

OWM's Analysis of the 2018 S&T Agenda Items

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

NEW ITEMS (unless otherwise indicated)

Grouped Items

BLOCK 1 ITEMS (B1) MANIFOLD FLUSH SYSTEMS

- **B1: GEN-1 G-S.2. Facilitation of Fraud.**
- **B1: VTM-1 S.3. Diversion of Measured Liquid and UR.2.6. Clearing the Discharge Hose. (Carry-Over Item)**

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

NEWMA - A presentation was given by the submitter of this group of items. NEWMA believes these two items have been fully developed and should move forward as an Information item.

This group of items did not appear on any other regional S&T Committee agenda in the fall of 2017.

OWM – OWM continues to believe that additional work is needed to develop specifications, test notes, and user requirements to adequately address these systems. The current proposal is significantly different than the earlier version (i.e., the proposal on the Committee's agenda in 2016 and 2017) and yet, it too, in OWM's opinion, needs substantial further development. For example, the changes proposed to paragraph S.3.1. in the current proposal exempts all metering systems with multiple compartments delivering multiple products through a single discharge hose from having to meet the provisions of the paragraph. Metering systems with multiple compartments delivering multiple products through a single discharge hose that are not equipped with a manifold flush system should not be provided such an exemption.

OWM believes a manifold flush system, as described by the submitter of this item, needs to be designed in such a way that it does not facilitate the perpetration of fraud and yet, is still able to provide a safe means for operators to flush a system when changing to a different product to be dispensed. It is inappropriate to provide a mechanism for device owners to petition for a waiver of the enforcement of a HB 44 requirement simply because of someone's (or some company's) neglect to consider existing requirements during the design process or when making changes to provide a means to flush a system from ground level. Allowing for a petition as proposed in Gen-1 would set the wrong precedent and likely lead to an undesirable trend as others will also want to be provided the same (much less expensive) option to having design their equipment properly that it complies with existing requirements. Consequently, OWM recommends the Committee consider withdrawing Gen-1 and direct its focus on the changes proposed in VTM-1.

Regarding the remainder of the proposal, in OWM's opinion, the submitter's previous approach to developing proposed requirements that would specifically address a manifold flush system was better as a starting point than the current proposal and suggests the submitter may want to revisit the original proposal as a foundation. OWM suggests the Committee and submitter review the detailed comments provided by OWM in 2016. In the meantime, OWM reviewed the current proposal and offers the following technical points and recommendations for the Committee and submitter to consider.

For proposed new paragraph S.3.1.1. Means for Clearing the Discharge Hose, requiring “means” to clear the discharge hose on *any* metering system delivering multiple products through a single meter may be construed by some as requiring the “manifold flush system” to be added to the metering system. It does not appear this was the submitter’s intent; thus, language should be modified to correct this. Likewise, if the intent was *not* to require all such systems to have these “manifold flush systems” installed on them, consideration should be given to rewording the proposed changes to paragraph S.3.1. Diversion of Measured Liquid such that any exemption from the paragraph for single hose/multiple product systems is *only* extended to those systems that meet the provisions of paragraph S.3.1.1. Means for Clearing the Discharge Hose.

OWM revisited the specific recommendations we provided in our 2016 analysis of the earlier version of this current proposal and noted that some of OWM’s recommendations were not addressed. Lacking any rationale for these gaps, it is possible that these may have been oversights. Thus, OWM recommends the following alternate version of proposed changes to paragraph S.3.1. Diversion of Measured Liquid and to new paragraphs S.3.1.1. Means for Clearing the Discharge Hose and UR.2.6. Clearing the Discharge Hose. OWM further notes it is important to design requirements to ensure transparency and accuracy for a transaction, not to match systems already in use. OWM would also like to better understand the rationale for installing the flush system as far from the hose reel as practical. OWM also suggests the Committee further discuss how the requirement for maintaining records might be implemented. NOTE: Editorial marks show *changes to the submitters proposal*; appropriate editorial marks for additions to HB 44 would need to be included in any final proposed language.

S.3.1. Diversion of Measured Liquid. – ~~Except on equipment used exclusively for fueling aircraft and for metering systems with multiple compartments delivering multiple products through a single discharge hose, n~~ 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 is provided to ~~insure~~ 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.**

S.3.1.1. Means for Clearing the Discharge Hose. ~~For m~~**Metering** systems with ~~multiple compartments delivering multiple products through a single discharge hose, means shall be provided~~ **may be equipped with systems specifically designed to facilitate clearing of** the discharge hose prior to delivery to avoid product contamination. ~~A~~ 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:

- (a) **The discharge hose remains of the wet hose type; and**
- (b) the valve and associated piping are approved by the weights and measures authority having jurisdiction over the device prior to commercial use; and
- (c) the valve is permanently marked with its purpose (e.g., flush valve); and
- (d) the valve is installed in a conspicuous manner and as far from the ~~hose-reel~~ **hose reel** as practical; and
- (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., “flushing mode” or “not for commercial use); and
- (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 to inhibit meter indications (or advancement of indications) and recorded representations while the flush system is in operation.
- (h) no hoses or piping are connected to the inlet when it is not in use; and
- (i) the flush system is not to be operational during a commercial transaction.

(Added 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 assist in flushing product between deliveries is not to be used or operational during a commercial transaction. The inlet valves for the system are not to be connected to any hose or piping (dust covers are permitted) when not in use. When the flushing system is in operation, the discharge hose is only to be connected to the port for the product type being flushed from the discharge line. Following the flushing process, indications and recording elements must be reset to zero prior to beginning a commercial delivery. A manifold flush system is not to be used on a metering system that is not equipped with the capability to accept separate calibration factors for different product types.

(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 and available for inspection by weights and measures for a period of 12 months (Added 20XX)

BLOCK 2 ITEMS (B2) DIVISION SIZE AND TOLERANCES FOR IN-MOTION RAILWAY SYSTEMS

- **B2: SCL-1 D Table 3, Parameters for Accuracy Classes (Carry-Over Item)**
- **B2: SCL-2 D T.N.3.6. Coupled-in-Motion Railroad Weighing Systems (Carry-Over Item)**

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA recommended withdrawal of the two items in this group because the changes are so substantial and the effect on other areas of the code and devices that are currently in use, that more research is needed to help the understand why the current code needs this change.

SWMA - The Committee took comments jointly on the following items in a “batch”: 3200-4 Table 3, Parameters for Accuracy Classes and 3200-8 T.N.3.6. Coupled-in-Motion Railroad Weighing Systems.

Mr. Russ Vires, speaking on behalf of SMA, stated that SMA opposes both items. He noted that the proposed changes seem rather simple, but would have considerable impact, including changes to the effective number of division and increasing the tolerance. Richard Suiter, speaking as a representative of the submitter (Meridian Engineers), gave a presentation on the proposal and noted that a key goal is to obtain harmonization with international requirements. Mr. Suiter noted that the effective error resulting from the proposed increase in tolerance is minimized by the large size of the overall load. The idea of establishing tolerances based on commodities would be a very different approach from our current system, but it may be something that needs to be considered in the future. Others expressed concerns over

that philosophy. Given the diverse opinions on this issue, the SWMA recommended this group of two items remain Developing.

NEWMA - Mike Sikula (NY) suggested an editorial change to the word “hopper” in footnote 3. The word should not be in bold print. Eric Golden (Cardinal Scale Manufacturing) speaking on behalf of the SMA commented that the SMA opposes this block of items and views the proposals as an unnecessary change to the code. A comment was heard that this item should be addressed in the test notes. NEWMA believes this item could be further developed by the submitter and recommended it be a Developing Item on the NCWM Agenda.

CWMA - The SMA opposes 3200-4 Table 3, Parameters for Accuracy Classes. They feel this is an unnecessary change to the code. The CWMA believes the product has merit, but it should be treated the same as similar devices which are NTEP approved and currently in use. The CWMA also believes the current language of this would show favoritism to devices which may not be able to pass NTEP. The CWMA recommended the item as a Developing item on the NCWM agenda.

SMA - The SMA recommends the withdrawal of this item.

Rationale: The SMA feels this is an unnecessary change to the code.

OWM – This item proposes four different accuracy classes for coupled-in-motion railroad weighing systems, which presents the need for someone to have to choose a weighing system that fits the intended application, yet, the proposal doesn’t provide any guidance on how this selection is to be made nor does it specify who decides the appropriate accuracy class. This approach of specifying different accuracy classes in HB 44 for the same type of scale to be used in, perhaps, same or similar applications deviates significantly from how commercial and law-enforcement scales in the U.S. are typically selected today. Without any guidance concerning acceptable and unacceptable uses of the different accuracy classes specified, this proposal presents a conflict for those having to decide an appropriate weighing system for a given installation.

OWM would need additional supporting data from the submitter of this item to be able to offer constructive feedback on the two proposals in this group. The following is some initial information we would need:

- Clarification on whether the proposal is intended to include “uncoupled-in-motion railroad weighing systems.” Although the title of proposed paragraph T.N.3.6. is “Coupled-In-Motion Railroad Weighing Systems,” proposed new paragraph T.N.3.6.3. Wagon Weighing references both uncoupled and coupled wagon weighing. If the proposal is to include uncoupled wagon weighing, the title of T.N.3.6. would need to be changed. If not, then the reference to “uncoupled wagon weighing” in T.N.3.6.3. would need to be deleted. We note that if the proposal is intended to apply to uncoupled-in-motion railroad systems, the tolerances specified in the proposal far exceed the current HB 44 tolerances specified in paragraph T.N.3.7. for this same application, which requires every weight error to be within the static maintenance tolerance.
- Results of comparison tests (using reference cars weighed as a single draft on an accurate static railroad track scale) that provide true indication of the accuracy of the Meridian system.
- The reason for the changes proposed to footnote 3 of Table 3.
- Clarification of how the tolerance values in proposed Table T.N.3.6. are calculated for both wagon weighing and train weighing on both initial and subsequent verifications based on the criteria specified in proposed paragraph T.N.3.6.3. and T.N.3.6.4. Perhaps an example of the tolerance calculations for both wagon weighing and train weighing would be helpful to clarify the application of these tolerances. We note that example calculations of these paragraphs are provided in OIML R106 and although somewhat helpful, their application is still not clear.
- A list of the different qualifying applications in which the proposed four accuracy classes of a coupled-in-motion railroad weighing system could be used.

As a final thought, while we are very supportive of wanting to harmonize U.S. and international standards when it makes sense to do so, we view this proposal as an attempt to increase the allowable tolerance on individual railcars weighed coupled-in-motion to pave the way for the use of railroad weighing systems installed on continuous rail. We question the reasonableness of increasing current HB 44 tolerances to allow for the use of less accurate commercial equipment given that existing commercial equipment is able to perform to within the current tolerances specified.

BLOCK 3 ITEMS (B3) SUMMING OF INDIVIDUAL WEIGHING/MEASURING ELEMENTS

- **B3: SCL-3 Table 3, Parameters for Accuracy Classes (Carry-Over Item)**
- **B3: OTH-1 Appendix A – Fundamental Considerations: Section 4.4 General Considerations (Carry-Over Item)**

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - At the submitter's request, the WWMA agreed to withdraw agenda item 3100-1 G-S.5.2.2. Digital Indication and Representation. The WWMA then considered Agenda Items 3200-5 Table 3, Parameters for Accuracy Classes and 3600-2 Appendix A – Fundamental Considerations: Section 4.4. General Considerations, together, and recommended they both be withdrawn. The WWMA agreed that each independent scale in a system with multiple scales and a summing indicator as well as the combined scale system must meet the requirements of Handbook 44.

SWMA - The Committee heard comments on the following three items as a “batch:” 3100-1 G-S.5.2.2. Digital Indication and Representation; 3200-5 Table 3, Parameters for Accuracy Classes; and 3600-2 Appendix A – Fundamental Considerations: Section 4.4. General Considerations. The Committee heard a recorded presentation (with accompanying PowerPoint slides) from the submitter. There were multiple comments indicating a lack of understanding of what the proposal was trying to accomplish. Most states report treating this as three scales when the systems are tested. The committee agreed that each independent scale in a system with multiple scales and a summing indicator as well as the combined scale system must meet the requirements of handbook 44. The committee recommends that all three items in this “batch” be withdrawn.

NEWMA - This item is part of Block 3, which originally included Items 3100-1, G-S.5.2.2. Digital Indication and Representation, 3200-5 Table 3, Parameters for Accuracy Classes, and 3600-2. Appendix A – Fundamental Considerations: Section 4.4. General Considerations. Item 3100-1 has since been withdrawn. Ross Andersen (NY retired and submitter of this block of items) gave a presentation during open hearings. Eric Golden (Cardinal Scale Manufacturing) speaking on behalf of the SMA commented that the SMA opposes these items as written and recommends further development of this block of items. Mr. Ross Anderson (NY retired, and submitter of the item) recommended Item 3100-1 be withdrawn and Items 3200-5 and 3600-2 be moved forward as developing items. NEWMA heard comments in support of this recommendations and agreed to recommend Item 3100-1 be withdrawn while 3200-5 and 3600-2 be designated Developing items.

CWMA – The CWMA recommended Item 3100-1, G-S.5.2.2. Digital Indication and Representation, be withdrawn at the recommendation of the submitter. The CWMA recommended items 3200-5, Table 3, Parameters for Accuracy Classes and 3600-2, Appendix A – Fundamental Considerations: Section 4.4. General Considerations as developing items on the NCWM agenda. With respect to items 3200-5 the CWMA reported the SMA opposes this item because it would restrict the use of multiple scales using internal resolution to create an additional scale that provides the total weight value. This proposal would not address the total scope of the changes necessary to eliminate ambiguity in the code. Changes in this area would require a more comprehensive approach. The committee agrees with the submitter that the Handbook is flawed, and the committee feels this item needs to be further developed. With respect to item 3600-2, the CWMA reported a PowerPoint presentation was submitted by Ross Anderson. The SMA opposes this item, as they feel it would restrict the use of multiple scales operating using internal resolution to create an additional scale that provides the total weight value. This proposal would not address the total scope of the changes necessary to eliminate ambiguity in the code. Rice Lake believes the presentation was incorrect on several points. The committee believes the submitter needs to further develop the item based on the comments received.

SMA - The SMA opposes these items as written.

Rationale: These proposals would not address the total scope of the changes necessary to eliminate ambiguity in the code. Changes in this area would require a more comprehensive approach. We suggest a Task Group be formed to further study this topic and recommend Handbook 44 changes.

Weights and Measures Consulting LLC – Comments in opposition to these items submitted by Mr. Henry Opperman to the NCWM dated 1/6/18 posted on NCWM's web site.

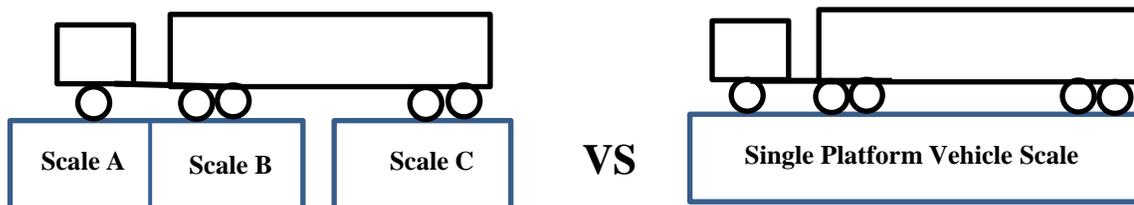
OWM – We’ve had the opportunity to review the submitter’s presentation that was developed for the fall 2017 regional weights and measures association meetings, including the narration developed for each of the slides in the presentation. This information did not change our view that each individual scale in the system and the scale system as a whole (i.e., the summed indication) must comply with the applicable tolerances specified in HB 44 for the accuracy class of scale being tested.

Our rationale for this, as stated in our earlier analysis of this item, is that when these systems are used in commercial application, it is the summed indication that serves as the basis for charges. It is the expectation of those having to rely on the weights obtained from these commercial and law-enforcement systems that each weight value indicated and recorded be accurate to within HB 44 tolerances. This includes the summed indication.

In our 2017 NCWM Interim Meeting analysis of this item, OWM noted that if you are willing to buy into the concept that HB 44 requirements should not apply to summed indications, then you must also be willing to accept some additional error in the weighing results obtained from these systems when a load is positioned on more than one of the weighing/load receiving elements of the scale system. We also provided an example illustration showing it is possible for each individual scale in such a system to comply with HB 44 tolerances and the summed indication exceed tolerance. We offer the following new example to again illustrate this point and to show that the summed error can exceed tolerance by an even greater amount than that of the earlier example.

Example: A combination tractor/trailer is positioned on a 200 000 x 20 lb vehicle scale system equipped with three independent weighing/load-receiving elements so that its steering axle is positioned on Scale A, its tandem drive axles of the tractor positioned on Scale B, and its tandem axles of the trailer on Scale C. The table provided below shows the weight that has been applied onto the different scales, the current HB 44 Scales Code Table 6 maintenance tolerances that would apply at these loads, and the scale indication from each independent scale as well as the summed indication:

	Applied Load (lb)	Applicable HB 44 Maintenance Tolerances (lb) for Class III	Range of Acceptable Scale Indication (lb)	Scale Indication (lb)
Scale A	10 200	+/- 40	10 160 to 10 240	10 240
Scale B	34 200	+/- 80	34 120 to 34 280	34 280
Scale C	33 960	+/- 80	33 880 to 34 040	34 040
	78 360 (Total)	+/- 160	78 200 to 78 520	78 560 (Sum)



The amount of error exceeding applicable tolerance that could result from not being able to apply code requirements to the summed indication in this example would be 40 lb. That is, if tolerance were applied only to the individual scales in the system, Scale A could have a plus 40 lb error, Scale B, a plus 80 lb error, Scale C, a plus 80 lb error, all three of which are within HB 44 maintenance tolerance at the applied loads specified. The system as a whole, however, exceeds applicable tolerance by 40 lb. We recognize that this additional error may not be considered very large, but it is large enough that no longer could it be claimed that the weight values obtained from these systems comply with current HB 44 tolerances, which we hope would raise significant concern.

The following are some additional OWM points offered in previous OWM comments and recommendations for this item:

- Many of these systems are used by truck weight enforcement agencies and the weights obtained are used to determine fines for exceeding legal load limits. The expectation of their accuracy is the same regardless of the application; each individual scale must be accurate and the summed total must also be accurate to within the tolerances specified in HB 44.
- Many years ago, when these systems were first introduced into the market, the S&T Committee was asked to provide an interpretation of how HB 44 requirements apply. Its interpretation was that multiple weighing elements (e.g., three axle-load scales permanently installed adjacent to one another or with a dead space between the weighing elements) used simultaneously to obtain a single weight in commercial applications shall be deemed to be a single system which shall meet the requirements of the applicable accuracy class. The classification of a scale or weighing system into an accuracy class should be based upon its application and method of use, not on the design of the device. The significance of this interpretation is that not only must each independent weighing device meet the requirements of Handbook 44, but the entire weighing system must meet all requirements that would apply if the device were a single scale
- OWM believes the interpretation provided by the 1990 S&T Committee was reasonable, accurate, and is still appropriate today. It would be unfair to apply a different performance standard to one vehicle scale over another when the application of those scales is the same.
- The requirements as described have been applied to these systems for more than 25 years (i.e., since the date the Committee's interpretation took effect) and scale manufacturers and service agencies have been installing these systems into commercial and law enforcement applications with no apparent issues regarding their accuracy when applying tolerances based on the 1990 Committee's interpretation.
- The total vehicle weight determined from these weighing systems is being represented as a weight that complies with HB 44.
- The proposal hasn't provided any technical justification for not applying the tolerances in Table 6 to the total vehicle weight.

OWM fundamentally disagrees with the notion that HB 44 tolerances should not be applied to a summed indication from one of these weighing systems. OWM notes that the expectation of the accuracy of a summed weighing result is different when someone manually totals the weight values of three different loads weighed separately on the same scale versus a weighing system that provides a summed result from three independent scales used at the same time to weigh a single truck.

In consideration of the SMAs suggestion that a work group be formed to further study this topic and recommend Handbook 44 changes, we question the scope of work that such a group would be assigned and cannot support this suggestion if one of the issues to be considered by such a group is to reconsider how HB 44 tolerances are to be applied to these systems. Since the submitter of this block of items has repeatedly gone on record stating that he now believes the Committee's 1990 interpretation was incorrect and he has proposed in Agenda Item Oth 1 Appendix A – Fundamental Considerations Section 4.4 General Considerations that an electronic sum of measured values from multiple devices is not subject to code requirements, we think reconsideration of the Committee's 1990 interpretation would be a likely initial starting point of any work group that gets formed to study this topic.

BLOCK 4 ITEMS (B4) TERMINOLOGY FOR TESTING STANDARDS

(Group of 10 items)

- **B4: SCL-4 N.2. Verification (Testing) Standards**
- **B4: ABW-1 N.2. Verification (Testing) Standards**
- **B4: AWS-1 N.1.3. Verification (Testing) Standards, N.3.1. Official Tests, UR.4. Testing Standards**
- **B4: CLM-1 N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards**
- **B4: CDL-1 N.3.2. Transfer Standard Test, T.3. On Tests Using Transfer Standards**

- **B4: HGM-1 N.4.1. Master Meter (Transfer) Standard Test, T.4. Tolerance Application on Test Using Transfer Standard Test Method**
- **B4: GMM-1 5.56(a): N.1.1. Air Oven Reference Method Transfer Standards, N.1.3. Meter to Like-Type Meter Method Transfer Standards and 5.56(b): N.1.1. Transfer Standards, T. Tolerances1**
- **B4: LVS-1 N.2. Testing Standards**
- **B4: OTH-2 Appendix A: Fundamental Considerations, 3.2. Tolerances for Standards, 3.3. Accuracy of Standards**
- **B4: OTH-3 Appendix D - Definitions: fifth-wheel, official grain samples, transfer standard and Standard, Field**

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to recommend this group of items as developing items. The SWMA identified some standards that may not be able to achieve the 1/3 standard in the Fundamental Considerations in Handbook 44. The Committee would also like some clarification as to the intent of these changes (i.e., is it the intent to have a 105-series standard for all field standards and current transfer standards?). Lastly, the Committee would like the submitter to consider retaining and clarify the definition of “transfer standard” and perhaps expand the application of the definition to include other device codes.

SWMA - The Committee heard comments on the ten items as a “batch.” Mr. Bob Murnane (Seraphin Test Measure) recommended withdrawing these items for further development and then resubmitting them later. He also provided written comments on these items, noting that in addition to the above items, two carryover items on the Committee’s report on “transfer standards” and two new items related to this. The Committee heard from Tina Butcher (NIST OWM) who noted that OWM’s goal was to attempt to align the terminology that is used in various sections of the Handbook (including the Fundamental Considerations) relative to standards used in testing. These proposals came about as a result of OWM’s analysis of the two carryover items referenced by Mr. Murnane. Mrs. Butcher acknowledged that additional work may be needed, given the comments that have been heard. The Committee recommended that these items remain as Developing items.

NEWMA - A comment was heard suggesting the proposed definition of “transfer standard” could cause issues categorizing several field standards into transfer standards when this is not always the case. The intention is a nice idea but incorrect to say that everything we use in the field is a transfer standard. NEWMA believes this item has merit but requires further Development by the submitter.

CWMA - The committee received written statements from Seraphin asking this item be Developmental. With respect to Item LVS-1 N.2. Testing Standards proposing changes to Section 5.59 Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices, Mr. Richard Suiter commented that ASTM uses the term reference standard, so this change would create a conflict between HB 44 and ASTM F2343. The CWMA agreed to recommend this group of items be Developmental.

SMA – (Position on “Scale Items” SCL-4, ABW-1, and AWS-1)

The SMA recommends these three items be given a Developing status.

Rationale: It is important to be consistent in our use of terms across multiple sections of Handbook 44.

Seraphin Test Measure Company – Comments in opposition to all items in Block 4 and Block 5, and stand-alone items LPG-4 and MFM-2 to the NCWM dated 12/28/17 posted on NCWM’s web site.

OWM – NIST OWM proposed Block 4 items, Terminology for Testing Standards to consider standardizing the terminology used for transfer standards, master meters, etc., and to consider the use of the term “Field Standards” to describe all standards use to test legal-for-trade devices. In addition, another proposal, Block 5, Define “Field Reference Standards” was submitted by Endress+Hauser Flowtec proposing different terminology, “Field Reference Standard” be used to describe standards used to test legal-for-trade devices. NIST OWM realizes that Block 4 items would generate a number of comments and reviews from different measurement areas and with a second proposal for this terminology, additional discussion and comments will be made. As such, NIST OWM recommends that Block 4 items be developing items.

BLOCK 5 ITEMS (B5) DEFINE “FIELD REFERENCE STANDARD”

(Group of 4 items)

- **B5: CLM-2 N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards**
- **B5: CDL-2 N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards**
- **B5: HGM-2 N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Test Using Transfer Standard Test Method**
- **B5: OTH-4 Appendix D – Definitions: field reference standard meter and transfer standard**

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA – The WWMA agreed to carry this group of four items forward as developmental recommending they be harmonized with items New 6-15 as the different terms used in these new items will affect their application. The WWMA believes that the terms such as “Transfer Standard”, “Testing Standards”, “Verification (Testing) Standards”, “Field Standards”, “Field Reference Standard Meter”, “Master Meter”, etc. in New 6-15, and New 24-27 need to be defined and possibly standardized prior to further development of this item. The WWMA is also concerned that Handbook 44 is not the appropriate place to specify the type of test equipment necessary for conducting tests.

SWMA - The Committee asked for comments on the following “batch” of items:

- New 24 - N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards (Cryogenics)
- New 25 - N.3.2. Transfer Standard Test and T.3. On Tests Using Transfer Standards (CO2)
- New 26 - N.4.1. Master Meter (Transfer) Standard Test and T.4. Tolerance Application on Tests Using Transfer Standards (Hydrogen)
- New 27 - Appendix D – Definitions for “field reference standard meter” and “transfer standard”

The Committee heard no specific comments on the items in this batch; however, they heard comments related to these items in conjunction with the batch of items discussed with New-6 through New-15 and Items 3302-1 and 3307-2. See those items for additional details.

The SWMA supports the concept of using “master meters” (and acknowledged that other terms have been and are being proposed) for various metering applications. The SWMA believes there is still confusion over the terminology and that it is difficult to review multiple items related to the same basic issue. The SWMA recommends that the items in this “batch” of items remain Developing.

NEWMA – NEWMA’s S&T Committee took comments on all items in this block at the same time. A comment was heard questioning whether this should not be considered a master meter. These items have merit but the NEWMA feels they should remain Developing at this time.

CWMA - The committee received written statements from Seraphin asking this item be Developmental. Until data is provided and evaluated that shows that the proposed field standards can perform at the level needed for a field standard, the CWMA agreed this group of items should remain Developmental.

Seraphin Test Measure Company – Comments in opposition to all items in Block 4 and Block 5, and stand-alone items LPG-4 and MFM-2 to the NCWM dated 12/28/17 posted on NCWM’s web site.

OWM: OWM considers all items in Block 4 and Block 5 to be related. Refer to OWM comments and recommendations under the Block 4 items to view OWM’s analysis of these two blocks of items.

BLOCK 6 ITEMS (B6) ALIGN VAPOR ELIMINATION REQUIREMENTS AMONG CODES

- **B6: LPG-1 S.2.1. Vapor Elimination.**
- **B6: CLM-3 S.2.1. Vapor Elimination.**

- **B6: CDL-3 S.2.1. Vapor Elimination.**

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agrees that these items have merit and should be carried forward as voting items.

SWMA - The Committee heard comments jointly on the following items in a “batch”:

- New 18 - S.2.1. Vapor Elimination (LPG & NH3)
- New 19 - S.2.1. Vapor Elimination (Cryogenics)
- New 20 - S.2.1. Vapor Elimination (CO2)

Mrs. Tina Butcher (NIST OWM), the submitter of the item, explained that OWM submitted these items at the request of the NCWM S&T Committee as a follow-up from items that were adopted at the 2017 NCWM Annual Meeting on the same topic. She noted that these items, as were the other items adopted in July 2017, are intended to align the language across multiple measuring codes and eliminate the reference to “rigid metal tubing” in favor of the more general language of “appropriate non-collapsible material.” The SWMA recommended they be designated as “Voting” items.

NEWMA – This block of items includes editorial changes and no comments were received during open hearings. NEWMA believes these items have been fully developed and are ready for a vote.

CWMA - There were no comments opposing this group of items, and since the language is already in HB 44, the CWMA recommends these items be moved to voting. CWMA appreciates the work of the Office of Weights & Measures on clarifying these items.

OWM – OWM submitted these items at the request of the NCWM S&T Committee as a follow-up to five items that were adopted at the 2017 NCWM Annual Meeting on the same topic. These items, as well as the five items adopted in 2017, are intended to align the language across multiple measuring codes with respect to the requirements pertaining to vapor elimination. OWM considers these items fully developed. These proposals eliminate the reference to “rigid metal tubing” in favor of the less restrictive language, “appropriate non-collapsible material.”

BLOCK 7 ITEMS (B7) ADDRESS DEVICES AND SYSTEMS ADJUSTED USING A REMOVABLE DIGITAL STORAGE DEVICE (ALL ITEMS IN BLOCK ARE CARRY-OVER ITEMS)

(Group of 19 items)

- **B7: GEN-2 D G-S.8.2. Devices and Systems Adjusted Using Removable Digital Device Storage**
- **B7: SCL-5 D S.1.11. Provision for Sealing.**
- **B7: BCS-1 D S.5. Provision for Sealing.**
- **B7: ABW-2 D S.1.6. Provision for Sealing Adjustable Components on Electronic Devices.**
- **B7: AWS-2 D S.1.3. Provision for Sealing.**
- **B7: LMD-1 D S.2.2. Provision for Sealing.**
- **B7: VTM-2 D S.2.2. Provision for Sealing.**
- **B7: LPG-2 D S.2.2. Provision for Sealing.**
- **B7: HGV-1 D S.2.2. Provision for Sealing.**
- **B7: CLM-4 D S.2.5. Provision for Sealing.**
- **B7: MLK-1 D S.2.3. Provision for Sealing.**
- **B7: WTR-1 D S.2.1. Provision for Sealing.**
- **B7: MFM-1 D S.3.5. Provision for Sealing.**
- **B7: CDL-4 D S.2.5. Provision for Sealing.**
- **B7: HGM-3 D S.3.3. Provision for Sealing.**
- **B7: EVF-1 D S.3.3. Provision for Sealing.**
- **B7: TIM-1 D S.4. Provision for Sealing.**

- **B7: GMM-2 D S.2.5. Provision for Sealing.**
- **B7: MDM-1 D S.1.11. Provision for Sealing.**

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agrees with the submitter that this item is fully developed and recommends it be moved forward to the national committee as a voting item as proposed.

SWMA - The Committee heard comments from Mrs. Tina Butcher NIST OWM, the submitter of the item. Mrs. Butcher noted that OWM took on the responsibility for this item after initial work done by the NTEP Grain Sector. OWM provided the recommendations in this item to the S&T Committee at the 2017 Annual Meeting with a recommendation that it replace the Item Under Consideration and be forwarded to the regional meetings for consideration in the upcoming cycle. The proposal recommends establishing a new paragraph in the General Code to address devices that are adjustable through use of removable digital media such as SD cards and flash drives. The proposal also recommends the addition of paragraphs in specific device codes which refer to the General Code paragraph for devices that are adjusted in this manner. This approach would, hopefully, eliminate potential conflicts with device types that are covered under existing sealing requirements and enable the current definition for “remote configuration capability” to remain intact. Russ Vires, speaking on behalf of SMA, noted that SMA has not met since the most recent recommendations presented by the submitter. Thus, SMA has no comments at this point, but will review the proposed changes at its fall meetings and provide input at that time. The Committee received no other comments on this item. The Committee noted the title of the item needs to be changed to reflect the proposals submitted to the NCWM S&T Committee in July 2017. The SWMA recommended this item be presented for a vote.

NEWMA - The SMA reported that it opposes this item. A comment was made that the title causes confusion as it states these are Appendix D definitions when the content of the item actually proposes changes to several codes. NEWMA recommended this block of items be withdrawn.

CWMA – The SMA is opposed to this as written. Their rationale is the industry accepted definition of “configuration” includes items that should not be considered sealable parameters. The SMA recommends removing the text “configuration or” from paragraph S.1.11.1. The CWMA recommended this item to be a Developing item.

SMA - The SMA is opposed to this item as written.

Rationale: It is not clear to the SMA if the requirements for the event counter would apply to removable storage devices located inside the equipment and protected by other security means.

Other - The Meter Manufacturers Association (MMA) received the following comments on January 5, 2018 from Mr. Marc Buttler (Micro Motion Emerson Automation Solutions) concerning this block of items:

I am still concerned that the proposed language for G-S.8.2.Devices and Systems Adjusted Using Removable Digital Device Storage could be misinterpreted as it is currently drafted.

From other discussions that I have been in, it was my understanding that the intent was to clearly define the difference between “Removable Digital Device Storage” and “Remote Configuration Capability” so that Category 2 Sealing would still be allowed for devices with Remote Configuration Capability. As it is currently worded, I’m concerned that the language might have the unintended consequence of nullifying USB flash drives, SD cards, and the like from being used as valid Remote Configuration tools.

As an example, a USB flash drive can be used to transport a parameter configuration change from a computer to a Category 2 device that has Remote Configuration capability as long as the metrological parameter settings that actually impact the measurements of the device are stored inside the device and are only changed by copying the new value from the USB flash drive during a single configuration change event in the same way that it would receive a new parameter value from any other type of remote configuration tool during a single configuration change event. I believe this scenario would be closer to the intended definition of Remote Configuration Capability than it would be to the intended definition of Removable Digital Device Storage. Perhaps the key reason these two cases are fundamentally different, even though they might both involve a USB flash drive, is because, in the case just described, it would still be possible to securely prevent

access to the internal metrological parameters in the device with a Category 2 seal, thus preventing the USB flash drive from impacting the measurements in any way without first breaking a physical seal, even if the USB flash drive were to be plugged into the device. Because the only metrological parameter settings that matters are the ones inside the device and not the ones on the USB flash drive in this case, this makes the USB flash drive the same as any other remote configuration tool. I would propose the highlighted additions from the excerpt below to aid in clarifying what I understood to be the true intent of G-S.8.2.

G-S.8.2. Devices and Systems Adjusted Using Removable Digital Storage Device. – For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, such as a secure digital (SD) card, USB flash drive, etc., and without first having to gain access to change those parameter settings through a means that is controlled by physical hardware on the device, security shall be provided for those parameters using an event logger in the device. The event logger...

OWM- We understand the concern of the SMA and Mr. Marc Buttler and propose the following changes to proposed new paragraph G-S.8.2. to make clear security may also be provided by physical seal:

G-S.8.2. Devices and Systems Adjusted Using Removable Digital Storage Device. - For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, such as a secure digital (SD) card, USB flash drive, etc., security shall be provided for those parameters using either (1) an event logger in the device; or (2) a physical seal that must be broken in order to remove the digital storage device from the device (or system). If security is provided using an event logger, the event logger shall include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available on demand through the device or through another on-site device. In addition to providing a printed copy of the information, the information may be made available electronically. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

Providing these changes satisfy the concerns of the SMA, Mr. Buttler, and others, we recommend this block of items, with the changes to paragraph G-S.8.2. shown above, for vote at the upcoming Annual Meeting.

Stand-Alone Items

GEN-GENERAL CODE

Gen-3 G-A.1. Commercial and Law-Enforcement Equipment. and G-S.2. Facilitation of Fraud.

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The SWMA recommends this item be continued as a developing item. We believe that the item has merit, however we would like to see a definition of “access” i.e. what constitutes access? In addition, what is the definition of “master key, universal key, and universal tools”? We are also concerned that with this item being included in the general code, it is very broad in the devices that will be affected by this code change, and we feel that industry needs time to vet the item in addition to a NIST OWM review. We also recommend the submitter consider the addition of a user requirement requiring the owner/operator to utilize the security features of the device. There was also a concern that this item was included under “Facilitation of Fraud” in G-S.2. because that code requirement is generally

understood to be facilitation of fraud by an owner/operator rather than someone trying to gain customer information through a skimming device installed outside of the owner/operators' knowledge.

SWMA - Some felt that the issue may not address metrological functions and, therefore, questioned whether it falls under weights and measures jurisdiction. Others pointed out that there are other items addressed by NIST Handbook 44 which do not speak to metrologically significant functions or features. The Committee heard multiple comments indicating concerns about this issue and the need for these devices to be addressed. The Committee believes that the item has merit. Consequently, based on the comments received, the Committee felt like this item needed additional input and development. However, after considering additional comments during the Committee's voting session, including comments from the submitter questioning what additional work would be needed, the SWMA decided to recommend the item be presented on the NCWM agenda as a "Voting" item.

NEWMA - Mike Sikula (New York) supported the item, but voiced concern about the restriction of access to prevent criminals from planting skimming devices which might also prevent inspectors from easily accessing devices. Frank Green (Connecticut) added his concern to make sure access is still possible for W&M. Eric Golden (Cardinal Scales) question of what lock is good enough in this situation. Walt Remmert (Pennsylvania) suggests more people in the discussion to standardize the situation by protecting and granting access to W&M. Steve Giguere (Maine, submitter) was put into general code on purpose to encompass all devices. Ross Andersen (Retired, NY) comments what authority do we have for this. Facilitation of fraud vs fraud itself. Mike Sikula commented he interpreted G-A.1. (b) that as written it made W&M officials responsible for the fraud investigation. NEWMA believes the submitters have developed the item and it should move forward as a committee owned Information item.

CWMA - Cardinal Scales opposes the item as written, but would be open with further clarification on the methods of security (Keys) Rice Lake questions whether this falls under the scope of HB 44, because this is a security issue and not a metrological issue. The CWMA has heard of two other states adopting similar security methods and recommends this to be a Developing item.

SMA – The SMA supports the intent of the item, however, recommends that it be given a status of "Developing."

Rationale: The SMA supports the proposed changes to G-A.1.(b), however the proposed changes to G-S.2. need additional consideration; specifically:

- What is the definition of "access? That is, what constitutes access?"
- What is the definition of "master key, universal key, and universal tools?"

OWM – While we recognize the seriousness of consumers being deceived by criminals able to extract their financial information using credit- and/or debit-card "skimmers," hidden cameras, etc., and then using this information for personal gain, we do not view this as a primary focus of weights and measures authority since the devices (skimmers) don't affect the measurement transaction. It is also not clear if weights and measures jurisdictions would have the authority to take action on these devices. It seems that the installation of illegal card readers attached to a payment terminal — like a gas pump — that grabs data off a credit or debit card's magnetic stripe without the consumer's knowledge is more of a concern for the manufacturers of commercial weighing and measuring equipment and the regulatory agencies that already have the authority to take action on these illegal acts (i.e., the FBI and the FTC). We note that in most instances it is a third-party thief installing these illegal devices to obtain a customer's financial information for benefit and not the owner/operator of a piece of commercial equipment simply trying to manipulate the equipment for a little extra profit. Care needs to be taken not to impose requirements on the device owner that would appear to be burdensome or punitive since the device owner may have limited control over these situations.

We do agree that Weights and Measures should continue to play a cooperative role (as many are doing today) in helping to reduce and eliminate these illegal acts by immediately reporting these illegal devices, when found, to the proper authorities. It is unreasonable and beyond the scope of weights and measures authority to require manufacturers of commercial weights and measures equipment to design equipment to be completely tamper proof when it doesn't affect the measurement transaction.

SCL - SCALES

SCL - 6 S.1.2.2.3. Deactivation of a “d” Resolution

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA believes that this item has merit and is sufficiently developed to be a voting item.

SWMA – There were no comments on this item and the SWMA recommended it be voting as presented.

NEWMA - Comments were heard on the procedures used to verify that a scale conforms to code requirements and is rounding properly. It is believed such testing would require the use of 10 mg or 1 mg weights. This does not seem like a realistic field test. NEWMA believes this item has been developed by the submitter and further development should be done by the committee. NEWMA supports this item moving forward on the NCWM agenda as an Information item.

CWMA – The CWMA reported there was no discussion on this item and recommended to go forward as a Developing item.

SMA - The SMA takes no position on this item.

Rationale: The SMA believes the requirements for this item are already covered in Handbook 44.

OWM – OWM drafted the current proposal after learning in 2017 that some Class I and II scales equipped with a value of “e” that differs from “d” may not round properly (i.e., to the nearest minimum unit that can be indicated) if the “d” resolution is simply deactivated or turned off. We believe the proposed new paragraph is a necessary addition to make officials and others aware of this possible “round off” problem, especially since paragraph S.1.2.2., which was added to the Handbook in 2017, requires the value of “e” and “d” to be the same on Class I and II scales used for direct sales. With the adoption of paragraph S.1.2.2., we envision the possibility of some scale distributors/installers and perhaps users too, not realizing the effect of their actions, electing to simply deactivate the “d” resolution to allow use of a particular scale for direct sales. The round-off error caused by this action will likely be unapparent and only disclosed by performing special tests using error weights, which, on a Class I or II scale, would most typically have to be performed in a lab setting given the accuracy and resolution required for the test weights.

SCL - 7 S.1.8.5. Recorded Representations, Point of Sale Systems (Carry-Over Item)

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA – The WWMA replaced the proposal in the Item Under Consideration and the text in the Purpose of the item with the following and recommended it be an informational item on the NCWM agenda:

Purpose:

Provide consumers the same opportunity, to be able to easily verify whether or not tare is taken on items weighed at a checkout stand using a POS system, which is currently afforded them when witnessing items being weighed and priced in their presence using other scales in the store.

Item under Consideration:

Amend NIST Handbook 44, Scales Code as follows:

S.1.8.5. Recorded Representations, Point-of-Sale Systems. – The sales information recorded by cash registers when interfaced with a weighing element shall contain the following information for items weighed at the checkout stand:

(a) the net weight;¹

(b) the unit price;¹

(c) the total price; and

(d) the product class or, in a system equipped with price look-up capability, the product name or code number.

(e) the tare weight¹

[Non-retroactive January 1, 2022]
(Amended 20XX)

SWMA – During Committee open hearings, Mrs. Tina Butcher (NIST OWM) noted that the title of the item in the Appendix to the Committee’s report still includes a reference to a part of the original proposal which would have required the tare weight to be printed on random-packed products. That portion of the proposal was removed from the proposal prior to the NCWM Annual Meeting. In addition, she noted that the submitters of the item made modifications to the proposal following the 2017 Annual Meeting. The modifications recommend extending the nonretroactive date to 2022 (rather than 2020) and moving the reference to “tare weight” to the last item in the list. The modifications are shown below and appear in the Appendix to the Committee’s report.

S.1.8.5. Recorded Representations, Point-of-Sale Systems. – The sales information recorded by cash registers when interfaced with a weighing element shall contain the following information for items weighed at the checkout stand:

(b) the net weight;¹

(b) the unit price;¹

(c) the total price; and

(a) the product class or, in a system equipped with price look-up capability, the product name or code number.

(e) the tare weight¹

[Non-retroactive January 1, 2022]
(Amended 20XX)

¹ For devices interfaced with scales indicating in metric units, the unit price may be expressed in price per 100 grams. Weight values shall be identified by kilograms, kg, grams, g, ounces, oz, pounds, or lb. *The “#” symbol is not acceptable.*

[Nonretroactive as of January 1, 2006]
(Amended 1995 and 2005)

Some comments heard on the proposal indicated there was some confusion about the purpose of the proposal and what specifically was being recommended. There were multiple comments, both in support of and in opposition to the proposal and consequently, the SWMA recommended the item for a vote to allow the membership to decide.

NEWMA - Eric Golden (Cardinal Scale Manufacturing) speaking on behalf of the SMA commented that the SMA opposes this item. Comments were heard on the possible confusion the proposed changes could cause. Comments were also heard on a recommendation to withdraw the item. Mr. Lou Sakin (Mass) believes the item has merit and recommended it be assigned a “voting” status. NEWMA recommends this item move forward as an Information Item.

CWMA - The SMA opposes this item due to the implementation costs to the manufacturers, retailers, and consumers. Iowa stated they supported the item as previously proposed, excluding the non-retroactive date. The CWMA believes this item has been fully developed and should be moved to a vote.

SMA - The SMA opposes this item.

Rationale: 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.

Food Marketing Institute: See 1/10/17 and 7/12/17 letters from FMI opposing this item posted on the NCWM web site.

FL Retail Federation (Florida Grocers Association) See 1/6/18 FGA letter opposing this item posted on the NCWM web site.

NC Retail Merchants Association: See 1/6/18 NCRMA letter opposing this item posted on the NCWM web site.

SC Retail Association: See 1/10/18 SCRA letter opposing this item posted on the NCWM web site.

OWM: OWM recommends the Committee consider modifying the proposal in the Item Under Consideration as shown below to: (1) require the tare weight and/or the gross weight be printed on the receipt; (2) clarify printed weight values must be clearly and definitely identified as gross, tare, and/or net weights (as required by the General Code); and (3) move text currently in a footnote to the paragraph into the body of the paragraph for ease of reference. New text proposed by OWM is highlighted. Our rationale for recommending these changes follows our recommendations.

S.1.8.5. Recorded Representations, Point-of-Sale Systems. – The sales information recorded by cash registers when interfaced with a weighing element shall contain the following information for items weighed at the checkout stand:

- (a) the net weight;[‡]
- (b) the unit price;[‡]
- (c) the total price; ~~and~~
- (d) the product class or, in a system equipped with price look-up capability, the product name or code number; ~~and~~

(e) **the gross weight and/or the tare weight**[‡]

[Non-retroactive January 1, 2022]

(Amended 20XX)

For devices interfaced with scales indicating in metric units, the unit price may be expressed in price per 100 grams. Weight values shall be identified by kilograms, kg, grams, g, ounces, oz, pounds, or lb.

All printed weight values (gross, tare, net) must be clearly and definitely identified as such.

The “#” symbol is not acceptable. [Nonretroactive as of January 1, 2006]

(Amended 1995, ~~and~~ 2005, and 201X)

Delete the current footnote and incorporate the language in the body of the paragraph:

~~¹ For devices interfaced with scales indicating in metric units, the unit price may be expressed in price per 100 grams. Weight values shall be identified by kilograms, kg, grams, g, ounces, oz, pounds, or lb. The “#” symbol is not acceptable.
[Nonretroactive as of January 1, 2006]
(Amended 1995 and 2005)~~

OWM’s rationale for these recommendations is outlined below.

Currently, requirements pertaining to the operation of a tare feature on a stand-alone retail computing scale used in a direct sale application at a grocery store are not the same as those applied to a scale interfaced with a cash register also being used in a direct sale application. For example, a stand-alone scale at the deli is required to indicate clearly when a tare has been taken. For point-of-sale scale systems, this is not the case. Many systems display only the “gross weight,” relying on the receipt to show the “net weight.”

The difference in how requirements have been applied to these two types of direct sale transactions was based on concessions made to early era point-of-sale systems which had limited capabilities for displaying and printing information. Certainly, today’s systems are much more complex, providing many details of a customer’s transaction and purchases in the customer display, printed receipt, and even electronically. It seems appropriate that the weights and measures community consider requirements that would eliminate the discrepancy between the two applications and to provide the customer with the opportunity to readily observe and understand the basis for a given weighing transaction, without placing an undue burden on manufacturers or store owners.

In conducting its analysis of this issue, OWM notes that many POS systems may not comply with requirements in current General Code Paragraph G-S.6. Marking, Operational Controls, Indications, and Features; this paragraph requires indications be clearly and definitely identified. In many POS transactions, two different weights are displayed, one on the scale weight display and (if tare has been deducted) a different weight on the receipt. These weights should be identified as “gross” and “net,” respectively in order to comply with these requirements.

As indicated in earlier OWM written comments relating to this item, it is extremely difficult for customers at a checkout stand to determine whether tare has been taken on packages weighed by a store cashier in their presence when the weight display of the POS system provides only an indication of the gross weight and the net weight of those same packages gets recorded on the sales receipt, which is provided to the customer after all items have been priced. Consumers are not always able to focus their attention on the indication when individual items are being weighed and recall those indications when reviewing a sales receipt. This is especially true when there are multiple items in a customer’s shopping cart to be weighed. Having both the net weight and tare weight recorded on the sales receipt provided to the customer would alleviate, if not eliminate this concern. While some might argue that most consumers would have no interest in being able to view this information on their receipt, consumers are entitled to the information. Making this information available to consumers would allow them to follow all parts of a transaction to ensure its accuracy.

OWM notes that some stores provide both net weight and tare weight values on packages put up in advance of sale. Thus, providing this information on a sales receipt generated from a cash register interfaced with a weighing/load-receiving element in a POS system would be consistent with what is already being done by some stores with their prepackaged weighed items.

In its review of the issues surrounding this proposal, OWM identified points cited in support of the proposal as well as points in opposition to the proposal. These are listed for the Committee to consider in its deliberations.

Reasons Cited in Support of the Proposal:

- Implementing the requirements for POS systems would eliminate the inconsistencies between transactions conducted with POS systems and other direct sale weighing transactions for similar products.
- Weights and measures requirements are designed to ensure transparency in a transaction. Consumers should be provided with information about their transaction that can be readily assimilated; it should be left up to the individual consumer as to whether they want to view or use the information.

- In a typical transaction, consumers may be placing numerous items on the conveyor belt and placing bags into their cart. Particularly given the speed at which a transaction takes place, it is difficult for a consumer to observe all details of a weighing transaction.
- Consumers have the right to observe all relevant information in a weighing transaction. Current systems that display only the gross weight do not reasonably provide a consumer the opportunity to observe details of the transaction.
- Allowing for a phased-in implementation of the requirements would allow companies time to bring systems into compliance with the requirements. Software changes are reportedly made on a rather frequent basis, so it may be possible to implement the proposed changes along with other software updates. Note that a later effective date might be considered.
- Receipts are already lengthy because of advertisement and marketing information; adding the gross and/or tare weight information shouldn't substantially increase the length.
- Electronic receipts are already offered as options in many stores; thus, receipt length and paper cost becomes less of an issue.
- The lack of consumer complaints is not a clear indication that consumers don't care or need this information. The lack of complaints may stem from a lack of consumer education on the potential impact of tare in a weighing transaction.
- Many POS operators are not properly trained to take tare and may not even consistently maintain the POS on zero.
- Many POS systems don't comply with current requirements for clearly and definitely identifying all indications. See paragraph G-S.6. Marking Operational Controls, Indications, and Features as referenced earlier in this analysis.
- Many POS include complex features and options. The concessions permitted in the 1970s due to limited system capability no longer seem justified.

Reasons Cited in Opposition to the Proposal:

- Implementation of proposed changes may be costly.
- Companies may have a difficult time implementing the changes in a short time period.
- Printing tare on receipts will add to the length of the receipts.
- Consumers don't need or care about this information.
- Few/no consumers have complained about not having this information.
- Including tare information on the receipt will likely result in confusion because customers are not familiar with tare weight.
- Including specific tare weight information does not ensure that the correct amount of tare has been deducted.
- Weights and measures officials already verify the programmed tare values in POS systems, so why is it necessary to implement this requirement?
- There are questions about how the requirements would apply to items weighed in self-weigh systems. Would these be handled like pre-packaged items since they have already been weighed and priced elsewhere? Or would the POS system have to print the tare on the receipt issued by the POS?
- Shouldn't these requirements also applied to weighed items sold through home delivery programs to ensure a level playing field?
- Systems have operated this way for many years. Why make changes now?

Given concerns raised by manufacturers and retailers, perhaps consideration should be given to further extend the effective date to better enable older systems to phase out and current systems to be updated. It seems better to set a date for compliance and work toward it rather than keep delaying any action.

There are a variety of systems in the marketplace with various configurations of scales, displays, and receipts. Some systems already provide many or all details of a transaction, such as the gross weight, net weight, and/or tare weight. Others have more limited capability, displaying only the gross weight on the customer display and the net weight on

the printed receipt, with neither weight identified as such. It is the latter situation that seems to be of most concern to the submitter and others in the community.

Given the spectrum of systems, there may be more than one way to satisfy these concerns, so perhaps more than one option might be used to provide the needed information. To keep the requirement simple and easy to understand and apply, OWM suggests the Committee consider two of these options. Additional options could certainly be added at a later point if needed. With this in mind, OWM suggests the Committee consider replacing the proposal in the Item Under Consideration as outlined at the beginning of OWM's comments.

SCL - 8 Sections Throughout the Code to Include Provisions for Commercial Weigh-in-Motion Vehicle Scale Systems (Carry-Over Item)

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to recommend this item move forward as an informational item. The WIM Vehicle Scale Task Group has circulated a white paper during the open hearings requesting input from the membership of the region. The Committee encouraged those wanting to provide input to contact Mr. Alan Walker (FL) Chairman of the Task Group, or Mr. Tim Chesser (AR) Co-Chairman of the Task Group. Several of those giving testimony at the open hearings stated that they would like the acceptance tolerance to equal $\frac{1}{2}$ the maintenance tolerance for both static and dynamic testing. Another comment was heard suggesting the acceptance tolerance be equal to $\frac{1}{2}$ the maintenance tolerance for static testing and equal to the maintenance tolerance for dynamic testing.

SWMA - The Committee heard comments from members of the WIM Task Group, who noted that a lot of progress has been made, but additional input is still needed. Multiple weighing device manufacturers, who are also members of the Task Group, expressed concerns about modifications to the tolerances and urged caution in considering the impact such changes might have. There were also questions raised regarding how the tolerance structure was established for other dynamic systems, including in-motion monorail scales and railway track scales, and some noted that review of the history for how these tolerances were established is warranted. Some also commented that additional work is needed on the test procedures; until clear test procedures can be established and agreed upon, there is no evidence that the systems can meet the proposed tolerances under conditions of normal use. The Committee also heard comments indicating that more data is needed to make an informed decision regarding changes to the tolerances. The Chairman of the Task Group, Alan Walker, commented that prior to elevating this item to a Voting item, the Task Group needs additional input, particularly from weights and measures jurisdictions to assess what additional work is needed, and he noted this may include collecting test data demonstrating that systems can meet the tolerances.

The Committee recommends this item remain "Informational" until such time that additional information has been gathered and a recommendation made by the Task Group to the NCWM S&T Committee to change the status of the item.

NEWMA - A comment was submitted electronically by Lou Straub (Fairbanks Scale) as a member of the WIM Task Group (TG) that there is disagreement amongst the TG members on what kinds of tolerances should be met. Item submitter John Lawn (Rinstrum) asked that maintenance and acceptance tolerances be the same. Eric Golden (Cardinal Scale) believes that the acceptance tolerance should be half the maintenance tolerance. WIM task group is looking for additional comments to further develop the item. This item is recommended to move forward as Informational and to be developed by the WIM task group.

CWMA -The committee heard support from Cardinal and Fairbanks for leaving acceptance tolerance one half of maintenance tolerance. Dick Suiter Consulting and Rinstrum supported acceptance tolerances equal to maintenance tolerances for dynamic testing to be uniform, with other dynamic weighing in HB 44. The CWMA believes this item has merit, however as (previously mentioned) devices need NTEP approval before being placed into commercial service. The CWMA recommended the item as a Developing Item on the NCWM agenda.

SMA - The SMA opposes the item as written.

Rationale: The SMA appreciates the work that the WIM Task Group has done thus far. Feedback from the regulatory community (on the White Paper produced by the WIM Task Group) is needed to help solve the issues related to tolerance and testing methods.

Other - Two members of NCWM's Weigh-in-Motion Task Group, Mr. Greg Gholston (MS) recently posted the following comments on the WIM Task Group's listserv:

Mr. Greg Gholston (MS) Jan. 4, 2018 wrote: I agree that the test procedure is weak as is. I think incorporating reference vehicles (that are weighed statically on a reference scale) would increase the validity of the test. Tolerances could then be based upon the reference vehicle weights instead the field standard test weight that may or may not be part of the vehicle's payload. Field standard test weights would then only be necessary in the static testing of the reference scale and any static test performed on the WIM scale. In such a test, a test truck could even be used as two reference vehicles quiet easily, as a loaded vehicle and an empty vehicle.

Of course, doing such a test would bring additional questions regarding the number (and types) of vehicles necessary and who is to provide them, as well as what to do when a reference scale isn't readily available.

Mr. Tim Chesser (AR) Jan. 5, 2018 responded: I have to disagree with the test procedure being weak. Why wouldn't you use a reference scale for all scale tests just to validate the test.

Reference scales only introduce an unknown to the test. I do support for NTEP purposes. Not for routine field examinations. We have discussed this for too many hours. We should move forward and put it to a vote for the NCWM S&T Committee or move forward with and/or language if jurisdictions need the language. The state of Arkansas will not support requirements to include a reference scale a block away or forty miles away.

OWM – OWM has not been able to identify a justification for support of this item due to the following reasons:

1. No manufacturer of a WIM vehicle scale system, to date, has been able to demonstrate to members of the WIM Task Group (TG) that their equipment can achieve a 0.2 percent degree of accuracy during all anticipated conditions of use; and
2. Members of the TG have not been able to agree on a method of establishing test standards accurate enough to meet paragraph 3.2. Tolerances for Standards in Appendix A - Fundamental Considerations of HB 44 that they could then be used to perform an official test of a WIM vehicle scale system having a declared accuracy of 0.2 percent. Members of the TG have also not been able to agree on any test procedure(s) that would confirm the accuracy of a system to within 0.2 percent of applied load without contributing to the uncertainty and additional error in the procedure itself.

Some members of the TG are supportive of a method of testing in which a test truck loaded with field standard test weights is run over the WIM system's load-receiving element multiple times. The test weights are then off-loaded and the empty test truck run over the scale the same number of times as when loaded. Net-weight values are then established from the difference in these results, although details concerning how this is to be done have not yet been firmly established. Those supporting this test method have suggested the tolerance be based upon the amount of known test weight used and that the tolerance be applied to each of the individual net weight results. OWM does not believe this method of testing or the application of tolerance to a net weight result is valid because the procedures fail to disclose the true amount of error in a system throughout its weighing range. That is, the use of these procedures does not enable an inspector or service person to determine how much built-in error might be in a weighing system in the range from zero load to the weight of the empty test truck, which is an unknown value. Consequently, each net weight result might be within tolerance using these procedures, but the true amount of error in the weighing system for the total amount of load applied remains unknown. For this reason, the results of testing using these procedures prove inclusive. Additionally, using net weight results for determining whether or not a weighing system complies with HB 44 tolerances deviates from how tolerances are applied to vehicle scales and other types of weighing systems whereby the tolerance is established for and based upon each applied test load.

The TG has requested input from the four regional weights and measures associations to assist in arriving at a consensus on the issues outlined above and OWM believes that the TG is at an impasse at this time. To date, there have not been any practical procedures identified that will clearly and precisely establish the mass of a reference test truck to within the degree of accuracy necessary for it to be used as a standard to test a commercial WIM system. This situation is exacerbated given the degree of accuracy declared by the submitter of this item and due to significant opposition that has been voiced by some to the net load test procedures supported by other TG members. Additionally, the submitter has not been asked by the Task Group to disclose the test procedures used to confirm its equipment could perform to within 0.2 % of the applied load under normal conditions of use as claimed. This information may prove very useful to the Task Group, especially if members could agree that the procedures are acceptable for use in validating the accuracy of a WIM system to within 0.2 percent accuracy.

OWM noted in its analysis of this item at the 2017 NCWM Interim and Annual Meetings the concern that the WIM Task Group may be developing proposed changes to HB 44 for equipment in which there is no model or type currently produced that is capable of meeting the 0.2 % tolerance proposed under conditions of normal/anticipated use. OWM believes it is reasonable to expect the submitter to provide test data demonstrating equipment capable of performing to within this declared tolerance currently exists. OWM questions the need to make changes to HB 44 and for a Task Group to continue work towards this effort without such demonstrable evidence.

ABW - AUTOMATIC BULK WEIGHING SYSTEMS

ABW - 3 A. Application, S Specifications, N. Notes, UR. User Requirements (Carry-Over Item)

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to recommend this item remain a developing item and understands the submitter is still working on the item. The WWMA would welcome input from other individuals on this item as there was only one comment during the open hearings.

SWMA - The Committee took comments jointly on the following items in a “batch”: 3200-1 S.1.2. Value of Scale Division Units & Appendix D (Scales); 3202-1 A. Application, S. Specifications, N. Notes, UR. User Requirements (ABWS); and New 28 A. Application and Appendix D. Definitions – batching systems. Mr. Russ Vires, speaking on behalf of SMA, noted that the SMA took no position on this item. There were no other comments on the item. The Committee noted that the item has been on the agenda for multiple years with little change. Consequently, the Committee proposed and the SWMA agreed to recommend the item be withdrawn and, should the submitter want to resubmit the item, could do so in the future.

NEWMA - No comments were heard on this item. NEWMA believes this item has merit but should remain in the hands of the source as a Developing item.

CWMA - The committee heard testimony from Kansas stating the item is fully developed and ready for vote. The CWMA agrees with the submitter and recommended this item to be voted on.

SMA - The SMA takes no position on this item at this time and looks forward to additional analysis performed by the appropriate stakeholders.

OWM – The proposed changes to the Automatic Bulk Weighing Systems (ABWS) code would expand its application to include some newer automatic weighing systems that currently fail to meet the application of the ABWS code (or the current HB 44 definition of an ABWS). OWM is not convinced this is a technically sound appropriate approach. The current ABWS code applies to systems that automatically weigh a single commodity in successive drafts; yet, it is our understanding that it was the submitter’s intent in drafting some of the proposed changes that the code also apply to systems that automatically weigh more than one commodity at a time in successive drafts. For example, some seed treatment systems can be programmed to weigh multiple drafts of the same recipe, which oftentimes is made up of different ingredients (commodities) that get mixed together to form the treatment for a particular seed

type. The various recipes to be weighed by a system can include not only different ingredients, but also different amounts of those ingredients, both which can affect the price charged to customers. Expanding the application of the ABWS code to address such systems may cause unnecessary confusion. For this reason, OWM prefers maintaining the current ABWS code as is. Perhaps a better approach to addressing these systems and the resulting gaps in HB 44 requirements would be to form a small group to further study such systems and recommend Handbook 44 changes, possibly including consideration of a separate code to address these and other types of dynamic weighing systems.

ABW - 4 A. Application and Appendix D: Definitions – batching system

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA recommends this item to be continued as an informational item because it feels the item has merit, however, it failed to make the printed agenda even though it was submitted on time. There was a lack of testimony in the open hearings due to the item not being a part of the printed agenda. This item is a replacement for voting item 3200-1.

SWMA - The Committee took comments jointly on the following items in a “batch”: 3200-1 S.1.2. Value of Scale Division Units & Appendix D (Scales); 3202-1 A. Application, S. Specifications, N. Notes, UR. User Requirements (ABWS); and New 28 A. Application and Appendix D. Definitions – batching systems.

Mr. Richard Suiter, submitter of the item, provided an overview of the item, including how the issue originated. He also displayed a picture of a sample system illustrating how one of the more modern “batching systems” are laid out. The Committee also heard comments from Tina Butcher (NIST OWM) questioning whether a separate code addressing dynamic weighing systems might be warranted, noting that the ABWS Code didn’t originally envision these new systems, but the current Scales Code may not include the necessary safeguards to automatically ensure a zero start. Mr. Suiter noted that he had recommended the addition of a specification in an earlier proposal, but that was not accepted by the NCWM. He noted that there is an urgency to include something to address these systems as opposed to waiting for the development of a separate code. The SWMA recommended the item be designated as a Voting item.

NEWMA - No comments were heard on this item during open hearings. NEWMA believes this item is fully developed and recommended it move forward as a voting item.

CWMA - This definition replaces 3200-1, which was withdrawn by the submitter. The CWMA believes this definition is more appropriate and the item is fully developed and ready for voting.

SMA - The SMA opposes this item.

Rationale: Batching systems are not commercial devices and therefore should not be included in Handbook 44.

Weights and Measures Consulting LLC – Comments in opposition to these items submitted by Mr. Henry Opperman to the NCWM dated 12/27/17 posted on NCWM’s web site.

OWM – OWM recognizes the further development of this item and appreciates the efforts of the submitter to amend this proposal. OWM believes the definition for “batching system” used to replace the definition in the previous version of the proposal is believed to be a more appropriate description of the term than that previously offered.

OWM believes however, that the definition now being proposed is a generic description of a process rather than a description of a device or system. Therefore, OWM questions the use of this definition in the classification of commercial weighing devices. OWM has noted that many scales of various designs could potentially be incorporated into a “batching system” and that, it is not a specific nor definitive characteristic of those various scales that will facilitate their use as a component in a batching system.

OWM also believes there is no reasonable justification to exclude the use of an ABWS from being used as part of a batching system. While no specific examples are being cited, there does not appear to be anything that would prevent an ABWS from being used in some phase of a batching system.

OWM believes the application of the Handbook 44 ABWS Code is appropriate for any weighing device/system that complies with the criteria provided in paragraph A.1. "General" in Section 2.22. of Handbook 44 including:

- automatic weighing of a bulk commodity;
- performed in successive drafts of a predetermined amount;
- automatically recording the no-load and loaded weight values of each draft; and
- the totalization or accumulation of the net weights of all successive drafts.

If the concern is that the ABWS code as currently written does not adequately address some types of dynamic weighing systems, then consideration needs to be given to modifying the ABWS code to better address these types of systems. Alternatively, perhaps consideration needs to be given to a separate code to better address these and other types of dynamic weighing systems.

LMD - LIQUID MEASURING DEVICES

LMD - 2 S.1.6.7. Recorded Representation, S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided. and UR.3.4. Printed Ticket

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - This item was originally presented by the committee in the voting session as a voting item on the voting consent calendar. Ron Hasemeyer with Alameda County, CA asked for it to be removed from the consent calendar during discussion in the voting session. It was removed and voted on individually, and the vote failed. The Committee briefly met during a recess in the voting session and agreed that this item should move forward as a developing item. This was presented when the voting session resumed and the WWMA agree it should move forward as a Developing Item on the NCWM agenda.

SWMA - The Committee heard no comments on this item. The Committee acknowledged that the submitter had modified the proposal from the original (which only proposed changes to the user requirement UR.3.4.) to include proposed changes to two specifications paragraphs, S.1.6.7. and S.1.6.8. During its work session, the Committee acknowledged that there was general support during the Measuring Sector's recent meeting for including identifying information for the pump on printed tickets/receipts, but there should be accompanying requirements in the "Specifications" section of the code. Given that the item has been updated (to include proposed specifications) based on comments received during the NCWM meetings and that there were no comments during the SWMA meeting, the SWMA recommended this item as a Voting item.

NEWMA – No comments were heard on this item during open hearings. NEWMA believes this item is fully developed and recommended it move forward as a voting item.

CWMA - The committee heard comment from the submitter and the CWMA believes the item is ready for voting.

OWM – As noted in its analysis for the 2017 Interim and Annual Meetings, OWM concurs that providing the dispenser designation on the printed ticket may be beneficial to the consumer and official in identifying the receipt for a particular transaction.

The provisions in paragraph UR.3.4. were originally added to NBS Handbook 44 in 1967 at the request⁵ of industry to address technology limitations which would have made it impractical from a cost perspective to print all three values. OWM continues to question whether, given today's technology, the provision to allow the remaining values to be written in hand script is still appropriate or if a system that is capable of providing a printed ticket should be capable of printing all the values. However, there may still be a need to allow for this option and this comment shouldn't detract from moving forward with the proposal.

OWM believes the addition of the proposed changes to paragraphs S.1.6.7. and S.1.6.8. make this proposal more complete and help ensure that the dispenser designation information will be included on receipts issued for systems covered under those paragraphs. OWM suggests that the Committee consider and address one concern regarding the effective dates prior to moving this item forward for a vote. The requirements in the proposed changes to paragraphs S.1.6.7. and S.1.6.8. are *nonretroactive* as of January 1, 2021. However, the changes to paragraph UR.3.4. are proposed to become *effective (?) and retroactive* as of that date. Thus, in 2021, UR.3.4. will apply to all systems in which a printed ticket is issued. Thus, some “point-of-sale” systems covered under S.1.6.7. and S.1.6.8. that do not require the system to designate the dispenser information under the specification will still require the user to hand write the information on the receipt. OWM questions whether a better option might be to make the provision in the User Requirement “nonretroactive” as of 2021. Alternatively, a statement could be included in UR.3.4. to state “except for systems that comply with paragraphs S.1.6.7. and S.1.6.8.” or similar wording.

LPG - LPG AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES

LPG -3 S.2.5. Zero-Set-Back Interlock, Stationary and Vehicle Mounted Meters, Electronic

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA – The WWMA agreed to recommend this item be carried forward as a developmental item, with the desire to hear input from the other regions in addition to hearing from industry including the meter manufacturers association.

SWMA - The Committee heard comments from the submitter, Ken Ramsburg, MD, who noted that the purpose of the proposal is to align the LPG & NH₃ code with requirements already included in the Vehicle-Tank Meters Code. The Committee heard no comments in opposition to the proposal. The SWMA recommended the item for a vote on the NCWM agenda.

NEWMA - There was some clarification provided on the purpose of this item. NEWMA believes the item has been fully developed and recommended it move forward as a Voting item.

CWMA – There were no comments opposing this item, and since the language is already in HB 44, the CWMA recommends the item be moved to voting. CWMA appreciates the work of the Office of Weights & Measures on clarifying these items.

OWM – OWM agrees with the submitter that additional requirements should be added to the LPG code for a zero-set-back interlock for electronic stationary (other than stationary retail motor fuel dispensers) and vehicle-mounted meters. OWM recommends adding a parenthetical to the title to limit the application of the new paragraph to stationary meters that are not used in retail motor-fuel applications; this will eliminate redundancy and help avoid confusion over how the **existing** paragraph S.2.5. Zero-Set-Back Interlock for Stationary Retail Motor-Fuel Devices (which includes similar requirements to the proposed new paragraph) would apply.

The last sentence of proposed **new** paragraph S.2.5. (S.2.5. Zero-Set-Back Interlock, Stationary (other than Stationary Retail Motor-Fuel Dispensers) and Vehicle-Mounted Meters, Electronic) includes a time-out limit. We agree a time-out specification is appropriate; however, we suggest that it be addressed in a separate paragraph. During our analysis, we noted that a new paragraph (S.1.6.10. Automatic Timeout, Pay-at-Pump Retail Motor-Fuel Devices) was added to the LMD Code in 2017 specifying an automatic timeout for retail motor-fuel applications where payment is rendered via a card at the dispenser; however, a corresponding paragraph to address LPG systems used in RMFD applications was not added at the same time. In keeping with the S&T Committee’s past efforts to align requirements for RMFDs in the LMD Code and the LPG & Anhydrous Ammonia Liquid-Measuring Devices Code, we suggest the Committee consider adding another paragraph to the proposal to mirror this requirement in the LMD Code. By moving the timeout limit in the proposed **new** paragraph S.2.5. into a separate paragraph (S.2.6. Automatic Timeout, Stationary (Other than Stationary Retail-Motor Fuel Dispensers)), the format of requirements for (1) zero-set-back interlock requirements and (2) timeout provisions will be consistent for stationary retail motor-fuel dispensers and other types of stationary devices,

Thus, OWM offers this alternate proposal:

S.2.5. Zero-Set-Back Interlock, Stationary (Other than Stationary Retail Motor-Fuel Dispensers) and Vehicle-Mounted Meters, Electronic. - **A device shall be so constructed that after an individual or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position.**

(Added 20XX) (Nonretroactive as of 20XX)

S.2.6. Automatic Timeout, Stationary (Other than Stationary Retail Motor-Fuel Dispensers) and Vehicle-Mounted Meters, Electronic. **For individual deliveries, if there is no product flow for three minutes the transaction must be completed before additional product flow is allowed. The 3-minute timeout shall be a sealable feature of an indicator.**

(Added 20XX) (Nonretroactive as of 20XX)

S.2.7- Zero-Set-Back Interlock for Stationary Retail Motor-Fuel Devices. – **A device shall be constructed so that:**

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S.2.8. Automatic Timeout Pay-at-Pump Retail Motor-Fuel Devices. – **Once a device has been authorized, it must de-authorize within two minutes if not activated. Re-authorization of the device must be performed before any product can be dispensed. If the time limit to de-authorize the device is programmable, it shall not accept an entry greater than two minutes.**

(Added 20XX) (Nonretroactive as of 20XX)

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Renumber remaining paragraphs.

LPG - 4 N.3. Test Drafts. (Carry-Over Item)

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to carry this item forward as developmental recommending it be harmonized with items New 6-15 and New 24-27 as the different terms used in these new items will affect their application. The WWMA believes that the terms such as “Transfer Standard”, “Testing Standards”, “Verification (Testing) Standards”, “Field Standards”, “Field Reference Standard Meter”, “Master Meter”, etc. in New 6-15, and New 24-27 need to be defined and possibly standardized prior to further development of this item. The WWMA is also concerned that Handbook 44 is not the appropriate place to specify the type of test equipment necessary for conducting tests.

SWMA - The Committee heard comments from Mrs. Tina Butcher (NIST OWM) on this item and 3307-2 noting that Val Miller will be looking at master meters and considering the development of a NIST HB 105-X which might address master meters. She noted that the issue of “master meters” is very broad and that it is necessary to consider the specific type (technology) of master meter used and the application where it will be used. During its work session, the Committee noted that the Measuring Sector also considered these items and is beginning work to address the use of one specific type of master meter as a starting point for developing further criteria for use in type evaluation. The Committee also acknowledged that Bob Murnane (Seraphin) provided written comments on this issue (see also the Committee’s comments under Item New-6).

The SWMA supports the concept of using “master meters” (and acknowledged that other terms have been and are being proposed) for various metering applications. The SWMA believes there is still confusion over the terminology

and that it is difficult to review multiple items related to the same basic issue. The SWMA recommended that this item remain Developing.

NEWMA - This item has been recently modified and is currently under development by the submitter. NEWMA believes this item has merit, but should remain developing at this time.

CWMA - The committee received statements from Seraphin asking this to be a Developing item. The CWMA agrees more development is necessary to keep up with changing technology in the marketplace and recommended the item as Developing on the NCWM agenda.

Seraphin Test Measure Company – Comments in opposition to all items in Block 4 and Block 5, and stand-alone items LPG-4 and MFM-2 to the NCWM dated 12/28/17 posted on NCWM’s web site.

OWM – OWM considers this item and MFM-2 N.3. Test Drafts similar and consequently, offers the following comments and recommendations to these two items:

Since 2015, the S&T Committee has had items LPG-4 N.3. Test Drafts and MFM-2 Test Drafts (previously numbered 3302-1 and 3307-1 and 332-5 and 337-3) on its agenda related to the use of what are being referenced as “transfer standards” (also referred to as “master meters” by many). OWM recognizes that many in the weights and measures community, regulators and service companies alike, would like to use “master meters” for testing products such as LPG and compressed natural gas (CNG). NIST OWM believes that using such standards, if appropriately verified, may offer advantages in terms of practicality for some types of measurement, cost effectiveness, saving time, and increasing safety. However, simply adding a paragraph to the “Notes” sections of these two device codes does not ensure that the use of such devices is appropriate. The following are some important points to consider relative to the introduction of a new standard to be used in testing a commercial or law-enforcement device:

1. Requirements for standards used as legal for trade devices
2. Adding delivery time requirements without adequate data to support the requirement.
3. Terminology “Field Reference Standards” to replace other terms such as “transfer standards,” “master meter,” or other terms used to describe a standard used to test legal for trade device remains a developing item.

1. Requirements for standards used as legal for trade devices.

When standards are used to test legal for trade devices, it is crucial that there be data available to support the NIST HB 44 Appendix A, Fundamental Consideration for testing apparatus; this section states that the combined error and uncertainty of a field standard be less than one-third the applicable tolerance.

In NIST, OWM previous reviews of these items and comments to the S&T committee as part of its regular “analysis of issues,” we provided the types of elements that need to be in place before such systems can be recognized. These elements are listed below.

A thorough evaluation of the standard must be conducted that includes:

- collection of data from the use of the standard over wide environmental conditions (since this standard will be used in various locations throughout the U.S.);
- demonstration of reliability and repeatability over time; and
- standards ability to duplicate actual use of the device.

In addition, there are infrastructure needs for the acceptance of field standards which needs to be in place at the various levels such as the following:

- Laboratories available to test the standards, including:
 - Adequate equipment for testing the standards in the laboratory.
 - Documented criteria and standards for the standards.
 - For example, a NIST 105 or other document outlining requirements and other criteria.

- Documented and accepted procedures for testing the standards.
- Training for laboratory staff.
- Field Testing
 - Training for field staff (service person and regulatory officials).
 - Documented test procedures for use of the standards.
 - For example, an EPO or other documented procedure.
 - Documentary standards to support the use of the standards
 - For example, changes needed (if any) to address the use of the standards to test a particular type of measuring system.
- Other Issues
 - Assessment of the appropriateness of the standard for use in testing commercial measuring (or weighing) systems.
 - Plans for implementation of standards and test procedures and associated training to ensure common understanding and application.

A system is needed for acceptance of field standards that results in the following:

- Manufacturers knowing and applying the requirements for the design of the standard;
- Systematic and appropriate collection of measurement data on proposed new standards;
- States (regulatory authority) having access to the measurement data to determine whether or not a standard meets the requirements; and
- Proper training and procedures for field use of the standards.

NIST OWM developed guidelines to collect data that States, interested in verification of standards used in field evaluation, may use to collect data. NIST OWM is also working with the Alternative Test Methods Work Group in efforts to analyze and review data collected that can be shared with States.

2. Adding delivery time requirements without adequate data to support the requirement.

In NIST OWM previous comments it was mentioned that data should be provided to ensure that an appropriate time is included in the requirements for N.3.2 for delivery of the minimum quantity. During NIST OWM review it was noted that the current recommended N.3.2 for both items LPG-4 and MFM-2, “The minimum quantity for any test draft shall be equal to or greater than the amount delivered in one minute at the flow rate being tested.” is not aligned with the current test procedures; allowing 1 minute of flow would result in a larger minimum quantity than what is in the current test procedures.

3. Terminology “Field Standards” to replace other terms such as “transfer standards,” “master meter,” or other terms used to describe a standard used to test legal for trade device remains a developing item.

NIST, OWM submitted Block 4 Items “Terminology For Testing Standards” for the:

- Cryogenic Liquid-Measuring Devices Code,
- Carbon Dioxide Liquid-Measuring Devices Code,
- Hydrogen Gas-Meter Code,
- Grain Moisture Meters Code,
- Electronic Livestock, Meat and Poultry Evaluation Systems and/or Devices Code,
- Appendix A and,
- Appendix D

to consider standardizing the term used for transfer standards, master meters, etc. and to consider the use of the term “Field Standards” to describe all standards use to test legal-for-trade devices.

Endress+Hauser Flowtec also submitted a similar proposal, Block 5 Items Define “Field Reference Standards” to add a definition for field reference standard and delete the use of transfer standards in the:

- Cryogenic Liquid-Measuring Devices Code;
- Carbon Dioxide Liquid-Measuring Devices Code; and
- Hydrogen Gas-Measuring Devices Code

Both items N.3.2. LPG-4 and MFM-2 use the terminology “Field Reference Standard Meter Test.” Because of the implications to various measurement areas, OWM is recommending that Block 4 items be Developing items. Also with the proposals in Block 5, there will be additional discussion on terminology for standards used to test legal for trade devices. As such, the Use of “Field Reference Standard Meter Test” will likely change as Block 4 Items and Block 5 items develop. See the NIST OWM comments on the Block 4 Items and Block 5 Items.

LPG -5 N.4.1.2. Repeatability Tests and N.4.2.4. Repeatability Tests for Type Evaluation (Carry-Over Item)

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to recommend this item continue as developing as work is continuing by the OWM, MMA, and submitter.

SWMA - The Committee heard no comments on this item. The SWMA acknowledged additional work is needed on the item and recommended the item remain Developing.

NEWMA - A comment was heard that the test currently being conducted by NTEP did not have any legal basis. The language in this item merely allows NTEP to conduct the same test legally. NEWMA feels this item is fully developed and ready for vote.

CWMA - The committee believes this item pertains specifically to mechanical compensators, and is not necessary for today’s technology. Consequently, the CWMA recommended it be withdrawn.

OWM – NIST OWM concurs with the need to make modifications to the measuring codes to clarify the application of repeatability criteria.

Prior to the addition of repeatability tolerances in the measuring codes, only G-S.5.4. applied. When considering the addition of the repeatability requirements to the specific measuring codes, the W&M community felt strongly that a measuring device should be able to repeat its indications within a much smaller limit. Field officials should be able to verify a device is capable of repeating its indications at other flow rates and use conditions. Repeatability testing at other than normal flow rates should not be limited to type evaluation.

In reviewing the history of this paragraph, it is not clear whether the decision to include the “Note” under the paragraph addressing “Normal Tests” was intended to limit the application of the repeatability tolerances in the specific codes to only certain types of tests. We found no mention of restricting the tolerances to only normal tests in either the S&T Committee or 2001 Measuring Sector reports when the tolerances were initially added. This raises the question of causes whether the location in the code is appropriate. Conducting repeatability testing at any flow rate at which the device is rated for use seems appropriate and suggests the code needs to be changed to clarify the intent.

During the Committee’s work session at the 2017 NCWM Annual Meeting, the NIST Technical Advisor further noted that, initially, OWM had questioned whether the 40 percent of the absolute value of maintenance tolerance was too stringent to apply to the results of “Special Tests.” However, during the MMA meeting that same meeting, it was noted that “Special Tests” are granted a larger tolerance. Thus, applying the “40 percent” value to the maintenance tolerances applied to special tests would result in applying a larger repeatability tolerance to those tests that for a

“Normal Test.” Based on the comments heard and its work session discussions, the Committee agreed to recommend this item be further developed.

OWM offers the following points (a number of which were shared previously) for the Committee and submitter to consider in developing any revisions to the proposal:

- OWM supports the bulk of the changes in principle.
- OWM concurs that the inclusion of the repeatability test under N.4.1. Normal Tests indicates the test is to be run at a normal flow rate; however, the original intent of this limitation is unclear.
- OWM believes the paragraph should be moved from under the “Normal Test” heading to a separate paragraph and suggests renumbering the paragraph accordingly.
- Systems must be able to provide repeatable measurements under all conditions of use, not just at the normal flow rate; however, appropriate tolerances must be applied and this may necessitate different tolerances under different test conditions.
- Field officials should not be precluded from conducting a repeatability test at all flow rates, provided appropriate tolerances are applied.
- There appears to still be some confusion over references to conducting repeatability testing for devices equipped with automatic temperature compensating systems. OWM concurs with technical points raised in discussions during S&T Committee work sessions, Measuring Sector, and Meter Manufacturers Association meetings questioning whether it is appropriate for repeatability tests to be conducted when automatic temperature compensating components are activated. OWM agrees that repeatability tests should not be conducted when mechanical ATC systems are activated. For systems equipped with electronic ATC, the calculation of the net value is determined based on a mathematical calculation, so the exemption should be unnecessary for those systems. However, it seems unnecessary to examine the net values for repeatability in such cases since they are simply a calculated value.

OWM suggests the Committee consider the following alternative proposal:

Move N.4.1.2. Repeatability Tests to follow paragraph N.4.2. Special Tests by renumbering N.4.1.2. to N.4.3. and renumbering current N.4.3. and subsequent paragraphs. Delete the new proposed N.4.2.4. Repeatability Tests for Type Evaluation.

N.4.1.2. N.4.3. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. **Repeatability tests shall be based on the uncompensated volume, e.g.; that is, with the temperature compensator deactivated. Both field tests and type evaluation tests shall be run at flow rates consistent with normal tests as specified in N.4.1. (amended 20XX)**

Add a new Paragraph N.4.2.4. as follows:

N.4.2.4. Repeatability Tests for Type Evaluation. ~~Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled~~

~~conditions where variations in factors such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained. Repeatability tests shall be based on the uncompensated volume, e.g. with the temperature compensator deactivated. Type evaluation tests shall be run at flow rates consistent with special tests as specified in N.4.2., N.4.2.1., N.4.2.2., or N.4.2.3. as appropriate.~~
~~(Added 20XX)~~

WTR – WATER METERS

WTR-2 S.2.1. Provision for Sealing and Table S.2.1. Categories of Device and Methods of Sealing

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to recommend this item go forward as a voting item with the following change:

- Add a non-retroactive date that specifies the date in which an audit trail if provided must use the format set forth in Table S.2.1.

SWMA - The Committee heard no comments on this item. The Committee acknowledged that, while there are some dates specified in the proposed table, there is no date specified under paragraph S.2.1. for the effective date of the table as a whole. The SWMA recommended the proposal for a vote with the recommendation that the NCWM S&T Committee specify an effective date prior to voting at the national level.

NEWMA - No comments were heard on this item. NEWMA determined that this item has merit and is fully developed. It is recommended to move forward as a vote.

CWMA - The committee received no comments on this item. The CWMA believes this item is fully developed and ready to be voted on.

OWM – Adding these additional categories of sealing to the Water Meters Code to permit the metrological parameters of new meters equipped with digital electronic registers to be secured by means other than physical seal seems a reasonable change and would improve harmonization of the sealing requirements in the various metering codes of HB 44. OWM cannot think of anything unique about a water meter that would necessitate different sealing requirements than those already specified in other measuring devices codes in HB 44 that these couldn't be copied to the Water Meters Code as proposed. Thus, the proposed changes to harmonize sealing requirements in the Water Meters Code with those in other measuring codes seems a sound approach.

OWM notes, as some of the regional weights and measures associations have too, that the proposed italicized sentence in brackets beneath paragraph S.2.1. making it nonretroactive needs an effective date of enforcement added. Additionally, because all of the text in Table S.2.1. is italicized, it too needs a nonretroactive date associated with it. OWM believes the entire table should be made nonretroactive as of January 1 of the year following its adoption and questions the reason for the two dates of enforcement shown in the first column of the table for Category 3 devices. That is, since sealing other than by use of physical seal has never been permitted in the past, why backdate the effective date of enforcement for Category 3 devices to 1995 and 2001?

MFM – MASS FLOW METERS

MFM-2 N.3. Test Drafts (Carry-Over Item)

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to recommend this item be withdrawn. The requirement in proposed N.3.1 Minimum Test requiring the minimum test shall be one test draft at the maximum flow rate of the installation is not possible for current testing equipment or NIST EPO's including gravimetric or flow meter testing of CNG retail motor fuel devices.

SWMA - The Committee took comments on both Items 3302-1 and 3307-2. See Item 3302-1 for additional details. The SWMA supports the concept of using "master meters" (and acknowledged that other terms have been and are being proposed) for various metering applications. The SWMA believes there is still confusion over the terminology and that it is difficult to review multiple items related to the same basic issue. The SWMA recommended that this item remain Developing.

NEWMA - This item was recently modified by the source and is currently under development. No comments were heard during open hearings. NEWMA recommended it remain in a Developing status.

CWMA - The committee received statements from Seraphin asking the item be Developmental. The CWMA agrees this item should remain Developmental, and the year "1982" be removed.

Seraphin Test Measure Company – Comments in opposition to all items in Block 4 and Block 5, and stand-alone items LPG-4 and MFM-2 to the NCWM dated 12/28/17 posted on NCWM's web site.

OWM – OWM considers this item and LPG-4 related items and provides the same comments and recommendation to both items. Refer to OWM comments and recommendations to LPG-4 to view OWM's analysis of these two items.

TXI – TAXIMETERS

TXI-1 S.1.2.2. Distance Mechanism and S.1.5.3. Distance Not Recording.

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA – The WWMA agreed to recommend this item be carried forward as voting item as it corrects this section of the code to bring it into conformance with the original intent allowing the industry time to comply with the requirements.

SWMA - The Committee heard comments from Mrs. Tina Butcher (NIST OWM) who provided history of the item. She noted that, when revisions were made to the Taximeters Code in July 2017, there was an oversight in designating a specific non-retroactive date; a date of 20XX was specified in the proposal when it was adopted. The standard approach for addressing a "20XX" date has been to use a date of the subsequent calendar year. Thus, OWM used 2018 as the specified date. However, there were concerns that taximeter manufacturers may have been anticipating a later date. Consequently, OWM polled the USNWG on Taximeters and is proposing a modification to the date as specified in the proposal. There were no other comments nor opposition to the proposed change and the SWMA recommended the item for a vote.

NEWMA – Mike Sikula (NY) supports this item. This item has been fully developed and is recommended to move forward as a voting item.

CWMA – Don Onwiler explained there was an error in the timing of the implementation date which could adversely affect industry, and therefore the CWMA believes the item should be moved to voting.

OWM - OWM recognizes that the effective dates established for the new requirements have been determined by adhering to a customary practice used routinely when nonretroactive requirements are adopted without a specific date provided at the time the proposed change is voted on by NCWM. That customary practice is to assign an effective date for a new requirement as January 1 of the year following the adoption of the proposal.

Considering that these new requirements would likely create a need for taximeter manufacturers to redesign software and hardware elements in their product line, OWM supports the changes to provide additional time for the necessary changes to be incorporated into new devices. Amending the nonretroactive effective dates from January 1, 2018 to January 1, 2020 would provide taximeter manufacturers an additional two years to incorporate the necessary changes in their new products.

OTH – OTHER ITEMS

OTH-5 D Electric Watthour Meters Code under Development (Carry-Over Item)

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to recommend this item be forwarded to the national committee as a developing item as there is continuing work by the US National Work Group.

SWMA - An update on this item was given by Mrs. Tina Butcher, NIST OWM, submitter of this item. Mrs. Butcher reported the USNWG on Electric Vehicle Refueling and Submetering has begun work on development of a draft NIST Handbook 44 code for utility type electric watthour meters used in submetering applications. She indicated the group held a face-to-face meeting in Sacramento, CA in mid-September and has made good progress on the draft code. The group plans another short meeting in November followed by another, longer meeting in early Spring. The group hopes to finish review and revision of the code and submit a final draft for review by the regions in fall 2018. NIST OWM will continue to provide updates on the Work Group's progress and encourages anyone interested in participating in the work (as an active member or observer) to contact Work Group Chairman, Lisa Warfield (lisa.warfield@nist.gov) or Technical Advisor, Tina Butcher (tina.butcher@nist.gov).

NEWMA – NEWMA supports the continued development of this item.

CWMA – The committee heard no comments on this item and the CWMA recommended leaving this as Developmental.

OWM- The Electric Watthour Meter Subgroup of the USNWG on Electric Vehicle Fueling & Submetering has held two meetings since the 2017 NCWM Annual Meeting. On September 12-14, 2017, the State of California Division of Measurement Standards hosted an in-person meeting of the Subgroup. On November 16, 2017, the National Electrical Manufacturers Association (NEMA) hosted an in-person meeting of the Subgroup. Both meetings included web-conferencing to allow those not able to attend in person to participate in the meetings. The Subgroup has developed a proposed addition to NIST Handbook 130's Uniform Regulation for the Method of Sale of Commodities to specify a method of sale for electrical energy sold through these systems. The Subgroup is steadily working on a proposed code for NIST Handbook 44 to address specifications, tolerances, and other requirements for metering systems. The Subgroup expects to have both proposals ready for submission in the 2018-2019 NCWM cycle. Those interested in participating in this work are asked to contact Subgroup Chairman, Ms. Lisa Warfield, NIST OWM by email (lisa.warfield@nist.gov) or phone (301-975-3308), or Technical Advisor, Mrs. Tina Butcher, NIST OWM by email (tbutcher@nist.gov) or phone (301-975-2196).

OTH-6 Appendix D – Definitions: Batch (Batching)

Regional Association Recommendations and Comments: *(from their fall 2017 meetings)*

WWMA - The WWMA agreed to recommend that this item be withdrawn as it does not feel that this term needs to be defined based on its current use in Handbook 44. In addition, this definition identifies only one type of batching operation when there are many different uses of the term “batch (batching)” currently in use.

SWMA - The Committee heard comments from Richard Suiter (Richard Suiter Consulting) who opposed the proposal, noting that the definition conflicts with many systems that are currently in the field. The definition only refers to one type of system. The Committee heard no other comments on the item. Given the comments received in opposition to the proposal and the other items addressing batching systems, the SWMA recommended the item be withdrawn

NEWMA - No comments were heard on this item. The committee recommends this item be designated with Developing status.

CWMA – The submitter chose to withdraw this item based on the inability to reach a consensus on the definition of “Batch.”

SMA - The SMA opposes this item.

Rationale: Batching systems are not commercial devices and therefore should not be included in Handbook 44.

OWM- **The submitter requested this item be withdrawn at the CWMA meeting**