OWM's Analysis of the NCWM 2021 Annual Meeting S&T Agenda Items

The NIST OWM analysis includes all items that are on the 2021 Interim Meeting agenda. All items are in chronological order by agenda item number within the individual technical sections.

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

Subject Series List

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

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

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

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

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

Other Items ..... OTH Series

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Table B
Glossary of Acronyms and Terms

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

Details of All Items
(In order by Reference Key)

GEN – GENERAL CODE

GEN-20.1 W G-T.3. Application and Appendix D-Definitions: True Value

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

GEN-21.1 W Use-for-Fee Vehicle and Axle-Load Scales

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

Block 2 Items (B2) A 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 (Originally 9 Items) 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim Meeting (2020 Fall)				✔			
CWMA Annual Meeting (2021 Spring)				✔			
(****) NEWMA Interim (2020 Fall)							
NEWMA Annual (2021 Spring)				✔			
SMA (Industry)							✔
NCWM S&T Committee Interim				✔			

NIST OWM. The different proposals included in this block present several very significant changes to the Scales codes of HB 44 with respect to the application of HB 44 tolerances and clearly identifying differences between "d" and "e" so that code requirements are correctly applied as intended. For Class I and II scales where the values of "e" and "d" are different, this information is of utmost importance. In many cases involving Class I and II scales where "e" and "d" are different, it is common to find that "e" is equal to 10 "d." When these values differ by a factor of ten, it is significantly more important to apply HB 44 requirements to the correct value.

We recognize there are paragraphs and tables of information throughout the Scales Code where it is not clear which value, "scale division (d)" or "verification scale division (e)" is their application to be based when (d) and (e) are different values on a scale. While it might seem an easy solution to simply conclude that in all cases the application of HB 44 requirements is to be based on the verification scale division (e), we know of instances where some scale manufacturers have designed their Class I and Class II scales to comply with one or more existing HB 44 requirements based on the "d" value for scales in which "d" and "e" are different. Additionally, based on our research and understanding of the operational characteristics of Class I and Class II scales with different values of "e" and "d," it should not be taken for granted that when a HB 44 paragraph specifies "d," the intended increment is, in fact "d," and not "e."

We appreciate the submitter's efforts in proposing changes to try and make clear which value should the application of some paragraphs be based, but we also believe the magnitude of this effort to clean up the Handbook with respect to "e" and "d" should involve input from the weighing community as a whole and would require specific identification of changes needed. We believe changes are long overdue based on the frequency of questions OWM receives relating to this concern.

OWM noted that the Task Group (TG) produced a "final" report in November 2020 and submitted that report to the S&T Committee. After a review of that report, OWM recognized that there were some stark differences in opinions from the TG's report and other subject matter experts that OWM had polled earlier. Noting these sharply contrasting differences in the interpretation of how certain requirements were to be applied, OWM recommended that the TG's findings be further vetted among the weights and measures community. Following up on that recommendation, the Committee requested the TG's review it positions as documented in the initial report and also asked that additional stakeholders be solicited to contribute. OWM notes that there was additional input received and acknowledged in a second draft of the TG's report. OWM is now more confident that the positions expressed within the TG's report have been fully vetted and represent more of a consensus from the weights and measures community than the initial version did.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Comments were received on the entire block: Updates were received from John Barton (NIST OWM) on the progress of the Task Group. Work is currently being performed by the Task Group (TG) and changes will be presented at the NCWM Annual meeting. The SMA (Russ Vires representative) supports the future development of this item. Comments were heard from Ross Anderson (NY retired) that there are additional pieces of this item that have been removed from the block but are no less important. The NEWMA S&T Committee recommends that this item remain with Assigned status.

CWMA 2020 Interim Meeting. During the 2020 Interim Meeting the CWMA S&T Committee heard testimony from Mr. Doug Musick (Kansas and Chair of the Task Group assigned to this item) who provided an update on the TG's progress. The CWMA S&T Committee agreed to recommend this item be retained as an Assigned item.

CWMA 2021 Annual Meeting. Comments were received on the entire block: Updates were received from John Barton (NIST OWM) on the progress of the Task Group. Work is currently being performed by the Task Group (TG) and changes will be presented at the NCWM Annual meeting. The SMA (Russ Vires representative) supports the future development of this item. Comments were heard from Ross Anderson (NY retired) that there are additional pieces of this item that have been removed from the block but are no less important. The NEWMA S&T Committee recommends that this item remain with Assigned status.

SMA. 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 Scale Interval" for "e" and "Scale Division" for "d".

SCL – Scales

SCL-16.1 W Sections Throughout the Code to Include Provisions for Commercial Weigh-in-Motion Vehicle Scale Systems

Originally SCL-3

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

SCL-17.1 V S.1.8.5. Recorded Representations, Point of Sale Systems, Appendix D-Definitions: tare

Originally SCL-2

This item was designated as a "Voting" item by the Committee at the 2020 NCWM Interim Meeting. The NCWM was unable to hold an Annual Meeting in July 2020 due to restrictions of the COVID-19 pandemic. The NCWM was able to hold a virtual continuation of the 2020 Annual Meeting in January 2021 during which it conducted a vote on items designated as "Voting" on the Committee's 2020 Agenda. This item was NOT supported with a positive vote by those attending that January 2021 meeting.

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	SCL – 17.1 – S.1.8.5. Recorded Rep, POS Systems, App D (1 Items) 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim Meeting (2020 Fall)	✔						
CWMA Annual Meeting (2021 Spring)	✔						
(****) NEWMA Interim Meeting (2020 Fall)							
NEWMA Annual Meeting (2021 Spring)	✔						
SMA (Industry)						✔	
NCWM S&T Committee Interim	✔						

NIST-OWM. OWM views the adoption of this item an important step towards improving harmonization of the weight information provided to consumers witnessing items being weighed and priced in their presence on scales

interfaced with a cash register in a POS system with that provided during transactions involving standalone retail-computing scales. OWM appreciates the effort extended by members of the POS Tare Task Group to work through their differences to be able to eventually agree on a proposal that the Committee could advance for vote.

- As previously noted in OWM comments and recommendations, this item should be considered of utmost importance to any consumer wanting to someday be able to determine if tare was taken on products weighed in their presence from a scale interfaced with a cash register in a POS system. It makes possible for customers and scale operators to be able to determine not only if tare was taken on products weighed at the front checkout, but also how much tare was taken when those products were weighed. While we acknowledge adoption of this item will improve harmonization, slight differences in the information provided by these scales and systems will still remain. For example, standalone retail-computing scales are required to provide indication to both the scale's operator and customer that a tare has been taken when those scales are being used in a direct sale application. A ticket printer is not required because the customer is able to witness the entire weighing transaction, although most retail computing scales in use today are equipped with a ticket printer. Scales interfaced with a cash register in POS system are not required to provide any indication that a tare has been taken at the time an item is weighed, but with the adoption of this proposal, new replacement equipment installed in the future will be required to record on the sales receipt the amount of tare taken for each item weighed as well as other transaction information already required by Scales Code paragraph S.l.8.5 Recorded Representations, Point of Sale Systems.

- Currently, the only way a customer can tell if a tare has been taken for items weighed at the checkout is to remember the gross weight value indicated for each item as it is weighed and then compare those gross weight values to the net weight values printed on the receipt for those same items. This is a feat we, ourselves as shoppers, have not been able to master, particularly when purchasing multiple items that are sold by weight. Few customers would know to do this because most customers have little or no knowledge of such operational intricacies of these systems to know they function as described.

- We can say with utmost confidence that weighing transactions occur so rapidly on many of today's POS systems, the information being displayed is not displayed long enough for it to be meaningful to the customer. We know this to be true based on our own experiences as customers purchasing products weighed and priced at today's retail outlets. Thus, paragraph G-S.5.1. is not being met today based on the 1973 S&T Committee's interpretation of it.

- The POS Tare Task Group considered whether the additional tare weight information might be made available from a display rather than requiring it to be recorded on the printed receipt. Members of the TG concluded the information needs to be printed on the receipt for the same reasons we've outlined above to show paragraph G-S.5.1. is not being met today. The TG agreed weighing transactions are completed so quickly on today's systems that a customer doesn't have sufficient time to understand the display information being provided, thus that information cannot be easily read (and understood). As a result, the TG concluded it should **not** be an option for this information to only be displayed; the information needs to be printed on the receipt.

- Several grocery industry associations, including FMI have opposed this item (in written comments to the Committee and voiced during Committee open hearings) since its introduction in 2017. The predominant reasons offered by those in the grocery industry for opposing this item has been the cost of implementation and that customers aren't interested in viewing the tare weight information. OWM is not aware of any detailed cost estimates provided by the grocery industry to the TG, which, in OWM's view, has been a missing component of this commentary. OWM believes that if there are other reasons for not implementing this proposal they should be provided to the Committee so those reasons could be given consideration. The current proposal addresses the cost concern by relaxing the time stores would have to comply; this being a concession offered in an attempt to gain industry acceptance.

Note: Should detailed cost estimates be provided to the Committee in the future, it would be important for those estimates to show the additional costs associated only with having to comply with either version of the current proposal and not the entire cost of a new upgraded system.

- The SMA also has opposed this item; reporting previously that regulators already verify tare values in POS systems are accurate and that the proposal would provide little or no benefit to the consumer. While it might be true some jurisdictions verify tare values that are programmed into POS systems, these verifications may be far and few between and not all jurisdictions perform them. With respect to the SMA's comment that the proposal would provide little or no benefit to the consumer, paragraph G-S.5.1. was only ever intended to provide consumers the *opportunity* to be able to view the transaction information. It is important customers be provided this opportunity. Whether or not they choose to take advantage of it is a completely different matter.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Several comments were heard in favor and against this item. Comments in favor believe that this item adds clarity and education on tare values while comments opposed to this item believe it adds confusion and no benefit to consumers. The NEWMA S&T committee feels that this item is fully developed and pass or fail, is ready to be voted on.

CWMA 2020 Interim Meeting. The S&T committee heard comments in opposition from the SMA. Many regulatory officials made comments in support of the item. The committee recommends the item moving forward as a voting item with the proposed amendments by the NCWM S&T Committee.

CWMA 2021 Annual Meeting. Loren Minnich (KS) believes that this provides more equity so that information is provided on the receipt, all deli scales indicate tare having it placed on the ticket provides more equity. Russ Vires (SMA) continues to oppose this item. They feel that this provides little or no value to the consumer. John Barton, NIST OWM stated there is only one additional piece of information added to the information to be included on the receipt and feels that additional information does not create confusion but creates more transparency in the transaction. Doug Musick stated Russ Vires is correct that some states do check Price Look Up entry, but most are not checking that the right tare is taken when purchases are made. The CWMA S&T Committee recommends that this item moves forward as a voting item.

SMA. The SMA continues to oppose this item. Since regulators verify that the tare values in POS systems are accurate, the SMA feels that the proposal would provide little or no benefit to the consumer. In addition, other device technologies could be unintentionally impacted by this item.

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.*

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	**SCL -20.9 – S.1.1.3 Zero Indication, Load Rec Ele Sep from Weigh Ele, App D (1 Items) 2021 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM		✔					
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim (2020 Fall)		✔					
CWMA Annual Meeting (2021 Spring)		✔					
(****) NEWMA Interim (2020 Fall)							
NEWMA Annual (2021 Spring)		✔					
SMA (Industry)						✔	
NCWM S&T Committee Interim		✔					

NIST OWM. OWM believes this proposal to be the second of two that have been submitted by the State of Kansas to address, what we believe are the same concerns pertaining to hopper scale systems. The other item (ABW-16.1) proposes changes to the ABWS Code of NIST Handbook 44 -. That S&T item has been withdrawn. If our interpretation is correct, we believe Kansas will place all their future efforts to advance SCL-20.9 forward for consideration.

OWM recognizes that there are some weighing systems that operate autonomously following an initial action by the operator to start the process. It is our understanding this proposal is intended to address hopper scale systems designed to be operated in an automatic mode to weigh and discharge successive drafts of product in bulk to either:

a. achieve some targeted amount entered into the system by its operator; or

b. provide a summed total of some unknown amount of product needing to be weighed in multiple drafts due to the limited capacity of the hopper.

Although similar in operation to an automatic bulk weighing system, we believe some of the hopper scale systems this proposal is intended to address are designed to weigh more than a single product; that is, a combination of different products comprised of the individual ingredients that form a recipe. Some of these products may be weighed on a separate scale or measured by a meter upstream of and prior to being conveyed into the hopper scale to ensure proper proportion to the overall recipe. Generally, however, it is the hopper scale that determines the final weight of the mixture in each draft that makes up a particular targeted amount or load. There exists varying designs of these systems and the arrangement of the different weighing and/or measuring devices used to weigh/measure the different individual ingredients included in the installation also varies with the design of the system.

This proposal seems to address one particular type of hopper scale system with automatic operation. That is, one which records the no-load starting or no-load ending reference (depending on its use as a weigh-in or weigh-out system) and determines from subtraction the net weight of each draft and then provides a summed total. Not all hopper scale systems equipped with automatic operation, however, are designed to function in this manner. Most systems that include hopper-type scales are required to return to a zero-balance after each successive draft. Other hopper scale systems with automatic operation are designed with an interlock, which prevents a subsequent draft from being initiated until all of the product in the previous draft has been discharged and the scale returned to a zero-load balance condition. With these systems, there is no subtraction of the starting or ending reference from the weight of the draft load in the hopper because for each draft, the scale starts the weighing process with the scale displaying zero and no product in the hopper. A very important consideration during field inspection of these systems is to verify proper operation of the interlock system during automatic operation. Additionally, for these systems, the owner/operator is required to maintain the hopper scale system on zero at all times in accordance with Scales Code paragraph UR.4.1. Balance Condition. This, however, would not be necessary with respect to a hopper scale system that determines the

amount of each draft load by recording the starting no-load or ending no-load reference and subtracts to determine the net weight of each draft.

We believe the operational differences in the two designs we've described to be significant enough to warrant a proposal that clearly distinguishes between the two and includes proposed changes and added paragraphs to address each separately. We encourage the submitter to continue developing this item to adequately address either design.

A point we wish to make clear is that we believe it is unnecessary and inappropriate to require a no-load starting and/or no-load ending reference be recorded by a hopper scale system simply because it is an automated system. OWM also believes it is not necessary to use no-load references when the system is designed with a functioning interlock that prevents the next subsequent draft load from being initiated until all product comprised of a previous draft load has been discharged from the hopper and the scale has returned to zero.

For the sake of consistency in testing, we think part of the discussion in the development of this item going forward should be whether or not each individual scale and meter comprised of a system would need to be tested by officials. We note that some recipes may produce a final product offered for sale as certified through some form of guaranteed analysis. In this case, some jurisdictions may conclude all of the individual scales and meters may not need to be certified. If it is agreed that the individual scales and meters installed in a system need to be tested along with the hopper scale, new test procedures will likely need development to address the testing of the individual scales installed in those systems.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. A comment was heard from John Barton (NIST OWM) outlining the NIST analysis. He believes this item needs more work and is willing to assist the submitter in the development. Russ Vires (SMA) is in opposition of this item and believes it may be an application issue and not a specification issue. The NEWMA S&T Committee recommends that this item remain with Developing status.

CWMA 2020 Interim Meeting. The S&T committee heard from the developer of this item, who requested this item remain developing to allow more time for input from all parties. The CWMA agreed and recommended this item remain as a Developing item.

CWMA 2021 Annual Meeting. Loren Minnich (KS) continues to work with NIST on this item and noted that limited work has been completed since January. Work will continue prior to the annual. Any questions or suggestions can be forwarded to Mr. Minnich. Russ Vires (SMA) opposes this item as it may be an application issue and not a specification issue. Some members of SMA willing to participate in further development of this item. John Barton (NIST OWM) believes this item needs additional work and stated that OWM will be willing to work with Mr. Minnich. The CWMA S&T Committee recommends that this item remain a developing item.

SMA. 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.

SCL-20.12 V Sections Throughout the Code to Include Provisions for Commercial Single Draft Weigh-in-Motion Vehicle Scales.

Note: 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	**SCL -20.12 – Sections Throughout the Code to Include Provisions for Commercial Single Draft Weigh-in-Motion Vehicle Scales (1 Items) 2021 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM							
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim (2020 Fall)		✔					
CWMA Annual Meeting (2021 Spring)	✔						
(****) NEWMA Interim (2020 Fall)							
NEWMA Annual (2021 Spring)	✔						
SMA (Industry)							✔
NCWM S&T Committee Interim	✔						

NIST OWM. OWM has noted the submitter (Mettler Toledo) has provided the Committee with a written request to implement an updated and amended proposal based on comments it received following the 2020 NCWM Interim Meeting and demonstration of their equipment on March 10, 2020. That demonstration was witnessed by representatives of several state Weights and Measures agencies, NCWM/NTEP, and NIST OWM. Many of OWM's comments offered during the 2020 NCWM Interim Meeting have been addressed by the submitter in the revised version of this proposal.

OWM also notes this proposal is similar to the S&T Item SCL-16.1 in that it addresses the use of weigh-in-motion operation of vehicle type scales. One significant difference in these two proposals is that SCL-16.1 incorporates a scale system that would generate a gross weight for a vehicle using multiple drafts (of axles or axle groups) and under SCL-20.12, the weight of the vehicle is determined in a single draft while the entire vehicle is positioned on the load-receiving element.

OWM believes that while SCL-16.1 and SCL-20.12 incorporate somewhat different technologies to obtain WIM weight values that would comply with the current HB 44 Scales Code Class III L tolerances, both proposals may have value in establishing a pathway of the eventual adoption of WIM systems as commercial devices.

While this proposal does include some detail regarding recommended test procedures, OWM has noted that there is no detailed information included regarding the required accuracy for the weight values assigned to any reference vehicles (or test loads) that are referred to in the proposed new requirement N.7.2.1. "Reference Vehicles." Likewise, there is no mention in the proposal for any required accuracy statement for a scale used to establish the weight value of these reference vehicles. The required minimum level of accuracy for dynamic test loads will be a critical parameter to be stated when an official examination of the WIM scale is performed. OWM would anticipate this required level of accuracy be in compliance with the criteria found in HB 44 Appendix A – Fundamental Considerations, Section 3.2. "Tolerance for Standards." The submitter of this proposal has acknowledged that certifying a reference scale to the criteria expressed in HB 44 Appendix A, Section 3.2 will be a challenge in some cases. Also, OWM recognizes that the submitter has already made contact with the NIST OWM, Laboratory Metrology program to assist in the development of appropriate test procedures for reference scales.

OWM acknowledges the submitter's efforts to draft changes to the HB 44 Scales Code that will have it apply to WIM vehicle scales. Noting the extensive amount of changes being proposed, we question however, whether these changes are being made to the appropriate HB 44 code. We note that the tentative "Weigh-In-Motion Systems Used for Vehicle Enforcement Screening" Code might also serve as an appropriate location for requirements pertaining to WIM vehicle scales used in commercial transactions. Alternatively, it may be appropriate to create a new HB 44 Code to encompass all types of in-motion weighing devices used in commercial service.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. A summary of the history and development of this item was provided by Russ Vires (MT). MT has made great efforts in showcasing their capabilities to meet tolerances. Comments were heard by John Barton (NIST) and Jim Willis (NY) in support of this item, but that there are strong feelings that there are test procedures that must be developed for the reference scales that are used to test these systems. Eric Golden (Cardinal Scale) and Russ Vires (SMA) expressed their support of this item as ready for a vote. The NEWMA S&T Committee recommends that this item move forward with Voting status.

CWMA 2020 Interim Meeting. During the 2020 CWMA Interim Meeting, Mr. Russell Vires (Mettler-Toledo, LLC) gave a presentation to the CWMA S&T committee on this item. The presenter answered a number of questions from the committee and from both regulatory officials and industry representatives on this item. A concern that was highlighted questioned if placing the reference scale into high resolution, the reference scale may not comply with the N max requirement. Another concern of regulatory officials was the need to test the reference scale to used capacity with known field standards. This could require an additional burden to both the regulatory officials and the device owners. Mr. Vires commented that this item was still being developed with the goal of presenting a final version at the NCWM meeting in January. Not having seen a final version of the item, the committee recommends this item remain a developing item.

CWMA 2021 Annual Meeting. Russ Vires (Mettler-Toledo) Mettler Toledo has demonstrated the ability to accurately utilize weigh-in-motion technology. They have met with NIST, NTEP, and several regulators as well held several webinars on this item. They believe this proposal is complete and the item is ready to be voted on. They are willing to work with NIST OWM on test procedures when the item is adopted and ask for support to pass this in July 2021. Doug Musick (KS) noted that Mettler should be held as a gold standard for companies that introduce new technology. Doug suggests some changes but states he will agree with the item as is going forward at the annual meeting. He provided some suggested changes from his review of the item and will forward to the S&T committee. John Barton (NIST OWM) stated these scales are dynamic it is more and more difficult to test the device using a reference standard to test the device in place of a known artifact. Creating a reference test standard that meets the principles of HB 44 Appendix A, Fundamental Considerations is a challenge that is not addressed in this proposal. OWM suggests that stakeholders get together to develop test procedures. Eric Golden (Cardinal Scale) Cardinal supports this item going forward as a voting item in July. They support some changes to publication 14 on the testing side. They believe that the weigh-in-motion scale being tested should also be used as the static reference scale for the test. Russ Vires, (SMA) the SMA recommends the adoption of this item. Russ Vires, (Mettler Toledo) stated the WIM scale must be a good static scale first. Charlie Stutesman (KS) asked if a different type of scale can be approved for this application like a CAT scale (multiple-platform vehicle scale). Russ Vires stated that the entire truck must be on the load receiving element for this proposal. Mr. Stutesman likes the proposal. Russ Vires stated these devices will be NTEP evaluated and Mettler Toledo technology requires that entire truck must be on the load receiving element. Eric Golden stated the code is already available for multi-platform scales. The CWMA S&T Committee recommends that this item moves forward as a voting item.

SMA. SMA recommends the adoption of this item. The SMA recognizes the importance and benefit of this item to the public. Stakeholder collaboration resulted in a refined proposal that has been well-received by regulators and industry members.

SCL-21.1 W S.1.1. Zero Indication

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

ABW – Automatic Bulk Weighing Systems

ABW-16.1 W A. Application, S Specifications, N. Notes, UR. User Requirements and Appendix D – Definitions: automatic bulk weighing system.

Originally ABW-3

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

Block 4 items (B4) D Electronically captured tickets or receipts

B4: D GEN-21.2 G-S.5.6. Recorded Representations.

B4: D LMD-21.2 S.1.6.5. Money Value Computations., UR.3. Use of a Device.

B4: D VTM-21.1 S.1.1. Primary Elements., UR.2. User Requirements

B4: D LPG-21.1 S.1.1. Primary Elements., UR.2. User Requirements

B4: D CLM-21.1 S.1.4.1. Printed Ticket Recorded Representation., UR.2.6.3. Printed 29 Ticket Recorded Representation.

B4: D MLK—XX-X D S.1.4.2 ~~Printed Ticket~~ Recorded Representation., UR.2.2. Printed Ticket, Recorded Representation.

B4: D MFM-21.2 S.6. Printer Recorded Representations., UR.2.6. Ticket Printer, Customer Ticket, 8 Recorded Representation., UR.3.4. Printed Ticket. Recorded Representation.

B4: D CDL-21.1 S.1.4.1. Printed Ticket Recorded Representations., UR.2.4.2. Tickets or Invoices. 2 Recorded Representation.

B4: D HGM-21.1 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: D OTH-21.2 Appendix D - Definitions.: recorded representations, recording element.

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 in yellow.

Organization (*) not submitted (**) no meeting (***) no recommendation	Block 4 items – Electronically captured tickets or receipts (9 Items) 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
WWMA Annual Meeting (2020)		✔					
SWMA Annual Meeting (2020)		✔					
CWMA Interim (2020 Fall)	✔						
CWMA Annual (2021 Spring)		✔					
NEWMA Interim (2020 Fall)	✔						
NEWMA Annual (2021 Spring)		✔					
SMA (Industry)							
NCWM S&T Committee Interim		✔					

NIST OWM. 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”

WWMA 2020 Annual Meeting. No comments were received during open hearings. However, the submitter did provide additional changes and continues to develop the item. The Committee recommends this block be assigned a developing status.

SWMA 2020 Annual Meeting. During the Open Hearings the Committee heard from Diane Lee (OWM) who stated that the purpose of this item is to allow an option for an electronic ticket by revising the language of the Recording Requirements in Handbook 44. She also stated that NIST OWM supports this block. The Committee also heard from Hal Prince (Florida) that electronic tickets are already allowed, and that this revision would allow electronic only tickets. The Committee also heard from Tina Butcher (OWM) who stated that she had the same concerns as Hal but was assured the intent was only to allow an electronic option for customers. The Committee also heard from Ken Ramsburg (Maryland) who stated that he agreed with Hal Prince, and that the General Code already covered this. The Committee also heard from Tory Brewer (West Virginia) who stated that he was concerned that this item would make it difficult for customers to receive a printed ticket if it was not set as a default, and how the customer would choose

a printed ticket instead of an electronic one. Tina Butcher also stated that Specific Code superseded the General Code, so that is why a change is likely needed to allow electronic tickets. After considering this item the Committee recommends that it be given Developing Status

NEWMA 2020 Interim Meeting. The Committee agrees with the body that the revised edition of this proposal has been fully developed by the submitter and recommends it move forward as a Voting Item. Discussion was heard both for and against the proposal. Comments against the proposal included that there was no significant change or that the location in the handbook was not appropriate or may conflict with current State laws regarding electronic records. Comments in favor of the proposal were that it allowed clarity through definitions and where "printed" hard copies are currently required, allows for an electronic option without adding conflict.

NEWMA 2021 Annual Meeting. Diane Lee (NIST OWM) commented on the desire by many to add the ability for electronic recorded representations and that she expects continued development from the submitter. Russ Vires (SMA) supports this item and recognizes the importance for options to the consumer. Comments were given in support by Jim Willis (NY) and John McGuire (NJ). The NEWMA S&T Committee recommends that this item remain with Developing status.

CWMA 2020 Interim Meeting. Charlie Stutesman (KS) the developer of the item gave a presentation to the S&T committee updating the current changes on the item. The committee received comments from both regulatory officials and industry representatives expressing a need for this item. The committee feels this item is fully developed and we recommend this item move forward as a voting item.

CWMA 2021 Annual Meeting. Comments taken on the whole block. Charlie Stutesman (KS), the developer of this item gave a brief update and requested that this item remains developing. Diane Lee (NIST OWM) supports continuing development of this item. Russ Vires (SMA) supports continuing development of this item. Loren Minnich (KS) submitted suggested changes to developer. Included in Appendix at the end of this report. He thought G-S.5.6. is getting too wordy and should be simplified to allow specific codes to speak for themselves. The CWMA S&T Committee recommends that this item remain a developing item.

Written Comments received from Loren Minnich (KS) regarding BLOCK 4 Item:
I think G-S.5.6. can be greatly simplified. Since each specific code overrides the general code, I don't see the value in including anything related to providing electronic receipts in the general code.

G-S.5.6. Recorded Representations. – Insofar as they are appropriate, the requirements for indicating and recording elements shall also apply to recorded representations. All recorded values shall be ~~printed~~ recorded digitally.
(Amended 1975, 2014 and 20XX)

Block 1 items (B1) A Terminology for Testing Standards (verification standards, Field Standards, transfer standards, Field Reference standards, etc.,) Tolerances on Tests when transfer standards are used, minimum quantity for field reference standard meter tests

NOTE: During the 2019 NCWM S&T Committee Meeting, the S&T Committee considered the comments during the opening hearing and recommended that the 2019 B1, B2, LPG-3 and MFM-5 agenda items be combined with GEN-3 and gave these items an assign status. This block of items ("New" BLOCK 1) now includes previously numbered items: GEN-3; Block 1; Block 2; LPG-3; and MFM-5. The Item Under Consideration for all individual items has been included in the listing that follows.

B1: GEN-19.1 A G-T.5. Tolerances on Tests When Transfer Standards are Used., Appendix D – Definitions: standards, field., ~~transfer standard.~~ and standard, transfer.

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	Gen 19.1 – General Code Initial Status – A (1 Items) 2020 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM				✔			
(****) WWMA Annual Meeting (2020)				✔			
(****) SWMA Annual Meeting (2020)							
CWMA Interim (2020 Fall)				✔			
CWMA Annual Meeting (2021 Spring)				✔			
(****) NEWMA Interim (2020 Fall)				✔			
NEWMA Annual (2021 Spring)				✔			
SMA (Industry)							
NCWM S&T Committee Interim				✔			

NIST OWM. NIST OWM continues to provide updates and comments to Block 1 items to keep the weights and measures community current on the activities occurring to move Block 1 items forward. The following list summarizes those activities:

- 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:
  1. 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.
  2. Find and examine different terminology used in HB 44 for standards used in testing commercial devices and select an appropriate term for these standards.
  3. Make appropriate changes in NIST HB 44, HB130 and other documents as appropriate.
  4. Collect data using NIST Purchased Coriolis meters to demonstrate that master meters are a viable option for use in testing devices
  5. 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.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Comments were received on the entire block: Diane Lee (NIST OWM) commented that there is currently discussion for definitions of field standards and work for testing of master meters. Russ Vires (SMA) supports the development as it applies to items GEN-19.1, SCL-18.1, ABW-18.1, and AWS-18.1 and looks forward to further development. Tina Butcher (NIST OWM) gave an overview of the master meter project and the different types of testing to be performed. Bob Murnane (Seraphin) commented that the Field Standard Task Group is currently without a chairman and at a standstill on definitions until a new chairman is found. Ross Anderson (NY retired) expressed concerns with testing versus calibrating and the associated uncertainties. He is concerned that calibrating will require additional uncertainty components that must be developed using control charts and proficiency tests. The cost and time of this to an inspector is not practical. Diane Lee (NIST OWM) is concerned that tolerances may be too small to encompass uncertainties in the field. The NEWMA S&T Committee recommends that this item remain with Assigned status.

CWMA 2020 Interim Meeting. During the 2020 Interim Meeting, G. Diane Lee (NIST OWM), a member of the Field Standards Task Group gave an update of the progress of this item to the S&T committee. We look forward to the work of the task group.

CWMA 2021 Annual Meeting. Comments taken on the whole block. Diane Lee (NIST OWM) reported that testing with NIST master meters is underway. CNG meters are being tested in Colorado. The LPG master meter is to set to begin being used shortly. There are two separate task groups working on this project. The NCWM Field Standards Task Group is looking for a new chairman. Russ Vires (SMA) stated that the SMA supports continued efforts on this proposal. Doug Musick (KS) support the items moving forward but more information is needed concerning their use.

Bob Murnane (Seraphin Test Measures) stated that not much more can be done without data to show that meters can be used as a standard. Seraphin stated that there is a paper discussing direction for the task group. Tina Butcher (NIST OWM) stated that testing for the different types of the master meters would occur simultaneously to speed up the data collection and analysis of the data. Charlie Stutesman (KS) asked if there was a date for conclusion of the task group activities and expressed the need to stay on top of this item. He suggested that there may be a need to set a sunset date for the activities of the task group. Loren Minnich (KS) reported that NCWM set an original goal of July 2021 to complete the mission but it is not a deadline. Tina Butcher reported on what the master meters group is trying to achieve. Tina reminded the group that the Fundamental Considerations allows States to use master meters. OWM is assisting states with determining that these "master meters" would be viable for use as a field standard Adding something to the Fundamental Considerations to clarify that states can use them may be helpful. NIST is currently focusing on the Coriolis meter but what will come out of the study will be protocols that States can apply to other meter technologies. The CWMA S&T Committee recommends that this item remain an assigned item.

BLOCK 1 ITEMS (B1) A TERMINOLOGY FOR TESTING STANDARDS

(original B1 items)

B1: SCL-18.1 A N.2. Verification (Testing) Standards

B1: ABW-18.1 A N.2. Verification (Testing) Standards

B1: AWS-18.1 A N.1.3. Verification (Testing) Standards, N.3.1. Official Tests, UR.4. Testing Standards

B1: CLM-18.1 A N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards

B1: CDL-18.1 A N.3.2. Transfer Standard Test, T.3. On Tests Using Transfer Standards

B1: HGM-18.1 A N.4.1. Master Meter (Transfer) Standard Test, T.4. Tolerance Application on Test Using Transfer Standard Test Method

B1: GMM-18.1 A 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 A N.2. Testing Standards

B1: OTH-18.1 A Appendix A: Fundamental Considerations, 3.2. Tolerances for Standards, 3.3. Accuracy of Standards

B1: OTH-18.2 A Appendix D – Definitions: fifth-wheel, official grain samples~~, transfer standard~~ and Standard, Field

NIST, OWM: See comments under Block 1

Block 1 items (B1) A define “field REFERENCE standard”

(original block 2 items)

B1: CLM-18.2 A N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards

B1: CDL-18.2 A N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards

B1: HGM-18.2 A N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method

B1: OTH-18.3 A Appendix D – Definitions: field reference standard meter ~~and transfer standard~~

NIST, OWM: See comments above

B1: LPG-15.1 A N.3. Test Drafts.

Originally LPG-3 N.3 Test Drafts

NIST, OWM: See comments above

B1: MFM-15.1 A N.3. Test Drafts.

Originally MFM-5 N.3 Test Drafts

NIST, OWM: See comments above

Block 5 items (B5) Category 3 Methods of Sealing

B5: LMD-20.1 W Table S.2.2. Categories of Device and Methods of Sealing.

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

B5: LMD-21.1 D Table S.2.2. Categories of Device and Methods of Sealing.

Organization (*) not submitted (**) no meeting (***) no recommendation	Block 5 items (B5) – Category 3 Method of Sealing (1 Items) 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM		✔					
WWMA Annual Meeting (2020)		✔					
SWMA Annual Meeting (2020)	✔						
CWMA Interim Meeting (2020 Fall)		✔					
CWMA Annual (2021 Spring)		✔					
NEWMA Interim (2020 Fall)	✔						
NEWMA Annual (2021 Spring)		✔					
SMA (Industry)							
NCWM S&T Committee Interim		✔					

NIST OWM: 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.

WWMA 2020 Annual Meeting. LMD-21-1 CATEGORIES OF DEVICE AND METHODS OF SEALING - Brent Price (Gilbarco) commented this is a little different than other proposals. Gas pumps have limited printing capabilities on receipts so they would like the option for electronic printing. Suggests combining into one proposal with Wayne Pump. Steven Harrington (Oregon) commented he was concerned about how this will affect device testing efficiency by adding additional testing steps in the field. He is also concerned about time and structure of how this information is received in the field. Committee recommends this to be assigned developing status. The Committee recommends that the submitter work with other stakeholders and vets this through the other regions for further development.

SWMA 2020 Annual Meeting. During Open Hearings the Committee heard from Brent Price (Gilbarco), the submitter, who stated that he wants to have the option of an Electronic Event Log, and for the item to be considered as fully developed. The Committee also heard from Tina Butcher (OWM) who stated she would like to have consistent

language in the Handbook for LMD, EVSE, and Taximeters. The committee notes that it prefers the language in this item rather than a similar item submitted by Wayne last year. After considering this item the Committee recommends the item as a Voting Item.

NEWMA 2020 Interim Meeting. B5 – LMD-21.1 The Committee agrees with the bodies recommendation that this item move forward with a Voting designation. During open hearings, the Committee heard from the submitter that the intent was not to have multiple proposals, but that there was support from the submitter of the developing, grouped item that this item move forward. There was no discussion heard against this proposal. There is another item proposed EVF 21.4 that has a similar purpose and should have matching language.

NEWMA 2021 Annual Meeting. A comment was heard from Diane Lee (NIST OWM) that Gilbarco is working with Wayne on the continued development of this item and that NIST supports its development. The NEWMA S&T Committee recommends that this item remain with Developing status.

CWMA 2020 Interim Meeting. G. Diane Lee (NIST OWM) advised the S&T committee that the developers of both of these items are working together to present one item in the future. We recommend this item remain developing and look forward to collaborative results to come.

CWMA 2021 Annual Meeting. Comments taken on the whole block. Diane Lee (NIST OWM) provided background and technical information on this item. OWM believes this should move forward as a developing item. The CWMA S&T Committee recommends that this item remain a developing item.

VTM – Vehicle Tank Meters

VTM-18.1 D S.3.1.1. Means for Clearing the Discharge Hose and UR.2.6. Clearing the Discharge Hose.

Note 1: This item was returned to committee at the 2019 Annual Meeting.

NOTE 2: 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

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	**(Previously VTM - 1 – Means for Clearing the Discharge Hose and UR.2.6 Clearing the Discharge Hose) VTM-18.1 same title (1 Items) 2021 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM		✔					
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim Meeting (2020 Fall)		✔					
CWMA Annual Meeting (2021 Spring)		✔					
(****) NEWMA Interim Meeting (2020 Fall)							
NEWMA Annual Meeting (2021 Spring)		✔					
NCWM S&T Committee Interim		✔					

NIST OWM.

- Some oppose modifications that will restrict the use of manifold flush systems with only certain products. Some in 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.

  - While OWM recommends additional work prior to including product limitations, OWM offers the following points to consider should the Committee decide to move forward with a limitation as proposed in 20.1.

    - OWM concurs with the comments from the SWMA suggesting the use of the term "engine" rather than "vehicle." However, OWM finds the use of the term "non-engine fuels" to be cumbersome. Consequently, OWM recommends use of the phrase "used to dispense product(s) other than engine fuels" instead.

    - Just as the development of S.3.1.1. was prompted by concerns over safety, some have questioned the safety and potential for fraud with using a single metering system to measure and delivery products of a significantly different nature.

    - While the concept of changes to the specification paragraphs (along with modifications to the terminology) seem appropriate, OWM believes that a change to the "user requirements" corresponding to this specification are even more important. Thus, OWM recommends the submitter consider the addition of the statement "Such flushing systems are not to be installed on delivery vehicles with metering systems used to dispense engine fuels." Following the first sentence in the proposed UR.2.6.1. OWM also suggests the elimination of the term "operational" since this speaks more to design criteria than a user requirement. OWM also has additional editorial suggestions for this paragraph.

- ***Proposed Revisions to Item Under Consideration:***

- As noted earlier, OWM believes more work is needed to address the concerns raised regarding the use of manifold flush systems and the items presented by each submitter. OWM believes a Developing status is appropriate for the combined item and appreciates the Committee's willingness to allow this work to continue.

- Given the collective recommendations in the original Items 18.1 and 20.1 and given OWM's specific suggestions for changes to the items, OWM offers the following suggestion to replace the Items Under Consideration in both those items. Given comments at the January 2020 NCWM Interim Meeting, OWM is aware that not all submitters may support these recommendations and looks forward to continued work with the submitters to refine the proposal.

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

(a) liquid can flow from only one such outlet at one time; and

(b) the direction of flow for which the mechanism may be set at any time is definitely and conspicuously indicated.

This paragraph does not apply to the following:

(1) Equipment used exclusively for fueling aircraft.

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

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

(a) the discharge hose remains of the wet-hose type;

(b) the valve and associated piping are approved by the weights and measures authority having jurisdiction over the device prior to commercial use;

(c) the valve is permanently marked with its purpose (e.g. flush valve);

(d) the valve is installed in a conspicuous manner and as far from the hose reel as practical;

(e) the system clearly and automatically indicates the direction of product flow during operation of the flush system; and

(f) clear means, such as an indicator light or audible alarm, is used to identify when the valve is in *use* ***on both quantity indications and any associated recorded representations (e.g., using such terms as "flushing mode" or "not for commercial use")****;*
[nonretroactive as of January 1, 2024.]

(g) ***effective, automatic means shall be provided to prevent passage of liquid through any such flush system during normal operation of the measuring system; and***
[nonretroactive as of January 1, 2024.]

(h) no hoses or piping are connected to the inlet when it is not in use.

(Added 2018)**(Amended 20XX)**

UR.2.6. Clearing the Discharge Hose.

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

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

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

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

(Added 20XX)

UR.2.6.2. 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)

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Jim Willis (NY, submitter) commented that he is working with NIST and Murray Control Systems and expects to finalize the development of this item. Tina Butcher (NIST OWM) echoed Jim's comments and supported the efforts made to find language that is more widely supported. The NEWMA S&T Committee recommends that this item remain with Developing status.

CWMA 2020 Interim Meeting.
Tina Butcher (NIST OWM) requested that the committee recommend this item remain a developing item. CWMA recommended a Developing status for this item.

CWMA 2021 Annual Meeting. No comments heard on this item. The CWMA S&T Committee recommends this item remain developing.

VTM-20.1 W S.3.1. Diversion of Measured Liquid.

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

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

NOTE: The item under consideration has been revised based on changes that were made by the Committee at the 2021 Interim Meeting.

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	**VTM-20.2 – Table T.2. Tolerances for Vehicle Mounted Milk Meters. 1 Item 2021 S&T Recommendations**						
	V	**D**	**W**	**A**	**I**	**Opposed**	**Support**
OWM							
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim Meeting (2020 Fall)				✔			
CWMA Annual (2021 Spring)	✔						
(****) NEWMA Interim Meeting (2020 Fall)							
NEWMA Annual Meeting (2021 Spring)	✔						
SMA (Industry)							
NCWM S&T Committee Interim	✔						

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

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.

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

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

Table 2.
Tolerances for Vehicle-Mounted Milk Meters

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

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:

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%

- 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.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Multiple comments were received in support of this item with a Voting status. Diane Lee (NIST OWM) is a member of the milk meter task group and the task group recommends tolerances used in OIML. Jim Willis (NY), also member of the task group, asks to expand the scope of the task group to assess all three codes in the handbook where milk meters are found. The NEWMA S&T Committee recommends that this item move forward with Voting status.

CWMA 2020 Interim Meeting. Charlie Stutesman (KS & Chair of Milk Meter Tolerance Task Group) updated the committee that the task group was hard at work on this item.

CWMA 2021 Annual Meeting. Chair of the S&T Committee reported that this item appeared in CWMA Pub 16 as an assigned item incorrectly and should have been presented as a voting item. NCWM has verified that this is the case. Charlie Stutesman (KS), Chair of the Milk Meter Tolerance Task Group reported that the task group is moving forward with a proposal to align NIST Handbook 44 tolerances with OIML tolerances. The task group has made a formal request to the Chairman of the NCWM S&T Committee to expand the scope of the task group and is awaiting final decision on that request. Charlie reported that the current HB44 tolerances may be beyond the manufacturer's ability and may be in conflict with Fundamental Considerations. The CWMA S&T Committee recommends that this item moves forward as a voting item.

MFM – Mass Flow Meters

MFM-21.1 W UR.3.3. Ticket Printer: Customer Ticket

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

EVF – Electric Vehicle Fueling Systems

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

Organization (*) not submitted (**) no meeting (xxx) no recommendation (****) only new and voting items discussed	EVF-20.1 - S.1.3.2. EVSE Value of the Smallest Unit 1 Item 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM		✔					
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim Meeting (2020 Fall)		✔					
CWMA Annual Meeting (2021 Spring)		✔					
(****) NEWMA Interim (2020 Fall)							
NEWMA Annual (2021 Spring)		✔					
SMA (Industry)							
NCWM S&T Committee Interim		✔					

NIST OWM. NIST OWM went forward with the current value because during the 2014 EVFS USNWG deliberations on the draft code, industry representatives indicated that the value of d or unit of measurement could be inexpensively modified.

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 EVFE Subgroup asks for 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)?

NIST OWM recognizes the status remains developing but notes that California has moved forward to modify its permanent EVFS Code to require that the smallest unit indicated and recorded be in increments not greater than 0.0001 kWh.

Other NIST Handbook 44 measuring devices' codes specify the value of the unit permitted for the display and indication of a delivered or dispensed quantity. In all cases that value shall not be exceeded (i.e., prescribes a maximum numerical value where a lesser value is also permissible) and is suitable for each device-specific application.

After its July 2021 reevaluation of the proposed modifications to this EVSE provision in paragraph S.1.3.2, NIST OWM is renewing its support for the proposal that currently appears in EVF 20.1 Item Under Consideration. In that same spirit NIST OWM also has developed an additional recommendation, a proposed new paragraph S.1.3.X, which is consistent with the language in other code sections' corresponding requirements. The newly proposed paragraph is a better option for addressing its 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. NIST OWM recommends the community reconsider the original proposed modifications of paragraph S.1.3.2 which do not limit the electrical energy unit to being expressed only as a single fixed numerical value but permit 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. Proposed new paragraph S.1.3.X. Expressed Value of EVSE Electrical Energy Unit will clarify the value of the quantity unit shall only be expressed as either decimal multiples or submultiples of the numbers 1, 2, or 5 as shown below.

S.1.3.X. Expressed Value of EVSE Electrical Energy Unit. – The electrical energy unit value shall be a decimal multiple or submultiple of 1, 2, or 5.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Jim Willis (NY) is not convinced that the resolution needs to be that fine and questions if it is necessary. Juana Williams (NIST OWM) responded that the MMQ may play a role and that there are other factors involved in testing and test time. Lou Sakin (MA) shared concerns about the financial impact to meter manufacturers meeting finer tolerances. Juana Williams (NIST OWM) elaborated on the full load and light load testing procedures. NIST believes this modification would help avoid any unintentional implication that increments in units such as 0.0003 or 0.0007 MJ or kWh (ie. Increment other than 1,2,5) would be appropriate. The NEWMA S&T Committee recommends that the item be remain developing.

CWMA 2020 Interim Meeting. The only comments heard on this item by the S&T committee were from Tina Butcher (NIST OWM) giving an update from the USNWG on EVFS for this item have yet to reach a consensus on the proposed or alternate language and asked the committee to recommend a developing status for this item. The committee concurs with her recommendation.

CWMA 2021 Annual Meeting. Juana Williams (NIST OWM) provided information on this item. OWM recommends that this item remain developing. She suggested the following change to the proposal:

S.1.3. EVSE Units.

S.1.3.2. EVSE Value of Smallest Unit. – The value of the smallest unit of indicated delivery by an EVSE, and recorded delivery if the EVSE is equipped to record, shall **not** be **~~greater than~~ 0.0005 MJ or 0.0001 kWh.**

(Amended 2020)

The USNWG has not reached a consensus on this item and recommends that it remain developing. CWMA recommends that this item remain developing.

EVF-20.2 V Definitions: submeter (Previously numbered OTH-20.1)

This item was renumbered as EVF-20.2 and is now a voting item as EVF-20.2)

This proposal first appeared on the Committee's 2020 agenda as OTH-20.1 and was designated as a Voting Item. During review of the item in preparation for the 2021 NCWM cycle, the Committee recognized this item was placed in the incorrect section of the Committee's 2020 agenda. The definition of "submeter" as referenced in the proposal has been part of the "Definitions" located in Section 3.40 Electric Vehicle Fueling Systems—Tentative Code in NIST Handbook 44 since the adoption of that code in 2015. Therefore, the Committee relocated and renumbered the proposal to its proper code designation to become agenda item EVF-20.2 and also maintain its status as a Voting Item.

Note: This item will update the definition applicable only to NIST HB 44 Section 3.40 Electric Vehicle Fueling Systems - Tentative Code.

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	EVF – 20.2 – Definitions: Submeter 1 Items 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM	✔						

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	EVF – 20.2 – Definitions: Submeter 1 Items 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim (2020 Fall)	✔						
CWMA Annual Meeting (2021 Spring)	✔						
(****) NEWMA Interim (2020 Fall)							
NEWMA Annual (2021 Spring)	✔						
SMA (Industry)							
NCWM S&T Committee Interim	✔						

NIST OWM. An EVSE is unlike other traditional vehicle refueling equipment so any terminology that further clarifies what constitutes a commercial EVSE and any accessories subject to weights and measures' jurisdiction is helpful to the equipment designer, installer, and regulator:

-to clearly determine where the responsibility for such equipment begins and ends; and

- it is essential to ensure installations are not interfaced with other equipment that might have a detrimental effect on the normal operation of an EVSE or it's metrological integrity.

There was no intent to limit the definition to electrical energy devices because we recognize other utility meters such as HC vapor meters and water meters are also designated as submeter installations.

NIST OWM also notes the term "master meter" is one of several terms being discussed within the S&T-assigned group to address "terminology" regarding standards used in inspecting and testing of commercial weighing and measuring equipment. OWM acknowledges the term as used in this rework of the current submeter definition has a specific meaning for the electric metering industry. At this point we agreed with the proposed modifications but would be willing to revisit the term if it becomes necessary to further refine the term or other alternative terminology is identified. At present NIST OWM agrees the proposed modification of the "submeter" definition in the proposal move forward for adoption by the NCWM in July 2021

USNWG'S EVFE SUBGROUP: At its January 7, 2020 meeting, the Subgroup voted and agreed to recommend to the NCWM S&T Committee that this item be designated as a Voting Item and the proposed changes shown in the Item Under Consideration be recommended for adoption at the July 2020 NCWM Annual Meeting.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Juana Williams (NIST OWM) provided an overview of the NIST analysis on this item and its intent to further refine the definition. The subgroup recommended that this item be put forth with a Voting designation. The NEWMA S&T Committee recommends that the item hold a Voting status.

CWMA 2020 Interim Meeting The only comments the S&T committee heard, from both NIST OWM and state regulatory officials, expressed a concern with the use of the word "master meter." Tina Butcher (NIST OWM) explained that the term "master meter" has a widely accepted definition in the electric vehicle and watt hour industry. We feel this item is fully developed and recommend this item move forward as a voting item.

CWMA 2021 Annual Meeting. Juana Williams (NIST OWM) Provided background and technical information on this item. OWM feels this item is fully developed and is ready to be voted on. The CWMA S&T Committee recommends that this item be moved to a voting item.

EVF-21.1 D A.1. General

Organization (*) not submitted (**) no meeting (***) no recommendation	EVF-21.1 – A.1. General 1 Item 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM			✔				
WWMA 2020 Annual Meeting		✔					
SWMA 2020 Annual Meeting		✔					
CWMA Interim (2020 Fall)		✔					
CWMA Annual (2021 Spring)			✔				
NEWMA Interim (2020 Fall)			✔				
NEWMA Annual (2021 Spring)			✔				
SMA (Industry)							
NCWM S&T Committee Interim		✔					

NIST OWM. 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).

WWMA 2020 Annual Meeting. Tesla, EV Connect, EV Go – Francesca Wahl – presentation: Sec 3.4 charging evolves and technology changes. They are trying to address the tentative code CA is now using. Charging involves many different speeds and levels. Trying to fit charging into what consumers are doing rather than making it a separate event (based on convenience). Metering technology is now becoming more commercial. Retro-fit costs are excessive. Add the 10-year phase-in that CA currently recognizes. Copy of the presentation that was provided is available on the WWMA website.

Kevin Schnepp (CA DMS) commented that the 10- year extension was political in CA and may not be necessary at the national level. He believes the indicator should not be solely tied to a mobile device. The extension of the accuracy may not be necessary for the national level. Note that some areas have sub-meters at residential units that fall under commercial device applications. CA-DMS would ask the committees look at the concessions that CA made as to whether or not this should be applied to HB 44.

Mahesh Albuquerque (CO) supports all of the proposals to move on to a voting item. He agrees with the comments made but wants to keep the process moving forward. Perhaps change the exception time to say "up to 10 years" allowing jurisdictions to make their own determination.

Juana Williams (NIST OWM) submitted written comment after open hearings and will be posted on the WWMA website.

The Committee agrees to recommend this item be assigned a developing status. The Committee also recommends the submitter continue to work with their stakeholders and jurisdictions to develop the item and consider language with regards to the 10-year period.

SWMA 2020 Annual Meeting. During the Open Hearing the Committee heard from Francesca Wahl who gave a presentation on the industry's support of these items, and willingness to develop them. The Committee also heard from Tina Butcher (OWM) who stated that the item needs terminology work, and that she had concerns about a 10-year blanket exemption for these devices. She also noted that some of these devices do not currently contain a meter. The Committee also heard from Ken Ramsburg (Maryland) who stated that he did not agree with a blanket exemption. After consideration of this item the Committee recommends that this item be given Developing Status, and assigned to the national work group.

NEWMA 2020 Interim Meeting. The Committee agrees with comments heard from the body that this proposal is unclear and a blanket exemption for certain devices in the same category would be contrary to the NCWM mandate to create equity in the market place and could create a competitive edge against other fuels or competing devices. Additionally, the ten year exemption in an evolving technological field is not appropriate. Some suggestions were heard that the proposal could conflict with User Requirements and allow a generation of devices to be used for ten years without compliance. Therefore, the Committee recommends this proposal be Withdrawn.

NEWMA 2021 Annual Meeting. Juana Williams (NIST OWM) has concerns on the lack of clarity of the proposal and what is exempted and why. Conflicts with the general code were outlined. The 10 year exemption on devices from HB44 is not supported. Jimmy Cassidy (MA) Supports the comments by NIST and recommends withdrawal of the item. No comments were received in support of the item. The NEWMA S&T Committee recommends that the item be Withdrawn.

CWMA 2020 Interim Meeting. The S&T committee heard numerous comments of concern from regulatory officials on this item. The key issues addressed were the 10-year exemption, the blanket exemption from the EVFS codes, and the competitive advantage this item may present to the industry. We feel this item has merit and feel a more appropriate course of action would be to request exemptions from specific requirements vs. a blanket exemption. We recommend this item move forward as a developing item.

CWMA 2021 Annual Meeting. Juana Williams (NIST OWM) provided comments on this item. The item is unclear. The potential lies for an entire generation of device to be exempt from Section 3.40 for entire period of use. Companies have expended money and resources to be compliant and allowing such exemptions create a competitive disadvantage environment in the marketplace. The USNWG will not consider this item until it is reworked by the submitter. Charlie Stutesman (KS) feels this item should be withdrawn as a 10 year exemption not acceptable. NIST Handbook 44, Section 3.40, has been published as a tentative code since 2015 and should be a consideration in the establishment of enforcement dates.

EVF-21.2 W A.2. Exceptions

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

EVF-21.3 W S.1.2. EVSE Indicating Elements, S.2.4.1. Unit Price, S.2.5. EVSE Money-Value Computations., S.2.7. Indication of Delivery

This item was withdrawn at the January 2021 NCWM Interim Meeting. See the January 2021 NCWM Interim Meeting Report and the previous NIST OWM analysis of the January 2021 NCWM S&T Committee Interim Meeting Agenda for additional information.

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EVF-21.4 V S.3.3. Provision for Sealing

Organization (*) not submitted (**) no meeting (***) no recommendation	EVF-21.4 S.3.3. Provision for Sealing 1 Item 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM	✔						
WWMA 2020 Annual Meeting	✔						
SWMA 2020 Annual Meeting	✔						
CWMA Interim (2020 Fall)	✔						
CWMA Annual (2021 Spring)	✔						
NEWMA Interim (2020 Fall)	✔						
NEWMA Annual (2021 Spring)	✔						
SMA (Industry)							
NCWM S&T Committee Interim	✔						

NIST OWM. NIST OWM acknowledges this proposal was developed to address past concerns expressed by officials because the modification to language in the sealing requirements specify both the printed and/or electronic audit trail record(s) will be easily accessible and in a usable format and this all occurs "at the time of inspection."

There are already requirements in place that require the audit trail has to be decipherable and readable and readily understandable, so that information is usable by the inspector. These current requirements apply to the size of the display, accessibility, and readability of electronic versions of an audit trail record that are provided through a device.

Additionally, an inspector can use the provisions of General Code paragraph G-UR.4.4. Assistance in Testing Operations to require assistance from the device owner/operator in obtaining the needed information during an inspection.

Consequently, NIST OWM agrees with this proposal to recognize electronic forms of audit trails as a method of sealing Category 2 and Category 3 EVSEs.

USNWG'S EVFE SUBGROUP: At the conclusion of its August 10, 2020 meeting deliberations the EVSE Subgroup agreed the proposed modifications to Table S.3.3. should be part of the EVFS Code and recommended that the U.S. Regional and NCWM S&T Committees support this proposal move forward as a Voting Item for adoption at the July 2021 NCWM Annual Meeting.

WWMA 2020 Annual Meeting. Kevin Schnepp (CA DMS) commented that CA is in support of this item. It recognizes the changes of tech and will not have to add any costs of having a physical printer on the device.

Tina Butcher (NIST OWM) commented that this item originated from the national working subgroup. This is a desire to move to alternative formats. The group recognizes this is the way of the future. It also recognizes these types of installations do not have people on site. W&M inspectors may be impeded during their inspection. The General Code allows the owner to provide assistance.

Mahesh Albuquerque (CO) supports this item.

The Committee agrees the item is fully developed and recommends assigning this item a voting status.

SWMA 2020 Annual Meeting. During Open Hearings the Committee heard from Alan Walker (Florida) who asked for clarification on sealing these devices. The Committee also heard from Diane Lee (OWM) who stated that NIST supported moving this forward as a Voting Item. She also stated that the Subgroup consensus was to permit an electronic event log. After considering this item the Committee recommends the item move forward as a Voting Item.

NEWMA 2020 Interim Meeting. The Committee agrees with the body that this proposal be considered a Voting Item. This item was submitted by NIST on behalf of the national work group, which believed it was fully developed and ready to be voted on. There is some concern that the electronic logger may provide an imposition for W&M inspectors that do not have a smart phone/laptop/internet service, but the User Requirement of assistance from the device owner should resolve any concerns. LMD 21.1 has a similar proposal and should have language aligned for the sake of consistency.

NEWMA 2021 Annual Meeting. Juana Williams (NIST OWM) provided an overview of the NIST analysis on this item. The subgroup believed that this item was fully developed. Comment were heard from John McGuire (NJ), Jim Willis (NY) and Jimmy Cassidy (MA) in support of the item. The NEWMA recommends that the item hold a Voting status.

CWMA 2020 Annual Meeting. The only comments heard by the S&T committee on this item were from Tina Butcher (NIST OWM). She advised that this item has come out of the work of the USNWG EVF&S and is fully developed and recommended this item for voting status. The committee agrees.

CWMA 2021 Interim Meeting. Juana Williams (NIST OWM) provided background and technical information on this item. OWM feels this item is fully developed and is ready to be voted on. The USNWG has reached consensus and believes this item is ready for a vote. The CWMA recommends that this item be moved to a voting item.

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

Organization (*) not submitted (**) no meeting (***) no recommendation	EVF-21.5 – T.2 Load Test Tolerance 1 Item 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM			✔				
WWMA Annual Meeting (2020)		✔					
SWMA Annual Meeting (2020)		✔					
CWMA Interim Meeting (2020 Fall)		✔					
CWMA Annual (2021 Spring)			✔				
NEWMA Interim (2020 Fall)			✔				
NEWMA Annual (2021 Spring)			✔				
SMA (Industry)							
NCWM S&T Committee Interim		✔					

NIST OWM. 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.

WWMA 2020 Annual Meeting. During the open hearings for these items a presentation by Tesla, EVConnect and EVgo was given in which a slide spoke to this item stating the need to separate the requirements for AC and DC systems. Extending the tolerances based on the extension of time allowing time for higher accuracy phase in. Kevin Schnepp (CA DMS) believes the phase in for tighter tolerances may be too long. Accuracy will become a greater issue as this becomes more prevalent. Clarification needs to be made; the submitter references public access, we deal with commercial use. The term public access should be changed to commercial use. Also, with technology changing so rapidly, 13-year phase in period is too long. Kurt Floren (LA County) agrees with Kevin's comments. Tina Butcher (NIST OWM) agrees with Kevin and consumers generally expect the tolerances be the same. Look at a shorter period of time to avoid consumer confusion.

The Committee agrees, and recommends this item be assigned a developing status. The Committee also recommends the submitter continue to work with their stakeholders and jurisdictions to develop the item. The Committee further recommends the submitter provides additional data beyond their original justification to support the necessity for two separate tolerances.

SWMA 2020 Annual Meeting. During the Open Hearing the Committee heard from Ken Ramsburg (Maryland) who stated that he would like real world data before determining the tolerances. He also stated that the proposed tolerance

is more than double the current tolerance. After considering this item the Committee recommends this item be given Developing Status, and be developed further by the national work group.

NEWMA 2020 Interim Meeting. The Committee agrees with the body that this item has no merit as there is lack of sufficient data. The committee recommends that the proposal be withdrawn. During open hearings, the Committee heard comments that the national work group could not come to a consensus on this item. There are concerns that consumers would be unaware of different devices in the same category operating on different tolerances. More data needs to be offered to show accuracy capabilities. Tolerance parameters set until 2033 is too distant for this fast paced technological field that is rapidly changing.

NEWMA 2021 Annual Meeting. Juana Williams (NIST OWM) shared NIST comments on this item and concerns on relaxing tolerances if existing devices in the marketplace are already meeting tolerances. If there are specific technical issues that justify the tolerances proposed, industry has not provided data in support. No sunset date was provided and devices with dual tolerances will not be distinguishable from each other. Lou Sakin (MA) questioned the rhyme or reason behind a 2033 date for the change in device tolerance. Jim Willis (NY) commented that there is currently no available test equipment to verify the need for relaxed tolerances on DC systems. The NEWMA S&T Committee recommends that the item be withdrawn.

CWMA 2020 Interim Meeting. The S&T committee heard concerns from regulatory officials that this item does not have a sunset date, so devices installed prior to January 1, 2033 would be allowed a higher tolerance for the life of those devices. The committee also heard comments that a limited amount of data was available to support the higher tolerances. We feel that this item has merit and recommend it move forward with a developing status.

CWMA 2021 Annual Meeting. Juana Williams (NIST OWM) provided background and technical information on this item. The question was raised about the number of DC devices versus the number of AC devices currently in the marketplace. Can the DC devices already in the marketplace meet the current tolerances? A marking on the device indicating the dual tolerance use be on the dispenser. The proposal needs to have a "sunset" date for the higher tolerances. Charlie Stutesman (KS) believes this item should be withdrawn as it provides too long of a time period before devices have to comply. The CWMA S&T Committee recommends that this item be withdrawn.

EVF-21.6 V Definitions: minimum measured quantity (MMQ)

Organization (*) not submitted (**) no meeting (***) no recommendation	EVF-21.6 – Definitions: minimum measured quantity (MMQ) 1 Item 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM	✔						
WWMA Annual Meeting (2020)	✔						
SWMA Annual Meeting (2020)		✔					
CWMA Interim Meeting (2020 Fall)	✔						
CWMA Annual Meeting (2021 Spring)	✔						
NEWMA Interim (2020 Fall)	✔						
NEWMA Annual (2021 Spring)	✔						
SMA (Industry)							
NCWM S&T Committee Interim	✔						

NIST OWM. In an anticipation of upcoming EVSE type evaluations and field enforcement action by U.S. officials, the term MMQ needs to be defined since it is currently cited in the EVFS design, test notes, and tolerance requirements in the NIST Handbook 44 Section 3.40 EVFS - Tentative Code.

NIST OWM believes the 2014 omission of the device-specific term MMQ from the newly adopted EVFS tentative code could best be remedied by a vote at the July 2021 NCWM Annual Meeting to adopt the proposal for including the term in the Definitions section of NIST HB 44 Section 3.40 EVFS - Tentative Code.

USNWG'S EVFE SUBGROUP: At the conclusion of its August 10, 2020 meeting the Subgroup acknowledged the oversight on omitting the definition of "minimum measured quantity (MMQ)" from the EVFS Code. The Subgroup agreed the definition should be part of the EVFS Code and recommended the U.S. Regional and NCWM S&T Committees that this item be designated as a Voting Item for adoption at the July 2021 NCWM Annual Meeting.

WWMA 2020 Annual Meeting. Tina Butcher (NIST OWM) commented, they think it's a housekeeping item, not technically substantial. There has been some discussion in the national working group as to whether the MMQ is relevant. But this is only dealing with the definition.

The Committee agrees this item is fully developed and recommends a voting status. The Committee noted that an editorial correction needs to be made removing the word "to".

SWMA 2020 Annual Meeting. During the Open Hearing the Committee heard from Diane Lee who stated that NIST supported moving this item forward as a Voting Item. After considering this item the Committee recommends that it be given Developing Status and be developed further by the national work group.

NEWMA 2020 Interim Meeting. The Committee agrees with the body that this proposal should be considered a Voting Item. This item was submitted by NIST and supported by the national work group. There is an error in the agenda and the item under consideration should read section 3.40, not Appendix D. This item duplicates the definition in Appendix D and provides a needed definition for a term being used (MMQ) within the tentative code. The item received no opposition during the open hearing.

NEWMA 2021 Annual Meeting. Juana Williams (NIST OWM) gave an overview of the intent of the item and the importance of defining MMQ in the tentative code. The USNWG supports this item. Jimmy Cassidy (MA) spoke in support of the item.

CWMA 2020 Interim Meeting. The only comments received by the S&T committee were from Tina Butcher (NIST OWM). She explained that this item is to correct an inadvertent omission to the EVFS code. She also advised that the submitted item should be changed as follows to add this definition to the EVFS code and not Appendix D.

Item Under Consideration:
Amend Handbook 44 NIST, Section 3.40. Definitions as follows**:**

minimum measured quantity (MMQ). – The smallest quantity delivered for which the measurement is to within the applicable tolerances for that system. [3.37, 3.39, 3.40]

The Committee feels that this item is fully developed with the change made above and recommend this item move forward as a Voting item.

CWMA 2021 Annual Meeting. Juana Williams (NIST OWM) provided background and technical information on this item. When Section 3.40 was published, this definition was overlooked. This is correcting the oversite. OWM believes this is fully developed and ready for a vote. The CWMA S&T Committee recommends that this item remain a voting item.

TXI – Taximeters

See Block 3 Items: Tolerances for Distance Testing.

GMA – Grain Moisture Meters 5.56 (a)

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

Previously GMA-3

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	GMA – 19.1 – Table T.2.1 Accept. & Maint. Tol. Air Oven Meth for all grain and oil seeds 1 Item 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM		✔					
(****) WWMA Annual Meeting (2020)							
(****) SWMA Annual Meeting (2020)							
CWMA Interim (2020 Fall)		✔					
CWMA Annual Meeting (2021 Spring)		✔					
(****) NEWMA Interim (2020 Fall)							
NEWMA Annual (2021 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.

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 and 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.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item

NEWMA 2021 Annual Meeting Diane Lee (NIST OWM) gave background information on this item and informed the committee that the submitter is currently gathering data from other States. The next grain sector meeting is in August and this should complete the analysis. NIST and grain sector support this as a developing item. The NEWMA S&T Committee recommends this as a Developing item.

CWMA 2020 Interim Meeting. The S&T committee heard comments from G. Diane Lee (NIST OWM) giving an update from the NTEP Grain Analyzer Sector work on this item and requested this item remain developing so they can complete their work on this item. The committee recommends this item remain with a developing status.

CWMA 2021 Annual Meeting. Diane Lee (NIST OWM) gave an update on the need for additional data on other grains. OWM recommends that this item remain developing. The CWMA S&T Committee recommends that this item remains developing.

Block 3 items (B3) D Tolerances for Distance Testing in Taximeters and Transportation Network Systems

B3: TXI-20.1 D T. Tolerances

B3: TNS-20.1 D T. Tolerances

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	B3 Tol for Dist Test in Taxi Mtrs. & Transp Netwk Sys. (2 Items) 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM							
****WWMA Annual Meeting (2020)							
****SWMA Annual Meeting (2020)							
CWMA Interim Meeting (2020 Fall)		✔					
CWMA Annual Meeting (2021 Spring)			✔				
****NEWMA Interim Meeting (2020 Fall)							

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	B3 Tol for Dist Test in Taxi Mtrs. & Transp Netwk Sys. (2 Items) 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
NEWMA Annual Meeting (2021 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 several virtual meetings 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" 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 (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.

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Comments were received on the entire block. John Barton (NIST OWM) commented on his recognition of the effort by the submitter to align tolerances between the two codes on transportation for hire systems but is not sure that tolerances can be applied in this manner. Work group is working toward uniformity and recommends a developing item or that the submitter withdraw and resubmit in the future. Jimmy Cassidy (MA) spoke in support of the intent of this item to provide a level playing field and supports the development of this item.

Jim Willis (NY, submitter) provided background information on this item and elaborated on the purpose and intent. He explained TNMS systems are being held to one tolerance but when TNMS system technology is used in taxi meters, they are held to tighter tolerances and can fail under test at values that would pass the TNMS tolerances. Jimmy Cassidy (MA) again expressed his desire for a level playing field and that both systems meet the same tolerances. NEWMA S&T Committee recommends this item with a Developing status.

CWMA 2020 Interim Meeting. The only comments received by the committee were from Tina Butcher (NIST OWM). She gave an update of the work of the USNWG and requested these items remain as developing items. The committee agrees.

CWMA 2021 Annual Meeting. John Barton (NIST OWM) provided comments. It is not necessary to increase tolerances on taxi meters. The taxi meters have been meeting these for decade. This addresses transportation network system primarily and adjustments to tolerances are being made to both codes. The practice of measuring intervals for taximeters is not followed when measuring distances in TNS. The USNWG is looking at possibly combining Taximeters and TNS into a single code. In order for this item to move forward it will need to be reworked. The submitter has agreed to work with the USNWG. The CWMA S&T Committee recommends that this item be withdrawn.

OTH – OTHER ITEMS

OTH-16.1 D Electric Watthour Meters Code under Development

Originally OTH-4

Organization (*) not submitted (**) no meeting (***) no recommendation (****) only new and voting items discussed	OTH – 16.1 – EWM Under Development (1 Items) 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM		✔					
****WWMA Annual Meeting (2020)							
****SWMA Annual Meeting (2020)							
CWMA Interim (2020 Fall)		✔					
CWMA Annual Meeting (2021 Spring)		✔					
****NEWMA Interim Meeting (2020 Fall)							
NEWMA Annual Meeting (2021 Spring)		✔					
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 latter subgroup, 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 (see Item MOS-8 on the L&R Committee's 2019 Agenda) to specify a method of sale for electrical energy sold through these systems. This proposal, titled "Section 2.38. Non-Utility Transactions of Electrical Energy (Other than Vehicle Fueling Applications)" was adopted by the NCWM in July 2019.

- The SG continues work on a proposed NIST Handbook 44 code for EWH-type meters.

- The SG has held eleven meetings since January 2021 (February 3; February 4; Feb 22; March 11; March 25; April 19; April 26; May 26; June 2; June 16; June 24), not including meetings of small Task Groups focused on specific issues. Additional SG meetings are scheduled for July 12 and 13.

- The SG continues to work on marking requirements, with only a few remaining items to be resolved.

- The SG is also conducting a final review of proposed definitions to accompany the code and is considering the need to align the definitions with those established by other groups in the industry and weights and measures community as well as the use of the terms in the draft code.

- Once these remaining points have been resolved, the SG will be balloted on the draft code in the hopes of reaching agreement on submitting it for consideration by the weights and measures community.

- The SG plans to submit the draft to the NCWM S&T for consideration in the 2021-2022 NCWM cycle under this agenda item.

- Three of the regional associations did not discuss this item in Fall 2020; however, the CWMA supported maintaining this item as a Developing item on the Committee's agenda. Both CWMA and NEWMA supported maintaining a Developing status on this item at their Spring 2021 annual meetings.

- 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).

WWMA 2020 Annual Meeting. At the 2020 WWMA Annual Meeting, the WWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

SWMA 2020 Annual Meeting. At the 2020 SWMA Annual Meeting, the SWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item

NEWMA 2020 Interim Meeting. At the 2020 NEWMA Interim Meeting, the NEWMA adhered to a condensed agenda due to the COVID pandemic and did not consider this item.

NEWMA 2021 Annual Meeting. Tina Butcher (NIST OWM) explained that the subgroup was focused on developing code, closing in on a draft code and hoped to have an item for the fall meetings. The subgroup requests that the item remain developing. NEWMA S&T Committee recommends this item remain with Developing status.

CWMA 2020 Interim Meeting. The only comments received on this item were from Tina Butcher (NIST OWM). She requested this item remain developing as the USNWG continues its work. We recommend this item remain developing.

CWMA 2021 Annual Meeting. Tina Butcher (NIST OWM) reported that work was nearly complete on this item and that a draft version of the code should be ready for the next cycle of meetings. The CWMA S&T Committee recommends that this item remain developing.

OTH-21.1 V Appendix A – 2.1. Acceptance and Maintenance Tolerances.

Organization (*) not submitted (**) no meeting (***) no recommendation	OTH-21.1 – Appendix A-2.1 Acceptance and Maintenance Tolerances 1 Item 2021 S&T Recommendations						
	V	D	W	A	I	Opposed	Support
OWM		✔					
WWMA Annual Meeting (2020)	✔						
SWMA Annual Meeting (2020)	✔						
CWMA Interim Meeting (2020 Fall)	✔						
CWMA Annual Meeting (2021 Spring)	✔						
NEWMA Interim (2020 Fall)		✔					
NEWMA Annual (2021 Spring)	✔						
SMA (Industry)							
NCWM S&T Committee Interim	✔						

NIST OWM. OWM notes that the submitter drafted a previous proposal addressing the same issue although, using a different approach in changing requirements to address those concerns. In that previous proposal, the submitter recommended changes to HB 44 General Code requirement G-T.1. "Acceptance Tolerances." During the 2020 Interim Meeting, there were multiple comments heard opposing this proposal during the open hearing session. The NCWM S&T Committee considered the initial proposal and determined that amendments offered by the submitter following the 2020 Interim Meeting open hearing session to the proposal substantially changed the direction and scope of that initial proposal and therefore, decided that the initial proposal should be withdrawn.

The submitter is now offering a new proposal that does not address concerns by changing General Code requirements but instead is recommending changes to HB 44 Appendix A, Fundamental Considerations.

OWM recognizes that there are statements addressing the application of acceptance tolerances in different sections of NIST HB 44 that appear to be in conflict. As shown in the Item Under Consideration, the current General Code requirement G-T.1. states acceptance tolerances are applied to devices that:

- are being placed into commercial service for the first time;
- are being officially tested for the first time if placed into service within the preceding 30 days;
- are being returned to commercial service after rejection based on performance and have been repaired within the preceding 30 days;
- are being officially tested within 30 days following major reconditioning or overhaul; or
- undergoing type evaluation.

OWM notes what is not explicitly stated in this General Code requirement is whether acceptance tolerances are to be applied within 30 days after any *routine* calibration adjustment(s) have been made to improve the device's performance. This type of adjustment would not be prefaced by an official rejection of the device. OWM also notes that the lack of addressing this point explicitly has created many instances of confusion for field officials. The absence of any statement addressing this specific circumstance has led to differences in interpretation regarding the appropriate application of acceptance tolerances.

This difference of interpretation is more evident when the General Code requirement (G-T.1.) is compared to the statement found in HB 44 Appendix A - Fundamental Considerations, Section 2.1. Acceptance and Maintenance Tolerances where acceptance tolerances are addressed. In Appendix A, application of acceptance tolerances are minimally described as follows:

"Acceptance tolerances are applied to new or newly reconditioned ***or adjusted equipment*** and are smaller than (usually one-half of) the maintenance tolerances."

It should be recognized that some commercially used equipment is officially tested and not afforded the less stringent maintenance tolerances. In general, this includes volumetric equipment such as graduated glassware, dry measure apparatus. This is done with the understanding that accuracy for this type of apparatus does not significantly degrade

over time. Thus, it would be reasonable to presume that only equipment whose performance is expected to deteriorate over periods of use should be afforded the application of maintenance tolerances. In other words, maintenance tolerances are applied to equipment that can reasonably be expected to gradually lose accuracy and performance over periods of time and use.

A strict interpretation of the statement in Section 2.1. of the Fundamental Considerations may prompt some to consider that since the device has undergone an adjustment (not preceded by an official rejection due to performance) within the preceding 30 days, that device should be capable of meeting acceptance tolerances. Therefore, some weights and measures officials have required devices that were recently adjusted (within 30 days) to comply with the more stringent tolerances whether or not that device had been officially rejected following an inspection and test within that 30-day period.

OWM notes there have been two proposals in the past to clarify the application of acceptance tolerances. Changes to G-T.1. were recommended in 1990 when a proposal was submitted that would have had acceptance tolerances apply whenever a security seal was broken. It was recognized however, that the seal could have been broken to make changes that did not affect the accuracy. This 1990 proposal was withdrawn following comments stating that the broken seal would not always positively indicate an adjustment affecting the device's accuracy.

This issue was also addressed during the 2009 NCWM Annual Meeting where comments were offered in opposition to the application of acceptance tolerances following "metrological adjustments." The proposal was not adopted for reasons related to some device owners entering into service contracts that could include routine adjustments. At that time, those opposing this change also pointed out that devices may not be capable of continuously operating within acceptance tolerance however, they could be maintained to operate within maintenance tolerances. The proposed changes to G-T.1. at that time were withdrawn due to a lack of support from industry and weights and measures officials.

OWM recognizes two opposing perspectives for the resolution of this matter. There are those that will support the idea when adjustments to commercial weights and measures equipment are made within a reasonable period of time, that equipment should perform within acceptance tolerances. If this notion is supported, then the former proposal to recommend changes to G-T.1. appear to be appropriate. Alternatively, others may take the position that device owners who proactively have entered in a contract for periodic routine service on their equipment will be penalized when that equipment is consistently held to more stringent, acceptance tolerances.

When a device owner has entered into a contract with a service agency to provide routine inspection and maintenance on their equipment. The frequency of these service visits will vary; such as on an annual or semi-annual basis although some may occur as frequently as on a monthly basis. During those contractual inspections, well-intentioned service agents may make minor adjustments to a device to ensure the best accuracy and performance from that device. As stated in the General Code requirement G-UR.4.3., adjustments made to equipment shall be made to bring the performance errors to as close to zero as practicable. The equipment owners/operators who are paying for this proactive service do so with the expectation that their devices are operating consistently at peak efficiency and accuracy. According to General Code requirement G-UR.4.1. this is the owner/operator's responsibility. This practice may provide more equitable transactions based on the accuracy of measurements/weighments made by that equipment.

Considering potential consequences of having equipment held to more stringent performance requirements on a frequent basis, owners/operators may elect to not have any regular service done to maintain optimum performance of their devices. This could potentially lead to less accurate equipment and larger errors in measuring and weighing operations during the interim period between official examinations.

As found in HB 44 General Code G-UR.4.3. "Use of Adjustments," service agents are expected to make any adjustments to a device so as to bring its performance to as close as possible to zero error. This expectation would support the notion of maintaining all weights and measures commercial device in prime operating condition. Therefore, it would be reasonable to expect that devices covered under a regular, routine service contract would be capable of performing within acceptance tolerances.

OWM believes that if a change to the Fundamental Considerations would be adopted (as recommended in this proposal), additional clarity could be achieved if those changes were accompanied by a specific explanation including

details for why acceptance tolerances are not to be applied to equipment that has undergone only routine adjustment. Therefore, if this proposal is supported OWM would recommend changes to G-T.1. be made to explicitly exclude the application of acceptance tolerances to equipment that has undergone routine adjustment not precipitated by an official rejection.

WWMA 2020 Annual Meeting. Michelle Wilson (AZ), submitter of the item, gave some background; in AZ, they've had debate on acceptance tolerance after calibration. Last year we submitted to clarify that acceptance tolerance would be applied following adjustment. Majority felt that that was not appropriate. This is a form 15 to clarify appendix A, sect. 2.1. - currently says acceptance tolerance is applied to new or adjusted. This leaves it open to interpretation. Removing "or adjusted" and add language to match the appendix with General code. Recommend to move forward as a voting item. John Barton (NIST OWM) commented is not convinced this is the only change needed to be made. For example, G.T.1. needs clarification when and when not to apply. Brent Price (Gilbarco) agrees to remove "when adjusted". He supports this item. The Committee agrees the item is fully developed and recommends voting status.

SWMA 2020 Annual Meeting. During Open Hearings the Committee heard from Tim Chesser (Arkansas) who stated that he supports the intent of the item but not the wording. Tim suggested amending the code instead. The Committee also heard from John Barton (OWM) who stated that this is a revision of a previous proposal, and that he agrees with the proposal. John also stated that enforcement of Acceptance Tolerance differs between some jurisdictions in regards to routine adjustments. The Committee also heard from Brent Price (Gilbarco) who stated that he supports the proposal. He stated that many devices are adjusted routinely, and shouldn't be considered like new. Tim Chesser also stated that the 30 day window for Acceptance Tolerance exists because a meter should hold that adjustment for at least 30 days. If it cannot hold that calibration, it may be a bad meter. The Committee also heard from Ken Ramsburg (Maryland) who stated that he agrees with Tim, and that this item would put us at the mercy of the service agency to do a good job. The Committee also heard from Hal Prince (Florida) who stated he sees both sides, and doesn't want to dissuade good maintenance practices, but knows some service agencies do poor work. After considering this item the Committee recommends the item as a Voting Item.

NEWMA 2020 Interim Meeting. The Committee agrees with the body that this proposal has merit and recommends that it be considered a Developing Item. During the open hearings, the Committee heard comments that the submitter has been working on this item and removed a conflicting statement. There are still some questions on routine maintenance and what precisely qualifies as an adjustment. There are also concerns that a device owner who responsibly maintains their equipment may be held to higher tolerances than an individual that does not properly maintain their equipment.

NEWMA 2021 Annual Meeting. Russ Vires (SMA) recommends that the item move forward as a Voting item with the following changes, based on the rationale that this change will make these conditions consistent with General Code G-T.1. Acceptance Tolerances and exclude non-performance related repairs, for example broken displays/keyboards or damaged data labels:

Acceptance tolerances are applied to new or newly reconditioned **or adjusted** equipment**, equipment returned to service following official rejection for failure to conform to performance requirements, or equipment undergoing NTEP evaluation,** and…

John Barton (NIST OWM) recognized this as the second proposal by the submitter. This is a replacement for the original proposal with a different approach to avoid conflicts. There is a debate on when/where acceptance tolerance is to be used, versus maintenance tolerance. NIST questions of the proposal goes far enough to clarify and recommends that changes are also made to the General Code G-T.1. as well for clarity. Brent Price (Gilbarco) acknowledged the concerns presented by NIST and supports the proposal as written. Cheryl Ayer (NH) expressed her support.

CWMA 2020 Interim Meeting. The committee heard from numerous regulatory officials that this item is a good addition to the handbook and recommended this item move forward as a voting item. We feel this item is fully developed and recommend this item as a voting item.

CWMA 2021 Annual Meeting. John Barton (NIST OWM) gave background and provided an explanation as to this proposal's elimination of conflicts in NIST Handbook 44 between the General Code requirement G-T.1. and Appendix A, Fundamental Considerations, section 2.1. While OWM agrees that making changes into the Fundamental Considerations is appropriate, changes in the General Code to reflect these changes would also be beneficial. The CWMA agrees the item is fully developed and recommends Voting status.

Russ Vires (SMA) supports this proposal with the following change: "Acceptance tolerances are applied to new or newly reconditioned **or adjusted** equipment**, equipment returned to service following official rejection for failure to conform to performance requirements, or equipment undergoing NTEP evaluation,** and…" The proposed SMA changes were agreed to by the NCWM S&T Committee during the January 2021 Interim meeting although, these changes were not reflected in the Item Under Consideration as presented. The CWMA S&T Committee recommends that this item proceeds as a voting item.