Report of the Specifications and Tolerances (S&T) Committee

Steve Giguere, Chairman
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Weights and Measures

Reference
Key Number

300 INTRODUCTION

This is the final report of the Committee on Specifications and Tolerances (S&T) (hereinafter referred to as the "Committee") for the 96th Annual Meeting of the National Conference on Weights and Measures (NCWM). The report is based on the Interim Report offered in the NCWM Publication 16, "Committee Reports," testimony at public hearings, comments received from the regional weights and measures associations and other parties, the NCWM 2011 Online Position Forum, the addendum sheets issued at the Annual Meeting, and actions taken by the membership at the voting session of the Annual Meeting.

Table A identifies the agenda and appendix items. The agenda items are identified in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting agenda. Voting items are indicated with a "**V**," or if the item was part of the Voting Consent calendar by the suffix "**VC**" after the item number. Items marked with an "**I**" after the Reference Key Numbers are Informational items. Items marked with a "**D**" after the Key Numbers are Developing items. The Developing designation indicates that an item, while it has merit, may not be adequately developed for action at the national level. Items marked "**W**" have been withdrawn from consideration. Items marked with a "**W**" will generally be referred to the regional weights and measures associations because they either need additional development, analysis, and input or did not have sufficient Committee support to bring them before the NCWM. Table B identifies the acronyms for organizations and technical terms used throughout the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in its entirety.

This report contains recommendations to amend the National Institute of Standards and Technology (NIST) Handbook 44, 2011 Edition, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." Proposed revisions to the handbook are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **<u>underlining</u>** information to be added. New items proposed for the handbook are designated as such and shown in **bold face print**.

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

Table A
Index to Reference Key Items

Table B
Glossary of Acronyms

BCS	Belt-Conveyor Scales	NTETC	National Type Evaluation Technical Committee
CC	Certificate of Conformance	NW&SA	National Weighing and Sampling Association
CWMA	Central Weights and Measures Association	OEM	Original Equipment Manufacturer
EPO	Examination Procedure Outline	Pub 14	NCWM Publication 14
GS	NTETC Grain Analyzer Sector	RMFD	Retail Motor-Fuel Dispenser
GIPSA	Grain Inspection Packers & Stockyards Administration	SI	International System of Units
HB 44	NIST Handbook 44	SMA	Scale Manufacturers Association
HB 130	NIST Handbook 130	SWMA	Southern Weights and Measures Association
LMD	Liquid-Measuring Device	TG	Task Group
LPG	Liquefied Petroleum Gas	WG	Work Group
MS	NTETC Measuring Sector	WIM	Weigh-in-motion
MMA	Meter Manufacturers Association	WMD	NIST Weights and Measures Division
NCWM	National Conference on Weights and Measures, Inc	WS	NTETC Weighing Sector
NEWMA	Northeastern Weights and Measures Association	WWMA	Western Weights and Measures Association
NH_3	Anhydrous Ammonia	USNWG	NIST/OIML U.S. National Working Group
NIST	National Institute of Standards and Technology	VTM	Vehicle-tank Meters
NTEP	National Type Evaluation Program		

"Handbook 44" (HB 44) means the 2010 Edition of NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices"

"Handbook 130" (HB 130) means the 2009 Edition of NIST Handbook 130 (including subsequent amendments), "Uniform Laws and Regulations in the Areas of Legal Metrology and Fuel Quality"

Note: NIST does not imply that these acronyms are used solely to identify these organizations or technical topics.

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
Consent Calendar					
310-1					Adopted
310-3					Adopted
320-2					Adopted
321-1					Adopted
331-1					Adopted
336-1					Adopted
342-1					Adopted
(Report on its Entirety Voice Vote)					Adopted

Details of All Items
(In Order by Reference Key Number)

310 GENERAL CODE

310-1 V Provision for Sealing Electronic Adjustable Components

(This item was adopted.)

Source: 2010 Carryover Item 310-1. This item originated from the Southern Weights and Measures Association (SWMA) Committee and first appeared on the Committee's 2008 Agenda.

Purpose: The purpose of the original submitter's proposed changes were intended to clarify what is considered an effective method of sealing metrological features, and what information is required to be indicated and recorded when a device is in a metrological adjustment mode.

Item Under Consideration: At the 2011 NCWM Annual Meeting, the Committee recommended that the interpretation of HB 44 General Code paragraph G-S.8. Provision for Sealing Electronic Adjustable Components as shown below be documented into the Report of the 96th NCWM.

> The current language in paragraph G-S.8. states: "A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism."
>
> Thus, for parameters protected by physical means of security, once a physical security seal is applied to the device, it should not be possible to make a metrological change to those parameters without breaking that seal. Likewise, for parameters protected by electronic means of security, it should not be possible to make a metrological change to those parameters without that change being reflected in the audit trail. Since this

philosophy addresses provisions for protecting access to any metrological adjustment, the philosophy should be applied consistently to all electronic device types.

Background/Discussion: Several years ago, NTEP evaluators inspected some devices that could be sealed in an "adjustment" mode that would allow the user to make adjustments without breaking a physical security seal, and for which the accompanying user's manual provided clear instructions that the physical security seal should not be affixed while the device was in that mode. For example, a switch placing the device in the "adjustment mode" should be set in the "off" position before affixing the physical security seal. Because device owners, including service agents, are required to comply with all user requirements, some NTEP evaluators and applicants believed that these devices complied with G-S.8. NTEP started receiving an increasing number of reports that users and service agents were not following the instructions in the user's manuals for these devices, thus, rendering the method of sealing ineffective. In many cases, this situation went undetected because weights and measures officials do not have access to the users' manuals, and the information was not consistently specified in the NTEP CC.

Since 2008, the NCWM S&T Committees, regional weights and measures associations, NTETC Sectors, and other interested parties considered several proposals intended to address what is considered an effective method of sealing metrological features. The proposals to amend HB 44 paragraph G-S.8. were intended to clarify what is considered an effective method of sealing that would be uniformly applied during type evaluation and field verification. Throughout these deliberations, it became apparent that the issues identified in type evaluation were based upon multiple interpretations of G-S.8., and that a single interpretation was needed and should be distributed to the NTEP laboratories, so that type evaluation procedures for sealing could be reviewed and, if necessary, amended. See the 2008 through 2010 NCWM Annual Reports to review previous language and positions and other background information to amend G-S.8.

At its August 2010 Annual Meeting, the WS: 1) reviewed the sealing procedures in Pub 14 Scales type evaluation checklist and procedures; 2) compared them with similar type evaluation criteria in Pub 14 for LMD; and 3) reviewed applicable HB 44 sealing requirements in the General, Scales, and LMD codes. Prior to the 2010 meeting of the WS, a small WG was formed to develop more detailed procedures for determining compliance of the methods for sealing, and requested the WS consider its recommendations for Pub 14, DES Section 10. The WS reviewed the recommendations. The WS agreed with the revised proposal to amend Pub 14 Scale Section 10 and recommended it be forwarded to the S&T Committee and the SMA for consideration prior to the 2011 NCWM Interim Meeting. The WS also agreed to forward the amended language for Pub 14 to the S&T Committee with a recommendation that the S&T item to amend G-S.8. be Withdrawn from the Committee's agenda. The final summary of the NTETC WS may be found in Appendix C of the NTEP Committee's 2011 Interim Report.

At its fall 2010 Interim Meeting, the CWMA stated that the item had been on the agenda since 2008, allowing sufficient time for development. The CWMA noted that no comments were received during its open hearing. Therefore, the CWMA S&T Committee believed that this should be moved forward as a Voting item. (The CWMA did not have a quorum to vote on its agenda.)

During the fall 2010 WWMA Annual Technical Conference, Mr. Darrell Flocken, Mettler Toledo, speaking on behalf of the SMA, restated SMA's position that this item be Withdrawn. Speaking as chairman of the WS, Mr. Flocken restated the history of the issues that initiated the original proposals. At the August 2009 WS meeting, it was noted that there were problems at NTEP weighing labs due to insufficient guidance in Pub 14. Mr. Cook, NIST Technical Advisor to the WS, speaking on behalf of the WS, provided the WWMA with a brief review of the WS recommendations to amend the weighing devices section of Pub 14. The WWMA recommended that this remain an Informational item until the 96th NCWM S&T Committee confirmed that the WS recommendations complied with the previous (95th) Committee's interpretation of General Code paragraph G-S.8.

During its fall 2010 Annual Meeting, the SWMA heard comments from Mr. Lou Straub, Fairbanks Scales, and Mr. Gordon Johnson, Gilbarco, indicating that no changes were needed to paragraph G-S.8. The SWMA S&T Committee also received information from the WWMA and the WS regarding work accomplished in the WS to refine criteria in Pub 14 relative to the interpretation of paragraph G-S.8. Ms. Tina Butcher, NIST WMD, and members of the WS, including Mr. Straub and Mr. Truex, reported that the WS had made progress on developing proposed changes to the Scales Checklist in Pub 14, and anticipated forwarding those changes to the NTEP Committee for possible inclusion in the next edition of Pub 14. In anticipation that the Sector's work will bring

closure to this issue, and to encourage consistent interpretation of paragraph G-S.8., the SWMA recommended that this remain an Informational item to allow this work to be completed.

The Committee reviewed the new language proposed by the WS for inclusion in the 2011 Edition of Pub 14. The Committee also agreed with WMD's suggestion that the Committee's interpretation of G-S.8. be restated in Pub 14 for each checklist where G-S.8. is referenced. As noted earlier in the background information, the proposed interpretation is based on language that is already in Pub 14 LMD Section 9.

The Committee initially recommended that this item remain Informational until the NTEP Committee agreed with the recommendation of the WS during the 2011 Interim Meeting. The Committee also agreed with the WMD suggestion that the Committee's interpretation be included in all Publication 14 checklists where paragraph G-S.8. is referenced. The NIST Technical Advisor contacted Mr. Truex, NTEP Administrator and NTEP Committee Technical Advisor, regarding the proceedings of the NTEP Committee in its review of the summary of the 2010 meeting of the NTETC WS during the Interim meeting. Mr. Truex reported that the NTEP Committee recommended no changes to the WS draft summary. Mr. Truex requested that the Committee consider:

1. Adding a statement in the Committee's report recommending the interpretation be placed in other NIST and NCWM documents as appropriate.

2. Rewording the Committee's interpretation of G-S.8. such that it is clear and applies only to electronic components (i.e., it's hard to seal a spring or nose iron).

3. Recommending that other Sectors (Measuring, Belt-Conveyor, and Grain Analyzer) be given the opportunity to review any additions to their respective Pub 14 checklists since the WS was given time to review the proposed Committee interpretation in the weighing sections of Pub 14.

4. The paragraph, in its final form, should probably be an up-front paragraph in Pub 14 "Philosophy for Sealing" appendices.

The Committee agreed with the comments from Mr. Truex. Although the Committee agreed with the comments to withdraw the proposal to amend G-S.8., it was concerned that its interpretation would be overlooked in the future because the item was Withdrawn. Therefore, the Committee agreed to remove the proposed language in its Interim agenda, and they recommended that the Committee's current interpretation of G-S.8. in the Item Under Consideration be a Voting item. The Committee further recommended the language in the "Item Under Consideration" be added to NIST and NCWM documents as appropriate, and that the NTETC Sectors consider adding the language to the applicable "Philosophy for Sealing" appendices in NCWM Pub 14.

During its spring 2011 Annual Meeting, the CWMA supported the item as presented after considering the following comments provided by the SMA:

> SMA understands that this item is a Voting item intended to recognize that the current language in G-S.2. Facilitation of Fraud and G-S.8. Provision for Sealing Electronic Adjustable Components, is sufficient to address the proper sealing methods for electronic devices. SMA understands that this item proposes no changes to HB 44.

At the spring 2011 NEWMA Annual Meeting, Mr. Ross Andersen, Retired Director of the New York Bureau of Weights and Measures, speaking on his own behalf, indicated that there have been other instances in the past where the NCWM membership voted on a Committee's position statement to provide a historical record of a particular Committee position/interpretation. Mr. Andersen also indicated that he believed the Committee's position could be more clearly defined. Shortly after the NEWMA meeting concluded, NIST Technical Advisor, Mr. Rick Harshman, contacted Mr. Andersen in an effort to obtain additional clarification regarding the comment he had made concerning the Committee's position. Mr. Andersen provided the following explanation:

> The Committee's interpretation of G-S.8. being voted on for addition into the Final Report of the 96th NCWM requires a physical seal to be broken before a metrological change can be made to a device. The language that was added to Pub 14 is different than what's proposed for vote. Pub 14 allows a device with

physical means of sealing to be sealed in the calibration or configuration mode if it provides a clear indication that it's in that mode. If NTEP wants to say that an indicator light (which depicts a device is in the calibration or configuration mode) is acceptable, I'd like to see the Committee sanction that in their interpretation. Since NTEP policy must conform with HB 44, it seems necessary to ensure the code also permits the indicator light. Thus, that must be included in the interpretation of the Committee.

After further review of the Weighing Sector (WS) language, WMD agreed with the concern raised by Mr. Andersen. WMD concurred that the WS language was not consistent with the Committee's interpretation of G.S.8. in that adjustments could still be made while a physical seal is intact.

During the open hearings at the 2011 NCWM Annual Meeting, WMD suggested making the following changes to Committee's interpretation of G-S.8. as shown in NCWM Publication 16 in the "Item Under Consideration," to clarify how that interpretation is intended to apply to electronic devices protected by physical means of security versus electronic devices protected by electronic means of security:

The current language in paragraph G-S.8. requires that a security seal be broken before a metrological change can be made to an electronic device (or other approved means of security such as an audit trail provided). Thus, **for parameters protected by physical means of security,** once a **physical** security seal is applied **to the device**, it should not be possible to make a metrological change to ~~**the device**~~ **those parameters** without breaking that seal. **Likewise, for parameters protected by electronic means of security, it should not be possible to make a metrological change to those parameters without that change being reflected in the audit trail.** Since this philosophy addresses provisions for protecting access to any metrological adjustment, the philosophy should be applied consistently to all electronic device types.

Mr. Gordon Johnson, Gilbarco, Inc.; Mr. Dmitri Karimov, Liquid Controls, speaking on behalf of MMA; and Mr. Darrell Flocken, Mettler-Toledo, speaking on behalf of the SMA, supported the language in Pub 16. Mr. Johnson and Mr. Karimov requested additional time for review of the language suggested by WMD. Mr. Flocken, speaking on behalf of Mettler-Toledo, indicated support for the amendments as suggested by WMD.

After discussing the comments from the 2011 NCWM Annual Meeting open hearings and the proposed changes from WMD, the Committee agreed to modify the language in its Interim Report to that shown in this Final Report in the Item Under Consideration. The Committee also requested that the WS review the language that was added to NTEP Pub 14 and make certain it is consistent with the Committee's interpretation of G.S.8.

Additional background information and previous language considered by the Committee including written and open hearing comments may be reviewed in the 2008, 2009, and 2010 NCWM Annual Reports.

310-2 D G-S.1. Identification. – (Software)

(The status of this item was changed from Informational to Developing.)

Source: 2010 Carryover Item 310-3. This item originated from the NTETC Software Sector (SS) and first appeared on the Committee's 2007 agenda as Developing Item Part 1, Item 1.

Purpose: This proposal is intended to amend the identification marking requirements for all electronic devices manufactured after a specified date, by requiring that metrological software version or revision information be identified. Additionally, the proposal suggests listing methods, other than "permanently marked," for providing the required information.

Item Under Consideration: Amend G-S.1. Identification and G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-Based Devices as shown in the 2010 Committee's Final Report. The language in the Final Report incorporated the March 2010 recommendation from the SS and the Committee's suggested language to address SMA concerns with the requirements in G-S.1., where it states that "all equipment . . . shall be permanently marked . . ." and G-S.1.1. that allows alternate methods, other than "permanently marked," to identify software-based devices.

Background/Discussion: In 2005, the Board of Directors (BOD) established an NTETC Software Sector. One of the Sector's tasks is to recommend HB 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 SS discussed the value and merits of required markings for software. This included the possible differences in some types of software-based devices and methods of marking these devices. 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 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 embedded software must display or hard-mark the device make, model, and S.N. to comply with G-S.1. Identification.

After the 2008 NCWM Annual Meeting, the Committee received the SS's Proposal to amend G-S.1. Identification and/or G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-Based Devices in the Committee's 2008 Interim Report. The proposal listed "acceptable" and "not acceptable" methods for presenting:

- NTEP CC number
- Make
- Model
- Serial Number
- Software Version/Revision Number

At the 2009 NCWM Interim Meeting, SMA commented that it has consistently opposed having different requirements between embedded and downloadable/programmable software-based devices. SMA added that it continues to support the intent of the proposal, and will continue to participate in the SS discussions to develop alternate proposals for the marking of software-based devices. Several weights and measures officials expressed concerns that the proposed language does not specify how the identification information is to be retrieved if it is not continuously displayed, noting this could result in several ways to access the information (e.g., passwords, display checks, or dropdown menus). SMA added that the identification location information on the NTEP CC will become outdated anytime a manufacturer changes the way the information can be retrieved. SMA suggested that a limited number of methods to access the identification information be developed and specified as the only acceptable methods to retrieve identification information. This would make it easier for the inspector to verify the required identification information.

WMD noted that in 1992, the NCWM adopted S&T Committee agenda Item 320-6, S.6.3. Marking Requirements; Capacity by Division and recommended that Tables S.6.3.a. and S.6.3.b. (Note 3) be interpreted to permit the required capacity and scale division markings to be presented as part of the scale display (e.g., displayed on a video terminal or in a liquid crystal display), rather than be physically marked on the device. WMD agrees with the interpretation and suggested that this interpretation could be expanded to other marking requirements (e.g., flow rates, capacity, interval, etc.), and codes after review on a case-by-case basis, and that specific language (based on the above interpretation) might be added to the applicable sections in HB 44.

SS Co-chairman Mr. Jim Pettinato, FMC Technologies, stated the SS recommended that this item remain an Informational Item to allow NCWM members to further study the proposal to develop a consensus on the format for Table G-S.1. Identification in its 2009 meeting summary.

See the 2009 and 2010 Annual Reports to review previous language and positions to amend HB 44 paragraphs G-S.1. and G-S.1.1.

In response to comments heard during the 2010 NCWM Interim Meeting, the SS (March 2010 meeting) proposed changes to the language shown in the NCWM S&T Committee's 2010 Interim Report Item 310-3. These revisions removed the differentiation between types of software (Type P and Type U), while still managing to achieve the Sector's objective of simplifying the process of locating required marking information.

The SS recommended amending the 2010 item under consideration by removing the proposed words "**and manufactured after January 1, 201X**" from the first sentence in paragraph G-S.1., and noted that the remainder of the proposal remains unchanged. The SS agreed that the reference to the manufacture date is not necessary since the current proposal to amend G-S.1. includes applicable nonretroactive dates for the amended subparagraphs.

The SS also initiated discussion on two new concepts, which may eventually result in additional recommendations to amend G-S.1. At that time, the SS noted that these new ideas were in the developmental stage and were included in the Committee's report by request of the Sector, since comments from the regions and other interested parties would be appreciated by the Sector.

The SS sees merit to requiring some "connection" between the software identifier (i.e., version/revision) and the software itself. The proposal was to add a new sub-subparagraph (3) to G-S.1.(d) to read as follows (with the expectation that examples of acceptable means of implementing such a link would be included in Pub 14).

> ***"The version or revision identifier shall be directly and inseparably linked to the software itself. The version or revision identifier may consist of more than one part, but at least one part shall be dedicated to the metrologically significant software."***

Second, it seems that at each meeting of the SS, state weights and measures officials reiterate the problems they have in the field locating the basic information required when the CC number is marked via the rather general current HB 44 requirement of "accessible through an easily recognizable menu and if necessary a sub-menu" (G-S.1.1. (b)(3)). States have indicated that this is too vague, and field inspectors often cannot find the certificate number on unfamiliar devices.

The SS requested feedback on a proposal to specify a limited number of menu items/icons for accessing the CC number (if it is not hard-marked or continuously displayed) in subparagraph (b) and that the information be accessible through one, or at most, two levels of access.

At its spring 2010 Annual Meeting, NEWMA recommended leaving this item Informational to allow review of the SS's revised language from its March 2010 meeting.

During the 2010 NCWM Annual Meeting, the SMA stated that the proposal from the SS addresses one of the SMA's concerns dealing with the use of the term "not built for purpose;" however, it still has concerns with the requirement in G-S.1., stating that the software version or revision identifier must be clearly and permanently marked. The SMA recommends that the Software Sector and the S&T Committee review and correct what appears to be conflicting requirements as stated in G-S.1. and G-S.1.1. dealing with the marking requirement.

The Committee also received a summary of the 2010 meeting of the NTETC laboratories where some of the NTEP evaluators were concerned that the revised language could be interpreted such that no markings are required on a device. These evaluators expressed concern that an inspector would have to guess which of the eight methods recommended in the March 2010 Software Sector Summary is to be used to find the CC number and questioned whether this would mean that a weighing or measuring device might not be marked with any identifier markings, including the manufacturer.

The Committee amended the item under consideration based on the recommendations of the SS at its March 2010 meeting. The Committee agreed to clarify and document the SMA concerns with the requirements in G-S.1. where it states that "all equipment . . . shall be permanently marked . . ." and G-S.1.1. that allows alternate methods, other

than "permanently marked," to identify software-based devices. Consequently, the Committee revised the first paragraph of G-S.1. to read as shown in the "Item Under Consideration" in its 2011 NCWM Interim Agenda.

At its fall 2010 Interim Meeting, the CWMA stated that it believes that this item should be moved to a vote and suggested an editorial change to G.S.1.1.(b)(3) to read "***no more than two levels of access***" instead of "***one or, at most, two levels of access***."

During the fall 2010 WWMA Annual Technical Conference, Mr. Steve Cook, NIST Technical Advisor to the WS, provided an update to the WWMA S&T Committee. Mr. Cook also discussed the conflicting language between G-S.1. and G-S.1.1. identified by the SMA, and the NCWM S&T Committee's solution to eliminate the conflict. The WS reviewed the list of acceptable abbreviations and icons as requested by the SS and agreed that the proposed software identification abbreviation "SI" should not be included in the list since "SI" is also the abbreviation for the International System of Units.

The WS also noted that the proposed icon "M" with the green fill  should not be used since it is used by the European Union as a metrology mark for all devices, not just for metrological software identification.

Mr. Flocken, speaking on behalf of the SMA, restated SMA's April 2010 position based on the conflicting language in paragraphs G-S.1. and G-S.1.1. He added that the revised language for G-S.1. in the S&T Agenda should also be reviewed by the SS. Mr. Johnson, Gilbarco, added that their current Retail Motor-Fuel Dispenser (RMFD) software cannot display alpha characters for software version identification, which is problematic since the latest version of the proposal includes software identification for all software-based devices. Mr. Johnson added that a possible solution would be to allow the software version to be reported on the NTEP CC.

The WWMA recommended the following amendment to G-S.1.(d)(1) that addressed Gilbarco's comments on devices with limited character sets such as RMFD without alpha displays and/or annunciators to read as follows:

(d) the current software version or revision identifier for ***~~not built for purpose,~~*** *software-based devices; [Nonretroactive as of January 1, 2004]*

(Added 2003)

(1) ***Except for devices with limited character sets (e.g., primary indications without alpha characters or annunciators*)*** *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]*
****[Nonretroactive as of January 1, 201X]***

(Added 2006) **(Amended 201X)**

(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.)

(Added 2006)
[Nonretroactive as of January 1, 2007]
****[Nonretroactive as of January 1, 201X]***

[**NIST Technical Advisor's Note:** *After the WWMA meeting, WMD noted that it believes there is a need to address the exception by adding language to address the method for identifying the version or revision number for devices with limited character sets. For example: Add a new sentence at the end of (d)(2) above such as "****For devices with limited character sets, the instructions to identify the version or revision identifier shall be listed on the NTEP CC.****")*]

The WWMA believes that its suggested changes to the proposal sufficiently address all issues identified during the open hearings, and this should remain an Informational item to allow the SS an opportunity to comment on the revisions proposed by the NCWM and WWMA S&T Committees.

At its 2010 Annual Meeting, the SWMA heard from Mr. Johnson, Gilbarco, restating his concern about how this proposal would apply to simpler devices that may have a limited display capability; while these devices may be able to display a software version number, they aren't able to display a designation that defines it as a "version number." Mr. Johnson also noted that the WWMA modified the proposed language to provide an exception for devices with limited character sets and encouraged the Committee to review this language. Mr. Straub, Fairbanks Scales, speaking on behalf of SMA stated that SMA, at its 2010 spring meeting, opposed this item. Mr. Straub also pointed out that there appears to be a conflict with regard to the required permanence of the marking, noting that G-S.1. refers to "permanently marked," whereas G-S.2. makes reference to "continuously displayed" markings.

The SWMA considered whether or not the proposal is ready to be adopted. Based on the variety of comments heard, comments opposing the item, and the alternatives presented, the SWMA did not feel it could make a recommendation at this time. The SWMA felt that the SS should be given the opportunity to review the input and comments made on this issue since the Sector's last meeting. Consequently, the SWMA felt that the item should remain as an Informational item on the NCWM S&T Committee's agenda.

At its fall 2010 Interim Meeting, NEWMA stated that the WWMA proposed revision to the "Item Under Consideration," and the questions raised during discussions of the issue have merit. NEWMA recommended this remain an Informational item to give the Weighing Sector and the NCWM S&T Committee time to evaluate the new language.

At the 2011 Interim Meeting, the NCWM S&T Committee heard from Mr. Jim Pettinato, SS Co-Chairman, on two key points.

1. The software version number would be required for all software-based devices (i.e., "built-for-purpose" devices as well as "not-built-for-purpose" devices).

2. Limit the options for nonhard-marked certificate numbers so they are easy to find. There have been reports of difficulty in finding information such as the CC number, particularly for not-built-for-purpose devices.

Mr. Pettinato also noted that the intent of the proposal is not to require stand-alone software to have a serial number.

The Committee agreed that this item is not ready to move forward as a Voting item. The Committee recommends the SS review the following comments and points made during the 2011 Interim meeting and consider how these issues should be addressed.

- Confirm that all software-based devices must have version/revision identification.

- Stand-alone software does not require a serial number.

- Is a definition needed for software-based (electronic) devices?

- Devices with limited character sets may need different requirements since they may not be able to display all characters; they may have limited or no room for full display; and hard-markings for identification information may be impractical.

- Guidance is needed for metrological and non-metrological software. Perhaps separate version numbers or specific character locations in the version number that applies to metrological software are needed.

- Combine G-S.1 and G-S.1.1.

- Should G-S.1.(c) be included in G-S.1.1.(b)?

At their May 2011 Annual Meeting, the CWMA recommended this item remain Informational while waiting recommended changes from the SS. The NEWMA also recommended this item remain Informational until the SS has had the chance to report back to the NCWM S&T.

Prior to the 2011 NCWM Annual Meeting, NIST Technical Advisor Mr. Harshman, contacted SS Co-Chairman, Mr. Jim Pettinato, to obtain an update on the progress of the Sector's continuing development of this item. Mr. Pettinato provided WMD a draft summary of the March 2011 SS Meeting. Based on the information provided and Mr. Pettanato's explanation of the discussions that took place during the meeting, WMD suggested the SS consider recommending to the S&T Committee that the status of this item be changed from Informational to Developing in order to provide the SS additional time to more fully develop the item.

During the 2011 NCWM Annual Meeting, the Committee heard from WMD relative to whether or not the status of this item should be changed to Developing to provide the SS additional time to more fully develop the item based on the following points:

1. The current proposal is not developed enough for consideration by the S&T. Based on the diversity of comments heard on this issue, WMD believes the item is not close to a vote, and considerable work still needs to be done to develop the item before it could be considered for a vote by the NCWM.

2. WMD interprets the current proposal to require software be marked with a non-repetitive serial number; when in fact, it is not the intent of the SS to require such marking. Thus, it is believed that the language in the 2010 Committee's Final Report will need modification to resolve this issue.

3. The draft of the March 2011 SS Summary reported that several SS members envision G-S.1. being developed further to the extent that G-S.1.1. may not be needed.

NIST Technical Advisor, Mr. Harshman, reported that SS Co-chairman, Mr. Pettinato, stated a key point agreed upon by members of the SS was that the software version/revision identifier should be accessible through the user interface. When asked about the possibility of changing the status of the item to Developing, Mr. Pettinato indicated he intended to poll members of the SS to determine whether or not they agree the status should be changed.

During the S&T Committee's open hearings, Mr. Darrell Flocken, representing SMA, indicated that he believes the SS is intending to propose a change to the current item, and looks forward to the further development of this item based on the work of the SS. Mr. Dmitri Karimov, speaking on behalf of the MMA, agreed with the comments made by Mr. Flocken. No member of the SS provided any input during the open hearings.

There were three positions posted on the NCWM 2011 Online Position Forum. Of those three, two indicated neutral positions, and the remaining one, posted by Mr. Gordon Johnson, Gilbarco, Inc. opposed the item and included the following comments:

> Gilbarco does not support the current proposed language. Our pumps and dispensers have a numeric display capable of displaying 6 digits. It is not currently possible to display the version identifier or an abbreviation or symbol that identifies the version number as required in (d) (1) and (2). It is not possible to access the software version using "one or, at most, two levels of access" as noted in section G-S.1.1 (3). We do not currently offer a menu based system and do not offer functions such as "Metrology," "System Identification," or "Help." We do not have the ability to offer icons or symbols. Meeting the new marking requirements will be costly to the customer. We can currently display the software version number (i.e., Software Version number 01.8.30 would be shown on the main display as 01830 by using controls on the device). The software version will also be displayed during the power-up cycle. Recommend the status be changed to Informational.

The Committee discussed the comments offered by WMD, SMA, and others. After considering those comments, the Committee agreed to change the status of this item to Developing because the item lacks enough information for full consideration, and a full proposal has yet to be developed.

310-3 V G-A.6. Nonretroactive Requirements (Remanufactured Equipment)

(This item was adopted.)

Source: WWMA and SWMA 2010 Carryover Item 310-4.

Purpose: Clarify the intent of the 2001 NCWM position on the application of nonretroactive requirements to devices which have been determined to have been "remanufactured."

Item Under Consideration:

1. Amend General Code paragraph G-A.6. Nonretroactive Requirements by amending subparagraphs (b) and (c), and adding a new subparagraph (d) as follows:

   G-A.6. Nonretroactive Requirements. – "Nonretroactive" requirements are enforceable after the effective date for:

   (a) devices manufactured within a state after the effective date;

   (b) **devices (**both new and used**)** brought into a state after the effective date; ~~**and**~~

   (c) devices used in noncommercial applications which are placed into commercial use after the effective date~~.~~**; and**

   (d) devices undergoing type evaluation, including devices that have been modified to the extent that a new NTEP CC is required.

   Nonretroactive requirements are not enforceable with respect to devices that are in commercial service in the state as of the effective date or to new equipment in the stock of a manufacturer or a dealer in the state as of the effective date.
   [*Nonretroactive requirements are printed in italic type.]*
   (Amended 1989 **and 2011**)

2. Amend General Code paragraph G-S.1.2. Remanufactured Devices and Remanufactured Main Elements by changing its status from nonretroactive to retroactive, adding an enforcement date, and changing the print from italics type to upright roman type as follows:

   G-S.1.2. Remanufactured Devices and Remanufactured Main Elements. – ~~**All remanufactured devices and remanufactured main elements**~~ **All devices and main elements remanufactured as of January 1, 2002**, shall be clearly and permanently marked for the purposes of identification with the following information:

   (a) the name, initials, or trademark of the last remanufacturer or distributor;

   (b) the remanufacturer's or distributor's model designation, if different than the original model designation.

   (Added 2001) **(Amended 2011)**

   Note: Definitions for "manufactured device," "repaired device," and "repaired element" are also included (along with definitions for "remanufactured device" and "remanufactured element") in Appendix D, Definitions.

Background/Discussion: This item was originally submitted by WMD in 2010, in response to an inquiry received from a state Weights and Measures Director regarding whether or not a nonretroactive paragraph in the LMD Code of HB 44 would apply to a remanufactured device. In researching this inquiry, WMD discovered an unintended gap in two General Code requirements relative to remanufactured equipment as follows:

- Paragraph G-S.1.2. Remanufactured Devices and Remanufactured Main Elements was designated a nonretroactive requirement for marking remanufactured devices and remanufactured main elements with the identification information of the remanufacturer and is enforceable as of January 1, 2002. WMD believed that this paragraph is intended to apply to remanufactured devices and remanufactured main elements that have been placed into commercial service as of the effective date of the requirement (i.e., January 1, 2002).

- Paragraph G-A.6. Nonretroactive Requirements provides the various conditions in which nonretroactive requirements apply. The paragraph references manufactured devices, new devices, and used devices, but did not include any reference to "remanufactured devices" or "remanufactured main elements."

While developing the original proposal, WMD contacted two RMFDs OEMs, and representatives from those companies both indicated that remanufactured RMFDs should comply with the most recent HB 44 nonretroactive requirements in effect as of the date they are remanufactured.

WMD also contacted Mr. Jim Truex, the Chairman of the Remanufactured Device Task Force, which was formed by the NCWM BOD in 1999. Mr. Truex indicated that to the best of his recollection, there was no conscious discussion from the task force of how nonretroactive requirements were to apply to remanufactured equipment. He believes that different states may be enforcing nonretroactive requirements differently with respect to remanufactured equipment.

WMD noted that the issue of applying paragraph G-A.6. to remanufactured equipment is separate from that of determining when a device or element has been "remanufactured." Definitions found in Appendix D of HB 44, along with guidance developed by the NCWM Remanufactured Equipment Task Force can be used to assist jurisdictions in determining when a device or main element has been "remanufactured." The proposed change does not suggest changing these tools or their application. The proposed change is only intended to clarify the application of G-A.6. to devices that have been determined to have been "remanufactured."

WMD believed that some alternate language needs to be added to G-A.6. to clarify its application to remanufactured equipment even if the proposed direction of solving this problem is not supported as written.

At the 2010 NCWM Annual Meeting, the Committee received several comments from remanufacturers requesting the item be made an Informational item to give the device remanufacturers additional time to evaluate the impact of the proposed amendment to G-A.6. See the 2010 Final Report of the S&T Committee for additional background information and to view the comments and positions taken on this issue by the various stakeholders during the 2010 NCWM Annual Meeting.

During the 2010 NCWM Annual Meeting, WMD provided the Committee with "real life" examples outlining when a device is considered as "repaired" or "remanufactured." The examples included both weighing and measuring devices and clarified when devices were to be considered "repaired" or "remanufactured." (**Note:** These examples along with HB 44 (2010) General and Scales Code List of Nonretroactive Requirements can be reviewed in Appendix B of this report.)

During its deliberations at the 2010 NCWM Annual Meeting, the Committee considered the following points:

- The marking requirement in paragraph G-S.1.2. was adopted as a "*nonretroactive requirement*" so that devices and elements remanufactured prior to January 1, 2002, would not have to be retroactively marked.

  - By formatting the language in paragraph G-S.1.2. in *italics* font, and designating it as a *"nonretroactive requirement"* directed specifically to remanufactured devices and elements, it could be argued that remanufactured devices and elements are subject to *"nonretroactive requirements."*

  - Alternatively, if one argues that remanufactured devices and elements are **not** subject to "*nonretroactive requirements*," then the "*nonretroactive markings*" specified in G-S.1.2. would never

be applied to any remanufactured device – even though the language is specifically directed to these devices.

- Paragraph G-A.6. is currently silent with respect to remanufactured devices and elements and without further clarification is subject to multiple interpretations.

- There is a lot of misunderstanding of the original findings and recommendations of the original task force.

- The report of the Remanufactured Task Force and table of scenarios is not readily available outside of the 2001 NCWM Final Report.

After considering these points and the comments received on this issue, the Committee agreed to designate this as Informational item to allow interests parties to review the report of the Remanufactured Task Force and associated table of scenarios. The Committee also requested that the NIST Technical Advisor contact the NTEP Administrator to discuss the potential impact of VCAP on remanufacturers with regard to how these guidelines would be integrated into the VCAP system.

At its fall 2010 Interim Meeting, the CWMA received comments during its open hearing to adopt the proposal as written, and move it forward for a Vote. Members of the CWMA believe that remanufactured devices also need to be traceable to an NTEP CC. The CWMA also received comments concerning unfair competition between original manufacturers and remanufacturers due to the use of non-OEM replacement parts. The CWMA S&T Committee recommends that this item be moved as a Voting item for the reasons stated above. All new and remanufactured device types to be used in trade or commerce must be traceable to an NTEP CC.

During the fall 2010 WWMA Annual Technical Conference, Mr. Cook, NIST Technical Advisor, provided the WWMA a handout, "Summary of 2010 HB 44 General, Scales, and Liquid-Measuring Devices Codes Nonretroactive Requirements," to help the WWMA assess the impact these requirements might have on remanufactured devices and elements listed in the examples referenced at the 2010 NCWM Annual Meeting. Mr. Cook added that he would contact Mr. Truex, NTEP Administrator, to discuss how the VCAP requirements might impact this issue, if VCAP addresses "production meets type" policies and guidelines for devices that have been remanufactured by parties other than the OEM. Mr. Flocken, speaking on behalf of the SMA, supported this proposal. Mr. Johnson, Gilbarco, also supported this proposal.

The WWMA S&T Committee considered the effect of applying nonretroactive requirements to devices which have been determined to have been "remanufactured," expressing concern that this General Code revision may have an unanticipated impact on certain devices. The WWMA S&T Committee reviewed a summary list of nonretroactive requirements provided by Mr. Cook, and found that some requirements seemed to be metrologically insignificant, with minimal benefit to users and/or consumers. The WWMA S&T Committee was uncertain if VCAP polices and guidelines should be considered when devices are required to be retested for compliance with influence factor requirements. The WWMA requested that the NIST Technical Advisor contact Mr. Truex, NTEP Administrator, and ask if VCAP policies and guidelines are also applicable to NTEP devices and elements subject to influence factor requirements that are remanufactured (and still traceable to the original CC).

The WWMA agreed that while the "Examples of Repaired Devices/Repaired Elements" were sufficiently developed, they need to be readily available to remanufacturers and field officials. The WWMA also agreed that the item should continue as an Informational item, allowing other regions and industry to provide input.

At its fall 2010 Annual Meeting, the SWMA considered the effect of applying nonretroactive requirements to devices which have been determined to have been "remanufactured." Based on some of the comments heard during its open hearings, the Committee was not clear how the proposed changes might impact some remanufactured equipment. The Committee reviewed a summary of nonretroactive requirements prepared by Mr. Cook, NIST WMD. The Committee agreed with the WWMA's assessment that some requirements seemed to be metrologically insignificant, with minimal benefit to users and/or consumers. The SWMA S&T Committee agreed with the WWMA, that while the examples of repaired and remanufactured devices and elements were sufficiently developed, they need to be readily available to remanufacturers and field officials. For example, referenced in HB 44 Appendix D Definitions, and published in NIST Handbook 112, and on NCWM and WMD websites.

The SWMA agreed that the item should remain an Informational item to allow for input from stakeholders on the impact of the proposal. The Committee noted that to assist field officials and industry in correctly applying the HB 44 paragraph G-A.6., it should be amended to clearly define whether nonretroactive requirements do apply or do not apply to remanufactured equipment.

At its 2010 fall Interim Meeting, NEWMA heard from Mr. McGee, PMP Corporation. He stated his opposition to this item. He believes the current language in the HB 44 already covers remanufactured devices by virtue of the use of the term "used" in General Code paragraph G-A.6. (b) Nonretroactive Requirements. He stated that any devices that are remanufactured, repaired, reconditioned, refurbished, or rebuilt are "used" equipment. Therefore, they are required to comply with nonretroactive requirements if brought into a state. Hence, there is no pressing need to change the wording to include "and remanufactured" in G-A.6.(b).

Discussion from the group restated the position that NEWMA does not see a need for this item when devices are serviced to such an extent that they are required to be marked as "Remanufactured" and must comply with nonretroactive requirements. NEWMA continues to question the purpose of this item if remanufactured devices are already considered as new devices in HB 44.

After receiving the report from NEWMA, Mr. Cook, NIST Technical Advisor, contacted Mr. McGee to clarify his reasons for opposing this item. He responded by questioning, as a practical manner, whether a weights and measures official would reject a specific model delicatessen scale, if a grocery store chain moved it from one of their stores in one state to one of their stores in another state, just because the imported scale did not have a CC number marked on the scale label; especially if it was the exact same model as the scales already in the store. Similarly, he questioned whether a weights and measures official was going to reject a retail motor fuel device brought into a state from another state to replace one hit and damaged beyond repair by a motorist, because it did not have the CC number marked on the dispenser label, or the name plate or the label was not placed at the required proper height. This is especially an issue in stations with dispensers manufactured by firms that are no longer in existence.

At the S&T Committee's 2011 NCWM Interim Meeting open hearings, Mr. Darrell Flocken, Mettler Toledo, speaking on behalf of the SMA, indicated that the SMA takes no position on the issue at this time. Mr. Tom McGee, PMP Corporation, restated his opposition to the item and requested it be Withdrawn. He commented that current language in G-A.6. Nonretroactive Requirements already applies to remanufactured equipment by virtue of the term "used." He also questioned the practicality of applying nonretroactive requirements to equipment that had been remanufactured and provided some examples to support his position. Mr. Tim Columbus of Steptoe and Johnson, LLP, specified that he and his clients have difficulty differentiating between the terms "remanufactured" and "used." He indicated that the guidelines developed by the NCWM Remanufactured Devices Task Force help somewhat, but with respect to retail motor fuel devices, the definitions of these terms are not clear. Mr. Doug Long, RDM Industrial Electronics, a remanufacturer of electronic boards for RMFDs, indicated his opposition to the item by stating that he saw no long-term benefits from requiring remanufactured devices to comply with nonretroactive requirements.

Mr. Ross Andersen, Retired Director of the New York Bureau of Weights and Measures, cautioned members to be careful concerning changing G-A.6., and emphasized the significance of changing an "Application" paragraph in the General Code. He questioned the difference between equipment that had been remanufactured versus repaired, and identified and noted that it may be confusing when a label is applied by a service agent. Mr. Andersen added that if a device has been repaired so that it is no longer traceable to the original CC and a new CC is required, then that equipment should be treated as a new device with respect to the application of nonretroactive requirements. Because such equipment would be treated as new, he did not see a need to change G-A.6.

[**NIST Technical Advisor's Note:** *Relative to Mr. Andersen's comments concerning the confusion created when a label is applied by a service agent, many state service agents regulations require that the service agent identify his or her work by an adhesive tag or label that includes much of the same information required by G-S.1.2. Other service agents, agencies, and installers label a device in order for the user to contact them in the event that additional sales or services are required.*]

NIST WMD suggested adding additional clarification in HB 44 to make clear the intent of G-A.6. as it relates to remanufactured equipment, offered three options for consideration, and provided a description of the effect that each option would have relative to its selection. WMD also suggested changing the requirement status of G-S.1.2. from nonretroactive to retroactive (by changing the type from italics to upright roman), and specifying the date in which the requirement is to be effective. WMD noted that G-S.1.2. pertains only to remanufactured devices and remanufactured main elements. G-A.6. specifies the conditions in which nonretroactive requirements apply to both new and used devices, but is silent with respect to remanufactured devices and remanufactured main elements. Thus, there is an unintended gap in the two paragraphs. As a result, WMD indicated a concern that the enforcement of the marking requirements in G-S.1.2. may be difficult to support. However, if the paragraph status of G-S.1.2. were changed from nonretroactive to retroactive and an effective date specified, the paragraph, in accordance with G-A.5. Retroactive Requirements would be enforceable with respect to all equipment, including remanufactured equipment, as of whatever date is specified.

Members of the Committee concluded that nonretroactive requirements should not necessarily apply to all devices that have been repaired/remanufactured, to the extent that the guidelines established by the NCWM Remanufactured Devices Task Force provide an indication that the device has been remanufactured. However, members agreed that nonretroactive requirements should apply to any device that has been modified, to the extent that a new NTEP CC is required. Thus, if a remanufactured device is issued a new CC, that device would be required to comply with all applicable nonretroactive requirements in effect as of the date the device is placed into service just as any new device would.

The Committee also agreed with WMD's assertion that there existed an unintended gap between G-A.6. and G-S.1.2. that could make enforcement of G-S.1.2. difficult to support. The Committee agreed that changing the status of G-S.1.2. from nonretroactive to retroactive and assigning an enforcement date of January 1, 2002, would be an easy and effective way to eliminate the gap without causing any undue hardship to device owners, equipment suppliers, equipment manufacturers, or any other interested party.

The Committee agreed to amend paragraphs G-A.6. and G-S.1.2. as shown in the Item Under Consideration and to move the item forward as a Voting item.

At their May 2011 Annual Meetings, the CWMA and NEWMA both recommended adoption of this item.

During the 2011 NEWMA Annual Meeting, Mr. Andersen, speaking on his own behalf, commented that the requirement will have a more significant impact on load cell manufacturers than on fuel pump manufacturers. When asked later by NIST Technical Advisor, Mr. Harshman, why he had made such a comment, Mr. Andersen explained that it was due to a difference in the definitions of "repair" and "remanufacture" and NTEP's policy as it relates to load cells. He also stated he felt the added language (proposed) in bullet (d) was redundant because if a device is remanufactured to the extent that a new CC is required, he considered it a new device. [**NIST Technical Advisor's Note:** *This statement is supported in NTEP Administrative Policy "M" and HB 130, Section 4 of the Uniform Regulation for National Type Evaluation.*] To further explain his point of view, Mr. Andersen stated that gas pumps are rarely remanufactured, while almost any work done on a load cell must be considered a remanufacture rather than a repair. This is because changes to the load cell affect influence factors that require a new certificate, and thus, should be considered a new device. Mr. Tom McGee of PMP Corp. stated he supports the item given the new language being proposed, but he questioned whether G-S.1.2. should be effective as of the date the item is passed as it may (unintentionally) have an unfavorable impact on devices that have been placed into service as of 2002. Mr. Harshman, NIST Technical Advisor, explained that the change proposed to G-S.1.2. does not in any way change the application of the requirement or the date that it becomes effective since the paragraph is currently nonretroactive as of January 1, 2002.

During the open hearings of the 2011 NCWM Annual Meeting, Mr. McGee, PMP Corporation and Mr. Gordon Johnson, Gilbarco, Inc., stated that they supported this item. Mr. Flocken, Mettler-Toledo, speaking on behalf of the SMA took no position on this item.

There were six positions posted on the NCWM 2011 Online Position Forum. Of those six, four supported the proposal and two were neutral to the proposal.

The Committee, during its deliberations, agreed with Mr. Andersen's earlier comments that subparagraph (d) is somewhat redundant; however, because of the past lack of consistency in the application of G-A.6 to remanufactured equipment, the Committee believed that the added language was necessary. Consequently, the Committee agreed to include subparagraph (d) and present the item for Vote.

Additional background information can be reviewed in the S&T Committee's 2010 Annual Report.

320 SCALES

320-1 W T.N.4.5.1. Time Dependence: Class II, III, and IIII Non-automatic Weighing Instruments

Source: 2010 NTETC Weighing Sector

Purpose: To reduce the inconsistency between full load time dependence (creep) requirements in T.N.4.5.1. and return to zero requirements in T.N.4.3. Zero Return: Non-automatic Weighing Instruments (creep recovery).

Item Under Consideration:

T.N.4.5.1. Time Dependence: Class II, III, and IIII Non-automatic Weighing Instruments. – A non-automatic weighing instrument of Classes II, III, and IIII shall meet the following requirements at constant test conditions. During type evaluation, this test shall be conducted at 20 °C ± 2 °C (68 °F ± 4 °F):

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing the load and the indication observed during the following 30 minutes shall not exceed**:** ~~**0.5 e.**~~

(1) 0.5 e for Class II and IIII devices;

(2) 0.5 e for Class III devices with 4000 or fewer divisions; and

(3) 0.83 e for Class III devices with more than 4000 divisions.

However, the difference between the indication obtained at 15 minutes and the indication obtained at 30 minutes shall not exceed 0.2 e.

For mutli-interval or multiple range instruments, when any load is kept on an instrument, the difference between the indication obtained immediately after placing the load and the indication observed during the following 30 minutes shall not exceed 0.83 e_i (where e_i is the interval of the weighing segment or range)

(b) If the conditions in (a) are not met, the difference between the indication obtained immediately after placing the load on the instrument and the indication observed during the following 4 hours shall not exceed the absolute value of the maximum permissible error at the load applied.

(Added 2005) (Amended 2006**,** ~~**and**~~**2010, and 201X**)

Background/Discussion: During the 2010 Annual Meeting, the NCWM voted to amend the language in T.N.4.5.3. Zero Load Return: Non-Automatic Weighing Instruments. Hobart Corporation reported that the changes to scale tolerances for time dependence in HB 44 adopted in 2005 were still not consistent with the intent to harmonize load cell and scale performance requirements. In 2009, the WS addressed creep recovery on return to zero, but there is still an extremely tight 0.5e requirement (Scales Code paragraph T.N.4.5.1.(a)) for the change in indications in 30 minutes. This requirement makes the recent changes to the scale zero return (creep recovery) specification of minimal value since the amount of creep at capacity is related to a load cells' ability to return to zero. The WS agreed with the intent of the proposal submitted by Hobart Corporation, and agreed to submit the above proposal to amend HB 44 Scales Code paragraph T.N.4.5.1.(a) to the NCWM S&T Committee and regional weights and measures associations.

At its fall 2010 Interim Meeting, the CWMA S&T Committee recommended this item be further developed by the WS since there was no one to speak on behalf of the proposal.

At the 2010 fall WWMA Annual Technical Conference, Mr. Flocken, Mettler-Toledo and Mr. Straub, Fairbanks Scales stated their support for this item. There were no comments in opposition. The WWMA agreed that this item was sufficiently developed for the NCWM Agenda as a Voting item.

During open hearings at the fall 2010 SWMA Annual Meeting, the SWMA heard support for this item from Mr. Straub. Mr. Straub noted that the industry was aware of the need for these changes when other, related changes, were adopted for paragraph T.N.4.5.1. in July 2010. However, rather than attempting to address these changes all at that time, the industry felt additional time should be given to allow industry and weights and measures officials to study additional changes to the paragraph. The SWMA heard no comments in opposition to the proposal and felt that the proposed change was reasonable. Additionally, the SWMA recognized that the issue had received technical review from the members of the WS. Thus, the SWMA recommended that the item be included on the NCWM S&T Committee's agenda as a Voting item.

At its fall 2010 Interim Meeting, the NEWMA recommended this item remain an Informational item since there was no one to speak on behalf of the proposal.

[**NIST Technical Advisor's Note:** *Prior to the NCWM 2011 Interim meeting, the NIST Technical Advisor asked the WS Chairman, Mr. Flocken, Mettler-Toledo, whether the change to this paragraph was intended to not only apply to Class III scales with d > 4000, but also, all class II and III multi-interval and multiple range scales as proposed changes to the paragraph indicate. No conclusive answer to this question was provided prior to the Interim meeting.*]

During the 2011 NCWM Interim meeting open hearings, Mr. Flocken speaking on behalf of the SMA supported this item. However, later, during S&T Committee deliberations, Mr. Flocken stated that after researching the item further, including a discussion he had with another scale manufacturer, it was concluded that the proposal is not needed since the ultimate determination of compliance is the four-hour test (specified in subparagraph (b) of T.N.4.5.1.) regardless of the 0.5 or 0.83 e determinations. Upon receiving this new information, the S&T Committee decided this item should be Withdrawn.

At their May 2011 Annual Meetings, the CWMA and NEWMA supported the Committee's recommendation that this item be Withdrawn from the NCWM Agenda. At the NEWMA meeting, Mr. Straub speaking on behalf of the SMA, also supported the Committee's recommendation to Withdraw this item.

No further action was taken by the Committee at the 2011 NCWM Annual Meeting.

320-2 V T.N.4.7. Creep Recovery for Load Cells

(This item was adopted.)

Source: 2010 NTETC Weighing Sector

Purpose: To eliminate the conflict in load cell creep recovery tolerances between Class III and III L load cells by increasing the creep recovery tolerance for Class III L load cells by the same factor (5/3) as was used in 2009 when the creep recovery tolerances for Class III load cells were amended.

Item Under Consideration:

T.N.4.7. Creep Recovery for Load Cells During Type Evaluation. – The difference between the initial reading of the minimum load of the measuring range (D_{min}) and the reading after returning to minimum load subsequent to the maximum load (D_{max}) having been applied for 30 minutes shall not exceed:

(a) 0.5 times the value of the load cell verification interval (0.5 v) for Class II and IIII load cells;

(b) 0.5 times the value of the load cell verification interval (0.5 v) for Class III load cells with 4000 or fewer divisions;

(c) 0.83 times the value of the load cell verification interval (0.83 v) for Class III load cells with more than 4000 divisions; or

(d) **2.5** ~~1.5~~ times the value of the load cell verification interval (**2.5** ~~1.5~~ v) for Class III L load cells.

(Added 2006) (Amended 2009 **and 2011)**

Background/Discussion: At the 2010 Annual Meeting of the WS, Avery Weigh-Tronix reported that HB 44 Creep Recovery tolerances for Class III load cells with n > 4000 divisions in Scales Code paragraph T.N.4.7., were greater than creep recovery tolerances applicable to Class III L load cells. In terms of mV/V equivalency, a Class III/III L load cell could pass Class III and fail Class III L creep recovery tolerances.

Prior to 2009, the tolerance for Class III load cells was 0.5v. This was increased by a factor of 5/3 to arrive at the 0.83 v tolerance in the current requirement. This recommendation proposes to increase the existing 1.5v tolerance for Class III L load cells by the same 5/3 factor. Thus the new tolerance would be 1.5v x 5/3 or 2.5v.

The following is an example of a 50 000 lb load cell marked with both III and III L accuracy classes that illustrates the problem:

Class III:	Class III L
n_{max} = 5000	n_{max} = 10 000
v_{min} = 10 lb	v_{min} = 5 lb

The HB 44 Class III creep recovery tolerance is 0.83v (0.83v x 10 lb/v = 8.3 lb)
The HB 44 Class III L creep recovery tolerance is 1.5v (1.5v x 5 lb/v = 7.5 lb)
The proposed HB 44 Class III L creep recovery tolerance is 1.5v x 5/3 = 2.5v (2.5v x 5 lb/v = 12.5 lb)

The NIST Technical Advisor to the WS provided the Sector with a summary of creep recovery test results from October 1, 2007, through August 12, 2010, for Class III L load cells from the NIST Force Group that showed the Class III L load cell creep recovery type evaluation compliance rate is 76 %, when existing tolerances are applied. The compliance rate for Class III load cells over the same time period is 69 % using the expanded tolerance adopted in 2009. Mr. Kevin Fruechte, Avery Weigh-Tronix, explained to the WS the need to amend the creep recovery tolerances for Class III L load cells based on the example provided by the NIST Technical Advisor. A WS member stated that using the 5/3 factor would reconcile the differences between U.S. Class III L creep recovery tolerances with comparable OIML R 60 Class C load cell tolerances. The WS agreed to submit the language to amend paragraph T.N.4.7. to the S&T Committee and regional weights and measures associations as shown in the item under consideration.

At its fall 2010 Interim Meeting, the CWMA recommended this item be further developed by the WS since there was no one to speak on behalf of the proposal.

At the fall 2010 WWMA Annual Technical Conference, Mr. Flocken, Mettler-Toledo, and Mr. Straub, Fairbanks Scales, stated their support for this item. There were no comments in opposition. The WWMA agreed that this item is sufficiently developed for the NCWM Agenda as a Voting item.

At the 2010 SWMA Annual Meeting open hearings, the SWMA S&T Committee heard no comments in opposition to the proposal and felt that the proposed change was reasonable. The SWMA also noted that there was industry support for the proposal at the WWMA based on the WWMA addendum sheets.

At its fall 2010 Interim Meeting, NEWMA recommended this item remain an Informational item since there was no one to speak on behalf of the proposal.

At the 2011 NCWM Interim Meeting, the Committee received comments from Mr. Flocken speaking on behalf of the SMA, who indicated support for the item as written. Mr. Flocken stated that the item addressed an omission that was made back in 2009 when the tolerance value was modified for Class III load cells, but overlooked for Class III L load cells. The Committee agreed and recommended this item be moved forward as a Voting item.

The CWMA and NEWMA both supported this item and recommended adoption by the NCWM during their spring 2011 Annual Meetings.

There were six positions posted (three from industry and three from government) on the NCWM 2011 Online Position Forum, all of which supported this item without additional comments.

During the S&T open hearings of the 2011 NCWM Annual Meeting, Darrell Flocken speaking on behalf of the SMA supported this item. There were no comments received in opposition.

The Committee believed there was sufficient support for this item without need for any change and agreed to present the item for Vote.

321 BELT-CONVEYOR SCALE (BCS) SYSTEMS

321-1 V N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length

(This item was adopted.)

Source: 2010 Carryover Item 321-1. This item originated from the 2008 WWMA Meeting. (This item first appeared on the 2008 Committee's Developing Items Section of its agenda as Item 360-2 Part 3 Item 2.)

Purpose: The U.S. National Work Group (USNWG) on Belt-Conveyor Scale Systems (BCS) agreed that the existing language in N.3.1.3. resulted in an excessive allowance for the variation in the totalizers for a belt with larger minimum division sizes. Conversely, the three division requirement potentially imposed an excessively narrow restriction for BCS with smaller minimum divisions. The proposed amendment corrects the issue and makes the allowable variation independent of division size.

Item Under Consideration: Amend NIST HB 44, Section 2.21. Belt-Conveyor Scales (BCS) Systems Code, paragraph N.3.1.3. as follows:

N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. – ~~**After a zero-load test with flow rate filtering disabled, the totalizer shall not change more than plus or minus 3.0 scale divisions (± 3 d) from its initial indication during one complete belt revolution.**~~ **During a zero-load test with all operational low-flow lock-out disabled, the absolute value of the difference between the maximum and minimum totalizer readings indicated on the totalizer during any complete revolution of the belt shall not exceed 0.12% of the minimum test load.**

Note: The end value of the zero-load test must meet the ± 0.06 % requirement referenced in the "Test for Zero Stability."

(Added 2002) (Amended 2004 **and 2011**)

Background/Discussion: At its fall 2007 Annual Technical Conference**,** the WWMA received a proposal from the USNWG on BCS to amend paragraph N.3.1.3. The USNWG stated that existing language in N.3.1.3. results in an excessive allowance for the variation in a belt. However, for belt-conveyor scales that can benefit from a smaller minimum division, the three division requirement can impose an excessively narrow restriction. It should be noted that variations in belt weight tend to be sinusoidal. In other words, the error caused by belt variations tended to be canceled if the material test were conducted using complete revolutions. The maximum belt variation would occur

at 0.5, 1.5, 2.5, etc., revolutions. However, material tests are rarely conducted using complete revolutions of the belt.

During the 2009 NCWM Annual Meeting, the Committee agreed with comments from Mr. Bill Ripka, Thermo Ramsey, Chairman of the USNWG on BCS, and WMD, that the item was not ready for vote and will remain Informational on its agenda as recommended by the USNWG.

At the 2010 NCWM Annual Meeting, Mr. Ripka, Thermo-Fisher Scientific, provided the Committee with a letter regarding the status of the USNWG on BCS work on this issue. Based on the progress of a USNWG Subcommittee tasked with working on this issue and the pending receipt of actual field information as it relates to belt consistency, the Subcommittee requested the National S&T Committee to consider moving the Belt Consistency proposal from Informational to Developing. A complete copy of the letter can be viewed in Appendix C of this report. The Committee agreed with the recommendation to give this item Developmental status and move it to the list on Developmental items on the Committee's 2011 Interim Agenda.

During the 2010 WWMA Annual Technical Conference open hearings, Mr. Ripka speaking on behalf of the Subcommittee of the USNWG on BCS, recommended this proposal be moved forward as a Voting item. He stated that a small survey had been conducted at thirteen BCS installations to verify whether these installations would fit within the new wording. He reported that twelve of the thirteen installations easily complied with the proposed requirements; the remaining scale was a non-commercial device. Mr. Ripka, speaking on behalf of Thermo Scientific, suggested deleting the last sentence of the proposal because the end value of the zero-load test is already covered in paragraph N.3.1.2. Test of Zero Stability. Mr. Cook, NIST Technical Advisor, reported that the recommendations of the subgroup were submitted to the entire USNWG on BCS with a recommendation that the item be upgraded to the NCWM S&T Committee agenda as a Voting item.

The WWMA agreed with the recommendation of the subgroup, pending approval of the entire USNWG on BCS in its letter ballot prior to the January 2011 NCWM Interim Meeting. In response to the recommendations from Thermo Fisher, the WWMA did not feel comfortable supporting Mr. Ripka's suggested changes to delete the last sentence of the above proposal, and suggested that this change be supported by the USNWG.

During the 2010 SWMA Annual Meeting, the SWMA received no comments on this issue during its open hearings. The SWMA S&T Committee heard from the NIST Technical Advisor and observed in the WWMA addendum sheets that the USNWG on BCS anticipates finalizing a recommendation on this issue in the near future. The SWMA supports the efforts of the USNWG and looks forward to considering future recommendations on this issue.

[**NIST Technical Advisor's Note:** *Just prior to the 2011 NCWM Interim Meeting, Ian Burrell, a member of the USNWG on BCS Subcommittee submitted a request to the NIST Technical Advisor to the USNWG on BCS to amend the language in Item Under Consideration specified in agenda Item 321-1 of the 2011 Interim agenda. The request was forwarded to other members of the subgroup to solicit their input relative to the changes proposed. Only one response (in acceptance of the changes) was received from the subgroup prior to the Interim meeting and at no time was the new language discussed or considered during the 2011 Interim Meeting Committee deliberations. The NIST Technical Advisor sought additional input concerning the proposed language change from members of the entire USNWG on BCS when that group met in February 2011, but no comments were received in support or opposition when the issue was raised. Thus, no action was taken at that time to amend the language as requested by Mr. Burrell.*]

During the 2011 NCWM Interim Meeting, Mr. Darrell Flocken, Mettler-Toledo, speaking on behalf of the SMA supported the item. Mr. Ripka speaking on behalf of the USNWG Subcommittee indicated that the item was sufficiently developed, and recommended that the proposal to amend N.3.1.3. be moved forward as a Voting item. The Committee agreed and recommended that the item as specified in Item Under Consideration be moved forward as a Voting item.

The CWMA and the NEWMA both supported the item and recommended adoption by the NCWM at their spring 2011 Annual Meetings. Mr. Lou Straub, Fairbanks Scales, speaking on behalf of the SMA at the 2011 NEWMA Annual Meeting, also supported this item.

Just prior to the 2011 NCWM Annual Meeting, WMD compared the language that had been previously submitted by Mr. Burrell to that which was being proposed. WMD concluded that the language submitted by Mr. Burrell was technically more accurate and less ambiguous, because it correctly associated the term "absolute value" with a change in totalizer readings. WMD noted that the language submitted by Mr. Burrell correctly stated the intent of the requirement. Thus, WMD agreed that the proposed language should be changed as requested by Ian Burrell. The NIST Technical Advisor to the USNWG on BCS, contacted Mr. Ripka, USNWG Chairman, to make him aware of the results of WMD's analysis relative to this item, and he too agreed that the proposed language should be changed.

During the 2011 NCWM Annual Meeting S&T Committee open hearings, NIST Technical Advisor, Mr. Steve Cook, speaking on behalf of WMD, supported the language that had been submitted by Mr. Burrell since it better reflects the intent of the USNWG. Mr. Ripka, speaking on behalf of Thermo-Fisher Scientific and as Chairman of the USNWG on BCS, supported the change and stated that the change removed ambiguity. Mr. Ripka also submitted a letter to the S&T Committee in support of the new language (refer to Appendix C), which indicated that the new language had been distributed to members of the USNWG, and all who had responded were in favor of the change.

The Committee agreed with the above comments that the revised language was technically more accurate and less ambiguous than that which had been proposed earlier. The Committee also agreed that the term "absolute value" was, as WMD had concluded, intended to be associated with the change in totalizer readings rather than the minimum totalized load. Consequently, the Committee decided that the change to the language as shown above in the Item Under Consideration was appropriate and maintained the status of the item as Voting.

(See the Committee's 2008, 2009, and 2010 Annual Reports for additional background information.)

331 VEHICLE-TANK METERS (VTM)

331-1 V S.2.6. Thermometer Well, Temperature Determination

(This item was adopted.)

Source: 2011 NCWM S&T Committee, CWMA, WWMA, SWMA, and NEWMA

Purpose: To provide a means for inspectors and service personnel to determine the temperature of the product at the meter, enabling them to reduce uncertainties in the testing process by applying paragraph N.5. Temperature Correction for Refined Petroleum Products.

Item Under Consideration: Add a new paragraph to S.2. Design of Measuring Elements in Section 3.31 Vehicle-Tank Meters to read as follows:

S.2.6. Thermometer Well, Temperature Determination - For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

(a) in the liquid chamber of the meter, or

(b) in the meter inlet or discharge line immediately adjacent to the meter.

[Nonretroactive as of January 1, 2012]

(Added 2011)

Background/Discussion: During discussions of proposed changes (which were adopted in July 2010) to reduce the tolerances for VTMs equipped with automatic temperature compensating systems in paragraph T.2.1., meter manufacturers expressed concerns about how to ensure that consistent and appropriate test procedures and equipment be used by weights and measures officials during inspections of VTMs. In response to these concerns, WMD revised the EPOs for VTMs and presented this information during a training seminar in April 2010. In the

process of revising and presenting the procedures, WMD received comments indicating that many VTMs are not equipped with means for determining the temperature of the product at the meter. As a result, the inspector is unable to correct for any differences due to temperature between the meter and the prover during testing and, thus, is unable to properly apply Test Note paragraph N.5. Temperature Correction for Refined Petroleum Products, which states:

> **N.5. Temperature Correction for Refined Petroleum Products.** – Corrections shall be made for any changes in volume resulting from the differences in liquid temperatures between the time of passage through the meter and the time of volumetric determination in the prover. When adjustments are necessary, appropriate petroleum measurement tables should be used.
>
> (Added 2007)

In order for inspectors and service personnel to determine the difference between the temperature of the product at the meter and at the prover, some means is needed for determining the temperature of the product as it passes through the meter. Inspectors have reported that few VTMs are equipped with provisions such as a thermometer well at the meter that would enable them to determine the temperature of the product at the meter using a traceable thermometer. Consequently, the inspector is not able to make adjustments to the changes in the indicated volume that are the result of differences in temperature between the meter and the prover. Failing to account for differences in product temperature can, in some instances, introduce errors into the testing process, possibly resulting in the acceptance of a meter that is actually out of tolerance or the incorrect rejection of a meter that may actually be performing within applicable tolerance.

While the inspector could apply General Code paragraph G-UR.4.4. Assistance in Testing to require the installation of a thermometer well or other provision for determining the temperature of the product at the meter, the S&T Committee believes it is more cost effective to require this to be incorporated into the equipment purchased by the user. To minimize the impact on manufacturers and device owners, the S&T Committee proposes that this paragraph be applied nonretroactively.

Gasoline products expand/contract by a factor of about 0.00069 for every degree Fahrenheit change in temperature. Diesel fuels expand by a factor of about 0.00050 for every degree Fahrenheit change in temperature. **NOTE:** These values are approximations and the exact API/ASTM correction factors for the product being dispensed should be used to calculate the volume delivered when conducting actual tests.

Consider the impact of a one degree temperature difference between the meter and prover on a 100 gal test draft:

1 degree difference x 0.00069/ °F x 100 gal = 0.069 gal = 15.9 in^3 for gasoline
1 degree difference x 0.00050/ °F x 100 gal = 0.05 gal = 11.6 in^3 for diesel

If acceptance tolerance applies, the tolerance on a 100 gal draft of a VTM meter would be 0.15 % of the indicated 100 gal delivery, which is 0.15 gal or 35 in^3. This means that almost half of the allowable tolerance is taken up by the effects of a one degree temperature difference on gasoline and about a third of the tolerance on diesel.

The LMD Code (Section 3.30.) already includes a paragraph (S.2.6. Temperature Determination – Wholesale Devices) requiring means for taking the temperature of the product at the meter for larger, wholesale meters and the Liquefied Petroleum Gas and Anhydrous Ammonia LMD Code (Section 3.32., paragraph S.2.5. Thermometer Well) requires this provision for all LPG & NH_3 meters. This proposed change to the VTM Code would also promote alignment of these liquid-measuring device codes.

This could result in additional costs for equipping some meters with a thermometer well. However, at least one manufacturer indicated that the meters they produce for this application are already designed with the option for thermometer wells. According to one manufacturer, a new meter equipped with thermometer wells would cost a device owner approximately $150 more than one without this provision. No additional cost considerations have been identified.

This new language will encourage the use of corrections for temperature differences between the meter and the prover during the testing process because a thermometer well will enable inspectors and service personnel to

determine the temperature of the product at the meter. As a result, this will promote more consistent calibration and verification of meter accuracy and improve uniformity in measurements from company to company.

The weights and measures community may wish to review other measuring codes for consistency and consider the possible inclusion of similar requirements in a future proposal(s).

At its 2010 WWMA Annual Technical Conference, the WWMA received comments on this item during its open hearings, suggesting that this was another attempt at temperature compensation. The WWMA S&T Committee disregarded those comments in their deliberation because the proposal is not an automatic temperature compensation issue. The Committee voted to recommend that this item move forward as a Voting item on the NCWM S&T Committee Agenda.

At its 2010 SWMA Annual Meeting, the SWMA heard no comments on this issue during its open hearings. In reviewing the background and history for this item, the SWMA S&T Committee agreed that the proposed change is appropriate given the potential impact of temperature differences between the meter and the prover for test drafts of the magnitude of those used in VTM testing. The SWMA S&T Committee also agreed that the proposed paragraph should be nonretroactive as of January 1, 2012. Consequently, the SWMA recommended that the item be forwarded, as originally proposed by the NCWM S&T Committee, to the NCWM S&T Committee as a Voting item.

At its fall 2010 Interim Meeting, NEWMA received a comment on the item during its open hearing that this proposal is not an automatic temperature compensation issue and that the temperature is used to correct for thermal expansion (or contraction) between meter and prover, which are calibrated to 60 ºF by state metrology labs. Before it can support the proposal, NEWMA wanted to see more data on the potential impact to justify a need for this requirement.

The NTETC Measuring Sector reviewed this issue at its October 2010 meeting. While the Sector had no specific technical guidance to offer on this issue, some Sector members suggested that the Committee consider requiring "wet-down" runs on each meter test as an alternative to requiring a thermometer well to help equalize the product temperature between the prover and the meter.

At the Committee's 2011 NCWM Interim Meeting open hearings, Mr. Dmitri Karimov, Liquid Controls, speaking on behalf of the Meter Manufacturers Association (MMA), noted the that MMA believes that the facility for taking the temperature of the product at the meter will improve accuracy during field testing. Accordingly, the MMA supports the addition of the proposed paragraph.

At the Interim Meeting during discussion on the comments received regarding this issue, the Committee considered the idea of requiring additional drafts (to equalize the product temperature between the meter and the prover) prior to the official accuracy test; however, the Committee believes that there is limited value to conducting additional runs, noting that this will increase testing time. The Committee also noted there may be other reasons for differences in temperature between the meter and prover, and additional runs may not entirely eliminate the difference. Given the potential impact of even a one degree Fahrenheit difference, the Committee believes the most appropriate way to reduce the uncertainties contributed by the temperature difference is to provide a means for the inspector/serviceperson to determine the temperature during testing.

The Committee also discussed whether or not more specific requirements for the thermometer well, such as material and thickness, should be specified, noting Canada's experiences that led not only to the specification of criteria for the thermometer wells, but also resulted in criteria that address other components installed near the wells that can also influence accurate temperature determination. The Committee recognizes the value of such specifications and is open to considering a proposal to include specifications at some future point. However, given the immediacy of the need to enable inspectors and service personnel to reduce uncertainties in the testing process, the Committee believes that the current proposal should strive to first align the VTM code requirements for thermometer wells with those in other metering codes. Any recommendation for the inclusion of more specific requirements for the thermometer well itself, should be considered in a separate proposal and, for consistency, should encompass all metering codes (particularly the LPG & Anhydrous Ammonia Liquid-Measuring Devices Code since the effects of temperature on LPG are significantly greater).

Acknowledging the importance of providing tools to enable the inspector and serviceperson to reduce uncertainties in the test process, hearing no opposition at its open hearings, and recognizing the potential impact of temperature on the test results, the Committee agreed to recommend this proposal for a Vote.

At their spring 2011 meetings, both NEWMA and the CWMA expressed support for the proposal as written. The CWMA further noted that the proposed change will align the VTM code with the Liquid-Measuring Devices and LPG and Anhydrous Ammonia Liquid-Measuring Devices Codes. The Committee also received two comments from regulatory officials in support of the proposal through the NCWM Online Comment Forum.

During open hearings at the 2011 NCWM Annual Meeting, the Committee announced that the proposed paragraph was intended to include an effective date of January 1, 2012, noting that the year was not specified in the published copy of the Committee's Interim Report. The Committee heard support by the MMA for the proposal, including the 2012 effective date. NIST WMD reiterated that the proposed language will provide the regulatory authority with the means to reduce uncertainties in the testing process associated with differences in temperature between the meter and the prover. The Committee heard no opposition to the proposed change.

331-2 I T.4. Product Depletion Test

Source: Northeast Weights and Measures Association (NEWMA). This item was originally part of the 2010 Agenda Item 360-3 – Developing Items Part 3.31., Vehicle-Tank Meters – Item 1.

Purpose: Modify the VTM code to base the product depletion test tolerances on the meter's maximum flow rate (a required marking on all meters), rather than the meter size (a required marking for meters manufactured beginning in 2009). This will enable more consistent application of the tolerances for older meters, which are not required to be marked with the meter size, and address an unintentional gap which allows an unreasonably large tolerance for smaller meters.

Item Under Consideration: The Committee is considering two options for modifications to paragraph T.4. and Table T.4. The Committee is asking for feedback on both of these proposals and is particularly interested in data from manufacturers and weights and measures jurisdictions that would illustrate the impact of these proposals on smaller meters.

Option 1:

Modify Paragraph T.4. as follows:

T.4. Product Depletion Test. – The difference between the test result for any normal test and the product depletion test shall not exceed **one-half (0.5 %) percent of the volume delivered in one minute at the maximum flow rate marked on the meter. Product depletion test tolerances for typical meters are** ~~**the tolerance**~~ shown in Table T.4. 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. Accuracy Classes and Tolerances for Vehicle-Tank Meters.

Delete current Table T.4.:

~~Table T.4.~~ ~~Tolerances for Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters~~	
~~Meter Size~~	~~Maintenance and Acceptance Tolerances~~
~~Up to, but not including, 50 mm (2 in)~~	~~1.70 L (104 in^3)[1]~~
~~From 50 mm (2 in) up to, but not including, 75 mm (3 in)~~	~~2.25 L (137 in^3)[1]~~
~~75 mm (3 in) or larger~~	~~3.75 L (229 in^3)[1]~~
~~[1] Based on a test volume of at least the amount specified in N.3. Test Drafts.~~	

Replace current Table T.4. with revised Table T.4. as follows:

Option 1

Table T.4. **Tolerances for Typical Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters**			
Meters Marked with Flow Rates in SI Units		**Meters Marked with Flow Rates in Inch-Pound Units**	
Marked Maximum Flow Rate[1]	**Maintenance and Acceptance Tolerances[2]**	**Marked Maximum Flow Rate[1]**	**Maintenance and Acceptance Tolerances[2]**
114 Lpm	**0.57 L**	**30 gpm**	**0.15 gal (34.6 in^3)**
227 Lpm	**1.14 L**	**60 gpm**	**0.30 gal (69.3 in^3)**
380 Lpm	**1.90 L**	**100 gpm**	**0.5 gal (115 in^3)**
757 Lpm	**3.78 L**	**200 gpm**	**1.0 gal (231 in^3)**
[1]Refer to T.4. for meters with maximum flow rates not listed. **[2]Based on a test draft volume of at least the amount specified in N.3. Test Drafts.**			

Option 2:

This option includes larger tolerances for smaller meters.

T.4. Product Depletion Test. – The difference between the test result for any normal test and the product depletion test shall not exceed **one-half (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 six-tenths (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. Product depletion test tolerances for typical meters are** ~~the tolerance~~ shown in Table T.4. 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. Accuracy Classes and Tolerances for Vehicle-Tank Meters.

Delete current Table T.4.:

~~Table T.4.~~ ~~Tolerances for Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters~~	
~~Meter Size~~	~~Maintenance and Acceptance Tolerances~~
~~Up to, but not including, 50 mm (2 in)~~	~~1.70 L (104 in^3)[1]~~
~~From 50 mm (2 in) up to, but not including, 75 mm (3 in)~~	~~2.25 L (137 in^3)[1]~~
~~75 mm (3 in) or larger~~	~~3.75 L (229 in^3)[1]~~
~~[1] Based on a test volume of at least the amount specified in N.3. Test Drafts.~~	

Replace current Table T.4. with revised Table T.4. as follows:

Option 2

Table T.4. **Tolerances for Typical Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters**			
Meters Marked with Flow Rates in SI Units		**Meters Marked with Flow Rates in Inch-Pound Units**	
Marked Maximum Flow Rate[1]	**Maintenance and Acceptance Tolerances[2]**	**Marked Maximum Flow Rate[1]**	**Maintenance and Acceptance Tolerances[2]**
114 Lpm	**0.68 L**	**30 gpm**	**0.18 gal (41.6 in3)**
227 Lpm	**1.36 L**	**60 gpm**	**0.36 gal (83.2 in3)**
380 Lpm	**2.28 L**	**100 gpm**	**0.6 gal (139 in3)**
757 Lpm	**3.78 L**	**200 gpm**	**1.0 gal (231 in3)**
[1]Refer to T.4. for meters with maximum flow rates not listed. **[2]Based on a test draft volume of at least the amount specified in N.3. Test Drafts**.			

Background/Discussion: This item was submitted to NEWMA at its October 2008 Interim Meeting as an alternative proposal to Item 331-1, "S.5.7. Meter Size," in the 2008 NCWM Annual Report. This alternative would base the tolerances for the product depletion test on a percentage of the maximum flow rate rather than meter size. Justification provided to NEWMA by the submitter is as follows:

> The NCWM S&T Committee received a proposal in 2008 to add new marking requirements to provide inspectors with a basis on which to assess tolerances, since the meter size in inches is not currently marked on meters used in VTM systems. This solution would add a new marking requirement non-retroactively, which will not solve the problem until the entire fleet of meters presently in use is replaced with new meters. This could take a very long time, since VTMs can see many years of service. In addition, the compromise made when this item originally passed did not address the possibility that smaller meters, (e.g., down to ¼ in) could be mounted on a vehicle and, thus, subject to these tolerances. Allowing the smallest current tolerance (104 in^3) on a ¼ in meter delivering 2 gpm would be 22.5 % relative error for one minute of flow due to air passing through the meter. Even at 20 gpm for a 1 in meter, the relative error only drops to 2.25 %. That seems unconscionable. New York recommends going back to the 0.5 % of 1 minute of flow at the maximum rated flow rate for the meter that was part of the original proposal. The max flow rate must be marked on every meter under current HB 44 requirements, thus, the inspector will have the information necessary to correctly apply the tolerance. It is further recommended that the table provide tolerances for the common meter sizes, which will handle most cases encountered in the

> field (i.e., 1¼-, 1½-, 2- and 3-inch meters with maximum flow rates of 30, 60, 100 and 200 gpm, respectively).
>
> There may be concern that users will move to larger meter sizes to take advantage of the larger tolerances. It is not thought that this will happen, since these systems cannot deliver much over 100 gpm without damaging storage tanks. In fact, most systems we have seen delivering heating oil are actually delivering at less than 80 gpm. If they move to a 200 gpm, 3 in meter, rated at 40 gpm to 200 gpm, they will then have to meet acceptance tolerances all the way down to 60 gpm, which it is not believed that to be achievable on a consistent basis. We believe the typical 2 in system will remain the mainstay of the industry.
>
> Graphs of the relationship of typical meter ratings to pipe cross section area show that positive displacement flow rates are clearly a function of pipe size. Any tolerance that does not reflect that relationship is fundamentally flawed in our view. For comparison, we have included a graphic comparison of the proposed tolerances.

The submitter also noted the following:

> We recognize that the tolerances proposed will reduce the tolerances for meter sizes 2 in and under. We could support some compromise to recognize diminishing returns on smaller meters, thus, allowing a slightly larger tolerance (e.g., 0.6 %) at or below 100 gpm rated flow rate. At 0.6 % for a 2 in (100 gpm) meter, the tolerance would be 139 in^3, virtually identical to the existing tolerance.

The submitter provided supporting graphics, which can be viewed in the Committee's 2010 Final Report in the Developmental Items Section.

In its initial review of this item in 2008, NEWMA did not feel the proposed change was justified. As a result of discussions at subsequent meetings, NEWMA since determined that this item is ready to be elevated for considerations by the NCWM S&T Committee.

At the 2010 NCWM Annual Meeting, the Committee heard comments from Mr. Andersen, New York, reiterating NEWMA's request to place this item on the Committee's 2011 Interim Agenda. The Committee agreed to NEWMA's request and included this item on its 2011 Interim Agenda and submitted it to the 2010 fall regional weights and measures association meetings.

At its 2010 fall Interim Meeting, the CWMA S&T Committee recommended that this item remain a Developing item as one of the committee members was concerned that the conversion of the metric value may have been incorrectly or inconsistently rounded or truncated in the proposed amendments to Table 4.

At its 2010 Annual Technical Conference, the WWMA recommended that this item move forward as a Voting item. The WWMA believes the proposed amendments to Table T.4. would reduce the unnecessarily large tolerances for meters under 60 gpm (2in meters) and more closely reflects existing tolerances of larger meters. The WWMA also recommended removing paragraph S.5.7. Meter Size from the VTM Code since the language was adopted in 2009 to facilitate a different application of the correct product depletion test tolerances, which were based on meter size. Since the item under consideration proposes to no longer use meter size as the basis for calculating product depletion tolerances, the WWMA believes that paragraph S.5.7. would no longer be necessary. During the voting session, Mr. Kurt Floren, Los Angeles County, California, commented he had no issue with the intent of the proposal, but asked that the NCWM Committee look into the mathematical agreement in the metric conversion listed in Table T.4. It was also suggested that it may be more appropriate to list the "inch-pound" (gpm) before the SI units in Table T.4.

At its 2010 Annual Meeting, the SWMA S&T Committee stated that it does not object to considering modifications to the tolerance to better address the product depletion test. However, it feels that additional time is needed for industry and weights and measures officials to study the proposed changes. The SWMA S&T Committee noted that

the product depletion tolerance was amended only five years ago, and a new marking requirement was added to correspond to that requirement a few years later in 2009. The SWMA S&T Committee feels that, before making yet another change, thoughtful consideration needs to be given to ensure that any changes are appropriate. The SWMA agreed with the SWMA's S&T Committee's justification and its recommendation that this item be made an Informational item on the 2011 NCWM Committee agenda.

At its 2010 Annual Meeting, NEWMA restated its support for this item and was looking forward to input from the other regional weights and measures associations and other interested parties.

At its open hearings at the 2011 NCWM Interim Meeting, the Committee heard comments from the MMA expressing concerns about both options presented in the proposal. Mr. Dmitri Karimov, Liquid Controls, speaking on behalf of the MMA, noted that 2 in meters tested against the tolerances proposed in the first option ("Option 1") would automatically fail. Under the second option ("Option 2"), 2 in meters would meet the requirements, but smaller meters such as 1¼ in meters would fail. The MMA believes that this item requires additional work and recommended that the item be designated as an Informational item.

Ms. Juana Williams, NIST Weights and Measures Division, offered the following comments for the Committee to consider in its technical analysis of this item:

- WMD observed that the breakpoints of the tolerance are depicted incorrectly relative to the meter sizes on the graphs (comparing current and proposed tolerances) in the Interim Agenda under both Option 1 and Option 2. For example, a tolerance of 104 in^3 is technically extended up to, but not including a 2 in meter rather than just beyond the 1½ in size mark. A different type of graph might be considered to better illustrate the comparison.

- For both Option 1 and 2, the resolution to which the metric values in the tables are reported should be reviewed and reconsidered relative to the typical graduation size of a metric prover. For example, the maximum value of the subdivision on a 200 L prover is 50 mL according to NIST Handbook 105-3. The resolution of the equivalent metric values presented in the proposed tables is to 0.01 L or 10 mL. Given the prover can only be read to a division of 50 mL (0.05 L), the metric values presented are at a higher resolution than the graduations on the prover gauge plate and, therefore, are not realistically readable on the prover.

- An alternative to consider for presenting metric versions of the tolerance is to present the metric tolerances in a separate table so that examples are more reflective of the actual numerical values for meters marked with flow rates in metric units.

- In Option 2, the metric tolerance values for meters with marked maximum flow rates below 100 gpm do not match the proposed changes shown in the corresponding paragraph T.4. The tolerances are calculated at 0.5 % rather than 0.6 %. (This was also noted by the WWMA and CWMA.)

- Present the proposed changes by striking the existing table and showing the proposed changes as a replacement table. As proposed, it initially appeared to some that the tolerance for a 2 in meter, for example, has been reduced from 104 in^3 to 34 in^3. However, the tolerance for that size meter (which is typically a 100 gpm maximum) is actually 115 in^3.

- Move the statement "Refer to T.4. for meters with flow rates not listed" to the bottom of the table rather than in the title.

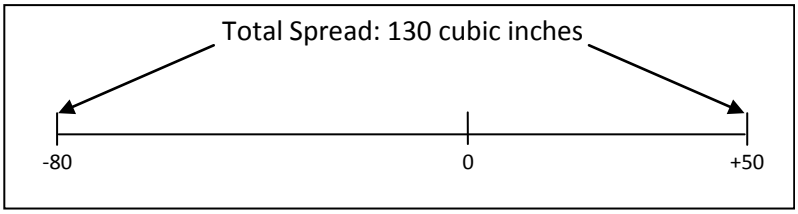
- Include examples of the current tolerance and the two options in a tabular format to allow easier comparison, and illustrate the impact of the two options. (WMD provided two examples for the Committee to consider along with proposed changes to the tolerance tables in both options to correct the errors noted above.)

The Committee generally agreed with the concept of basing the tolerances on the marked maximum flow rate of the meter rather than on the marked meter size. Additionally, while recognizing that one goal of the proposal was to reduce what the submitter considered to be an unreasonably large tolerance for smaller meters, the Committee expressed concern about the magnitude of the impact on these meters. The Committee also heard comments from one meter manufacturer indicating that consideration should be given to different technology types, since turbine meters, for example, may have different typical flow rate ranges than a positive displacement meter. After reviewing the two options (Option 1 and Option 2) presented by the submitter; considering the comments made during the open hearings and in the regions; and reviewing the examples provided by WMD, the Committee agreed that additional work is needed on this item. Consequently, the Committee decided to designate the status of the item on its agenda as an "Informational" item to allow additional time for this information to be collected and reviewed.

The Committee would specifically like feedback from meter manufacturers and weights and measures jurisdictions regarding the impact on smaller meters, including results from past tests that could be analyzed against the current and proposed tolerances. In the meantime, the Committee modified the two options proposed to correct the errors noted in the discussion above and agreed to include the following examples provided by WMD to illustrate the impact of the tolerances.

- **Example A** illustrates a 2 in meter with max flow of 100 gpm:

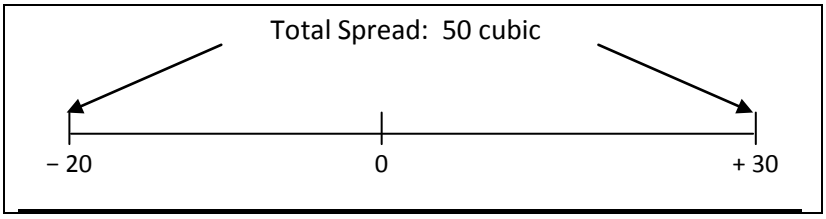
Example A **Sample Results of a Product Depletion Test**	
Meter Size:	2 in
Minimum Flow Rate:	20 gpm
Maximum Flow Rate:	100 gpm
Normal Test Draft Results	+ 50 in^3
Product Depletion Test Draft Results	− 80 in^3
Difference [Normal Test Result – Product Depletion Test Result]	130 in^3



Comparison of Tolerances (Current vs. Proposed) for Example A (2 in, 100 gpm max)			
	Current Tolerance	**Proposal #1 (0.5 %)**	**Proposal #2 (0.6 %)**
Product Depletion Tolerance Calculation		0.5 % x Max Marked Flow Rate = 0.005 x 100 = 0.5 gal	0.6 % x Max Marked Flow Rate = 0.006 x 100 = 0.6 gal
Product Depletion Tolerance	137 in^3	115.5 in^3	138.6 in^3
Conclusion: Does System "Pass" or "Fail" the Product Depletion Test?	Pass	Fail	Pass

- **Example B** illustrates a 1-1/4 in meter with a max flow of 30 gpm.

Example B Sample Results of a Product Depletion Test	
Meter Size:	1¼ in
Minimum Flow Rate:	5 gpm
Maximum Flow Rate:	30 gpm
Normal Test Draft Results	+ 30 in^3
Product Depletion Test Draft Results	− 20 in^3
Difference [Normal Test - Product Depletion Test Results]	50 in^3



Comparison of Tolerances (Current vs. Proposed) for Example B (1-1/4 in, 30 gpm max)			
	Current Tolerance	**Proposal #1 (0.5 %)**	**Proposal #2 (0.6 %)**
Product Depletion Tolerance Calculation		0.5% x Max Marked Flow Rate = 0.005 x 30 = 0.15 gal	0.6% x Max Marked Flow Rate = 0.006 x 30 = 0.18 gal
Product Depletion Tolerance	104 in^3	34.6 in^3	41.6 in^3
Conclusion: Does System "Pass" or "Fail" the Product Depletion Test?	Pass	Fail	Fail

At their 2011 spring Meetings, the CWMA and NEWMA expressed continued support for maintaining this item as Informational on the Committee's agenda. The Committee also received comments through the NCWM Online Comment System from Mr. Randy Jennings, Tennessee, supporting the concept of the proposed changes, but concurring with the Committee's position that data is needed to analyze the impact of any proposed change. Mr. Jennings also questioned whether or not data from NTEP tests might be considered as a source of data.

At the 2011 NCWM Annual Meeting, the Committee reiterated its need for data to evaluate the impact of any proposed tolerances changes, noting that, to date, no data has been submitted to the Committee.

The Committee asks that the following test data be submitted to assist the Committee in making this assessment:

- make and model of the meter;
- marked maximum flow rate of the meter;
- actual delivery rate during the normal test;
- error (in cubic inches or percent) for the normal test;
- actual delivery rate during the product depletion test;
- error (in cubic inches or percent) for the product depletion test; and
- type of test (e.g., routine or follow-up).

[**Technical Advisor's Note***: This list was updated by the Committee following the Annual Meeting to include additional data points relative to the "normal test" and the "type of test."*]

For information on submitting data, contact the NIST Technical Advisor, Ms. Tina Butcher by e-mail at tina.butcher@nist.gov or by phone at (301) 975-2196. The Committee also plans to distribute a request on WMD's Weights and Measures Directors' list serve for jurisdictions to submit data.

Mr. Karimov, speaking on behalf of the MMA, indicated the MMA continues to be concerned about the impact of any proposed changes on smaller meter sizes, particularly meter sizes that are less than 1½ in.

The Committee looks forward to receiving additional proposals and requested data by November 1, 2011, so that the information can be considered at the 2012 NCWM Interim Meeting and the item can remain on the Committee's agenda.

336 WATER METERS

336-1 V Appendix D – Definition of Utility-Type Water Meters

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA).

Purpose: To add a definition for the term "utility-type water meter," which is used with increased frequency in the Water Meters code.

Item Under Consideration:

utility-type water meter. – A device used for the measurement of water generally applicable to meters installed in residences or business establishments, excluding batching meters.[3.36]

(Added 2011)

Background/Discussion: With the recent changes to the Water Meter Code for utility-type meters, it was made apparent that a definition for a utility-type meter was not listed in Appendix D – Definitions of HB 44. Several water meter manufacturers believe that a clear definition for these types of metering intruments is needed. The manufacturers that developed and support this item are:

Mr. Andre Noel	Neptune Technology Group Inc.
Mr. George De Jarlais	Badger Meter
Mr. Scott Swanson	Sensus Metering
Mr. Alex Watson	Elster AMCO
Mr. Scott Bruneau	Master Meter

During the 2010 WWMA Annual Technical Conference, the WWMA S&T Committee agreed with the justification for the definition provided by the submitters. The Committee revised the proposed definition for a "utility-type water meter" to eliminate the term "utility-type" from the body of the definition. The WWMA recommended that this item (as revised by the WWMA S&T Committee) move forward as a Voting item on the NCWM S&T Committee Agenda.

At its 2010 Annual Meeting, the SWMA heard no opposition to establishing a definition for "utility-type water meter." Like the WWMA, the SWMA noted that the definition as originally proposed included the word that was being defined in the definition itself and was, therefore, still not clear. The SWMA S&T Committee reviewed alternative language developed by the WWMA, and agreed the alternative language was preferable. Consequently, the SWMA voted to recommend that the language as modified by the WWMA move forward as a Voting item on the NCWM S&T Committee Agenda.

During its open hearings at the 2011 Interim Meeting, the Committee heard comments from Mr. George DeJarlais, Badger Meter, speaking on behalf of the water meter manufacturers present at the meeting (Badger Meter, Neptune Technology Group, and Master Meter). Mr. DeJarlais reported the above meter manufacturers support the proposed definition with revisions suggested by the WWMA. The Committee Chairman also advised meeting participants that the Committee received letters of support from Sensus Metering and Elster AMCO. Also, during the open hearings, Ms. Juana Williams, NIST WMD, suggested the following two alternative definitions for the Committee to consider:

utility-type water meter. – A device used for the measurement of water ~~generally applicable to meters~~ installed in residences or business establishments. ~~excluding batching meters.~~ [3.36]

(Added 201X)

or:

utility-type water meter. A device used for the measurement of water, generally ~~applicable to meters installed~~ of an equivalent design to those meters installed by water utilities in residences or business establishments, excluding batching meters. [3.36]

(Added 201X)

The Committee reviewed the alternate proposals provided by WMD. The Committee felt that, in the first option, the deletion of the term "generally" would make the definition too limiting in its application, and the exclusion for batching meters needs to be retained. The Committee also discussed the second proposal, but still felt that the version provided by the WWMA was more appropriate. Given that the Committee heard no opposition to the recommendation proposed by the WWMA, the Committee agreed to recommend this item for a vote as presented in the Recommendation above.

The Committee also acknowledged in its discussions that, at some point, the code may need to be modified to better address water meters used in other applications, such as water vending applications. However, for the present time, the Committee hopes that the proposed definition at least clarifies the use of the term "utility-type water meter."

At their spring 2011 meetings, NEWMA and CWMA expressed support for the proposal as written. The Committee received one comment in support of the proposal from the NCWM Online Comment Forum and a letter of support from Master Meter.

During open hearings at the July 2011 NCWM Annual Meeting, the Committee heard support for the proposed language from Mr. Andre Noel, Neptune, who indicated that he also spoke on behalf of other water meter manufacturers, including Sensus and from Ms. Kristin Macey, California. The Committee also received letters of support for the proposed definition from Master Meter and Badger.

342 FARM MILK TANKS

342-1 V N.5.1. Verification of Master Metering Systems

(This item was adopted.)

Source: Central Weights and Measures Association (CWMA) (This item was originally part of the 2010 Agenda Item 360-2 Developing Items Part 4.42, Farm Milk Tanks – Item 1: N.5.1. Verification of Master Metering Systems.) (This item was previous indicated as Item 442-1 in the 2011 Interim Agenda [Pub 15].)

Purpose: Eliminate unnecessary verification testing for master meters capable of operating within a prescribed percent of the applicable tolerance.

Item Under Consideration: Amend paragraph N.5.1. as follows:

> **N.5.1. Verification of Master Metering Systems.** – A master metering system used to gauge a milk tank shall be verified before and after the gauging process. A master metering system used to calibrate a milk tank shall be verified before starting the calibration and re-verified at least every quarter of the tank capacity, or every 2000 L (500 gal), whichever is greater. **The process of re-verifying the master metering system at every quarter of the tank, or every 2000 L (500 gal) may be waived if the system is verified using a NIST traceable prover with a minimum of two tests immediately before and one test immediately after the gauging process and that each test result is within 25 % of T.3. Basic Tolerance Values.**
>
> (Added 2001)**(Amended 2012)**

Background/Discussion: The CWMA received a proposal at its fall 2008 Interim Meeting to modify paragraph N.5.1. Verification of Master Metering Systems in NIST HB 44 Section 4.42. Farm Milk Tanks. USDA provided data suggesting that mass flow meters currently used to test milk tanks would not have to be verified every quarter of the tank capacity, or every 2000 L (500 gal), whichever is greater. Because no supporting data was provided to show that all mass flow meters will perform to the same standard, the CWMA originally recommended this proposal be Informational.

At its fall 2008 meeting, NEWMA recommended this proposal be Informational. NEWMA forwarded the following additional justification for the proposed change from Mr. Richard Koeberle, Federal Milk Market Administrator:

> The use of mass flow meters has eliminated the variations seen in other types of meters used to calibrate or check farm bulk milk tanks. The reverification of the meter at every quarter of tank capacity adds time, and potentially introduces errors by requiring the hose or valves to be moved before the tank is totally filled. This proposal originated by Mr. Tom MacNish, Market Administrator, and was presented to the CWMA in September [2008]. Mass flow meters have been used extensively in their market with excellent results.

At the 2010 NCWM Annual Meeting, the Committee heard comments from Mr. Andersen, New York, in which he reiterated NEWMA's request to place this item on the Committee's 2011 Interim agenda. In response to NEWMA's request, the Committee agreed to include this item on its 2011 Interim agenda and submitted it to the 2010 fall regional weights and measures association meetings.

At its 2010 fall Interim Meeting, the CWMA heard comments during the open hearing about testing from the USDA; which performs the most testing of this type of device for farm milk tanks in the region. Additional comments noted the increased uncertainty resulting from the connecting and disconnecting of valves and hoses in order to verify the master meter at every 2000 L (500 gal) when calibrating a farm milk tank, as opposed to testing the master meter only at the beginning and end of a farm milk tank calibration. Based on comments heard from the floor and data provided by Mr. Koeberle and Mr. MacNish, the CWMA S&T Committee believes that this proposal is ready to move forward as a Voting item on the NCWM S&T Committee agenda.

During its 2010 WWMA Annual Technical Conference, the WWMA S&T Committee reviewed the submitted data in a file titled "cali_massflowsheet.xlx." The WWMA S&T Committee raised questions about how to interpret the data, noting that the unit of measure for the reported difference between meter and prover readings is inconsistent with the units of measure for the prover and meter indications. The WWMA S&T Committee commented that this inconsistency along with a lack of information describing test parameters, legends, and column headings made it difficult to analyze the data. The WWMA recommends the NCWM S&T Committee seek additional information on the data describing the test conditions and type of mass flow meter used. Additionally, a general summary of the data would help in assessing the proposal as would a clarification of whether or not the reduced re-verification applies to other meter technologies (e.g., PD meter, turbine meter, etc.). The WWMA recommends that this item move forward as an Informational item on the NCWM Interim agenda to allow time to seek the additional information on the submitted data.

At its 2010 Annual Meeting, the SWMA recognized the efficiencies realized by using a master meter to test farm milk tanks. Allowing fewer verification points to be used when a master meter can be shown to perform within a tighter tolerance would provide for further efficiency in the test process, while maintaining confidence in the test. Consequently, the SWMA supports the proposal as written.

At its fall 2010 Interim Meeting, a representative of New York volunteered to obtain a summary of the analysis and work with the Market Administrators to address WWMA's concerns.

During its open hearings at the 2011 Interim Meeting, the Committee heard comments from Mr. Koeberle, who outlined a history of this proposal from his organization's perspective and described the challenges posed by the current language. He acknowledged that there may be questions regarding how to interpret the data submitted with the proposal, and offered to work with the Committee in responding to those questions. He also noted that he had additional data to provide to the Committee in support of the proposed change.

Mr. Ross Andersen, retired Director of the New York Bureau of Weights and Measures, speaking on his own behalf, expressed his support for this proposal. In addition to some of the points already made, he noted that technology has changed over the years and some of the influences previously experienced with positive displacement meters can be eliminated or reduced through the use of mass flow meters.

Ms. Juana Williams, NIST WMD, shared some additional technical points for the Committee to consider in its deliberations. While noting that the phrase "capable of operating within 25 % of applicable tolerance" is already included in text of N.5., NIST WMD questioned whether or not the reference might need further elaboration to clarify how to define when a system meets that criterion. For example, should a minimum number of runs be specified or repeatability criteria referenced?

During the Committee's work session, Mr. Koeberle provided an explanation to the Committee of the differences between a calibration (i.e., developing a new chart to correspond to volumes in the tank established during testing) and verification (i.e., verifying the "as found" accuracy of a tank, a process also known as "gauging") of farm milk tanks, and the procedures used by his agency to test them. Mr. Koeberle provided additional results of tests that

were completed by his agency, including a cover letter describing the format of the data sheets. The letter and this data are included in Appendix C to this report. Mr. Koeberle indicated that an interim test of the meter must be conducted at each 500 gal, and he noted that, in the process of conducting these interim tests, additional uncertainty is introduced into the test process due to purging of lines, switching of valves, and other variables.

The Committee also discussed the comments raised by NIST regarding whether or not the reference to testing "within 25 %" needed additional qualification, such as specifying the amount of testing, limits of repeatability, or other criteria. The Committee discussed whether interim testing of the meter is necessary if a test of the meter before and after testing of the farm milk tank showed that the master meter was in tolerance. Committee members with active farm milk tank testing programs indicated that the current test of the meter before a test was begun and after a test had concluded would satisfy their concerns that the meter was accurate. Individual jurisdictions will determine the suitability of the test equipment based on fundamental considerations in HB 44. The Committee believes that the current language allows flexibility for jurisdictions to make the assessment on a case-by-case basis and that this flexibility needs to be maintained.

After reviewing the comments received during the open hearings, input from the regions, data and testimony provided by Mr. Koeberle, and other points raised during its work session discussions, the Committee agreed to recommend the proposal outlined in the "Item Under Consideration" for a Vote.

At their spring 2011 meetings, NEWMA and the CWMA expressed support of the proposal as written.

At the 2011 NCWM Annual Meeting, NIST WMD provided the Committee with additional technical comments to assist the Committee in its analysis of this issue and spoke to this information during the open hearings. NIST WMD acknowledged that the intent of the proposal is to eliminate unnecessary testing and reduce uncertainties in the test process. However, WMD reiterated its concerns that the reference in the proposed language to "capable of operating within 25 %" may need further elaboration to clarify how to define when a system meets this criterion and ensure consistent interpretation. WMD believes that the language proposed in the Committee's Interim Report was unclear with regard to the instances in which the master metering system has to be verified only before and after the gauging process, and in which instances the systems has to be verified at every quarter of the tank. For example, is "calibrating" a farm milk tank the same as "gauging" a farm milk tank? If yes, then there is currently no guidance on when to conduct intermediate verification of the master metering system, or when the intermediate tests are not necessary.

Working with Mr. Koeberle, WMD technical advisors developed and presented to the Committee two alternative versions of the language that might help to improve consistency in the interpretation and application of the requirements. The Committee agreed upon one of the alternatives, which is shown in the "Item Under Consideration" above, noting that they felt this language would improve consistency in applying N.5.1. During the opening hearings, Mr. Koeberle offered support for the above modified language. Hearing no opposition to the modified proposal, the Committee presented it for a Vote.

WMD also noted that additional work is needed to correct similar inconsistencies in terminology in the current code and suggested that the Committee consider creating a Developing item for inclusion in next year's NCWM cycle to address these inconsistencies.

360 OTHER ITEMS

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

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum (APLMF), 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 http://www.oiml.org. NIST WMD staff will provide the latest updates on OIML activities during the open hearing sessions at NCWM meetings. For more information on specific OIML-related device activities, contact the WMD staff listed in the table below. The OIML projects listed below represent only currently active projects. For additional information on other OIML device activities that involve WMD staff, please contact WMD using the information listed below:

NIST Weights and Measures Division (WMD) Contact List for International Activities	
Contact Information	**Responsibilities**
Postal Mail and Fax for All Contacts:	NIST WMD 100 Bureau Drive MS 2600 Gaithersburg, MD 20899-2600 Tel: (301) 975-4004 Fax: (301) 975-8091
Mr. John Barton (LMDG) (301) 975-4002 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 (LMG) (301) 975-4859 kenneth.butcher@nist.gov	•D 1 "Elements for a Law on Metrology" •TC 3 "Metrological Control" •TC 3/SC 2 "Metrological Supervision" •TC 6 "Prepackaged Products"
Mr. Steven Cook (LMDG) (301) 975-4003 steven.cook@nist.gov	•R 76 "Non-automatic Weighing Instruments"
Dr. Charles Ehrlich (ILMG) (301) 975-4834 charles.ehrlich@nist.gov	•CIML Member for the United States •V1 "International vocabulary of terms in legal metrology (VIML)" •V2 "International vocabulary of basic and general terms in metrology (VIM)" •B3 "OIML Certificate System for Measuring Instruments" •B6 "OIML Directives for the Technical Work" •B 10 "Framework for a Mutual Acceptance Arrangement (MAA) 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 (LMDG) (301) 975-8107 richard.harshman@nist.gov	•R 51 "Automatic Catchweighing Instruments" •R 61 "Automatic Gravimetric Filling 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 (LMDG) (301) 975-4405 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"

NIST Weights and Measures Division (WMD) Contact List for International Activities	
Contact Information	**Responsibilities**
Mr. Ralph Richter (ILMG) (301) 975-3997 ralph.richter@nist.gov	•D 11 "General Requirements for Electronic Measuring Instruments" •R 35 "Material Measures of Length for General Use" •R 49 "Water Meters" (Cold Potable Water & 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 (ILMG) (301) 975-2333 ambler@nist.gov	•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 (LMDG) (301) 975-3989 juana.williams@nist.gov	•R 81 "Dynamic Measuring Devices and Systems for Cryogenic Liquids" •R 139 "Compressed Gaseous Fuels Measuring Systems for Vehicles"

LIST OF ACRONYMS

B	Basic Publication	LMDG	Legal Metrology Devices Group
CIML	International Committee of Legal Metrology	P	Project
D	Document	R	Recommendation
ILMG	International Legal Metrology Group	SC	Subcommittee
LMG	Laws and Metrics Group	TC	Technical Committee

The WWMA and the SWMA support these issues and the related device activities as an Informational item.

360-2 D Developing Items

The NCWM established a category of items called Developing items as a mechanism to share information about emerging issues which have merit and are of national interest, but have not received sufficient review by all parties affected by the proposal or that may be insufficiently developed to warrant review by the Committee. The items in this section have been designated as Developing items by the submitter and/or the Committee based on an assessment of their relative stage of development. The Developing items are currently under review by at least one regional association, technical committee, or organization.

Developing items are listed in Appendix A according to the specific HB 44 code section under which they fall (e.g., a scale-related item appears in part 2.20 which corresponds to NIST HB 44 Section 2.20 Scales Code). Periodically, a proposal will be removed from the Developing item agenda without further action because the submitter recommends it be Withdrawn. Any remaining proposals will be renumbered accordingly.

The Committee encourages interested parties to examine the proposals included in Appendix A and send their comments to the contact listed in each item. The Committee asks that the regional associations and NTETC Sectors continue their work to develop each proposal fully. Should an association or sector decide to discontinue work on an item, the Committee asks that it be notified.

In future Committee reports, the Committee plans to include only a brief summary and point of contact for each Developing item in this section and will post any additional details on the item on the Committee's web page on the NCWM web site.

Mr. Steve Giguere, Maine, Chairman
Mr. Kenneth Ramsburg, Maryland
Mr. Paul Moyer, Nebraska
Mr. Doug Deiman, Alaska
Mr. Brett Gurney, Utah

Mr. Ted Kingsbury, Measurement Canada, Technical Advisor
Ms. Tina Butcher, NIST, Technical Advisor
Mr. Steve Cook, NIST Technical Advisor
Mr. Richard Harshman, NIST, Technical Advisor

Specifications and Tolerances Committee

Appendix A – Developing Items

Item 360-2: Developing Items

In future Committee reports, the Committee plans to include only a brief summary and point of contact for each Developing item in this section and will post any additional details on the item on the Committee's web page on the NCWM web site.

Part 2.20. Weigh-In-Motion Vehicle Scales for Law Enforcement – Work Group

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

Purpose: Introduce a new Developing Item on the Specification and Tolerances Committee 2011 Agenda to 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: The FHWA is forming a U.S. National Work Group (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 HB 44. FHWA has been collaborating with NIST WMD and the commercial vehicle enforcement community to identify industry experts, device users, regulatory officials, and others interested in participating in the WG. The WG 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 (FMCSA) 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 HB 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.

During the fall 2010 CWMA Interim Meeting, a comment was heard from the floor during its open hearings 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 CWMA S&T 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. Stephen Langford, Cardinal Scales, stated during the open hearings that he is a member of the WG and supports adding language defining performance parameters of WIM devices for use in law enforcement. Mr. Langford added that the WG will be considering other existing standards to help develop the language in HB 44 (e.g., OIML R 134 "Automatic instruments for weighing road vehicles in motion and measuring axle loads"). Mr. Kurt Floren, Los Angeles County, added that even though these devices are non-commercial they are covered under the scope of HB 44 General Code Application paragraph G-A.1.(c) Commercial and Law Enforcement Equipment.

During the open hearings at its 2010 Annual Meeting, the SWMA heard comments from Mr. Langford, Cardinal Manufacturing, supporting the direction of this WG. 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 WG is just getting started and that Cardinal is looking forward to participating in this work. Mr. Max Gray, Florida questioned whether putting requirements for highway WIM devices in HB 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. Tina Butcher, NIST WMD, 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 currently reference HB 44, they felt that recognition of these devices in NIST HB 44 as law enforcement equipment would lend credibility and consistency to the design, use, accuracy, and application of this equipment.

At its 2010 Annual Meeting, the SWMA S&T Committee stated its support for the efforts of the WG. However, given some of the concerns and questions raised at the open hearings about resources for testing, that committee did not want to take a position on this issue until it has more information about the direction of the WG.

During open hearings at its fall 2010 Interim Meeting, NEWMA heard comments supporting the formation of the WG but questioned what role existed for the NCWM S&T Committee at this time.

At the Committee's 2011 NCWM Interim Meeting open hearings, Juana Williams, NIST WMD, provided the following update on the progress of weigh-in-motion (WIM) standards development:

Purpose of the Project: The Federal Highway Administration's (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 (CMV) weight enforcement.

In response to this need, and recognizing the credibility of having a standard included in HB 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 Project Oversight Committee for consideration.

The next step will be to establish a work group (WG) 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 WG 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 the NCWM in 2012. For additional information regarding this project, contact Mr. Rick Harshman, NIST WMD by e-mail at richard.harshman@nist.gov; by telephone at 301-975-8107; or by mail at NIST, 100 Bureau Drive – MS 2600, Gaithersburg, MD, 20899-2600.

Mr. Max Gray, State Director of Florida 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 HB 44 was appropriate because the application of the proposed code was for screening purposes only.

Mr. Langford 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 WG had yet to be formed.

The CWMA and NEWMA supported further development of this item at their 2011 spring Annual Meetings.

At the 2011 NCWM Annual Meeting, Rick Harshman, NIST Technical Advisor to the WIM WG provided the following update:

Mr. Harshman reported that the project is progressing slower than anticipated. A few months ago the project team leader resigned due to a relocation of her residence to another state. Dr. Dan Middleton, Texas Transportation Institute (TTI), was then selected to be the new project team leader. Since the 2011 Interim Meeting, the Project Oversight team has developed and agreed on a WG charter, which among other things defines the rules of the WG, including voting rights, membership balance, etc. Candidates for the WG have been identified, invitations to participate circulated, and members selected based on returned invitations. As of April 2011, 35 candidates had agreed to participate on the WG. The initial kickoff meeting is scheduled July 28, 2011, in Dallas, Texas. A second face-to-face meeting is planned, perhaps later in the year.

Part 3.30. Liquid-Measuring Devices (LMD) – Item 1: Price Posting and Computing Capability and Requirements for a Retail Motor-Fuel Dispenser (RMFD)

Source: 2010 Carryover Developing Item 360-3, Part 3.30-Item 1. This item originated from WMD and the regional associations and first appeared on the Committee's 2007 agenda.

Purpose: To 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: In 2008 and 2009, the Committee considered a proposal to make modifications to HB 44 Section 3.30. LMD Code to address price posting and computing capability for RMFDs. Full details of the recommendation are found in Agenda Item 330-3 in the Committee's 2008 and 2009 Final Reports. The Committee believes that changes are needed to the LMD Code; however, based on comments received it does not believe the proposal adequately addressed the community's concerns. In 2010, the Committee received approval to form an NCWM Task Group (TG) on RMFD price posting and computing capability (PPCC) to review and recommend necessary changes to the LMD Code by January 2012.

Key Points:

- Current LMD Code requirements relative to unit price posting and selection and total price computation were developed to address marketing practices in place in the early 1990s; primarily cash/credit forms of payment.

- Marketing practices have changed since the 1990s, and the LMD Code does not adequately address these changes with regard to the display, posting, and selection of unit price information or total price information at various points in a transaction.

- There appears to be general agreement in the weights and measures community that changes are needed to the LMD Code in HB 44 to better reflect current market practices.

- Comments indicate the proposal considered in 2008-2009 by the Committee did not adequately address concerns, particularly on the parts of weights and measures officials.

- Weights and measures officials are concerned that customers be given adequate information at all points of the transaction, not just at the end.

- Regional weights and measures associations and industry comments indicated support for a WG to further develop this issue.

- The 2010 S&T Committee established a TG to further develop this issue and present an alternative recommendation for its consideration in 2012.

Background/Discussion: In the early 1990s, various sections of the LMD Code in HB 44 (including paragraphs S.1.6.4. Display of Unit Price and Product Identity, S.1.6.5.4. Selection of Unit Price, UR.3.2. Unit Price and Product Identity, and UR.3.3. Computing Device) were modified to address multi-tier pricing applications, such as cash or credit in instances, where the same product is offered at different unit prices based on the method of payment 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 WMD 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 HB 44 to ensure the requirements adequately address current marketplace conditions and practices. WMD has raised this issue with the Committee, and has also discussed a variety of pricing practices with individual state and local weights and measures jurisdictions.

The WMD reviewed the existing requirements and their application to current market practices and collected information on a number of scenarios, including the following:

(1) Frequent shopper discounts
(2) Club member discounts
(3) Discount for prepaying cash (to prevent "drive-offs")
(4) Prepay at the cashier for credit sales
(5) Discounts for purchasing store products
(6) Discounts for purchasing a service (e.g., carwash)
(7) Targeted group discounts (e.g., Tuesday – ladies 5 cents off per gallon)
(8) Full service
(9) Self service
(10) Progressive discounts based on volume of motor-fuel purchased
(11) Coupons for discounts on immediate or future purchases
(12) Rebates (e.g., use of oil company credit card)
(13) Day of the week discounts

Note: The conditions under some of these scenarios may not typically fall under the authority of weights and measures jurisdictions.

The WMD expressed an interest in receiving input from the weights and measures community about various practices and pricing structures in use, and indicated it welcomed opportunities to discuss this item at regional weights and measures associations to ensure the item is adequately addressed.

The regional weights and measures associations agreed that changes are needed and encouraged WMD to continue development of the issue. During the 2007 NCWM Interim Meeting, the S&T Committee agreed to add to its agenda a Developing item to begin to address these issues. At the 2008 NCWM Interim Meeting, Ohio Weights and Measures submitted a proposal to modify various sections of the LMD Code to the Committee. With a specific proposal to consider, the 2008 Committee elevated the item from Developing to Informational status for further review and input.

In 2008, the CWMA noted that although the proposal was a good start it did not address what was happening in the marketplace. The CWMA also recommended establishment of a small WG to further develop the issue and encouraged consideration of points such as the following:

1. discounts calculated at the pump and others at the counter;
2. level of consumer responsibility;
3. can the dispensers do tier pricing;
4. competitors complaining about non-uniformity of enforcement;
5. discounts should be done electronically; and
6. all is okay as long as the receipt explains the transaction.

NIST WMD agreed to form a small WG to further study this issue and held an initial meeting of interested parties in July 2008. A reduction of staff at NIST prevented subsequent work on this issue. The S&T Committee continued to hear requests from the regional associations and industry regarding the importance that this work be continued, and urging NIST to allocate resources to the project. Mr. John Eichberger, National Association of Convenience Stores, offered to coordinate assistance from some of the association's interested members at the point where work would resume. See the Committee's 2008 and 2009 Final Reports for additional details on this effort.

At its fall 2009 meeting, the CWMA urged that resources be committed to this item's further development. CWMA members commented that price posting continues to be a problem, noting that the current language in NIST HB 44 does not reflect current market practices, and the language needs to be either fixed or removed from the handbook. The CWMA also requested that the NCWM sponsor a WG to address this issue.

At its fall 2009 meeting, NEWMA agreed that this is a priority item and encouraged the formation of a WG as soon as possible. NEWMA further noted comments heard during its meeting:

- As long as terms and conditions are made clear prior to sale, the transaction should be allowed.
- Businesses should purchase the correct equipment (according to HB 44) for their marketing strategy.
- This item needs to move forward as a priority.
- We need to find some remedy for businesses that have older equipment.
- It is very difficult to take a hard line (follow HB 44 exactly) on this item.
- We must enforce equally and provide a level playing field.
- HB 44 is antiquated and should be revised.

At its fall 2009 meeting, the SWMA recommended that NIST WMD resume working on this proposal as soon as resources are available. The SWMA also encouraged NIST to include Mr. Eichberger and other sectors that are interested in the work and any stakeholders impacted by proposals to modify the LMD code relative to price posting and computing for RMFDs.

The Committee heard comments from all four regional weights and measures associations (including the CWMA), industry, and individual NCWM members that, while changes are needed to the LMD Code, the proposal on the NCWM S&T Committee's 2008 and 2009 agendas did not meet the needs of the marketplace (see the Committee's 2008 and 2009 Final Reports for details of specific concerns). A key concern raised by weights and measures officials was the importance for consumers to have full information about the purchase price of the product before they dispense the fuel and to be able to follow all aspects of the transaction.

Prior to the 2010 January NCWM Interim Meeting, NIST reallocated additional resources to work on this issue and announced that Ms. Juana Williams, NIST WMD, would lead the effort to renew the WG. Working in collaboration with the S&T Committee, Ms. Williams held an informal meeting during the 2010 Interim Meeting to allow interested parties to further discuss the issue, share thoughts about next steps, and indicate interest in participating in the WG. That meeting was well attended with 29 NCWM members participating, and a number of useful comments were made. Prior to the open hearings, Ms. Williams gave the Committee an overview of the informal meeting and an update on the plan to renew the WG.

At its 2010 open hearings, the S&T Committee received positive comments regarding NIST's reallocation of resources to this project and agreed that reviewing and revising current requirements is important. The Committee continued to strongly support the intent of the proposal and recognized that significant additional development is needed. The Committee believes that this can best be done through an S&T TG, and decided to give this item Developing status until the TG develops a proposal for consideration by the Conference. After collaborating with NCWM Chairman, Mr. Randy Jennings, the Committee Chair indicated that the TG should be chaired by an NCWM voting member under the technical direction of NIST, and report to the NCWM S&T Committee. The Committee asked that Ms. Williams collaborate with the S&T Chair regarding possible candidates for the TG's chair position, based on those who have indicated an interest in serving on the TG. The Committee asked that the TG provide frequent updates on its progress to the Committee and to the regional weights and measures associations. The Committee also asked that the TG communicate a work plan and time line after its first official meeting.

Prior to the July 2010 NCWM Annual Meeting, Chair Jeff Humphreys, Los Angeles County (California) Weights and Measures, and Vice Chair Fran Elson-Houston, Ohio, were appointed to lead the TG. On July 11, 2010, the RMFD Price Posting and Computing Capability (PPCC) Task Group (TG) held its first formal meeting. The TG expressed its thanks to its sponsor the NCWM S&T Committee and also to NCWM members for their contributions made up to this session.

The TG was tasked with reviewing the current NIST Handbook 44 Section 3.30 LMD Code to determine if the code requirements address rapidly changing practices for marketing retail motor-fuels to the general public. The TG was also tasked with developing proposals for modifying those codes that need changing and preparing them for a review by the S&T Committee.

Since July 2010, the TG has made progress in the following areas to achieve its goals:

(1) September 2010 – Established a Work Plan (to include a project timeline) approved by the S&T Committee;

(2) September 2010 – Developed a Motor-Fuel Marketing Method Information Form approved by the S&T Committee;

(3) September 2010 – Recruited and confirmed 13 new TG members who are stakeholders affected by these marketing practices who represent the following organizations/agencies/associations/sectors:

CWMA	Convenience Store Associations;
NEWMA	Discount Programming/Point of Sale Systems;
SWMA	Petroleum Marketers Associations;
WWMA	RMFD Manufacturers;
NTEP	Weights and Measures Consultants.

(4) October 21, 2010 – Web/Teleconference Meeting;

(5) December 14, 2010 – Web/Teleconference Meeting;

(6) January 23, 2011 – In-Person Meeting; and

(7) Upcoming Web/Teleconference Meetings are planned for February 23, 2011, and March 22, 2011.

The NCWM has provided the TG with two resources: a web page and a list serve e-mail system. The web page is available as a central point for posting TG documents, photos, etc., so these working documents and information can be viewed or downloaded. The website allows the TG to work more efficiently through draft documents. The NCWM Listserv allows the TG to communicate ideas and proposals, etc. by e-mail.

The TG began its work by requesting additional information to ensure that it does not reinvent code sections that already work to address marketing practices. The TG was interested in any recent legislation or policies enacted to address these marketing scenarios and will continue to accept this information. The TG plans to examine various examples of marketing practices to establish some general categories for classifying these marketing practices and later analyzing if a practice is adequately addressed by any codes it might develop. The TG developed a Motor-Fuel Marketing Method Information Form for stakeholders to provide information on newly emerging marketing practices they encounter which are either: (1) not addressed in the code; (2) result in non-uniform interpretation of the application of code sections; or (3) are difficult to enforce because of conflicting codes that apply to the equipment's design and use.

The primary focus of the TG's work has been six existing HB 44 LMD Code requirements that apply to RMFDs and address the equipment's:

- computing capability/suitability;
- receipts;
- unit price displays;
- unit price selection and Control; and
- exemptions from these requirements.

The TG outlined several principles that might be considered as the basis for any marketing practice used in motor-fuel sales through a RMFD. These principles would:

- ensure transparency of the transaction;
- allow for customer selection of the unit price;
- result in the unit price being correctly applied; and
- provide detailed transaction information available on the receipt.

These principles would allow sufficient flexibility for the consumer and avoid unintentional errors that the weights and measures community has observed in the absence of requirements for past marketing schemes.

Since multiple agency requirements apply to service station transactions at RMFDs for street signage, credit card regulations, etc., at some point the TG may need to determine if there are other laws and regulations that should be examined for conflicts or redundancy. The TG has discussed and will continue to monitor the Dodd-Frank Wall Street Reform and Consumer Protection Act, and its effects on discounts offered for motor-fuel purchases based on payment made with various types and levels of credit/debit cards. The Dodd-Frank Act is an extensive piece of legislation intended to offer consumer protections and improve practices and services in the U.S. financial system. The TG plans to work with its membership and available resources to ensure that any requirements it develops are in harmony with this Act.

The TG has provided summaries of its October 2010 and December 2010 Web/Teleconference Meetings to the January 2011 S&T Committee to update the Committee on its work. During the January 2011 NCWM Interim

Meeting open hearing session, TG Chair Humphreys also provided an update on the TG's work to the entire NCWM.

At the 2011 NCWM Annual Meeting, Mr. Jeff Humphreys, Chairman of the NCWM TG on RMFD Price Posting, provided the Committee with an update on the progress of the TG.

To provide comments or submit questions to the TG, please contact NIST WMD Technical Advisor Ms. Juana Williams by e-mail at juana.williams@nist.gov, by telephone at (301) 975-3989, or in writing at NIST 100 Bureau Drive – Stop 2600, Gaithersburg, MD 20899-2600.

Appendix B - Attachments

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) – Examples of Repaired Devices/Repaired Elements

2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force

Section I
Examples of Repaired Devices/Repaired Elements
(no metrological change)

	Remanufactured Device	**Remanufactured Element**	**Still Traceable to NTEP CC**	**Marking Required**
Weighing Activity				
I-1-W A scale that is disassembled for the purpose of cleaning and repairing pivots and bearings this activity covers cleaning and packing bearings.	No	No	Yes	No
I-2-W A device in which the electronic components have been changed on site using original manufacturer's factory components parts or NTEP traceable replacement parts.	No	No	Yes	No
I-3-W A weighing element that is replaced on site with original manufacturer's factory parts or NTEP traceable replacement parts. This does not prohibit repairs by other than the original manufacturer.	No	No	Yes	No
I-4-W A Class III L scales in which a section adjustment (mechanical or electronic) is made and some disassembly is required.	No	No	Yes	No
I-5-W A mechanical scales in which a nose iron is adjusted and some disassembly is required.	No	No	Yes	No
I-6-W Replacement of Liquid Crystal Display (LCD) or non-metrological computer boards or chips.	No	No	Yes	No

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) – Examples of Repaired Devices/Repaired Elements

2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force

	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
I-7-W Replacement of pivots and bearings on mechanical scales. **NOTE:** Pivots and bearings would have to meet the original manufacturer's specifications for the scale to operate correctly.	No	No	Yes	No
I-8-W Replacement of some or all load cells with load cells identical (same manufacturer, make and model) to those removed.	No	No	Yes	No
I-**9-W** Replacement of some or all load cells with metrologically equivalent (nmax, vmin, etc.) load cells from a different manufacturer, provided the load cells are of the same basic type that have an NTEP CC and can be replaced without modification to the basic design of the load cell mounting assembly.	No	No	Yes	No
I-10-W Replacement of all load cells of a particular technology (analog, digital, and hydraulic) in a scale system with approved and compatible digital load cells that have an NTEP CC provided the cells can be replaced without any modification to the basic design of the load cell mounting assembly.	No	No	Yes	No
Measuring Activity				
I-1-M Disassembly of a motor fuel dispenser for the purpose of replacing a meter gasket.	No	No	Yes	No
I-2-M A device in which the electronic components have been replaced on site using original manufacturer's factory components, parts, or NTEP traceable replacement parts.	No	No	Yes	No

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) – Examples of Repaired Devices/Repaired Elements

2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force

	Remanufactured Device	**Remanufactured Element**	**Still Traceable to NTEP CC**	**Marking Required**
I-3-M Any measuring element that is replaced on site with original manufacturer's factory parts or NTEP traceable replacement. This does not prohibit repairs by other than the original manufacturer.	No	No	Yes	No
I-4-M Replacement of nozzles on gasoline dispensers.	No	No	Yes	No
I-5-M Replacement of LCD or non-metrological computer boards or chips.	No	No	Yes	No
I-6-M Adjustment of ranger gears on meters (some disassembly required). This activity applies to meters calibrated with a range of gears rather than an adjustor.	No	No	Yes	No
I-7-M A service agency replaces a meter that cannot be brought into the proper calibration with a used meter (at the service station) of the same model and the meter is recalibrated.	No	No	Yes	No
Section II - Examples of Remanufactured Devices/Remanufactured Elements (no metrological change)				
Weighing Activity				
II-1-W A scale that is disassembled for the purpose of checking for worn parts, cleaning the scale, and replacing some or all of the scale's load cells with remanufactured load cells provided the load cells are remanufactured by the original manufacturer or are remanufactured metrologically equivalent (nmax, vmin, etc.) load cells with an NTEP CC and are identical to those removed.	No	Yes – Load Cells No – Weighing Element	Yes	Yes – (Load Cells) No – (Weighing Element Original markings meet requirement)

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2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force

	Remanufactured Device	**Remanufactured Element**	**Still Traceable to NTEP CC**	**Marking Required**
II-2-W A service agency replaces a digital indicating element of a floor scale with the same model indicator remanufactured by a firm other than the original manufacturer of the scale. **NOTE:** The remanufacturer made no design change to the indicator.	No	Yes – Indicating Element No – Weighing Element	Yes	Yes (Indicating Element only)
II-3-W A service agency completely disassembles a counter computing scale in their shop, checks for worn parts and replaces all worn parts (without replacing the load cell(s)) with remanufactured parts (not original manufacturer but no design change), replaces other parts as needed, cleans and reassembles the scale for sale.	Yes	Yes	Yes	Yes
II-4-W A device or element is sent back to the original equipment manufacturer. The device is disassembled, checked for wear, parts are replaced or fixed as necessary, and the device is reassembled and made to operate like a new scale of the same type.	Yes	No	Yes	No (Original markings meet requirement)
II-5-W A device or element is sent to a company (not the original manufacturer). The device is disassembled, checked for wear, parts are replaced with Original Equipment Manufacturer (OEM) parts or fixed as necessary, and the device or element is reassembled and made to operate like a new device or element of the same type.	Yes	No	Yes	Yes
Measuring Activity				
II-1-M Complete disassembly of a motor fuel dispenser, checking for worn parts, cleaning the dispenser and replacement of all badly worn parts with parts identical (same manufacturer, make, and model) to those removed.	Yes	No	Yes	Yes

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) – Examples of Repaired Devices/Repaired Elements

2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force

	Remanufactured Device	**Remanufactured Element**	**Still Traceable to NTEP CC**	**Marking Required**
II-2-M A service agency replaces a meter on site that cannot be brought into the proper calibration in a dispenser with the same model meter remanufactured by a firm other than the original manufacturer of the dispenser. **NOTE:** The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
II-3-M A service agency replaces a meter mechanical indicating element with the same model–mechanical indicating element remanufactured by a firm other than the original manufacturer of the mechanical indicating element. **NOTE:** The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
II-4-M A device is sent back to the original equipment manufacturer. The device is disassembled, checked for wear, parts are replaced or fixed as necessary, and the device is reassembled and made to operate like a new device or element of the same type.	Yes	No	&es	No (Original markings meet requirement)
II-5-M A company completely disassembles a motor fuel dispenser in their shop, checks for worn parts and replaces all worn elements with remanufactured elements (not original manufacturer but no design change), cleans and reinstalls the dispenser.	Yes	Yes	Yes	Yes
II-6-M A dispenser remanufacturer completely disassembles a motor fuel dispenser, replaces a meter that cannot be brought into the proper calibration with the same model meter remanufactured by another firm, fixes and/or replaces all other parts as needed, reassembles the dispenser for sale as a remanufactured dispenser.	Yes	Yes	Yes	Yes

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) – Examples of Repaired Devices/Repaired Elements

2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force

	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
II-7-M A company brings a motor fuel dispenser in their shop, fixes any leaks, replaces any meter which cannot be calibrated with a remanufactured meter which can be calibrated (not original manufacturer but no design change), replaces other non functioning parts with new, used, or repaired parts which function, cleans, installs new graphics, and sends the dispenser out for installation. **NOTE:** The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
II-8-M A device is sent to a company (not the original manufacturer). The device is disassembled, checked for wear, parts are replaced with OEM parts or fixed as necessary, and the device is reassembled and made to operate like a new device of the same type.	Yes	No	Yes	Yes
Section III **Examples of Remanufacturing/Repairs/Modifications that Constitute a Metrological Design Change or a Violation of NTEP Policy**				
Weighing Activity				
III-1-W A company disassembles a scale, cleans the scale and checks for worn parts, then replaces hydraulic load cells with shear beam load cells. **NOTE:** Requires different mounting due to different type of cells.	Not Applicable	Not Applicable	No	Yes*
III-2-W A metrological change to Original Equipment Manufacturer (OEM) design of a weighing device or element.	Not Applicable	Not Applicable	No	Yes*
III-3-W Structural modifications to weighbridges. Scale changes that do not comply with UR. 4.3. Scale Modification	Not Applicable	Not Applicable	No	Yes*
III-4-W Replacing a lever system with load cells.	Not Applicable	Not Applicable	No	Yes*

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) – Examples of Repaired Devices/Repaired Elements

2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force

	Remanufactured Device	Remanufactured Element	Still Traceable to NTEP CC	Marking Required
III-5-W Substitution of a load cell or cells in a scale when the replacement cells were not repaired or remanufactured by the original manufacturer or authorized agent of the original manufacturer. The remanufactured load cell(s) does not have an NTEP CC. (NTEP Policy, see NCWM Pub. 14)	Not Applicable	Not Applicable	No	Yes*
III-6-W A company completely disassembles a counter computing scale in their shop, checks for worn parts and replaces all worn parts with remanufactured parts (not the original manufacturer but no design change) and load cell without an NTEP CC, replaces other parts as needed, cleans and reassembles the scale.	Not Applicable	Not Applicable	No	Yes*
Measuring Activity				
III-1-M A metrological change to the Original Equipment Manufacturer (OEM) design of a measuring device or element.	Not Applicable	Not Applicable	No	Yes*
III-2-M A dispenser remanufacturer adds temperature compensation to a dispenser, which was never approved for temperature compensation.	Not Applicable	Not Applicable	No	Yes*

*The Committee agreed that devices in Section III should be marked. The Task Force indicated that remanufactured marking requirements do not apply to Section III activities. The Committee noted that devices in Section III require the following:

- must be reevaluated
- must be marked with new manufacturer's identity
- must be marked with new NTEP CC number
- must meet paragraph G-S.1. Identification

The Committee agreed that it was historically important to include in the report the following NTEP Policies that are the basis for placing examples in Section III (activities that represent a metrological change or violation of current NTEP Policy).

III-1-W The 2000 edition of NCWM Pub 14 Weighing Devices Checklist for Load Cells Section A Program Description 5. Substitution of Metrologically Equivalent Load Cells in Scales states that metrologically equivalent

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) – Examples of Repaired Devices/Repaired Elements

2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force

load cells from the same or a different manufacturer may be substituted into a scale provided that the substituted load cells can be placed in the scale without any modification to the design of the load cell mounting assembly.

III-2-W The 2001 edition of NCWM Pub 14 Administrative Policy Section M. Policy on Remanufactured and Repaired Devices specifies that a device is no longer covered by an NTEP Certificate of Conformance if a company or individual makes changes to a device to the extent that the metrological characteristics are changed.

III-3-W Devices that fall under this activity are not covered by a CC unless the device complies NIST Handbook 44 paragraph UR.4.3. Scale Modification. Devices that meet UR.4.3. require approval by the weights and measures authority having jurisdiction over the device.

III-4-W The 2000 edition of NCWM Pub 14 Checklist for Digital Electronic Scales Section E. Modification of Type 1. Replacing the Lever System with Load Cells specifies that changing a scale from a lever system scale to a full electronic scale is considered a modification of type. The total replacement of any levers in a mechanical scale is a modification of type that is not covered by the original CC without additional testing.

III-5-W The 2000 edition of NCWM Pub 14 Weighing Devices Checklist for Load Cells Section A. Program Description 4. Repaired or Remanufactured Load Cells specifies that the original Certificate of Conformance (CC) no longer applies to a repaired load cell if that load cell is repaired by other than the original manufacturer or its authorized agent.

III-6-W The 2000 edition of NCWM Pub 14 Weighing Devices Checklist for Load Cells Section A. Program Description 5. Substitution of Metrologically Equivalent Load Cells in a Scale states that load cells from the same or a different manufacturer may be substituted into a scale provided that the load cells to be substituted have been evaluated separately and have a CC. **III-1-M** NIST Handbook 130, Uniform National Type Evaluation Regulation Section 4. Prohibited Acts and Exemptions (9) Repaired Device and (10) Remanufactured Device and the 2001 edition of NCWM Pub 14 Administrative Policy Section M and the Checklist for Liquid-Measuring Devices Section K. Policy on Remanufactured and Repaired Devices specify that if a company or individual repairs or remanufactures a device, they are obligated to repair or remanufacture the device consistent with the manufacturer's original design. Otherwise, that specific device is no longer traceable to the NTEP CC.

III-2-M Handbook 130, Uniform National Type Evaluation Regulation Section 4. Prohibited Acts and Exemptions (9) Repaired Device and (10) Remanufactured Device and the 2001 edition of Pub 14 Administrative Policy Section J.2 Re-evaluation to Expand an Existing Certificate of Conformance. A type with a valid CC may be re-evaluated in order to encompass additional features such as expanding the kinds of commodities that may be measured. See also Publication 14 Administrative Policy Section M. Policy on Remanufactured and Repaired Devices, and Section K. Evaluation of New Technology.

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) – HB 44 (2010) General and Scales Code List of Nonretroactive Requirements.

Code Section	Nonretroactive paragraph	Effective Date	Subject	Comment
1.10	G-S.1.(b)(1)	2003	Identification - Model Identifier	Abbreviations for Model
1.10	G-S.1.(c)	1968	Serial number	Required
1.10	G-S.1.(c)(1)	1986	Serial number	Identified with words, symbols, etc.
1.10	G-S.1.(c)(2)	2001	Serial number	Acceptable abbreviations
1.10	G-S.1.(d)	2004	Software version	Must be identified
1.10	G-S.1.(d)(1)	2007	Software version	Identified with words, symbols, etc.
1.10	G-S.1.(d)(2)	2007	Software version	Acceptable abbreviations
1.10	G-S.1.(e)	2003	CC number	Identified with words, symbols, acceptable abbreviations, etc.
1.10	G-S.1.1.	2004	Locations of markings	Applicable to not-built-for-purpose devices
1.10	G-S.1.2.	2002	Remanufactured devices and elements	Markings
1.10	G-S.5.2.2.(d)	1986	Digital zero indications	Minimum zero indications
1.10	G-S.6.	1977	Operational control indications, etc.	Markings
1.10	G-S.8.	1990	Sealing electronic adjustable components	
1.10	G-S.8.1.	2010	Sealing multiple elements	
2.20	S.1.1.1.(b)	1993	Center of zero requirements	
2.20	S.1.2.	1986	Value of d	
2.20	S.1.2.1.	1989	Digital indicating scales single unit of measure	
2.20	S.1.4.3.	2002	Width of index for graduations	
2.20	S.1.7.(b)	1993	Capacity indication	Max 9d above capacity
2.20	S.1.8.3.1.	2001	Weight classifiers-sealing and indications	Applicable to weight classifiers and normal rounding scales capable of weight classifying
2.20	S.1.8.4. (a)(b) footnote	2006	# symbol	Prohibited
2.20	S.1.11.(a)	1979	Sealing	
2.20	S.1.11.(b)	1990	Sealing	Recognizes audit trail
2.20	S.1.11.(c)	1995	Sealing	Table S.1.11. format for audit trails
2.20	S.1.1.11. (table)	1995	Audit trail format	
2.20	S.1.12.	1993	Manual weights	Requirements and abbreviations for manual weights
2.20	S.1.12.	1995	Manual weights	Net weights permitted
2.20	S.2.1.3.	???	Automatic zero-tracking	Mfg. before and after dates in lieu of nonretroactive dates (applicable to remanufactured devices?)

Code Section	Nonretroactive paragraph	Effective Date	Subject	Comment
2.20	S.2.1.3.3.	2001	Means to disable AZT	
2.20	S.2.1.5.(c)	2009	IZSM	Requirements and limits for IZSM on separable indicating elements
2.20	S.2.2.2.	1989	Equal arm scales	Balance indicator requirements
2.20	S.2.3.	1983	Tare	Nonretroactive requirements for clearing of tare and for MI & MR scales.
2.20	S.2.4.	1986	Level-indicating means	**Retroactive exemption** for jewelers, prescription, and dairy test scales including Class I and II scales.
2.20	S.5.1.	1986	Accuracy Class Markings	
2.20	S.5.2.	1986	Parameters for Accuracy Classes	
2.20	S.5.4.	1994	Relationship of v and e	Suitability of load cell vmin
2.20	Table 3	1986	Parameters for Accuracy Classes	Table
2.20	S.6.1.	1989	CLC marking requirements	
2.20	S.6.4.	2002	RR track scale section capacity	Limitations of capacity of 2-section and more that 2-section scales
2.20	S.6.5.	2003	Livestock scales	Limitations of capacity of 2-section and more that 2-section scales
2.20	S.6.3.(b)1	2003	Model designation	Allowable prefixes
2.20	S.6.3.(b)2	1968	Serial number	Required
2.20	S.6.3.(b)2	1986	Serial number	Allowable prefixes
2.20	S.6.3.(b)3	1983	Nominal Capacity	Nonretroactive requirement for value of the scale division
2.20	S.6.3.(b)4	1986	d and e	Markings
2.20	S.6.3.(b)5	1986	Temperature ranges	Marking if required
2.20	S.6.3.(b)6	1988	nmax for load cells	Includes acceptable abbreviation.
2.20	S.6.3.(b)7	1988	Single and Multiple load cell	Markings
2.20	S.6.3.(b)8	1988	Separable indicating element	Marking Included III/III L
2.20	S.6.3.(b)9	1989	CLC marking requirements	Includes modified scales
2.20	S.6.3.(b)11	1991	Load cell markings	Permits accompanying document
2.20	S.6.3.(b)12	1989	CLC marking requirements	Acceptable abbreviation
2.20	S.6.3.(b)13	1986	Marking for special application	In additions to existing **retroactive** counting feature requirements
2.20	S.6.3.(b)14	2003	CLC marking requirements	Added for livestock scales that also weigh vehicles
2.20	S.6.3.(b)15	1988	Loading direction for load cells	Markings
2.20	S.6.3.(b)16	1986	Serial number markings	Includes prefix
2.20	S.6.3.(b)17	1986	Accuracy class marking requirements	
2.20	S.6.3.(b)18 (e)	1989	Included load-receiving elements	Nominal capacity marking
2.20	S.6.3.(b)19	1988	nmax, vmin, accuracy class markings	Applicable to separable weighing-load-receiving elements

Code Section	Nonretroactive paragraph	Effective Date	Subject	Comment
2.20	S.6.3.(b)20	2000	CLC requirements for combination RRtrack/Vehicle scales	Markings
2.20	S.6.3.(b)21	2001	vmin in terms of mass	
2.20	S.6.3.(b)22	2003	CLC and section capacity markings	Applicable to combination RR track and vehicle scales
2.20	S.6.3.(b)23	2001	CC marking requirement	refers to G-S.1.(e)
2.20	S.6.3.(b)24	2005	Acceptable abbreviations for "Section Capacity."	
2.20	N.1.5.	1986	Discrimination test	
2.20	N.1.4.2.	1991?	CIM railroad weighing systems < ten cars	"In-service before" in lieu of nonretroactive dates (applicable of remanufactured devices?)
2.20	N.1.4.3.	1991?	CIM railroad weighing systems < ten cars	"In-service after" in lieu of nonretroactive dates (applicable of remanufactured devices?)
2.20	T.N.1.	1986	Tolerance for marked scales	Applicable to remanufactures scales (e.g., T.N.4.5., T.N.4.6., T.N.4.7., T.N.7., T.N.8.,)
2.20	UR.1.3.	1986	Value of scale division	Recorded value same as indicated value.
2.20	UR.1.5.	1996	RR track scale printer requirement.	
2.20	UR.2.6.1.	1976	Approaches	
3.30	S.1.5.3.(a)	2002	Width of index for graduations	
3.30	S.1.6.1.	2006	Indications of delivery for electronic devices	Quantity and total price inhibited until fueling conditions reached.
3.30	S.1.6.2.	1983	Power loss provisions	Transaction and user information retention requirements
3.30	S.1.6.4.1.(b)	1991	Display of Unit Prices	Selected UP displayed prior to delivery with exceptions (e.g., fleet, contract, and truck refueling sales).
3.30	S.1.6.5.(a)	1991	Money-Value computations	Device shall compute (and display?) all possible sales within range of measurement or computing elements (i.e., with exceptions to fleet, contract, truck-stop dispensers)
3.30	S.1.6.5.3.	1985	Auxiliary element money indications	Agreement requirements with primary indications
3.30	S.1.6.5.4.	1991	Selection on unit price	Requires selection of UP prior to delivery using device or other customer activated controls with exceptions (e.g., fleet, contract, and truck refueling sales).
3.30	S.1.6.5.5.	1994	Retention of quantity and total price	Indications on the face of the dispenser retained for a minimum of 5-minutes or until new transaction initiated. Exception for aviation refueling.
3.30	S.1.6.5.6.(a)	2008	Quantity and total price - Aviation refueling	Quantity displayed through the transaction.
3.30	S.1.6.5.6.(b)	2008	Total price display	Conditions for displaying total price

Code Section	Nonretroactive paragraph	Effective Date	Subject	Comment
3.30	S.1.6.5.6.(c)	2008	Retention of quantity and total price	Indications retained for a minimum of 5-minutes or until new transaction initiated.
3.30	S.1.6.5.6.(d)	2008	Printed receipt	Shall be available & include TP, UP, and quantity.
3.30	S.1.6.6. (b)	1998	Agreement between indications	Primary and auxiliary indicated or recording elements meet formula (quantity x UP = TP to nearest 1 cent)
3.30	S.1.6.7.	1986	Recorded representations (receipt)	Receipt requirements for POS and card (debit/credit) or cash activated devices with exceptions to fleet and contract sales.
3.30	S.2.2.	1995	Provisions for sealing	Table S.2.2. format for audit trails
3.30	S.2.2. Table	1996	Methods for sealing Cat. 2 devices	Hardware on-site, scales with adequate event counters or physical seal and requirements for the location of event counters.
3.30	S.2.2. Table	2001	Cat. 3 devices	Indication, operation, and recorded representations during remote configuration.
3.30	S.2.6.	1985	Temp. determinations (wholesale)	Requirements for thermometer well and its location.
3.30	S.4.4.1.	1985	Retail devices (discharge rate)	Discharge rate marking requirements.
3.30	S.4.4.2.	2003	Retail devices (location - G-S.1. Info)	Height range, internal/external access, and permanent part of device,
3.30	S.5.	1995	Retail devices (totalizers)	Requirements.
3.30	T.4.	1988	ATC - differences in meter error	Based on results of determined with and without ATC activated.

Appendix C – Correspondences

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) - Letter from PMP

Letter from Mr. Thomas McGee, President, PMP Corporation, submitted to the 2010 NCWM Annual Meeting

PMP CORPORATION
Petroleum Meter & Pump

May 4, 2010

Steve Giguere
Maine Department of Agriculture State House Station 28 Augusta, ME 04333

Dear Steve,

The National Conference on Weights and Measures has on its agenda for 2010 a voting item which could a dramatic effect on the Remanufacturing Industry and on low volume retail fuel outlets. Item 310-4 (See Supplement I) was proposed at the 2009 WNMA and SWMA Regional Meetings but was originally submitted by the NIST Office of Weights and Measures. It was based on an inquirer NIST received from a State Director, asking if the Nonretroactive Requirements apply to Remanufactured Devices. It is stated that the change is needed to clarify the application of intent for the Nonretroactive Clause in Handbook 44, G-A.6.

To say that this change is just a clarification is an understatement It changes the overall interpretation and scope of the Nonretroactive requirement. The change will add requirements to remanufactured devices that were added to the Handbook after the device was originally manufactured. It ultimately could eliminate or severely impact the practice and business of Remanufacturing and of low volume retail fuel outlets.

If you review G-A.6 as it currently reads in the 2010 version of Handbook 44, Nonretroactive Requirements apply to New Devices based on the "Original Manufacturing Date" compared to effective date of a requirement. Adding "Remanufactured" to the requirement will establish a new point in time (Remanufactured Date) to apply requirements. So in short a device originally manufactured in January of 2002 and remanufactured January of 2007 would need to meet all nonretroactive requirements added to the handbook up to and including January of 2007.

A good example of this would be if a Tokheim 1200 series dispenser was removed from the island and remanufactured. Let say the dispenser was disassembled checked for wear and a new mechanical computer and new outer skins were installed. The dispenser was checked for accuracy and everything checked out per handbook 44. Because this dispenser was out of production prior to the adding of the nonretroactive marking requirement specifying that the CC number be clearly marked on the dispenser, it could be rejected by a state and not allowed to be installed. These dispensers are very accurate, and proven to be very reliable and especially suitable for low volume retail outlets in rural areas. There is a vast difference in the cost per gallon

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) - Letter from PMP

Letter from Mr. Thomas McGee, President, PMP Corporation, submitted to the 2010 NCWM Annual Meeting

for equipment that is passed on to the consumer from a retail location that sells 250,000 gallons per month verses the location that sells 30,000 gallons per month. The same issues apply to scales such as a deli scale that is removed from one grocery store location to the stores shop where it is rebuild and move to another grocery store.

As stated in the discussion of the item NIST wants to make a direct comparison between a new device and a remanufactured device indicating they directly compete with each other. This is true as far as competing in the same market as a whole but not if you factor in technology, features, warranty, etc. Some time back the Remanufactured Task Force recognized that Remanufacturing has been going on for a long time and is just part of the business. The remanufactured devices do not directly compete with new devices but they do fin a void. A smaller low volume operation can buy remanufactured devices at a reduced price which keeps them competitive with the large volume operations. It provides a means to extend the life of equipment that maybe has gone out of production but is still very accurate and reliable.

NIST has also stated they do not want to reopen the whole remanufactured discussion. However to fully understand the ramification of the change and to determine if the change is even needed, one has to go back and review the current handbook requirements, and definitions for remanufactured devices and repaired devices. Simply said there are very subtle differences between the definitions or repaired and remanufactured. More importantly, the handbook under the nonretroactive requirements already defines application for "used" devices which includes remanufactured devices.

This item should be moved back to an informational item or removed for the agenda. If made informational it would give all of those companies that could be impacted by the change to review and comment on this issue. This is not just a clarification. It is clearly a change in the philosophy of applying Nonretroactive Requirements.

Please feel free to contact me at 1 (800) 243-6628 if you have any questions or need further information.

Sincerely,

Thomas McGee
President

S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) - Stakeholders Letter from Graffco

Letter from Mr. Dan Graff, President, Graffco Inc., submitted to the 2010 NCWM Annual Meeting

July 2, 2010

Tina G. Butcher (NIST Tech Advisor)
NIST, Weights & Measures Division
100 Bureau Drive, MS 2600
Gaithersburg, MD 20899-2600

Ms. Butcher:

We write to you as stakeholders in the community that works to recondition-or, as coined in Handbook 44, "remanufacture" - used gas pumps for sale in the United States. It has come to our attention that a provision currently viewed as a "technical correction" is proposed as a voting item at the National Conference of Weights and Measures in July; the item is 310-4 of the 2010 Publication 15, entitled "Nonretroactive Requirements (Remanufactured Equipment)." This "correction," however, could have a major and lasting impact on the market for reconditioned or remanufactured gas pumps and has not been adequately discussed by the Weights and Measures community or by the remanufacturing community.

This letter is to urge you to support moving the 310-4 G-A6 amendment from "voting" to an "informational item," so that a task force, like the Remanufacturing Task Force formed in the early 2000s, can adequately discuss the ramifications of the change and the resulting impact on the process of reconditioning gas pumps.

We realize that there has been continued debate on how exactly to treat reconditioned or remanufactured gas pumps, and the need for conformity throughout the Weights and Measures community. This item, 310-4, however, is likely to exacerbate the problem and lead to further confusion in the remanufacturing community on the appropriate procedure for compliance with Handbook 44. For this reason, both the Northeast Weights and Measures Association and the Central Weights and Measures Association have recommended that the item be moved to "informational" status at the National conference.

For the last decade, "gas pump remanufacturers," equipment distributors, oil companies, and convenience store operators have been reconditioning gas pumps to meet the specifications of the original Certificate of Compliance (CC). The proposal for revised language in 310-4, however, could be interpreted as requiring these reconditioned gas pumps (and possibly even gas pumps repaired on site, but taken off the island) to be treated as if they were newly manufactured gas pumps. This change would drastically increase the costs associated with reconditioning used gas pumps, and potentially ending the practice in the industry, leaving only new gas pumps available in an already depressed market and used pumps sitting as potential hazards in local landfills.

This change would not only harm those that recondition gas pumps, but also the industries that rely on selling used gas pumps, or retailers that seek access to reconditioned pumps as a way to reduce costs in an economically strained market. This letter has been signed by stakeholders with the hope that this issue can be better discussed if there is no change in July. Item 310-4 needs to remain an informational item.

We appreciate all the work that you do on behalf of the Weights and Measures community and look forward to continued discussion on this topic. Please feel free to contact any of us with questions regarding our position on Item 310-4.

Sincerely,

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Letter from Remanufacturing Stakeholders July 2, 2010
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Letter from Remanufacturing Stakeholders July 2, 2010
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Letter from Remanufacturing Stakeholders July 2, 2010
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S&T Agenda Item 310-3: Nonretroactive Requirements (Remanufactured Equipment) - Letter from Dresser Wayne

Letter from Mr. R. Michael Carlson President, Dresser Wayne North America Dresser, Inc., submitted to the 2010 NCWM Annual Meeting

DRESSER Wayne

July 7, 2010
Executive Secretary
National Conference on Weights and Measures
National Institute of Standards and Technology 100 Bureau Drive, Stop 2600
Gaithersburg, MD 20899-2600

ATTN: Specifications and Tolerances Committee

RE: Item 310-4. G-A.6. Nonretroactive Requirements (Remanufactured Equipment)

Dear Mr. Saum and the Specifications and Tolerances Committee:

As one of the leading manufacturers of fuel dispensers in the United States, Dresser Wayne takes great care in providing products in which fuel retailers can place their confidence and can rest assured that their equipment will be safe for and fair to the general public. To that end, we put considerable effort into maintaining Certificates of Conformance for each of our dispensers to ensure that they meet all current NTEP requirements. Dresser Wayne understands that changes to the NTEP standards are not arbitrary: they are put into place to meet the changing needs of the marketplace and to help protect consumers and retailers alike.

Under ordinary circumstances, retailers replace their fuel dispensers with new equipment at the end of the normal lifecycle, a practice that helps ensure that their dispensers always meet the most current standards. However, there is a growing trend to extend that lifecycle by refurbishing or "remanufacturing" the equipment after its removal from the original site, and then placing it back into the stream of commerce without first bringing it into compliance with current NTEP standards. This failure to meet applicable NTEP certification standards increases the chances of errors, misuse, and fraud, and puts consumers as well as station owners at risk.

The purpose of the NTEP standards is to promulgate consistency and fairness in the dispensing of fuel to the public. Dresser Wayne believes that those standards should apply equally to every company selling fuel dispensers, whether the equipment is new, used or remanufactured. The current practice of extending the usable life of fuel dispensers without a system of checks and balances to help ensure that, at the time of sale, such used and remanufactured equipment meets current NTEP standards results in inconsistency in the marketplace, and an unacceptable risk of error. All dispenser suppliers should have an obligation to help keep the public protected, and to see to it that customers at the pump are getting exactly what they pay for.

The consistency and accuracy of fuel-dispensing equipment is an issue of critical and growing importance. For decades the industry has been able to safely and reliably operate within a fueling and payment infrastructure that remained relatively stable. However, the last few years have brought significant changes to the marketplace including:

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- **Payment security**. Higher fuel prices and sophisticated identity-theft schemes both have exposed dispensing equipment to increasing threats of fraud - manifested by the theft of fuel as well as customers' personal and financial data. As such, the credit card industry has mandated increasingly rigorous payment-security standards, and dispenser manufacturers have enhanced fuel-meter technology and associated electronics to deter tampering with measurement and calibration.

- **Fuel evolution.** The last few years have brought unprecedented changes in the country's fuel supply based on national energy policy and environmental initiatives. The introduction of ultra-low-sulfur diesel (ULSD) and diesel exhaust fluid (DEF) have taxed the capabilities of dispensers' hydraulic systems. In addition, higher levels of ethanol in today's fuels require specially fabricated seals and components. Manufacturers must adapt quickly and skillfully to these changes, not only to meet environmental standards, but also to maintain the integrity of the metrological function.

- **Communications interface.** Although current dispenser communications are via serial interface, the recent introduction of Ethernet communication to the forecourt portends both the download of dispenser software from remote sources as well as the potential for automatic meter-calibration based on real-time statistical reconciliation. These emerging technological advances may well require updated sealing methods and robust audit requirements achievable only with adherence to the latest industry standards.

It is critical that such developments in a rapidly evolving industry be built upon an infrastructure that does not compromise when it comes to fairness. As such, Dresser Wayne supports maintaining item 301-4 G-A.6 as a voting item at the National Conference of Weights and Measures on July 11-15, 2010. It is in the best interest of the general public, station owners and the fuel-dispensing industry in general.

Sincerely,

R. Michael Carlson
President, Dresser Wayne
North America Dresser, Inc.

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S&T Agenda Item 321-1: Belt-Conveyor Scale Systems - Letter from Thermo Fisher Scientific

Thermo Fisher
SCIENTIFIC

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7-18-2011

TO: NCWM S&T Committee
REF: Key Number 321-1

A polling of the full membership of the USNWG on Belt-Conveyor Scales took place beginning on 9/30/2010 in order to determine the level of support within the entire WG for the draft proposal of the amendments to N.3.1.3. The members of the WG were contacted by email and asked to review and provide a yes/no vote of the proposal as shown.

> N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. — During a zero-load test with flow rate filtering disabled, the total change indicated in the totalizer during one revolution of the belt shall not exceed 0.12% of the minimum test load for the system as defined in paragraph N.2.3. Minimum Test Load. The end value of the zero-load test must meet the ± 0.06 % requirement of paragraph N.3.1.2. Test for Zero Stability. (Added 2002) (Amended 2004 and 201X)

Every respondent to the balloting indicated his/her support for the draft proposal.

> N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. — During a zero-load test with all operational fie low-flow lockout disabled, the total change indicated in the totalizer during one revolution of the belt any complete revolution of the belt shall not exceed an absolute value of 0.12% of the minimum test load.
>
> *Note: The end value of the zero-load test must meet the ± 0.06 % requirement: Test for Zero Stability. (Added 2002) (Amended 2004 and 201X)

A final review of the proposal resulted in one change to reduce the ambiguity of the allowable range. This change was proposed by a scale manufacturer (CST). distributed to the USNWG, and all members of the work group who responded were in favor of the suggested wording changes. The final proposal requested to be adopted by the NCWM is:

> N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. — During a zero-load test with all operational no low-flow lockout disabled, the absolute value of the difference between the maximum and minimum totalizer readings indicated on the totalizer during any complete revolution of the belt shall not exceed 0.12% of the minimum test load.

*Note: The end value of the zeroload test must meet the ± 0.06 % requirement:
Test for Zero Stability. (Added 2002) (Amended 2004 and 201X)

Bill Ripka

S&T Agenda Item 321-1: Belt-Conveyor Scale Systems - Letter from Thermo Fisher Scientific

Letter Thermo Fisher Scientific, submitted to the 2010 NCWM Annual Meeting S&T Agenda Item 321-1

ThermoFisher SCIENTIFIC

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Memo to:
National Conference on Weights and Measures
Specifications and Tolerances Committee

20 June 2010

A sub-committee of the Belt Conveyor Scale Working Group has held conference calls on over the past several months to discuss NCWM informational item 321-1 regarding the consistency of the conveyor belt.

The existing wording in HB-44 is:

N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. – After a zero load test with flow rate filtering disabled, the totalizer shall not change more than plus or minus (+/- 3d) 3.0 scale divisions from its initial indication during one complete revolution.

The current proposal (321-1) reads:

N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. –
During a zero-load test, the total change indicated in the totalizer during one revolution of the belt shall not exceed 0.18% of the load that would be totalized at scale capacity for the duration of the test. The end value of the zero-load test must meet the +/-0.06% requirement of paragraphs N.3.1.2. Initial Stable Zero and N.3.1.3 Test for Zero Stability.

The sub-committee has agreed that the final proposal must include reference to disabling the flow rate filtering (low flow cutoff, dead band, flow rate damping, etc.). The committee also has agreed that the allowable error should be based on the maximum load that can be delivered in one revolution of the belt operated at maximum capacity. The effects of significant variations in the belt carcass could affect the delivered load if the delivered load requires less than complete revolutions of the belt (it is uncommon for a load to be equal to a exact belt revolution or multiples thereof). The committee has also agreed that the allowable error should be expressed in percentage, not in scale divisions. We have also noted that it is not necessary to refer to a different paragraph in the handbook, as each section should be capable of being enforced individually.

In order to determine the current % of belt consistency variance, the team has distributed a brief survey to several manufacturers and scale service companies to obtain data on current installations, both commercial and non-commercial use. Use of current conditions in the majority of installations will be used to establish the final proposed allowable consistency variance.

While not yet fully defined, the committee's version of the revised proposal will be similar to:

N.3.1.4.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. –
Prior to performing a materials test, the consistency of the conveyor belt shall verified as follows:

- **a. Flow rate filtering and no flow cut-off shall be disabled.**
- **b. The belt shall be marked in order to verify one complete revolution.**
- **c. Run the empty belt.**
- **d. The total variance in weight accumulation during one complete revolution of the belt shall not exceed *x*% (tbd) of the load delivered when operated at maximum capacity for one revolution of the belt.**

S&T Agenda Item 321-1: Belt-Conveyor Scale Systems - Letter from Thermo Fisher Scientific

Letter Thermo Fisher Scientific, submitted to the 2010 NCWM Annual Meeting S&T Agenda Item 321-1

(example: If the capacity is 2500 TPH and 1 belt revolution takes = 260 seconds, the load delivered in one revolution at maximum capacity = 180.55 Tons. The total variance of < 0.12% (total +/- accumulation) cannot exceed 0.216 tons.)

Based on the progress of the sub-committee, and the pending receipt of actual field information as it relates to belt consistency, the sub-committee of the National Belt Conveyor Scale Working Group requests the National S&T committee to consider moving the Belt Consistency proposal from informational to developing. The sub-committee expects to have data ready for the fall 2010 regional conferences, or if data is slow in being provided, by the NCWM interim meeting in January, 2011.

Respectfully submitted,

Bill Ripka – sub-committee lead

Sub-Committee Members:
Peter Sirrico – Thayer Scale
Phil Carpentier – PTC Consulting
Al Page – independent
James Hale – Southern Company Services
John Barton – NIST
Rick Harshman – NIST
Jim Dietrich – Kaskaskia Valley Scale

S&T Agenda Item 342-1: Data from Federal Milk Marketers Administration

Mass Flow Meter Study Summary

The Northeast Market Administrator upgraded one of the bulk milk tank calibration units in early 2008 with a mass flow meter made by Micro Motion. The mass flow meter system was studied for accuracy, repeatability and effects of water temperature during August, September and November of 2008 and March through July of 2009.

There were 56 bulk tank calibrations performed during the study period with bulk tanks larger than 500 gallons. The meter was checked 228 times by metering 50 gallons into a certified Determine-Brownie prover can which was certified by the New York State Metrology Laboratory in Albany, NY.

During each bulk milk tank calibration, the meter was checked at the start and after completion. The meter was also checked (re-verified) during the interim if the tank was larger than 500 gallons. There were 116 interim meter checks performed. Only during one of these meter checks did the reading prove to exceed the allowable tolerance of +/-6 cubic inches. The other 115 meter checks proved to be within the allowable tolerance. It should be noted that the one meter check that was out of tolerance read +7 cubic inches.

The mass flow metering system has proven to be very accurate, has excellent repeatability, and is very reliable. The data is attached. A brief description of each column follows:

Date-The day the calibration was performed

Tank check/calibration-service provided at that time. A calibration check is a much quicker procedure usually checking at 4-5 levels throughout the producer's production range. A calibration establishes approximately 60 levels throughout the tank and converts gallons to pounds. A conversion chart is create and left for measuring milk by the producer and milk hauler.

(Prover) Cu/Inches Start- this is the scale reading from the certified 50 gallon prover can in cubic inches after the meter delivered 50 gallons into the prover. This column includes start and interim meter checks.

(Display) Meter Reading-reading on the display after the meter delivered 50 gallons into the prover can.

(Prover) Cu/Inches Finish- this is the scale reading from the certified 50 gallon prover can in cubic inches after the meter delivered 50 gallons into the prover. This column is used for readings after the tank calibration is completed.

Water Temp (F)-this is the temperature of the water being used when the meter was checked.

Delivery Size- amount (in gallons) used to check the meter system. For example, if there is a 10 in the column, it means that five deliveries of 10 gallon each were used to fill the prover.

Comments-in many cases, the operator included the gallons in the bulk tank when the interim meter checks were being performed. Also, notes about meter system adjustments are included. A note was usually included when adding water to the unit during a calibration to study temperature affects on the metering system.

We have continued to monitor both of our calibration units performance and record all meter checks during tank checks and calibrations. However, the data is not summarized in the above.

Richard Koeberle

Marketing Specialist
Federal Milk Market Administrator
Northeast Marketing Area-Order 1
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S&T Agenda Item 342-1: Data from Federal Milk Marketers Administration

Rkoeberle@fedmilk1.com

August-SLH							
Date	Tank Check/ Calibration	Meter Error (Prover) Cu/Inches Start	(Display) Meter Reading	Final draft (Prover) Cu/Inches Finish	(Display) Meter Reading	Water Temp (F)	Comments
8/1/08	check	1	50.00	3	50.00		
8/1/08	calibration	2	49.99				Start (wet down)
"	"	-1	49.99				500 gallons
"	"			-1	49.99		End (1000 gal tank)
8/4/08	check	1	50.00	1	49.99		
8/4/08	check	3	50.00	5	50.01		
8/4/08	check	3	50.00	4	50.00		
8/5/08	check	2	50.00	3	50.00		
8/5/08	check	8	50.01	6	50.00		very steep grade
8/5/08	check	6	50.00	3	49.99		
8/6/08	check	3	50.00	1	50.00		adjusted @ start
8/6/08	check	4	50.00	2	50.00		
8/6/08	calibration	3	50.00				start
"	"	0	50.00				500 gallons
"	"	0	50.00				1000 gallons
"	"	1	49.99				1500 gallons
"	"			-1	50.00		end
8/6/08	check	0	50.00	-2	49.99		
8/7/08	check	-1	50.00	2	50.00		
8/7/08	check	2	50.01	1	50.00		
8/8/08	calibration	0	50.00				adjusted @ start
"	"	2	50.00				500 gallons
"	"	-1	49.99				1000 gallons
"	"	-1	49.99				1500 gallons
"	"			4	50.00		end
8/11/08	check	2	50.00	0	49.99		
8/11/08	check	-1	50.00	0	50.00		
8/11/08	calibration	3	50.00				start
"	"	-2	49.99				500 gallons
"	"			-2	50.00		end
8/11/08	check	3	50.00	2	50.00		
8/12/08	check	3	50.00	2	50.00		
8/12/08	check	3	50.00	2	50.00		
8/13/08	check	3	50.00	4	50.00		
8/13/08	check	5	50.01	4	50.00		
8/13/08	check	4	50.00	6	50.01		
8/14/08	check	6	50.00	5	49.99		
8/14/08	check	4	50.00	4	49.99		
8/14/08	check	7	50.00	7	50.00		
8/15/08	check	6	50.00	7	50.00		

August-SLH							
Date	Tank Check/ Calibration	Meter Error (Prover) Cu/Inches Start	(Display) Meter Reading	Final draft (Prover) Cu/Inches Finish	(Display) Meter Reading	Water Temp (F)	Comments
8/15/08	check	6	50.00	7	50.00		
8/15/08	check	7	50.00	6	50.00		
8/25/08	check	1	50.00	3	50.00		adjusted @ start
8/25/08	calibration	1	50.00	-1	50.00		adjusted @ start
8/26/08	check	-4	50.00	-4	50.00		
8/26/08	check	-3	50.00	-4	50.00		
8/26/08	calibration	2	50.00				adjusted @ start
"	"	2	50.01				500 gallons
"	"			5	50.00		end
Con't							
8/28/08	check	-2	50.00	0	50.01		
8/28/08	calibration	0	50.00				start
"	"	3	50.01				500 gallons
"	"	2	50.00				1000 gallons
"	"			1	50.00		end
8/29/08	calibration	-3	49.99				start
"	"	3	50.00				750 gallons (adj)
"	"	1	49.99				1500 gallons
"	"	5	50.00				2200 gallons
"	"			2	50.01		end

September-DAA							
Date	Tank check/ calibration	(Prover) Cu/Inches Start	(Display) Meter Reading	(Prover) Cu/Inches Finish	(Display) Meter Reading	Water Temp (F)	Comments
9/2/08	check	3		-1			
9/3/08	check	2		1	50.00		
9/3/08	check	2	50.00	2	49.99		
9/3/08	calibration	3	50.00				start
"	"	2	49.99				500 gallons
"	"	2	49.99				1000 gallons
"	"	0	50.00				1500 gallons
"	"			0	50.00		end
9/4/08	check	3	50.00	2	49.99		
9/4/08	check	1	50.00	2	50.01		
9/4/08	check	4	50.00	5	50.01	73.7	
9/4/08	check	1	50.01	2	50.00	74.6	adjusted @start
9/5/08	check	2	50.01	1	50.00	75.2	
9/5/08	check	1	50.00	2	50.00	75.2	
9/5/08	check	0	50.01	1	50.01	76.2	
9/5/08	check	2	49.99	2	50.00	77.4	
9/8/08	check	0	50.00	1	50.00	77.4	

September-DAA							
Date	**Tank check/ calibration**	**(Prover) Cu/Inches Start**	**(Display) Meter Reading**	**(Prover) Cu/Inches Finish**	**(Display) Meter Reading**	**Water Temp (F)**	**Comments**
9/8/08	check	-1	49.99	1	50.00	76.8	
9/8/08	calibration	1	50.00			76.8	start
"	"	0	50.00			76.8	500 gallons
"	"	1	50.00			76.8	1000 gallons
"	"			-1	49.99	76.8	end
9/9/08	check	3	50.00	2	49.99	77.6	
9/9/08	check	0	50.00	-1	49.99	78.0	
9/9/08	check	3	50.00	2	50.00	78.1	
9/10/08	check	2	50.00	1	50.00	78.6	
9/10/08	check	1	49.99	1	50.00	78.7	
9/10/08	check	1	49.99	1	49.99	78.8	
9/11/08	check	3	49.99	2	50.00	78.3	
9/11/08	check	2	49.99	3	50.00	78.3	
9/11/08	check	4	50.01	3	50.00	79.2	
9/11/08	check	4	50.01	3	50.00	79.1	
9/12/08	check	3	50.00	3	50.00	78.4	
9/12/08	check	3	50.00	3	50.00	78.1	
9/15/08	check	4	50.01	3	50.00	80.7	
9/15/08	check	3	50.00	3	50.00	79.5	
9/15/08	check	5	50.00	4	50.00	80.5	
9/15/08	check	5	50.00	5	50.00	80.0	
9/16/08	check	4	49.99	5	50.00	79.6	
9/16/08	check	5	50.00	4	49.99	79.8	
9/16/08	check	4	50.00	3	50.00	80.4	(2 tanks
9/16/08	check	3	50.00	4	50.00	80.4	same farm)
9/16/08	check	5	50.01	4	50.00	80.5	(2 tanks
9/16/08	check	4	50.00	3	49.99	80.5	same farm)
9/17/08	calibration	5	50.01			79.6	start
"	"	-2	49.99			74.4	1800 gallons
"	"	-1	49.99			72.9	3550 gallons
"	"	-2	50.00			71.0	5300 gallons
"	"			-1	50.01	71.0	7220 gallons (end)
9/18/08	check	-2	50.01	-1	50.00	73.1	
9/18/08	check	3	50.02	2	50.00	73.6	
9/18/08	check	3	50.00	3	50.00	73.2	
9/18/08	check	2	50.00	3	50.00	73.5	
9/19/08	check	0	50.00	1	50.00	74.2	
9/19/08	check	-2	50.00	-2	50.00	74.6	
9/19/08	check	0	50.01	-1	50.00	74.3	
9/22/08	check	1	50.00	0	49.99	73.4	
9/22/08	check	0	50.00	1	50.00	74.1	
9/22/08	check	-1	50.00	0	50.00	74.6	
9/22/08	check	1	50.00	2	50.01	75.2	

September-DAA							
Date	Tank check/ calibration	(Prover) Cu/Inches Start	(Display) Meter Reading	(Prover) Cu/Inches Finish	(Display) Meter Reading	Water Temp (F)	Comments
9/23/08	check	-2	50.00	-1	50.00	74.6	
9/23/08	check	0	50.00	-1	49.99	75.1	
9/23/08	check	-1	50.00	0	50.00	75.5	
9/23/08	check	0	50.00	-2	49.99	75.7	
9/23/08	check	2	50.01	2	50.00	75.9	
9/24/08	check	0	50.00	1	50.00	74.4	
9/24/08	check	1	50.00	2	50.00	75.5	
9/24/08	check	1	50.00	3	50.00	77.6	
9/25/08	check	1	50.00	2	50.01	76.6	
9/29/08	check	3	50.00	3	50.00	75.4	
9/29/08	check	2	50.00	3	50.01	75.7	
9/30/08	check	3	50.00	2	50.00	74.8	
9/30/08	check	-2	49.99	-1	50.00	74.6	
9/30/08	check	-1	50.00	-1	50	74.5	

Temperature Correction Data

	Temp in °C	Gallon pounds	Gallon grams	Cubic inch at 5°C	50 Gal Cubic Inch	Expected Correction	cu in per liter			
							61.02374	Steel Expansion		
32.0	0	8.33467	3780.543	230.7360	11536.8	-0.012		0.00004608	21701.39	
33.8	1	8.33518	3780.781	230.7361	11536.8	-0.009			-0.00069	0.00038
35.6	2	8.33556	3780.953	230.7361	11536.81	-0.007			-0.00031	0.00024
37.4	3	8.33580	3781.060	230.7362	11536.81	-0.005			-0.00007	0.00010
39.2	4	8.33590	3781.105	230.7362	11536.81	-0.002			0.00003	-0.00003
41.0	5	8.33587	3781.090	230.7363	11536.81	0.000			0.00000	-0.00017
42.8	6	8.33570	3781.015	230.7363	11536.82	0.002			-0.00017	-0.00029
44.6	7	8.33541	3780.884	230.7364	11536.82	0.005			-0.00046	-0.00041
46.4	8	8.33500	3780.698	230.7364	11536.82	0.007			-0.00087	-0.00053
48.2	9	8.33447	3780.458	230.7365	11536.82	0.009			-0.00140	-0.00064
50.0	10	8.33383	3780.167	230.7365	11536.82	0.012			-0.00204	-0.00076
51.8	11	8.33307	3779.821	230.7365	11536.83	0.014			-0.00280	-0.00087
53.6	12	8.33220	3779.426	230.7366	11536.83	0.016			-0.00367	-0.00098
55.4	13	8.33122	3778.983	230.7366	11536.83	0.018			-0.00465	-0.00108
57.2	14	8.33014	3778.495	230.7367	11536.83	0.021			-0.00573	-0.00117
59.0	15	8.32897	3777.962	230.7367	11536.84	0.023			-0.00690	-0.00127
60.8	16	8.32770	3777.415	230.7368	11536.84	0.025			-0.00817	-0.00137
62.6	17	8.32633	3776.764	230.7368	11536.84	0.028			-0.00954	-0.00146
64.4	18	8.32487	3776.103	230.7369	11536.84	0.030			-0.01100	-0.00155
66.2	19	8.32332	3775.398	230.7369	11536.85	0.032			-0.01255	-0.00165

68.0	20	8.32167	3774.653	230.7370	11536.85	0.035			-0.01420	-0.00173
69.8	21	8.31994	3773.868	230.7370	11536.85	0.037			-0.01593	-0.00181
71.6	22	8.31813	3773.044	230.7371	11536.85	0.039			-0.01774	-0.00191
73.4	23	8.31622	3772.180	230.7371	11536.85	0.041			-0.01965	-0.00198
75.2	24	8.31424	3771.279	230.7371	11536.86	0.044			-0.02163	-0.00207
77.0	25	8.31217	3770.340	230.7372	11536.86	0.046			-0.02370	

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
4/2/2007		53.80	50.00	49.99	(0.01)
4/2/2007	13:00	54.00	49.99	49.97	(0.02)
4/2/2007	13:30	54.10	50.00	49.98	(0.02)
4/2/2007	15:00	54.30	50.00	49.99	(0.01)
4/2/2007	15:40	54.60	50.00	49.99	(0.01)
4/2/2007	16:15	54.80	50.00	49.99	(0.01)
4/3/2007	12:30	55.00	50.00	49.99	(0.01)
4/3/2007	13:15	55.50	50.00	49.97	(0.03)
4/3/2007	13:30	55.70	49.99	49.96	(0.03)
4/3/2007	15:30	56.10	49.99	49.99	0.00
4/3/2007	16:00	56.40	50.00	50.00	0.00
4/3/2007	16:00	56.40	50.00	50.00	0.00
4/3/2007	16:40	56.60	50.01	50.00	(0.01)
4/3/2007	17:05	56.80	50.00	49.99	(0.01)
4/4/2007	10:25	55.80	50.00	50.00	0.00
4/4/2007	11:05	55.40	50.01	50.03	0.02
4/4/2007	11:30	55.30	50.00	50.02	0.02
4/4/2007	12:45	55.00	50.01	50.00	(0.01)
4/4/2007	13:25	55.10	50.01	50.00	(0.01)
4/4/2007	14:00	55.10	50.01	50.00	(0.01)
4/5/2007	12:30	53.00	49.99	49.99	0.00
4/5/2007	13:10	52.90	50.00	50.01	0.01
4/5/2007	13:35	52.90	50.01	50.01	0.00
4/5/2007	14:00	52.70	50.00	50.01	0.01
4/5/2007	14:40	52.20	50.01	50.03	0.02
4/6/2007	9:15	53.40	50.00	50.00	0.00
4/6/2007	10:15	52.70	49.99	50.02	0.03
4/6/2007	10:55	52.50	50.00	50.01	0.01
4/6/2007	11:35	52.40	50.01	50.02	0.01
4/6/2007	12:00	52.40	50.00	50.00	0.00

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
4/9/2007	15:15	53.40	50.01	50.00	(0.01)
4/9/2007	15:55	52.80	49.99	50.02	0.03
4/9/2007	16:25	52.40	50.00	50.01	0.01
4/9/2007	18:30	52.60	50.00	50.00	0.00
4/9/2007	19:00	52.60	50.02	50.01	(0.01)
4/9/2007	19:35	52.50	50.00	50.00	0.00
4/10/2007	9:50	52.90	49.99	49.99	0.00
4/10/2007	10:40	52.40	50.00	50.02	0.02
4/10/2007	11:05	52.40	50.01	50.01	0.00
4/10/2007	12:55	52.20	50.00	50.00	0.00
4/10/2007	13:30	52.00	50.00	50.00	0.00
4/10/2007	13:55	52.10	50.00	50.00	0.00
4/11/2007	9:15	51.20	50.00	50.00	0.00
4/11/2007	10:05	51.40	50.00	50.00	0.00
4/11/2007	10:35	51.40	50.00	50.00	0.00
4/11/2007	11:00	51.40	50.00	49.99	(0.01)
4/11/2007	11:45	51.60	49.99	49.97	(0.02)
4/12/2007	8:35	51.20	50.00	50.00	0.00
4/12/2007	9:15	51.40	49.99	49.98	(0.01)
4/12/2007	10:05	51.10	50.00	49.99	(0.01)
4/12/2007	10:35	51.30	50.00	49.98	(0.02)
4/12/2007	9:36	51.40	50.00	49.97	(0.03)
4/12/2007	11:55	51.50	50.00	50.01	0.01
4/12/2007	12:40	51.30	50.00	50.01	0.01
4/12/2007	1:10	51.40	50.00	50.01	0.01
4/15/2007	10:05	47.70	49.99	49.99	0.00
4/15/2007	11:30	47.80	49.99	49.98	(0.01)
4/15/2007	12:15	47.80	50.00	49.99	(0.01)
4/16/2007	1:10	47.70	50.00	50.00	0.00
4/16/2007	2:00	47.80	50.00	50.00	0.00
4/17/2007	10:20	47.00	50.00	50.00	0.00
4/17/2007	11:00	47.30	49.99	49.98	(0.01)
4/17/2007	12:15	47.30	50.00	50.00	0.00
4/17/2007	1:10	47.50	50.00	50.00	0.00
4/17/2007	1:50	47.50	50.01	50.00	(0.01)
4/24/2007	8:50	56.90	50.00	50.00	0.00
4/24/2007	9:30	56.90	50.01	50.01	0.00
4/24/2007	10:05	56.90	50.00	50.02	0.02

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
4/24/2007	10:25	57.00	50.00	50.01	0.01
4/24/2007	11:00	57.10	50.00	50.00	0.00
4/24/2007	1:15	57.50	50.00	50.01	0.01
4/24/2007	1:50	57.90	50.01	49.99	(0.02)
4/24/2007	2:25	58.20	50.01	49.99	(0.02)
4/25/2007	10:30	58.30	50.00	50.01	0.01
4/25/2007	11:10	58.40	50.00	50.00	0.00
4/25/2007	11:35	58.50	50.00	50.00	0.00
4/25/2007	1:20	58.50	49.99	49.99	0.00
4/25/2007	2:05	58.50	50.00	50.00	0.00
4/25/2007	2:45	58.40	50.00	50.01	0.01
4/25/2007	4:30	58.40	50.00	50.00	0.00
4/25/2007	5:05	58.60	50.00	49.98	(0.02)
4/25/2007	5:40	58.80	50.00	49.97	(0.03)
4/26/2007	10:45	57.80	50.00	50.00	0.00
4/26/2007	11:45	58.00	50.00	49.98	(0.02)
4/26/2007	12:35	58.00	50.00	49.98	(0.02)
4/26/2007	2:55	58.20	50.00	50.00	0.00
4/26/2007	3:40	58.40	50.00	49.98	(0.02)
4/26/2007	4:15	58.40	50.00	49.98	(0.02)
4/26/2007	7:50	58.30	50.00	49.99	(0.01)
4/26/2007	8:25	58.50	50.00	50.00	0.00
4/26/2007	8:50	58.60	50.01	50.00	(0.01)
4/26/2007	9:50	58.50	50.00	50.01	0.01
4/26/2007	10:50	58.50	50.00	50.00	0.00
5/2/2007	10:20	55.90	50.00	50.00	0.00
5/2/2007	11:20	56.10	50.00	49.99	(0.01)
5/2/2007	12:00	56.10	49.99	49.98	(0.01)
5/2/2007	12:40	56.20	49.99	49.98	(0.01)
5/2/2007	13:15	56.60	50.00	49.99	(0.01)
5/2/2007	13:40	56.60	50.00	49.99	(0.01)
5/2/2007	13:45	56.60	50.00	49.99	(0.01)
5/2/2007	14:15	57.00	49.99	49.97	(0.02)
5/3/2007	6:30	56.70	50.00	50.00	0.00
5/3/2007	7:45	56.70	50.00	50.00	0.00
5/3/2007	12:00	56.80	50.00	50.00	0.00
5/3/2007	12:40	57.30	50.00	49.99	(0.01)
5/3/2007	13:10	57.30	50.00	50.00	0.00

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
5/7/2007	11:30	59.30	50.00	50.01	0.01
5/7/2007	12:05	59.60	50.00	50.01	0.01
5/7/2007	12:30	59.70	50.00	50.00	0.00
5/7/2007	12:55	59.80	50.00	50.00	0.00
5/7/2007	13:30	60.00	49.99	49.97	(0.02)
5/8/2007	7:40	60.20	50.00	50.01	0.01
5/8/2007	8:30	60.20	50.00	50.00	0.00
5/8/2007	9:05	60.40	50.00	50.00	0.00
5/8/2007	9:35	60.50	50.01	49.99	(0.02)
5/8/2007	12:15	61.00	50.00	49.99	(0.01)
5/8/2007	12:55	61.20	50.00	49.99	(0.01)
5/8/2007	13:40	61.30	50.00	49.99	(0.01)
5/9/2007	8:40	60.20	50.00	50.00	0.00
5/9/2007	9:40	60.30	50.00	49.99	(0.01)
5/9/2007	10:10	60.50	50.01	50.00	(0.01)
5/9/2007	10:50	60.70	50.00	50.00	0.00
5/9/2007	11:55	61.10	50.00	50.00	0.00
5/10/2007	9:15	61.90	50.01	50.00	(0.01)
5/10/2007	9:55	62.00	50.00	50.00	0.00
5/10/2007	10:25	62.30	50.00	49.99	(0.01)
5/10/2007	11:50	62.30	50.00	50.00	0.00
5/10/2007	13:30	62.70	50.01	50.00	(0.01)
5/10/2007	13:10	62.90	50.00	49.98	(0.02)
5/14/2007	9:50	63.20	50.00	50.01	0.01
5/14/2007	10:40	63.30	50.00	49.99	(0.01)
5/14/2007	11:20	63.60	50.00	49.98	(0.02)
5/14/2007	12:30	63.70	50.00	50.01	0.01
5/14/2007	13:30	63.80	50.00	49.98	(0.02)
5/15/2007	12:00	64.20	50.00	50.00	0.00
5/15/2007	13:50	64.50	49.99	49.98	(0.01)
5/15/2007	16:10	65.20	50.00	50.00	0.00
5/15/2007	16:40	65.30	50.00	49.99	(0.01)
5/15/2007	17:10	65.70	50.00	49.99	(0.01)
5/15/2007	17:30	65.70	49.99	49.98	(0.01)
5/16/2007	9:10	65.40	50.00	50.02	0.02
5/16/2007	9:50	65.40	50.00	50.01	0.01
5/16/2007	10:20	65.40	50.00	50.00	0.00
5/16/2007	10:45	65.40	50.00	50.00	0.00

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
5/16/2007	11:25	65.40	50.00	50.00	0.00
6/4/2007	10:45	71.20	50.00	50.01	0.01
	11:30	71.40	50.00	50.03	0.03
	12:05	71.80	50.00	50.02	0.02
	12:40	72.30	50.00	50.02	0.02
	1:20	72.80	50.00	50.01	0.01
6/5/2007	9:50	71.80	50.00	50.00	0.00
	11:30	71.20	50.00	50.00	0.00
	1:15	71.60	50.00	50.00	0.00
	2:00	71.60	50.00	50.00	0.00
	2:45	71.60	50.00	50.00	0.00
6/7/2004	11:45	70.60	50.00	49.99	(0.01)
	12:45	71.00	50.00	49.99	(0.01)
	2:00	71.50	50.00	49.99	(0.01)
6/11/2007	11:20	72.00	50.00	49.99	(0.01)
	1:30	72.60	50.00	49.99	(0.01)
6/12/2007	9:30	72.70	50.00	50.00	0.00
	12:00	73.90	50.00	49.99	(0.01)
6/14/2007	10:00	74.30	50.00	50.00	0.00
	10:50	74.70	50.00	50.00	0.00
	11:20	75.00	50.00	50.00	0.00
	3:15	75.50	50.00	50.00	0.00
	4:20	75.60	50.00	50.00	0.00
6/15/2007	4:30	74.90	49.99	49.99	0.00
	5:30	75.10	49.99	50.00	0.01
	7:00	74.50	49.99	49.99	0.00
	8:00	74.50	49.99	49.99	0.00
	8:55	74.50	49.99	49.99	0.00
	9:45	74.60	50.00	50.00	0.00
6/18/2007	11:30	75.90	50.00	50.00	0.00
	12:35	76.20	50.00	50.00	0.00
	2:00	76.40	50.00	50.00	0.00
	3:15	76.40	50.01	50.00	(0.01)
6/19/2007	12:20	63.70	50.00	50.00	0.00
	1:15	63.80	50.00	49.98	(0.02)
	2:10	64.20	49.99	49.99	0.00
6/20/2007	10:00	64.90	50.00	50.01	0.01
	10:45	65.10	50.00	50.00	0.00

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
	11:20	65.20	50.00	50.00	0.00
	12:00	65.40	50.00	50.00	0.00
	12:30	65.50	50.00	50.00	0.00
	1:30	65.50	50.00	50.00	0.00
	2:10	65.70	50.00	50.00	0.00
	2:40	66.00	50.00	50.00	0.00
7/2/2007	12:45	69.60	50.00	50.00	0.00
	2:00	69.90	50.00	50.00	0.00
7/3/2007	9:45	69.60	50.00	50.00	0.00
	10:30	69.80	50.00	49.99	(0.01)
	11:10	70.00	50.00	50.00	0.00
	11:45	70.20	50.00	50.00	0.00
	12:45	70.50	50.00	50.00	0.00
7/5/2007	8:00	70.50	50.00	50.00	0.00
	8:45	70.80	50.00	50.00	0.00
	9:30	71.20	50.00	50.00	0.00
	10:15	71.50	50.00	50.01	0.01
	11:30	71.70	50.00	50.01	0.01
7/6/2007	8:20	71.00	50.00	50.01	0.01
	9:00	71.10	50.00	50.00	0.00
	9:40	71.20	50.00	50.00	0.00
	10:30	71.40	50.00	50.00	0.00
	11:30	71.50	50.00	49.99	(0.01)
	12:15	71.70	49.99	49.99	0.00
	12:50	71.90	50.00	49.99	(0.01)
	1:30	72.00	50.00	49.99	(0.01)
	2:10	72.30	50.00	49.98	(0.02)
7/9/2007	8:45	73.40	50.00	49.99	(0.01)
	9:30	73.50	50.00	50.00	0.00
	10:05	73.50	50.00	50.00	0.00
	10:45	73.70	50.00	49.99	(0.01)
	11:30	73.70	50.00	50.00	0.00
	1:30	73.70	50.00	50.00	0.00
	2:10	74.10	49.99	49.98	(0.01)
	2:40	74.70	50.00	49.98	(0.02)
	3:20	75.40	50.00	49.98	(0.02)
7/10/2007	9:30	76.00	50.00	50.00	0.00
	10:10	76.10	50.00	50.00	0.00

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
	10:45	76.10	50.00	50.00	0.00
	11:30	76.20	50.00	50.00	0.00
	12:10	76.30	50.00	49.99	(0.01)
7/11/2007	1:30	76.30	50.00	50.00	0.00
	2:10	76.30	50.00	50.00	0.00
	2:45	76.30	50.00	50.00	0.00
	3:25	76.30	50.00	49.99	(0.01)
7/16/2007	9:15	67.10	50.00	50.01	0.01
	10:15	67.40	50.00	50.00	0.00
	11:45	67.40	50.00	49.99	(0.01)
	12:30	67.80	50.00	49.99	(0.01)
	1:15	68.10	50.00	49.98	(0.02)
7/17/2007	11:15	69.00	50.00	50.00	0.00
	11:50	69.40	50.00	50.00	0.00
	12:30	69.60	50.00	49.99	(0.01)
	4:00	70.10	50.00	50.00	0.00
	4:50	70.30	50.01	50.02	0.01
7/18/2007	10:00	70.50	50.00	50.01	0.01
	10:40	70.60	50.00	50.00	0.00
	11:15	70.80	50.00	50.00	0.00
	11:50	70.80	50.00	50.00	0.00
	12:45	70.90	50.00	50.00	0.00
7/19/2007	10:00	71.60	50.00	50.00	0.00
	11:10	71.80	50.00	49.99	(0.01)
	12:00	71.80	50.00	50.00	0.00
	1:00	71.90	50.01	50.00	(0.01)
7/23/2007	1:10	72.30	50.00	50.01	0.01
	2:15	72.80	50.00	50.00	0.00
7/26/2007	12:30	71.60	50.00	50.00	0.00
	1:15	71.70	50.00	50.00	0.00
	2:00	71.80	50.00	50.00	0.00
7/30/2007	11:00	73.00	50.00	50.00	0.00
	11:45	72.60	50.00	50.00	0.00
	12:30	70.20	50.00	50.00	0.00
	1:15	67.70	50.00	50.00	0.00
	2:15	65.60	50.00	50.00	0.00
	4:00	70.90	50.00	50.00	0.00
	4:40	71.80	50.00	50.00	0.00

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
	5:15	72.40	50.00	50.00	0.00
	6:00	72.80	50.00	50.00	0.00
	6:40	73.40	50.00	49.98	(0.02)
8/1/2007	11:45	73.50	50.00	50.00	0.00
	12:30	73.70	50.00	50.00	0.00
	1:15	74.00	50.00	50.00	0.00
	2:00	74.30	50.00	50.00	0.00
	2:35	74.70	50.00	49.99	(0.01)
	11:15	75.00	50.00	50.00	0.00
	12:30	76.10	50.00	49.99	(0.01)
8/7/2007	10:15	75.20	50.00	50.00	0.00
	11:00	75.50	50.00	50.00	0.00
	11:40	75.80	50.00	50.00	0.00
	12:15	76.00	50.00	50.00	0.00
8/8/2007	9:45	75.40	50.00	50.00	0.00
	11:30	76.50	50.00	50.00	0.00
	2:00	76.80	50.01	50.01	0.00
	3:00	77.00	50.00	50.00	0.00
8/9/2007	10:15	76.10	50.00	50.00	0.00
	12:00	76.60	50.00	50.00	0.00
8/13/2007	10:35	76.10	50.00	50.01	0.01
	11:30	76.90	50.00	50.02	0.02
	12:20	77.00	50.00	50.01	0.01
	1:00	77.60	50.00	50.01	0.01
	1:40	77.90	50.00	50.01	0.01
	2:15	78.20	50.00	50.01	0.01
	3:45	78.20	50.00	50.00	0.00
	4:20	78.30	50.00	50.00	0.00
	5:00	78.40	50.00	50.00	0.00
8/14/2007	4:15	77.40	50.00	50.01	0.01
	6:15	77.40	50.00	50.02	0.02
8/15/2007	3:20	77.50	50.00	50.00	0.00
	4:30	77.60	50.00	50.00	0.00
8/16/2007	5:45	77.30	50.00	49.99	(0.01)
	6:20	77.40	49.99	49.99	0.00
	7:00	77.50	49.99	49.98	(0.01)
	7:45	77.50	49.99	49.98	(0.01)
	1:00	77.10	50.00	50.00	0.00

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
	1:40	77.60	50.00	50.00	0.00
	2:20	78.00	50.00	50.00	0.00
8/20/2007	11:15	68.00	50.00	50.00	0.00
	12:15	68.10	50.00	49.99	(0.01)
	2:00	67.30	50.00	50.00	0.00
	3:15	68.40	50.00	50.00	0.00
8/21/2007	3:00	68.20	50.00	50.00	0.00
	3:40	68.40	50.00	50.00	0.00
	4:20	68.50	50.00	50.00	0.00
	5:00	68.70	50.00	50.00	0.00
	5:50	68.70	50.00	50.00	0.00
8/22/2007	10:00	67.70	50.00	50.01	0.01
	10:45	68.00	50.00	50.01	0.01
8/23/2007	11:30	68.30	50.00	50.00	0.00
	12:15	68.50	50.00	50.00	0.00
	1:10	68.80	50.00	49.99	(0.01)
8/27/2007	9:45	71.70	50.00	50.00	0.00
	10:30	72.10	50.00	50.00	0.00
	11:15	72.40	50.00	50.00	0.00
	11:55	72.60	50.00	50.00	0.00
	12:45	72.80	50.00	49.99	(0.01)
8/29/2007	12:00	72.90	50.00	50.00	0.00
	12:50	73.10	50.00	50.00	0.00
	1:30	73.40	50.00	50.01	0.01
9/11/2007	9:45	69.00	50.01	50.01	0.00
	10:30	69.10	50.00	50.01	0.01
	11:00	69.20	50.00	50.01	0.01
	11:45	64.20	50.00	50.01	0.01
	12:30	64.20	50.00	50.00	0.00
	12:50	64.20	50.00	50.00	0.00
	1:30	64.20	50.00	50.02	0.02
	3:00	64.40	50.00	50.02	0.02
9/12/2007	12:00	68.40	50.00	50.00	0.00
	2:00	68.60	50.00	50.00	0.00
9/14/2007	9:00	68.10	50.00	50.01	0.01
	10:15	68.30	50.00	50.00	0.00
	11:30	68.40	50.00	50.00	0.00
	12:15	68.80	50.00	49.99	(0.01)

Mass Flow Meter Calibration Data					
Date	**Time**	**Temp °F**	**Meter Gal**	**Prover Gal**	**Diff in cc**
	1:20	69.00	50.00	49.98	(0.02)
9/18/2007	10:00	67.20	50.00	50.00	0.00
	10:45	67.50	50.00	49.99	(0.01)
	11:25	67.70	49.99	49.99	0.00
9/19/2007	10:00	67.20	50.00	50.01	0.01
	11:20	67.30	50.00	50.00	0.00

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