NIST OWM Analysis of NCWM 2022 Interim Meeting S&T Agenda Items

OWM's comments are intended to offer technical information to the NCWM for its consideration in its deliberations before the Conference.
DRAFT 1/6/2022

Subject Series List

Table A
Table of Contents

Table B
Glossary of Acronyms and Terms

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

GEN – GENERAL CODE

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.

OTH-22.1 Appendix A: Fundamental Considerations, 3. Testing Apparatus

Note: *The original GEN-19.1 proposal was a modification of the 2021 S&T Agenda Block 1 Item GEN-19.1. Since the S&T Committee has changed these items from "assigned" to "developing," the submitter has revised and expanded the original proposal to address discussions within the NCWM Field Standards Task Group and other comments received on the proposal..*

Note: *Seraphin and NIST, OWM worked in a joint effort to develop items GEN-19.1, OTH-22.1, Block 1 and Block 7 items on the S&T 2022 Interim Meeting Agenda. Seraphin and NIST, OWM requested that GEN-19.1 and OTH-22.1 be combined and submitted as a single proposal because they are related. The requested change to the source, purpose and item under consideration is included below.*

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	**GEN-19.1 – 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 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM	✓**w/revisions**						
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)				✓			
CWMA Interim Meeting (2021 Fall)		✓					
CWMA Annual Meeting (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry) - no position							
NCWM S&T Committee Interim							

See Item OTH-22.1 in this NIST, OWM analysis of the S&T 2022 Interim Meeting Agenda for regional meeting table of decisions for Item OTH-22.1.

Source:
Seraphin Test Measure Company and NIST, Office of Weights and Measures

Purpose:

(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 use of the OIML R117 Reduced MPE formula when the uncertainty of the transfer standard exceeds the one-third requirement; and**~~ **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 identifies the critical characteristics for field and transfer standards regarding the Fundamental Considerations of Handbook 44.

NIST OWM.

Seraphin and NIST OWM worked together in a joint effort to address changes to GEN-19.1 and other items on the agenda that are impacted by the proposed General code and Appendix A, Fundamental Considerations changes, which includes Block 7, Block 1, and OTH-22.1. Seraphin is the original submitter of GEN-19.1 and Block 7 items and NIST OWM is the original Submitter of Block 1 items and OTH-22.1. Both Seraphin and NIST, OWM request that GEN-19.1 and OTH-22.1 be combined. The revised source, purpose, and proposed new item under consideration are included in this NIST, OWM analysis.

Mr. Henry Oppermann, WM-consulting with Seraphin worked with Mr. Marc Buttler, Emerson-Micro Motion, to address Mr. Buttler's concerns with the equations that are currently in the Interim Meeting Agenda and based on that collaboration Mr. Henry Opperman, agreed with the changes proposed by Mr. Buttler with modifications and both Mr. Oppermann and Mr. Buttler are in agreement with the alternate equation. Mr. Oppermann and Seraphin reviewed the alternate equation with NIST, OWM and both are in support of the alternate equation, as well.

The submitters agree that these items, GEN-19.1 and OTH-22.1 are fully developed and requested that this combined item be a Voting Item in 2022.

Below is the Alternate proposal for the Item Under Consideration for the combined items GEN-19.1 and OTH-22.1:

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:

Increased MPE = (2/3 x MPE + U)

with an upper limit of U_{MAX} = 2/3 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 (typically one year), (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)

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 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.

During the discussion of the proposed modified equation NIST OWM looked at examples of the 2 proposed equations as follows:

Seraphin's original proposal (based on OIML): Reduced MPE = (4/3 x MPE – U)

Examples:
Reduced MPE = (4/3 x 0.01 – 0.005)
= (0.00833)

Reduced MPE = (4/3 x 0.01 – 0.01)
= 0.00333

Reduced MPE = (4/3 x 0.01 – 0.015)
= - 0.00167

The "Reduced MPE" or tolerance cannot result in a negative number. Thus, in the above example with a tolerance of 1% (0.01) you will not be permitted to use a transfer standard that has an uncertainty greater than 0.0133 since uncertainties larger than this value will result in a negative "reduced MPE." To this equation, a statement would be needed that the reduced MPE could not result in a negative number. And per Mr. Buttler's concern, as the uncertainty of the test increases, there is less tolerance provided for the device under test and at higher values of uncertainty no tolerance is left for the device under test.

Revised proposal as suggested by Mr. Marc Buttler at the WWMA: Increased MPE = (2/3 x MPE + U)

Examples:

Increased MPE = (2/3 x 0.01 + 0.005)

= 0.01166

Increased MPE = (2/3 x 0.01 + 0.01)
= 0.0166

Increased MPE = (2/3 x 0.01 + 0.015)
= 0.0216

Thus, in the above example with a tolerance of 1% (0.01) you will be permitted to use a transfer standard that has an uncertainty greater than 0.0133. There is no upper limit on the amount of uncertainty you can have in your standard. But this violates the principle outlined in the Fundamental Considerations which states:

"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."

To correct the second equation it is suggested that an upper limit (U_{max}) be applied to the uncertainty in the equation.

Mr. Henry Oppermann performed an analysis of the two equations that show the amount of error from the device and uncertainty associated with each equation. This analysis is posted on the NCWM website.

Regional Association's Comments:

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

Marc Buttler (Emerson Micro Motion) : Regards to the fine work of the workgroup and authors of form 15, he finds it useful and helpful by augmenting the existing wording to add clarity as we work forward to more practical testing. He wanted to comment on whether the underlying principle of affording additional tolerance not capable of meeting the 1/3rd. In the language there is an equation (lower down in the proposal) reduced MPE. This is intended to penalize the tolerance of the device and not give additional leeway. Further in to 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 x 2/3 PLUS and not minus. This avoids jurisdictions having different uncertainty testing to different tolerances. He can prepare a written summary of his comments and will send to us.

Bob Murnane (Seraphin) : Seraphin proposed this. There is a lack of definitions. This comes into play in block 5. This was put in to clarify and give definite definitions to field and transfer standards. He hopes this clarifies multiple items on the agenda.

Russell Vires (Scale Manufactures Association) : 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.

Diane Lee (NIST OWM) : Wants to expand on Russ's comments. This was included in a block with terminology for standards, (master meter, transfer standard or field standard). She questioned whether the transfer standards could meet the 1/3 standard. NIST has an analysis from the annual meeting that will address some of the issues; however, they have not met as a group yet. We can look online on NCWM and look forward to them providing additional info. (Previous analysis is available on the NCWM website).

Kurt Floren (LA County): He commented on the proposed definition of field standard (S&T 7). He thinks it is better, but raises an issue that there is a distinction between volumetric and gravimetric. The existing language spoke to the calibration and certification in the lab. Field standards are tested under all environmental conditions and range of operating conditions. In a lab setting, there are conditions that need to be very strict. He's concerned that it says that it's known to maintain. Question: are we thinking more from a volumetric standpoint (temperature changes, etc.) that's

not really a concern with a mass standard. Thinks that there will be challenges in the future on pass/fail, and question all of the environmental criterial that the standards were tested to. Requesting (please) take into consideration the environmental factors (lab or/vs. field) and how this would relate to an enforcement action.

The WWMA S&T Committee recommends that this item should remain developmental in status. The Committee recommends that the submitter works with NIST OWM and commentators above to resolve issues presented. A letter was submitted to the Committee by Marc Buttler (Emerson Micro Motion) and will be posted to the NCWM website. The Committee also recommends that consideration be made that this item be included in Block 7.

SWMA 2021 Annual Meeting: At the SWMA 2021 Open Hearing Mr. Henry Oppermann, representing 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, State of 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.

Russ Vires, Scale Manufacturers Association, stated that they have no position at this time.

Russ Vires, Mettler Toledo, stated that he believes this is in conflict with Block 1, and would recommend it continue with a Developing status.

Mr. Michael Keilty, Endress + Hauser, assured Mr. Chesser that any devices used as a Field Standard would have a traceable chain of metrology.

This committee recommends that this item remain Assigned pending the Workgroup finding a new Chairperson.

NEWMA 2021 Interim Meeting: During the 2021 NEWMA Interim S&T open hearings, the following comments were heard.

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.
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 recommends that this item be given a Developing Status.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Tina Butcher-NIST about working together with Seraphin to develop more. Robert Murnane-Seraphin Test Measure agreed with Tina and looked forward to working together. Should stay as developing. Lou Straub-SMA has not had the chance to review but would be meeting in two weeks.

CWMA S&T Committee recommends item move forward as a developing item.

CWMA 2022 Annual Meeting:

SMA 2021 Fall Meeting: The SMA takes no position on this item as this does not relate to scales.

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

SCL – SCALES

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

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

Organization (*) not submitted (**) no meeting (***) no recommendation	**SCL -20.9 – S.1.1.3 Zero Indication, Load Rec Ele Sep from Weigh Ele, App D – Def: no load ref value (1 Items) 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM			✓				
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)			✓				
CWMA Annual Meeting (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

Source:
Kansas Department of Agriculture

Purpose:
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.

NIST OWM: 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.

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

Russell Vires (SMA): carryover item. SMA opposes item in current form. The potential problem is an application issue and not specification issue. Their position is recorded on the NCWM website.

The WWMA S&T Committee recommends the status remain developmental so that the submitter can continue to work on this as they have previously stated.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing Russ Vires, SMA, 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 committee recommends this item remain a Developing status.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, no comments were heard, and the submitter was not available.

The NEWMA Specifications and Tolerances Committee recommends that this item remain in Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Loren Minnich-Kansas (submitter) suggested withdraw. Lou Straub-SMA does not support item, feels it's an application issue not a specifications item.

CWMA S&T Committee supports the submitter request to withdraw.

CWMA 2022 Annual Meeting:

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

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

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

Organization (*) not submitted (**) no meeting (***) no recommendation	SCL -22.2 – UR.1. Selection Requirements, UR.1.X. Cannabis (1 Items) 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)	✓						
CWMA Annual Meeting (2022 Spring)							
NEWMA Interim (2021 Fall)	✓						
NEWMA Annual (2022 Spring)							
SMA (Industry)		✓					
NCWM S&T Committee Interim							

Source:
NCWM Cannabis Task Group

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

NIST OWM: 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 not significant relative to the load being weighed. Although we can understand why many would be in favor of supporting such a proposal given its simplicity, we question whether or not it is possible to designate a tiered set of maximum division values that will remain relevant over time. A potential problem we see, and several others have already pointed it 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.

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 when 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 latitude to decide, 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 factors that need to be considered when selecting a scale for cannabis application and distribute it to all the states?

The following are some additional areas of concern that were discussed by members of OWM's Legal Metrology Devices Programs 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 0.01g for loads up to and including 10 g, and yet allow a scale division value ten times greater (i.e., 0.1g) once the load is increased beyond a 10g? The same question can be asked for the loads comprised of the next higher breakpoints (i.e., 0.1g versus 1g).
- We believe the same argument supporting the need 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. This leads us to the question, "Why cannabis (and not other products)?" We think adoption of the proposal could set a precedent and quite possibly lead to additional proposals to try and establish maximum scale division values for other products, e.g., gems, precious metals, meat products, etc, which we view as completely unnecessary.
- What are the ranges of tare anticipated and are some so heavy that a scale of a large enough nominal capacity to weigh net loads in the ranges specified isn't manufactured?

Regional Associations' Comments:
WWMA 2021 Annual Meeting: At the 2021 WWMA Open Hearings the following comments were heard:

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.

Matt Douglas (California - DMS) : 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

Eric Golden (Cardinal Scales) : section A B and C, be better to say 0.1 g for net weighments up to 10 grams, then B 10 to 100 grams, then C say over 100, etc..

Kurt Floren (LA County) : Mr. Golden stated perfectly what is lacking. There has to be ranges put in as to where the graduations are appropriate.

Erin Sullivan (CO Department of Agriculture) : does this pertain to cannabis in any form or concentration?

Josh Nelson (Ex-Officio NCWM S&T Committee) : this is what is going into HB44 - each jurisdiction has to define their own. For Oregon, medical is much different than retail. Retail has to abide by this. Med. Does not. Verbiage in A B and C does need additions.

Erin Sullivan (CO Department of Agriculture) : grows vs. dispensaries? Different products in processing facilities are weighed with many containers on the scales. Do states determine the regulation?

Josh Nelson (Ex-Officio NCWM S&T Committee) : up to the states to determine how to apply tares and increments in which product is weighed.

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

Josh Nelson (Ex-Officio NCWM S&T Committee) : 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.

Kurt Floren (LA County): 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 product or are the scales being used for any cannabis containing product?

Josh Nelson (Ex-Officio NCWM S&T Committee) : welcomes written input for this topic from anyone. Don Onwiler was a big proponent in this, Josh will continue to develop this

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

Josh Nelson (Ex-Officio NCWM S&T Committee) : 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

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

Josh Nelson (Ex-Officio NCWM S&T Committee) : 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 pigeon hole any device into one category, just trying to figure out what works, that's the intent

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

SWMA 2021 Annual Meeting: At the SWMA Open Hearing, Russ Vires, SMA, stated that they have no position on this item at this time.

Matt Curran, State of Florida, stated that he supports this as a Voting item. He also provided comments in support of this item from Eric Golden, Cardinal Scale. 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) 0.01g for net weighments ~~up to capacity~~ up to 10g,
(b) 0.1g for net weighments greater than 10g, up to 100g~~, capacity, and~~
(c) 1g for net weighments greater than 100g, up to capacity.
(Added 20XX)

Charlie Rutherford, Cannabis Committee, stated that he supports this item moving forward as a voting item with the changes suggested by Cardinal Scale and Dr. Curran.

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

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Eric Golden (Cardinal Scale)- Made suggestions to change the language in this item to the following:
UR.1.X *Cannabis*……
(a) 0.01g for net weighments up to 10 g
(b) 0.1g for net weighments greater that 10g , up to 100 g, and
(c) 1 g for net weighments greater than 100g , up to capacity

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

Discussions were heard regarding the agreement with table 8 in scale code as this requirement is more restrictive than table 8 parameters.

Eric Golden (Cardinal Scale) commented that national uniformity would be good and many states have informational publications that outline requirements in their state for Cannabis scale requirements.

Jimmy Cassidy (MA) recommends voting status with the changes above.

Matt Curran (FL) commented that harmonization with table 8 would be a good idea if possible
.
Lou Sakin (Hopkinton/Northbridge, MA) questioned if Cannabis should be in *italics.* The Committee suggests making the change to italics for *Cannabis*.

The NEWMA Specifications and Tolerances Committee recommends that this item be given Voting Status with suggested edits.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Loren Minnich-Kansas stated he's not sure of the intent and that it needs more developing. Eric Golden-Cardinal Scales agreed with Loren, is it "e" or "d", will send notes to committee. Ivan Hankins-Iowa would support item with Eric Golden language. Eric 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) 0.01g for net weighments ~~up to capacity~~ up to 10g,
(b) 0.1g for net weighments greater than 10g, up to 100g, ~~capacity, and~~
(c) 1g for net weighments greater than 100g, up to capacity.
(Added 20XX)

CWMA S&T Committee recommends as voting item with the proposed changes from Cardinal Scales.

CWMA 2022 Annual Meeting:

SMA 2021 Fall Meeting**:** The SMA supports the continued development of this item.

LMD – LIQUID MEASURING DEVICES

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

Source:
Gilbarco, Inc.

Purpose:
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.

Organization (*) not submitted (**) no meeting (***) no recommendation	LMD-21.1 Table S.2.2. Categories of Device and Method of Sealing 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)	✓						
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)	✓						
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)	✓						
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: OWM met with Gilbarco in 2021 to discuss this proposed changed and feel this is ready to proceed as voting.

NIST OWM Previous Comments: This block previously included two items LMD 20.1 and LMD 21.1 that address 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.

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 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 raise 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.

- Initially, the submitter of the item, 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.

- 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 notes 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 (AK, OR, CA, NY) support the concept of an electronic version of the required event log on a Category 3 device, but noted the proposal requires additional work.

- 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).

- OWM also notes that there is a similar proposal for S&T agenda item EVF-21.4 and the committee may wish to compare the language and align the language as appropriate. S&T Item EVF-21.4 proposes changes to both category 2 and category 3 devices. The change to EVF Category 2 removes "hard" copy and adds "this information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection". The Change to Category 3 adds "The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference".

- OWM agrees a Developing status is appropriate to allow for further development by the submitters and others who may be able to provide suggestions and input to assist in the process and looks forward to reviewing any proposed revisions. Since regulatory official will most be impacted by this change, OWM would suggest that the S&T committee consider the status of this item based on the input from regulatory officials.

- If 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.

Regional Associations' Comments:

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

Brent Price (Gilbarco) : submitter : to modify event logger for cat. 3 devices - will allow electronic copy be available to W/M and not just hard copy. Worked with Wayne to develop this, conferenced with NIST and they are supportive. EV systems allows for this. We ask to allow LMD allow this (like EV). Has support of industry. Wants to consider this for voting status.

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

SWMA 2021 Annual Meeting: At the SWMA Open Hearing Brent Price, Gilbarco, who is the submitter of this item, 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.

Tim Chesser, Arkansas, supports moving this forward as a Voting Item.

This committee recommends moving this item forward as a Voting Item.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Jim Willis (New York) and John McGuire (New Jersey) commented to recommend voting status.
The NEWMA Specifications and Tolerances Committee recommends that this item be given Voting Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Diane Lee-NIST this item is ready to move forward as a voting or remain developing item. Charles Stutesman-Kansas item is read for vote.

CWMA S&T Committee recommends that the item move forward as voting.

CWMA 2022 Annual Meeting:

SMA:

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

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

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

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

Organization (*) not submitted (**) no meeting (***) no recommendation	LMD-22.1 Table T.2. Accuracy Classes and Tolerances for Liquid Measuring Devices Covered in NIST Handbook 44, Section 3.30 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM	✓						
(*) WWMA Annual Meeting (2021)							
(*) SWMA Annual Meeting (2021)							
(*) CWMA Interim (2021 Fall)							
CWMA Annual (2022 Spring)							
(*) NEWMA Interim (2021 Fall)							
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM:

- During a 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 in NIST Handbook 44.
    - 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.

Regional Associations' Comments:

WWMA 2021 Annual Meeting: n/a
SWMA 2021 Annual Meeting: n/a
NEWMA 2021 Interim Meeting: n/a
CWMA 2021 Interim Meeting: n/a

SMA:

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

VTM – VEHICLE TANK METERS

VTM-18.1 D 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 <u>on a multiple-product, single discharge hose.</u>

NOTE: At the 2020 Interim Meeting the Committee agreed to combine both VTM-18.1 and VTM-20.1. Both items are now one item under VTM-18.1

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

Purpose:
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.

Organization (*) not submitted (**) no meeting (***) no recommendation	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 <u>on a multiple-product, single discharge hose.</u> 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: Tina Butcher, NIST, OWM, Jim Willis, New York, and Jim Hathaway, Murry 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. Tina Butcher, NIST, OWM, Diane Lee, NIST, OWM, Jim Willis, New York, and Jim Hathaway, Murry Equipment 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 a follows:

<u>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</u>

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)

Our discussion points during the December 2, 2021 and January 4, 2022 meeting our 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 Previous Comments: 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 Jim Willis (NY) during the NEWMA meeting, NY, 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 NY and Murray 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 (NY & 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 FL at the July 2019 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 offers 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 not be *used* when a commercial transaction is in progress.

- ***OWM offers 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 (NY) 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 NY 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.

Regional Associations' Comments:

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

Matt Douglas (California - DMS) : California supports further development. Has there been any further development since annual meeting?

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

SWMA 2021 Annual Meeting: At the SWMA Open Hearing No comments were received on this item.

NIST requests this item remain Developmental.

This committee recommends the status remain Developing at the request of the submitter

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Comments were heard from Jim Willis (New York) as submitter of this item. He stated that communication was in process with Murray Controls in regards 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 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. NYS 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.

Jim Willis (New York) recommends further development.

Lou Sakin (Hopkinton/Northbridge, MA) asked when development may be finished. Jim Willis responded that hopefully by the NCWM Interim meeting.

John McGuire (New Jersey) supported developing status.

The NEWMA Specifications and Tolerances Committee recommends that this item remain in Developing Status and encourages New York, NIST and Murray Controls to continue working towards full development.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Diane Lee-NIST comments about this item are in NCWM Annual report. Charles Stutesman-Kansas was the intent of this item for vehicle motor fuel or for all items such as home heating oil.

CWMA S&T Committee recommends item as a developing item.

CWMA 2022 Annual Meeting:

SMA:

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

VTM-20.2 D 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 Interim Meeting.

NOTE: The item under consideration was removed from the voting consent calendar at the 2021 Annual Meeting and the S&T Committee made this a developing item)

Source:
POUL TARP A/S

Purpose:
Change tolerances to accommodate more efficient milk-metering systems.

Organization (*) not submitted (**) no meeting (***) no recommendation	VTM-20.2 Table T.2. Tolerances for Vehicle Mounted Milk Meters. 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)				✓			
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: A Milk Meter Task Group Meeting is scheduled for Monday, January 3, 2022 to further discussed the proposed tolerances for Milk Meters.

NIST OWM Previous Comments: This is a proposal to increase the tolerances for vehicle mounted pump metering systems that measure milk.

Collected volume	Proposed Tolerance Maintenance		Current NIST Tolerance Maintenance		Proposed Tolerance Acceptance		Current NIST Tolerance 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 inherit 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 interim meeting another company stated that they met the current tolerances in 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.

Charlie Stutesman, KS, and chair of the task group sent an email to the Milk Meter Tolerance Task Group (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-Charlie Stutesman (KS)
NEWMA Representative-Jim Willis (NY)
SWMA Representative-TBD
WWMA Representative-Jeff Cambies (CA)
NTEP Technical Advisor-Mike Manheim
NIST Technical Advisor- Diane Lee
Measurement Canada Technical Advisor-Luciano Burtini
Industry Representative- Carey McMahon (Poul Tarp)
Industry Representative-Leigh Hamilton (Piper Systems)
Industry Representative-Brandon Meiwes (Dairy Farmers of America)
Industry Representative-Bob Fradette (Agri-Mark)
Mitch Marsalis (LA) 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

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~~

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)	**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.**

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 processer (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.

Charlie Stutesman, Task Group chair, proposes 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.

Regional Associations' Comments:

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

Diane Lee (NIST OWM) : put forth by task group working on milk meters. They're still in process of reviewing. It was put forth to vote but last minute change to make it non retroactive. This put it back to developing. What would happen to devices that are currently in the field? During annual meeting this was returned back to developing and NIST supports developing.

The WWMA S&T Committee recommends the status remain Developmental. During the WWMA S&T Work Session Diane Lee (NIST OWM) 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.

SWMA 2021 Annual Meeting: At the SWMA 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 recommends the item remain Developing so that the submitters can gather more evidence about the accuracy of these devices.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Jim Willis (New York) commented as a member of the task group about the field trip that was taken in Rochester NY just prior to the NCWM meeting in July to witness the truck mounted Milk Meters in action. The task group is asking for recommendations in-regards to a tolerance value that people would be comfortable with. Jim 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.

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

The NEWMA Specifications and Tolerances Committee recommends that this item remain in Developing Status.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Charles Stutesman-Kansas would like to see item be returned to task group.

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

CWMA 2022 Annual Meeting:

SMA:

LIQUIFIED PETROLEUM GAS AND ANHYDROUS LIQUID-MEASURING DEVICES

LPG-15.1 D N.3. Test Drafts.

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

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

Organization (*) not submitted (**) no meeting (***) no recommendation	LPG-15.1 N.3. Test Drafts 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							

Organization (*) not submitted (**) no meeting (***) no recommendation	LPG-15.1 N.3. Test Drafts 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)	✓						
CWMA Annual (2022 Spring)	✓						
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: This item was removed from Block 1 items of previous agendas and now appears as a separate item 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.

- Although this item has been on the agenda for a number of years, this item was group with other similar items so that a project to collect data on meters to be used as field standards, provided the data need for regulatory officials to make the decision of whether or not meters could be used as field standards. This information is what all regulatory officials will need to assess these meters. Instead of all regulatory officials having to collect this data individually, NIST, OWM is working with States using meters purchased for this study and other equipment for transporting meters for testing across the county to collect this data. This data will be shared with all regulatory officials to assist them with their approval of meters as standards.

- The purpose statement of this item which is not included in the 2022 Interim Meeting Agenda is the same purpose statement that is included for item MFM-15.1 in the 2022 Interim Meeting Agenda which states "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 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 developed Item OTH-22.1 on the 2022 Interim Meeting Agenda 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.

NIST OWM Previous Comments:

- NIST OWM recognizes that one of the issues concerning the use of the term "Field Standard" and having the term apply to all standards is that all standards may not be able to meet the requirements for field standards addressed in Section 3.2 of the Fundamental Considerations in NIST HB 44. There is also an issue of who has the authority to accept a standard for use. To address these and other concerns NIST, OWM believes a possible approach to resolving the issues included in Block 1 items:
  - Add a statement to Section 3.2 in NIST HB44, Fundamental Considerations, to address another option for standard accuracy during testing, elaborate on traceability and how it is achieved and language concerning regulatory responsibility similar to what is included in NIST HB 130.
  - Find and examine different terminology used in HB 44 for standards used in testing commercial devices and select an appropriate term for these standards.
  - Make appropriate changes in NIST HB 44, HB130 and other documents as appropriate.
  - Collect data using NIST Purchased Coriolis meters to demonstrate that master meters are a viable option for use in testing devices
  - Develop a guidance document with clear processes to describe how standards are validated and values are assigned.
- NIST OWM continues to agree with the WWMA, CWMA, and NEWMA regional weights and measure associations that this item remain assigned. In addition, it may be beneficial to the task group to consider the data currently being collected by NIST, prior to considering and developing a position for block 1 items. As such, an informational status, until such time that all data is available, could be considered.
- NCWM appointed a task group to develop B1 items. The chair of the task group was Jason Glass of the SWMA, with representatives from NEWMA, WWMA, CWMA, the GA Sector, and NIST OWM
- NIST OWM purchased mass flow meters of various sizes to collect data on their potential use as "master meters." NIST OWM met with State representatives interested in participating in this work at the 2019 NCWM Interim Meeting to discuss plans for testing and also via teleconference in early September 2019.
  - Preliminary field testing was conducted October 28 - November 1, 2019, with regulatory and industry participation including Colorado, Florida, Oregon, Emerson, Tulsa Gas Technology, and NIST OWM.
- The NCWM-assigned Task Group (TG) met virtually several times throughout 2020. At its last two meetings, the TG expressed an interest in test protocols that can be used by States to collect data and agreed that, before moving forward, data needs to be reviewed to determine whether or not master meters can be used as field standards.
- NIST OWM periodically updated the NCWM TG and the NCWM S&T Committee on the activities of the NIST Master Meters Work Group (MMWG) and their efforts to collect field test data. The test protocol developed by the NIST MMWG was also shared with the NCWM TG members. TG members were encouraged to attend a December 1, 2020 NIST MMWG meeting where the test protocol and process for collecting data was discussed.
- Some members of the NCWM task group also offered to participate in the NIST MMWG data collection.
- At its December 15, 2020 meeting the MMWG provided an extensive review of the Excel spread sheet that will be used to collect the data on CNG.

- In January 2021, NIST reported to the S&T Committee that the NIST MMWG has resumed data collection on the potential use of mass flow meters as "master meters" in CNG metering applications. Several MMWG participants, including CO, FL, OR, and OK, are ready to begin collecting data on master meters for CNG.

- In early 2021, Jason Glass (KY) resigned as chairman of the NCWM Field Task Group and as of July 2021 another chairman has not been appointed.

- The NIST USNWG on FRM has met multiple times since January 2021, most recently on July 6, 2021. Recent activities include the following.

- In June 2021, NIST OWM formalized the NIST-led Work Group, including working with NIST Legal Counsel to establish Operational Guidelines and a Data Collection Agreement, both of which will be used to guide WG operation and ensure transparency of the work. NIST OWM also reported changing the name of its working group from the NIST OWM Master Meter Work Group to the NIST U.S. National Working Group (USNWG) on Field Reference Meters (FRM) to better reflect the WG's goal of validating the potential use of Coriolis mass flow meters as field reference meters.

- **CNG:**
    - Colorado Division of Oil and Public Safety has received the NIST-owned Coriolis meter in the May/June 2021 time frame and has been using it along with their own Coriolis Meter to collect data. Scott Wagner (CO) arranged for a Web-based conference link with NIST staff during initial testing. This provided a great opportunity for NIST OWM to have discussion and dialog about meter setup and observations and discuss final test protocols developed by the WG. Mr. Wagner provided an update to the USWNG on progress at the July 2021 USWNG meeting.

    - Once CO has completed its data collection, the NIST-owned unit will be shipped to another USNWG participant state who has agreed to collect data in CNG applications. This presently includes FL, OK, and OR.

- Other mass flow meters purchased by NIST for this project to collect data in other metering applications will need to have framework constructed for transport and use before progressing into those applications.

- **LPG:**

    - As previously shared with the S&T Committee, the procurement process for constructing the frame needed for transporting and using the NIST-owned master meter for LPG is proceeding.

    - USNWG Technical Advisor, Val Miller is creating a data collection spreadsheet and test protocols for LPG based on those created by the USNWG for CNG. The USWNG will begin reviewing and refining these documents at its next meeting and will also consider input from those participants collecting data on CNG applications regarding any necessary changes.

- **Loading Rack Meters for Refined Fuels:**
    - At the July USWNG meeting, NIST OWM reported that OWM Chief Doug Olson has allocated funding to construct the frame needed for transporting and using the NIST-owned master meter for refined fuels such as gasoline and diesel in loading-rack meter applications and the procurement process has been initiated. Val Miller will collaborate with the USNWG on FRM to develop and refine the data collection sheets and test protocols using master meters for refined fuels at loading racks.

- Since NIST OWM's last update to the S&T Committee, representatives from two additional states, New Mexico and New York have joined the USWNG to possibly assist in data collection in one or more metering applications.

- Comments were received at both the NEWMA and CWMA 2021 Annual Meetings suggesting that data is needed before the NCWM task group could move forward. It was also noted that suggestion for direction of the NCWM task group was provided to task group members.

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

Regional Associations' Comments:

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

Michael Keilty (Endress + Hauser) : in 2014 - he submitted a form 15 to edit content and add N.3.2. It was set to developing. Several W/M officials have supported this. Asks that this be a voting item in 2022.

Bob Murnane (Seraphin) : this is to allow a field reference standard meter, this definition does not currently exist. Recommends that this be withdrawn so that the definitions can be worked out.

Diane Lee (NIST OWM) : this item was put forth in 2015 - purpose was: to accept a specific master meter in the field. It's not necessary to ref. field ref. standards in specific code. NIST and states are working to collect data to see if master meters can be used. States are to determine which standards are to be used in the states. N.3.2 was an issue. there was no information as to justify a different test draft size than was specified in N.3 or if it is necessary to use a field reference meter.

Bruce Swice (National Propane Gas Association): he lent support to this discussion (master meters). It would be nice to have something in HB44 to assist in uniformity.

Michael Keilty (Endress + Hauser) : to address Diane Lee: he agrees and disagrees. Agree: it was stated that jurisdictions are responsible for their own equipment, however, he was told by states that they need something in HB44 to tell them what should be used. Again - wants voting on this item in 2022.

The WWMA S&T Committee recommends the status remain developmental. The Committee recommends 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 Michael Keilty (Endress + Hauser) 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

SWMA 2021 Annual Meeting: At the SWMA 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, supports 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 recommends this item move forward as a Voting item with the editorial changes requested by Mr. Keilty.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Michael Keilty (Endress + Hauser Flowtec) as the submitter of this item, gave a history of the item from 2015 and is recommending voting status with changes striking text seen below. Michael 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)

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 recommends further development.

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

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Michael Keilty-Endress+Hauser Flow asked that the item be moved to voting and if not, asks for suggestions from the committee on how to improve item. Dr. Henry Opperman-Weights and Measures Consultants does not support the item. Says it does not explain mass flow meter as a standard and where is the data that supports this item. Tina Butcher-NIST agreed with comments from Dr. Henry Opperman. Charles Stutesman-Kansas agreed with Tina Butcher but understands the submitting of this proposal and should be moved as a voting item.

CWMA S&T Committee recommend this item moving forward as a voting item.

CWMA 2022 Annual Meeting:

SMA:

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

Source:
North Carolina Department of Agriculture and Consumer Services

Purpose:
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 used a non-RMFD dispenser.

Organization (*) not submitted (**) no meeting (***) no recommendation	LPG-22.1 A.1. General., and Appendix D – Definitions. Liquefied Petroleum Gas Retail Motor Fuel Device. 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM		✓					
WWMA Annual Meeting (2021)							
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

Organization (*) not submitted (**) no meeting (***) no recommendation	LPG-22.1 A.1. General., and Appendix D – Definitions. Liquefied Petroleum Gas Retail Motor Fuel Device. 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support

NIST OWM: 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 the installation of a "T" and hose which had a K15 nozzle which is required for filling vehicles. These were being used in part as retail motor fuel device and they 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:

- The proposed definition for LP-Gas RMFD states in the definition that it has the same meaning as retail motor fuel dispenser and retail motor device, as such, is another term necessary?
- Whether or not LP-Gas is dispensed as a motor fuel or into a tank, it is a commercial transaction and as such do current devices (those devices that are retail motor fuel device and others that are used to fill propane tanks) meet appropriate requirements in NIST HB 44?
- The use of the term "licensed" in the definition need clarification.
- The current definition for retail motor fuel dispensers is adequate for any devices used to fuel internal combustion engines.
- Adding this definition may open the door to creating a laundry 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.

Regional Associations' Comments:

WWMA 2021 Annual Meeting: At the 2021 WWMA Annual Meeting, the WWMA

SWMA 2021 Annual Meeting: At the SWMA Open Hearing 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, Endress+Hauser, 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 recommends moving this item forward as a Voting Item.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, no Comments were heard on this item.

The NEWMA Specifications and Tolerances Committee recommends that this item remain in Developing Status.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Loren Minnich-Kansas had issues with the word "licensed". What does it mean.

CWMA S&T Committee recommends item as developing.

CWMA 2022 Annual Meeting:

SMA:

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

Source:
U-Haul International, Inc.

Purpose:
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.

Organization (*) not submitted (**) no meeting (***) no recommendation	LPG-22.2 S.2.6. Zero-Set-Back Interlock, for Stationary Customer-Operated Retail Motor-Fuel Devices, Electronic. 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)			✓				
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: 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 submitters 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.

Regional Associations' Comments:

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

Dwight Farr (U-Haul Program Manager) : they 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 effect 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.

Bruce Swiecicki (National Propane Gas Association): supports this proposal as stated. This will go a long way towards fixing the problem.

Cadence Matijevich (Nevada) : Question for submitter: retroactive status?

Dwight Farr (U-Haul Program Manager) : retroactive to 2017 - law was established at that year.

Cadence Matijevich (Nevada) : the way it is written, it will not suffice

Dwight Farr (U-Haul Program Manager) : if it needs to be changed, so be it.

The WWMA S&T Committee recommends 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 recommends 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 HB44.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing 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.

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

This committee agrees that the item could allow subpar devices to be put into commerce, that the item itself is incomplete, and recommends this item be Withdrawn.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, no Comments were heard on this item.

The NEWMA Specifications and Tolerances Committee recommends that this item remain in Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard no comments from the floor. Committee received updated proposal to S.2.5. and S.2.6 from Bruce Swieciki-National Propane Gas Association because technology won't be available till 2022 per manufacturers.

CWMA S&T Committee recommends item move forward as a developing item.

CWMA 2022 Annual Meeting:

SMA:

LPG-22.3 S.2.5. Zero-Set-Back Interlock, Stationary ~~and Vehicle Mounted~~ Meters, Electronic., S.2.6. Zero-Set-Back Interlock, Vehicle Mounted Meters, Electronic., and S.2.~~6~~7. Zero-Set-Back Interlock for Stationary Self-Operated Retail Motor-Fuel Devices.

Source:
National Propane Gas Association

Purpose:
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.

Organization (*) not submitted (**) no meeting (***) no recommendation	LPG-22.3 S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle Mounted Meters, Electronic., S.2.6. Zero-Set-Back Interlock, Vehicle Mounted Meters, Electronic., and S.2.67. Zero-Set-Back Interlock for Stationary Self-Operated Retail Motor-Fuel Devices. 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: NIST OWM has similar comments to this item as are provided in LPG-22.2. The current requirements in the 2022 version of NIST HB 44 already address electronic and mechanical zero set-back interlock. The requirements in the code apply to both employee and/or customer-operated devices without having to make that distinction.

The proposed changes were made to an older version of the handbook. The two features (Zero-set-back interlock and timeout) are addressed in two separate requirements in the 2022 version of the Handbook because they are two different mechanism

In reference to requirements for a 5-minute timeout, the timeout was discussed during previous reviews and 2, 3 and 5 minutes were discussed. A three-minute time was considered appropriate.

Based on the 2022 version of NIST HB 44 this proposal seems redundant; These requirements are already addressed in the code. Additional discussion may be needed, and these items may need to be reworked based on the current code requirements.

Regional Associations' Comments:

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

Bruce Swiecicki (National Propane Gas Association): This addresses two subjects: has to do with zero setback, but were breaking out vehicle meters. In some situations with a bobtail where there may be several tanks not close to one another and the operator has to carry the long hose.. They have to walk from tank to tank. They want more time (5 minute timer). He supports this but wants to break out the systems that aren't used full time for Retail motor fuel.

Dwight Farr (U-Haul Program Manager) : they are in support of the NPGA proposal.

Tina Butcher (NIST OWM) : 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 recommends 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 recommends 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 HB44.

SWMA 2021 Annual Meeting: At SWMA Open Hearing Annual Meeting, Steve Benjamin, North Carolina, supports this item.

This committee recommends this item move forward as a Voting item.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, no Comments were heard on this item.

The NEWMA Specifications and Tolerances Committee recommends that this item remain in Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard no comments from the floor. Committee received updated proposal to S.2.5. and S.2.6 from Bruce Swieciki-National Propane Gas Association because technology won't be available 2022 per manufacturers.

CWMA S&T Committee recommends item move forward as a developing item.

CWMA 2022 Annual Meeting:

SMA:

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

Purpose: (Missing in 2022 Interim agenda)

Organization (*) not submitted (**) no meeting (***) no recommendation	**MFM-15.1 N.3. Test Drafts 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM							
WWMA Annual Meeting (2021)							
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)	✓						
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: This item was removed from Block 1 items of previous agendas and now appears as a separate item 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.

- Although this item has been on the agenda for a number of years, this item was group with other similar items so that a project to collect data on meters to be used as field standards, provided the data need for regulatory officials to make the decision of whether or not meters could be used as field standards. This information is what all regulatory officials will need to assess these meters. Instead of all regulatory officials having to collect this data individually, NIST, OWM is working with States using meters purchased for this study and other equipment for transporting meters for testing across the county to collect this data. This data will be shared with all regulatory officials to assist them with their approval of meters as standards.

- The purpose statement of this item which is not included in the 2022 Interim Meeting Agenda is the same purpose statement that is included for item LPG-15.1 in the 2022 Interim Meeting Agenda which states "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 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 developed Item OTH-22.1 on the 2022 Interim Meeting Agenda 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.

NIST OWM Previous Comment:

- NIST OWM recognizes that one of the issues concerning the use of the term "Field Standard" and having the term apply to all standards is that all standards may not be able to meet the requirements for field standards addressed in Section 3.2 of the Fundamental Considerations in NIST HB 44. There is also an issue of who has the authority to accept a standard for use. To address these and other concerns NIST, OWM believes a possible approach to resolving the issues included in Block 1 items:
    - Add a statement to Section 3.2 in NIST HB44, Fundamental Considerations, to address another option for standard accuracy during testing, elaborate on traceability and how it is achieved and language concerning regulatory responsibility similar to what is included in NIST HB 130.
    - Find and examine different terminology used in HB 44 for standards used in testing commercial devices and select an appropriate term for these standards.
    - Make appropriate changes in NIST HB 44, HB130 and other documents as appropriate.
    - Collect data using NIST Purchased Coriolis meters to demonstrate that master meters are a viable option for use in testing devices
    - Develop a guidance document with clear processes to describe how standards are validated and values are assigned.
- NIST OWM continues to agree with the WWMA, CWMA, and NEWMA regional weights and measure associations that this item remain assigned. In addition, it may be beneficial to the task group to consider the data currently being collected by NIST, prior to considering and developing a position for block 1 items. As such, an informational status, until such time that all data is available, could be considered.
- NCWM appointed a task group to develop B1 items. The chair of the task group was Jason Glass of the SWMA, with representatives from NEWMA, WWMA, CWMA, the GA Sector, and NIST OWM
- NIST OWM purchased mass flow meters of various sizes to collect data on their potential use as "master meters." NIST OWM met with State representatives interested in participating in this work at the 2019 NCWM Interim Meeting to discuss plans for testing and also via teleconference in early September 2019.

- Preliminary field testing was conducted October 28 - November 1, 2019, with regulatory and industry participation including Colorado, Florida, Oregon, Emerson, Tulsa Gas Technology, and NIST OWM.

- The NCWM-assigned Task Group (TG) met virtually several times throughout 2020. At its last two meetings, the TG expressed an interest in test protocols that can be used by States to collect data and agreed that, before moving forward, data needs to be reviewed to determine whether or not master meters can be used as field standards.

- NIST OWM periodically updated the NCWM TG and the NCWM S&T Committee on the activities of the NIST Master Meters Work Group (MMWG) and their efforts to collect field test data. The test protocol developed by the NIST MMWG was also shared with the NCWM TG members. TG members were encouraged to attend a December 1, 2020 NIST MMWG meeting where the test protocol and process for collecting data was discussed.

- Some members of the NCWM task group also offered to participate in the NIST MMWG data collection.

- At its December 15, 2020 meeting the MMWG provided an extensive review of the Excel spread sheet that will be used to collect the data on CNG.

- In January 2021, NIST reported to the S&T Committee that the NIST MMWG has resumed data collection on the potential use of mass flow meters as "master meters" in CNG metering applications. Several MMWG participants, including CO, FL, OR, and OK, are ready to begin collecting data on master meters for CNG.

- In early 2021, Jason Glass (KY) resigned as chairman of the NCWM Field Task Group and as of July 2021 another chairman has not been appointed.

- The NIST USNWG on FRM has met multiple times since January 2021, most recently on July 6, 2021. Recent activities include the following.

- In June 2021, NIST OWM formalized the NIST-led Work Group, including working with NIST Legal Counsel to establish Operational Guidelines and a Data Collection Agreement, both of which will be used to guide WG operation and ensure transparency of the work. NIST OWM also reported changing the name of its working group from the NIST OWM Master Meter Work Group to the NIST U.S. National Working Group (USNWG) on Field Reference Meters (FRM) to better reflect the WG's goal of validating the potential use of Coriolis mass flow meters as field reference meters.

- **CNG:**
  - Colorado Division of Oil and Public Safety has received the NIST-owned Coriolis meter in the May/June 2021 time frame and has been using it along with their own Coriolis Meter to collect data. Scott Wagner (CO) arranged for a Web-based conference link with NIST staff during initial testing. This provided a great opportunity for NIST OWM to have discussion and dialog about meter setup and observations and discuss final test protocols developed by the WG. Mr. Wagner provided an update to the USWNG on progress at the July 2021 USWNG meeting.

  - Once CO has completed its data collection, the NIST-owned unit will be shipped to another USNWG participant state who has agreed to collect data in CNG applications. This presently includes FL, OK, and OR.

- Other mass flow meters purchased by NIST for this project to collect data in other metering applications will need to have framework constructed for transport and use before progressing into those applications.

- **LPG:**

- As previously shared with the S&T Committee, the procurement process for constructing the frame needed for transporting and using the NIST-owned master meter for LPG is proceeding.

- USNWG Technical Advisor, Val Miller is creating a data collection spreadsheet and test protocols for LPG based on those created by the USNWG for CNG. The USWNG will begin reviewing and refining these documents at its next meeting and will also consider input from those participants collecting data on CNG applications regarding any necessary changes.

- **Loading Rack Meters for Refined Fuels:**
  - At the July USWNG meeting, NIST OWM reported that OWM Chief Doug Olson has allocated funding to construct the frame needed for transporting and using the NIST-owned master meter for refined fuels such as gasoline and diesel in loading-rack meter applications and the procurement process has been initiated. Val Miller will collaborate with the USNWG on FRM to develop and refine the data collection sheets and test protocols using master meters for refined fuels at loading racks.

- Since NIST OWM's last update to the S&T Committee, representatives from two additional states, New Mexico and New York have joined the USWNG to possibly assist in data collection in one or more metering applications.

- Comments were received at both the NEWMA and CWMA 2021 Annual Meetings suggesting that data is needed before the NCWM task group could move forward. It was also noted that suggestion for direction of the NCWM task group was provided to task group members.

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

Regional Associations' Comments:

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

Michael Keilty (Endress + Hauser) : companion item to LPG-15.1. this is enabling language. Wants this to be a voting item in 2022.

Bob Murnane (Seraphin) : does not recognize the verbiage, needs a definition - see previous comments (referencing LPG-15.1, field reference standard meter).

Diane Lee (NIST OWM) : agree with Michael about companion item. Clarification to both items: MFM-15.1 - in HB the purpose statement is not there. In Amendment A there is already criteria there. Needed justification for language in N.3.2 - standard meter test - the min. quant. for any test draft shall be equal to or greater than am. delivered in 1 min. of the amount being tested. in CNG there is a 1/3 test being conducted. it wouldn't even take a minute to deliver. the question was: how do you come up with 1 min. and this would not be appropriate for all master meters.

Michael Keilty (Endress + Hauser) : addressing Diane: in 2016 there was supposed to be a vote. NIST tech. adviser brought this up. There was a revision to the time to be extended. CNG is completely separate, 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 made it 1 min. because N.3.1 says one test draft at the max. flow rate and one at the min. flow rate of installation.

The WWMA S&T Committee recommends the status remain developmental. The Committee recommends 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 Michael Keilty (Endress + Hauser) 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.

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

Mr. Keilty, Endress+Hauser, the 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.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Michael Keilty (Endress + Hauser Flowtec) commented and recommended 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)

Rich Harshman (NIST OWM) commented and discussions were had regarding states meeting the requirement of flow time that may be less than the one minute flow in N.3.2.
Michael Keilty responded that new equipment is in place and will meet the requirement in N.3.2.

Henry Opperman (Weights and Measures Consulting) commented that some NTEP certs 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 Specifications and Tolerances Committee recommends that this item remain in Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Michael Keilty-Endress+Hauser Flow asked that the item be moved to voting and if not, asks for suggestions from the committee on how to improve item. Dr. Henry Opperman-Weights and Measures Consultants does not support the item. Says it does not explain mass flow meter as a standard and where is the data that supports this item. Tina Butcher-NIST agreed with comments from Dr. Henry Opperman. Charles Stutesman-Kansas agreed with Tina Butcher but understands the submitting of this proposal and should be moved as a voting item.

CWMA S&T Committee recommend this item moving forward as a voting item.

CWMA 2022 Annual Meeting:

SMA:

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

MFM-22.1 Table T.2. Accuracy Classes and Tolerances for Mass Flow Meters.

Source:
NIST, Office of Weights and Measures

Purpose:
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.

Organization (*) not submitted (**) no meeting (***) no recommendation	**MFM-22.1 Table T.2. Accuracy Classes and Tolerances for Mass Flow Meters 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM							
WWMA Annual Meeting (2021)	✓						
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)	✓						
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)	✓						
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: 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.

Regional Associations' Comments:

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

Matt Douglas (California - DMS) : The language is clarifying. CA DMS supports this item.

Michael Keilty (Endress + Hauser) : states other gasses (hydrocarbon gasses). Solves issue with blended gasses. He supports this item.

The WWMA S&T Committee recommends that this item be assigned a Voting status. The Committee agrees that this item has merit and is fully developed.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing Mr. Keilty, Endress+Hauser, commented that this item is a simple language cleanup from NIST, and that he supports moving it forward as a Voting item.

This committee recommends moving this item forward as a Voting item.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Juana Williams (NIST OWM) commented that this is a housekeeping item that adds clarification.

Michael Keilty (Endress + Hauser Flowtec), Lou Sakin, (Hopkinton/Northbridge, MA) and Jim Willis (New York) agreed with and recommended Voting Status for this item.

The NEWMA Specifications and Tolerances Committee recommends that this item be moved forward with a Voting Status.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Michael Keilty-Endress+Hauser Flow asked that item be moved to voting item.

CWMA S&T Committee recommends item move forward as a voting item.

CWMA 2022 Annual Meeting:

SMA:

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

Purpose:
To provide clarity on how Handbook 44, Sec. 3.4 tentative code will apply to existing EVSE that are in the ground before it becomes effective by identifying which elements are non-retroactive.

Organization (*) not submitted (**) no meeting (***) no recommendation	EVF-21.1 A.1. General 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)			✓				
SWMA Annual Meeting (2021)			✓				
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: 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 submitter needs 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's 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 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 five years (and was under development by regulators and industry for three years prior to that).

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.

Throughout 2021 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.

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/marking, 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. NIST OWM awaits updates from the submitters on their next steps to rework the alternate proposal and make that information available for distribution and further input during the 2022 weights and measures standards development cycle (and beyond).

Regional Associations' Comments:

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

Justin Wilson (ChargePoint) : in the notes for 2021(Interim) there is an error : the notations are incorrect. They recommend withdraw of this proposal. They think the flexibility should be provided to state officials.

Kevin Schnepp (California - DMS) : extended exemptions are not appropriate - this is still tentative. This should be withdrawn.

The WWMA S&T Committee recommends 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.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing, the committee received no comments on this item.

This committee recommends this item be Withdrawn due to the item allowing a 10 year exemption. Annual Meeting, the SWMA

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Francesca Wahl (Tesla) speaking on behalf of the submitters group of EVSE companies asked 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. Alex Beaton from EV GO supported Francesca's comments and supports a development status.

Juana Williams (NIST OWM) commented in-regards 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 Specifications and Tolerances Committee recommends that this item remain in Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Tina Butcher-NIST has not seen a revised proposal from the submitters. Submitters recommend item stay developing.

CWMA S&T Committee recommends item stay developing.

CWMA 2022 Annual Meeting:

SMA:

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

EVF-20.1 D S.1.3.2. EVSE Value of the Smallest Unit.

Source:
NIST, Office of Weights and Measures

Purpose:
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.

Organization (*) not submitted (**) no meeting (***) no recommendation	EVF-20.1 S.1.3.2. EVSE Value of the Smallest Unit.2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)	✓						
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)	✓						
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)	✓						
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: In 2020 NIST OWM went forward with the proposed value (i.e., 0.0005 MJ [0.0001 kWh]) because during the 2014 EVFS USNWG 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 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 is still in subcommittee. Chairman Hardy has 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 has conducted testing on DC systems due to the availability of test apparatus.

NIST OWM recognizes the proposal's status has remained developing throughout 2020-2021 but notes 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 has 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 and for systems in commercial use in California the value of that measurement unit shall not exceed 0.0001 kWh, respectively.

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 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 allow 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 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 subparagraph 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 units of measurement is the MJ as shown below.

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:

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.

Regional Associations' Comments:

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

Kevin Schnepp (California - DMS) : Supports this item. This was adopted in California and helped in time of testing. It would be beneficial to all (less timely). In support.

Tina Butcher (NIST OWM) : Echoes what Kevin Schnepp indicated: 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 recommends that this item be assigned a Voting status. The Committee agrees that this item has merit and is fully developed.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing The committee received no comments on this item.

This committee recommends the item move forward as a Voting item.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Jim Willis (New York) commented in-regards to the value of the smallest unit. NY has tested many charging stations that have a resolution to the thousands 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.
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 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.

Jim Willis (New York) 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 Specifications and Tolerances Committee recommends that this item move forward as a Voting item.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Diane Lee-NIST and Tina Butcher-NIST recommend this item for voting as it is in line with California.

CWMA S&T Committee recommends this item as a voting item.

CWMA 2022 Annual Meeting:

SMA:

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

EVF-21.5 D T.2. Load Test Tolerances.

Source:

ABB, BTCPower, Electrify America, Edison Electric Institute, EVConnect, EVgo, Greenlots, Rivian, Siemens, Tesla, Tritium

Purpose:
To create separate metering requirements for DC EVSE due to significant technology differences and challenges between AC and DC systems.

Organization (*) not submitted (**) no meeting (***) no recommendation	EVF-21.5 D T.2. Load Test Tolerances. 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)			✓				
SWMA Annual Meeting (2021)			✓				
CWMA Interim (2021 Fall)			✓				
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: 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 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.

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.

Throughout 2021 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.

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/marking, 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. NIST OWM awaits updates from the submitters on their next steps to rework the alternate proposal and make that information available for distribution and further input during the 2022 weights and measures standards development cycle (and beyond).

Regional Associations' Comments:

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

Kevin Schnepp (California - DMS) : this was adopted in California Regulation. Just this past week (September 23rd 2021) a complete analysis was done and clearly identified that they can meet the 1% tolerance. Recommends to be withdrawn.

Justin Wilson (ChargePoint) : Recommend to be withdrawn - equipment can meet tolerance as is

Keith Bradley (Electrify America) : there are two questions: 1 - can devices in near term meet the tolerance? 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.

Kurt Floren (LA County) : when equipment is out there that is meeting the standards, this is not the time to roll back.

The WWMA S&T Committee recommends 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.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing the committee received no comments on this item.

This committee recommends this item be Withdrawn because we believe that current tolerances are attainable.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Francesca Wahl (Tesla) representing the submitting group commented and was supported by Alex Beaton (EV GO) in-regards 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.
Juana Williams 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, 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

The NEWMA Specifications and Tolerances Committee recommends that this item remain in Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: 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 recommends this item be withdrawn.

CWMA 2022 Annual Meeting:

SMA:

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

TXI – TAXIMETERS

TXI-22.1 Table S.5. Categories of Device and Methods of Sealing

Source:
NIST, Office of Weights and Measures

Purpose:
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.

Organization (*) not submitted (**) no meeting (***) no recommendation	TXI-22.1 Table S.5. Categories of Device and Methods of Sealing 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)	✓						
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)	✓						
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)	✓						
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: 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.

Regional Associations' Comments:

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

Tina Butcher (NIST OWM) : They put this forward: the recommended changes are just to clarify what is already in place for audit trails. This is to fill in the blanks for what is considered the minimum for audit trails. This specifies two event counters for the minimum form of an audit trail.

The WWMA S&T Committee recommends that this item be assigned a Voting status. The Committee agrees that this item has merit and is fully developed.

SWMA 2021 Annual Meeting: At 2021 SWMA Open Hearing The committee heard no comments on this item.

This committee recommends this item move forward as a Voting item.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Juana Williams NIST- commented in support and feels the item is fully developed and ready for voting status.
Jim Willis (New York) and John McGuire (New Jersey) also supported moving this item forward with a voting status.

The NEWMA Specifications and Tolerances Committee recommends that this item be given a Voting Status.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Tina Butcher-NIST recommends that this item move forward to voting. California has this in type evaluation now.

CWMA S&T Committee recommends this item move forward as a voting item.

CWMA 2022 Annual Meeting:

SMA:

GMA – GRAIN MOISTURE METERS 5.56 (A)

GMA-19.1 D Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Method <u>for All Grains and Oil Seeds.</u>

Source:
NTEP Grain Analyzer Sector

Purpose:
Reduce the tolerances for the air oven reference method.

Organization (*) not submitted (**) no meeting (***) no recommendation	GMA-19.1 D Table T.2.1. Acceptance and Maintenance Tolerances Air Oven Method <u>for All Grains and Oil Seeds.</u> 2019 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: 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 agrees with the S&T committee that this item should be given a developing status until additional data is examined.

Ms. Diane Lee (NIST) is working with the Sector to collect data on Unified Grain Moisture Algorithm (UGMA) grain moisture meters and non-UGMA grain moisture meters NC, AR, IL, and IA 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 NC 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 2014-2017. 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.

Regional Associations' Comments:

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

Diane Lee (NIST OWM) : This item has been on the agenda since 2019 - when it was proposed there was a study done on only corn and soybean samples (maybe we could lower the tolerances) subsequent to that, they received a report from a state to hold off to look at more data from different grain types (rough rice). Agreed to collect additional data, from a few additional states. A memo has gone out to participating states to collect more data on additional grains. They are in the process of collecting and hope to have a report in the interim on validity. Support as a developing item.

The WWMA S&T Committee recommends the status remain developmental.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing The committee heard no comments on this item.

This committee recommends this item remain Developing so that more data can be collected and presented in the future.

NEWMA 2021 Interim Meeting: At the 2021 NEWMA Interim Meeting, the NEWMA

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Diane Lee-NIST is part of the sector. The sector met in August of this year and four States will be submitting data. Once data is collected, it will be given to the Grain Sector for them to decide what to with the item. Doug Musick-Kansas are there old technology that can meet this requirement? Has any data been submitted regarding this?

CWMA S&T Committee recommends this item as developing.

CWMA 2022 Annual Meeting:

SMA:

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

MDM – MULTIPLE DIMENSION MEASURING DEVICES

MDM-22.1 S.1.7. Minimum Measurement.

Source:
Parceltool P/L

Purpose:
Exempt mobile tape based MDMD devices from the 12D minimum measurement.

Organization (*) not submitted (**) no meeting (***) no recommendation	**MDM-22.1 S.1.7. Minimum Measurement. 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM			✓				
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)			✓				
(***) CWMA Interim (2021 Fall)							
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)			✓				
NCWM S&T Committee Interim							

NIST OWM: This very same proposal 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. 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 ($1 \div 12 = 0.083 \simeq 8.3\%$). 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 x-unit^3 – 1728 x-unit^3 = 469 x-unit^3	
Percent error calculation	(469 x-unit^3 ÷ 1728 x-unit^3) x 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

Regional Associations' Comments:

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

Russell Vires (Mettler Toledo) : Mettler is opposed to the change proposed here. No reason to eliminate the minimum measurement.

The WWMA S&T Committee recommends that this item be assigned a Developmental status. The Committee recommends that the submitter provide data to support why the devices are unable to meet the 12-division requirement. The Committee also recommends that the submitter consult the MDMD working group.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing Russ Vires, Mettler Toledo, requested that this item be withdrawn because the justification was invalid.

This committee recommends this item be Withdrawn due to having no justification provided for the change. Annual Meeting, the SWMA

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Rick Harshman (NIST OWM) commented 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).

Lou Sakin (Hopkinton/Northbridge, MA) commented that this item is in-need of further development.

The NEWMA Specifications and Tolerances Committee recommends that this item be given Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard no comments from the floor.

CWMA S&T Committee has no recommendation for this item.

CWMA 2022 Annual Meeting:

SMA 2021 Fall Meeting: 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 other MDMD devices. The SMA recommends 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

Purpose:

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.

Organization (*) not submitted (**) no meeting (***) no recommendation	**OTH-16.1 Electric Watthour Meters Code under Development 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM		✓					
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

- **NIST OWM:** The USNWG on Electric Vehicle Fueling & Submetering is divided into two subgroups; one to address electric vehicle fueling and one to address utility-type watt hour meters.
    - This item addresses work being done by the "Electric Watthour Meter Subgroup (EWH SG).
- 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.
- 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.
- 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.
- The SG held eighteen meetings since January 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), in addition to meetings of small Task Groups focused on specific issues.
- Work continues on some sections of the draft code; however, the SG would like to begin getting feedback from the weights and measures community in advance of proposing the code for a vote.
- In September 2021, Tina Butcher, submitted a request to NCWM S&T Committee Chairman, 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.

- Chairman 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.

- The SG requests comments be submitted to the SG Chair or Technical Advisor by the end of March 2022, after which the SG will review and address comments, updating the draft code as needed and requesting the NCWM S&T Committee to post updated versions for review as available.

- After addressing comments and balloting the SG, the SG plans to submit the 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 Chairman, Ms. Lisa Warfield, (OWM)
      Email (lisa.warfield@nist.gov) or phone (301-975-3308)
    - Technical Advisor, Mrs. Tina Butcher, (OWM)
      Email (tbutcher@nist.gov) or phone (301-975-2196).

Regional Associations' Comments:

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

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 seral 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 recommends 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 CA 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.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing The committee heard no comments on this item.

This committee recommends this item remain Developing so that more work can continue at the request of the submitter.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Juana Williams (NIST OWM) 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 Specifications and Tolerances Committee recommends that this item be given Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Tina Butcher-NIST item has been on the agenda for 5 years. Needs a little more work from subcommittee. She recommended item as developing and would like public comments.

CWMA S&T Committee recommends the item as a developing item.

CWMA 2022 Annual Meeting:

SMA:

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

OTH-22.1 Appendix A: Fundamental Considerations, 3. Testing Apparatus

Note: *Seraphin and NIST, OWM worked in a joint effort to develop items GEN-19.1, OTH-22.1, Block 1 and Block 7 items on the S&T 2022 Interim Meeting. Seraphin and NIST, OWM requested that GEN-19.1 and OTH-22.1 be combined and submitted as a single proposal because they are related. See GEN-19.1 for the combined proposal with the changes to the source, purpose and item under consideration*

Source:
NIST, Office of Weights and Measures

Purpose:
To clarify 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.

Organization (*) not submitted (**) no meeting (***) no recommendation	OTH-22.1 Appendix A: Fundamental Considerations, 3. Testing Apparatus 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM	✓ per revision						
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)	✓ w/chgs						
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: There are several items on the agenda for changes to NIST HB 44 with the intent of having standards recognized, so that they may be used for inspections of commercial devices. The authority to recognize a standard for use in testing commercial devices has always been at the discretion of the Individual State weights and measures jurisdiction, which is included in the fundamental consideration in NIST HB 44. The change proposed on OTH-22.1 is to further address and clarify who has the authority to accept a standard for use to test commercial devices and what is needed to prove the adequacy of a standard.

Seraphin and NIST OWM worked jointly to develop this item and requested that this item be combined with item GEN-19.1 on the S&T 2022 Interim Meeting Agenda. The revised proposed item under consideration for OTH-22.1 is included with GEN-19.1.

The submitters agree that items GEN-19.1 and OTH-22.1 are fully developed and requested that this item along with GEN-19.1 be a Voting Item in 2022.

Regional Associations' Comments:

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

Michael Keilty (Endress + Hauser) : 3.1.1 on pg. S&T 112, line 2: unnecessary language: "likely through NIST" is not appropriate. In 3.1.2 : "standards will meet the… or other appropriate…. ASTM ASME" NIST HB105 is not consensus standards and we should not be referring to that. Traceability is not solely owned by NIST. speaks about international traceability (Switzerland, Canada, etc..) Recommends developing.

Tina Butcher (NIST OWM) : Submitter: NIST is not the only one for traceability - key here is making sure that due diligence that essential elements of traceability have been addressed. Authority rests with W/M director. Item 3.12: question ab. HB105: this requirement is simply taking the already existing language and moving it up into the main body. This is to clarify where authority rests (W/M directors). Clarifies what is needed to be looked at.

Matt Douglas (California - DMS) : They support this item.

Randy Jennings (Retired state of Tenn. Rep's himself) : supports comments made by Michael. Wants to be careful about bringing forward anything that can take away options

Cadence Matijevich (Nevada) : seeking clarification from Tina Butcher: clarification on traceability/distinction, SI vs NIST, in 3.1.1: we say traceable to international system, in 3.1.3: says traceable to NIST. Why is there a discrepancy in traceability verbiage? Is there a specific reason to limit to NIST in 3.1.3?

Tina Butcher (NIST OWM) : they tried to preserve the language already in footnote 2 and just bring it up into the body. Trying to emphasize that the director has the authority. Tried to provide a link between 3.1.1 and 3.1.3. Could say traceable to SI likely through NIST.

Michael Keilty (Endress + Hauser) : they say traceability is through national standards and they feel that that covers it all.

The WWMA S&T Committee recommends that this be assigned a Developmental status.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing Annual Meeting, Mr. Keilty, Endress+Hauser, 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, Seraphin, 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 agrees that this item should be reworded or possibly combined with Gen 19.1 and recommends this item be assigned a Developing status.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Juana Williams NIST commented

- 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.

Michael Keilty (Endress + Hauser Flowtec) comments below: He is suggesting the removal of yellow highlighted portions that are referencing NIST and the change reflected in 3.1.3.(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.

Lou Sakin (Hopkinton/Northbridge, MA) commented that he believes NIST OWM has a responsibility that is authorized by the Federal Dept. of Commerce.
Bob Murnane (Seraphin) recommends developing status, Henry Opperman (Weights and Measures Consulting) stated that NIST is relevant to this portion and Juana Williams NIST commented that NIST is indeed charged with responsibility from the Dept. of Commerce.

The NEWMA Specifications and Tolerances Committee recommends that this item be given Developing Status with consideration given to the new language above.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Tina Butcher-NIST says 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" 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.

Michael Keilty-Endress+Hauser 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 recommends that this agenda item be revised as recommended and moved forward as a voting item.

CWMA S&T Committee recommends that this item move forward as a voting item with Michael Keilty-Endress+Hauser recommendations.

CWMA 2022 Annual Meeting:

SMA:

OTH-22.2 Appendix D – Definitions: face

Source:
NIST, Office of Weights and Measures

Purpose:
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.

Organization (*) not submitted (**) no meeting (***) no recommendation	**OTH-22.2 Appendix D – Definitions: face 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM							
WWMA Annual Meeting (2021)	✓						
SWMA Annual Meeting (2021)	✓						
CWMA Interim (2021 Fall)	✓						
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)	✓						
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: 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 sections. The 15 relevant handbook code paragraphs 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 specified in Code Sections:

(1) 3.32 LPG and NH_3 Liquid-Measuring Devices
(2) 3.37 MFM Code, and
(3) 3.39 Hydrogen Gas-Measuring Devices

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.

Regional Associations' Comments:

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

Matt Douglas (California - DMS) : This item seems to be housekeeping. CA DMS supports this code.

The WWMA S&T Committee recommends that this item be assigned a Voting status. The Committee agrees that this item has merit and is fully developed.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing The committee heard no comments on this item.

This committee recommends moving this forward as a Voting item.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Juana Williams (NIST OWM) commented that this is a house keeping item and recommends moving forward as a voting item.

Jim Willis (New York) also supports giving this item voting status.

The NEWMA Specifications and Tolerances Committee recommends that this item be moved forward with a Voting Status.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Tina Butcher-NIST item is cleaned up and ready to move forward as a voting item.

CWMA S&T Committee recommends this item move forward as a voting item.

CWMA 2022 Annual Meeting:

SMA:

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

ITEM BLOCK 1 (B1) D TERMINOLOGY FOR TESTING STANDARDS

(original B1 items)

B1: SCL-18.1	D	N.2. Verification (Testing) Standards
B1: ABW-18.1	D	N.2. Verification (Testing) Standards
B1: AWS-18.1	D	N.1.3. Verification (Testing) Standards, N.3.1. Official Tests, UR.4. Testing Standards
B1: CLM-18.1	D	N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B1: CDL-18.1	D	N.3.2. Transfer Standard Test, T.3. On Tests Using Transfer Standards
B1: HGM-18.1	D	N.4.1. Master Meter (Transfer) Standard Test, T.4. Tolerance Application on Test Using Transfer Standard Test Method
B1: GMM-18.1	D	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	D	N.2. Testing Standards
B1: OTH-18.1	D	Appendix A: Fundamental Considerations, 3.2. Tolerances for Standards, 3.3. Accuracy of Standards
B1: OTH-18.2	D	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".

Organization (*) not submitted (**) no meeting (***) no recommendation	**Item Block 1 (B1) Terminology for Testing Standards 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM			✓				
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

Source:
NIST, Office of Weights and Measures

Purpose:
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.

NIST OWM: Seraphin and NIST OWM worked on revisions to GEN-19.1 and OTH-22.1. The definitions and terminology used in GEN-19.1 and OTH-22.1 are in conflict with the terminology in Block 1. As such, NIST OWM recommends the withdraw of Block 1 items. NIST OWM plans to work with Seraphin to develop revisions to Block 1 Terminology that would agree with other proposals currently on the 2022 S&T Interim Meeting agenda, at a later date.

NIST OWM Previous Comments:

- NIST OWM recognizes that one of the issues concerning the use of the term "Field Standard" and having the term apply to all standards is that all standards may not be able to meet the requirements for field standards addressed in Section 3.2 of the Fundamental Considerations in NIST HB 44. There is also an issue of who has the authority to accept a standard for use. To address these and other concerns NIST, OWM believes a possible approach to resolving the issues included in Block 1 items:
  - Add a statement to Section 3.2 in NIST HB44, Fundamental Considerations, to address another option for standard accuracy during testing, elaborate on traceability and how it is achieved and language concerning regulatory responsibility similar to what is included in NIST HB 130.
  - Find and examine different terminology used in HB 44 for standards used in testing commercial devices and select an appropriate term for these standards.
  - Make appropriate changes in NIST HB 44, HB130 and other documents as appropriate.
  - Collect data using NIST Purchased Coriolis meters to demonstrate that master meters are a viable option for use in testing devices
  - Develop a guidance document with clear processes to describe how standards are validated and values are assigned.
- NIST OWM continues to agree with the WWMA, CWMA, and NEWMA regional weights and measure associations that this item remain assigned. In addition, it may be beneficial to the task group to consider the data currently being collected by NIST, prior to considering and developing a position for block 1 items. As such, an informational status, until such time that all data is available, could be considered.
- NCWM appointed a task group to develop B1 items. The chair of the task group was Jason Glass of the SWMA, with representatives from NEWMA, WWMA, CWMA, the GA Sector, and NIST OWM
- NIST OWM purchased mass flow meters of various sizes to collect data on their potential use as "master meters." NIST OWM met with State representatives interested in participating in this work at the 2019 NCWM Interim Meeting to discuss plans for testing and also via teleconference in early September 2019.
  - Preliminary field testing was conducted October 28 - November 1, 2019, with regulatory and industry participation including Colorado, Florida, Oregon, Emerson, Tulsa Gas Technology, and NIST OWM.
- The NCWM-assigned Task Group (TG) met virtually several times throughout 2020. At its last two meetings, the TG expressed an interest in test protocols that can be used by States to collect data and agreed that, before moving forward, data needs to be reviewed to determine whether or not master meters can be used as field standards.

- NIST OWM periodically updated the NCWM TG and the NCWM S&T Committee on the activities of the NIST Master Meters Work Group (MMWG) and their efforts to collect field test data. The test protocol developed by the NIST MMWG was also shared with the NCWM TG members. TG members were encouraged to attend a December 1, 2020 NIST MMWG meeting where the test protocol and process for collecting data was discussed.

- Some members of the NCWM task group also offered to participate in the NIST MMWG data collection.

- At its December 15, 2020 meeting the MMWG provided an extensive review of the Excel spread sheet that will be used to collect the data on CNG.

- In January 2021, NIST reported to the S&T Committee that the NIST MMWG has resumed data collection on the potential use of mass flow meters as "master meters" in CNG metering applications. Several MMWG participants, including CO, FL, OR, and OK, are ready to begin collecting data on master meters for CNG.

- In early 2021, Jason Glass (KY) resigned as chairman of the NCWM Field Task Group and as of July 2021 another chairman has not been appointed.

- The NIST USNWG on FRM has met multiple times since January 2021, most recently on July 6, 2021. Recent activities include the following.

- In June 2021, NIST OWM formalized the NIST-led Work Group, including working with NIST Legal Counsel to establish Operational Guidelines and a Data Collection Agreement, both of which will be used to guide WG operation and ensure transparency of the work. NIST OWM also reported changing the name of its working group from the NIST OWM Master Meter Work Group to the NIST U.S. National Working Group (USNWG) on Field Reference Meters (FRM) to better reflect the WG's goal of validating the potential use of Coriolis mass flow meters as field reference meters.

- **CNG:**
    - Colorado Division of Oil and Public Safety has received the NIST-owned Coriolis meter in the May/June 2021 time frame and has been using it along with their own Coriolis Meter to collect data. Scott Wagner (CO) arranged for a Web-based conference link with NIST staff during initial testing. This provided a great opportunity for NIST OWM to have discussion and dialog about meter setup and observations and discuss final test protocols developed by the WG. Mr. Wagner provided an update to the USWNG on progress at the July 2021 USWNG meeting.

    - Once CO has completed its data collection, the NIST-owned unit will be shipped to another USNWG participant state who has agreed to collect data in CNG applications. This presently includes FL, OK, and OR.

- Other mass flow meters purchased by NIST for this project to collect data in other metering applications will need to have framework constructed for transport and use before progressing into those applications.

- **LPG:**

    - As previously shared with the S&T Committee, the procurement process for constructing the frame needed for transporting and using the NIST-owned master meter for LPG is proceeding.

    - USNWG Technical Advisor, Val Miller is creating a data collection spreadsheet and test protocols for LPG based on those created by the USNWG for CNG. The USWNG will begin reviewing and refining these documents at its next meeting and will also consider input from those participants collecting data on CNG applications regarding any necessary changes.

- **Loading Rack Meters for Refined Fuels:**

- At the July USWNG meeting, NIST OWM reported that OWM Chief Doug Olson has allocated funding to construct the frame needed for transporting and using the NIST-owned master meter for refined fuels such as gasoline and diesel in loading-rack meter applications and the procurement process has been initiated. Val Miller will collaborate with the USNWG on FRM to develop and refine the data collection sheets and test protocols using master meters for refined fuels at loading racks.

- Since NIST OWM's last update to the S&T Committee, representatives from two additional states, New Mexico and New York have joined the USWNG to possibly assist in data collection in one or more metering applications.

- Comments were received at both the NEWMA and CWMA 2021 Annual Meetings suggesting that data is needed before the NCWM task group could move forward. It was also noted that suggestion for direction of the NCWM task group was provided to task group members.

Regional Associations' Comments:

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

Russell Vires (Mettler Toledo): there are some conflicts now that GEN-19.1 has been removed (from the block). OTH-18.1: some conflicts there. This needs additional work. Recommend that it remains developing to give stakeholders opportunity to properly vet item

Diane Lee (NIST OWM): Russ is correct. Previous agenda - OTH-18.1 was listed as a separate item on the agenda but it has always been a part of block 1 (concern raised). That is fixed and 18.1 is included. What do we call master meters? What do we call transfer standards? NIST wants to call everything a field standard. All items were in a block - 18.1 should remain in the block but it was removed. NIST supports developing.

Kurt Floren (LA County) : wont comment on tech. aspects. Question on status? SCL-18.1 and OTH-18.3: these are shown as assigned items. Have they been assigned to a task force? Are they still in the hands of NIST? Need to define the terms (field standard and transfer standard).

Josh Nelson (Ex-Officio NCWM S&T Committee) : to Kurt - it had previously been assigned but the task group disbanded to allow NIST to continue their work on the questions at hand. They are looking to have members of that group to join the NIST group to gain more understanding. This is a typo - should be changed to developmental.

Matt Douglas (California - DMS) : California supports further development.

Don Onwiler (NCWM) : the report from S&T said that the block would be broken up. National committee agreed to separate blocks. They just forgot to delete the extra item. National committee will sort it out. Scratch 18.1 as individual item.

Cadence Matijevich (Nevada) : NIST HB 105 - may be a useful reference doc. To look at the definitions. To avoid conflict bet. HB44 and HB105.

The WWMA S&T Committee recommends the status remain developmental.

SWMA 2021 Annual Meeting: At the SWMA Open Hearings, 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.

Russ Vires, SMA, stated they support SCL/ABW/AWS because it is important to use consistent terminology across Handbook 44.

Russ Vires, Mettler Toledo, stated that this item conflicts with Gen 19.1, and that he supported this item remaining Developing.

This committee feels that more work needs to be done on this item regarding consistent terminology.

This committee recommends this item remain Developing pending the Field Standard Task Group finding a new Chairperson.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Henry Opperman (W&M Consulting/Seraphin) commented that this item should remain a developing item along with continued discussions with NIST OWM.

Lou Straub (SMA) supports 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.

Henry Opperman (Seraphin) commented that this block originally contained (Gen 19.1) that was separated from the block and recommends further development.

The NEWMA Specifications and Tolerances Committee recommends that this item remain in Developing Status.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Diane Lee-NIST mentioned that other items have been taken out of this block. Will be working with Seraphin to come up with better language. Is maybe "Meter" more suitable. Should stay has developing. Tina Butcher-NIST submitted OTH 22.1 and will help develop more. Lou Straub-SMA can support ABW-18.1 and AWS-18.1. Charles Stutesman-Kansas has issues with term "master meter". Ivan Hankins-Iowa Why can't we use the term "prover" doesn't understand "transfer meter or master meter".

CWMA S&T Committee recommends item as developing.

CWMA 2022 Annual Meeting:

SMA:

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

BLOCK 2 ITEMS (B2) DEFINE TRUE VALUE FOR USE IN ERROR CALCULATIONS

B2: A SCL-20.3 S.5.4. Relationship of Minimum Load Cell Verification Interval to the Scale Division

B2: A SCL-20.4 Table 3. Parameters of Accuracy Classes.

B2: A SCL-20.5 Table S.6.3.a. Marking Requirements, Note 3.

B2: A SCL-20.6 T.N.1.2. Accuracy Classes and T.N.1.3. Scale Division.

B2: A SCL-20.7 Table 7. Maintenance Tolerances

B2: A SCL-20.8 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.*

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	**B2 – Define True Value for Use in Error 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM							
WWMA Annual Meeting (2021)					✓		
SWMA Annual Meeting (2021)				✓			
CWMA Interim Meeting (2021 Fall)				✓			
CWMA Annual Meeting (2022 Spring)							
NEWMA Interim (2021 Fall)					✓		
NEWMA Annual (2022 Spring)							
SMA (Industry)				✓			
NCWM S&T Committee Interim							

Source:
Ross Andersen (Retired)

Purpose:
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. 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 also, 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 Chairman 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 Chairman 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.

Regional Association's Comments:

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

Matt Douglas (California - DMS) : the language is not clear, recommend that this item be withdrawn. (the whole block)

Russell Vires (Scale Manufactures Association): this is a carryover item. SMA supports further development of this item, recommend that the SMA encourage the use of term: Verification Scale Interval for (e) and Scale Division for (d). (he can send info.) States that his comments are the same from the Annual meeting.

Diane Lee (NIST OWM) : NIST OWM comments on this item are posted on NCWM website

The WWMA S&T Committee recommends 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 Matt Douglas' (California - DMS) testimony questioned whether or not the item provides assistance to an Inspector in the field in the performance of their job.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing Russ Vires, SMA, supports further development of this item, and recommended the descriptive name changes for "e" and "d" as posted on the NCWM website.

This committee recommends this item move forward with an Assigned status.

NEWMA 2021 Interim Meeting: During the 2021 NEWMA Interim S&T open hearings, the following comments were heard.

Rick Harshman (NIST OWM) recommends 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. Meeting notes are available on NCWM website.

Henry Opperman (Weights and Measures Consulting) objected to many of the blocked items and recommend to keep this item in informational status.
Lou Staub (SMA) suggested the use of the term "verification scale interval" for "e" and "scale division" for "d".
John McGuire (New Jersey)- Recommends keeping the item in informational status.

The NEWMA Specifications and Tolerances Committee recommends that this item be kept in Informational Status.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Lou Straub-SMA supports item. Would like to see it written that "scale division" will have value of "d" and "verification scale interval" for "e".

CWMA S&T Committee recommends that item be assigned back to the Verification Scale Division Task Group.

CWMA 2022 Annual Meeting:

SMA 2021 Fall Meeting**.** 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 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 recommends 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 recommends the following change: **"… except that (d) is not used in reference…"**
B2: SCL-20.7 Table 7. Maintenance Tolerances
Recommendation: The SMA recommends the following change: **Table 6. Maintenance Tolerances**
B2: SCL-20.8 Table 8 Recommended Minimum Load
Recommendation: The SMA recommends 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.***

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

BLOCK 3 ITEMS (B3) TOLERANCES FOR DISTANCE TESTING IN TAXIMETERS AND TRANSPORTATION NETWORK SYSTEMS

Source:
New York Department of Agriculture and Markets

Purpose:
Provide the same distance-measurement tolerances for the Taximeters Code and Transportation Network Systems Code.

Organization (*) not submitted (**) no meeting (***) no recommendation	Block 3 items (B3) Tolerances for Distance Testing in Taximeters and Transportation Network Systems 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: OWM appreciates the efforts of the submitter to harmonize the tolerance requirements in the Taximeters Code and the TNMS 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 (state of NY) 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 NY 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 expand 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.

Regional Associations' Comments:

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

Kurt Floren (LA County) : This coincides with previous comments: new tech with GPS tracking and network companies are out. We are now taking age-old tech that's meeting 1% tolerance and proposing to expand the tolerance. (existing equipment has been meeting with no issues). He does not support this item until the data has been evaluated. He recommends this item to remain developmental until more data is available.

The WWMA S&T Committee recommends the status remain developmental.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing The committee heard no comments on this item.

This committee recommends this item remain a Developing item so that the involved parties have more time to find a way to align the tolerances in the Handbook.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Jim Willis commented to explain the relationship of the two systems. Taxi Meters vs Transportation Network Systems and the different tolerances that are applied. The tolerances are different in the HB 44 and therefor when a taxi meter using satellite technology is used, the tolerance is tighter and therefore the playing field is not level.

Lou Sakin (Hopkinton/Northbridge, MA) asked if industry has commented or questioned this procedure. Jim Willis (New York) was not aware at the time. Lou Sakin (Hopkinton/Northbridge, MA) further commented that if the playing field is not level, then he recommends a voting status.

Juana Williams (NIST OWM) commented and recommended that the submitter work with the work group to fully develop the code.

The NEWMA Specifications and Tolerances Committee recommends that this item be given Developing Status with continued involvement with the national Taxi Meter Work Group.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Diane Lee-NIST comments are in report on NCWM website.

CWMA S&T Committee recommends the item move forward as a developing item.

CWMA 2022 Annual Meeting:

SMA:

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

BLOCK 4 ITEMS (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.

Organization (*) not submitted (**) no meeting (***) no recommendation	Block 4 items – Electronically captured tickets or receipts (9 Items) 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)	✓						
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

Source:
Kansas Department of Agriculture, Division of Weights and Measures

Purpose:
Allow recorded values to be captured electronically as an alternative to a printed ticket or receipt.

NIST OWM: Although NIST, OWM feels that all proposed changes would benefit from additional review, NIST OWM believes that the additional changes to G-S.5.6 provides clarity and with the appropriate edits the proposed

changes to G-S.5.6. may be ready to move forward for a vote. NIST OWM believes that changes to the B4 specific codes need to be 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. As an example, the removal of "printed" from some of the NIST HB 44 Code requirements may change the original intent of the specific code.

NIST OWM 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.

OWM's Recommendation:

Based on the above assessment of the most recent proposal in the Item Under Consideration, OWM recommends 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**)

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.~~ Strick out "Printed Ticket"

B4: VTM-21.1 - S.1.4.2. ~~Printed Ticket~~ Strick out "Printed Ticket"

Regional Associations' Comments:

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

Matt Douglas (California - DMS): California supports further development of the block

Russell Vires (SMA) : SMA supports 2 of the items GEN-21.2, OTH-21.2

Diane Lee (NIST OWM) : carryover item. NIST has comments on this item posted. They support it as a developing item going forward.

The WWMA S&T Committee recommends the status remain developmental. The Committee recommends that the submitter continue to work with NIST OWM to further develop the item.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing Russ Vires, SMA, stated that he supports this item.

Tim Chesser, State of Arkansas, suggested changing the wording in Gen 21.1. His suggestion is to change "presented" to "available".

This committee recommends this item remain Developing, so they have an opportunity to work with the NIST OWM to clarify and clean up the language.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Jim Willis (New York) commented that it is important to recognize that the future will bring us to electronically captured tickets or receipts.

Lou Straub SMA, John McGuire (New Jersey), and Jim Willis (New York) all recommended to move this item forward as voting.

The NEWMA Specifications and Tolerances Committee recommends that this item be given Voting Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Charles Stutesman-Kansas (submitter) mentioned that he hoped to have more information to NCWM Interim Meeting and supported this item staying as developing. Diane Lee-NIST stated there are comments on this item in OWM's Analysis that was sent to the committee. Supports this item as developing. Lou Straub-SMA supports OTH-21.2.

CWMA S&T Committee recommends item as developing.

CWMA 2022 Annual Meeting:

SMA:

ITEM BLOCK 5 (B5) DEFINE "FIELD REFERENCE STANDARD"

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 D N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: CDL-18.2 D N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards
B5: HGM-18.2 D N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method
B5: OTH-18.3 A Appendix D – Definitions: field reference standard meter ~~and transfer standard~~

Source:
Endress + Hauser Flowtec AG USA (2018)

Purpose:
Add definition field reference standard meter to HB 44. Delete transfer standard definition. Change terms in sections 3.34, 3.38 and 3.39.

Organization (*) not submitted (**) no meeting (***) no recommendation	Item Block 5 (B5) Define "Field Reference Standard" 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM			✓				
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)			✓				
CWMA Interim (2021 Fall)			✓				
CWMA Annual (2022 Spring)							
NEWMA Interim (2021 Fall)			✓				
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: 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. Michael 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.

Regional Associations' Comments:

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

Michael Keilty (Endress + Hauser) : he submitted these in 2017, sept. in response to NIST comments. NIST committed a form 15 in that same year with the language from Block 1. He had hoped that the task group formed in 2019 would have addressed block 1 and 5 items. Lang. in block 5 is in line with (LPG-15.1 and MFM-15.1) ..... Language in documents was copied and inserted. asks committee to look at language specific to the item and not the general block.

Kurt Floren (LA County) : last reference was to block 5, error.

Michael Keilty (Endress + Hauser) : Would like to move from developing to a voting status in the 2022 cycle.

Bob Murnane (Seraphin) : new terminology that does not exist in HB currently. The definition proposed is vague.. It does not limit the tolerance for field standard. W/M officials needs to know that enforcement is legally enforceable. HB44 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. Doesn't think we need new terminology. the existing terms (transfer standard / field standard) be worked on. Recommends that this item be withdrawn.

Josh Nelson (Ex-Officio NCWM S&T Committee) : Question: can he submit to the committee his notes? He will. Recommend entire block be withdrawn?

Bob Murnane (Seraphin) : Yes (in reference to above testimony), withdraw entire block.

Michael Keilty (Endress + Hauser) : to follow up on Bob: 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. This is just enabling language.

The WWMA S&T Committee recommends the status remain developmental. The Committee recommends 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 Bob Murnane (Seraphin) and will be posted to the NCWM website.

SWMA 2021 Annual Meeting: At the SWMA Open Hearing, Mr. Keilty, Endress + Hauser, who is the submitter of this item, 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.

Russ Vires, Mettler Toledo, recommended the Withdrawal of this item.
Mr. Oppermann, Weights and Measures Consulting, Seraphin, supports Withdrawal of this item.
This committee recommends this item be Withdrawn at the submitters request.

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Michael Keilty (Endress + Hauser Flowtec) has submitted comments and is requesting withdrawal of the items in this block.

Further comments were heard form Juana Williams (NIST OWM) on the history of the item. Comments were received in support of withdrawal.

The NEWMA Specifications and Tolerances Committee recommends Withdrawal of this item.

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Michael Keilty-Endress+Hauser Flow (submitter) recommends that item be withdrawn.

CWMA S&T Committee recommends that item be withdrawn.

CWMA 2022 Annual Meeting:

SMA:

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

BLOCK 6 ITEMS (B6) COMMERCIAL AND LAW ENFORCEMENT, AXLE AND AXLE GROUP WEIGHTS

B6: GEN-22.1 **G.A.1. Commercial and Law-Enforcement Equipment.**
B6: SCL-22.1 **S.1.14. Recorded Representation of Axle or Axle Group Weights**
B6: SCL-22.1 **UR.3.3. Single-Draft Vehicle Weighing., and UR.3.4. Axle and Axle Group Weight Values.**

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	**B6 – Commercial and Law enforcement, Axle and Axle Group Weights 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM	✓ **GEN.22.1 only**	✓ **both SCL items**					
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim Meeting (2021 Fall)		✓	✓ **w/draw Gen 22.1**				
CWMA Annual Meeting (2022 Spring)							
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							✓ **with changes**
NCWM S&T Committee Interim							

Source:
NIST, Office of Weights and Measures

Purpose:
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. The feedback we received on the items in Block 6 from those providing comment during S&T open hearings at the most recent regional W&M association meetings was extensive and very constructive. Most everyone seemingly agrees, based on comments received during those meetings, that NIST Handbook 44 is intended to apply to weighing equipment used in assessing a fee for the service of providing a weight. Our view has always been (and continues to this day to be) that it is only reasonable to expect 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 HB 44 requirements. Clarifying this point was our sole purpose in proposing a change to paragraph G.A.1. Commercial and Law-Enforcement Equipment.

Although all regional W&M associations recommended the group of Block 6 items be developing during their fall 2021 meetings, several individuals providing comment during open hearings at those meetings (both W&M officials and industry representatives alike) recommended item GEN-22.1 be removed from Block 6 and considered as an

individual item because they considered the GEN-22.1 item fully developed and dissimilar to the other two "scale" items in the block. We, too, agree with this assessment that the GEN-22.1 item is fully developed and is dissimilar enough to the two "scale" items that it can be considered on its own merits. If the Committee and others agree, our preference would be to advance the GEN-22.1 item as a voting item for the upcoming 2022 NCWM Annual Meeting and carryover the two "scale" items in the block for consideration next year. This would allow us time to amend the content of the two "scale" items based on the feedback received thus far and address any future concerns made evident.

OWM notes that the WWMA, at its 2021 Annual Meeting, offered an amended draft of the GEN 22.1 proposal that restructured how the information in the paragraph is presented. Additionally, the CWMA, at its 2021 Interim Meeting, proposed some grammatical changes to the text in subpart (b) ii. of OWM's proposed draft changes to paragraph G-A.1. Refer to the WWMA's S&T 2021 Annual Meeting Draft Report and the CWMA's S&T 2021 Interim Report to view these proposed changes. Neither the WWMA or CWMA, in our view, proposed any changes to the technical content of the paragraph we had earlier drafted.

In consideration of the changes proposed by the WWMA and CWMA, OWM offers the following amended version of the proposal in GEN-22.1 and recommends it be advanced as a voting item during the 2022 NCWM Annual Meeting:

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

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:

i. 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;

ii. assessing a fee for the use of the equipment to determine a weight or measure;

iii. determining the basis of an award using count, weight, or measure; or

iv. 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.

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

With respect to the two "Scale" items in this block, OWM has revised the proposal in SCL-22.1 from that appearing in the Committee's 2022 Interim Meeting Agenda based on the feedback received during the most recent regional W&M association meetings. OWM offers the following revised proposal for consideration as replacement for the one currently appearing in Item SCL-22.1 of this block:

B6: SCL-22.1 Recorded Representation of Axle or Axle Group Weights

Item Under Consideration: Amend NIST Handbook 44, Scales Code as follows:

S.1.14. Recorded Representations, Multi-Independent Platform[1] Vehicle Scale Systems

S.1.14.1. 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.1.14.2. 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 determined[2], 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.

[2]Alternatively, 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.

[subsequent requirements to be renumbered as appropriate]

OWM also plans to revise the proposal in SCL-22.3. having recently concluded that the elimination of the "Note" in Scales Code paragraph UR.3.3. should not have been proposed because multi-draft weighing is an acceptable practice for law-enforcement application. Additionally, OWM wishes to clean up some of the terminology appearing in proposed new Scales Code paragraph UR.3.4. to better harmonize it with terminology used in OIML R-134. Once OWM has finalized a revised version of the proposal appearing in SCL-22.3. it will submit the amended version to the national S&T as replacement for the one currently appearing in the Committee's 2022 Interim Meeting Agenda.

OWM requests the Committee carryover the two "Scale" items in Block 6 for future consideration as it views these two items very important future additions to NIST HB-44 Scales Code.

Regional Association's Comments:

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

Kurt Floren (LA County) : He wants to offer that the last part of subsection A and breaking into bullet points. He wants to break out equipment that is commercial, then the other types. It's titled commercial and law enforcement then

"other commercial" and it becomes confusing. Is it all commercial and subsect to our jurisdiction. rephrase GA-1 : apply "to commercial equipment as follows": ... explains that everything under is commercial. (strike "commercial" from A and B). Between apply and as in the first line, insert commercial equipment. Kurt Floren stated that he will submit a written statement to the Committee as presented during open hearings.

Ivan Hankins (Iowa): He wants clarification as to what is being changed to make it better. It looks like it's already there, and he wants more definition on why this is changing.

Cadence Matijevich (Nevada) : Agrees with Kurt, but cautions that we consider how the heading reads if we add commercial to the opening statement then there might be some interpretation that what is or is not commercial law enforcement equipment. (is there a fine assessed?) does not want to narrow the subsection of law enforcement devices only to commercial purposes.

Kurt Floren (LA County) : fix to Cadence Matijevich : restructure under GA-1: insert subsection under 1: commercial as follows, then insert A,B,C then 2 for law enforcement.

Cadence Matijevich (Nevada) - states that Kurt is much better at this, and his fix is good

Lou Straub (Fairbanks Scales) : agrees with Ivan, that the original language is satisfactory. Language needs to say that its NTEP approved and meet handbook requirements

Eric Golden (Cardinal Scale) : does a commercial transaction include just getting a weight: he says yes. Change the wording that that transaction is commercial. No suggestions at this time. Kurt missed a typo: in B2: "Basis"

Tina Butcher (NIST OWM) ; their office submitted this. Wanted to clarify commercial transactions. Agrees with previous testimony. They have submitted other proposals to amend method of sale reg. and uniform law. They have determined that HB44 and 2 sections in HB130 are slightly different. Uniform Reg. for service persons also needs to be aligned. Wants this to remain developing so that they can continue to align the language and make it more uniform.

Russell Vires (Scale Manufactures Association) : This is a new item, the SMA has not vetted this yet. They will do so at November meeting. This should remain developing so that there's no unintended consequences.

Tina Butcher (NIST OWM) : In the agenda, this is blocked with two other "companions". She feels that the block should continue, however, if others think that other items in the block are ready (SCL-22.1 and SCL-22.3) those items can move forward.

Don Onwiler (NCWM) : SCL-22.3 is the name of the next item

Russell Vires (Scale Manufactures Association): he is looking at it as a block and is commenting as an entire block. Wants all 3 to remain developing so that they can research.

Lou Straub (Fairbank Scales): SCL-22.1 : concern about the second sentence: talking about the entire truck on the scale = not legal for trade: this is ok. Second part about axle identifications (axle groups) this gets difficult to identify group notifications. Wants the ticket that has already been marked as not legal for trade to not have to identify all axels. Wants this re-worded. They will put down axle weight and gross weight. Pre printed labels don't allow enough space.

Eric Golden (Cardinal Scales) : agrees with Tina to split the items. "Blow the block apart." The second two items introduce additional items and topics. Wants to pull the second two items out.

The WWMA S&T Committee recommends that this be assigned a Developmental status. The Committee recommends 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, t~~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 20XX)

(**~~b~~c**) 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.

~~(c~~d)(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.)

SWMA 2021 Annual Meeting: At the SWMA Open Hearing, 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 recommends that this item move forward with a Developing status.

NEWMA 2021 Interim Meeting: During the 2021 NEWMA Interim S&T open hearings, the following comments were heard.

GEN-22.1
Rick Harshman (NIST OWM) commented that the language is in-need of some changes and NIST will be providing changes for the NCWM.
Eric Golden (Cardinal Scale) supports the intent of this item, but it may need some wordsmithing
Lou Straub (SMA) Cheryl Ayer (New Hampshire) and John McGuire (New Jersey) all support this as a developing item.

SCL 22.1
Eric Golden (Cardinal Scale) supports this item moving forward as developing

Lou Straub (Fairbanks Scale) agrees with language in general. But questions the benefit of including all the language on a scale ticket and the large amount of information would be difficult to fit on the ticket.
Eric Golden (Cardinal Scale) and Cheryl Ayer (New Hampshire) agree with comments from Mr. Straub.
John McGuire (New Jersey) recommends keeping this item in developing status.

SCL 22.3r
Eric Golden (Cardinal Scale) suggested to strike "non-commercial" and additional wordsmithing to align with paragraph UR3.4.
John McGuire (New Jersey) supports keeping this item in developing status.

The NEWMA Specifications and Tolerances Committee recommends that this item be given a Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Loren Minnich-Kansas suggested change he sent to the committee (in green).

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**)

(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~~ 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)

Loren Minnich-Kansas also asked NIST for clarification on G-A.1. because different states already interrupt rule different ways. Diane Lee-NIST agreed with Loren and suggested it be developing. Eric Golden-Cardinal Scales agrees 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. Eric also recommended striking out the following (in red) stating the reasoning behind this is 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.

Tina Butcher-NIST agreed G-A.1. needed more work and had no objection to Eric Golden suggestion of splitting SCL-22.1 and SCL-22.3. Lou Straub-Fairbanks says current G-A.1. is already correct. He also agreed with Eric Golden from Cardinal Scales on SCL 22.1. Doug Musick-Kansas agreed with Lou Straub. Says that item is not practical for all vehicles out there. Keep as developing. Ivan Hankins-Iowa feels G-A.1. is already correct. Charles Stutesman-Kansas stated original language is good as written.

CWMA S&T Committee recommends that GEN 22.1 be withdrawn and SCL-22.1 and SCL 22.3 remain developing.

CWMA 2022 Annual Meeting:

SMA. The SMA….

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

BLOCK 7 ITEMS (B7) TOLERANCES ON TESTS USING TRANSFER STANDARDS

Source:
Seraphin Test Measure Company, A Division of Pemberton Fabricators, Inc.

Purpose:
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 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.

Organization (*) not submitted (**) no meeting (***) no recommendation	**Block 7 items (B7) Tolerances on Tests Using Transfer Standards 2022 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM	✓ **if GEN-19.1 and OTH-22.1 are Voting in 2022**						
WWMA Annual Meeting (2021)		✓					
SWMA Annual Meeting (2021)		✓					
CWMA Interim (2021 Fall)		✓					
CWMA Annual (2022 Spring)							

Organization (*) not submitted (**) no meeting (***) no recommendation	Block 7 items (B7) Tolerances on Tests Using Transfer Standards 2022 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
NEWMA Interim (2021 Fall)		✓					
NEWMA Annual (2022 Spring)							
SMA (Industry)							
NCWM S&T Committee Interim							

NIST OWM: Seraphin developed changes to the Block 7 Item Under Consideration that appears in the 2022 Interim Meeting Agenda, which are impacted by changes being made to the now combined agenda items GEN-19.1 and OTH-22.1. These changes make it clear that the tolerances to be applied to the device under test is to be increased by the uncertainty of the transfer standard. The equation was revised and is now included in the General Code proposed recommendation in GEN-19.1. In addition, instead of including the equation in each Code paragraph for the Item Under Consideration for Block 7, the general code requirement (See GEN-19.1) that contains the equation is referenced in each paragraph. Also see the change to the purpose statement in the NIST OWM analysis for this item due to a change in the proposed equation in GEN-19.1.

If the S&T Committee presents the combined item GEN-19.1 and OTH-22.1 for a vote in 2022, then this item may also go forward for a vote in 2022.

Below is the revised Item Under consideration for Block 7:

B7: CLM-22.1 T.3. On Tests Using Type 2 Transfer Standards.

Item Under Consideration:
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 T.3. On Tests Using Type 2 Transfer Standards.

Item Under Consideration:
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 T.4. Tolerance Application on Tests Using Transfer Standard Test Method.

Item Under Consideration:
Amend Handbook 44, Hydrogen Gas-Measuring Devices Code as follows:

T.4. Tolerance Application on Tests 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.~~ **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)

Regional Associations' Comments:

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

Bob Murnane (Seraphin) : submitter: this needs to go with the GEN-19.

Marc Buttler (Emerson Micro Motion) : wants to re-state : earlier comment on GEN item would also apply to calculation on this. He will adjust the calculation to increasing tolerance from decreasing.

Bob Murnane (Seraphin) : they have looked at original comments in GEN 19 : they will have info for us shortly.

A letter was submitted to the Committee by Marc Buttler (Emerson Micro Motion) and will be posted to the WWMA website.

The WWMA S&T Committee recommends that this Block be assigned a developmental status. The Committee recommends that item GEN-19.1 be inserted into Block 7.

SWMA 2021 Annual Meeting: At the SWMA 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 recommends this item be assigned Developing status. Annual Meeting, the SWMA

NEWMA 2021 Interim Meeting: During the NEWMA S&T open hearings, the following comments were heard.

Henry Opperman (Seraphin) commented with clarification from Bob Murnane (Seraphin) that this item is in conjunction with Gen 19 and with the changes outlined in Gen 19 (see comments) He recommends this item to be forwarded as a developing item.

The NEWMA Specifications and Tolerances Committee recommends that this item be given a Developing Status

NEWMA 2022 Annual Meeting:

CWMA 2021 Interim Meeting: The committee heard comments from the floor. Dr. 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. Tina Butcher-NIST Thinks original formula is correct, where as modified formula would not put a limit. Believes it needs more work. Robert Murnane-Seraphin recommended that the item stay as developing and be combined with GEN 19.1.

CWMA S&T Committee recommends that the item be developing.

CWMA 2022 Annual Meeting:

SMA: