

## Specifications and Tolerances (S&T) Committee Interim Report

Mr. Steve Giguere, Committee Chair  
Maine

### 300 INTRODUCTION

The S&T Committee (hereinafter referred to as the “committee”) submits this Committee Interim Report for consideration by National Conference on Weights and Measures (NCWM). This report contains the items discussed and actions proposed by the committee during its Interim Meeting in New Orleans, Louisiana, January 22-25, 2012. The report will address the following items in Table A during the Annual Meeting. Table A identifies the agenda items by reference key, title of item, page number and the appendices by appendix designations. The acronyms for organizations and technical terms used throughout the report are identified in Table B. The headings and subjects apply to *NIST Handbook 44 Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, 2012 Edition*. The first three digits of an item’s reference key are assigned from the Subject Series List. The status of each item contained in the report is designated as one of the following: **(D) Developing Item:** the committee determined the item has merit; however, the item was returned to the submitter or other designated party for further development before any action can be taken at the national level; **(I) Informational Item:** the item is under consideration by the committee but not proposed for Voting; **(V) Voting Item:** the committee is making recommendations requiring a vote by the active members of NCWM; **(W) Withdrawn Item:** the item has been removed from consideration by the committee.

Some Voting Items are considered individually, others may be grouped in a consent calendar. Consent calendar items are Voting Items that the committee has assembled as a single Voting Item during their deliberation after the Open Hearings on the assumption that the items are without opposition and will not require discussion. The Voting Items that have been grouped into consent calendar items will be listed on the addendum sheets. Prior to adoption of the consent calendar, the committee will entertain any requests from the floor to remove specific items from the consent calendar to be discussed and voted upon individually.

Committees may change the status designation of agenda items (Developing, Informational, Voting, and Withdrawn) up until the report is adopted, except that items which are marked Developing, Informational or Withdrawn cannot be changed to Voting Status. Any change from the Committee Interim Report (as contained in this publication) or from what appears on the addendum sheets will be explained to the attendees prior to a motion and will be acted upon by the active members of NCWM prior to calling for the vote.

An “Item Under Consideration” is a statement of proposal and not necessarily a recommendation of the committee. Suggested revisions are shown in **bold face print** by ~~striking out~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in **bold faced italics**. Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

All sessions are open to registered attendees of the conference. If the committee must discuss any issue that involves proprietary information or other confidential material; that portion of the session dealing with the special issue may be closed provided that (1) the Chairman or, in his absence, the Chairman-Elect approves; (2) the Executive Director is notified; and (3) an announcement of the closed meeting is posted on or near the door to the meeting session and at the registration desk. If at all possible, the posting will be done at least a day prior to the planned closed session.

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

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**Table B**  
**Glossary of Acronyms and Terms**

<b>Acronym</b>	<b>Term</b>	<b>Acronym</b>	<b>Term</b>
AAR	Association of American Railroad	NCWM	National Conference on Weights and Measures
AES	Advanced Encryption Standard	NEWMA	Northeastern Weights and Measures Association
AREMA	American Railway Engineering and Maintenance-of-Way Association	NIST	National Institute of Standards and Technology
B	Basic Publication	NTEP	National Type Evaluation Program
BCS	Belt-Conveyor Scale	NTETC	National Type Evaluation Technical Committee
CC	Certificate of Conformance	OIML	International Organization of Legal Metrology
CWMA	Central Weights and Measures Association	OWM	Office of Weights and Measures
D	Document	P&SP	Packers and Stockyards Program
DOT	Department of Transportation	R	Recommendation
ECR	Electronic Cash Register	RMFD	Retail Motor Fuel Dispenser
FHWA	Federal Highway Administration	S&T	Specifications and Tolerances
GIPSA	Grain Inspection Packers and Stockyard Administration	SI	International System of Units
GPS	Global Positioning System	SMA	Scale Manufacturers Association
IATR	International Association of Transportation Regulators	SWMA	Southern Weights and Measures Association
IEC	International Electrotechnical Commission	TC	Technical Committee
ISO	International Standardization Organization	USDA	United States Department of Agriculture
LMD	Liquid Measuring Devices	USNWG	U.S. National Work Group
MDMD	Multiple Dimensions Measuring Device	WIM	Weigh-in-Motion
MMA	Meter Manufacturers Association	WWMA	Western Weights and Measures Association
NACS	National Association of Convenience Stores		

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**Details of All Items**  
(In order by Reference Key)

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**320 SCALES****320-1 W S.1.7. Capacity Indication, Weight Ranges, and Unit Weights****Source:**

Kansas Department of Agriculture (2012)

**Purpose:**

Uniform testing of commercial devices.

**Item Under Consideration:**

Amend *NIST Handbook 44*, 2.20 Scales as follows:

**S.1.7. Capacity Indication, Weight Ranges, and Unit Weights.**

- (a) Gross Capacity. An indicating or recording element shall not display nor record any values when the gross load (not counting the initial dead load that has been canceled by an initial zero-setting mechanism) is in excess of 105 % of scale capacity.
- (b) *Capacity Indication. Electronic computing scales (excluding postal scales and weight classifiers) **shall display and record a gross or net weight of the scale capacity and the applicable tolerance but shall neither display nor record a gross or net weight in excess of scale capacity plus 9d.***

*[Nonretroactive as of January 1, 1993]*

**(Amended 20XX)**

The total value of weight ranges and of unit weights in effect or in place at any time shall automatically be accounted for on the reading face and on any recorded representation.

This requirement does not apply to: (1) single-revolution dial scales, (2) multi-revolution dial scales not equipped with unit weights, (3) scales equipped with two or more weigh beams, nor (4) devices that indicate mathematically derived totalized values.

(Amended 1990, 1992, and 1995)

**Background / Discussion:**

Kansas has noted that software used with electronic-computing scales does not always allow the scales to indicate a weight value that is above marked scale capacity, even though there is an allowance making it permissible for the scales to display an overcapacity indication that is up to nine divisions greater than the capacity marked. That creates an inspection problem when the error in a computing scale, at or near capacity, is in the direction of overregistration by an amount greater than the programmed limit for the overcapacity indication. In this situation, the inspector cannot verify the scale error at capacity.

At the 2011 Central Weights and Measures Association (CWMA) Interim Meeting, attendees representing the weighing industry asked how the software would know what the applicable tolerance is. They also inquired whether or not this item would be retroactive. Regulatory officials responded that:

- When testing a scale at capacity and the device is over registering, it may blank out and not allow the inspector to determine the error at capacity
- This proposed amendment to paragraph S.1.7. would promote uniformity, and
- Provide for ease of testing.

The CWMA recommended the proposed language be changed to **“shall display and record a gross or net weight of the scale capacity and the applicable maintenance tolerance.”** This proposal would facilitate the uniform testing of computing scales and allow the inspector to determine the error at capacity. CWMA forwarded the item to NCWM, recommending it as an Informational Item with the above amendment to the original proposal.

During the 2012 NCWM Interim Meeting, Ms. Henzler, Kansas Department of Agriculture, reported that Kansas inspectors had discovered some unattended scanner scales that “blanked out” when a capacity test load was applied to the load-receiving element. The overcapacity indication on the scales discovered by Kansas is controlled by software that causes the scales to “blank out” at an indication slightly over capacity (e.g. one or two divisions over capacity). Thus, when one of these scales is being tested, if it is overregistering (i.e., registering a value that is greater than the test load applied) by an amount to cause the indication to reach the point where the software blanks the scale when a capacity test load is applied, there is no way of knowing (at that particular test load) whether or not the scale is performing within acceptable tolerance limits. Ms. Henzler stated that she was aware that the test procedures could be modified to enable that determination be made. It was her view, however, that the modified procedures would be labor intensive and not likely applied by service technicians, who, in the State of Kansas, are permitted to perform official tests on scales. She also indicated that some service technicians may not have the necessary equipment to apply the modified procedures.

National Institute of Standards and Technology (NIST), Office of Weights and Measures (OWM) pointed out there are three critical verifications that officials need to make relative to testing an electronic-computing scale, manufactured as of January 1, 1993, at maximum test load:

1. The scale must be capable of displaying the nominal capacity marked on the device.
2. The scale must not indicate or record any values in excess of nominal capacity plus 9 d.
3. The scale must be within tolerance at the maximum test load (i.e., the maximum value the device is capable of displaying).

NIST, OWM has traditionally recommended a slight modification to test procedures in order to make it easy for an inspector to determine whether or not a scale is capable of displaying a value equal to nominal capacity and complying with paragraph S.1.7.(b). The following example procedures were provided: step (1) apply fractional weights in the amount of applicable tolerance; step (2) zero the scale; step (3) conduct an increasing-load test to the nominal capacity of the scale. If the scale fails to display the nominal capacity with a nominal capacity test load applied due to overregistration, incrementally remove the fraction weights one division at a time until the scale displays nominal capacity. The amount of weight removed to cause the scale to display the capacity indication represents the amount of error in the scale. NIST, OWM noted that this simple modification to the procedures would enable an inspector to verify compliance with S.1.7., thus eliminating the need to modify a scale’s (or electronic cash register’s) software. Given the ease at which these procedures can be applied, consideration should be given as to whether or not the cost of modifying would warrant the proposed change.

NIST, OWM noted the following additional concerns should the committee decide to proceed with the proposal:

1. The proposed new text specifies “gross or net weight”. NIST, OWM recommended that the proposed requirement should not apply to “net weight” indications. There is the potential to overload a scale using tare values above 5 % of the capacity of the scale.
2. The proposed new text specifies “shall display and record.” If this proposal were to be adopted as written, all electronic computing scales manufactured as of 1/1/93 would be required to be equipped or interfaced with a ticket printer.
3. The proposed new text would require the display and recording of “scale capacity and the applicable tolerance” which can be interpreted to mean that two separate values need to be displayed and recorded, the first being the value of nominal capacity, and the second being the applicable tolerance.
4. The proposed new text would require software on existing applicable computing scales to be modified since the proposed language is written as a nonretroactive requirement that would be applicable to devices manufactured after January 1, 1993 unless amended.
5. The proposed new text is not clear as to whether it is applicable to non-computing scales interfaced with Electronic Cash Registers (ECR) in a point-of-sale system since an ECR is a computing accessory used in conjunction to a non-computing scale in a point-of-sale system.

Mr. Flocken, speaking on behalf of the Scale Manufacturers Association (SMA), opposed the item, stating that the proposed changes were unnecessary and that the overcapacity indication should not be tied to device tolerance.

Mr. Calix, NCR Corporation and Mr. Grabski, Wal-Mart Stores, Inc., also indicated their opposition to the item.

In discussing this item, the committee agreed that the test procedures used to verify whether or not an electronic-computing scale complies with paragraph S.1.7.(b) are well known, fairly simple to apply, and are already being consistently applied by field officials. The committee considered whether service technicians would need additional equipment to enable them to apply those test procedures. The committee concluded that the equipment needed to perform the modified procedures recommended by NIST, OWM would include that which service technicians should already possess in order for them to properly conduct an official test on a scale. The 2012 S&T Committee designated this item as a Withdrawn Item.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

## **320-2 I S.6.4. Railway Track Scales and Appendix D – Definitions**

### **Source:**

Systems Associates, Inc., (2012)

### **Purpose:**

Align *NIST Handbook 44* with updated material in *AAR Scale Handbook*.

### **Item Under Consideration:**

1) Amend *NIST Handbook 44*, Scales Code paragraph S.6.4. Railway Track Scales as follows:

**S.6.4. Railway Track Scales.** – A railway track scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale. ~~The nominal capacity of a scale with more than two sections shall not exceed twice its rated section capacity. The nominal capacity of a two section scale shall not exceed its rated section capacity.\*~~ **The nominal scale capacity shall not exceed the lesser of;**

- (a) The sum of the Weigh Module Capacities as shown in Table S.6.4, or;
- (b) Rated Sectional Capacity (RSC) multiplied by the quantity of the Number of Sections (Ns) minus the Number of Dead Spaces (Nd) minus 0.5. As a formula this is stated as  $RSC \times (Ns - Nd - 0.5)$ ,
- (c) 640,000 lb; or
- (d) The nominal capacity listed on the CC.

<b>Table S.6.4.</b>	
<b>Railway Track Scale – Weigh Module Capacity</b>	
<b>Weigh Module Length (ft)</b>	<b>Weigh Module Capacity (ton)</b>
<u>&lt;5</u>	<u>40</u>
<u>5 to &lt; 10</u>	<u>80</u>
<u>10 to &lt; 15</u>	<u>120</u>
<u>15 to &lt; 23</u>	<u>160</u>
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<u>35 to &lt; 40</u>	<u>258</u>
<u>40 to &lt; 56</u>	<u>284</u>

**Note: The capacity of a particular module is based on its length and determined from corresponding capacity values specified in Table S.6.4.**

*~~[\*Nonretroactive as of January 1, 2002]~~*

(Amended 1988, 2001, ~~and 2002,~~ and 20XX)

- 2) Add the following definition for the term “Weigh Module” to *NIST Handbook 44*, Appendix D:

**WEIGH MODULE - The portion of a load-receiving element supported by two sections of the weighing element. The length of a module is the distance to which load can be applied. [2.20]**

**Background / Discussion:**

The capacity of a railcar weighing system has historically been based on the capacity of the pivots or load cells supporting the scale section. As pivots were generally the weakest element, this was logical. With the introduction of load cell technology, the capacity of the section could far outreach the capacity of the weighbridge. Weighbridge design, based on the requirements of the *AAR Scale Handbook*, must be capable of supporting 80,000 pound axles on 5 foot centers. With the introduction of combined short span weigh modules over multiple sections, the use of the section capacity to determine scale capacity provides both the opportunity for overloaded structures and/or the requirement to overdesign the section. The submitter stated that determining the nominal scale capacity based on both the section capacity and the structural capacity is the best solution. Additionally, a 640,000 lb limit assures these scales can be calibrated with 12.5 % of capacity using the conventional 80,000 lb test weight equipment.

The changes to the nominal capacity specification were developed by Committee 34 - Scales, of the American Railway Engineering and Maintenance-of-Way Association (AREMA) and approved, by unanimous vote, for inclusion in the *AAR Scale Handbook*.

At the 2011 CWMA Interim Meeting, members of the weighing industry reported that it is inappropriate to rate a scale’s capacity based solely on the sectional capacity of the scale. One regulatory official questioned whether the capacities in table S.6.4 should be listed in pounds. In addition to the proposed definition for weigh module, the CWMA noted it may also be appropriate to include a definition of dead spaces. CWMA believed there would be support for the item to align *NIST Handbook 44* and the *AAR Handbook*. CWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2011 Western Weights and Measures Association (WWMA) Annual Meeting, Mr. Straub, Fairbanks Scales, Inc., supported the item as submitted. Mr. Cook, NIST, OWM stated that the definition of weigh module may be confusing and suggested that the submitter include diagrams to NCWM S&T Committee illustrating some typical weigh module installations. The WWMA S&T Committee recognized that this proposal aligns *NIST Handbook 44* with the updated material in the *AAR Scale Handbook*, and added that there remains some confusion around the use of the word “articulated” in the definition which could be clarified with illustrations. WWMA forwarded the item to NCWM, recommending it as a Developing Item until such time that the committee receives diagrams that illustrate weigh module installations from the submitter.

At its 2011 Northeastern Weights and Measures Association (NEWMA) Interim Meeting, NEWMA forwarded the item to NCWM, recommending it as an Informational Item.

At the 2011 Southern Weights and Measures Association (SWMA) Annual Meeting, Mr. Oppermann, Weights and Measures Consulting, LLC, suggested that the reference to “single or articulated” are unnecessary and could be deleted. It doesn’t matter how the module is put together. The SWMA S&T Committee also heard from Mr. Feezor, Scales Consulting and Testing, who noted that the term “articulated” refers to how the modules are connected. He offered to submit some drawings of how these are made in the field and he noted that this could apply to more than just railway track scales. Mr. Straub, Fairbanks Scales, Inc., indicated support for the proposal. He stated that he had talked with the original submitter, Mr. Beitzel, Systems Associates, Inc., and suggested that perhaps diagrams from *NCWM Publication 14* might be considered to help illustrate the use of the term “articulated.” SWMA forwarded the item to NCWM, recommending it as a Voting Item with unanimous support for the following change to the definition, eliminating the phrase “single or articulate”:

**WEIGH MODULE - ~~The single or articulated~~ portion of a weighing element supported by two sections. The length of a module is the distance to which load can be applied. [2.20]**

At the 2012 NCWM Interim Meeting, Mr. Cotsoradis, Flint Hills Resources questioned whether anyone had considered the impact that the item would have on existing scales considering that the new language proposed is retroactive.

Mr. Lewis, Rice Lake Weighing Systems, Inc., indicated that the proposal, if adopted, would affect two existing National Type Evaluation Program (NTEP) Certificate of Conformance (CCs) issued to Rice Lake Weighing Systems, Inc. Mr. Lewis questioned whether those CC’s would need to be updated if the proposal was adopted and who would be responsible for the costs associated with those updates should they be required.

Mr. Flocken, speaking on behalf of the SMA, supported the item. However, he suggested that the word “articulated” be removed from the language in the definition originally proposed because it could be misunderstood and its removal would not have any impact on the requirement.

NIST, OWM stated that the SMA recommendation to delete the word “articulated” from the definition originally proposed would not change its meaning and agreed that it may facilitate a better understanding of the definition. Regarding use of the term “weighing element” in the proposed definition, NIST, OWM indicated that the term “load-receiving element” seemed more appropriate given the definition of the two terms in *NIST Handbook 44* (i.e., load-receiving element and weighing element).

Similar to the question raised by Mr. Cotsoradis, NIST, OWM questioned whether adequate consideration had been given to the impact the proposal might have on existing equipment, especially equipment manufactured between the dates January 1, 2002 (the effective date of enforcement of the nonretroactive portion of the current paragraph proposed for deletion) and the date the proposed changes to the paragraph would take effect. Of particular concern is whether or not existing equipment would be able to comply with the changes being proposed. To that end, NIST, OWM provided the committee a brief analysis of existing NTEP CC’s for modular railway track scales. The analysis showed that the nominal capacity listed on the CC for some single module scales was greater than the lesser of the three values derived from the three bullets specified in the proposal. There were even more instances where the lesser value in the proposal exceeded the nominal capacity listed on the CC for module installations with and without dead spaces. NIST, OWM’s analysis did not include all of the various configurations listed on the CC’s. A

related concern noted by NIST, OWM was whether anyone had considered the impact of the proposal relative to combination vehicle/railway track scales.

Should the committee decide to proceed with the proposal, NIST, OWM suggested that the committee consider adding a fourth bullet to the list of proposed nominal capacity considerations that includes the nominal capacity listed on the CC and that a note be added to proposed Table S.6.4. to make clear that module capacities are to be based on the length of the module and corresponding capacities specified in Table S.4. NIST, OWM offered the following proposed additions to the committee in relation to these recommendations:

1. Add the following note to proposed Table S.6.4.:

**Note: The capacity of a particular module is based on its length and determined from corresponding capacity values specified in Table S.6.4.**

2. Add a fourth bullet to the list of nominal capacity considerations that includes the nominal capacity listed on the CC.
  - (a) The sum of weigh module capacities in the proposed table
  - (b) The results of a calculation using the rated section capacity, number of sections and number of dead spaces,
  - (c) 300 000 kg (640 000 lb), or

**(d) The nominal capacity listed on the CC.**

NIST, OWM also noted that the current version of the proposed language uses “ton” units in the proposed table and “lb” units in the proposed changes to paragraph S.6.4. It was suggested that the committee consider making the units consistent by either including both units for every value [e.g., 640,000 lb (320 ton)] or only a single unit. Note that the railroad industry has traditionally rated section capacity in tons and nominal capacity in lb units. Additionally, NIST, OWM noted that it will likely include equivalent International System of Units (SI) values in *NIST Handbook 44* if this item is adopted.

Mr. Oppermann, Weights and Measures Consulting, LLC., suggested amending the first sentence in the definition of weigh module (originally proposed) to read as follows:

**The portion of a load-receiving element supported by two sections of the weighing element.**

Mr. Beitzel, Systems Associates, Inc., stated that he supported removal of the words “single or articulated” from the proposed definition of weigh module, but would be opposed to adding a fourth bullet “d” to reference the nominal capacity listed on the CC. Adding a reference to the nominal capacity on the CC would create a circular argument in that, if added, some might interpret that to mean that the nominal capacity of a scale cannot be increased beyond the value specified on the original CC, even if load cell capacity and the structural integrity of the weighbridge make possible an increase to the capacity. Subparagraph (d) would continue to limit the nominal capacity for the system. With respect to NIST, OWM’s suggestion to the committee to change the units of measure in proposed table S.6.4. from tons to pounds, there would be no problem as Nominal Capacity is generally represented in pounds on railway track scales.

Prior to the 2012 Interim meeting, the committee received a letter of support of this item as proposed from the Association of American Railroads (AAR).

The committee considered the comments received during the Open Hearings and agreed with concerns for how the proposed new language would affect current equipment that is already in service.

In consideration of the analysis presented by NIST, OWM, the committee agreed with their suggestion to add a fourth bullet to the list of proposed nominal capacity considerations that includes the nominal capacity listed on the CC. The committee also agreed to add a note beneath proposed Table S.6.4. to make clear that the module capacities are to be based on the length of the module and corresponding capacities specified in the proposed table. A final change agreed to by the committee was to amend the definition originally proposed. All of the changes agreed to by the committee are included in the Item Under Consideration. The 2012 S&T Committee designated this item as an Informational Item to allow time for additional information relative to these concerns and further analysis and comments on the amended proposal.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

### 320-3 V N.3.1.2. Interim Approval

**Source:**

Systems Associates, Inc., (2012)

**Purpose:**

Align *NIST Handbook 44* with updated material in *AAR Scale Handbook*.

**Item Under Consideration:**

Amend *NIST Handbook 44*, Scales Code paragraph N.3.1.2. Interim Approval as follows:

**N.3.1.2. Minimum Tests for Interim Approval.** – A test-weight load of not less than 13 500 kg (30 000 lb) and a strain-load test up to at least 25 % of scale capacity may be used to return a scale into service following repairs **that could affect the accuracy of the weighing system. A test for an Interim Approval shall include a shift (section) test using a test-weight load of not less than 13 500 kg (30 000 lb). All results shall meet applicable tolerances. The official with statutory authority shall be immediately notified when scales are repaired and placed in service with an interim test. The time period of temporary use is at the discretion of the official with statutory authority.**

~~**Note: The length of time the scale may be used following an interim test is at the discretion of the official with statutory authority.**~~

(Added 1990) (**Amended 20XX**)

**Background / Discussion:**

The interim approval for railway track scales was added to *NIST Handbook 44* in 1990 to address the response time for positioning proper test weight equipment following a breakdown and subsequent repairs of a railcar weighing system. An interim approval is not appropriate under normal scale maintenance circumstances. In addition, returning a scale to service without requiring a section test could overlook a serious accuracy problem, especially when using 30,000 lb weights. As *NIST Handbook 44* requires 80,000 lb of test weights for testing a railcar scale, any cost impact in limiting the scope of the interim test would be minimal.

The changes to the interim test specification were developed by Committee 34 - Scales, of the AREMA and approved, by unanimous vote, for inclusion in the *AAR Scale Handbook*.

At the 2011 CWMA Interim Meeting, members of the weighing industry stated that this proposal would strengthen the type of test conducted for an interim approval by requiring that a shift test be conducted during an interim approval. Regulatory officials voiced concerns that a calibration would be a repair that could affect the accuracy of the weighing system. Inserting the words “excluding calibration” between the words repairs and the start of the proposed language would help clarify that an interim approval is not meant to be used in cases where only

calibration is being performed. CWMA forwarded the item to NCWM, recommending it as a Voting Item with the following amendments:

**N.3.1.2. Minimum Tests for Interim Approval.** – A test-weight load of not less than 13 500 kg (30 000 lb) and a strain-load test up to at least 25 % of scale capacity may be used to return a scale into service following repairs, **excluding calibration, that could affect the accuracy of the weighing system. A test for an Interim Approval shall include a shift (section) test using a test-weight load of not less than 13 500 kg (30 000 lb). All results shall meet applicable tolerances. The official with statutory authority shall be immediately notified when scales are repaired and placed in service with an interim test. The time period of temporary use is at the discretion of the official with statutory authority.**

**~~Note: The length of time the scale may be used following an interim test is at the discretion of the official with statutory authority.~~**

(Added 1990) **(Amended 20XX)**

At the 2011 WWMA Annual Meeting, there were no comments on this proposal at the Open Hearings. The WWMA S&T Committee agreed that the proposal provides additional clarification of the tests to be conducted during an interim approval of railroad track scales and when an interim approval test is required. WWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2011 NEWMA Interim Meeting, there was no opposition to this item. NEWMA forwarded the item to NCWM, recommending it as an Informational Item so that input from other regions may be considered.

At the 2011 SWMA Annual Meeting the S&T Committee heard comments from Mr. Straub, Fairbanks Scales, Inc., who supported the proposal. The committee also heard comments from Mr. Feezor, Scales Consulting and Testing, who indicated that the definition has already been changed in the *AAR Handbook* and that this proposal would align *NIST Handbook 44* with the *AAR Handbook*. He noted that the Interim Approval was intended to allow a scale to be returned to service until adequate test standards could be brought in by the railroad. There were no comments in opposition. SWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2012 NCWM Interim Meeting, the committee received comments in support of the item from Mr. Beitzel, Systems Associates, Inc. Mr. Beitzel stated that adding the words “excluding calibration” would agree with the original intent of AREMA Committee 34, which was to allow someone to return an inoperable scale to service following repairs using 30 000 lb of test weight. It was not AREMA’s intent to allow someone to put a scale back into service with only 30 000 lb of test weight if all they had done was break the seal and adjust accuracy (i.e., calibrate the scale). Mr. Beitzel added that 30 000 lb of test weight is an insufficient amount to calibrate a railway track scale. The railroads have designated a minimum of 80 000 lb of test weight be used to calibrate a railway track scale. Currently, paragraph N.3.1.2. does not require a person conducting an interim test to notify officials with statutory authority.

Mr. Feezor, Scales Consulting and Testing, stated that the AAR developed the proposed amendments to paragraph N.3.1.2. in an effort to prevent someone from putting a scale back into service with an insufficient amount of test weights. He indicated that the adjustment of calibration is not a repair, which reflects the heart of the problem. Scale service personnel, contracted to perform work under a scale maintenance agreement, are breaking security seals when they discover railroad scales out of tolerance. They’re making calibration adjustments using only 30 000 lb of test weight and then return those scales back to service without notifying anyone. Either the words “excluding calibration” need to be included it needs to be stated that “a calibration is not a repair.”

Mr. Flocken, speaking on behalf of the SMA, supported the item as written in the Item Under Consideration.

NIST, OWM indicated they had no issues with the item as originally proposed but believed that adding the words “excluding calibration,” as suggested by the CWMA, created the potential that some might think a calibration can be conducted without regard to notifying the official with statutory authority and using a minimum amount of test weight to place the scale into service. NIST, OWM noted that the words “immediately notifying” could be modified to include a notification time frame to promote uniformity among railroads, service agencies and regulators (e.g., “shall be immediately notified within XX-hours, (X business days . . .”).

Prior to the 2012 NCWM Interim Meeting, the committee received a letter of support of this item as proposed from the AAR.

The committee considered the comments received during the Open Hearings and concluded that adding the words “excluding calibration” changes the intent of the proposal. The 2012 S&T Committee designated this item as a Voting Item as originally proposed.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

**320-4 V UR.1.2. Grain Hopper Scales**

**Source:**

Nebraska Department of Agriculture (2012)

**Purpose:**

Clarify that grain hopper scales shall be Class III

**Item Under Consideration:**

1) Amend *NIST Handbook 44*, Scales Code Table T.1.1. Tolerances for Unmarked Scales, as follows:

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Table T.1.1. Tolerances for Unmarked Scales

Type of Device	Subcategory	Minimum Tolerance	Acceptance Tolerance	Maintenance Tolerance	Decreasing-Load Multiplier <sup>1</sup>	Other Applicable Requirements
Vehicle, axle-load, livestock, railway track (weighing statically), crane, and hopper (other than grain hopper)		Class III L, T.N.3.1. (Table 6) and T.N.3.2.			1.0	T.N.2., T.N.3., T.N.4.1., T.N.4.2., T.N.4.3., T.N.4.4., T.N.5., T.N.7.2., T.N.8.1.4. <sup>4</sup> , T.N.9.
Grain test scales	n ≤ 10 000 n > 10 000	Class III, T.N.3.1. (Table 6) and T.N.3.2. Class II, T.N.3.1. (Table 6) and T.N.3.2.			1.0	T.N.8.1.4. <sup>4</sup> , T.N.9.
Railway track scales weighing in- motion		T.N.3.6. except that for T.N.3.6.2. (a), no single error shall exceed four times the maintenance tolerance.			1.0	T.N.8.1.4. <sup>4</sup> , T.N.9.
Monorail scales, in-motion		T.N.3.8.			1.0	T.N.8.1.4. <sup>4</sup> , T.N.9.
Customer-operated bulk-weighing systems for recycled materials		± 5 % of applied material test load. Average error on 10 or more test loads ≤ 2.5 %.			1.0	T.N.8.1.4. <sup>4</sup> , T.N.9.
Wheel-load weighers and portable axle-load scales	Tested individually or in pairs <sup>2</sup>	0.5 d or 50 lb, whichever is greater	1 % of test load	2 % of test load	1.5 <sup>3</sup>	T.N.8.1.4. <sup>4</sup> , T.N.9.
Prescription scales		0.1 grain (6 mg)	0.1 % of test load	0.1 % of test load	1.5	T.N.8.1.4. <sup>4</sup> , T.N.9.
Jewelers' scales	Graduated	0.5 d	0.05 % of test load	0.05 % of test load	1.5	T.N.8.1.4. <sup>4</sup> , T.N.9.
	Ungraduated	Sensitivity or smallest weight, whichever is less				
Dairy-product test scale	Loads < 18 g 18 g load	0.2 grain 0.2 grain	0.2 grain 0.3 grain	0.2 grain 0.5 grain	1.5	T.N.8.1.4. <sup>4</sup> , T.N.9.
Postal and parcel post scales designed/used to weigh loads < 2 lb	Loads < 2 lb	15 grain, 1 g, 1/32 oz, 0.03 oz, or 0.002 lb	15 grain, 1 g, 1/32 oz, 0.03 oz, or 0.002 lb	15 grain, 1 g, 1/32 oz, 0.03 oz, or 0.002 lb	1.5	T.N.8.1.4. <sup>4</sup> , T.N.9.
	Loads ≤ 2 lb	Table 5	Table 5	Table 5		
Other postal and parcel post scales		Table 5	Table 5	Table 5	1.5	T.N.8.1.4. <sup>4</sup> , T.N.9.
All other scales ( <u>including grain hopper</u> )	n > 5000	0.5 d or 0.05 % of scale capacity, whichever is less	0.05 % of test load	0.1 % of test load	1.5	T.N.2.5., T.N.4.1., T.N.4.2., T.N.4.3., T.N.5., T.N.7.2., T.N.8.1.4. <sup>4</sup> , T.N.9.
	n ≤ 5000	Class III, T.N.3.1., Table 6 and T.N.3.2.			1.0	T.N.2, T.N.3., T.N.4.1., T.N.4.2., T.N.4.3., T.N.5., T.N.7.2., T.N.8.1.4. <sup>4</sup> , T.N.9.
<sup>1</sup> The decreasing load test applies only to automatic indicating scales.			<sup>3</sup> The decreasing load test does not apply to portable wheel load weighers.			
<sup>2</sup> If marked and tested as a pair, the tolerance shall be applied to the sum of the indication.			<sup>4</sup> T.N.8.1.4. Operating Temperature, is nonretroactive and effective for unmarked devices manufactured as of January 1, 1981.			

(Table Added 1990; Amended 1992, and 1993, and 2012)

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2) Amend *NIST Handbook 44*, Scales Code paragraph UR.1.2. Grain Hopper Scales as follows:

**UR.1.2. Grain Hopper Scales. – Hopper scales manufactured as of January 1, 1986 that are used to weigh grain shall be Class III and have a minimum of 2000 scale divisions. The minimum number of scale divisions for a Class III Hopper Scale used for weighing grain shall be 2000.**

3) Amend *NIST Handbook 44*, Scales Code Table 7a. Typical Class or Type of Device for Weighing Applications as follows:

<b>Table 7a.</b>	
<b>Typical Class or Type of Device for Weighing Applications</b>	
<b>Class</b>	<b>Weighing Application or Scale Type</b>
I	Precision laboratory weighing
II	Laboratory weighing, precious metals and gem weighing, grain test scales
III	All commercial weighing not otherwise specified, grain test scales, retail precious metals and semi-precious gem weighing, <b>grain-hopper scales</b> , animal scales, postal scales, vehicle on-board weighing systems with a capacity less than or equal to 30 000 lb, and scales used to determine laundry charges
III L	Vehicle scales, vehicle on-board weighing systems with a capacity greater than 30 000 lb, axle-load scales, livestock scales, railway track scales, crane scales, and hopper (other than grain hopper) scales
III	Wheel-load weighers and portable axle-load weighers used for highway weight enforcement
<b>Note:</b> A scale with a higher accuracy class than that specified as “typical” may be used.	

(Amended 1985, 1986, 1987, 1988, 1992, and 1995, **and 2012**)

#### **Background / Discussion:**

*NIST Handbook 44* Scales Code does not specifically state that grain hopper scales manufactured after 1986 shall be marked as Class III devices. There are only indirect references that give exceptions for grain hopper scales as being class III (e.g., the phrase “commercial weighing not otherwise specified” and “hopper (other than grain hopper)” in Tables T.1.1. and Table 7.a.). The submitter stated there may be inconsistency among jurisdictions as to whether grain hopper scales are required to comply with Class III tolerances. This proposal would bring about uniformity among jurisdictions and be in accord with the original intent of the committee. Some states may have difficulty requiring Class III tolerances on hopper scales for weighing grain if they have already allowed the use of Class III L tolerances on hopper scales used to weigh grain. If this concern is raised then perhaps this requirement should remain non-retroactive. If some jurisdictions have allowed Class III L hopper scales to weigh grain, it is an indication that the committee’s original intent of the user requirements and tolerances of a hopper scale used to weigh grain does require clarification offered by this proposal.

At the 2011 CWMA Interim Meeting, regulatory officials commented that Table 7a already states that “all weighing not otherwise specified” would define a grain hopper as a Class III scale; indicating that the problem is already addressed. CWMA forwarded the item to NCWM, recommending it as a Developing Item.

At the 2011 WWMA Annual Meeting, Mr. Deiman, Alaska Division of Measurement Standards/CVE, suggested that a modification be made to Scales Code Table 7a. by adding “Grain Hopper Scales” to the list of typical Class III applications. He was also concerned that a Class III L vehicle scale weighbridge could be modified by removing the deck and adding hoppers, and could potentially be used to weigh grain. In its deliberations, the committee considered Mr. Deiman’s example as a modification of type and thus the conversion would not be covered by an NTEP CC. Mr. Cook, NIST, OWM reported that OWM tried to verify the exact problem that initiated the proposal. One possibility is that the use of the word “typical” in the title of Table 7a. is not strong enough to ensure that Class III tolerance apply to Grain Hopper Scales. The item is not fully developed because the problem was not sufficiently demonstrated to justify a change to *NIST Handbook 44*. The WWMA S&T Committee believes that Table 7a. sufficiently addresses the concern and clearly states that Class III L Hopper scales are specifically excluded from weighing grain. The committee notes that unmarked scales in Table T.1.1. considers Grain Hopper Scales as “all other scales” and that tolerances are based on *NIST Handbook 44* Scales Code Table 6 for Class III devices which is identical to the wording in Table 7a. for scales marked with as a Class III device. WWMA did not forward the item to NCWM and recommended further development by the submitter.

At the 2011 NEWMA Interim Meeting, NEWMA forwarded the item to NCWM, recommending it as a Developing Item.

At the 2011 SWMA Annual Meeting, the S&T Committee did not believe it had enough information to make a decision on this issue. The justification provided in the proposal is not sufficient to clarify the issues that need to be resolved. The committee noted that there are references in *NIST Handbook 44 Scales Code* to minimum numbers of divisions for Grain Hoppers. The committee acknowledged that Table 7a. includes only “typical” applications and that additional changes might be warranted to clearly define the required parameters for grain hoppers. However, without additional information on the problem that needs to be resolved, the committee is reluctant to offer any suggestions. Consequently, the committee believes additional development is needed on this item before it is ready for consideration. SWMA forwarded the item to NCWM, recommending it as a Developing Item, provided that the original submitter agrees to further develop the item.

At the 2012 NCWM Interim Meeting, Mr. Lampmann, Nebraska Division of Weights and Measures, explained the events which led to the Division’s submission of the proposal to amend paragraph UR.1.2. Mr. Lampmann explained that NTEP had recently evaluated a new hopper scale installed in the State of Nebraska and issued a CC based on that evaluation. That particular scale is marked with a III L accuracy class designation by the manufacturer. The State of Nebraska was not notified in advance of the evaluation and it wasn’t until later that the State discovered the scale being used to weigh grain; an application that the State had believed it necessary to use a Class III scale. Although it may not be appropriate to require “unmarked” hopper scales (i.e., those manufactured prior to 1986) to be marked Class III, Mr. Lampmann indicated that this proposal is an attempt to clearly state the appropriate accuracy class designation for grain hopper scales in *NIST Handbook 44*.

Mr. Lewis, Rice Lake Weighing Systems, Inc., voiced support of the proposal by commenting that although everyone present in the room is aware that a grain hopper scale must be Class III, not all their customers (grain dealers) share that same awareness.

NIST, OWM noted that the item, if adopted as originally proposed, would require all hopper scales used to weigh grain, including those manufactured prior to January 1, 1986, to be marked with a Class III accuracy class. Scales manufactured prior to January 1, 1986 are not currently required to be marked with an accuracy class designation (i.e., the date a new Scales Code was added to *NIST Handbook 44*, which classified scales into different accuracy classes). Thus, it would not be feasible or reasonable to require scales manufactured prior to 1986 to be marked with an accuracy class designation. Additionally, it would be inconsistent with the note that appears at the bottom of Table 7a. in the Scales Code to require grain hopper scales manufactured as of January 1, 1986 to be designated Accuracy Class III because the note makes it permissible to use a scale with a higher accuracy class than that specified in the table. For example, it would be permissible to use a Class II hopper scale for weighing grain. With respect to unmarked grain hopper scales, Table T.1.1. Tolerances for Unmarked Scales specifically excludes grain hopper scales from other hopper scale types (e.g., those used to weigh fertilizer, aggregate, etc.). Thus, grain hopper scales, by virtue of the fact that they are not specifically identified as one of the device types elsewhere in the table, fall into the category titled “All other scales.”

NIST, OWM stated that their analysis of this item revealed that Tables 7a. and 7b. were added to the Scales Code in 1986 in an effort to provide guidance on how to apply General Code suitability requirements. As noted by the 1985 S&T Committee in their final report, “suitability” had been a subject of discussion probably since the beginning of weights and measures. NIST, OWM concluded that the word “Typical” appearing in Table 7a. was added by NCWM because the table was only intended to provide guidance, and recognized the fact that the suitability of a commercial device depends on many factors, all of which must be considered on a case by case basis by the official conducting the inspection.

In consideration of these points, NIST, OWM offered the following alternative means of amending *NIST Handbook 44* should the committee agree to add further clarification that hopper scales manufactured as of January 1, 1986 used to weigh grain were intended to be designated Accuracy Class III.

- Amend Table T.1.1. Tolerance for Unmarked scales by adding the words “including grain hopper” after “All other scales” to read as “All other scales **(including grain hopper)**”;
- Amend Table 7a. by adding “grain hopper scales” in the “Weighing Application” column for Class III devices; and
- Amend paragraph UR.1.2. to address scales manufactured after January 1, 1986. The following changes to UR.1.2. were suggested:
- **UR.1.2. Grain Hopper Scales. – The minimum number of scale divisions for a Class III Hopper Scale used for weighing grain shall be 2000. Hopper scales manufactured as of January 1, 1986 and used to weigh grain, shall be designated Accuracy Class III and have a minimum of 2000 scale divisions.**

During the committee work session, the question was raised as to whether a “grain hopper scale” and a “hopper scale used to weigh grain” were one in the same or different devices. After reviewing the definitions of “hopper scale” and “grain-hopper scale” in *NIST Handbook 44* Appendix D, the committee concluded that these terms are used interchangeably throughout the Scales Code to identify the same device. The committee then considered whether or not it was the intent of NCWM to require hopper scales manufactured as of January 1, 1986 and used to weigh grain to be Class III. The committee concluded that this was likely the intent of NCWM. The 2012 S&T Committee designated this item as a Voting Item with the amendments offered by NIST, OWM.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

### **320-5 I Appendix C – Units of Mass (ton)**

**Source:**

Rice Lake Weighing Systems, Inc. (2012)

**Purpose:**

Establish uniform abbreviations for Short Ton and Long Ton

**Item Under Consideration:**

Amend the Units of Mass Table on page C-19 of *NIST Handbook 44* Appendix C to recognize the abbreviation “tn” for (net or short) ton as follows:

<b>Units of Mass</b>	
1 assay ton <sup>17</sup> (AT)	29.167 grams
1 carat (c)	200 milligrams (exactly) 3.086 grains
1 dram apothecaries (dr ap or ʒ)	60 grains (exactly) 3.888 grams
1 dram avoirdupois (dr avdp)	27 <sup>11</sup> /32 (= 27.344) grains 1.772 grams
1 gamma (γ)	1 microgram (exactly)
1 grain	64.798 91 milligrams (exactly)
1 gram (g)	15.432 grains 0.035 ounce, avoirdupois
1 hundredweight, gross or long <sup>18</sup> (gross cwt)	112 pounds (exactly) 50.802 kilograms
1 hundredweight, gross or short (cwt or net cwt)	100 pounds (exactly) 45.359 kilograms
1 kilogram (kg)	2.205 pounds
1 milligram (mg)	0.015 grain
1 ounce, avoirdupois (oz avdp)	437.5 grains (exactly) 0.911 troy or apothecaries ounce 28.350 grams
1 ounce, troy or apothecaries (oz t or oz ap or ʒ)	480 grains (exactly) 1.097 avoirdupois ounces 31.103 grams
1 pennyweight (dwt)	1.555 grams
1 point	0.01 carat 2 milligrams
1 pound, avoirdupois (lb avdp)	7000 grains (exactly) 1.215 troy or apothecaries pounds 453.592 37 grams (exactly)
1 micropound (μlb) [the Greek letter mu in combination with the letters lb]	0.000 001 pound (exactly)
1 pound, troy or apothecaries (lb t or lb ap)	5760 grains (exactly) 0.823 avoirdupois pound 373.242 grams
1 scruple (s ap or ʒ)	20 grains (exactly) 1.296 grams
1 ton, gross or long ( <b>lt</b> ) <sup>19</sup>	2240 pounds (exactly) 1.12 net tons (exactly) 1.016 metric tons
1 ton, metric (t)	2204.623 pounds 0.984 gross ton 1.102 net tons
1 ton, net or short ( <b>tn</b> )	2000 pounds (exactly) 0.893 gross ton 0.907 metric ton

<sup>17</sup> Used in assaying. The assay ton bears the same relation to the milligram that a ton of 2000 pounds avoirdupois bears to the ounce troy; hence the mass in milligrams of precious metal obtained from one assay ton of ore gives directly the number of troy ounces to the net ton.

<sup>18</sup> The gross or long ton and hundredweight are used commercially in the United States to only a very limited extent, usually in restricted industrial fields. The units are the same as the British “ton” and “hundredweight.”

<sup>19</sup> The gross or long ton and hundredweight are used commercially in the United States to a limited extent only, usually in restricted industrial fields. These units are the same as the British “ton” and “hundredweight.”

**Background / Discussion:**

The submitter of this item has discovered a difference between U.S. and Canadian abbreviation requirements that may impact manufacturers that sell products in both countries and NTEP type evaluations under the US/Canada mutual recognition program. Most units of mass have an abbreviation for SI and U.S. customary units (e.g., kg, lb, g, oz, etc.). However, the same abbreviation, the lower case “t,” is used to represent both the metric ton and the short ton (2000 lb). If an indicator is set up to display both SI and U.S. customary units, the operator or customer cannot know what units are displayed if “t” is the only abbreviation that is acceptable for metric ton. Because of the limited space available on today’s indicators, the words “short ton” or “long ton” are not always an option.

In the *Canadian Lab Manual*, Part 2, Section Appendix-2A in the table for abbreviations and symbols accepted in Canada, metric ton is abbreviated by “t” and ton (short ton) is abbreviated by “tn”. In *NCWM Publication 14*, Appendix C in a table marked Acceptable Abbreviation/Symbols there is an abbreviation for short ton as TN and long tons as LT. In keeping with the Canadian abbreviation, the committee considered a request that *NIST Handbook 44* be amended to use the lower case “tn” and “lt” as the abbreviations for short and long ton respectively.

At the 2011 CWMA Interim Meeting, CWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2011 WWMA Annual Meeting, Mr. Ripka, Thermo-Fisher Scientific, expressed concern for the impact that the proposed abbreviation changes would have on the substitution or replacement of existing terms on longstanding industry practices. Mr. Flocken, Mettler-Toledo, LLC, expressed similar concerns. He would support the proposal moving forward as an Informational Item. Mr. Cook, NIST, OWM reported that *NIST Handbook 44* Appendix C (2011 Edition) uses the lower case “t” for both the U.S. Customary short ton (2000 lb) on page C-6 and the metric ton (2204.623 lb) on page C-19. Additionally, *NIST Special Publication 811 Guide for the International Systems* doesn’t use any abbreviation for U.S. Customary tons and uses the lower case (t) for the metric ton. The committee believes the proposal lacks specific direction whether to add or replace the existing abbreviations in *NIST Handbook 44* Appendix C. Additionally, there was no proposed solution or suggested abbreviation for indicators with both U.S. Customary and Metric tons used in his example. WWMA forwarded the item to NCWM, recommending it as a Developing Item.

At its 2011 SWMA Annual Meeting, the S&T Committee heard from Mr. Lewis, Rice Lake Weighing Systems, Inc. Mr. Lewis indicated that, based on opposition he had heard on his proposal to include an abbreviation for “long ton”, he suggests removing that abbreviation from the proposal. Thus, the proposal would only include an abbreviation for “short ton.” Mr. Flocken, Mettler-Toledo, LLC, noted that the Weighing Sector considered this and agreed to move this forward because of differences between the U.S. and Canadian requirements. Canada doesn’t accept upper case “TN”. Ms. Butcher, NIST, OWM noted during the committee work sessions that *NCWM Publication 14* includes an exception to the abbreviation for “short ton”, with accepted designations of “ton” or “TN”. Mr. Lewis indicated that the Weighing Sector agreed to modify *NCWM Publication 14* to designate the abbreviation for short ton as “tn”. There was support for the proposed abbreviation during the Open Hearings. Noting the proposed change would align the U.S. requirements with Canadian requirements, there were no indications that the proposed change would impact existing equipments. Mr. Flocken indicated that the same change is being proposed for *NCWM Publication 14* scales checklists. The SWMA agreed with its committee recommendation to delete the reference to “long ton” in the original submission as requested by the submitter. SWMA forwarded the item to NCWM, recommending it as a Voting Item after modifying the reference to “ton” on page C-6 of *NIST Handbook 44*, Appendix C to specify the unit “tn” as the abbreviation for “ton”.

At the 2012 NCWM Interim Meeting, the original submitter, Mr. Lewis, Rice Lake Weighing Systems, Inc., requested that the proposal in the Interim Agenda be modified to remove the reference to long ton and its associated proposed abbreviation “lt”. Mr. Lewis indicated that the intent of the proposal is to align U.S. and Canadian requirements and noted that the abbreviation “tn” is an acceptable Canadian abbreviation for short ton.

Mr. Flocken, speaking on behalf of the SMA, suggested making the item Informational to allow for more discussion. He stated that SMA supports the abbreviation “tn” for short ton but not the long ton abbreviation “lt”.

NIST, OWM stated that they agreed with the points raised during the 2011 WWMA Annual Meeting for continued development of the item.

Mr. Ripka, Thermo Fisher Scientific, indicated that several different references for ton (short) have been used with belt-conveyor scale systems over the years. For example, both lower case “t” and upper case “T” have been used to abbreviate short ton. He stated that although he was not opposed to the item, more work is needed to ensure that references are consistent throughout all of *NIST Handbook 44*.

The committee considered the comments received during the Open Hearings and agreed with the recommendation to amend the Units of Mass table on page C-19 of *NIST Handbook 44 Appendix C* as shown in Item Under Consideration. The committee agreed that additional work is needed on this item. The committee asked the NIST Technical Advisors to undertake a review of the references in *NIST Handbook 44*, the Canadian requirements, and *NCWM Publication 14*, and identify any additional changes that might be needed to ensure consistency. Additionally, the committee is seeking input from the community on the impact that this item might have on existing scales in the marketplace. The 2012 S&T Committee designated this item as an Informational Item.

*Technical Advisors Note: After the 2012 NCWM Interim meeting had concluded, NIST, OWM, in reviewing summary comments from the 2011 SWMA fall meeting, discovered an additional reference on page C-6 of Appendix C, NIST Handbook 44, that SWMA had identified as needing to be changed in order to be consistent with the change proposed in the Item Under Consideration. NIST, OWM suggests that the following change be made for future consideration of this item:*

Amend the abbreviation “t” representing the “net” or “short” ton on page C-6 of *NIST Handbook 44 Appendix C* to “tn” as follows:

#### Avoirdupois Units of Mass<sup>6</sup>

[The “grain” is the same in avoirdupois, troy, and apothecaries units of mass.]

1 $\mu$ lb	= 0.000 001 pound (lb)
27 <sup>11/32</sup> grains (gr)	= 1 dram (dr)
16 drams	= 1 ounce (oz)
	= 437 <sup>1/2</sup> grains
16 ounces	= 1 pound (lb)
	= 256 drams
	= 7000 grains
100 pounds	= 1 hundredweight (cwt) <sup>7</sup>
20 hundredweights	= 1 ton (tn)
	= 2000 pounds <sup>7</sup>

In “gross” or “long” measure, the following values are recognized:

112 pounds (lb)	= 1 gross or long hundredweight (cwt) <sup>7</sup>
20 gross or long hundredweights	= 1 gross or long ton
	= 2240 pounds

<sup>6</sup> When necessary to distinguish the **avoirdupois** dram from the **apothecaries** dram, or to distinguish the **avoirdupois** dram or ounce from the **fluid** dram or ounce, or to distinguish the avoirdupois ounce or pound from the **troy** or **apothecaries** ounce or pound, the word “avoirdupois” or the abbreviation “avdp” should be used in combination with the name or abbreviation of the **avoirdupois** unit.

<sup>7</sup> When the terms “hundredweight” and “ton” are used unmodified, they are commonly understood to mean the 100 pound hundredweight and the 2000-pound ton, respectively; these units may be designated “net” or “short” when necessary to distinguish them from the corresponding units in **gross** or **long** measure.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

## 320-6 V Appendix D – Definitions (Reference Weight Car)

### Source:

Systems Associates, Inc. (2012)

### Purpose:

Align *NIST Handbook 44* with updated material in *AAR Scale Handbook*.

### Item Under Consideration:

Replace the existing definition of “reference weight car” in *NIST Handbook 44*, Appendix D with the following:

**reference weight car. – ~~A railroad car weighed on a scale for temporary use as a mass standard over a short period of time (typically, the time required to test one scale) as part of a test train. A railcar that has been statically weighed for temporary use as a mass standard over a short period of time, typically the time required to test one scale.~~**

**Note:** A test weight car that is representative of the types of cars typically weighed on the scale under test may be used wherever reference weight cars are specified.[2.20]

(Added 1991) (**Amended 20XX**)

### Background / Discussion:

The proposal would require that reference cars be weighed on a static scale and would remove the statement regarding being part of a train. For instance, Reference Weight Cars may be used in a belt scale test where the concept of a train doesn't exist. The proposed definition change was developed by AREMA Committee 34 – Scales and approved, by unanimous vote, for inclusion in the *AAR Scale Handbook*.

At the 2011 CWMA and NEWMA Interim Meetings, both associations forwarded the item to NCWM, recommending it as a Voting Item.

At the 2011 WWMA Annual Meeting, Mr. Straub, Fairbanks Scales, Inc., supported the item as submitted. There was no opposition. The WWMA S&T Committee recognized that this proposal aligns *NIST Handbook 44* with the updated material in the *AAR Scale Handbook*. WWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2011 SWMA Annual Meeting, the S&T Committee heard one comment in support and no comments in opposition. The SWMA agreed with the committee's comments that the modification will further align *NIST Handbook 44* and the *AAR Handbook*. SWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2012 NCWM Interim Meeting, Mr. Flocken, speaking on behalf of the SMA, supported this item. NIST, OWM agreed that adding the words “statically weighed” improved the definition and made clear how reference weight cars are to be weighed. The committee reviewed a January 7, 2012 letter from AAR in support of the proposal. The committee agreed that the proposed changes improved the definition. The 2012 S&T Committee designated this item as a Voting Item.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

## 321 BELT-CONVEYOR SCALE SYSTEMS

### 321-1 V S.1.9. Zero Ready Indicator

**Source:**

U.S. National Work Group (USNWG) on Belt-Conveyor Scales (BCS) (2012)

**Purpose:**

Add a new device specification and user requirement to help ensure that a stable zero-balance condition is established prior to running material across a belt scale.

**Item Under Consideration:**

1) Add a new paragraph S.1.9 Zero Ready Indicator to *NIST Handbook 44*, Section 2.21., Belt-Conveyor Scale Systems Code to read as follows:

**S.1.9. Zero Ready Indicator. A belt conveyor scale shall be equipped with a Zero Ready indicator. Permanent means shall be provided to produce an audio or visual signal when the zero is within +/- 0.12% of the rated capacity of the scale during an unloaded belt condition. The type of indication (audio or visual) shall be determined by the individual installation.**

**[Nonretroactive as of January 1, 20XX]**

**(Added 20XX)**

2) Amend *NIST Handbook 44*, Section 2.21., Belt-Conveyor Scale Systems Code paragraph UR.3.2. Maintenance by adding a new subparagraph UR.3.2. (a) and renumbering subsequent subparagraphs as follows:

**UR.3.2. Maintenance.** – Belt-conveyor scales and idlers shall be maintained and serviced in accordance with manufacturer’s instructions and the following:

**(a) Zero Balance. – The zero balance condition of a belt-conveyor scale shall be maintained such that, prior to beginning any commercial transaction, with no load on the belt, the zero balance condition is within +/- 0.12% of the scales rated capacity.**

**(Added 20XX)**

*Renumber subsequent subparagraphs as follows:*

~~(a)~~**(b)** The scale and area surrounding the scale shall be kept clean of debris or other foreign material that can detrimentally affect the performance of the system.

~~(b)~~**(c)** There shall be provisions to ensure that weighed material does not adhere to the belt and return to the scale system area.

(Added 2004)

~~(e)~~**(d)** Zero-load tests and simulated load or material tests shall be conducted at periodic intervals between official tests and after a repair or mechanical adjustment to the conveyor system in order to provide reasonable assurance that the device is performing correctly. The minimum interval for periodic zero load tests and simulated load tests shall be established by the official with statutory authority or according to manufacturer recommendations.

\*\*\* No changes recommended for Change in Zero or Change in Factor (Reference) Tables \*\*\*

**(d)(e) Scale Alignment.** – Alignment checks shall be conducted in accordance with the manufacturer’s recommendation when conveyor work is performed in the scale area. A material test is required after any realignment.

(Amended 1986 and 2000)

**(e)(f) Simulated Load Equipment.** – Simulated load equipment shall be clean and properly maintained.

**(f)(g) Zero Load Reference Information.** – When zero load reference information is recorded for a delivery, the information must be based upon zero load tests performed as a minimum both immediately before and immediately after the totalized load.

(Added 2002)

(Amended 2002, 2004, and 2009)

### **Background / Discussion:**

The intent of the proposal is to; 1) provide an indication that the zero condition of the scale is within the specified requirements for accurate measurement, and 2) further clarify General Code paragraph G-UR.4.1. Maintenance of Equipment regarding a user’s responsibility to maintain the scale in proper operating condition. It should be noted that a similar proposal first appeared on the 2009 S&T Committee’s Agenda. The item was subsequently withdrawn at the request of the submitter in order to further develop the proposal addressing the USNWG concerns reported during their February 2009 NCWM Annual Meeting. Additional background information on this item can be reviewed in 2009 NCWM S&T Committee’s Final Reports.

It is apparent to owners, manufacturers, and service agents associated with belt conveyor scale systems that a zero shift may occur that is readily observed on systems running at a “no-load” level of operation (particularly those equipped with automatic zero mechanisms). The USNWG on belt-conveyor scales has developed a recommendation that would require that an indication be present which indicates a zero condition during these low-flow periods when no material is being totalized by an integrator.

During the 2008 USNWG on Belt-Conveyor Scales meeting, the work group submitted a proposal to NCWM S&T Committee that would add a requirement to *NIST Handbook 44* requiring belt-conveyor scales to include a means to provide the operator with an indication that the system is “ready” to operate. The recommended addition of paragraph S.1.6.1. would require an indication to notify an operator of an out-of-zero condition and also would define the limit of the width of zero for that device.

This indication would signify that the system had arrived at an acceptable stable zero condition with the belt running during periods when no totalization of material was taking place. The work group also acknowledged the need for an associated User Requirement that would provide guidance for an operator of the system in the event that the system failed to achieve this “ready” state.

During the February 2011 meeting of the USNWG, the work group agreed that additional effort should be expended to continue developing a requirement that will provide indication that an acceptable zero condition exists prior to any totalization operation. There was no consensus regarding specifics related to such a requirement such as: the nature of this proposed indication and its visibility to the operator; the duration of time or length of belt travel needed to establish a zero condition; and the allowable limits that would be applied to any variation from the established zero condition. Further discussion was tabled on this item and the sub-group that was established to address this item agreed to further explore these issues and develop a draft proposal. The sub-group consisted of:

- Mr. Ian Burrell
- Mr. Phil Carpentier
- Mr. Paul Chase
- Mr. Todd Dietrich
- Mr. Lars Marmsater
- Mr. Bill Ripka
- Mr. Peter Serrico

This sub-group met via e-mail and teleconference and developed draft proposals for both, a Specification Requirement (S.1.9. Zero Ready Indicator) and the associated User Requirement UR.3.2. (a), which has been submitted as a separate item.

The draft proposals were sent electronically to the entire USNWG on belt-conveyor scales, asking for review and comments by August 10, 2011. No additional comments were received from the members of the USNWG.

At the 2011 CWMA and NEWMA Interim Meetings, and the SWMA Annual Meeting, both associations forwarded the item to NCWM, recommending it as Voting Item.

At the 2011 WWMA Annual Meeting, Mr. Ripka, Thermo Fisher Scientific, provided the following comments and added that the Belt-Conveyor Scale USNWG has thoroughly discussed the topic of “zero” as it relates to a belt-conveyor scale condition prior to running material loads. Some of these discussions went beyond the “ready” topic and delved into some type of zero alarm. Responses to the alarm comments seem to agree that this is a separate issue and should be addressed at a different time. The USNWG considered the following in its development of this item.

**The name of this feature / requirement.**

In the initial proposal the term “zero balance” was used, and members of the work group preferred the terms: “Zero Ready” and “Scale Ready.” The work group agreed that having a stable zero, within a predefined range, does not totally verify that the scale is ready. Thus, it was decided that we would use the term “Zero Ready” in the final proposal submitted to the regional S&T Committee for consideration.

**Visibility to the operator.**

The work group does not believe there is a need to clutter the code by specifying the indicator must be visible to the operator. General Code Paragraph G-UR.3.3. Position of Equipment, states “A device or system equipped with a primary indicating element and used in direct sales, except for prescription sales, shall be positioned so that its indications may be accurately read and the weighing or measuring operation may be observed from some reasonable “customer” and “operator” position.” It is within this General Code reference that the rate of flow limit indicator positioning is based (i.e. viewable by the operator) and the same requirements should hold true for the “Zero Ready” indicator.

**Period to determine the “Zero” condition.**

All testing criteria currently used for belt-conveyor scales base zero on full belt revolutions. The work group agrees the same basis should be used for this condition / indication. Paragraph N.3.1.1. Determination of Zero identifies: a “Zero-Load test” as “a percentage of the full-scale capacity, or a change in a totalized load over a whole number of complete belt revolutions.” The work group agreed not to redefine this during its discussions. There may be capabilities within belt profiling schemes that would be able to identify this condition in less than a revolution and the revised proposal allows for development of this or other technologies.

**Location of specification.**

Due to the methodology of indicating retroactive or non-retroactive in the handbook, the work group agreed that the new requirement should not be included in paragraph S.1.5. Rate of Flow Indicators and Recorders, which currently has a non-retroactive date of January 1, 1986. Changing this to a non-retroactive date of January 1, 20XX could possibly put some old existing systems into a non-compliance condition. Therefore, the recommendation is to add the zero condition statement in a new section, numbered S.1.9 simply to keep the new requirement as a stand-alone item, and to eliminate the need to renumber the other items in this area.

**Allowable limits.**

There were many opinions regarding the amount of zero error allowed prior to the initiation of the “Zero Ready” condition. The initial proposal used 0.06 %. The team discussions continually referenced the 0.12 % value as allowed during the performance of a materials test. When “testing” a belt-conveyor scale, the zero is to be confirmed to be able to hold a zero condition for three consecutive tests within 0.06 %. This test proves zero stability of an empty system only (N.3.1.2. Test of Zero Stability). After a materials test load has been delivered, the scale is expected to remain within 0.12 %. This ensures that the materials load test has not been compromised or influenced by a zero shift (T.1.1. Tolerance Values – Test of Zero Stability). If the zero requires adjustment during

the conduct of a materials test in excess of 0.18 %, the statutory authority may establish specific intervals for zero testing. This requirement does not restrict the zero range. It can perhaps be argued the allowable zero range during “use” is 0.18 %, or even 0.25 % - the tolerance of the device itself. While this may be a high value, we need to make changes in the handbook that do not conflict with other requirements already in place. After final discussion, the sub-team of the USNWG agreed that the value to be implemented in this proposal is 0.12 %.

The WWMA S&T Committee agreed with the recommendation and justification provided by the USNWG on belt-conveyor scales. WWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2012 NCWM Interim Meeting, Mr. Ripka, Thermo Fisher Scientific, spoke on behalf of the USNWG on Belt-Conveyor Scales. Mr. Ripka indicated that over the past two years a subcommittee of the USNWG had worked very hard to understand influences that affect zero to be able to recommend improvements to help ensure a BCS started on zero. The group initially developed a “Specification” requirement that provides easy to understand indication that a scale is ready to use. Mr. Ripka indicated that it was now time to move forward to the next step, i.e., to require users to start a commercial transaction only when the scale is in a ready to use zero balance condition. Thermo Fisher Scientific supported this item as written.

Mr. Flocken, speaking on behalf of the SMA, supported the item as written.

NIST, OWM indicated that the language in the proposed user requirement doesn’t necessarily require a BCS system operator to start a commercial transaction with the zero balance condition within +/- 0.12 % of the scales rated capacity as is intended by the proposal. They offered the following suggested changes to the proposed user requirement to make the paragraph an enforceable requirement:

- (a) Zero Balance. – The balance condition of a belt-conveyor scale shall be maintained such that, prior to beginning any commercial transaction, with no load on the belt, a the zero balance condition is within +/- 0.12 % of the scales rated capacity-can-be-verified.**

**(Added 20XX)**

*(No changes recommended for Change in Zero or Change in Factor (Reference) Tables)*

*(Renumber subsequent subparagraphs)*

*(Amended 2002, 2004, and 2009)*

NIST, OWM noted that their suggested changes to proposed user requirement UR.3.2 (a) had been circulated to the USNWG on BCS systems as part of an alternative reorganization of the User Requirements proposed by NIST, OWM under agenda item 321-2 and that members of the work group had supported those suggested changes.

The committee considered the comments provided by Mr. Ripka, Thermo Fisher Scientific, and Mr. Flocken, Mettler-Toledo, LLC, in support of the original proposal and the proposed changes from NIST, OWM that had been supported by the work group. The committee agreed that the changes suggested by NIST, OWM to the language originally proposed for UR.3.2. (a) were needed in order to make the paragraph an enforceable requirement and thus modified the original proposal accordingly. The 2012 S&T Committee designated this item as a Voting Item.

The committee then considered the effect that this agenda item would have on agenda item 321-2 should both be considered Voting Items at the NCWM Annual Meeting. The committee concluded that item 321-1 was intended as a stand-alone item to be voted on separately from item 321-2. However, if agenda item 321-1 were to be adopted by NCWM, the insertion of the new user requirement proposed under item 321-1 would change the organization and some of the paragraph references in the user requirement restructuring proposed under item 321-2. It was noted that NIST, OWM had suggested a further reorganization of the language in the User Requirements in item 321-2. They circulated this language (including their suggested changes to UR.3.2. proposed under item 321-1) to members of the USNWG on BCSs and indicated that they had supported this alternative proposal. The committee decided that if

item 321-1 were adopted by NCWM, the user requirement proposed under item 321-1 should be inserted into the alternative restructuring proposal and should be voted upon as part of item 321-2.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

## **321-2 V UR.1. User Requirements**

### **Source:**

U.S. National Work Group on Belt-Conveyor Scales (2012)

### **Purpose:**

Achieve a better organization and formatting of the User Requirement section, by renumbering and/or relocated paragraphs within this section.

### **Item Under Consideration:**

Amend *NIST Handbook 44*: Belt-Conveyor Scales Systems UR. User Requirements section as follows:

#### **UR. User Requirements**

**UR.1. Use Installation Requirements.** – ~~A belt-conveyor scale system shall be operated between 20 % and 100 % of its rated capacity.~~

~~(Amended 2004)~~

~~**UR.1.1. Minimum Totalized Load.**—Delivered quantities of less than the minimum test load shall not be considered a valid weighment.~~

**UR.1.1. Protection from Environmental Factors.** – The indicating elements, the lever system or load cells, and the load-receiving element of a belt-conveyor scale shall be adequately protected from environmental factors such as wind, moisture, dust, weather, and radio frequency interference (RFI) and electromagnetic interference (EMI) that may adversely affect the operation or performance of the device.

~~**UR.1.2. Security Means.**—When a security means has been broken, it shall be reported to the official with statutory authority.~~

~~(Amended 1991)~~

**UR.1.2. Conveyor Installation.** – The design and installation of the conveyor leading to and from the belt conveyor scale is critical with respect to scale performance. The conveyor can be horizontal or inclined, but if inclined, the angle shall be such that slippage of material along the belt does not occur. Installation shall be in accordance with the scale manufacturer's instructions and the following:

~~(Amended 2002)~~

\*\*\*Items (a) through (n) of UR.2.2. to be relocated beneath and become part of UR.1.2. Conveyor Installation. No other changes recommended for (a) through (n).\*\*\*

**UR.1.3. Material Test.** – A belt-conveyor scale shall be installed so that a material test can be conveniently conducted.

[Nonretroactive as of January 1, 1981]

UR.1.4. Belt Travel (Speed or Velocity). – The belt travel sensor shall be so positioned that it accurately represents the travel of the belt over the scale for all flow rates between the maximum and minimum values. The belt travel sensor shall be so designed and installed that there is no slip.

UR.2. Installation Use Requirements.

~~UR.2.1. Protection from Environmental Factors. – The indicating elements, the lever system or load cells, and the load-receiving element of a belt-conveyor scale shall be adequately protected from environmental factors such as wind, moisture, dust, weather, and radio frequency interference (RFI) and electromagnetic interference (EMI) that may adversely affect the operation or performance of the device.~~

UR.2.1. Rate of Operation. – A belt-conveyor scale system shall be operated between 20% and 100% of its rated capacity.

~~UR.2.2. Conveyor Installation. – The design and installation of the conveyor leading to and from the belt-conveyor scale is critical with respect to scale performance. The conveyor can be horizontal or inclined, but if inclined, the angle shall be such that slippage of material along the belt does not occur. Installation shall be in accordance with the scale manufacturer's instructions and the following:~~

*\*NIST Technical Advisor's note: Also delete items (a) through (n) since there were relocated to UR.1.2.*

~~(Amended 2002)~~

UR.2.2. Minimum Totalized Load. – Delivered quantities of less than the minimum test load shall not be considered a valid weighthment.

~~UR.2.3. Material Test. – A belt-conveyor scale shall be installed so that a material test can be conveniently conducted.~~

~~[Nonretroactive as of January 1, 1981]~~

UR.2.3. Security Means. – When a security means has been broken, it shall be reported to the official with statutory authority.

~~(Amended 1991)~~

~~UR.2.4. Belt Travel (Speed or Velocity). – The belt travel sensor shall be so positioned that it accurately represents the travel of the belt over the scale for all flow rates between the maximum and minimum values. The belt travel sensor shall be so designed and installed that there is no slip.~~

UR.2.4. Loading. – The feed of material to the scale shall be controlled to assure that, during normal operation, the material flow is in accordance with manufacturer's recommendation for rated capacity.

UR.2.5. Diversion or Loss of Measured Product. – There shall be no operation(s) or condition(s) of use that result in loss or diversion that adversely affects the quantity of measured product.

~~(Added 2005)~~

**UR.2.6. Retention of Maintenance, Test, and Analog or Digital Recorder Information. – Records of calibration and maintenance, including conveyor alignment, analog or digital recorder, zero-load test, and material test data shall be maintained on site for at least the three concurrent years as a history of scale performance. Copies of any report as a result of a test or repair shall be mailed to the official with statutory authority as required. The current date and correction factor(s) for simulated load equipment shall be recorded and maintained in the scale cabinet.**

**(Added 2002)**

**UR.3. Use Maintenance Requirements.**

~~UR.3.1. Loading. – The feed of material to the scale shall be controlled to assure that, during normal operation, the material flow is in accordance with manufacturer’s recommendation for rated capacity.~~

**UR.3.1. Scale and Conveyor Maintenance. – Belt-conveyor scales and idlers shall be maintained and serviced in accordance with manufacturer’s instructions and the following:**

- (a) Scale Clearance. – The scale and area surrounding the scale ...**
- (b) Weighed Material. – There shall be provisions to ensure that ...**
- (c) Simulated and Zero-load Test Intervals. – Zero-load tests and simulated load or ...**

\*\*\* The tables under UR.3.2.(c) to be relocated beneath and become part of UR.3.1.(c). No other changes recommended for those tables. \*\*\*

- (d) Scale Alignment. – Alignment checks shall be conducted ...**
- (e) Simulated Load Equipment. – Simulated load equipment shall be ...**
- (f) Zero Load Reference Information. – When zero load reference information is recorded ...**

(Amended 2002, 2004, 2009, **and 20XX**)

~~UR.3.3. Retention of Maintenance, Test, and Analog or Digital Recorder Information. – Records of calibration and maintenance, including conveyor alignment, analog or digital recorder, zero load test, and material test data shall be maintained on site for at least the three concurrent years as a history of scale performance. Copies of any report as a result of a test or repair shall be mailed to the official with statutory authority as required. The current date and correction factor(s) for simulated load equipment shall be recorded and maintained in the scale cabinet.~~

**(Added 2002)**

~~UR.3.4. Diversion or Loss of Measured Product. – There shall be no operation(s) or condition(s) of use that result in loss or diversion that adversely affects the quantity of measured product.~~

**(Added 2005)**

**UR.4. Compliance. –** Prior to initial verification, the scale manufacturer or installer shall certify to the owner that the scale meets code requirements. Prior to initial verification and each subsequent verification, the scale owner or his agent shall notify the official with statutory authority in writing that the belt-conveyor scale system is in compliance with this specification and ready for material testing.

(Amended 1991)

*\*NIST Technical Advisors note: No relocation or changes are proposed for paragraph UR.4. Compliance.*

**Background / Discussion:**

This item comes from the recommendation of the NIST Technical Advisor to the USNWG on BCS and would:

1. Consolidate applicable operational user requirements into paragraph UR.1. User Requirements,
2. Change the title of paragraph UR.3. from “User Requirements” to “Maintenance,” and
3. Consolidate applicable maintenance requirements into paragraph UR.3.

As the USNWG on Belt-Conveyor Scales developed new User Requirement (UR.3.2. (a)) they recognized that many of the individual paragraphs within the User Requirements section were not appropriately located in the Belt-Conveyor Scales Code. They also recognized that paragraphs UR.1. and UR.3 were both titled “Use Requirements.”

The draft proposal as shown was circulated to the entire USNWG by e-mail. The members of the work group were asked to respond with their support or comments based on this draft. All responses indicated support for the proposal as drafted.

At the 2011 CWMA and NEWMA Interim Meetings, and the SWMA Annual Meeting, both associations forwarded the item to NCWM, recommending it as a Voting Item.

At the 2011 WWMA Annual Meeting Mr. Ripka, Thermo Fisher Scientific, restated the reasons and history for this proposal to reorganize the User Requirements. There were no comments on this item. The committee agreed with the justification and background information provided with the submission of this proposal and agreed this reorganization helps consolidate application users requirements. WWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2012 NCWM Interim Meeting, Mr. Ripka, speaking on behalf of the USNWG on BCS systems supported the item. He noted that the proposal doesn’t change existing maintenance requirements and provides more meaningful headings to the requirements.

NIST, OWM offered an alternative restructuring proposal to improve the organization of the User Requirements in the BCS systems code beyond that being proposed. NIST, OWM’s proposal would change the order of the User, Installation, and Maintenance requirements being proposed to be consistent with how similar requirements are organized in most other specific *NIST Handbook 44* codes. The NIST Technical Advisor to the USNWG on BCS Systems distributed their alternative restructuring of the User Requirements to members of the USNWG prior to the 2012 NCWM Interim Meeting. It included the technical advisor’s suggested changes to the user requirement being proposed under Item 321-1. USNWG members were polled and those responding supported submitting the NIST, OWM version to the S&T Committee for consideration.

The committee considered the comments received during the Open Hearings and agreed replace the original proposal with the alternative arrangement that was approved by the USNWG. The 2012 S&T Committee designated this item as a Voting Item.

The committee also agreed that, should agenda items 321-1 and 321-2 both pass, the proposed language adopted for paragraph UR.3.2.(a) in agenda item 321-1 would be renumbered to UR.3.1.(a) and the designations of the remaining subparagraphs in UR.3.1. would be revised.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

### 330 LIQUID MEASURING DEVICES

*S&T Committee Note: Proposals under Items 330-1 through 330-6 of the committee's 2012 Interim Agenda were consolidated by the committee into a single item, 330-1. An explanation of the committee's rationale is provided under Item 330-1.*

**330-1 V Unit Price Posting, Selection, and Display Requirements - S.1.6.4.1. Unit Price; S.1.6.5.4. Selection of Unit Price; S.1.6.6. Agreement Between Indications; S.1.6.7. Recorded Representations; S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided; UR.3.2. Unit Price and Product Identity; and UR.3.3. Computing Device**

**Source:**

NCWM Task Group on Retail Motor Fuel Dispenser Price Posting and Computer Capability (2012)

**Purpose:**

Update specifications to address current marketing methods for offering pricing discounts beyond simple cash/credit pricing and to establish a framework for "post-delivery" discounts offered after the delivery of fuel is complete.

**Item Under Consideration:**

Amend *NIST Handbook 44*, Liquid Measuring Devices Code paragraph S.1.6.4.1. as follows:

**S.1.6.4.1. Unit Price.**

- (a) A computing or money-operated device shall be able to display on each face the unit price at which the device is set to compute or to dispense.
- (b) Except for dispensers used exclusively for fleet sales, other price contract sales, and truck refueling (e.g., truck stop dispensers used only to refuel trucks), whenever a grade, brand, blend, or mixture is offered for sale from a device at more than one unit price, then all of the unit prices at which that product is offered for sale shall meet the following conditions:
  - (1) For a system that applies a discount prior to the delivery, all unit prices shall be displayed or shall be capable of being displayed on the dispenser using controls available to the customer through a deliberate action of the purchaser prior to the delivery of the product. It is not necessary that all of the unit prices for all grades, brands, blends, or mixtures be simultaneously displayed prior to the delivery of the product. This subsection shall not apply to fleet sales, other contract sales, or truck refueling sales (e.g., sales from dispensers used to refuel trucks).  
[Effective and nonretroactive as of January 1, 1991]
  - (2) For a system that offers post-delivery discounts on fuel sales, display of pre-delivery unit price information is exempt from (b)(1), provided the system complies with S.1.6.8.

(Added 2012)

Note: When a product is offered at more than one unit price, display of unit price information may be through the deliberate action of the purchaser: 1) using controls on the device; 2) through the purchaser's use of personal or vehicle mounted electronic equipment communicating with the system; or 3) verbal instructions by the customer.

(Amended 1989, ~~and~~ 1997 and 2012)

Amend *NIST Handbook 44*, Liquid Measuring Devices Code paragraph S.1.6.5.4. as follows:

**S.1.6.5.4. Selection of Unit Price.** – *Except for dispensers used exclusively for fleet sales, other price contract sales, and truck refueling (e.g., truck stop dispensers used only to refuel trucks), when a product or grade is offered for sale at more than one unit price through a computing device, a system shall not permit a change to the unit price during delivery of product and the following conditions shall be met:*

**(a)** *Except for a system only capable of applying a post-delivery discount(s), the selection of the unit price shall be made prior to delivery ~~using controls on the device or other customer-activated controls~~ through a deliberate action of the purchaser to select the unit price for the fuel delivery. A system shall not permit a change to the unit price during delivery of product.*

*[Nonretroactive as of January 1, 1991]*

**(b)** *For a system only capable of applying a post-delivery discount(s), the selection of the unit price shall be made through a deliberate action of the purchaser to select the unit price for the fuel delivery.*

*(Added 2012)*

*Note: When a product is offered at more than one unit price, selection of the unit price may be through the deliberate action of the purchaser: 1) using controls on the device; 2) through the purchaser's use of personal or vehicle mounted electronic equipment communicating with the system; or 3) verbal instructions by the customer.*

*(Added 2012)*

*(Added 1989) (Amended 1991, 1992, 1993, ~~and~~ 1996, and 2012)*

Amend *NIST Handbook 44*, Liquid Measuring Devices Code Paragraphs S.1.6.6. as follows:

**S.1.6.6. Agreement Between Indications.** –

**(a)** When a quantity value indicated or recorded by an auxiliary element is a derived or computed value based on data received from a retail motor fuel dispenser, the value may differ from the quantity value displayed on the dispenser, provided the following conditions are met:

**(a1)** all total money-values for an individual sale that are indicated or recorded by the system agree; and

**(b2)** *within each element, the values indicated or recorded meet the formula (quantity x unit price = total sales price) to the closest cent.*

*[Nonretroactive as of January 1, 1988]*

**(b)** *When a system applies a post-delivery discount(s) to a fuel's unit price through an auxiliary element, the following conditions shall apply for computed values:*

**(1)** *the total volume of the delivery shall be in agreement between all elements in the system.*

*(Added 2012)*

*(Added 1985) (Amended 1987, ~~and~~ 1988, and 2012)*

Amend *NIST Handbook 44*, Liquid Measuring Devices Code Paragraphs S.1.6.7. as follows:

**S.1.6.7. Recorded Representations.** – Except for fleet sales and other price contract sales **and for transactions where a post-delivery discount is provided.** a printed receipt providing the following information shall be available through a built-in or separate recording element for all transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash:

- (a) the total volume of the delivery;
- (b) the unit price;
- (c) the total computed price;
- (d) the product identity by name, symbol, abbreviation, or code number.

**For systems equipped with the capability to issue an electronic receipt, the customer may be given the option to receive the receipt electronically (e.g., via cell phone, computer, etc.)**

[Nonretroactive as of January 1, 1986]

(Added 1985) (Amended 1997 **and 2012**)

Add a new paragraph S.1.6.8. to *NIST Handbook 44*, Liquid Measuring Devices Code as follows:

**S.1.6.8. Recorded Representations for Transactions Where a Post-Delivery Discount(s) is Provided.** – Except for fleet sales and other price contract sales, a printed receipt providing the following information shall be available through a built-in or separate recording element that is part of the system for transactions involving a post-delivery discount:

- (a) **the product identity by name, symbol, abbreviation, or code number;**
- (b) **transaction information as shown on the dispenser at the end of the delivery and prior to any post-delivery discount(s), including the:**
  - (1) **total volume of the delivery;**
  - (2) **unit price; and**
  - (3) **total computed price of the fuel sale;**
- (c) **an itemization of the post-delivery discounts to the unit price; and**
- (d) **the final total price of the fuel sale after all post-delivery discounts are applied.**

**For systems equipped with the capability to issue an electronic receipt, the customer may be given the option to receive the receipt electronically (e.g., via cell phone, computer, etc.).**

**(Added 2012)**

Renumber current S.1.6.8. Lubricant Devices, Travel of Indicator to S.1.6.9.

Amend *NIST Handbook 44*, Liquid Measuring Devices Code Paragraphs UR.3.2. as follows:

**UR.3.2. Unit Price and Product Identity.**

- (a) ~~The following information~~ **In the case of a computing type or money-operated type dispenser, the final unit price that includes any pre-delivery discounts and at which the device or system is set to compute shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sales. At the completion of a transaction, the displayed unit price shall revert to the highest unit price available. Additionally, any discounted prices may be posted on or adjacent to the dispenser. The completion of a transaction is defined as the time the delivery has been terminated and payment has been settled. The payment may be automatic if the delivery is to a pre-paid amount. If the sale is prepaid, the delivery is considered terminated after the "handle" is in the off position or after the nozzle has been returned to a designed hanging position.**
- (1) ~~except for dispensers used exclusively for fleet sales, other price contract sales, and truck refueling (e.g., truck stop dispensers used only to refuel trucks), all of the unit prices at which the product is offered for sale; and~~
- (2) ~~in the case of a computing type or money-operated type, the unit price at which the dispenser is set to compute.~~

~~Provided that the dispenser complies with S.1.6.4.1. Display of Unit Price, it is not necessary that all the unit prices for all grades, brands, blends, or mixtures be simultaneously displayed or posted.~~

**Note: Dispensers used exclusively for fleet sales, or other price contract sales, and truck refueling (e.g., truck stop dispensers used only to refuel trucks), are exempt from paragraph U.R.3.2.(a).**

- (b) The following information shall be conspicuously displayed or posted on each side of a retail dispenser used in direct sale:
- (1) the identity of the product in descriptive commercial terms; and
- (2) the identity of the grade, brand, blend, or mixture that a multi-product dispenser is set to deliver.
- (Amended 1972, 1983, 1987, 1989, 1992, ~~and~~ 1993, ~~and~~ **2012**)

Amend *NIST Handbook 44* Liquid Measuring Devices Code Paragraphs UR.3.3. as follows:

**UR.3.3. Computing Device.** – Any computing device used in an application where a product or grade is offered for sale at one or more unit prices shall be used only for sales for which the device computes and displays the sales price for the selected transaction.

(Added 1989) (Amended 1992)

The following exceptions apply:

- (a) Fleet sales and other price contract sales are exempt from this requirement.
- (b) A truck stop dispenser used exclusively for refueling trucks is exempt from this requirement provided that:
- (1) all purchases of fuel are accompanied by a printed receipt of the transaction containing the applicable price per gallon, the total gallons delivered, and the total price of the sale; and  
(Added 1993)

- (2) unless a dispenser complies with S.1.6.4.1. Display of Unit Price, the **unit** price posted on the dispenser and the unit price at which the dispenser is set to compute shall be the highest **unit** price for any transaction which may be conducted.

(Added 1993)

**(c) A dispenser used in an application where a price per unit discount is offered following the delivery is exempt from this requirement, provided the following conditions are satisfied:**

- (1) The unit price posted on the dispenser and the unit price at which the dispenser is set to compute shall be the highest unit price for any transaction.**
- (2) All purchases of fuel are accompanied by a printed receipt recorded by the system for the transaction containing:**
  - (a) the product identity by name, symbol, abbreviation, or code number,**
  - (b) transaction information as shown on the dispenser at the end of the delivery and prior to any post-delivery discount including the:**
    - (1) total volume of the delivery;**
    - (2) unit price; and**
    - (3) total computed price of the fuel sale prior to post-delivery discounts being applied,**
  - (c) an itemization of the post-delivery discounts to the unit price, and**
  - (d) the final total price of the fuel sale.**

**For systems equipped with the capability to issue an electronic receipt, the customer may be given the option to receive the receipt electronically (e.g., via cell phone, computer, etc.)**

**(Added 2012)**

**Background / Discussion:**

At the 2012 NCWM Interim Meeting, the committee considered six proposals from NCWM S&T Committee's Task Group on Retail Motor Fuel Dispenser Price Posting and Computer Capability to modify the *NIST Handbook 44* Liquid Measuring Devices Code to accommodate changes in marketing practices relative to price discounts at retail motor-fuel stations. These proposals were covered in the committee's 2012 Interim Agenda under separate items, 330-1 through 330-6. After reviewing these items and the comments received during Open Hearings, the committee agreed that the proposals were interdependent and should not be addressed individually. Consequently, the committee consolidated Items 330-1 through 330-6 into a single item, 330-1. The committee further modified the proposals to clarify how current requirements apply when a pre-delivery discount is offered and to include additional requirements for the operation of equipment that offers post-delivery discounts on motor fuel prices. Consolidated background information for these items and a summary of the committee's conclusions are outlined below.

**Proposed changes to paragraph S.1.6.4.1. Unit Price:** Paragraph S.1.6.4.1. currently requires all possible unit prices to be posted or capable of being posted on the dispenser. In addition to the cash/credit unit prices that have been conventionally offered in retail fuel sales, some marketing practices now offer multiple different unit prices to customers both pre-delivery and post-delivery, depending on payment method, loyalty programs, services purchased, etc. Newer dispensers, or associated point-of-sale software, can allow for a large variety of final unit prices, depending on card type, loyalty programs, etc. There is no reason to display or provide unit price

information to a customer who may not qualify for a certain discounted unit price that is being offered only to eligible customers.

The committee modified the proposal to paragraph S.1.6.4.1. to ensure that the unit prices for any pre-delivery discounts, such as those given for the use of cash or debit card, would be posted for every customer to see, but also would allow for unit price discounts that take place only after the product is dispensed. The order of requirements for equipment that offers pre-delivery discounts and for currently exempted devices was reworked for clarity. A subparagraph was added to reference new requirements for systems that offer post-delivery discounts. Inserting the phrase “through a deliberate action of the purchaser” would allow for the selection of a unit price through the use of some form of electronic activation, such as a cell phone, or swipe card.

**Proposed changes to paragraph S.1.6.5.4. Selection of Unit Price:** These changes would allow for greater flexibility in how customers can select a unit price and accommodate new technology and marketing practices. The current language requires the purchaser to physically make contact with the device to select a unit price. The proposed modifications would expand the requirement to allow a customer to use a personal electronic device such as a cell phone to select a unit price and would also recognize verbal instructions such as those given to a console operator for a particular payment method as acceptable methods for selecting the unit price. For systems that are only capable of applying a discount after the delivery (e.g., single unit price devices), the expanded requirement would apply retroactively. Changes to the unit price during delivery would still be prohibited.

**Proposed changes to paragraph S.1.6.6. Agreement Between Indications:** These changes would provide an exemption from the money values agreement requirement when the dispensing system offers discounts after delivery that result in total price indications that differ from that indicated on an auxiliary element.

Price discounts could be given through either:

1. the dispenser’s roll back of the unit price, or
2. recalculation of the transaction at the lower unit price that would be performed by auxiliary equipment after, or post, delivery.

Roll back of unit prices prior to fuel delivery requires exact agreement of the total price displayed on the dispenser and the total price displayed on any auxiliary element. When a post-delivery discount is offered, a revised total price reflecting the post-delivery discount would be shown on the auxiliary display. This would result in a total price displayed on the auxiliary equipment that is different from that shown on the dispenser. A change is needed to Paragraph S.1.6.6. as shown in the “Item Under Consideration” to recognize this situation while ensuring that, at a minimum, there is agreement in the total indicated and recorded volume between all the elements in the system.

**Proposed changes to S.1.6.7. Recorded Representations and proposed addition of new paragraph S.1.6.8.:** These changes could help to ensure that fuel dispensers provide receipts with sufficient information to allow customers to fully understand any post-delivery discounts and allow the use of electronic as well as printed receipts. Proposed new paragraph S.1.6.8., like paragraph S.1.6.7., would exempt certain types of sales, while specifying where a receipt must be generated and addressing information that must be recorded in post-delivery discount transactions.

Customer confusion can result when service station consoles apply post-delivery discounts and display total prices that are not reflected on the total price shown on dispenser. The confusion could be resolved if the dispenser’s printed receipt showed the total price, volume, and unit price displayed on the dispenser at the end of the delivery along with an itemization of any additional “post-delivery” discounts that are applied following the delivery. An itemization of the post-delivery discounts on the receipt would enable the customer to verify that, particularly in the case where multiple discounts (for example, a unit price discount given for the purchase of an item in the convenience store along with a discount for purchasing a certain quantity of fuel) are given, all discounts to which they believe they are entitled have been applied. Combined with the printing of the information shown on the dispenser, this itemized information would allow the customer to reconstruct how the final total sale information, including all applied discounts, was calculated and to better understand and follow the transaction. Additionally, this information could be used by weights and measures officials and service station owners in the case of customer disputes to recreate transactions and ensure that all discounts for which the customer was eligible have been applied.

Proposed changes to S.1.6.7. also recognize that electronic receipts such as those delivered to computers or smart phones are making their way into the marketplace.

**Proposed changes to UR.3.2. Unit Price and Product Identity:** These changes would provide realistic requirements for displaying or posting unit prices in consideration of the discount marketing practices being offered to consumers.

Paragraph U.R.3.2. currently requires all unit prices at which the product is offered for sale to be capable of being posted while only making an exception to this requirement for fleet and price contract sales and truck refueling dispensers. The growing trend of post-delivery unit pricing in the form of rewards cards, car wash discounts, and others, makes posting all of these unit prices impractical. Unit price discounts may apply only to certain customers using certain types of credit cards. A requirement to post all of these unit prices is also unrealistic.

The amendment would ensure that motor-fuel unit prices for pre-delivery discounts such as cash or debit card purchases are displayed on or adjacent to the dispenser. Any post-delivery discounts such as loyalty cards, car wash purchases, discounts based on volume of purchase, etc., would be exempt from any requirement to display each of the unit prices on the dispenser. After the product is dispensed, the unit price displayed on the pump would automatically revert to the highest unit price offered by the retailer. This would avoid confusion possibly caused when drivers pull up to a pump and see a unit price to which they are not entitled. Other proposals presented as part of this agenda item would ensure there are sufficient safeguards to provide both the customer and the operator with sufficient information about the transaction.

**Proposed changes to UR.3.3. Computing Device:** These changes would add a new exemption to the requirement for computing and displaying the total sale price for all unit prices available in a given application for a particular product or grade for applications where a discount is offered following the delivery. This new exemption (which is in addition to those already existing for fleet and other price contract sales and devices used exclusively for truck refueling) would only apply in such instances if: (1) the unit price posted on the dispenser and the unit price at which the device is set to compute are the highest unit price for any transaction; and (2) the customer is provided with a printed receipt containing adequate information about the transaction, including an itemization of the discounts, to allow the customer to verify all applicable discounts have been applied. This information would allow the customer to recreate their transaction, including the application of discounts, using the receipt provided by the dispenser. The proposed revisions would also allow electronic receipts to be provided in lieu of paper receipts.

The new exemption proposed in paragraph UR.3.3. recognizes that various methods of pricing fuel are coming to the retail market. In addition to discounts offered for cash or debit cards, new post-delivery discounts to unit prices are becoming more common. These include loyalty cards, discounts based upon the type of credit card used, discounts for car washes purchased, etc. In order for consumers to be confident that they are receiving all the discounts to which they are entitled, it is essential that the dispenser receipt display the original unit price and subtotal, the discounts that were applied to the original unit price, and the final total price that the customer is charged.

At the 2012 NCWM Interim Meeting, Ms. Williams, NIST, OWM, suggested some changes to the language to eliminate some observed gaps and also suggested that the committee consider developing definitions for some of the terminology being introduced. She encouraged the committee to consider grouping Items 330-1 through 330-6 together into a single item, noting that the basis for proposing changes to some paragraphs hinges on related changes proposed to other paragraphs in this series of items. Ms. Williams also noted that, in analyzing the proposed changes and their impact on the marketplace, it is critical that the language be compared with actual examples of pricing scenarios and associated receipts to ensure that the proposed changes meet the needs of the weights and measures community and the marketplace. The task group had planned to do such an analysis using the numerous examples and receipts that were submitted by its membership. Ms. Williams encouraged the group to complete that task and encouraged others in the community to do the same. NIST, OWM offered the following general comments in writing to the committee.

1. Any proposed device specifications should be examined to ensure that equipment currently offering pre-delivery discounts is not precluded from also offering post-delivery discounts.
2. Care should be taken to ensure that the provisions put into place in the 1990's to prevent customer confusion and facilitation of fraud are not circumvented.
3. The language should ensure that systems do not frustrate value comparisons prior to the delivery.
4. Language should be examined and strengthened if necessary to ensure that mathematical computations are based on dispenser indications and are mathematically correct. This will eliminate rounding errors that occur when determining an inferred volume based on the original total and unit prices (i.e., not allowing different quantity values between indicated and inferred quantities as proposed in paragraph S.1.6.6. Agreement Between Indications).
5. Add a definition(s) in *NIST Handbook 44* such as "pre-delivery," "post-delivery discounts," etc. to lend clarity to the terminology used in these proposals and to make sure it is understood.
6. Any proposed language should be analyzed to ensure that there are no conflicts with NIST Handbook 130 Weights and Measures Laws and Regulations.

Mr. Humphreys, Chair of the Task Group on Retail Motor Fuel Dispenser Price Posting and Computer Capability, thanked NIST, OWM for the comments and noted their recommendations are supported by the task group based on a poll that was taken. Mr. Humphreys encouraged the committee to review and accept those changes. He indicated that he believed it would be reasonable for the task group to complete a review of the receipts and examples by the July meeting.

Mr. Eichberger, National Association of Convenience Stores (NACS), emphasized the importance of adopting language that won't inhibit a retailer from offering a discount. Mr. Eichberger commented that the proposed language provides a good balance while giving the retailer the flexibility to offer a discount. He didn't believe NACS members would have a problem with the changes offered by NIST, OWM and also supported consolidating the items. Mr. Columbus, Steptoe and Johnson, LLP, representing SIGMA, a fuel marketers association, also spoke in support of the proposed changes. Mr. Johnson, Gilbarco, Inc., spoke in support of the recommendations by NIST, OWM. Mr. Johnson questioned the reference in paragraph UR.3.2. to the display of the unit price between transactions and suggested that the Task Group may need to clarify how the time limit requirements would be applied and interpreted for various types of transactions. Ms. Butcher, NIST Technical Advisor, suggested considering other Liquid Measuring Devices (LMD) Code paragraphs with similar references and mirroring them to clarify when a transaction is considered completed and to ensure that the customer has adequate time to observe the transaction information. Mr. Saunders, Virginia Department of Agriculture and Consumer Services, also expressed a concern about the time limit, citing customer complaints in instances where the information is not displayed long enough for the customer to observe the final details of the transaction. Others in the audience, including Mr. Carroll, Massachusetts Division of Standards, and Mr. Andersen, retired member, agreed that further examination by the task group of these references is warranted to ensure that the language is correct. Mr. Eichberger offered to research existing marketing practices relative to this point and report back to the task group. In response to Mr. Johnson's and Mr. Sander's questions, the committee modified paragraph UR.3.2.(a) to include a generally accepted point at which a transaction is considered complete relative to termination of the delivery and settlement of payment.

The committee agreed that Agenda Items 330-1 through 330-6 need to be consolidated into a single agenda item. After hearing support during the Open Hearings for the recommendations of the Task Group on Retail Motor Fuel Dispenser Price Posting and Computer Capability as well as the additional changes proposed by NIST, OWM, the committee agreed to the modified proposals as shown in the "Item Under Consideration" above. The committee recognized the importance of assessing the proposed language against receipts and scenarios that are being encountered in the field to ensure that the proposed changes are appropriate. The committee asked that the task group: (1) compare the examples of receipts and scenarios that were submitted to the task group to ensure that the proposed language provides for clear and understandable transactions; and (2) address the questions raised about the application of the requirements relative to the unit price display following a delivery. Additionally, the committee asked that the regional weights and measures associations, regulatory officials, manufacturers, and device owners evaluate the proposed changes as they pertain to existing marketing practices. The 2012 S&T Committee designated this item as a Voting Item.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

**330-2 V S.1.6.5.4. Selection of Unit Price**

This item was consolidated with Item 330-1 as a result of action by the committee at the 2012 Interim Meeting.

**330-3 V S.1.6.6. Agreement Between Indications**

This item was consolidated with Item 330-1 as a result of action by the committee at the 2012 Interim Meeting.

**330-4 V S.1.6.7. Recorded Representations**

This item was consolidated with Item 330-1 as a result of action by the committee at the 2012 Interim Meeting.

**330-5 V UR.3.2. Unit Price and Product Identity**

This item was consolidated with Item 330-1 as a result of action by the committee at the 2012 Interim Meeting.

**330-6 V UR.3.3. Computing Device**

This item was consolidated with Item 330-1 as a result of action by the committee at the 2012 Interim Meeting.

**330-7 W UR.3.X. Nozzle Color for Retail Motor Fuel Dispensers**

**Source:**

Missouri Department of Agriculture (2012)

**Purpose:**

Prevent accidental mis-fueling by establishing uniform fuel dispenser nozzle colors for product recognition.

**Item Under Consideration:**

The committee considered a proposal to add the following paragraph to *NIST Handbook 44: Liquid Measuring Devices Code*:

**UR.3.X. Nozzle Color for Retail Motor Fuel Dispensers.**

**(a) Diesel fuel nozzles shall be green in color and shall be used only for diesel fuel, and**

**(b) E85 fuel nozzles shall be yellow in color and shall be used only for E85.**

**Background / Discussion:**

Missouri Weights and Measures Division receives numerous complaints each year related to the accidental mis-fueling of vehicles. Information received from many other states indicates the same problem exists nationwide.

If uniform colors were established for nozzles or nozzle covers, the same colors could be used for fill connections on storage tanks. If color codes were consistent for both fill openings and dispensing nozzles there would likely be far less contamination of fuel in storage tanks and damage to vehicles.

The submitter also noted that some diesel auto manufacturers now require a minimum of 23.63 mm (0.930 in) outside diameter for nozzle spout size. This diameter was a common size for all fuels prior to the introduction of unleaded gasoline.

The proposal would establish uniform fuel nozzle colors for product recognition on retail motor fuel dispensers to prevent accidental mis-fueling of passenger vehicles. The proposal would require yellow colored nozzle covers for E-85 and mid-level ethanol blends for flex-fuel vehicles and restrict the color yellow from use to identify other products. The proposal would also require green colored nozzle covers for diesel fuel and mid-level blends of diesel fuel and restrict the color green from use to identify other products. In the future, consideration could be given to establishing color codes for other products (gasoline, kerosene, etc.)

At the 2011 CWMA and NEWMA Interim Meetings, and the 2011 SWMA Annual Meeting, the associations forwarded the item to NCWM, recommending it as a Developing Item. During the CWMA meeting, a number of regulatory officials supported for this item to promote uniformity. There was discussion at that meeting about over-regulating and whether the consumer would be aware of and pay attention to this color coding system. Industry members suggested that more lead time is needed on this requirement to allow for consumer education, and time to defray the costs associated with this change. Others expressed concern that this requirement would adversely affect certain brands. At the NEWMA meeting, many members noted they have received complaints on this issue and would support a standard to help the consumer more readily identify diesel is being selected. SWMA is amenable to considering a proposal to address the issue of mis-fueling; however, SWMA does not believe the proposal is complete as written and expressed concern that the proposal may not completely address the problems that lead to mis-fueling. In particular, they believe that nozzle size requirements should be considered.

At 2011 WWMA Annual Meeting, there was no testimony in support of the proposal. WWMA noted that the proposal doesn't prevent accidental mis-fueling and the potential number of colors for different grades and types of fuel products could be more confusing to customers. WWMA noted that a similar proposal was submitted to NCWM in 2002 and was ultimately withdrawn in 2003 due to lack of support. WWMA did not forward the item to NCWM since no new justification was provided.

At the 2012 NCWM Interim Meeting, Mr. Hayes, Missouri Department of Agriculture, spoke in support of the proposal and provided an amended version for the committee to consider that would also reference nozzle size. Mr. Hayes noted that their jurisdiction handles numerous complaints and suggested that larger nozzle sizes may provide additional protections against mis-fueling. Mr. Columbus, NACS and SIGMA, opposed the proposal, citing concerns about the impact on companies that have invested significant costs in branding and station design and questioning whether the change would be effective in preventing mis-fueling. NIST, OWM pointed out that, as noted by the WWMA, a similar proposal had been considered by the committee in the past and suggested that the committee revisit those discussions to determine whether or not changes or new factors would warrant reconsideration of the issue. NIST, OWM also noted that the committee should give careful consideration to whether this proposal would be overly restrictive with regard to businesses that have established color schemes associated with their brands, particularly given comments that indicate that color alone may not be effective in preventing mis-fueling. NIST, OWM noted that *NIST Handbook 44* presently includes identity requirements and that amendments to that paragraph to require additional markings on the nozzle as to the product identity might offer a more reasonable alternative for clarifying product identity.

The committee considered the comments from Open Hearings suggesting that color coding of nozzles would not prevent accidental mis-fueling. The committee considered additional amendments that were proposed during the Open Hearings to incorporate nozzle size requirements into the proposal. The committee concluded that requiring either 1) color coding of nozzles, or 2) nozzles of different sizes for different products offered for sale, wouldn't prevent accidental mis-fueling. Additionally, the committee had concerns that size requirements could negatively impact consumers whose diesel-fueled vehicles may not accommodate nozzles with larger diameters. The 2012 S&T Committee designated this item as a Withdrawn Item.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

### 331 VEHICLE-TANK METERS

#### 331-1 I T.4. Product Depletion Test

**Source:**

Northeastern Weights and Measures Association (2009 – Developing Items Part 3.31., Vehicle-Tank Meters - Item 1.)

**Purpose:**

Enable more consistent application of the tolerances between older and newer meters and address an unintentional gap that allows an unreasonably large tolerance for smaller meters.

**Item Under Consideration:**

Amend *NIST Handbook 44* Vehicle Tank Meter Code paragraph T.4. and the accompanying Table T.4 as follows: Note that this option was identified as “Option 2” in the committee's 2011 Final Report and 2012 Interim Agenda.

**T.4.Product Depletion Test.** – The difference between the test result for any normal test and the product depletion test shall not exceed ~~tolerance shown in Table T.4.~~ **0.5 % percent of the volume delivered in one minute at the maximum flow rate marked on the meter for meters rated higher than 380 Lpm (100 gpm) or 0.6 % percent of the volume delivered in one minute at the maximum flow rate marked on the meter for meters rated 380 Lpm (100 gpm) or lower.** Test drafts shall be of the same size and run at approximately the same flow rate.

[**Note:** The result of the product depletion test may fall outside of the applicable test tolerance as specified in Table 1.]

Delete current Table T.4.

<b>Table T.4.</b>	
<b>Tolerances for Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters</b>	
<b>Meters Size</b>	<b>Maintenance and Acceptance Tolerances</b>
<b>Up to, but not including, 50 mm (2 in)</b>	<b>1.70 L (104 in<sup>3</sup>)<sup>†</sup></b>
<b>From 50 mm (2 in) up to, but not including, 75 mm (3 in)</b>	<b>2.25 L (137 in<sup>3</sup>)<sup>†</sup></b>
<b>75 mm (3 in) or larger</b>	<b>3.75 L (229 in<sup>3</sup>)<sup>†</sup></b>
<b>Based on a test volume of at least the amount specified in N.3. Test Drafts.</b>	

**Background / Discussion:**

This item was submitted to NEWMA at its 2008 Interim Meeting to propose an alternative to existing product depletion test tolerances which are based on the size of the meter. The alternatives presented by the original submitter propose basing tolerances on a percentage of maximum flow rate rather than meter size. The submitter noted that, while a nonretroactive marking requirement added in 2008 eliminates difficulties in determining meter size for newer metering systems, inspectors are still faced with difficulties consistently determining meter size for older systems, and those systems will likely remain in service for many years. Additionally, the submitter noted that the original proposal to base tolerances on meter size did not consider the possibility of smaller meters (e.g., down to ¼ inch diameter) being mounted on vehicles. Applying current tolerances to these smaller meters based on meter size would result in a 22.5 % relative error for one minute of flow during a product depletion test. Even a slightly larger, 1-inch meter would have a relative error of 2.25 %. These tolerances seem inappropriately large. While the submitter noted that 2-inch and 3-inch meters are expected to comprise the largest number of vehicle-mounted meters, the current tolerances based on meter size provide an inappropriately large tolerance for smaller meters.

The committee has agreed with the concept of basing the product depletion test tolerances on the marked maximum flow rate of the meter rather than on the marked meter size and has considered several proposals for modifying the tolerances since this item was introduced in 2008. Details of these proposals and associated discussion can be found in the committee's 2009-2011 final reports. While recognizing that one goal of the original proposal was to reduce what the submitter considered an unreasonably large tolerance for smaller meters, the committee expressed concern about the impact the proposal would have on these meters based on comments from Meter Manufacturers Association (MMA), including comments during the 2011 NCWM Annual Meeting.

From 2009 to 2011, the committee repeatedly requested data to support or oppose the proposals under consideration with little success. At the 2011 NCWM Annual Meeting, the committee reiterated its need for data to evaluate the impact of any proposed tolerances changes. Following the meeting, NIST Technical Advisor, Ms. Butcher distributed a request on the NIST, OWM Director's list serve on behalf of the committee asking weights and measures jurisdictions to submit data.

At their fall 2011 Meetings, CWMA, SWMA, and WWMA encouraged the collection of data. Since work continues on this issue, all three associations recommended that the item be a Developing Item until data has been submitted and analyzed. SWMA also noted that there does not appear to be a clear preference for either of the two options presented in NCWM S&T Committee's 2011 Final Report; the SWMA heard that a third proposal may be under development by the MMA.

At the 2011 NEWMA Interim Meeting, it was suggested that there is not a lot of product depletion testing in the field. If the truck only has one tank, it makes the logistics of testing very difficult. NEWMA also noted that variations in product flow rate and clinging of product will also skew test results. Members believe it is much easier to ascertain product flow information from the ID plate rather than determine actual meter size with piping variations. NEWMA encouraged jurisdictions to forward any data to the S&T Committee NIST Technical Advisor.

At the 2012 NCWM Interim Meeting, the committee reiterated its position that tolerances for the product depletion test of a vehicle tank meter should be based on the marked maximum flow rate of the meter rather than meter size. The committee considered the three options for modifying *NIST Handbook 44*, including two options presented in its 2011 Interim Agenda and a third option submitted by the MMA prior to the meeting. A summary of the three options is outlined in the following table. A second table illustrating examples of tolerances for common meter sizes and maximum flow rates is also included.

Summary of Product Depletion Tolerance Options Considered		
	Marked Maximum Flow Rate or Meter Size	Tolerance (% of Marked Max Flow Rate)
<b>Current</b>	Up to but not including 2"	104 in <sup>3</sup>
	2" up to but not including 3"	137 in <sup>3</sup>
	3" and larger	229 in <sup>3</sup>
<b>Option 1:</b>	All Maximum Flow Rates	0.5 %
<b>Option 2:</b>	Marked Max ≤ 100 gpm	0.6 %
	Marked Max > 100 gpm	0.5 %
<b>Option 3:</b>	Marked Max ≤ 60 gpm	0.8 %
	Marked Max > 60 gpm up to and including 100 gpm	0.6 %
	Marked Max > 100 gpm	0.5 %

Examples of Product Depletion Tolerance Options for Different Meter Sizes/Flow Rates					
Size	Marked Maximum Flow Rate (gpm)	Current Tolerance	Option 1 (0.5 % max)	Option 2 (0.6 % max) (0.5 % max)	Option 3 (0.8 % max) (0.6 % max) (0.5 % max)
1-1/2"	60 gpm	104 in <sup>3</sup>	69 in <sup>3</sup>	83 in <sup>3</sup>	111 in <sup>3</sup>
2"	100 gpm	137 in <sup>3</sup>	115 in <sup>3</sup>	139 in <sup>3</sup>	139 in <sup>3</sup>
2"	150 gpm	137 in <sup>3</sup>	173 in <sup>3</sup>	173 in <sup>3</sup>	173 in <sup>3</sup>
3"	150 gpm	229 in <sup>3</sup>	173 in <sup>3</sup>	173 in <sup>3</sup>	173 in <sup>3</sup>
3"	200 gpm	229 in <sup>3</sup>	231 in <sup>3</sup>	231 in <sup>3</sup>	231 in <sup>3</sup>
3"	300 gpm	229 in <sup>3</sup>	346 in <sup>3</sup>	346 in <sup>3</sup>	346 in <sup>3</sup>
3"	350 gpm	229 in <sup>3</sup>	404 in <sup>3</sup>	404 in <sup>3</sup>	404 in <sup>3</sup>

At the 2012 NCWM Interim Meeting Open Hearings, members of the MMA supported Option 3. Mr. Andersen, who originally proposed the item in 2008, pointed out that the tolerances in option 1 were the same as those that apply prior to modifying the tolerance to be based on meter size.

Ms. Butcher, NIST Technical Advisor, reported that the committee received product depletion test data from nine state and county weights and measures jurisdictions. She brought a copy of the raw data for examination by the committee during its work sessions and also distributed a summary to the committee as shown in the following two tables. She explained how the data was analyzed and noted that assumptions were made about meter size in some instances where meter size and/or maximum flow rate were not both provided. The first table summarizes for each jurisdiction the number of meters on which the product depletion test was conducted along with a comparison of the number that failed the current and proposed tolerances; the data includes both total meters for each option along with a breakdown of meters in three different flow rate categories. The second table provides a summary showing these totals for all jurisdictions combined.

<b>Summary of Product Depletion Test Data Submitted by State and County Weights and Measures Jurisdictions As Of 1/20/12</b>						
	<b>Total Meters</b>	<b>Failed Current Tolerance</b>	<b>Failed Option 1</b>	<b>Failed Option 2</b>	<b>Failed MMA</b>	<b>Marked Max</b>
<b>Jurisdiction #1</b>	67	0	2	1	1	---
	1	0	1	1	1	60 gpm
	53	0	1	0	0	100 gpm
	12	0	0	0	0	>100 gpm
	1	0	0	0	0	??
<b>Jurisdiction #2</b>	9	0	0	0	0	No Data
<b>Jurisdiction #3</b>	288	21	33	22	20	---
	28	1	5	3	1	60 gpm
	228	17	25	16	16	100 gpm
	32	3	3	3	3	>100 gpm
<b>Jurisdiction #4</b>	196	7	18	9	6	---
	14	0	3	3	0	60 gpm
	153	5	14	5	5	100 gpm
	29	2	1	1	1	>100 gpm
<b>Jurisdiction #5</b>	134	7	12	7	7	---
	10	2	3	2	2	60 gpm
	72	4	8	4	4	100 gpm
	52	1	1	1	1	>100 gpm
<b>Jurisdiction #6</b>	200	20	29	20	20	---
	0	0	0	0	0	60 gpm
	178	16	25	16	16	100 gpm
	22	4	4	4	4	>100 gpm
<b>Jurisdiction #7</b>	196	13	14	13	13	---
	0	0	0	0	0	60 gpm
	150	11	12	11	11	100 gpm
	46	2	2	2	2	>100 gpm
<b>Jurisdiction #8</b>	761	0	7	1	0	---
	103	0	1	1	0	60 gpm
	629	0	6	0	0	100 gpm
	29	0	0	0	0	>100 gpm
<b>Jurisdiction #9</b>	71	26	26	20	20	No Data

	<b>Total Meters</b>	<b>Failed Current Tolerance</b>	<b>Failed Option 1</b>	<b>Failed Option 2</b>	<b>Failed Option 3</b>	<b>Marked Maximum Flow Rate</b>
<b>Summary of All Jurisdictions</b>	156	3	13	10	4	60 gpm
	1463	53	91	52	52	100 gpm
	222	12	11	11	11	>100 gpm
	81	26	26	20	20	No Info
<b>Totals</b>	<b>1922</b>	<b>94</b>	<b>141</b>	<b>93</b>	<b>87</b>	

The committee expressed sincere appreciation to those jurisdictions that submitted data. The committee discussed the data and the summaries. The committee recognized that the data was not obtained under controlled conditions or as part of a structured survey or study; however, the data was extremely valuable in assessing the relative impact of the three options proposed. The committee agreed that option 2 represents a reasonable compromise between the original proposal and the MMA's proposal (designated Option 3 in the tables above). The committee acknowledged that this item has included multiple proposals up to this point and it is important to designate a single option for consideration by NCWM so this item can move forward. Consequently, the committee presented Option 2 for consideration. Because this item has included multiple proposals up to this point, the 2012 S&T Committee designated this item as an Informational Item and requested comments on the proposal as shown in the Item Under Consideration prior to moving the item forward as a Voting Item.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

## **336 WATER METERS**

### **336-1 V S.3. Markings**

**Source:**

Neptune Technology Group, Inc. (2012)

**Purpose:**

Add marking requirements for Utility Type Meters under *NIST Handbook 44*: Section 3.36 Water Meters.

**Item Under Consideration:**

Add the following to *NIST Handbook 44* Water Meters Code:

**S.3. Markings**

**S.3.1. Location of Marking Information; Utility Type Meters. - The markings may be either on the meter body or primary indicator. The manufacturer's name or trademark, the model designation, and identifying symbols for the model and serial numbers as required by G-S.1. Identification shall also be marked on the meter body or primary indicator.**

**[Nonretroactive as of January 1, 2013]**

**Background / Discussion:**

Utility water meters are type approved under the California Type Evaluation Program; however, they are not yet accepted for evaluation by NTEP. Water meter manufacturers have set precedence since 1982 for the marking requirements of utility water meters. This precedence has been upheld by California state and county inspectors since its inception without incidence or harm. In many utility-type meter installations, visibility of markings on the meter body can be quite limited, while visibility of markings on the primary indicator are usually substantially better.

The submitter also stated that marking requirements are needed in Water Meter Code of *NIST Handbook 44* as outlined in the Item Under Consideration before NCWM can offer NTEP Certification of these devices. When water meters are accepted for NTEP certification, utility type water meter manufacturers could participate in the National Type Evaluation Technical Committee (NTETC) Measuring Sector and play a more active role in providing greater visibility and education to the industry regarding utility water meters and their use.

The following water meter manufacturer representatives expressed support for the proposal on behalf of their respective companies: Mr. Noel, Neptune Technology Group, Inc.; Mr. De Jarlais, Badger Meter, Inc.; Mr. Leckman, Badger Meter, Inc.; Mr. Swanson, Sensus Metering; Mr. Koch, Master Meter, Inc.; and Mr. Watson, Elster AMCO Water.

At the 2011 WWMA Annual Meeting Mr. Noel, Neptune Technology Group, Inc., spoke on behalf of the Water Meter Manufacturers consisting of Badger Meter, Inc., Neptune Technology Group, Inc., Sensus Metering, Master Meter, Inc. and Elster Amco voicing their support of the item. WWMA received letters of support from the water meter manufacturers group. Mr. Hasmeyer of Alameda County, California opposed the item based on the proposal allowing identification information located on an accompanying document. Based on comments received, the submitter proposed amendments to the item, removing the reference to supplemental documentation. WWMA forwarded the item as modified below to NCWM, recommending it as a Voting Item:

### **S.3. Markings**

#### **S.3.1. Location of Marking Information; Utility Type Meters [See also G-S.1. Identification, G-S.4. Interchange or Reversal of Parts, G-S.7. Lettering and G-UR.2.1.1. Visibility of Identification]**

**The markings may be either on the meter body or primary indicator. The manufacturer's name or trademark, the model designation, and identifying symbols for the model and serial numbers as required by G-S.1. Identification shall also be marked on the meter body or primary indicator.**

**[Nonretroactive as of January 1, 2013]**

At the 2012 NCWM Interim Meeting, Mr. Noel, Neptune Technology Group, Inc. spoke in support of the proposed marking requirement on behalf of Neptune and four other water meter manufacturers (including Badger Meter, Elster, Master Meter, and Sensus). The committee also received letters of support from Mr. Koch, Master Meter, Inc., and Mr. Swanson, Sensus. Mr. Cooper, speaking on behalf of the MMA, expressed support for the proposal as modified by the WWMA. NIST, OWM suggested eliminating the references to the General Code requirements in the title of the paragraph, noting that the Introduction Section of *NIST Handbook 44* clarifies that the General Code requirements also apply. Referencing specific paragraphs also creates the risk of inadvertently missing paragraphs that should be applied.

After considering the comments received, the committee agreed to the alternative language proposed by the WWMA and also agreed that the General Code paragraph references in the bracketed portion of the item proposed are not needed. The committee amended the proposed language accordingly. The 2012 S&T Committee designated this item as a Voting Item.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

## **354 TAXIMETERS**

### **354-1 D S.5. Provision for Security Seals**

The 2012 S&T Committee designated this item as a Developing Item and moved it to Section 360 Developing Items as Item 360-5.

## **354-2 D Global Positioning Systems Applications for Taximeters**

The 2012 S&T Committee designated this item as a Developing Item and moved it to Section 360 Developing Items as Item 360-6.

## **356 GRAIN MOISTURE METERS**

### **356-1 I UR.3.4. Printed Tickets**

**Source:**

Grain and Feed Association of Illinois (2012)

**Purpose:**

Change the mandatory printing of tickets from grain moisture meters to an “on demand at the time of transaction” printing and remove the requirement of printing the calibration version identification. Note that the committee did not agree with proposed removal of the requirement to print the calibration version identification; this position is reflected in the version of the proposal currently under consideration by the committee.

**Item Under Consideration:**

Amend *NIST Handbook 44*, Grain Moisture Meter Code 5.56.a. as follows:

**UR.3.4. Printed Tickets.**

- (a) Printed tickets shall be free from any previous indication of moisture content or type of grain or seed selected.
- (b) The customer shall be given a printed ticket **at the time of the transaction or as otherwise specified by the customer.** The printed ticket shall include the date, grain type, grain moisture results, ~~and~~ test weight per bushel, and calibration version identification. The ticket **information** shall be generated by the grain moisture meter system.

(Amended 1993, 1995, ~~and~~ 2003, **and 20XX**)

**Background / Discussion:**

According to the submitter, the user requirement to provide a printed ticket for every single load is unrealistic in the country elevator industry. Traffic patterns at country elevators do not lend themselves to providing a printed ticket to all customers and customers really don't want them. As the speed and capacity increases in the industry, outbound scales are being located at a distance from the inbound scale and the scale house where the moisture tester is located to alleviate traffic bottlenecks. When the outbound scale is located away from where the ticket is printed, the truck driver must circle back around to pick up the ticket, thus, causing logistical problems. In addition, since meters are sealed, inspected and required to have the correct calibration, there is no need for the calibration version identification to be printed on the ticket. Also, most customers are not going to know if it is the correct calibration version identification or not. There have been problems getting the information from the grain moisture meter to the grain accounting system – especially the calibration version identification. Some grain accounting systems have to be “hard coded” for calibration version identification which must be changed whenever the calibration changes. The change will be at an added cost for the industry.

When a consumer pays at a gas pump, they have the option of a receipt on demand at the time of transaction or not receiving a receipt. There would be a cost savings to moisture meter users as they would save on paper and filing space, and in the situation where the calibration version identification is “hard coded,” there will be a cost savings of the expense to have the grain accounting software provider make those changes.

Since moisture meters are capable of printing the ticket, some would argue that they should just go ahead and print them and provide them to the customer. In addition, the requirement does not say when the ticket shall be given to the customer; thus, the printed tickets could be saved for weeks, months, or even years in case the customer had a concern at some point. Printing the calibration version identification ensures the correct calibration is being used.

The submitter proposed amendments to paragraph UR.3.4. Printed Tickets as follows:

**UR.3.4. Printed Tickets.**

- (a) Printed tickets shall be free from any previous indication of moisture content or type of grain or seed selected.
- (b) The customer shall be given a printed ticket **on demand at the time of the transaction** showing the date, grain type, grain moisture results, test weight per bushel, ~~and calibration version identification~~. The ticket **information** shall be generated by the grain moisture meter system.

(Amended 1993, 1995, ~~and 2003,~~ **and 20XX**)

At the 2011 CWMA Interim Meeting some jurisdictions opposed the proposal citing that it is a fundamental element of a point of sale transaction that there is either a witness to the transaction or that a receipt is made available. Others supported the item and recognized that many customers refuse to take the printed tickets. The CWMA believes that the calibration version identification is not necessary on the ticket since most jurisdictions are already verifying the calibrations version when the device is inspected. This proposal is not eliminating the opportunity for the seller to obtain a printed ticket. CWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2011 WWMA Annual Meeting the committee heard no comments on this item. The WWMA amended the proposal to make the language consistent with other codes such as 3.32. . LPG and Anhydrous Ammonia Liquid-Measuring Devices Code paragraph UR.2.6. Ticket Printer: Customer Tickets. WWMA forwarded the modified version below to NCWM, recommending it as a Voting Item.

**UR.3.4. Printed Tickets.**

- (a) Printed tickets shall be free from any previous indication of moisture content or type of grain or seed selected.
- (b) The customer shall be given a printed ticket **showing at the time of the transaction or as otherwise specified by the customer. The printed ticket shall include** the date, grain type, grain moisture results, ~~and~~ test weight per bushel, ~~and calibration version identification~~. The ticket **information** shall be generated by the grain moisture meter system.

(Amended 1993, 1995, ~~and 2003,~~ **and 20XX**)

At the 2011 NEWMA Interim Meeting there were no comments. Deferring to the expertise of the Grain Analyzer Sector, NEWMA forwarded the item to NCWM, recommending it as a Developing Item.

At the 2011 SWMA Annual Meeting, Ms. Butcher, NIST Technical Advisor, noted that the proposed language submitted was slightly different from that discussed by the NTETC Grain Analyzer Sector and provided a summary corresponding to this item prepared by Ms. Lee, Grain Analyzer Sector Technical Advisor. Ms. Butcher also pointed out that WWMA proposed alternate language that is consistent with printed tickets requirements in other Codes. SWMA agreed that the customer should be given the option of receiving a printed ticket from a transaction and that the proposed changes would clarify the responsibility of the device user. SWMA preferred the option

forwarded by WWMA since it mirrors existing language in other *NIST Handbook 44* codes. SWMA forwarded the item to NCWM, recommending it as a Voting Item as revised by WWMA.

At the 2012 NCWM Interim Meeting, the committee received comments in support of the alternative language submitted by the WWMA. NIST, OWM reported that the proposed language submitted to the regional weights and measures associations was different from that agreed to by the Grain Analyzer Sector at its August 2011 meeting. The Grain Analyzer Sector had specifically opposed deleting the phrase “calibration version identification.” NIST, OWM also noted that not all grain moisture meters are Category 3 devices; consequently, calibration version identification information is a critical component on the printed receipt to reconstruct the basis for a sale and help officials to resolve complaints.

The committee agreed that the version proposed by WWMA and SWMA was preferable since it mirrors similar language in other *NIST Handbook 44* Codes. The committee also agreed that, given the Grain Analyzer Sector’s opposition to deleting the reference to “calibration version identification,” this phrase should be retained in the paragraph. The committee presented an amended version of the proposal. The committee recognized that the regional associations were not aware of the sector’s position on the proposed deletion of the reference to the calibration version and that the submitter has not had an opportunity to review the significant changes from the original version. The 2012 S&T Committee designated this item as an Informational Item to allow additional opportunity for input.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

## 358 MULTIPLE DIMENSION MEASURING DEVICES

### 358-1 V N.1.3.4. Test Objects with Protrusions

**Source:**

Multiple Dimensions Measuring Device (MDMD) Work Group (2012)

**Purpose:**

Update the MDMD code based on the MDMD Work Group’s clarification of irregularly shaped objects and protrusions.

**Item Under Consideration:**

Delete paragraph N.1.4.3. Test Objects with Protrusions:

~~**N.1.4.3. Test Objects with Protrusions.— If the device is marked with a minimum protrusion dimension to be measured, a test object with protrusion shall be used to verify the marked limitation during type evaluation.**~~

~~(Added 2008)~~

**Background / Discussion:**

The MDMD Work Group determined that a “protrusion” is nothing more than the part or parts of an object that changes the object from a hexahedron shape to an irregularly shaped object. Therefore, no special test object is required for type evaluation and the reference to testing objects with protrusions as specified in N.1.4.3. Test Objects with Protrusions is unnecessary. If appropriate, the manufacturer is required to mark the unit with a “minimum protrusion size” as stated in Note 7 of Table S.4.1.b and the irregularly-shaped object used during type evaluation will be configured to verify the manufacture’s declared limitation.

At the fall 2011 regional meetings, CWMA, WWMA, and SWMA forwarded the item to NCWM, recommending it as a Voting Item. At the WWMA meeting, Mr. Flocken, Mettler-Toledo, LLC commented on behalf of the MDMD Work Group, that the proposed deletion of N.1.4.3. will harmonize *NIST Handbook 44* with Canadian requirements and other international recommendations for MDMDs regarding irregular shaped objects. SWMA received additional background from Mr. Flocken that the current MDMD Code includes requirements for hexahedrons (e.g., a six-sided box) and irregularly-shaped, non-hexahedrons (e.g., something other than a six-sided box such as a tailpipe). The code also includes provisions to address objects with “protrusions.” However, the MDMD Work Group believes that objects with protrusions should be addressed the same way as irregularly shaped objects. Thus, the proposed change would simplify the requirements by reducing the types of objects addressed in the code to two categories: hexahedrons and non-hexahedrons.

At the 2011 NEWMA Interim Meeting, NEWMA forwarded the item to NCWM, recommending it as an Informational Item.

At the 2012 NCWM Interim Meetings, Mr. Flocken, Mettler-Toledo, LLC supported the item and echoed comments that he provided during the regional association meetings. NIST, OWM suggested that the committee consider deleting the term “minimum protrusion size” from Table S.4.1.b. Note 7 to coincide with the proposal.

The committee considered NIST, OWM’s proposal to delete the term “minimum protrusion size” from Note 7 in Table S.1.4.1.b.; however, based upon a later recommendation from NIST, OWM to withdraw that proposal, the committee decided to maintain the item as originally proposed by the MDMD Work Group.

Hearing no opposition to the changes proposed by the MDMD Work Group and deferring to that group’s expertise, the committee agreed with the proposal to delete paragraph N.1.4.3. Test Objects with Protrusions from the MDMD Code. The 2012 S&T Committee designated this item as a Voting Item.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to [www.newm.net/content/2012pub-16](http://www.newm.net/content/2012pub-16) to review these documents.

### **359 ELECTRONIC LIVESTOCK, MEAT, AND POULTRY EVALUATION SYSTEMS AND/OR DEVICES – TENTATIVE CODE**

#### **359-1 V Tentative Status of Code Section 5.59.**

**Source:**

United States Department of Agriculture (USDA), Grain Inspection Packers and Stockyard Administration (GIPSA), Packers and Stockyards Program (P&SP) (2012)

**Purpose:**

Remove the Tentative Code status of Section 5.59, making it enforceable.

**Item Under Consideration:**

Amend the title of *NIST Handbook 44*: Tentative Code 5.59 as follows:

**Section 5.59. Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices —~~Tentative Code~~**

~~This tentative code has only a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final Code for Livestock, Meat, and Poultry Evaluation Systems and/or Devices. Officials wanting to conduct an official examination of a device or system are advised to see paragraph G A.3. Special and Unclassified Equipment.~~

**Background / Discussion:**

Electronic livestock carcass evaluation equipment is used in livestock procurement to determine the value of the livestock being purchased. There is no independent, third party verifying the accuracy of these devices. In 2010, 106.9 million hogs weighing 21.8 billion pounds with a total value of \$15.7 billion were commercially slaughtered. Of these, approximately 80 % were made on a carcass yield weight basis with an electronic carcass evaluation device. In 2010, 27 million steers and heifers weighing 34.6 billion pounds with a total value of \$33 billion were commercially slaughtered. The use of electronic carcass evaluation devices in the beef industry is just beginning to take hold, so there is no data at this point that indicates the number of transactions in which carcass evaluation devices are being used commercially. Electronic carcass evaluation devices are also used to measure composition or quality constituents in individual cuts of meat for further sale to consumers. Studies have shown that improper use of electronic carcass evaluation equipment can change the value of livestock, meat and poultry. The impact of calibration, machine, and formula errors is unknown. The economic impact of the use of electronic livestock, meat and poultry evaluation equipment is very large. The revenues of livestock and poultry producers in every state are or will be affected by the use of these devices.

State and federal regulatory agencies are charged with protecting livestock, meat and poultry producers as well as the consumer in the marketing of livestock, poultry and meat food products. USDA, GIPSA, P&SP references *NIST Handbook 44* in 9 C.F.R. 201.71(a) in its livestock, poultry and carcass weight scale programs to ensure that all scales are installed, maintained and operated to safeguard accurate weights. *NIST Handbook 44* currently includes a tentative code for electronic carcass evaluation devices. Changing the status of the code from “tentative” to “permanent” would assist state and federal regulatory agencies in the enforcement of standards that would ensure compliance, accuracy and consistency across the country.

ASTM International, an organization that develops voluntary international standards, has established the F-10 Committee specifically to address electronic livestock, meat and poultry evaluation devices and systems. It developed several standards referenced in the tentative code. The F-10 Committee remains committed to continuing the development of new standards and the revision of current standards to assist the livestock industry as technology takes a larger role in the determination of value in livestock. Changing the status of the *NIST Handbook 44* code to “permanent” would also support the efforts of this committee to ensure consistency and accuracy across the country.

At the SWMA 2011 Annual Meeting Mr. Ainsworth, USDA, asked the SWMA to consider moving this proposal forward to the NCWM S&T Committee as a Voting Item based upon the rationale provided in the background information. The SWMA heard no opposition to the proposed changes and acknowledged that there has been no negative feedback since the code was given tentative status several years ago. SWMA forwarded the item to NCWM, recommending it as a Voting Item.

At the 2012 NCWM Interim Meeting, two states reported that their inspectors have no experience with this equipment and they expressed reservations about having enough knowledge about the equipment to consider the proposal or resources to train inspectors to test the equipment. One of those jurisdictions also questioned adoption of a code that would only meet the needs of one jurisdiction, albeit a federal government agency.

One state and two private sector representatives supported the proposal. They noted that, if NCWM is to fulfill its mission of being the organization that develops the legal metrology standards for the U.S., it isn't wise to turn agencies away, particularly those that have experience working with the equipment in question and that have an

immediate need for the standard. While there are sometimes risks in adopting requirements for new technologies and applications, at some point adoption of the requirements must proceed and consideration must be given to the expertise of the members of the work group that developed the standards and who have applied it thus far. *NIST Handbook 44* is regularly revised to respond to changes in the commercial marketplace and the need for modifications in new areas of application

NIST, OWM reported contacting two state jurisdictions where this equipment is in use in large facilities in an effort to gather additional input on this item for the committee. While these jurisdictions had not applied the code, Mr. Wilke, USDA GIPSA, reported that GIPSA applies the code to electronic carcass evaluation systems on a regular basis and is satisfied with the results obtained from its use. He also reported that new devices being manufactured have been found to comply with the requirements in the code.

After considering comments on this issue, the committee acknowledged that, although there is no evidence that states have applied the tentative code, one regulatory agency, USDA GIPSA has applied the code on a regular basis and is requesting that the tentative status be lifted to allow enforcement of the code. The 2012 S&T Committee designated this item as a Voting Item.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

## 360 OTHER ITEMS – DEVELOPING ITEMS

### 360-1 D International Organization of Legal Metrology (OIML) Report

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum, and other international groups are within the purview of the committee. Additional information on OIML activities will appear in the Board of Directors agenda and Interim and Final Reports and on the OIML website at [www.oiml.org](http://www.oiml.org). NIST, OWM staff will provide the latest updates on OIML activities during the Open Hearings at NCWM meetings. For more information on specific OIML related device activities, contact the OWM staff listed in the table below. The list below of OIML projects only represents active projects.

**Mr. John Barton** – Liquid Measuring Device Group  
Phone: (301) 975-4002 Email: [john.barton@nist.gov](mailto:john.barton@nist.gov)

- R 21 *Taximeters*
- R 50 *Continuous Totalizing Automatic Weighing Instruments (Belt Weighers)*
- R 60 *Metrological Regulations for Load Cells*
- R 106 *Automatic Rail-weighbridges*

**Mr. Kenneth Butcher** – Laws and Metrics Group  
Phone: (301) 975-4859 Email: [k.butcher@nist.gov](mailto:k.butcher@nist.gov)

- TC 6 *Prepackaged Products*

**Mr. Steven Cook** – Liquid Measuring Device Group  
Phone: (301) 975-4003 Email: [stevenc@nist.gov](mailto:stevenc@nist.gov)

- R 76 *Non-automatic Weighing Instruments*

**Dr. Charles Ehrlich** – International Legal Metrology Group

Phone : (301) 975-4834 Email : [charles.ehrlich@nist.gov](mailto:charles.ehrlich@nist.gov)

- International Committee of Legal Metrology Member for the United States
- V1 *International Vocabulary of Terms in Legal Metrology*
- V2 *International Vocabulary of Basic and General Terms in Metrology*
- B 3 *OIML Certificate System for Measuring Instruments*
- B 6 *OIML Directives for the Technical Work*
- B 10 *Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations*
- TC 3/SC 5 *Expression of Uncertainty in Measurement in Legal Metrology Applications, Guidelines for the Application of ISO/IEC 17025 to the Assessment of Laboratories Performing Type Evaluation Tests*
- TC 3 *Metrological Control*
- ISO/IEC *Guide to the Expression of Uncertainty in Measurement*

**Mr. Richard Harshman** – Legal Metrology Devices Group

Phone: (301) 975-8107 Email: [richard.harshman@nist.gov](mailto:richard.harshman@nist.gov)

- R 51 *Automatic Catchweighing Instruments*
- R 61 *Automatic Gravimetric Filling Instruments*
- R 76 *Non-automatic Weighing Instruments*
- R 107 *Discontinuous Totalizing Automatic Weighing Instruments* (totalizing hopper weighers)
- R 134 *Automatic Instruments for Weighing Road Vehicles In-Motion and Measuring Axle Loads*

**Ms. Diane Lee** – Liquid Measuring Device Group

Phone: (301) 975-4405 Email: [diane.lee@nist.gov](mailto:diane.lee@nist.gov)

- R 59 *Moisture Meters for Cereal Grains and Oilseeds*
- R 92 *Wood Moisture Meters – Verification Methods and Equipment*
- R 121 *The Scale of Relative Humidity of Air Certified Against Saturated Salt Solution*
- TC 17/SC 8 *Measuring Instruments for Protein Determination in Grains*

**Mr. Ralph Richter** – International Legal Metrology Group

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- D 11 *General Requirements for Electronic Measuring Instruments*
- R 35 *Material Measures of Length for General Use*
- R 49 *Water Meters* (Cold Potable Water and Hot Water Meters)
- R 71 *Fixed Storage Tanks*
- R 80 *Road and Rail Tankers* (static measurement)
- R 85 *Automatic Level Gauges for Measuring the Level of Liquid in Fixed Storage Tanks*
- R 95 *Ship's Tanks*
- R 117 *Measuring Systems for Liquids Other Than Water* (all measuring technologies)
- R 118 *Testing Procedures and Test Report Format for Pattern Examination of Fuel Dispensers for Motor Vehicles*
- TC 3/SC 4 *Verification Period of Utility Meters Using Sampling Inspections*
- R 137 *Gas Meters* (all measuring technologies)
- R 140 *Measuring Systems for Gaseous Fuel* (i.e., large pipelines)
- ISO TC 30/SC 7 *Water Meters*

**Dr. Ambler Thompson** – International Legal Metrology Group

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- D 16 *Principles of Assurance of Metrological Control*
- D 19 *Pattern Evaluation and Pattern Approval*
- D 20 *Initial and Subsequent Verification of Measuring Instruments and Processes*
- D 27 *Initial Verification of Measuring Instruments Using the Manufacturer's Quality Management System*
- D 31 *General Requirements for Software Controlled Measuring Instruments*
- R 34 *Accuracy Classes of Measuring Instruments*
- R 46 *Active Electrical Energy Meters for Direct Connection of Class 2*

**Ms. Juana Williams** – Legal Metrology Devices Group

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- R 81 *Dynamic Measuring Devices and Systems for Cryogenic Liquids*
- R 139 *Compressed Gaseous Fuels Measuring Systems for Vehicles*

The WWMA and the SWMA support these issues and the related device activities as an Informational Item. At the 2011 NEWMA Interim Meeting it was noted that Dr. Ehrlich does a great job at annual and interim meetings explaining OIML issues. NEWMA supports the efforts of NIST to harmonize with OIML wherever possible to create a marketplace that reflects the global marketplace of today.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

### 360-2 D G-S.1. Identification. – (Software)

**Source:**

2010 Carryover Item 310-3. This item originated from the NTETC Software Sector and first appeared on NCWM S&T Committee's 2007 agenda as Developing Item Part 1, Item 1.

**Purpose:**

Provide marking requirements that enable field verification of the appropriate version or revision for metrological software, including methods other than "permanently marked," for providing the required information.

**Item Under Consideration:**

Amend *NIST Handbook 44*: G S.1. Identification and G S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-Based Devices as follows:

**G S.1. Identification.** – All equipment, except weights, **and** separate parts necessary to the measurement process but not having any metrological effect, ***and software-based devices covered in G-S.1.1. Location of Marking Information\****, shall be clearly and permanently marked for the purposes of identification with the following information:

***[\*Nonretroactive as of January 1, 20XX]***

**(Amended 20XX)**

- (a) the name, initials, or trademark of the manufacturer or distributor;
- (b) a model identifier that positively identifies the pattern or design of the device;
  - (1) *The model identifier shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod." Prefix lettering may be initial capitals, all capitals, or all lowercase.*

[Nonretroactive as of January 1, 2003]

(Added 2000) (Amended 2001)

- (c) *a non-repetitive serial number, except for equipment with no moving or electronic component parts ~~and not built for purpose software-based software device;~~*

[Nonretroactive as of January 1, 1968]

(Amended 2003 **and 20XX**)

- (1) *The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.*

*[Nonretroactive as of January 1, 1986]*

- (2) *Abbreviations for the word “Serial” shall, as a minimum, begin with the letter “S,” and abbreviations for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., S/N, SN, Ser. No., and S. No.).*

*[Nonretroactive as of January 1, 2001]*

- (d) *the current software version or revision identifier for ~~not built for purpose~~ software-based electronic devices;*

*[Nonretroactive as of January 1, 2004]*

(Added 2003) (**Amended 20XX**)

- (1) *The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.*

*[Nonretroactive as of January 1, 2007]*

(Added 2006)

- (2) *Abbreviations for the word “Version” shall, as a minimum, begin with the letter “V” and may be followed by the word “Number.” Abbreviations for the word “Revision” shall, as a minimum, begin with the letter “R” and may be followed by the word “Number.” The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.).*

*[Nonretroactive as of January 1, 2007]*

(Added 2006)

- (e) *an NTEP CC number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms “NTEP CC,” “CC,” or “Approval.” These terms may be followed by the word “Number” or an abbreviation of that word. The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.)*

*[Nonretroactive as of January 1, 2003]*

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

(Amended 1985, 1991, 1999, 2000, 2001, 2003, **and**, 2006, **and 20XX**)

**G-S.1.1. Location of Marking Information for ~~Not Built For Purpose~~ all Software-Based Devices.** – For ~~not built for purpose~~, software-based devices, either:

- (a) *The required information in G S.1. Identification. ~~(a), (b), (d), and (e)~~ shall be permanently marked or continuously displayed on the device; or*

- (b) *The Certificate of Conformance (CC) Number shall be:*

- (1) *permanently marked on the device;*

- (2) *continuously displayed; or*
- (3) *accessible through ~~an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G S.I. Identification," or "Weights and Measures Identification."~~ one or, at most, two levels of access.*
- (i) For menu based systems, "Metrology," "System Identification," or "Help."*
- (ii) For systems using icons, a metrology symbol "(M)", "(SI)," or a help symbol ("?", "i," or an "i" within a magnifying glass).*

*Note: For (b), clear instructions for accessing the information required in G S.I. (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.*

*[Nonretroactive as of January 1, 2004]*

(Added 2003) (Amended 2006 **and 20XX**)

#### **Background / Discussion:**

Among other tasks, the NTETC Software Sector was charged by the NCWM Board of Directors to recommend *NIST Handbook 44* specifications and requirements for software incorporated into weighing and measuring devices, which may include tools used for software identification. During its October 2007 meeting, the sector discussed the value and merits of required markings for software, including possible differences in some types of software-based devices and methods of marking requirements. After hearing several proposals, the sector agreed to the following technical requirements applicable to the marking of software:

1. The NTEP CC Number must be continuously displayed or hard-marked;
2. The version must be software-generated and shall not be hard-marked;
3. The version is required for embedded (Type P) software;
4. Printing the required identification information can be an option;
5. Command or operator action can be considered as an option in lieu of a continuous display of the required information; and
6. Devices with Type P (embedded) software must display or hard-mark the device make, model, and serial number to comply with G S.I. Identification.

In 2008, the sector developed and submitted a proposal to the NCWM S&T Committee to modify G-S.I. and associated paragraphs to reflect these technical requirements. Between 2008 and 2011, this item appeared on the S&T Committee's main agenda and the committee and the sector received numerous comments and suggestions relative to the proposal. The sector developed and presented several alternatives based on feedback from weights and measures officials and manufacturers. Among the key points and concerns raised during discussions over this period were how to address the following:

- (a) **Limited Character Sets and Space.** – How to address devices that have limited character sets or restricted space for marking.
- (b) **Built-for-Purpose vs. Not-Built-for-Purpose.** - Whether or not these should be treated differently.
- (c) **Ease of Access.** – Ease of accessing marking information in the field.
  - Complexity of locating the marking information
  - Use of menus for accessing the marking information electronically
  - Limits on the number of levels required to access information electronically
  - Possibility of single, uniform method of access

- (d) **Hard Marking vs. Electronic.** – Whether or not some information should be required to be hard marked on the device.
- (e) **Continuous Display.** – Whether or not required markings must be continuously displayed.
- (f) **Abbreviations and Icons.** – Establishment of unique abbreviations, identifiers, and icons and how to codify those.
- (g) **Certificate of Conformance Information.** – How to facilitate correlation of software version information to a CC, including the use of possible icons.

Further details on the alternatives considered can be found in the committee's Final Reports from 2008 to 2011.

At the 2011 NCWM Interim Meeting, the S&T Committee concurred with the Software Sector Chair that this item is not ready to move forward as a Voting Item. The committee recommended the sector review a number of specific comments and points (see the committee's 2011 Final Report for details.)

At the 2011 NCWM Annual Meeting, the committee heard support for the continued work of the sector. The 2011 S&T Committee designated this item as a Developing Item to provide the Software Sector additional time to more fully develop the item. The committee looked forward to considering the sector's future recommendations.

At the fall 2011 regional meetings, the regional weights and measures associations noted the importance of this work. All regional associations recommended that the item remain as a Developing Item to allow the sector to further develop the issue.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

### **360-3 D Part 2.20. Weigh-In-Motion Vehicle Scales for Law Enforcement – Work Group**

**Source:**

NIST, OWM, Mr. Richard Harshman, on behalf of the U.S. Federal Highway Administration (FHWA) (2011)

**Purpose:**

Keep the weights and measures community apprised of work to develop standards for Weigh-In-Motion (WIM) scale systems and to encourage their participation in this work.

**Item under Consideration:**

This item is under development. Comments and inquiries may be directed to Mr. Rick Harshman, NIST, OWM at (301) 975-8107 or [richard.harshman@nist.gov](mailto:richard.harshman@nist.gov).

The FHWA is forming a USNWG to develop proposed standards that would apply to WIM scale systems used to screen or sort commercial vehicles for possible violations of legal roadway weight limits with the ultimate goal of bringing the proposed standards before the weights and measures community for possible inclusion in *NIST Handbook 44*. FHWA has been collaborating with NIST, OWM and the commercial vehicle enforcement community to identify industry experts, device users, regulatory officials, and others interested in participating in the work group. The work group plans to develop proposed specifications, tolerance, and other technical requirements applicable to WIM scale systems used in official use for the enforcement of law or for the collection of statistical information by government agencies.

**Background / Discussion:**

The nation's highways, freight transportation system, and enforcement resources are being strained by the volume of freight being moved and the corresponding number of commercial vehicles operating on its roads. Traditional, manual-based vehicle inspection activities simply cannot keep pace with anticipated truck volume increases. Current U.S. Department of Transportation (DOT) forecasts project freight volumes to double by 2035 and commercial vehicles to travel an additional 100 billion miles per year by 2020. WIM technology has been targeted by FHWA and Federal Motor Carrier Safety Administration to a technology capable of supporting more effective and efficient truck weight enforcement programs.

Several DOT efforts are underway and planned for the future to maintain adequate levels of enforcement that ensure equity in the trucking industry market and protection of highway infrastructure. Judicial support for enforcement decisions to apply more intense enforcement actions on specific trucks depends on support from the U.S. legal metrology community. Standards are needed in *NIST Handbook 44* to address the design, installation, accuracy, and use of WIM systems used in a screening/sorting application. The implementation of a uniform set of standards will greatly improve the overall efficiency of the nation's commercial vehicle enforcement process.

Once adopted by the truck weight enforcement community, these requirements will enhance the accuracy of the nation's WIM scale systems, serve as a sound basis for judicial support of next-generation truck weight enforcement programs and result in fewer legally loaded vehicles being delayed at static weigh station locations, thus reducing traffic congestion and non-productive fuel consumption and improving the movement of freight on our nation's roadways.

At the 2010 CWMA Interim Meeting, a commenter said that WIM scales could be used for enforcement issues and evaluating or assessing fines to overweight trucks. Currently most of these scales are used for audit purposes only. The committee believes that the efforts to establish requirements for WIM scales has merit, and when fully developed, will assist in expediting commerce by not having to reweigh clearly legal highway vehicles while protecting roadways from vehicles that exceed legal highway load limits.

At the 2010 WWMA Annual Technical Conference, Mr. Langford, Cardinal Scales Manufacturing Co., stated that he is a member of the work group and supports adding language defining performance parameters of WIM devices for use in law enforcement. Mr. Langford added that the work group will consider other existing standards to help develop the language in *NIST Handbook 44* (e.g., OIML Recommendation (R) 134 *Automatic Instruments for Weighing Road Vehicles in Motion and Measuring Axle Loads*). Mr. Floren, Los Angeles County Agricultural Commissioner / Weights and Measures, added that even though these devices are non-commercial they are covered under the scope of *NIST Handbook 44* General Code Application paragraph G-A.1.(c) Commercial and Law Enforcement Equipment.

At the 2010 SWMA Annual Meeting, Mr. Langford, Cardinal Manufacturing Co., supported the direction of this work group. Mr. Langford noted that these WIM scales are not currently used to levy fines, but rather to screen for overweight trucks. He noted that the work group is just getting started and that Cardinal Manufacturing Co. is looking forward to participating in this work. Mr. Gray, Florida Department of Agriculture and Consumer Services, questioned whether putting requirements for highway WIM devices in *NIST Handbook 44* would obligate jurisdictions to conduct tests of these devices. While he doesn't oppose the inclusion of requirements in general, he questioned the availability of resources to accommodate the additional workload given the extreme budget restrictions many jurisdictions are facing. Ms. Butcher, NIST, OWM, noted that DOT reported that highway weight enforcement officials are concerned that the use of the scales in screening will be challenged without reference to a recognized standard. Since many of these agencies reference *NIST Handbook 44*, they believed that recognition of these devices in *NIST Handbook 44* as law enforcement equipment would lend credibility and consistency to the design, use, accuracy, and application of this equipment.

The SWMA S&T Committee supported efforts of the work group. However, given some of the concerns and questions raised at the Open Hearings about resources for testing, the committee did not want to take a position on this issue until it has more information about the direction of the work group.

At the 2010 NEWMA Interim Meeting comments were heard supporting the formation of the work group but questioned what role existed for NCWM S&T Committee at this time.

At the 2011 NCWM Interim Meeting, Ms. Williams, NIST, OWM, provided the following update on the progress of WIM standards development:

**Purpose of the Project:**

The FHWA's Office of Freight Management and Operations recognized a need to encourage uniformity in the design, testing, installation, and performance of WIM technology and subsequently encourage acceptance by prosecution agencies (administrative or judicial) regarding the validity of WIM technology's role in supporting commercial motor vehicle weight enforcement.

In response to this need and recognizing the credibility of having a standard included in *NIST Handbook 44* because it lends integrity and is more recognizable in legal actions, the FHWA seeks to integrate WIM technology into the handbook. The FHWA recently contracted the services of the Texas Transportation Institute—The Texas A&M University System and Battelle (a private company) to begin this process. Additionally, a small oversight committee was formed by the FHWA, made up of three representatives from the FHWA, a NIST Technical Advisor, and a representative of a U.S. manufacturer of WIM equipment to validate that each contract deliverable is completed according to contract.

The intended application of the proposed new code is for screening purposes only (i.e., for screening/sorting commercial vehicles for possible violations of FHWA vehicle weight requirements). It is anticipated that as WIM technology continues to advance, this code may have a much broader application sometime in the future.

As a first step in this effort, the contracted team was tasked to develop an initial, detailed Project Work Plan intended to guide activities and establish lines of communication from project inception to project completion. This deliverable has been completed and was recently submitted to the FHWA Project Oversight Committee for consideration.

The next step will be to establish a work group from the WIM technology stakeholder community. This process is already underway and the WG will be comprised of representatives from state departments of transportation, state law enforcement agencies, weights and measures officials, WIM technology manufacturers and vendors, academic researchers, and others. The initial meeting of the work group is planned, although not yet scheduled, for the middle of February 2011. It is anticipated that a final draft code will be ready for consideration by NCWM in 2012.

Mr. Gray, Florida Department of Agriculture and Consumer Services, commented that although he didn't have any issues regarding developing standards for WIM systems, he did not believe that inclusion of a new WIM code into *NIST Handbook 44* was appropriate because the application of the proposed code was for screening purposes only.

Mr. Langford, Cardinal Manufacturing Co., supported the development of the standard and stated that the "Application" section of the General Code not only applies to commercial equipment, but also equipment used in law-enforcement and for the collection of statistical information by government agencies. He also stated that it was too early to make a determination on how much work would be involved in the testing of WIM systems because the work group had yet to be formed.

At the 2011 NCWM Annual Meeting Mr. Harshman, NIST, OWM provided an update on the progress of the WIM Work Group.

At the 2011 WWMA Annual Meeting Mr. Cook, NIST, OWM, provided the following update on the activities of the WIM Vehicle Scales Work Group: Mr. Harshman, NIST, OWM, is the NIST Technical Advisor to the work group and participated in the discussions and offered technical positions on the various items during its first meeting in July 2011. Mr. Harshman presented an overview of the process to develop the technical content of a new WIM code. He explained how *NIST Handbook 44* was organized, and how requirements developed by the work group would fit into the various sections of a new *NIST Handbook 44* code. He also provided an overview of the standards development process and discussed the benefits of the work group using a "straw man," which he has already created to develop the new draft code. Mr. Langford, Cardinal Scale Manufacturing Co., gave a presentation on the *NIST Handbook 44* amendment process which detailed the various steps the work group would need to complete to add a new device code to *NIST Handbook 44*.

Several concerns/questions were raised by participants during a scheduled open discussion of the work group. The following are some of the more important concerns/questions discussed:

1. The application section of the code is critical. The types of WIM systems in which the code does and does not apply will significantly impact all other sections of the code.
2. What tolerance should be specified in the draft code? An important related question is: What degree of accuracy will the judicial system (courts) accept as being sufficiently accurate enough to screen commercial vehicles for possible overweight violations? The degree of accuracy required will have a large impact on the kinds of systems that get included or excluded in the application section of the code.
3. There needs to be a separation of requirements, i.e., those that apply to virtual weigh stations and those that apply to WIM systems installed at weigh stations having a static scale.
4. To adopt a draft code at the national level, two things must happen: 1) A legitimate test procedure is needed to enable states to test these systems, and 2) federal funding is needed to help cover the cost of testing.
5. Will *NCWM Publication 14* type evaluation criteria be needed since these systems are not commercial and are unlike other devices typically covered by *NIST Handbook 44*?

Mr. Flocken, Mettler-Toledo, LLC, accepted the position as the WIM work group chair, and encouraged stakeholders to submit comments to the work group. These questions/concerns and others are to be discussed during the next meeting of the work group. The next meeting date has not yet been decided.

At the 2011 NEWMA Interim Meeting, it was suggested that resources may be too limited to enforce and conduct inspections on these devices once the code is developed. The NEWMA S&T Committee recognized, however, that the traffic at truck stops can be backed up and this technology would help to ease that problem. They would also be easier to set up than axle-load weighers. While the committee heard some support for WIM scales, there are also questions. Would these be located at permanent or temporary locations? Will fines be issued off of these scales? How often will scales need to be tested? The committee recommended continuing to collect data and comments on this new technology.

At the 2011 SWMA Annual Meeting, Mr. Flocken, Mettler-Toledo, LLC, reported that he has been appointed chair of the USNWG and that the work group held its first meeting in July. He also noted that Mr. Harshman, NIST, OWM, prepared a draft code for the work group to consider as a starting point. Mr. Flocken has created a checklist that he proposes to distribute to the work group along with the draft code; he plans to ask work group members to complete the checklist as they review the code, identifying sections which they believe need additional work. He hopes that this review process can be completed by mid-December, after which time the work group will meet to review the input from members. Mr. Flocken noted that if the timing is appropriate, it may be possible to hold a work group meeting in conjunction with the NCWM Interim Meeting. Mr. Flocken will submit his proposed next steps to the FHWA's Project Oversight Committee for approval. He also asked that the community be patient while this work group gets underway and he will look forward to bringing specific proposals to the committee as work progresses further. The committee recognizes that this work is still in the developmental stages and agrees that additional time is needed before any proposals can be considered by the committee.

At the 2012 Interim Meeting, Mr. Flocken, Mettler-Toledo, LLC, new chair of the Weigh-In-Motion Work Group provided an update on the standards development for WIM scale systems. Mr. Flocken reported that the work group held its first face to face meeting in July 2011 to launch the project, get participants involved, and discuss some of the more important tasks at hand. Mr. Harshman, NIST Technical Advisor to the work group had prepared a draft code for participants of the work group to consider as a starting point. That draft code, as well as a checklist that Mr. Flocken created, had been distributed to participants of the work group. Participants were asked to complete the checklist as they reviewed the draft code, identifying sections which they believed needed additional work. Based upon the comments indicated on completed checklists that have been returned thus far, it was evident that participants of the work group have very diverse ideas concerning the standards that should go into a new draft code. For that reason, Mr. Flocken and Mr. Harshman met earlier during the week to talk about how best to proceed. They decided to arrange a teleconference meeting with members of the FHWA's Project Oversight Committee to seek guidance on the scope of the project. Mr. Flocken planned to schedule that conference within a few weeks following conclusion of the 2012 Interim Meeting. There is a mix of support and opposition to this project and Mr. Flocken requested that the community be patient. He looked forward to bringing specific proposals to the committee as work progresses further.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

**360-4 D Part 3.30. Price Posting and Computing Capability and Requirements for a Retail Motor-Fuel Dispenser (RMFD)**

**Source:**

NIST, OWM and the Regional Associations (2008)

**Purpose:**

Review and update criteria in the LMD Code related to price posting and computing capability of RMFDs to reflect current market practices.

**Item under Consideration:**

NCWM Task Group on Retail Motor Fuel Dispenser Price Posting and Computer Capability developed specific proposals for modifying the LMD Code to address price posting and computing requirements for RMFDs. These proposals can be found under Item 330-1 of the committee's agenda. This item, 360-4, is being retained as a Developing Item pending any additional assignments that may be given by the committee to the Task Group relative to the implementation of new code requirements that may be adopted. Comments or inquiries may be directed to NIST Technical Advisor, Ms. Juana Williams, at (301) 975-3989 or [juana.williams@nist.gov](mailto:juana.williams@nist.gov).

**Background / Discussion:**

In the early 1990s, various sections of the LMD Code in *NIST Handbook 44* were modified to address multi-tier pricing applications in instances where the same product is offered at different unit prices based on the method of payment (such as cash or credit) or other conditions of the sale. Since that time, marketing practices have evolved to include the addition of new practices, such as frequent shopper discounts and club member discounts. Numerous questions have been posed to NIST, OWM and weights and measures officials regarding the requirements for posting unit prices, calculation of total price, customer-operated controls, and other related topics, such as the definitions for associated terminology. It is clear from these questions that changes are needed to *NIST Handbook 44* to ensure the requirements adequately address current marketplace conditions and practices. The committee agreed that changes are needed to the LMD Code relative to these issues and, in 2010, established a task group to further develop this issue and present an alternative recommendation for its consideration.

Additional details on this item can be found in the committee's 2008-2011 Final Reports.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

**360-5 D S.5. Provision for Security Seals**

This item originally appeared as 354-1 in the committee's 2012 Interim Agenda.

**Source:**

Frias Transportation Infrastructure LLC (2012)

**Purpose:**

Allow for a more advanced and secure method of sealing a Taximeter.

**Item Under Consideration:**

Amend *NIST Handbook 44*, Taximeter Code as follows:

**S.5. Provision for Security Seals.** – Adequate provision shall be made to provide security for a taximeter. Security may be provided ~~either~~ by:

- (a) Affixing security seals to the taximeter and to all other components required for service operation of a complete installation on a vehicle, so that no adjustments, alterations, or replacements affecting accuracy or indications of the device or the assembly can be made without mutilating the seal or seals; ~~or~~
- (b) Using a combination of security seals described in paragraph (a) and, in the case of a component that may be removed from a vehicle (e.g., slide mounting the taximeter), providing a physical or electronic link between components affecting accuracy or indications of the device to ensure that its performance is not affected and operation is permitted only with those components having the same unique properties; or
- (c) Using a combination of security seals described in paragraph (a) and, (b) and, in the case of a component that is electronic data affecting accuracy or indications of the taximeter, providing a unique electronic security seal on the electronic data that is encrypted and protected by an audited authentication and authorization mechanism, so that no adjustments, alterations, or replacements affecting the component can be made without the authentication and authorization. (Encryption algorithm for electronic seals must meet NIST AES ADVANCED ENCRYPTION STANDARD.)

The sealing means shall be such that it is not necessary to disassemble or remove any part of the device or of the vehicle to apply or inspect the seals.

(Amended 1988, ~~and~~ 2000, and 20XX)

**Background / Discussion:**

The submitter of this proposal noted that, per the Taxicab Limousine and Paratransit Association in the United States, there are approximately 6,300 companies operating 171,000 taxicabs. More than 80 % of these companies operate less than 50 vehicles while 6 % of taxicab operations have more than 100 vehicles in service. Taxicab companies provide work for 350,000 people and transport 1.4 billion passengers annually for purposes that primarily include business, travel, and community transportation. A vast majority of these taxicabs are required by a regulatory authority to have a sealed taximeter.

The last amendments made to *NIST Handbook 44* Section 5.54. Taximeters paragraph S.5. were made in 2000 and 1988. Since then many advancements have been made in the security of electronic data to eliminate the need for a physical security seal on a manual programming button used to program the way in which a taximeter can operate. Furthermore, the new technology without physical seals may remove the need for any programming buttons on the actual taximeter itself creating a more secure and tamper resistant device.

Use of a physical security seal allows the possibility for personnel who have access to such seals (like a taximeter shop) to compromised the seal and use incorrect programming of a taximeter resulting in unfair rates for the traveling public. By using an encrypted data packet that is sealed by an audited authentication and authorization mechanism, only certain personnel would be allowed to make such changes to a taximeter providing additionally for a complete audit trail of all changes. If inconsistent or flawed parameters were to be programmed to a taximeter one could assess who, when and why such changes were made.

The removal and placement of physical seals along with programming of a taximeter can also be a tremendous burden on taxi drivers, taxi operators, as well as the taxpayer. Every time a rate change or fuel surcharge is approved by the regulatory body, the regulatory body must oversee the removal and replacement of new taximeter seals. Drivers and operators also face significant downtime while such changes are made to the taximeters. By using electronic seals the time it takes to change seals and program a taximeter would be reduced from 5 to 10 minutes per car to seconds per car.

For the purpose of this proposal, the submitter made reference to NIST Advanced Encryption Standard (AES). AES (FIPS PUB 197) believes that the encryption algorithm for such a security seal on a taximeter should meet this standard.

The submitter also pointed out that Nevada is one of the only states that do not reference *NIST Handbook 44* on Taximeters. To correct this problem, alternate language was introduced in the 2011 legislative session to allow for the electronic sealing of a taximeter. This bill was signed into law by the Governor of Nevada on June 16, 2011.

It is difficult to estimate cost savings accurately as every regulatory body that oversees the taxicab industry has different rules on operations. There are also differences in who owns or maintains the vehicle or equipment. This new way of sealing a taximeter would however, allow for such an option by a regulatory body or an operator to install new equipment that would benefit all parties dependent on such rulemaking.

The submitter suggested the following benefits to stakeholders:

- Additional level of security for taximeter.
- Audit trail for all changes made to taximeter programming.
- Fast implementation of approved rate changes by regulatory bodies. (In some jurisdictions operators or drivers may have to wait weeks to implement fuel surcharges because the process for changing rates and seals under current standards is time consuming)
- Reduction in costly observational enforcement to industry. (Currently the only way a regulator can determine if an operator has a broken seal or has tampered with a taximeter is through observational enforcement – An electronic seal would allow for real time reporting as to the condition of such a seal, as well as the programming of the taximeter)
- Reduction in overcharges to customers by compromised drivers, and operators.
- Allow for new more advanced ways of programming a taximeter and delivery of such programming onto a taximeter.

The submitter offered the following individuals as contacts. Additionally, a letter of support was presented by Mr. Daus, President of the International Association of Transportation Regulators (IATR) and former Commissioner of the NYC Taxi and Limousine Commission.

**Chief Information Officer**

Mr. James Wisniewski  
Frias Transportation Infrastructure  
5010 S Valley View Blvd  
Las Vegas, NV 89118  
Phone: (702) 210-6176

**Chief Technology Officer**

Mr. Mike Pinkus  
Frias Transportation Infrastructure  
5010 S Valley View Blvd  
Las Vegas, NV 89118  
Phone: (702) 210-4896

**President of the IATR**

Mr. Matthew W. Daus  
Windels Marx Lane and Mittendorf, LLP  
156 West 56<sup>th</sup> St  
New York, NY 10019  
Phone: (212) 237-1106

At the 2011 NEWMA Interim Meeting it was noted that there is no prototype yet. The submitter explained that there is an electronic data component that is to be sealed. An official questioned how the data would get to the regulatory agency. Comments were made that a cloud-based system could be used. Officials were told that no physical seal is needed if this is implemented. An industry member commented that there should still be some type of security seal used. There would be a comfort level for consumers but not for weights and measures officials. Some questioned what would happen with regard to accessing the data if the company goes out of business. NEWMA recommends that this item be presented to the Taximeter Work Group being formed by NIST, OWM for further development. NEWMA did not forward the item to NCWM.

At the 2011 SWMA Annual Meeting, Mr. Wisniewski, Frias Transportation Infrastructure, recommended Developing status for this item. Mr. Wisniewski explained that NIST, OWM and NCWM are exploring the formation of a Taximeter Work Group to develop proposed changes to the code to reflect current technologies. He indicated that Frias Transportation Infrastructure plans to work with other manufacturers and regulators in the taximeter community as well as NIST, OWM to further develop this issue through this work group. SWMA forwarded the item to NCWM, recommending it as a Developing Item, with the provision that the submitter will work with the Taximeter Work Group being and further develop the issue through that venue.

At the 2012 NCWM Interim Meeting, Mr. McGrath, Boston ISD Weights and Measure, expressed concerns about the lack of a physical security seal on taximeters. He cited difficulty tracking down drivers for the purposes of monitoring the use of adjustments and suggested withdrawing the item as presented. Ms. Macey, California Division of Measurement Standards, expressed concerns about the resources required to train inspectors to apply the standards referenced in the proposal and she does not believe the item is sufficiently developed as presented to go forward on the committee's agenda. Ms. Williams, NIST, OWM, reported that a small group, including Mr. Barton, NIST, OWM and herself, along with Mr. Nelson, California Division of Measurement Standards, Mr. Thompson, California Division of Measurement Standards, and Mr. Fishman, retired NY Bureau of Weights and Measures metrologist, met to begin identifying areas of the code that need to be updated, including requirements relative to device security. Ms. Williams confirmed that NIST, OWM plans to establish a formal work group to examine issues such as these relative to updating the code to reflect current technology and practices. Citing the concerns raised by NEWMA and SWMA, Ms. Williams suggested that this item might be best undertaken by that work group.

The committee agreed with the Open Hearing comments that this item needs additional work. The committee supports the formation of the work group by NIST, OWM and looks forward to further development of this issue. The 2012 S&T Committee designated this item as a Developing Item. Interested parties should contact Mr. John Barton, Legal Metrology Devices Program, NIST, OWM at (301) 975-4002 or [john.barton@nist.gov](mailto:john.barton@nist.gov).

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

### **360-6 D Global Positioning Systems for Taximeters**

This item originally appeared as 354-2 in the committee's 2012 Interim Agenda.

**Source:**

Consumer Affairs Unit, City of Seattle (2012)

**Purpose:**

Amend *NIST Handbook 44*, Section 5.54 Taximeters to make it specifically apply to Global Positioning System (GPS) system applications used commercially to compute fares based upon distance and/or time measurements.

**Item Under Consideration:**

A specific proposal was not submitted.

**Background / Discussion:**

GPS system applications designed to compute fares based upon distance and/or time measurements are being introduced into the for-hire industry (e.g., taxicabs, limousines) in major U.S. cities. Regulatory officials need up-to-date technical standards to protect the consumer from being charged inaccurate fares. The absence of NCWM standards may encourage fraudulent practices by some users just as some taxicab drivers are known to use “zappers” on traditional electronic taximeters, or intentionally use the wrong rate (recent widespread problem in New York City and Los Angeles). The potential for fraud using computer programs and wireless technology was amply demonstrated by the “pulser” unit substitutions in retail motor-fuel dispensers at a very large number of gas stations in Los Angeles a few years ago. Section 5.54 Taximeters must be completely rewritten to reflect the new technology represented by “virtual taximeters.” The test methods (i.e., measured mile, dynamometer) and tolerances are probably satisfactory but the remainder of Section 5.54 must be updated to account for “virtual taximeter” technology.

GPS system applications used commercially to compute fares based upon distance and/or time measurements are: (1) performing the same functions of traditional taximeters, (e.g., computing distance and time charges, determining “crossover” speeds); (2) “virtual taximeters” replacing traditional (“black box”) taximeters; and (3) substituting computer programs and wireless technology to replace electronic taximeters – just as electronic taximeters replaced mechanical taximeters some time ago. These “virtual taximeters” are the next generation of measuring devices employed by taxicabs – and now limousines. The “devices” consist of computer software that resides in a “black box” somewhere remote from the taxicab instead of inside the taxicab. However, the challenges for consumer protection remain (e.g., accuracy, security of calibration components and display of measurements at the point of sale where the decision to buy is made.)

NCWM, as a standard-setting body, has three goals: (1) consumer protection, (2) uniformity of standards and enforcement, and (3) providing a level playing field for businesses to fairly compete. This proposal to amend *NIST Handbook 44* is aimed at all of these goals. Producers of traditional taximeters meet *NIST Handbook 44* Section 5.54 (e.g., Centrodyne), but their competitors selling GPS system applications used commercially to compute fares based upon distance and/or time measurements (e.g., Uber) do not meet any standards.

According to media coverage and product web sites, easily available by a search of the internet, new technology is being introduced to the taxicab and limousine industry for both dispatching and determining fares. There are several new applications for smart phones that dispatch a taxicab passenger based upon inputs from the taxicab computer dispatch system (e.g., Taxi Magic) but the passenger enters the taximeter fare on the smart phone application in order to pay electronically. The GPS system applications actually determine the fare based upon distance inputs from GPS such as Google Maps (e.g., Uber). Uber is active in San Francisco, New York and Seattle.

New technology using GPS inputs and computer programming to measure distance and time in order to compute fares is growing very rapidly. If NCWM does not promptly begin to examine the GPS system applications, (“virtual taximeters”) as measuring devices then the consumer is not being protected and the taximeter industry will not be afforded a level playing field.

At the 2011 NEWMA Interim Meeting and 2011 SWMA Annual Meeting, both regions agreed that the issue should be taken up by a work group being formed by NIST, OWM and NCWM. SWMA further commented that the submitter should work with that work group and also noted that the use of technologies and devices such as GPS need to be reviewed and addressed by *NIST Handbook 44* for applications (such as that described by the submitter) where they will be used to generate commercial measurements. NEWMA and SWMA forwarded the item to NCWM, recommending it as a Developing Item.

At the 2012 NCWM Interim Meeting, NIST, OWM reported that NCWM and NIST had agreed that a work group is needed to review and revise the *NIST Handbook 44* Taximeters Code to better reflect current technology and practices. After consultation with NCWM, NIST, OWM agreed to establish a work group and held a meeting of NTEP representatives and NIST, OWM representatives to identify areas of the code that require revision. Once a draft revision of the code (a “strawman”) has been prepared, NIST, OWM will expand the work group by extending an invitation for other interested parties, including regulators, manufacturers, and users to begin review and discussion of the draft.

NIST, OWM noted that this item on GPS-based systems needs additional work and review and suggested that the work group might further develop this issue. The committee also heard from representatives of two jurisdictions who expressed concerns about the ability to regulate these systems to ensure that consumers have adequate information and the ability to do value comparisons. Both cited recent examples of numerous consumer complaints during New Year's Eve when fares were raised significantly. Conventional taximeters must conform to the requirements of *NIST Handbook 44* with regard to accuracy, operation, fare changes, and posting requirements. These systems are competing with conventional taximeter, yet changes in fare can be made at any time without any control by regulatory authority. An official acknowledged the advantages that such systems can bring for consumers and encouraged the work group in its efforts to establish requirements for these systems, stating that weights and measures requirements should not inhibit new technology. A retired official also encouraged the work group to take on these issues and urged the work group to carefully study these systems to ensure that appropriate safeguards are put into place to protect consumers without placing a significant cost burden on design of the equipment.

The committee agreed with the comments that this item needs additional work. The committee supports the formation of the work group by NIST, OWM and looks forward to further development of this issue. The 2012 S&T Committee designated this item as a Developing Item. Interested parties should contact Mr. John Barton, Legal Metrology Devices Program, NIST, OWM at (301) 975-4002 at [john.barton@nist.gov](mailto:john.barton@nist.gov).

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to [www.ncwm.net/content/2012pub-16](http://www.ncwm.net/content/2012pub-16) to review these documents.

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Mr. Steve Giguere, Maine | Committee Chair  
Mr. Kenneth Ramsburg, Maryland | Member  
Mr. Paul Moyer, Nebraska | Member  
Mr. Brett Gurney, Utah | Member  
Mr. Mahesh Albuquerque, Colorado | Member  
Mr. Ted Kingsbury, Measurement Canada | Canadian Technical Advisor  
Ms. Tina Butcher, NIST, OWM | NIST Technical Advisor  
Mr. Rick Harshman, NIST, OWM | NIST Technical Advisor

#### **Specifications and Tolerances Committee**

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