combines several different rules under one CFR. ASTM revised its standard specification for gasoline oxygenated blends to incorporate the rule. This is new and is under ASTM 4814.21 c since most states adopt the most recent version and NIST HB 130 incorporates the most recent version, this has major impact.

Mr. Chuck Corr (Iowa Renewable Fuels) agreed that these items were not editorial in nature when they were addressed in July 2021, and there is considerable difference between the text of the regulation currently cited and the proposed replacement. Mr. Corr also asked the following questions:

1. Are the federal fuel laws and regulations important in the context of Handbook 130? FLR 2.1.1 references a specific federal law and 2.1.2 references a specific federal regulation. If all of the federal laws and regulations are important, would it not be easier to just have a simple statement.
2. A possible approach is to have a statement at the beginning of fuels and lubes section of handbook 130. All fuels, blendstocks, and additives shall comply with applicable federal laws and regulations. Examples of these regulations are 40 CFR parts 79 and 80 and 16 CFR part 306.
3. Are only a few federal fuel laws and regulations important enough to be referenced in NIST HB 130?
 - a. Which laws and regulations are important enough to warrant reference in NIST Handbook 130?
 - b. What criteria is used to make this distinction?

Regarding terminology there are differences between NIST Handbook 130 and EPA regulations? NCWM should seek to harmonize the terminology of the handbook with that in the federal regulations

Mr. Corr does feel that the new CFR 1090 regulation misrepresents the regulation. He believes that if referencing the regulation is important then additional changes are needed to properly represent this regulation, therefore request this item be made developmental.

Several recognized the comments made by Mr. Corr and hopes the Committee recognizes the need for additional review and discussion.

Many regulators and industry rose in support of this item. The Committee assigned Voting status for this item at the 2022 Interim Meeting. The Committee assigned Voting status to this item because it heard favorable comment without opposition and believes it is fully developed.

At the 2022 NCWM Annual Meeting, hearing no opposition against this item it remained in Voting status and was adopted.

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, the Committee heard many comments in support of this item. The Committee recommended this as a Voting item.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, Mr. Randy Jennings (representing FALS) gave a background on this item, and FALS recommended this item move forward as a Voting item. Ms. Marilyn Herman (Herman & Associates as chair of the FALS EPA Streamlining Rule Task Group) commented that the Task Group supports this item moving forward as a Voting item. Mr. Chuck Corr (Iowa Renewable Fuels Association) commented that he believes there is an error in FAL 22.1 (2.20.3 should be stricken and made 3.2.6). He further commented that the new EPA citation reference contains more information than the old citation, and he is concerned it will be more confusing. He is proposing changes which he indicated were relatively minor but further clarify the intent. Mr. Charlie Stutesman (Kansas) commented that incorporating references in HB 130 rather than listing out the actual language was already adopted by the Conference. He believes the item is ready for Voting status. Mr. Jennings commented that the scope of the task group was to change the reference from Part 80 to Part 1090 and to make sure there were no unintended consequences. Ms. Kristy Moore (Growth Energy) commented that she has additional questions about Part 1090 and wonders if regulators understand that 1090 might broaden their responsibilities. Mr. Mike Harrington (Iowa) commented that he believes the item needs to be developed. Ms. Tamara Paik (Marathon) commented that as a regulated entity they must comply with both federal and state regulation, and she believes that if there are further discussions to be had on the issue, they should occur. Ms. Rebecca Richardson (NBB and member of the FALS EPA Streamlining Task Group) commented that while there are issues to consider in Part 1090, the purpose of the focus group was to make sure nothing that was in the handbook was omitted as the reference moved from Part 80 to 1090. Mr. Ron Hayes, retired regulator from Missouri concurs. The Committee believes this item has been fully developed and ready for Voting status.

At the 2022 CWMA Annual Meeting, Mr. Corr provided some revisions to the proposal for the Committee to consider. Mr. Stutesman commented that he agrees that including the full title of sections of the CFR in the model regulation is helpful. He supports moving forward with the item with the revisions Mr. Corr has proposed. Mr. Konrad Crockford (North Dakota) agreed with the amended changes. Mr. Russ Lewis, (Marathon Petroleum) commented that if this amended language slows down adoption of this, that it not be included. Ms. Kristy Moore (Growth Energy) commented that she is opposed to putting EPA regulation in state code but has no objections to these amended changes. Mr. Corr's modifications are found within Appendix D of this report. Mr. Corr's proposed amended language will be submitted as a supporting document to this report for consideration at a later date

The Committee recommended this item remain a Voting item as it is presented in the agenda.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, Mr. Prentiss Searles (API) and Mr. Randy Jennings (FALS) both spoke in support of this as a Voting item. NIST OWM provided written analysis that recommended that this proposal be made a Voting item.

The Committee believes this item has merit and is fully developed. The Committee recommended this item as a Voting Item.

Northeastern Weights and Measures Association

At the 2021 NEWA Interim Meeting, Mr. Randy Jennings (retired Tennessee) commented that FALS Chair Striejewske asked him to relay that these items have already been fully vetted and are ready for Voting status. Mr. John McGuire (New Jersey) supports the items moving forward as a Voting status. Mr. Chuck Corr (Iowa RFA) commented that there are considerable differences between the old citation number and the new citation number being proposed here, and he believes this could cause confusion among regulators. He believes the items need further development. Mr. Mike Sikula (New York) supports the items but wants to hear from Mr. Corr the differences between the old citation and the new citation. Mr. Corr believes that the new citation number references a much broader code. Mr. Jennings commented that the language in the new citation reference is a very close match to the old reference. Ms. Marilyn Herman (past Chair FALS EPA Streamlining FG) stated the FG had reviewed the language in both CFR codes and agreed that there were no substantial changes between former and new CFR renumbered sections. Ms. Herman commented that the EPA Streamlining FG has nothing more to pursue on this item. Ms. Tamara Paik (Marathon Petroleum) commented that she supported this item moving forward as a Voting item. The Committee recommends this item move forward with Voting status.

At the 2022 NEWMA Annual Meeting, Ms. Kristy Moore (Growth Energy) noted that NEWMA and NCWM has been working on this item “wrestling with this item” and she supports this item. No additional comments received during the open hearing.

Item Block 6 (B6) Transmission Fluid

B6: MOS-21.1. A Section 2.36.2. Labeling and Identification of Transmission Fluid
B6: FLR-21.2. A Section 3.14.1. Labeling and Identification of Transmission Fluid

Source: Missouri Department of Agriculture**Submitter’s Purpose and Justification:**

Protect consumers by providing a cautionary statement of package labels of obsolete transmission fluids. Cautionary statements regarding obsolete products are currently required for tractor hydraulic fluids and are under consideration for motor oil. A cautionary statement and its position on the product label are currently not required for Transmission fluid in either the Method of Sale, or Fuels and Lubricants Regulations. This proposal will protect consumers by ensuring they are informed when purchasing transmission fluids.

The submitter acknowledged that there may be argument that there is not sufficient space on the front package label for a cautionary statement.

The submitter requested Voting status for this item in 2021.

NIST OWM Executive Summary for Section Item Block 6 Transmission Fluid

NOTE: The original submitter of this Item was Missouri Department of Agriculture. The source should read the Fuels and Lubricants Subcommittee. OWM supports the continued work of Transmission Fluid Focus Group.

NIST OWM Recommendation: OWM recommends this as Assigned Item.

Item Under Consideration:

B6: MOS-21.1. A Section 2.36.2. Labeling and Identification of Transmission Fluid

2.36.2. Labeling and Identification of Transmission Fluid. – Transmission fluid shall be labeled or identified as described below.

(Added 2017)

2.36.2.1. Container Labeling. – The label on a container of transmission fluid shall not contain any information that is false or misleading. Containers include bottles, cans, multi-quart or liter containers, pails, kegs, drums, and intermediate bulk containers (IBCs). In addition, each container of transmission fluid shall be labeled with the following:

- (a) the brand name;
- (b) the name and place of business of the manufacturer, packer, seller, or distributor;
- (c) the words “Transmission Fluid,” which may be incorporated into a more specific description of transmission type such as “Automatic Transmission Fluid” or “Continuously Variable Transmission Fluid”;
- (d) the primary performance claim or claims met by the fluid and reference to where any supplemental claims may be viewed (for example, website reference). Performance claims include but are not limited to those set by original equipment manufacturers and standards setting organizations such as SAE and JASO and are acknowledged by reference; and
- (e) an accurate statement of the quantity of the contents in terms of liquid measure.
- (f) **Any obsolete equipment manufacturer specifications shall be clearly identified as “obsolete” and accompanied by the following cautionary statement on the principal display in accordance with the Uniform Packaging and Labeling Regulation, Section 8. Prominence and Placement: Consumer Packages and Section 9. Prominence and Placement: Non-Consumer Packages.**
- (g) **Caution: Some of the specifications are no longer deemed active by the original equipment manufacturer. Significant harm to the transmission is possible when using in applications in which it is not intended. Always refer to your vehicle owner’s manual for proper transmission fluids.**

- (h) **The above ~~warning~~ cautionary statement is not required if the fluid claims to meet current original equipment manufacturer’s specifications and refers to thereby preceding specifications**

(Added 20XX)

(Added 2017 **and Amended 20XX**)

B6: FLR-21.2. A Section 3.14.1. Labeling and Identification of Transmission Fluid

Amend Handbook 130, Uniform Fuels and Automotive Lubricants Regulation, as follows

3.14.1. Labeling and Identification of Transmission Fluid. – Transmission fluid shall be labeled or identified as described below

(Added 2017)

3.14.1.1. Container Labeling. – The label on a container of transmission fluid shall not contain any information that is false or misleading. Containers include bottles, cans, multi-quart or liter containers, pails, kegs, drums, and intermediate bulk containers (IBCs). In addition, each container of transmission fluid shall be labeled with the following:

- (a) the brand name;
- (b) the name and place of business of the manufacturer, packer, seller, or distributor;
- (c) the words “Transmission Fluid,” which may be incorporated into a more specific description of transmission type such as “Automatic Transmission Fluid” or “Continuously Variable Transmission Fluid”;
- (d) the primary performance claim or claims met by the fluid and reference to where any supplemental claims may be viewed (e.g., website reference). Performance claims include but are not limited to those set by original equipment manufacturers and standards setting organizations such as SAE and JASO and are acknowledged by reference; and
- (e) an accurate statement of the quantity of the contents in terms of liquid measure.
- (f) **Any obsolete equipment manufacturer specifications shall be clearly identified as “obsolete” and accompanied by the following cautionary statement on the principal display panel in accordance with the Uniform Packaging and Labeling Regulation, Section 8. Prominence and Placement: Consumer Packages and Section 9. Prominence and Placement: Non-Consumer Packages.**

Caution: Some of the specifications are no longer deemed active by the original equipment manufacturer. Significant harm to the transmission is possible when using in applications in which it is not intended. Always refer to your vehicle owner’s manual for proper transmission fluids.

The above cautionary statement is not required if the fluid claims to meet current original equipment manufacturer's specifications and refers to thereby preceding specifications

(Added 20XX)

(Amended 2017 and 20XX)

NIST OWM Detailed Technical Analysis:

NIST supports the work of the Focus Group and encourages them to work with industry to reach for recommended language for inclusion into the NIST Handbook.

Summary of Discussions and Actions:

At the 2021 NCWM Interim Meeting, Mr. Ron Hayes (retired) provided an overview to the Committee regarding the issue with obsolete fluids in the marketplace. He also remarked that at the CWMA 2020 Meeting he worked with Ms. Warfield (NIST OWM) to clarify the language in the first paragraph of (f). Ms. Warfield (NIST OWM) remarked that the language should be clear and conspicuous following the UPLR. Ms. Warfield had noted that UPLR does not have specifications for color however, Section 8. does state it must be conspicuous. It was unknown whether this product type include both consumer and non-consumer type packaging. Ms. Johanna Johnson (Automotive Oil Change Association) would like additional time to reach consensus with industry regarding to align terminology (e.g., obsolete, current, active). Ms. Johnson requested the Committee provide this with an informational status.

The Committee reviewed the following item for consideration in NCWM Publication 15 (2021):

- (e) Any obsolete equipment manufacturer specifications shall be clearly identified as "obsolete" and accompanied by the following warning on the principal display panel in clearly legible font size and color as stated in Uniform Packaging and Labeling Regulation 8.2.2.**

Caution: Some of the specifications are no longer deemed active by the original equipment manufacturer. Significant harm to the Transmission is possible when using in applications in which it is not intended. Always refer to your vehicle owner's manual for proper transmission fluids.

The above warning is not required if the fluid claims to meet current original equipment manufacturer's specifications and refers to thereby preceding specifications

(Added 20XX)

It was agreed by the Committee that this language should be identical to the language that was just voted in at the 2020 NCWM Annual Meeting within Item Block 2. Tractor Hydraulic Fluid.

The Committee provided this a status of Assigned and would like FALS to further evaluate with recommendations that Ms. Johnson provides. The Committee would like FALS to review the language to see if this product includes consumer and non-consumer type packaging. Many spoke in support of how this item will be developed through FALS.

At the 2021 NCWM Annual Meeting, FALS Chair Striejewske provided an update that Ms. Johnson provided an update of the FG work to date. The FG has concluded that the model regulation in the handbook is sufficient, but there is no licensing system for transmission fluid as there is for engine oil. Transmission fluids have been found in the marketplace in Missouri that are not suitable for use in some

transmissions. The group is working to harmonize the various standards across the industry. Several OEM specifications have been found and are being categorized. This work is ongoing, and no further action was taken by the Committee.

At the 2022 NCWM Annual Meeting, FG Chair Johnson was unable to attend but provided a written update that was read by FALS Chair Striejewske when he provided an overview of FALS Item OTH-07. “In summary, the FG has reached agreement that (1) designating transmission fluid “obsolete” is impractical for a variety of reasons, including lack of a comprehensive and consistent standards setting organization mechanism, and therefore the original amendment approach should no longer be pursued; and (2) that they should switch focus to developing other potential consumer protection language for labels. The latter, for instance, may involve exploring general references to checking one’s owner’s manual for transmission fluid recommendations.”

Regional Association Reporting:

Western Weights and Measures Association

At the 2021 WWMA Annual Meeting, Mr. Russ Lewis (API) provided testimony in support of this Block moving forward as a Voting item. FALS Chair Striejewske stated that this Item Block has been assigned to FALS, and that the item is being worked on by a Task Group led by Ms. Johnson. Mr. Hayes stated as part of the TG they are working on a list with Allan Morrison (CDFA – DMS). Remarked that the list is comprised of both current and obsolete automatic transmission fluids. The Committee recommended that this item remain Assigned. The Committee supports the work that the FALS Subcommittee is conducting.

Central Weights and Measures Association

At the 2021 CWMA Interim Meeting, Mr. Hayes commented that there have been several meetings related to this issue, and he and Mr. Morrison are working on a list of specifications for all existing transmission fluids for engines. He believes the item is fully developed and is ready for Voting status pending the completion of the list of specifications for transmission fluids for engines. Ms. Johnson made several comments. The FG does not recommend the current language because there is no clear distinction or understanding of the definition of obsolete. The FG is supportive of developing the complete list of specifications to see if there is a way to distinguish ones that are not fit for purpose or should be considered obsolete, and the engine manufacturers will comply with. Based on comments provided during open hearings, the Committee recommended the item remain Assigned to the focus group.

At the 2022 CWMA Annual Meeting, there were no comments heard on this item. The Committee recommended keeping this Assigned.

Southern Weights and Measures Association

At the 2021 SWMA Annual Meeting, Mr. Prentiss Searles (API) is in support of this item remaining as Assigned. NIST OWM provided written analysis supporting the development of this Blocked item through FALS. The Committee recommended this item to remain Assigned.

Northeastern Weights and Measures Association

At the 2021 NEWMA Interim Meeting, Mr. Hayes provided an update on this item. Ms. submitted a statement that Mr. Hayes read. Ms. Warfield commented that she recommended the item move forward with Voting status provided the list of obsolete transmission fluids is completed by April 2022 (deadline

for NCWM Publication 16). Mr. McGuire supports NIST's recommendation as a Voting item, as does the Committee.

At the 2022 NEWMA Annual Meeting, no comments received during the open hearing.

References:

- [1] NIST OWM Analysis and Executive Summary reports <https://www.nist.gov/pml/weights-and-measures/publications/owm-technical-analysis>
- [2] NIST OWM [insert date history of reports] 20## Annual Summary of U.S. Legal Metrology Issues
- [3] National Conference on Weights and Measures (2022) Publication 15 and 16 <https://www.ncwm.com/>
- [4] 1905-2021 NCWM Annual Conference reports <https://www.nist.gov/pml/weights-and-measures/publications/ncwm-annual-reports>

Appendix A. L&R Supplemental Documents

- A. Block 3. WAM-22.2 – Section 11. Powers and Duties of the Director and Block 3. Cannabis: Florida Department of Agriculture – Re: Cannabis Agenda Items Submitted by the NCWM Cannabis Task Group (dated 12/7/2021)

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FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
 COMMISSIONER NICOLE "NIKKI" FRIED

December 7, 2021

Mr. John McGuire, State of New Jersey
 NCWM Laws and Regulations Committee Chair

Mr. Brad Bachelder, State of Maine
 NCWM Specifications and Tolerances Committee Chair

Re: *Cannabis* Agenda Items Submitted by the NCWM *Cannabis* Task Group

Laws and Regulations Agenda Items:

Block 3:

PAL-22.1
 PAL-22.2
 MOS-22.2
 NET-22.1

Specifications and Tolerances Agenda Item:

SCL-22.2

Committee Chairs McGuire and Bachelder,

The Florida Department of Agriculture and Consumer Services (FDACS) is writing this letter in strong support of the *Cannabis* items before your respective NCWM Committees. FDACS has been a leader in regulating the *Cannabis* marketplace over the past three years and has adopted model regulations that have been emulated in part or in whole by other jurisdictions across the nation. We are one of the few agencies to regulate the entire process from seed to sale for human consumption. Since the inception of our *Cannabis* laws in 2019, we have worked with industry leaders; elected officials at the local, state, and federal levels; regulatory agencies at the local, state, and federal levels; and with numerous *Cannabis* trade associations to ensure the establishment of a fair, equitable, and safe *Cannabis* marketplace in Florida.

FDACS has followed the *Cannabis*-related items before your respective NCWM Committees through the four regional association meetings and witnessed the overwhelming support by regulators and industry to move these items forward as "Voting" items. We have also thoroughly read the analysis prepared by NIST OWM as it pertains to these items. While we appreciate the effort that went into the NIST OWM analysis, we respectfully disagree with numerous assertions made by NIST OWM and discovered several inaccuracies in their analysis. We are also disappointed that the NIST OWM analysis and recommendations fall short in the areas of consumer protection, marketplace equality, and regulatory responsibility, which are vital to the establishment of a healthy national *Cannabis* marketplace. It is imperative to note that further delay in the adoption of these standards will force states with active *Cannabis* marketplaces, like Florida, to adopt their own standards in the absence of these NCWM standards. This will only further perpetuate the development of boutique *Cannabis* regulations across our nation and harm this rapidly growing industry.

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It is understandable that the *Cannabis* space is new to NIST OWM so there is much they have to learn, but we are concerned the opinions and inaccuracies expressed in their analysis may lead others to also incorrectly understand this industry and will create undue confusion and misperceptions across the board. It is our expectation that the NCWM will actively participate in the growth and evolution of this new industry, but we hope they do not elect to sit passively on the sidelines watching the *Cannabis* industry evolve around (and without) them simply because of these NIST OWM recommendations. We hope that the NIST OWM analysis does not impair the judgement of the Committees to do the right thing and move these scientifically based agenda items forward as "Voting" items into the NCWM Annual meeting in July 2022.

We offer the following detailed narrative in response to the NIST OWM analysis that will hopefully clarify these areas of inaccuracy and misinterpretation.

NIST OWM Analysis Page 17:

- **OUTREACH** – Outreach is a critical and active part of responsible regulation. Numerous national organizations have been consulted by FDACS over the years in the development of regulations. As a result, NIST OWM's recommendation to develop a strategy to reach out to organizations has been satisfied (noting the organizations listed in the NIST OWM analysis were only examples and not specific targets). The following list is a sampling of organizations that FDACS has worked with over the past few years in the development of regulations.
 - Texas Hemp Growers Association (THGA) <https://txhempgrowersassociation.com/>
 - Hemp Alliance of Tennessee (HAT) <https://www.yourhat.org/>
 - Tennessee Growers Coalition (TGC) <https://tngrowerscoalition.com/>
 - National Hemp Association <https://nationalhempassociation.org/>
 - National Industrial Hemp Council (NIHC) <https://www.nihcoa.com/>
 - National Hemp Regulators Conference (50 State's Regulators)
 - United States Department of Agriculture (USDA) <https://www.ams.usda.gov/rules-regulations/hemp>
 - United States Drug Enforcement Agency (DEA) <https://www.dea.gov/stories/2021/2021-05/2021-05-14/dea-continues-prioritize-efforts-expand-access-marijuana-research>
 - CannaMommy <https://www.cannamommy.org/>
 - Minorities for Medical Marijuana <https://minorities4medicalmarijuana.org/>
 - National Association of State Departments of Agriculture (NASDA) <https://www.nasda.org/>
 - Global Hemp Association <https://globalhempassociation.org/>
 - Florida Hemp Association <http://flahempassociation.com/>
 - Florida Hemp Council <https://theflhc.org/>
 - Florida Industrial Hemp Advisory Council <https://www.fdacs.gov/About-Us/Advisory-Councils-and-Committees/Industrial-Hemp-Advisory-Council>
 - Individual State's Departments of Agriculture (many)
 - Hundreds if not thousands of individual businesses too numerous to list here.
- **SURVEY TO THE STATES** – FDACS submitted a detailed 57-question survey to all 50 states inquiring about all aspects from seed to sale. We received partial or complete responses from many states. It should be noted that several states did not submit complete responses and some states did not respond. FDACS cannot control the number or content of responses.
- **SURVEY TO THE STATES (First Bullet)** – Consultation with agency counsel occurs any time a new addition to the Handbooks enters administrative code or state law. This is part of the normal legal review process, so this isn't a new scenario resulting from the emergence of *Cannabis*.

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- **SURVEY TO THE STATES (Second Bullet)** – Partial compatibility with state’s laws and regulations is not something unique due to the emergence of *Cannabis*. There are other concepts in the Handbooks that are not under the regulatory authority of some state’s weights and measures laws. The state of Florida is an example. The state of Florida’s Weights and Measures Law does not include taximeters, transportation measurement systems, and equipment used for the purpose of inspecting the accuracy of aviation fuel devices.

Section 531.37(1) of the Florida Statutes reads “Weights and measures” means all weights and measures of every kind, instruments, and devices for weighing and measuring, and any appliance and accessories associated with any or all such instruments and devices, excluding taximeters, transportation measurement systems, and those weights and measures used for the purpose of inspecting the accuracy of devices used in conjunction with aviation fuel.

NIST OWM Analysis Page 18:

- **SURVEY TO THE STATES (Third Bullet)** – Considering the two previous bullets, state and local jurisdiction’s Offices of General Counsel regularly review rules to determine which standards are permissible for adoption. This is common practice and occurs with each concept introduced into the Handbooks.

Florida excludes taximeters, transportation measurement systems, and those weights and measures used for the purpose of inspecting the accuracy of devices used in conjunction with aviation fuel. This does not mean that these codes need to be removed from the Handbooks simply because Florida’s Weights and Measures Law does not include them.
- **SURVEY TO THE STATES (Closing Paragraph)** – NIST OWM states there are 19 states that automatically adopt the UPLR in Handbook 130. The table in Section II of Handbook 130, *Uniformity of Laws and Regulations*, does not stipulate “automatically” rather it reads “adopted and updated on an annual basis.” This would also include non-automatic annual updates. As a result, it cannot be concluded that 19 states automatically adopt this section of Handbook 130 on an annual basis as purported by NIST OWM.
- **REGULATORY AUTHORITY (Second Paragraph)** – NIST OWM states “OWM does not agree with the statements that having the authority to recognize moisture loss or gain or test fuel quality allows weights and measures directors to establish a water activity limits [sic].” These statements were not made (to our knowledge) rather the statements that were made in the *Cannabis* Task Group meetings were made in response to advising statements suggesting that “we do not regulate quality.” The response was “we actually do [regulate quality] in the form of fuel quality” and further statements were made that “we regulate moisture loss or gain for other commodities.” These statements were analogous comparisons demonstrating that the basis for adopting a water activity standard already exists within the Weights and Measures Community and throughout the Handbooks. Water activity is NOT just a quality aspect rather it is equally if not more so a quantity aspect (revisited in greater detail in subsequent paragraphs).

NIST OWM states “In most states the authority to promulgate the types of labeling and method of sale requirements included among these proposals is delegated by legislatures to state health departments or to specially created cannabis [sic] regulatory agencies (e.g., Colorado Cannabis, or the Maryland Medical Cannabis Commission.” NIST OWM provided two examples without specificity as to those boundaries but stated “most states,” which implies more than two. We are requesting NIST OWM to provide a specific list of states and their offices. Further, it should be noted that *Cannabis* has a medical space as

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well as a non-medical space with medical space(s) housed under state departments of health, but this should not be confused with cannabinoids marketed and sold outside of the medical space, which is a rapidly growing market.

We would ask NIST OWM why the *Cannabis* Task Group was asked to conduct a survey of states to determine if "...state's weights and measures laws authorize the director to adopt rules and regulations that require ingredient labeling, safety warnings, potency declarations and if they allow the director to establish and enforce water activity limits and verify potency labeling" when NIST OWM previously stated "In most states the authority to promulgate the types of labeling and method of sale requirements included among these proposals is delegated by legislatures to state health departments or to specially created cannabis [sic] regulatory agencies (e.g., Colorado Cannabis, or the Maryland Medical Cannabis Commission)." In one statement NIST OWM is purporting they are unsure who has this authority but in the other statement NIST OWM is purporting that "most states" delegate this authority to the state departments of health.

In NIST's home state of Maryland, the state's Department of Agriculture oversees the weights and measures program (including the inspection of motor fuel dispensers) whereas fuel quality testing is conducted by the Maryland Comptroller. According to the table in Section II of Handbook 130 *Uniformity of Laws and Regulations*, Maryland has fuel regulations in force, but not based on NCWM standards. However, this bifurcation of regulatory duties between state agencies in Maryland is not delineated in this table. This leads one to conclude that the "yes*" notation in the table for Maryland is an indication of the state rather than for a single agency within the state. Further, Maryland's Department of Agriculture is an active participant at the NCWM, but their Comptroller is not. The state of Maryland is not unique to this scenario and one could easily conclude this same paradigm would exist with *Cannabis* regulations as well.

- **REGULATORY AUTHORITY (Third Paragraph)** – While consultation with a jurisdiction's legal counsel, as suggested, is a routine process (and not unique to these proposals) the proposed language by NIST under "Current Authority in Weights and Measures Law" creating a **Section 11. Powers and Duties of the Director** is acceptable, with changes as noted in later in this document.

NIST OWM Analysis Page 19:

- **WATER ACTIVITY (First Bullet)** – While the statement that "water activity is different from water content (or moisture content) ..." is not inaccurate, it is incomplete. Water activity is overlapping with moisture content as it results in a stable moisture content.
- **WATER ACTIVITY (Second Bullet)** – While water activity is important to the food industry, it is a scientific principle used by the food industry, but not relegated only to the food industry. A common definition of water activity that can easily be found on the internet is "**Water activity (a_w) is the partial vapor pressure of water in a solution divided by the standard state partial vapor pressure of water." This scientific principle is used to help control the growth of microorganisms, which is critical to the food industry, but it can apply to any industry (e.g., *Cannabis*).**
- **WATER ACTIVITY (Third Bullet)** – NIST OWM states "The only reason weights and measures officials are concerned with moisture content is in determining whether variations in the net weight of packaged goods due to the loss or gain of moisture are reasonable." We would not agree with this statement as weights and measures officials are also concerned that moisture is not substituted for product when traded in commerce, unbeknownst to the purchaser. For example, adjustments are made for glazing on seafood, meat, and poultry in Handbook 133 as there are known practices that add excess ice on select commodities resulting in consumers paying per-pound seafood prices for ice. In the *Cannabis* industry

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"diversion" is a similar fraudulent tactic used by unscrupulous businesses to adjust the water weight in their favor and thus, alter the actual weight of *Cannabis* being traded.

- **WATER ACTIVITY (Fourth Bullet)** – NIST OWM makes several statements in this paragraph that are not germane to the proposal and are believed to be a source of much confusion.

NIST OWM states "FDA further explains that 'most foods have a water activity above 0.95 and that will provide sufficient moisture to support the growth of bacteria, yeasts, and mold. The amount of available moisture can be reduced to a point which will inhibit the growth of the organisms.'" This last sentence is the exact intent of the proposed water activity standard of 0.60 +/- 0.05 for *Cannabis*.

NIST OWM states "FDA explains that if the water activity of food is controlled to 0.85 or less in the finished product, it is not subject to the FDA regulations." FDA does not regulate *Cannabis* currently, therefore the NIST OWM statement is moot.

The same statement by NIST OWM also references "finished products" which are not the subject of this proposal. This proposal does not apply to finished products, rather it only applies to *Cannabis* plant material, whether intended to be a food or non-food product. Therefore, there would be no change to any application of water activity to food products currently under FDA jurisdiction.

NIST OWM references 21 CFR Part 113 and 114, which apply to acidified foods. *Cannabis* is not an acidified food. If *Cannabis* were to be added to acidified food products it would not be subject to this water activity requirement and it would be subject to the water activity requirements currently in use for processed food products.

- **WATER ACTIVITY (First Paragraph, Without Bullets)** – NIST OWM requests "...that the Committee or *Cannabis* TG provide a document that includes specific citations to the studies and references or to the industry standards (e.g., ASTM) and the recommendations of the U.S. Pharmacopeia..." These references were provided with the Form 15 submission by the NCWM *Cannabis* Task Group and have been available for review since submission.
- **WATER ACTIVITY (Second Paragraph, Without Bullets)** – NIST OWM states "...OWM recommends that the proposal be amended to include suitable storage temperature and humidity limits wherever unprocessed *cannabis* [sic] is sold or ownership transferred." We would not recommend that these specifications include control limits such as temperature and humidity. Climates vary significantly across the nation and further, regulators typically don't prescribe *how* to meet a regulation rather they ensure that the regulation is satisfied. Prescribing *how* a regulation will be satisfied has the potential to lead to liability claims and costly lawsuits should the prescribed steps not yield the intended outcome. It is typically up to the regulated entity to determine *how* they maintain compliance. Further, ASTM International is in the process of developing environmental standards for *Cannabis* processors related to humidity and temperature to ensure the water activity is 0.60 +/- 0.05. As a result, such limits will be available soon.

NIST OWM Analysis Page 20:

- **WATER ACTIVITY (Third Paragraph, Without Bullets)** – NIST OWM recommends adding a statement that the water activity limits proposed only apply to *Cannabis*. We believe this was clear in the initial drafts as it is the intent of the water activity proposal, but further clarification would be acceptable.

"WHEN UNPROCESSED CANNABIS IS SOLD, OR OWNERSHIP TRANSFERRED" (First Paragraph) – NIST OWM asks "...the *Cannabis* TG or Committee provide examples of how an inspector is to enforce the water activity requirement without interfering with a commercial transaction." If an inspector elected to

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test water activity in the field they would acquire (either through purchase or if they have the authority to obtain without purchase) a product sample and proceed with the testing. For example, inspectors collecting fuel samples either buy or under proper authority acquire without payment a product sample and either screen it in the field or send it back to a laboratory for testing. The same scenario would exist for water activity testing.

Additionally, it is not reasonable to interpret the language to indicate an inspector must wait until a commercial transaction is completed before determining compliance. State laws typically include the offering for sale under the definition of "selling." However, inclusion of "offering for sale" would be acceptable.

We would offer a slightly modified version of NIST OWM proposal in 2.XX.X.

2.XX.X. Water Activity-When unprocessed Cannabis is kept, offered, or exposed for sale, sold, bartered, or exchanged, or ownership transfers, the water activity shall be 0.60 (+/- 0.05). Unprocessed Cannabis is in compliance with this requirement unless the water activity is less than 0.55 or greater than 0.65.

- **CONFLICT IN LAW OR REGULATION** – NIST OWM raises the concern for potential conflict between weights and measures authorities and the jurisdiction having authority, if any. This is no different than any other regulation introduced into the Handbooks. At present, almost every state has different rules and regulations pertaining to Cannabis products. Also, as referenced earlier, Florida adopts Handbook 44, which includes taximeter and GPS codes, but Florida Law specifically excludes "...taximeters, transportation measurement systems, and those weights and measures used for the purpose of inspecting the accuracy of devices used in conjunction with aviation fuel." from weights and measures authority. That stated, incorporation of a note as proposed by NIST OWM would be acceptable, with slight modification.

NOTE: Conflict of Laws and Regulations. – If any particular provision of the requirements in this section or subsection (include the section or subsection here for exactness) are found to conflict with existing federal or state laws or regulations (i.e., sale of Cannabis cannabis is prohibited) or local ordinances relating to the definition, labeling, potency or other requirements for Cannabis cannabis or Cannabis cannabis containing products, the enforcement of such provisions shall be permanently suspended. Such suspension shall not affect the validity or enforcement of the remaining provisions of any other requirement in this regulation.

- The word "federal" would not be acceptable since many of these products are currently "prohibited" at the federal level.
- The words "local ordinances" would not be acceptable since many regulations are pre-empted to the state agency having jurisdiction, not the reverse, and local jurisdictions typically do not have legal authority to supersede state authority.

NIST OWM Analysis Page 21:

- **CURRENT AUTHORITY IN WEIGHTS AND MEASURES LAW (First Paragraph)** – NIST OWM states "The survey may also reveal that a director has advisement from legal counsel that the State's weights and measures law does not give the state director authority to regulate the types of cannabis [sic] labeling." While this legal review takes place any time a rule is promulgated (i.e., it is not unique to Cannabis) and the survey is not necessary to initiate this process, the proposed language would be acceptable with the following modifications.

Section 11. Powers and Duties of the Director

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The Director **may** ~~shall~~:

(1) for Cannabis and Products Containing Cannabinoid(s)

(i) Prescribe by regulation:

i. reasonable variations in quantity caused by the loss or gain of moisture during current good distribution practice or by unavoidable deviations in current good manufacturing practice and procedures for moisture determination;

ii. labeling requirements for and defining reasonable variations in water activity that occur in current good manufacturing practice and current good distribution practice and procedures for the measurement of water activity;

iii. labeling requirements for and define reasonable variations in levels of cannabinoid: ~~delta-9 THC, delta-8-THC (potency)~~ that occur in current good manufacturing practice and current good distribution practice and procedures for the measurement of potency; and

iv. packaging and labeling requirements that may include, among other requirements, the characteristics of the packaging (e.g., color) and type of packaging (e.g., tamper evident, childproof, product stabilization), requirements for identity, ingredients, product lot code and date of packaging, contact information of the packer, special symbols or warnings, and potency. The requirements may also include prohibitions on packaging that may be misleading or confusing.

(2) The Director may prescribe by regulation, programs that utilize accredited testing laboratories and may enter into agreements to utilize conformity assessment programs and other technical services to ensure compliance with any of the prescribed requirements.

- The power of the director should not be a “shall” rather it should be a “may” as it will not necessarily be applicable in every jurisdiction.
- It is not recommended to list the types of cannabinoids rather it is important to leave them generally categorized as “cannabinoids” since the market is constantly changing as are the cannabinoids being sold.
- The term “product stabilizing” was added as products containing cannabinoids have both a thermal sensitivity and photosensitivity.
- CURRENT AUTHORITY IN WEIGHTS AND MEASURES LAW (Fourth Paragraph) – NIST OWM suggests that home deliveries of commodities and internet sales have increased as of late. While we agree with this observation, it is not unique to *Cannabis* products. This increase has been observed across all product and service sectors from home restaurant or grocery delivery to non-food products to third-party online ordering of products.

NIST OWM Analysis Page 22:

- CURRENT AUTHORITY IN WEIGHTS AND MEASURES LAW (Fifth Paragraph) – NIST OWM notes that they often hear “weights and measures plays catch-up instead of actively participating in the development of new areas of commercial weighing and measurement.” While we agree with this statement, we believe it is for different reasons. NIST OWM points to electric vehicle charging systems and GPS transportation systems. We believe these are two areas that the weights and measures community fell behind with the development of regulations and had to play “catch up” rather than actively participating in the development of these new areas to ensure timely development of standards. Delaying adoption of

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standards until “perfected” or “just right” does not provide leadership or marketplace supervision. During this time an industry moves forward and evolves without contribution from the weights and measures community, thus jeopardizing consumer protection and marketplace equity by vacating regulatory responsibility. We believe it is prudent to protect an industry and consuming public through the adoption of standards at a much earlier stage than has been observed for other sectors, such as electric vehicle charging systems, GPS transportation systems, and compressed and liquefied natural gas (CNG/LNG). Further studies following the adoption of standards are certainly encouraged, but they should not delay the adoption of standards. Should these *Cannabis* items not be taken up for a vote at the next NCWM Annual Meeting in July 2022, the earliest possible time these regulations could be incorporated into print would be 2024 (and we don’t need to remind readers this was written in 2021).

- **CURRENT AUTHORITY IN WEIGHTS AND MEASURES LAW (Sixth Paragraph)** – NIST OWM states “*Most states that have a Department of Agriculture also have a state chemist and seed control laboratory, that have regulatory authority to prescribe net quantity of contents requirements.*” This statement is confusing as authority is typically given by a legislature to an agency and not to a specific position or to a specific laboratory. We are unaware of any seed laboratories that oversee net contents of packages. We are also aware there are myriad configurations throughout the country but in Florida, the remainder of this paragraph is not relatable.

NIST OWM Analysis Page 23:

- **CANNABIS FORMATTED AS ITALICIZED TEXT (First Paragraph)** – NIST OWM notes “*Within the proposed section title, the term Cannabis is italicized.*” This topic was heavily discussed within the *Cannabis* Task Group. The difficulty is that different states use different terminology to describe plants and products containing more than or less than 0.3% Total Delta-9 THC. For example, California prohibits use of the term “marijuana” whereas states like Florida have it incorporated into their statutes. California in turn uses “cannabis,” a common word with no taxonomic basis. In attempts to find common terminology that would not conflict with state’s terminology across the board, the taxonomic term of “*Cannabis*” was selected as it applies to all states and represents plants, whether they contain more than or less than 0.3% Total Delta-9 THC. The capitalization and italics are taxonomically correct whereas the lower case “c” and non-italics represent the common name that has no taxonomic meaning for products or plants containing more than 0.3% Total Delta-9 THC (i.e., “marijuana” in other states). If the NCWM Membership elects to use the lower case, non-italicized “cannabis” form, then caution should be taken, particularly when considering legal challenges as the two forms of the same word have different scientific and accepted meanings.
- **B3: PAL-22.1** – The language proposed by NIST OWM on lines 12-15 is acceptable.

NIST OWM Analysis Page 24:

- **B3: PAL-22.2** – NIST OWM proposes to eliminate the proposed wording “*...with the exception of commodities listed under Section 10.9 Textile Products, Threads and Yarns and other non-food products not intended for human or animal application,...*” It should be noted that this would then apply to all non-food products which was not the intent of this proposal. The intent of the proposal was to apply to food products and select non-food products, but not to all non-food products.
- **“Shall Bear on the Outside of the Package.”** – NIST OWM asks for clarification of the intent of the statement “*shall bear on the outside of the package.*” The outside of the package means it cannot appear on the inside of the package. By applying the statement on the outside of the package it is then accessible to the potential purchaser before making the purchase versus after making the purchase and opening the package. The phrase is general enough that it is silent regarding peel away labels, which are

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located on the outside of a package. More specific or detailed information to clarify could possibly be acceptable.

NIST OWM Analysis Page 25:

- **"Contains Cannabis"** – In response to NIST OWM's comments regarding product identity and ingredients, *Cannabis* may be an ingredient, or it may not be an ingredient, depending on the product. We believe the word "*Cannabis*" on the package, if used in the right context, provides adequate declaration as to the content as well as the identity. It should be noted that some states have minimum age requirements for the purchase of *Cannabis* products as well.
- **"Will placing the Delta-9 THC potency information on the bottom of the package or bottle be permitted?" (First Paragraph)** - NIST OWM asks if the potency declaration will be allowed to appear on the bottom of the package. Placement of information on the bottom of packages is generally not acceptable in the weights and measures community. Placement of the potency information on the bottom of the package would not be acceptable to us and further clarification may be acceptable.
- **"Will placing the Delta-9 THC potency information on the bottom of the package or bottle be permitted?" (Second Paragraph)** - NIST OWM asks if the intent of the proposal is to only apply to food product and not to non-food products. A simple delineation would be nice, but as mentioned earlier, the proposal would apply to food products as well as some non-food products, such as lotions, creams, and other products intended for non-ingestible human consumption.
- **"Will placing the Delta-9 THC potency information on the bottom of the package or bottle be permitted?"** – NIST OWM's suggested language in lines 32-40 would be acceptable with the following modifications.

10 XX. Cannabis and Cannabis-Containing Products – Any Cannabis or Cannabis-containing products intended for human or animal consumption or application, shall bear on the outside of the package the following:

(a) On the principal display panel

(i) The statement "Contains Cannabis."

(b) On any panel or surface of the package

(ii) The statement "Contains more than 0.3% Total Delta-9 THC" or "Contains 0.3% Total Delta-9 THC or less." and

(iii) A declaration of the quantity ~~number~~ of milligrams of each marketed cannabinoid per serving or application.

NIST OWM Analysis Page 26:

- **"Will placing the Delta-9 THC potency information on the bottom of the package or bottle be permitted?" (First Bullet)** – Please refer to comments provided on Page 8 of this document for "CANNABIS FORMATTED AS ITALICIZED TEXT (First Paragraph)."
- **"Will placing the Delta-9 THC potency information on the bottom of the package or bottle be permitted?" (Second Bullet)** – NIST OWM recommends using "quantity in" instead of "number of." This proposed change would be acceptable.

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- **TEST METHODS (Lines 9-16)** – NIST OWM suggests “...the Committee provide information on the acceptable test methods to be used for enforcement.” This is not practical and not typical for many test methods of this nature. Typically, regulators do not prescribe test methods since multiple acceptable methods often exist. Prescribing test methods can open the door for potential bias toward a particular vendor, which is prohibited in government procurement (at least in Florida). In the *Cannabis* space there are two common types of instruments that can be used to determine the cannabinoid content of a product. Gas Chromatography (GC) and Liquid Chromatography (LC) are the two main techniques used, but there are variations within each (e.g., detectors, columns, etc.). Currently, AOAC is the only consensus organization that has published a viable testing method. Other testing methods are in the developmental stage but may not be the same once published. We would encourage labs to use test methods that have been developed by consensus organizations, much in the same way in the motor fuel sector. It should also be noted that the situation FDA outlined was already known and previously observed in states that currently test *Cannabis* products for cannabinoid content. The proposal requiring the declaration of cannabinoid type and concentration allows the regulatory community to hold the responsible party accountable and act if the product does not meet the labeling claims. When the cannabinoid content deviates from labeling claim it tends to be from one of four categories.

1. Heterogeneity in processing
2. Laboratory deviations
3. Thermal or photo-degradation over time
4. Fraud

- **B3: MOS-22.2** – “OWM recommends that the Committee move only partial sections of this proposal forward as a Voting Item. The Committee will need additional time to address the requirements for limits on water activity...” This statement highlights a critical philosophical disagreement between NIST OWM and many regulatory agencies. This recommendation by NIST would let the market continue unchecked and essentially unregulated in this regard while studies are conducted. This would allow fraud to perpetuate, substandard products to enter the market, and consumers and businesses to be financially harmed while these additional studies are being conducted and additional information is being gathered. An alternative approach that would protect the consumers and businesses would be to move these items forward as “Voting” items, so they can be introduced into regulations and simultaneously conducting any desired additional studies and gathering any desired additional information. The NIST OWM philosophy to wait versus placing established consensus-based regulations into the handbooks is not one that we share. The *Cannabis* market has already been highly active for 3-5 (or more) years, depending on the jurisdiction, and failing to move these items forward with a “Voting” status now would result in the year 2024 being the earliest possible time they could make it into print. This would allow an unchecked market for 6-8 (or more) years before weights and measures regulations would be introduced to regulate the market. We can’t speak for other states but if these items do not move forward with a “Voting” status, Florida will look to adopt their own regulations, which has been echoed by other jurisdictions as well.

NIST OWM Analysis Page 27:

- **B3: MOS-22.2 (First Full Paragraph)** – NIST OWM states “...water activity is associated with product quality.” This statement is only partially accurate as water activity is also associated with quantity, by keeping the moisture content stable. NIST OWM adds emphasis (**bold and underline**) to the word “quantity” throughout the paragraph. Since water activity keeps the moisture content constant, thus also affecting quantity, we would agree with lines 7-16 of this paragraph. If you don’t control the moisture content you allow for “diversion”, which is a technique currently used by unscrupulous

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businesses to manipulate the amount of *Cannabis* sold and allows for deception and fraud to perpetuate in the marketplace. In this paragraph, NIST OWM, once again, tethers water activity to traditional food products, which is not applicable to the water activity proposal.

- B3: MOS-22.2 (Second Full Paragraph)** – NIST OWM states “*The Committee should request the NCWM Cannabis TG and the cannabis [sic] industry, and trade associations provide scientific studies and other information to justify and validate the limits of water activity requirements stated within the proposal. The Committee can have the data evaluated by a qualified panel of experts who could also assist in developing the justifications and technical language in the regulations.*” This process as prescribed by NIST OWM would take multiple years and during this time *Cannabis* products on the market would go unregulated. In our opinion, this is not a responsible approach to ensure fair and equitable trade practices in the marketplace nor does it help protect consumers and businesses. Further, ASTM International D37 Committee on *Cannabis* has nearly 1,000 members and the very same water activity standard in these proposals was vetted out through their consensus process and determined to be the best water activity for *Cannabis* plant material. We would argue that nearly 1,000 industry members would more than satisfy the request for input from the *Cannabis* industry and trade associations to justify and validate the limits of the water activity requirement proposed in this item. We would also argue that this would also satisfy NIST OWM’s request to have “...growers, packers, distributors, retailers, and other stakeholders have adequate notice and an opportunity to comment on the water activity limits...” This is the primary composition of the nearly 1,000 members of ASTM International’s D37 Committee on *Cannabis*.

In this paragraph NIST OWM cites “criminal” penalties related to water activity. NIST OWM should understand that the weights and measures regulatory community typically relies on civil remedies to address violations and rarely do they move into the criminal realm. Tools typically used by weights and measures officials are in the form of stop sale and stop use orders as well as administrative fines. Sometimes injunctions are necessary in extreme cases and only in rare occasions are criminal penalties pursued, which are typically handed to the Attorney’s General or State Attorney’s Offices for prosecution. In the *Cannabis* trade, criminal penalties arise typically from the level of THC found in products. Beyond the issuance of a stop sale order and potentially an administrative fine for high THC content found in commercially available products, any further handling would be by the state’s Attorney’s General or State Attorney’s Offices or at the federal level, by the Drug Enforcement Agency. In short, discussion combining criminal penalties with water activity is not applicable and only confuses the matter for those learning this sector.

- B3: MOS-22.2 (Third Full Paragraph)** – NIST OWM suggests developing guidance and procedures for sampling and testing related to water activity. NIST OWM also mentions that states metrology labs will need to be trained and equipped to certify devices used in the field. It should be noted that there are currently field screening units (e.g., octane) that are not certified by NIST’s metrology lab. Further, there are other laboratory tests that NIST’s metrology lab does not certify, specifically pertaining to vehicular fluids and fuels. The test procedures for a water activity meter are straight forward and simple. A basic description of those procedures has been provided for a measure of clarity.

 1. Take an aliquot of *Cannabis* plant material (e.g., a “pinch”),
 2. Place it in the sample compartment,
 3. Close the lid,
 4. Press the button, and
 5. Read the screen.

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Laboratory instruments should always be sent back to the manufacturer periodically for proper diagnostics and recalibration, if necessary, but not to a NIST laboratory as they are not certified by vendors to perform this type of proprietary work. This is, of course, is recommended for all types of similar instrumentation. This statement should not be confused with the necessity for the NIST metrology lab's certification of weights and measures artifacts.

- **B3: MOS-22.2 (Fourth Full Paragraph)** – NIST OWM recommends that the NCWM *Cannabis* Task Group be placed under PALS so it can be “better led.” We do not believe that the *Cannabis* Task Group should be a Focus Group under PALS as the topics within the *Cannabis* sector extend well beyond just packaging and labeling. The *Cannabis* sector is fast-moving and rapidly developing so we believe the future of the NCWM *Cannabis* Task Group will be long standing and widespread, far beyond the scope of PALS. We do agree; however, that PALS will play an integral role in certain aspects of the NCWM *Cannabis* Task Group's work.

NIST OWM Analysis Page 28:

- **B3: NET-22.1** – NIST OWM recommends changing the title of this item to read “*Section 1.2.6. Deviations Caused by Moisture Loss or Gain and 3 Section 2.3.8. Table 2-3 Moisture Allowances.*” We believe this would be an acceptable change.

NIST OWM Analysis Page 29:

- **B3: NET-22.1 (First Bullet)** – NIST OWM has stated that moisture allowances cannot be arbitrary and must be backed by a scientific study, citing *Cook Family Foods, Ltd. v Voss (1991)*. After reviewing this filing, it is clear the court opined that a moisture allowance must follow due process, but it was silent as to requiring a scientific study. According to the filing, state inspectors were arbitrarily applying moisture allowances, if applying one at all, based on their judgement when conducting on-site inspections. This resulted in an arbitrary application of moisture allowance to packages, which did not follow due process. The state contended that setting a constant moisture allowance without scientific data would be subjective (this statement was made by the state during deposition and quoted in the case but was not a statement rendered by the judge). The court noted that the businesses impacted by the state's approach had no way to know in advance of the requirement they had to meet, thus due process had not been followed. However, the court did not state that a moisture allowance must be based on a scientific study. Due process may involve a scientific study but does not require a scientific study to be performed in advance of the adoption of a standard. Thus, NIST OWM's contention that the court ruled a moisture allowance must be based on a scientific study is incorrect.
- **B3: NET-22.1 (Second Bullet)** – Continuing the thought in the previous paragraph, NIST OWM goes on to state “*If the studies are not done in a way that is scientifically valid, which represents real world conditions, and reflects the typical packaging and shelf-life of products, they will NOT protect consumers or packers. They will also not ensure inventory or taxes are accurately maintained.*” We would not fully agree with this statement. Any moisture allowance is applied on top of the maximum allowable variation (MAV) and thus constitutes a more relaxed limit, based on accounting for moisture loss or gain. Additionally, NIST OWM's comment concentrates solely on the accuracy of the measurement rather than factoring in precision, which is equally as critical. So long as the allowance is constant a level of balance will be maintained. Concentrating on accuracy only would have more merit if the allowance was only for loss or only for gain; however, the proposal includes moisture loss and gain, thus allowing for a level of overall balance to be maintained. Therefore, NIST OWM's contention in this paragraph are incomplete and do not convey an accurate picture of the impact of this proposal.

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- **B3: NET-22.1 (Third Bullet)** – If procedures need to be modified in Handbook 133, we’re confident the NCWM Cannabis Task Group would be willing to address this, but we cannot speak for the Task Group.
- **B3: NET-22.1 (Fourth Bullet)** – Inspectors have traditionally used sample error limits and the concept of predominance to prevent facilities from “just underfilling” all packages. This is not a new concept created by this proposal rather it has permeated the industry for generations by unscrupulous vendors in all sectors.
- **B3: NET-22.1 (Fifth Bullet)** – NIST OWM states “Under this moisture allowance approach inspectors will not be able to take enforcement actions as they currently do when using NIST Handbook 133.” I would note that most jurisdictions (if not all) rely on their statutory penalty authority and structure when determining enforcement actions. Handbook 133 (nor any other of the Handbooks) do not supersede state law or jurisdictional codes.

NIST OWM further states “Since the 1970s weights and measures has treated overweight and overfilled packages as being acceptable because overpacking is limited by the packer for economic reasons.” While this may be the case, Cannabis is a new commodity type in its overall scope and the approach used in the 1970s are not necessarily indefinitely applicable. Fifty years of market evolution forces us to revisit, review, and revise philosophies and approaches.

NIST OWM also states “They will also determine if the packer is following current good manufacturing and distribution practices, obtain other information, and then make a determination that the overfilling or underfilling were reasonable or not.” This approach by NIST OWM speaks to the very concern the court expressed in the Cook Family Foods, Ltd. V Voss (1991) case regarding subjectivity. The inspector should not “then make a determination that the overfilling or underfilling were reasonable or not.” This subjectivity is the exact reason why a standard should be put in place.
- **B3: NET-22.1 (Sixth Bullet)** – NIST OWM recommends “the state directors be surveyed (see OWM comments on Block 3) to determine if they intend to have their inspectors take enforcement action on overweight packages of cannabis [sic].” While surveys are typically informative, they are not a requisite to the establishment of a standard. As has been mentioned previously, there is no known jurisdiction that adopts and enforces every aspect of any Handbook. This is left to the individual jurisdiction to ensure compliance and compatibility with their codes and laws. Further, diversion with Cannabis plant material is unique to this commodity and prompts the adoption of an overfilling limit, consistent with a controlled water activity.

NIST OWM Analysis Page 30:

NIST OWM further states that “OWM has not heard of any recent cases where overfilling has been an issue.” As has been noted by NIST OWM, Cannabis has yet to have federal regulations promulgated and thus, NIST OWM has not had experience with such products. Again, diversion is a known tactic to evade taxes as well as “launder” THC-containing Cannabis into the underground markets.

- **B3: NET-22.1 (Seventh Bullet)** – NIST OWM states “OWM recommends that the Committee study the idea of changing this approach and have the MAV values apply to both positive and negative package errors when packaged cannabis [sic] is being tested.” We would agree that the MAV should apply in both the positive and negative directions.
- **B3: NET-22.1 (Eighth Bullet)** – NIST OWM “encourages the Committee to consider conducting a broad long-term study in cooperation with the cannabis [sic] industry to determine if the 10 percent MAV packages under 36 g is appropriate for application to cannabis [sic] packages.” We would not be

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opposed to additional studies being conducted in the *Cannabis* or other realms, but we do not believe waiting until such additional studies are conducted before the adoption of these established scientific standards is being responsible to consumers, businesses, or the market in general.

I would like to conclude by reiterating the need to understand that further delay in the adoption of these *Cannabis* standards will force states with active *Cannabis* marketplaces, like Florida, to adopt their own standards in the absence of these NCWM standards. This will only further perpetuate the development of boutique *Cannabis* regulations across our nation and harm this rapidly growing industry.

We appreciate the input by NIST OWM and encourage NIST OWM staff to continue their learning and education of this new market sector. We also encourage NIST OWM to fully understand how we must evolve and rapidly respond to emerging sectors to ensure the weights and measures community remains relevant, promotion of marketplace equality, and protection consumers in this and all other market sectors.

Again, the Florida Department of Agriculture and Consumer Services strongly supports the *Cannabis* proposals before the Specifications and Tolerances Committee and the Laws and Regulations Committee and encourages the Committees to move all items forward with a "Voting" status out of the NCWM Interim Meeting and into the NCWM National Meeting in July of 2022. I would be happy to discuss further any of these comments with either of both of you, if desired. I can be reached at (850) 631-1569 or at Holly.Bell@FDACS.gov.

Sincerely,

Digitally signed by

10/24/2022 10:24:24 AM
Holly Bell
Director of *Cannabis*

Appendix B. List of Symbols, Abbreviations and Acronyms

API

American Petroleum Institute

ASME

American Society of Mechanical Engineers

CFR or C.F.R.

Code of Federal Regulations

CNG

Compressed Natural Gas

CWMA

Central Weights and Measures Association

DMS

Division of Measurement Standards

EPO

Examination Procedure Outline

EV

Electric Vehicle

EVFE

Electric Vehicle Fueling Equipment

EVSE

Electric Vehicle Supply Equipment

EWH

Electric Watt Hour

FALS

Fuels and Lubricants Subcommittee

FHWA

Federal Highway Administration

GA

Grain Analyzer

GMM

Grain Moisture Meter

GPS

Global Positional System

HB

Handbook

ILMA

Independent Lubricant Manufacturers Association

L&R

Laws and Regulations

LGRR

Long Grain Rough Rice

LMD

Liquid Measuring Devices

LNG

Liquefied Natural Gas

LPG

Liquefied Petroleum Gas

MAV

Maximum Allowable Variation

MMA

Meter Manufacturer Association

MDMD

Multiple Dimension Measuring Device

MMQ

Minimum Measured Quantity

NCWM

National Conference on Weights and Measures

NEVI formula

National Electric Vehicle Infrastructure Formula program

NEWMA

Northeastern Weights and Measures Association

NFPA

National Fire Protection Association

NIST

National Institute of Standards and Technology

NPGA

National Propane Gas Association

NTEP

National Type Evaluation Program

OWM

Office of Weights and Measures

OIML

International Organization of Legal Metrology

PALS

Packaging and Labeling Subcommittee

RMFD

Retail Motor Fuel Dispenser

S&T

Specification and Tolerances

SD

Secure Digital

SG

Subgroup

SI

International System of Units

SMA

Scale Manufacturers Association

SWMA

Southern Weights and Measures Association

TC

Technical Committee

TG

Task Group

TNMS

Transportation Network Measurement Systems

UGMA

Unified Grain Moisture Algorithm

USDA AMS

U.S. Department of Department of Agriculture, Agriculture Marketing Service

USDOT

U.S. Department of Transportation

USNWG

U.S. National Work Group

VTM

Vehicle Tank Meter

WIM

Weigh-in-Motion

WWMA

Western Weights and Measures Association