

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

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Weights and Measures

Reference  
Key Number

### 300 INTRODUCTION

The Specifications and Tolerances (S&T) Committee (Committee) submits its Interim Report for consideration by the National Conference on Weights and Measures (NCWM). This report contains the items discussed and actions proposed by the Committee during its Interim Meeting in Dallas, Texas, January 23 - 26, 2011.

Table A identifies the agenda items in the report by reference key number, title of item, and page number. The item numbers are those assigned in the Interim Meeting agenda. A Voting item is indicated with a “**V**” after the item number, an item marked with an “**I**” indicates it is an Informational item, and a “**D**” after indicates it is a Developing item. The Developing designation indicates an item has merit; however, the item was returned to the submitter for further development before any action can be taken at the national level. An item marked with a “**W**” was withdrawn by the Committee and generally will be referred to the regional Weights and Measures associations because it either needs additional development, analysis, and input or does not have sufficient Committee support to bring it before the NCWM.

The headings and subjects used in Table A apply to National Institute of Standards and Technology (NIST) Handbook 44, “Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices.” The Appendices to the Interim report are also listed in Table A. The acronyms for organizations and technical terms used throughout the agenda are identified in a glossary in Table B. In some cases, background information will be provided for an item.

The “Item(s) Under Consideration” (formerly designated as “Recommendations”) are statements of proposals and are not necessarily those of the Committee. Suggested revisions to the Handbook are shown in **bold face print** by ~~striking out~~ information to be deleted and underlining information to be added. Requirements that are proposed to be nonretroactive are printed in **bold-faced italics**.

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

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**Table B**  
**Glossary of Acronyms**

BCS	Belt-Conveyor Scales	NTEP	National Type Evaluation Program
CC	Certificate of Conformance	NTETC	National Type Evaluation Technical Committee
CWMA	Central Weights and Measures Association	NW&SA	National Weighing and Sampling Association
EPO	Examination Procedure Outline	OEM	Original Equipment Manufacturer
GS	NTETC Grain Analyzer Sector	Pub 14	NCWM Publication 14
GIPSA	Grain Inspection Packers & Stockyards Administration	RMFD	Retail Motor-Fuel Dispenser
HB 44	NIST Handbook 44	SI	International System of Units
HB 130	NIST Handbook 130	SMA	Scale Manufacturers Association
LMD	Liquid-Measuring Device	SWMA	Southern Weights and Measures Association
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 <sub>3</sub>	Anhydrous Ammonia	USNWG	NIST/OIML U.S. National Working Group
NIST	National Institute of Standards and Technology	VTM	Vehicle-tank Meters
“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”			
<b>Note:</b> NIST does not imply that these acronyms are used solely to identify these organizations or technical topics.			

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

**310 GENERAL CODE**

**310-1 V Provision for Sealing Electronic Adjustable Components**

**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 Interim Meeting, the Committee agreed to delete the proposed language as shown in its Interim Agenda. The Committee recommends that the interpretation of HB 44 General Code paragraph G-S.8. Provision for Sealing Electronic Adjustable Components as shown below is documented into the Report of the 96<sup>th</sup> NCWM.

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, once a security seal is applied, it should not be possible to make a metrological change to the device without breaking that seal. 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:** The 92<sup>th</sup> through 96<sup>th</sup> NCWM S&T Committees, regional weights and measures associations, NTETC Sectors, and other interested parties have considered several proposals intended to address what is considered an effective method of sealing metrological features since 2008.<sup>1</sup> 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 a better solution to the issues identified in type evaluation was 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. The following background information is provided to document the most current positions on the proposal to amend G-S.8.

At the 2010 NCWM Interim Meeting, the Committee received testimony from the SMA restating its November 2009 position that supported the conclusions of the 2009 Weighing and Measuring Sectors recommending that no change to HB 44 is required as the wording of G-S.2. and G-S.8. is sufficient. WMD stated that it remains concerned about devices that could be sealed while allowing access to calibration or configuration changes without breaking that seal. WMD agreed with the position of the NCWM S&T Committee that the current language in paragraph G-S.8. requires that a security seal be broken before a metrological change can be made to a device (or other approved means of security such as an audit trail provided). Thus, once a security seal is applied, it should not be possible to make a metrological change to the device without breaking that seal. Since this philosophy addresses provisions for protecting access to any metrological adjustment, the philosophy should be applied consistently to all device types. WMD encouraged the Committee to reiterate in its Interim and Final Reports the correct interpretation of G-S.8. as the Committee and the MS have done in the past, and as demonstrated in more recent actions by the WS.

The 2010 Committee agreed with comments that no changes are needed to paragraph G-S.8. and that type evaluation procedures have been amended in applicable sections of NCWM Pub 14 to address the issues of incorrectly applying the requirements in G-S.8. The Committee also noted that there was some confusion regarding the meaning of the terms “adjustment” and “adjustment mode” in the CWMA Annual Meeting reports.

The Committee received no comments addressing potential inconsistent interpretations of the requirements by field officials, requirements for adjustment mode indications, and limitations on metrological indications while in the adjustment mode in any proposals. Consequently, the Committee developed a revised proposal in its 2010 Committee Report that:

1. did not change the existing text in G-S.8.;
2. added language that restates the intent of G-S.8.;
3. added language to address metrological (legal for trade) measurements while in an adjustment mode;
4. added a new paragraph G-S.8.1. that requires an indication and, recorded representations (if equipped with a printer) while in the adjustment mode; and

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<sup>1</sup> NTEP evaluators inspected some devices that could be sealed in an “adjustment” mode which 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.

5. recommended new definitions for “adjustment” and “adjustment mode” from the white paper on the “Metrological Requirements for Audit Trails” adopted by NCWM in July 1993 to facilitate a common understanding of the terms.

The Committee also recommended that the amended proposal be given Informational status to allow interested parties sufficient time to analyze and comment on the most recent language that appears in the “Item Under Consideration.”

Key Points Considered by the Committee:

- All agree that the intent of the proposal is that metrological adjustments shall be secured with: 1) physical seals that must be broken to access metrological adjustments; or 2) other approved means (e.g., data change audit trails) that indicate that metrological adjustments have been made.
- Devices must be equipped with either an approved audit trail or designed such that a physical seal is required to be broken before performing metrological adjustments.
- For devices with approved electronic method of sealing, an indication that the adjustment mode is in operation is necessary unless the device does not operate or provide metrological indications that can be interpreted or transmitted into memory or to recording elements.
- Devices that use physical seals to secure metrological adjustments are clearly in violation of G-S.8. if they allow external or remote access to metrological adjustment modes without breaking a physical seal.
- Any changes to General Code paragraph G-S.8. should ensure that the intent of the requirement is clear and is uniformly interpreted.

At NEWMA’s May 2010 Annual Meeting open hearing, Mr. Flocken, speaking as chairman of the NTETC Weighing Sector, stated the Sector concluded at its August 2009 meeting that existing language in HB 44 is sufficient and the Sector has established a small work group (WG) to review existing type evaluation criteria to suggest procedures in Pub 14 to verify that devices are designed with effective means to ensure compliance with HB 44. Consequently, NEWMA stated that it will await the WS recommendations for changes to Pub 14 before taking a position on this item.

At its spring 2010 Annual Meeting, the CWMA agreed with a proposal from Mr. Paul Lewis, Rice Lake Weighing, to delete the subparagraph (a) in the item under consideration since it restates the language in G-S.8.

At the 2010 NCWM Annual Meeting open hearings, Mr. Flocken, Mettler Toledo, speaking as chairman of the NTETC Weighing Sector restated his report from the spring 2010 NEWMA Meeting. Mr. Straub, Fairbanks Scales, speaking on behalf of the SMA stated that SMA opposes this item and recommends this item be Withdrawn. The SMA believes the current wording is a step back from previous proposals. The SMA continues to support the recommendation from the 2009 Weighing and Measuring Sectors stating that no change to HB 44 is required because the wording of G-S.2. and G-S.8. is sufficient.

WMD suggested that it might be appropriate for the Committee to consider withdrawing the item. In its comments to the NCWM in 2008, WMD stated that its interpretation of G-S.8. and S.1.11. Provision for Sealing, in the Scales Code, clearly does not allow a device to be “sealed” in a mode that allows a change that detrimentally affects the metrological integrity of the device without breaking that “seal.” WMD suggested that the Pub 14 procedures for evaluating the method of sealing in the checklist for electronic scales be amended to more closely align it with the procedures in the liquid-measuring devices (LMD) checklist Section 9 which states:

Measuring elements shall be designed with adequate provisions to prevent changes from being made to the measuring element or the flow rate control (if the flow rate control affects the accuracy of deliveries) without evidence of the change being made. These provisions can be an approved means of security (e.g., data change audit trail) or physically applying a security seal which must be broken before adjustments can

be made. When applicable, the adjusting mechanism shall be readily accessible for the purposes of affixing a security seal.

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

The Committee is concerned about a device, which could be sealed in a “mode,” that would allow access to calibration or configuration changes without breaking a seal. Since the NTEP tests and procedures are based on interpretations of HB 44, the Committee supports the efforts of the WS and is recommending that this item remain an Information item until the WS can review and revise (as needed) Pub 14 type evaluation procedures to verify compliance with G-S.8. provisions for sealing consistent with the Committee’s interpretation of G-S.8. stated in the previous paragraph.

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 to consider its recommendations for Pub 14, DES Section 10. The WS reviewed the recommendations and 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 be Withdrawn from the Committee’s agenda. The final summary of the NTETC Weighing Sector may be reviewed in NTEP Committee’s 2011 Interim Report, Appendix C.

At its fall 2010 Interim Meeting, the CWMA stated that the item has been on the agenda since 2008 and has had sufficient time for development. The CWMA noted that no comments were received during its open hearing. Therefore, the CWMA S&T Committee believes 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. Flocken, Mettler Toledo, speaking on behalf of the SMA, restated its position that this item be Withdrawn. Mr. Flocken, speaking as chairman of the WS 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 at its 2010 meeting. The WWMA recommended that this remain an Information item until the NCWM S&T Committee confirms that the WS recommendations comply with the previous Committee’s interpretation of General Code paragraph G-S.8.

During its fall 2010 Annual Meeting, the SWMA heard comments from Mr. Straub, Fairbanks Scales, and Mr. Gordon Johnson, Gilbarco, indicating that no changes are needed to paragraph G-S.8. The SWMA S&T Committee also received information from the WWMA and the WS regarding work being done 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 has made progress on developing proposed changes to the Scales Checklist in Pub 14 and anticipates 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 encourage consistent interpretation of paragraph G-S.8., the SWMA S&T Committee agreed to recommend that this remain an Information 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. After the Interim Meeting, the NIST Technical Advisor contacted Mr. Truex, NTEP Administrator and technical advisor to the NTEP Committee, regarding the proceedings of the NTEP Committee in its review of the summary of the 2010 meeting of the NTETC WS. 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 NCWM Publication 16 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 it applies only to electronic (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 appreciates and agrees with the comments from Mr. Truex. Although the Committee agreed with the comments to withdraw this item, 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 recommends the current proposal in the Item Under Consideration as a Voting item. The Committee further recommends that 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.

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 I G-S.1. Identification. – (Software)**

**Source:** 2010 Carryover Item 310-3. This item originated from the NTETC Software Sector 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 follows. (**Note:** This language incorporates the March 2010 recommendation from the NTETC Software Sector 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.):

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

[\*Nonretroactive as of January 1, 201X]

(Amended 201X)

- (a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model identifier that positively identifies the pattern or design of the device;

(1) *The model identifier shall be prefaced by the word “Model,” “Type,” or “Pattern.” These terms may be followed by the word “Number” or an abbreviation of that word. The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.). The abbreviation for the word “Model” shall be “Mod” or “Mod.” Prefix lettering may be initial capitals, all capitals, or all lowercase.*

*[Nonretroactive as of January 1, 2003]*

(Added 2000) (Amended 2001)

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

*[Nonretroactive as of January 1, 1968]*

(Amended 2003 **and 201X**)

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

*[Nonretroactive as of January 1, 1986]*

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

*[Nonretroactive as of January 1, 2001]*

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

*[Nonretroactive as of January 1, 2004]*

(Added 2003) (**Amended 201X**)

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

*[Nonretroactive as of January 1, 2007]*

(Added 2006)

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

*[Nonretroactive as of January 1, 2007]*

(Added 2006)

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

*[Nonretroactive as of January 1, 2003]*

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

(Amended 1985, 1991, 1999, 2000, 2001, 2003, ~~and~~, 2006 **and 201X**)



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

- (a) The required information in G-S.1. Identification. ~~(a), (b), (d), and (e)~~ shall be permanently marked or continuously displayed on the device; or
- (b) The CC Number shall be:
  - (1) permanently marked on the device;
  - (2) continuously displayed; or
  - (3) accessible through one or, at most, two levels of access. ~~an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, “Help,” “System Identification,” “G-S.1. Identification,” or “Weights and Measures Identification.”~~
    - (i) For menu based systems, “Metrology,” “System Identification,” or “Help.”
    - (ii) For systems using icons, a metrology symbol “(M)”, “(SI),” or a help symbol (“?”, “i,” or an “i” within a magnifying glass).

*Note:* For (b), clear instructions for accessing the information required in G-S.1. (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.

[Nonretroactive as of January 1, 2004]

(Added 2003) (Amended 2006 and 201X)

**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 Sector 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 requirements. After hearing several proposals, the Sector agreed to the following technical requirements applicable to the marking of software:

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

After the 2008 NCWM Annual Meeting, the Committee received the Software Sector’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 Software Sector 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 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.

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

At its spring 2009 meeting, NEWMA received similar comments from SMA and the Software Sector and took no position on this item pending its member review of the Software Sector's report.

At the 2009 NCWM Annual Meeting, the Committee reviewed the recommendations and comments from the Software Sector, SMA, and others, which may be reviewed in greater detail in the 2009 NCWM Annual Report:

The Committee agreed to retain this item as an Information item and that the regional weights and measures associations review the above information and provide the Committee with comments and recommendations.

At its fall 2009 meeting, the CWMA had lengthy discussions about providing the required identification information in a single uniform method. Some of the topics addressed were:

- A single operation or button is needed to view all software version information.
- Use a single function key to access or continuously display software version information.
- Electronic data for both Type U and Type P devices could be hard marked, continuously displayed or accessed by command (operator action).
- The data is useless if it is not easy to access in the field.
- Concern about the cost of requiring a single designated button to access software version information.

The CWMA recommended this remain Informational item with changes to the Committee's recommendations as shown in the 2009 S&T Committee Annual Report and summarized as follows:

1. In proposed paragraph G-S.1.1.(a), add “or accessed by a command (operator action)” **and** delete subparagraph G-S.1.1.(b) (3). to read as follows:

***G-S.1.1. Location of Marking Information for Type U (Not-Built-For-Purpose), Software-Based Devices. – For Type U—not-built-for-purpose, software-based devices manufactured prior to January 1, 201X, either:***

- (a) *The required information in G-S.1. Identification. (a), (b), (d), and (e) shall be permanently marked or continuously displayed on the device; **or accessed by a command (operator action);***
  - (b) *The CC Number shall be:*
    - (1) *permanently marked on the device; **or***
    - (2) *continuously displayed.*
    - (3) ~~*accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, “Help,” “System Identification,” “G-S.1. Identification” or “Weights and Measures Identification.”*~~
2. Delete Note 8 in “Table G-S.1. Notes on Identification.”\*
  3. Amend “Table G-S.1. Identification . . .” by deleting the three references to “via menu display,” “Print Option (8),” adding “by command (operator action),” and deleting the language at the bottom of the table.\*

\*Table G-S.1. appeared in the 2009 proposal.

During the open hearings at the fall 2009 WWMA Annual Technical Conference, Mr. Straub, speaking on behalf of SMA, indicated SMA continues to oppose this item, referring to comments made in conjunction with Item 310-2. He also noted that even if the designations of Type U and Type P were adopted, SMA would continue to oppose the proposed changes to G-S.1., noting that requirements should apply equally to the two different device types described. The WWMA also heard from Mr. Johnson, Gilbarco, who agreed with SMA’s assessment. He also indicated that it would be desirable to have the option of using a menu to provide information, citing increasingly limited space in which to provide marking information, and noted it would be virtually impossible for their company to provide a full time display.

Based on the comments received and its position relative to corresponding definitions for the device types developed by the Software Sector, the WWMA recommended that this remain an Informational item until the Software Sector has had an opportunity to review comments from the 2009 NCWM Annual Meeting and any comments made at subsequent regional weights and measures association meetings.

At its fall 2009 meeting, the SWMA agreed that the Software Sector should continue to work on the proposal until it arrives at some final language for amending paragraphs G-S.1. Identification and G-S.1.1. Location of Marking Information for Not-Built-For Purpose, Software-Based Devices. The Software Sector should work with manufacturers in its development of the requirement, and any table or other tools should provide further clarity on the intent of the marking requirements.

During its fall 2009 meeting, NEWMA stated that it supports the Committee’s decision to keep this item Informational to have sufficient time to consider the most recent comments from the regional Weights and Measures associations and other interested parties.

At the 2010 NCWM Interim Meeting, the Committee received comments from Mr. Straub, speaking on behalf of the SMA, reiterating SMA’s spring 2009 position opposing any requirements for software that are different between types of devices and recommending that this item be Withdrawn from the Committee’s agenda. Mr. Straub added that SMA comments are based on the proposed “Item Under Consideration” in the Interim Agenda and not the alternate proposal submitted by the software sector after its 2009 spring meeting. Mr. Lewis, Rice Lake Weighing,

stated that metrologically significant software should have the same version number marking requirements in Type P (fixed hardware and software) devices or in Type U software (not built-for-purpose) devices. The Software Sector chairman responded that the only difference in the sector's proposed language is that software identification requires version numbers and not serial numbers. In addition to the comments regarding the "hard marked" terminology presented at the 2009 Annual Meeting, WMD noted that devices with only Type U software are not required to have serial numbers. However, WMD asks the Sector to clarify its position on marking devices with both Type U and Type P software. Is a device required to have a serial number if it uses both Type P and Type U software?

Mr. Truex, NTEP Administrator, asked the members of the NCWM to provide direction to the Software Sector and the Committee for what is needed during field verification of software-based devices in order to determine that the software used in weighing and measuring devices represents the devices that were certified during type evaluation. What does a field inspector need to know about the software version in vehicle scales, electronic indicators, electronic cash registers interfaced with weighing and/or measuring devices, controllers with metrological software, etc.

Ms. Julie Quinn, Minnesota, reported that the state has problems because its officials find software versions that appear to be older than the version listed on the CC. Ms. Quinn added that NTEP evaluates software in these devices to verify that the accuracy of the first indication of the final measurement and the security of metrological adjustments.

Mr. Bryce Wilke, GIPSA, stated that most of the livestock investigations and other regulatory issues most commonly involve software that has not been developed by the original device manufacturer. He noted that any language in HB 44 and NTEP Pub 14 will help GISPA.

Mr. Ross Andersen, New York, stated that there is still some confusion about where the scope of NTEP ends and weights and measures' jurisdiction ends. He cited an example on a vehicle scale where a typewriter is used to issue the printed ticket. Weights and Measures still has the authority to regulate the way that measurement is used to accurately or inaccurately represent the transaction. Weights and measures authority still exists when the measurement takes place in one jurisdiction and is recorded and subsequently invoiced through a software system in a different jurisdiction.

Ms. Judy Cardin, Wisconsin, stated that NTEP is required if the software can change the measurement result and NTEP should evaluate software up to the point that the first indication of the final weight is presented.

Mr. Steve Malone, Nebraska, added that every electronic weighing and measuring device evaluated by NTEP has software and that the software is needed to make the device work. The problem is that the field inspector has no way of determining if the software in the device is the same as the software evaluated by NTEP without having to carry a hard copy of the CC with them. Nebraska and other states within the CWMA would like to see a simple and standardized method an inspector could use to obtain the relevant software identification and version information.

Mr. Truex thanked the members who commented and reminded them that the Software Sector is not proposing to reopen the "first final" discussion, but to develop recommendations to help field officials to verify that software in a weighing or measuring device represents the type of software covered by an NTEP CC. The Committee concurs with Mr. Truex's comments. The Committee agreed to replace the agenda language in the "Item Under Consideration" with the Software Sector's 2009 proposed language in the Committee's Interim Report. The Committee appreciates the work of the Sector and asks that it review the discussions on this item from the reports from regional Weights and Measures associations, as well as comments in writing from interested parties and from the open hearing during the 2010 Interim Meeting.

The Committee agreed that the status of this item should remain as Informational and asks for additional input from the Software Sector after it has reviewed these and other comments received since its last meeting.

Additional background information on this item can be reviewed in the Committee's 2008 and 2009 Final Reports.

In response to comments heard during the 2010 NCWM Interim Meeting, the Software Sector (at its 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 Sector 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 added that the remainder of the proposal remains unchanged. The Sector 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 Software Sector also initiated discussion on two new concepts, which may eventually result in additional recommendations to amend G-S.1. It should be noted that these new ideas are in the developmental stage and are included here by request of the Sector, since comments from the regions and other interested parties would be appreciated by the Sector.

First, the Sector 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 Sector, 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 Sector would like feedback on the proposal to specify a limited number of menu items/icons for accessing the CC number (it is not hard-marked or continuously displayed) in subparagraph (b) as follows:

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

*(1) permanently marked on the device;*

*(2) continuously displayed; or*

*(3) accessible through ~~an easily recognized menu and, if necessary a submenu.~~ **one or, at most, two levels of access. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."***

**(i) For menu-based systems, "Metrology", "System Identification", or "Help".**

**(ii) For systems using icons, a metrology symbol ("M" or "SI"), or a help symbol ("?", "I," or an "i" within a magnifying glass).**

Note that this is not suggested to be the final list of valid options for locating the point of access for the CC number; the Software Sector would like to have feedback specifically on other acceptable menu text/icon images that identify how to access the CC number on software-based systems. The Software Sector agreed that a reasonable list of acceptable options is not as much of an issue as the fact that the list is finite. The sector realizes this may affect manufacturers so feedback from associate members and representative groups is also appreciated.

At its 2010 Annual Meeting, NEWMA recommended leaving this item informational to allow review of the software Sector's newly proposed language from its March 2010 meeting.

During the 2010 NCWM Annual Meeting, the SMA stated that the proposal from the Software Sector 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 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 Software Sector 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 on 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. 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 Software Sector and agreed that the 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 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 Software Sector. 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 addresses 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)

**(WMD Technical Advisor 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 (2) (see [(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.”)**

*[Nonretroactive as of January 1, 2007*

*\*[Nonretroactive as of January 1, 201X]*

The WWMA believes that the above changes to the proposal sufficiently address all issues identified during the open hearings and that this should remain an Information item to allow the Software Sector 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 Software Sector 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 Information 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 questions raised have merit. NEWMA recommends this remain an Information 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 the Software Sector 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 non hard 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.

It was also noted that the intent of the proposal is not to require stand alone software to have a serial number.

The Committee agrees that this item is not ready to move forward as a Voting item. The Committee recommends the Software Sector 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)?

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

**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 201X~~)

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 201X**)

**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:** WMD received an inquiry in 2010 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 is a non-retroactive 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 believes 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 does not include any reference to "remanufactured devices" or "remanufactured main elements."

Appendix D of HB 44 defines a "manufactured" device as any commercial weighing or measuring device shipped as new from the original equipment manufacturer (OEM). The unintended gap in the two paragraphs results by virtue of the fact that paragraph G-S.1.2. is a nonretroactive requirement applicable to remanufactured equipment, while G-A.6. seems to only apply to manufactured equipment and equipment considered new or used, but not devices or main elements that have been remanufactured.

Past NCWM Conference Reports indicate that a proposal to change the HB 44 definition of "manufactured device" was adopted by the NCWM in 2001. The definition was amended and new definitions for "remanufactured" and "repaired" devices were added. These changes were made based on the recommendations of the NCWM Remanufactured Devices Task Force to provide guidance on how to distinguish remanufactured devices from repaired devices and, thus, give the field official tools to determine what requirements apply to both types of devices. The original definition, shown below and identified as the "2001 HB 44 definition," included text that WMD believes was intended to include remanufactured devices. The definition, as modified in 2002, deleted the text "new device or any other device" to the extent that the definition from 2002 forward only applies to devices shipped as new from the OEM.

#### **2001 HB 44 Definition**

**manufactured device.** – Any new device or any other device that has been removed from service and substantially altered or rebuilt.

#### **2002 HB 44 Definition**

**manufactured device.** – Any commercial weighing or measuring device shipped as new from the original equipment manufacturer.

It should be noted that the definitions for repaired and remanufactured devices were also adopted to provide guidance to officials to determine if a device has been remanufactured to "be made to operate like a new device of the same type" or repaired to bring it "back into proper operating condition" (see the "Report of the 86<sup>th</sup> NCWM" Annual Report S&T Item 310-1, page S&T - 5).

If paragraph G-A.6. were interpreted as being silent with respect to remanufactured devices and remanufactured main elements, the marking requirements specified in G-S.1.2., in WMD's opinion, could not be applied. This was clearly not the intent since, as indicated by its title, it was specifically designed to apply to "remanufactured" equipment.

Because remanufactured devices compete with newly manufactured devices, WMD believes that G-A.6. Nonretroactive Requirements is intended to include such equipment in the scope of the paragraph. That is, remanufactured devices and remanufactured main elements should have to comply with the most current nonretroactive requirements in effect as of the date the devices or elements are remanufactured.

A change is needed to G-A.6. to clarify the application of G-S.1.2. and other nonretroactive requirements, which WMD believes should apply to remanufactured devices and remanufactured main elements.

Additionally, in the event that weights and measures officials are challenged regarding the application of G-S.1.2. or other nonretroactive paragraphs to remanufactured equipment or elements, the proposed modification to G-A.6. would clearly support their actions

It should be noted that device owners and remanufacturers may experience difficulty in complying with applicable nonretroactive requirements in instances where states have not previously applied them to remanufactured equipment. The extent to which this has occurred may become more evident as this issue is discussed within the regional weights and measures and industry associations and alternatives to alleviate this burden on existing equipment could be considered.

While developing this proposal, WMD contacted two RMFDs OEMs and representatives from those companies both indicated that remanufactured RMFD's 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 that 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.

The proposed change in the "Item Under Consideration" will clarify how nonretroactive paragraphs apply to remanufactured equipment.

WMD notes 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 to clarify the application of G-A.6. to devices that have been determined to have been "remanufactured."

WMD believes 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 Information item to give the device remanufacturers additional time to evaluate the impact of the proposed amendment to G-A.6.

During the open hearing, the Committee received a letter from Mr. Thomas McGee, PMP Corporation, (Appendix C) stating he disagrees with WMD that the proposed changes to G-A.6. is a clarification of the intent of the Remanufactured Devices Task Force. He believes the 2010 version of HB 44, G-A.6 Nonretroactive Requirements applies to new devices based on the "Original Manufacturing Date" as compared to the effective date of a requirement. Therefore, a device originally manufactured in January 2002 and remanufactured January 2007 would not need to meet any of the nonretroactive requirements in the handbook with an enforcement date beyond

January 1, 2002. Mr. McGee provided an example of a RMFD removed from an installation and remanufactured. In the example provided, the dispenser was disassembled, checked for wear, and a new mechanical computer and new outer skins installed. According to Mr. McGee, the dispenser was checked for accuracy and everything checked out per HB 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.

Mr. McGee added that NIST makes a direct comparison between a new device and a remanufactured device indicating they directly compete with each other as stated in the discussion of the item. This is true as far as competing in the same market as a whole, but not if you factor in technology, features, warranty, etc. The 1990's 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 fill a void. A smaller low volume station can buy remanufactured devices at a reduced price, which allows them to be economically feasible in a rural location and keeps them competitive with the large volume stations in other markets. Remanufacturing provides a means to extend the life of equipment that maybe has gone out of production but is still very accurate and reliable. Mr. McGee recommended that this be moved back to an Informational item or removed from the agenda. If made an Informational item it would give all of those companies that could be impacted by the change to review and comment on this issue. He added that this is not just a clarification. It is clearly a change in the philosophy of applying nonretroactive requirements. A complete copy of Mr. McGee's letter (less extracts of HB 44 and above background information) can be viewed in Appendix C of this Report.

Mr. Don Graff, Graffco Inc., submitted a list of remanufacturers of LMD in Appendix C that may be impacted by the enforcement of nonretroactive requirements on remanufactured devices and requested that this item be given Informational status. A complete copy of Mr. Graff's letter can be viewed in Appendix C of this Report.

The Committee also received a letter of support for this item from Mr. R. Michael Carlson, President, Dresser Wayne North America (see Appendix C). Mr. Carlson expressed his company's concerns about a growing trend to extend the 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 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.

Mr. Carlson added that 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 the following:

- Payment security including:
  - Increasing threats of fraud through sophisticated fuel and identity-theft schemes;
  - Credit card industry mandates for 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 including:
  - Ultra-low-sulfur diesel (ULSD) and diesel exhaust fluid (DEF) have taxed the capabilities of dispensers' hydraulic systems; and
  - Higher levels of ethanol in today's fuels require specially fabricated seals and components.
- Communications interface (and security) including:
  - Download of dispenser software from remote sources; and
  - The potential for automatic meter-calibration.

Thus, Dresser Wayne supported maintaining this item as a Voting item at the National Conference on Weights and Measures in July 2010 and noted that it is in the best interest of the general public, station owners and the fuel-dispensing industry in general. A complete copy of the letter can be viewed in Appendix C of this Report.

Mr. Andersen, New York, stated that one of the primary issues that led to the marking requirements was original manufacturers' concern over warranty and liability concerns when devices were remanufactured with unauthorized parts. Mr. Lewis, Rice Lake Weighing, expressed concern about a remanufacturer's ability to remanufacture a device to operate like a new one of the same type without the original manufacturer's blueprints and parts lists. Additionally, Mr. Lewis stated that NTEP's Voluntary Conformity Assessment Program (VCAP) should also be applicable to remanufacturers that work on devices subject to testing for influence factors.

The SMA stated its support for this item during the open hearings. WMD reiterated that the current issue was proposed because paragraph G-A.6. does not specifically reference "remanufactured" devices and elements and that WMD has received questions on how or if nonretroactive requirements are to be applied to "remanufactured" devices and elements. WMD believes that it was the intent of the 2001 and 2002 Committees that remanufactured devices would be subject to nonretroactive requirements according to the definition for "remanufactured devices" in Appendix D. Other OEMs have also stated that they remanufacture their own devices and, typically, remanufacture them to the current applicable nonretroactive devices.

WMD also provided the Committee with the following "real life" examples outlining when a device is considered as "repaired" or "remanufactured."

### **Weighing Devices**

**Example 1:** A scale service agency replaces all of the load cells of a vehicle scale's weighing/load-receiving element with load cells of a different manufacture that are metrological equivalent cells and of the same basic type. The replacement cells have been issued an NTEP CC and are replaced without any modification to the load cell mounting assembly.

The associated guideline adopted by the NCWM in 2002 is "Guideline Item" 9-W, Section I Examples of Repaired Devices/Repaired Elements (no metrological change).

*According to the guideline, this is an example of a repaired device. The weighing/load-receiving element would still be traceable to the original NTEP CC and would not be required to comply with the most recent nonretroactive requirements.*

**Example 2:** A scale service agency completely rebuilds a used retail-computing scale that they acquired from a grocery store that had had it in service for over 15 years. The scale is completely disassembled, parts inspected for wear, and all worn parts replaced with remanufactured parts that are not OEM, but are the same design. The load cell, found to still be functioning satisfactorily, is not replaced. The scale is then reassembled and sold to a delicatessen located within the same state as the service agency.

The associated guideline adopted by the NCWM in 2002 is "Guideline Item" 3-W, Section II Examples of Remanufactured Devices/Remanufactured Elements (no metrological change).

*According to the guideline, this is an example of a "remanufactured" device. The scale would still be traceable to the original NTEP CC, but would need to be marked in accordance with paragraph G-S.1.2. Remanufactured Devices and Remanufactured Main Elements and also would be required to comply with the most recent HB 44 nonretroactive requirements in effect as of the date the scale is installed in its new location. For example, if the remanufactured scale were installed July 1, 2010, it would need to comply with paragraph G-S.1., bullet (e) which requires an NTEP Certificate of Conformance (CC) or CC Addendum Number for devices that have a CC be permanently marked. This particular requirement is nonretroactive as of January 1, 2007.*

## Measuring Devices

**Example 1:** A used equipment dealer replaces a meter that cannot be brought into proper calibration with a used meter of the same model taken from a used dispenser. This work is performed at the used equipment dealer's shop. The replacement meter is recalibrated after installation and then placed back into service.

The associated guideline adopted by the NCWM in 2002 is "Guideline Item" 8-M, Section I Examples of Repaired Devices/Repaired Elements (no metrological change).

*According to the guideline, this is an example of a "repaired" device. The device is still traceable to the original NTEP CC and would not be required to comply with the most recent nonretroactive requirements in effect as of the time this work was completed.*

**Example 2:** A remanufacturer of dispensers completely disassembles a RMFD and replaces the meter with the same model meter remanufactured by another firm. They then fix and replace all other parts as needed, reassemble the dispenser, and offer it for sale as a "remanufactured" dispenser.

The associated guideline adopted by the NCWM in 2002 is "Guideline Item" 6-M, Section II – Examples of Remanufactured Devices/Remanufactured Elements (no metrological change).

*According to the guideline, this is an example of a "remanufactured" device. It would need to be marked in accordance with paragraph G-S.1.2. Remanufactured Devices and Remanufactured Main Elements and also would be required to comply with the most recent HB 44 nonretroactive requirements in effect as of the date the dispenser is installed into commercial service. For example, if a 15 year old dispenser were remanufactured and returned to service on July 1, 2010, it would need to comply with Liquid-Measuring Devices Code, paragraph S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers, which is nonretroactive as of January 1, 2003.*

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 in Appendix B. Mr. Cook added that he will discuss with Mr. Truex, NTEP Administrator, how the VCAP requirements will 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” in Appendix B 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 Information 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 Information 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 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 the clients, whom he represents, 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 RMD’s, 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 New York state director, 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. Anderson 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.

**(Technical Advisor 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 their 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 and 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 specify 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.

Additional background information can be reviewed in the S&T Committee 2010 Interim 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  $20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  ( $68\text{ }^{\circ}\text{F} \pm 4\text{ }^{\circ}\text{F}$ ):

- (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<sub>i</sub> (where e<sub>i</sub> 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 are 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 is 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, Fairbanks Scales. 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 is reasonable. Additionally, the SWMA recognized that the issue has received technical review from the members of the WS. Thus, the SWMA recommends 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 Information item since there was no one to speak on behalf of the proposal.

**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, Mettler-Toledo, speaking on behalf of the SMA supported this item. However, later, during S&T Committee deliberations, Mr. Flocken stated that after researching the item, 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.

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

**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 III 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 201X)

**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., is now 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 can now 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
$n_{max} = 5000$	$n_{max} = 10\ 000v$
$v_{min} = 10\ lb$	$v_{min} = 5\ lb$

The current Class III creep recovery tolerance is 0.83v ( $0.83v \times 10\ lb/v = 8.3\ lb$ )

The current Class III L creep recovery tolerance is 1.5v ( $1.5v \times 5\ lb/v = 7.5\ lb$ )

The proposed Class III L creep recovery tolerance is  $1.5v \times 5/3 = 2.5v$  ( $2.5v \times 5\ lb/v = 12.5\ lb$ )

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 shows that Class III L load cell creep recovery type evaluation compliance rate is 76 % using existing tolerances. 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, 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 is 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 Information 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, Mettler-Toledo, speaking on behalf of the SMA, who indicated support for the item as written. Mr. Flocken stated that the item addresses 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.

## 321 BELT-CONVEYOR SCALE (BCS) SYSTEMS

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

**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 Belt-Conveyor Scale Systems (BCS) WG agrees that the existing language in N.3.1.3. results in an excessive allowance for the variation in the totalizers for a belt with larger minimum division sizes. Conversely, the three division requirement can impose 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. – During a zero-load test with all operational low-flow lockout disabled, the total change indicated in the totalizer during any complete revolution of the belt shall not exceed the absolute value of 0.12 % of the minimum totalized load. After a zero-load test with flow rate filtering disabled, the totalizer shall not change more than plus or minus ( $\pm 3 d$ ) 3.0 scale divisions from its initial indication during one complete belt revolution.**

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

(Added 2002) (Amended 2004 **and 201X**)

**Background/Discussion:** At its fall 2007 Annual Technical Conference, the WWMA received a proposal from the Belt-Conveyor Scale WG (BCS WG) to amend paragraph N.3.1.3. The BCS WG 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.

At its February 2009 meeting, the BCS WG reported to the Committee that, after its meeting adjourned, an extended session of the meeting took place with a smaller group. The smaller group developed an amended proposal. However, the smaller group and the larger BCS WG both agreed that this item should not go forward as a Voting item, but be given Informational status to allow more time to consider developing a revised proposal and to conduct additional research on the appropriate tolerance.

During the 2009 NCWM Annual Meeting open hearings, the Committee received comments from Mr. Ripka, Thermo Ramsey and NIST WMD supporting the recommendation from the BCS WG. The Committee agreed with the WG that more time is needed to conduct additional research on this item to determine the appropriate tolerance and revise the proposal. The Committee agreed to keep this item on its agenda as Informational.

At the 2010 NCWM Interim Meeting, the SMA submitted a comment supporting the intent of this item and encourages additional research to determine the correct allowable value to verify suitable belt consistency. The Committee agreed to keep this item on its agenda as an Informational item.

At the February 2010 USNWG on BCS meeting, there was much discussion on the original purpose of the existing language that was adopted into HB 44 in 1985 as part of a larger revision to the BCS Systems Code. The WG did not reach a consensus on this item and agreed to continue its work to develop a consensus position.

At the 2010 NCWM Annual Meeting, Mr. Ripka, Thermo-Fisher, provided the Committee with a letter regarding the status of the WG. 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 BCS WG 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. 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, Thermo Scientific, speaking on behalf of the sub group of the BCS WG, reviewed the contents of the letter they submitted to the NCWM S&T Committee on September 9, 2010. (The letter from Thermo Fisher Scientific may be reviewed Appendix C S&T Item 321-1.) He recommended this proposal to be moved forward as a Voting item. Mr. Ripka added that a small survey was conducted at thirteen BCS installations to verify that 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 sub group were submitted to the entire BCS WG 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 sub group pending approval of the entire BCS WG in its letter ballot prior to 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 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.

**Technical Advisor's Note:** Just prior to the 2011 NCWM Interim Meeting, one member of the BCS subgroup submitted a request to the NIST Technical Advisor to the USNWG on BCS to amend the language from that shown above in Item Under Consideration. 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 Committee deliberations. The NIST Technical Advisor plans to seek additional input concerning the proposed language change from members of the entire USNWG on BCS when that group meets in February 2011. This information was shared with the NCWM S&T Committee to consider in its deliberations.

During the 2011 NCWM Interim Meeting, Mr. Darrell Flocken, Mettler-Toledo, speaking on behalf of the SMA supported this item. Mr. Bill Ripka, Thermo Ramsey, speaking on behalf of the sub group of the BCS WG indicated that the item was sufficiently developed, and recommended it move 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.

(See also the Committee's 2008 Annual Report for additional background information in Developing Item 360-2 Part 3 Item 2.)

### 331 VEHICLE-TANK METERS (VTM)

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

**Source:** 96<sup>th</sup> 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 S.2. Design of Measuring Elements of the Vehicle-Tank Meters Code to section 3.31 VTM code 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, 201X]**

**(Added 201X)**

**Background/Discussion:** During discussions of proposed changes (which were adopted in July 2010) to the tolerances for VTMs equipped with automatic temperature compensating systems (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 paragraph 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 indications for changes due to 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 in actual testing.

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

1 degree difference x 0.00069/ °F x 100 gallons = 0.069 gallons = 15.9 cubic inches for gasoline  
1 degree difference x 0.00050/ °F x 100 gallons = 0.05 gallons = 11.6 cubic inches for diesel

If acceptance tolerance applies, the tolerance on a 100-gallon draft of a VTM meter would be 0.15 %, which is 0.15 gallons or 35 cubic inches. 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 for all LPG & NH<sub>3</sub> meters. This proposed change to the VTM Code would also promote alignment of these 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. 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 they were inaccurate. 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 recommends that the item be forwarded to the NCWM S&T Committee as a Voting item as originally proposed by the NCWM S&T Committee.

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 °F by state metrology labs. Before it can support the proposal, NEWMA wants 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, Dmitri Karimov, Liquid Controls, speaking on behalf of the Meter Manufacturers Association (MMA), noted 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 test drafts 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 included, noting Canada’s experiences leading not only to the specification of criteria for the thermometer wells, but also of criteria regarding 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.

### **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. Tolerances for typical meters are 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.:**

<b>Table T.4. Tolerances for Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters</b>	
<b>Meter Size</b>	<b>Maintenance and Acceptance Tolerances</b>
<b>Up to, but not including, 50 mm (2 in)</b>	<b>1.70 L (104 in<sup>3</sup>)<sup>1</sup></b>
<b>From 50 mm (2 in) up to, but not including, 75 mm (3 in)</b>	<b>2.25 L (137 in<sup>3</sup>)<sup>1</sup></b>
<b>75 mm (3 in) or larger</b>	<b>3.75 L (229 in<sup>3</sup>)<sup>1</sup></b>

<sup>1</sup>**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**

<b>Table T.4. Tolerances for Typical Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters</b>			
<b><u>Meters Marked with Flow Rates in SI Units</u></b>		<b><u>Meters Marked with Flow Rates in Inch-Pound Units</u></b>	
<b><u>Marked Maximum Flow Rate<sup>1</sup></u></b>	<b><u>Maintenance and Acceptance Tolerances<sup>2</sup></u></b>	<b><u>Marked Maximum Flow Rate<sup>1</sup></u></b>	<b><u>Maintenance and Acceptance Tolerances<sup>2</sup></u></b>
<b><u>114 Lpm</u></b>	<b><u>0.57 L</u></b>	<b><u>30 gpm</u></b>	<b><u>0.15 gal (34.6 in<sup>3</sup>)</u></b>
<b><u>227 Lpm</u></b>	<b><u>1.14 L</u></b>	<b><u>60 gpm</u></b>	<b><u>0.30 gal (69.3 in<sup>3</sup>)</u></b>
<b><u>380 Lpm</u></b>	<b><u>1.90 L</u></b>	<b><u>100 gpm</u></b>	<b><u>0.5 gal (115 in<sup>3</sup>)</u></b>
<b><u>757 Lpm</u></b>	<b><u>3.78 L</u></b>	<b><u>200 gpm</u></b>	<b><u>1.0 gal (231 in<sup>3</sup>)</u></b>

<sup>1</sup>**Refer to T.4. for meters with maximum flow rates not listed.**

<sup>2</sup>**Based on a test 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. Tolerances for typical meters are 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.]

Delete current Table T.4.:

<b>Table T.4. Tolerances for Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters</b>	
<b>Meter Size</b>	<b>Maintenance and Acceptance Tolerances</b>
<b>Up to, but not including, 50 mm (2 in)</b>	<b>1.70 L (104 in<sup>3</sup>)<sup>1</sup></b>
<b>From 50 mm (2 in) up to, but not including, 75 mm (3 in)</b>	<b>2.25 L (137 in<sup>3</sup>)<sup>1</sup></b>
<b>75 mm (3 in) or larger</b>	<b>3.75 L (229 in<sup>3</sup>)<sup>1</sup></b>

<sup>1</sup>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**

<b>Table T.4. Tolerances for Typical Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters</b>			
<b>Meters Marked with Flow Rates in SI Units</b>		<b>Meters Marked with Flow Rates in Inch-Pound Units</b>	
<b>Marked Maximum Flow Rate<sup>1</sup></b>	<b>Maintenance and Acceptance Tolerances<sup>2</sup></b>	<b>Marked Maximum Flow Rate<sup>1</sup></b>	<b>Maintenance and Acceptance Tolerances<sup>2</sup></b>
<b>114 Lpm</b>	<b>0.68 L</b>	<b>30 gpm</b>	<b>0.18 gal (41.6 in<sup>3</sup>)</b>
<b>227 Lpm</b>	<b>1.36 L</b>	<b>60 gpm</b>	<b>0.36 gal (83.2 in<sup>3</sup>)</b>
<b>380 Lpm</b>	<b>2.28 L</b>	<b>100 gpm</b>	<b>0.6 gal (139 in<sup>3</sup>)</b>
<b>757 Lpm</b>	<b>3.78 L</b>	<b>200 gpm</b>	<b>1.0 gal (231 in<sup>3</sup>)</b>

<sup>1</sup>Refer to T.4. for meters with maximum flow rates not listed.

<sup>2</sup>Based on a test volume of at least the amount specified in N.3. Test Drafts.

**Background/Discussion:** This item was submitted to NEWMA at its 2008 Interim Meeting as an alternative 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 are 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<sup>3</sup>) 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-inch meter, rated at 40 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-inch 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 inches 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 inch (100 gpm) meter, the tolerance would be 139 in<sup>3</sup>, virtually identical to the existing tolerance.

The submitted provided supporting graphics which can be viewed in the Committees 2011 NCWM Interim Agenda and in past years' 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. will reduce the unnecessarily large tolerances for meters under 60 gpm (2-inch meters) and more closely reflects existing tolerances of larger meters. The WWMA also recommends removing paragraph S.5.7. Meter Size since the language was adopted in 2009 to facilitate the application of the correct product depletion test tolerances, which were based on meter size. Since the item under consideration uses meter size to calculate product depletion tolerances, the WWMA believes that paragraph S.5.7. is no longer 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 Information item on the NCWM Committee agenda.

At its 2010 Annual Meeting, NEWMA restated its support for this item and looks 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. 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 Information item.

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

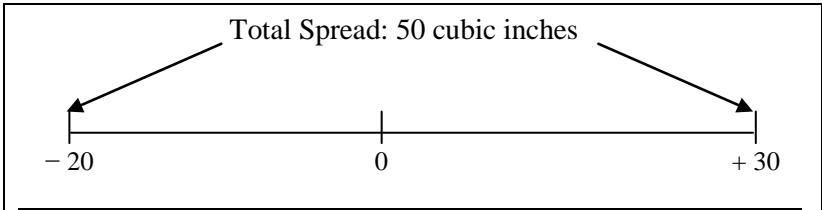
- The graphs in the Interim Agenda under both Option 1 and Option 2 the breakpoints of the tolerance are depicted incorrectly relative to the meter sizes. For example, a tolerance of 104 in<sup>3</sup> is technically extended up to, but not including a 2 in meter rather than just beyond the 1½ in size 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 is to 0.1 L or 100 mL; this represents two divisions 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 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 appears to some that the tolerance for a 2 in meter, for example, has been reduced from 104 in<sup>3</sup> to 34 in<sup>3</sup>. However, the tolerance for that size meter (which is typically a 100 gpm maximum) is actually 115 in<sup>3</sup>.
- 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.)
- 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.



- **Example B** illustrates a 1-1/4-inch 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 <sup>3</sup>
Product Depletion Test Draft Results	- 20 in <sup>3</sup>
Difference (Normal Test - Product Depletion Test Results)	50 in <sup>3</sup>

Comparison of Tolerances (Current vs. Proposed) for Example B (1-1/4-inch, 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 <sup>3</sup>	34.6 in <sup>3</sup>	41.6 in <sup>3</sup>
Conclusion: Does System “Pass” or “Fail” the Product Depletion Test?	Pass	Fail	Fail



336 WATER METERS

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

**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 201X)

**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 instruments 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 that 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 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, 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.”

## 342 FARM MILK TANKS

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

**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 previously 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 every quarter of the tank capacity or every 2000 L (500 gal), whichever is greater. **A master metering system capable of operating within 25 % of the applicable tolerance in T.3. Basic Tolerance Values needs only be verified before and after the gauging process.**

**(Added 201X)**

**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 a mass flow meter 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 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.xlsx." 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 Information 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 work with the Market Administrators to address WWMA's concerns and obtain a summary of the analysis.

During its open hearings at the 2011 Interim Meeting, the Committee heard comments from Mr. Richard 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 has additional data to provide to the Committee in support of the proposed change.

Ross Andersen, formerly 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.

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, Richard 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.



## 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:

<b>NIST Weights and Measures Division (WMD) Contact List for International Activities</b>	
<b>Contact Information</b>	<b>Responsibilities</b>
<b>Postal Mail and Fax for All Contacts:</b>	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	<ul style="list-style-type: none"> <li>•R 21 “Taximeters”</li> <li>•R 50 “Continuous Totalizing Automatic Weighing Instruments (Belt Weighers)”</li> <li>•R 60 “Metrological Regulations for Load Cells”</li> <li>•R 106 “Automatic Rail-weighbridges”</li> </ul>
Mr. Kenneth Butcher (LMG) (301) 975-4859 kenneth.butcher@nist.gov	<ul style="list-style-type: none"> <li>•D 1 “Elements for a Law on Metrology”</li> <li>•TC 3 “Metrological Control”</li> <li>•TC 3/SC 2 “Metrological Supervision”</li> <li>•TC 6 “Prepackaged Products”</li> </ul>
Mr. Steven Cook (LMDG) (301) 975-4003 steven.cook@nist.gov	<ul style="list-style-type: none"> <li>•R 76 “Non-automatic Weighing Instruments”</li> </ul>
Dr. Charles Ehrlich (ILMG) (301) 975-4834 charles.ehrlich@nist.gov	<ul style="list-style-type: none"> <li>•CIML Member for the United States</li> <li>•V1 “International vocabulary of terms in legal metrology (VIML)”</li> <li>•V2 “International vocabulary of basic and general terms in metrology (VIM)”</li> <li>•B3 “OIML Certificate System for Measuring Instruments”</li> <li>•B6 “OIML Directives for the Technical Work”</li> <li>•B 10 “Framework for a Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations”</li> <li>•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”</li> <li>•TC 3 “Metrological Control”</li> <li>•ISO/IEC Guide to the Expression of Uncertainty in Measurement”</li> </ul>
Mr. Richard Harshman (LMDG) (301) 975-8107 richard.harshman@nist.gov	<ul style="list-style-type: none"> <li>•R 51 “Automatic Catchweighing Instruments”</li> <li>•R 61 “Automatic Gravimetric Filling Instruments”</li> <li>•R 107 “Discontinuous Totalizing Automatic Weighing Instruments” (totalizing hopper weighers)</li> <li>•R 134 “Automatic Instruments for Weighing Road Vehicles In-Motion and Measuring Axle Loads”</li> </ul>
Ms. Diane Lee (LMDG) (301) 975-4405 diane.lee@nist.gov	<ul style="list-style-type: none"> <li>•R 59 “Moisture Meters for Cereal Grains and Oilseeds”</li> <li>•R 92 “Wood Moisture Meters – Verification Methods and Equipment”</li> <li>•R 121 “The Scale of Relative Humidity of Air Certified Against Saturated Salt Solution”</li> <li>•TC 17/SC 8 “Measuring Instruments for Protein Determination in Grains”</li> </ul>

<b>NIST Weights and Measures Division (WMD) Contact List for International Activities</b>			
<b>Contact Information</b>		<b>Responsibilities</b>	
Mr. Ralph Richter (ILMG) (301) 975-3997 ralph.richter@nist.gov		<ul style="list-style-type: none"> <li>•D 11 “General Requirements for Electronic Measuring Instruments”</li> <li>•R 35 “Material Measures of Length for General Use”</li> <li>•R 49 “Water Meters” (Cold Potable Water &amp; Hot Water Meters)</li> <li>•R 71 “Fixed Storage Tanks”</li> <li>•R 80 “Road and Rail Tankers” (static measurement)</li> <li>•R 85 “Automatic Level Gauges for Measuring the Level of Liquid in Fixed Storage Tanks”</li> <li>•R 95 “Ship’s Tanks”</li> <li>•R 117 “Measuring Systems for Liquids Other Than Water” (all measuring technologies)</li> <li>•R 118 “Testing Procedures and Test Report Format for Pattern Examination of Fuel Dispensers for Motor Vehicles”</li> <li>•TC 3/SC 4 “Verification Period of Utility Meters Using Sampling Inspections”</li> <li>•R 137 “Gas Meters” (all measuring technologies)</li> <li>•R 140 “Measuring Systems for Gaseous Fuel” (i.e., large pipelines)</li> <li>•ISO TC 30/SC 7 “Water Meters”</li> </ul>	
Dr. Ambler Thompson (ILMG) (301) 975-2333 ambler@nist.gov		<ul style="list-style-type: none"> <li>•D 16 “Principles of Assurance of Metrological Control”</li> <li>•D 19 “Pattern Evaluation and Pattern Approval”</li> <li>•D 20 “Initial and Subsequent Verification of Measuring Instruments and Processes”</li> <li>•D 27 “Initial Verification of Measuring Instruments Using the Manufacturer’s Quality Management System”</li> <li>•D 31 “General requirements for software controlled measuring instruments”</li> <li>•R 34 “Accuracy Classes of Measuring Instruments”</li> <li>•R 46 “Active Electrical Energy Meters for Direct Connection of Class 2”</li> </ul>	
Ms. Juana Williams (LMDG) (301) 975-3989 juana.williams@nist.gov		<ul style="list-style-type: none"> <li>•R 81 “Dynamic Measuring Devices and Systems for Cryogenic Liquids”</li> <li>•R 139 “Compressed Gaseous Fuels Measuring Systems for Vehicles”</li> </ul>	
<b>LIST OF ACRONYMS</b>			
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.

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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 2020 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 work group. Mr. Langford noted that these WIM scales are not currently used to levy fines, but rather to screen for overweight trucks. He noted that the 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 work group.

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 working 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 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. Stephen Langford, Cardinal Scales, 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.

### **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 work group to further develop this issue.

- The 2010 S&T Committee established a task group 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   | (8) Full service   |
| (2) Club member discounts  | (9) Self service   |
| (3) Discount for prepaying cash (to prevent “drive-offs”)                    | (10) Progressive discounts based on volume of motor-fuel purchased |
| (4) Prepay at the cashier for credit sales                                   | (11) Coupons for discounts on immediate or future purchases        |
| (5) Discounts for purchasing store products                                  | (12) Rebates (e.g., use of oil company credit card)                |
| (6) Discounts for purchasing a service (e.g., carwash)                       | (13) Day of the week discounts                                     |
| (7) Targeted group discounts (e.g., Tuesday – ladies 5 cents off per gallon) |  |

**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 Information 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 work group 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 that NIST 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 items 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 work group to address this issue.

At its fall 2009 meeting, NEWMA agreed that this is a priority item and encouraged the formation of a work group 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 work group. 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 work group. 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 work group.

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 task group, and decided to give this item Developing status until the task group develops a proposal for consideration by the Conference. After

collaborating with NCWM Chairman, Randy Jennings, the Committee Chair indicated that the task group 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 Juana Williams collaborate with the S&T Chair regarding possible candidates for the task group's chair position based on those who have indicated an interest in serving on the task group. The Committee asked that the task group provide frequent updates on its progress to the Committee and to the regional Weights and Measures associations. The Committee also asked that the task group 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.

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](mailto:juana.williams@nist.gov), by telephone at (301) 975-3989, or in writing at NIST 100 Bureau Drive – Stop 2600, Gaithersburg, MD 20899-2600.

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## Appendix B - Attachments

<b>S&amp;T Agenda Item 310-3: Examples of Repaired Devices/Repaired Elements</b>				
2002 NCWM Annual Report Agenda Item 310-2A from the Remanufactured Devices Task Force				
<b>Section I Examples of Repaired Devices/Repaired Elements (no metrological change)</b>				
	<b>Remanufactured Device</b>	<b>Remanufactured Element</b>	<b>Still Traceable to NTEP CC</b>	<b>Marking Required</b>
<b>Weighing Activity</b>				
<b>I-1-W</b> 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
<b>I-2-W</b> 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
<b>I-3-W</b> 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
<b>I-4-W</b> A class III L scales in which a section adjustment (mechanical or electronic) is made and some disassembly is required.	No	No	Yes	No
<b>I-5-W</b> A mechanical scales in which a nose iron is adjusted and some disassembly is required.	No	No	Yes	No
<b>I-6-W</b> Replacement of Liquid Crystal Display (LCD) or non-metrological computer boards or chips.	No	No	Yes	No
<b>I-7-W</b> Replacement of pivots and bearings on mechanical scales. <b>NOTE:</b> Pivots and bearings would have to meet the original manufacturer's specifications for the scale to operate correctly.	No	No	Yes	No
<b>I-8-W</b> Replacement of some or all load cells with load cells identical (same manufacturer, make and model) to those removed.	No	No	Yes	No
<b>I-9-W</b> Replacement of some or all load cells with metrologically equivalent ( $n_{max}$ , $v_{min}$ , 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
<b>I-10-W</b> 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
<b>Measuring Activity</b>				
<b>I-1-M</b> Disassembly of a motor fuel dispenser for the purpose of replacing a meter gasket.	No	No	Yes	No

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<b>I-2-M</b> 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
<b>I-3-M</b> 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
<b>I-4-M</b> Replacement of nozzles on gasoline dispensers.	No	No	Yes	No
<b>I-5-M</b> Replacement of LCD or non-metrological computer boards or chips.	No	No	Yes	No
<b>I-6-M</b> 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
<b>I-7-M</b> 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
<b>I-8-M</b> A used equipment dealer replaces a meter that cannot be brought into the proper calibration with a used meter (in their shop) of the same model taken from a used dispenser and the meter is recalibrated when installed and placed back in service.	No	No	Yes	No
<b>I-9-M</b> A remanufacturer disassembles a dispenser to replace a meter that cannot be brought into the proper calibration with a used meter (in their plant) of the same model taken from a used dispenser and the meter is recalibrated when installed and placed back in service.	No	No	Yes	No
<b>I-10-M</b> A service agency partially disassembles a motor fuel dispenser, cleans the dispenser and replaces the meter with a meter identical (same manufacturer, make and model) to that removed.	No	No	Yes	No
<b>Section II - Examples of Remanufactured Devices/Remanufactured Elements (no metrological change)</b>				
	<b>Remanufactured Device</b>	<b>Remanufactured Element</b>	<b>Still Traceable to NTEP CC</b>	<b>Marking Required</b>
<b>Weighing Activity</b>				
<b>II-1-W</b> 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 ( $n_{max}$ , $v_{min}$ , 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)
<b>II-2-W</b> A service agency replaces a digital indicating element of a floor scale with the same	No	Yes – Indicating Element	Yes	Yes (Indicating)

<b>S&amp;T Agenda Item 310-3: Examples of Repaired Devices/Repaired Elements</b>				
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model indicator remanufactured by a firm other than the original manufacturer of the scale. <b>NOTE:</b> The remanufacturer made no design change to the indicator.		No – Weighing Element		Element only)
<b>II-3-W</b> 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
<b>II-4-W</b> 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)
<b>II-5-W</b> 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
<b>Measuring Activity</b>				
<b>II-1-M</b> 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
<b>II-2-M</b> 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. <b>NOTE:</b> The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
<b>II-3-M</b> 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. <b>NOTE:</b> The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
<b>II-4-M</b> 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	Yes	No (Original markings meet requirement)
<b>II-5-M</b> 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
<b>II-6-M</b> A dispenser remanufacturer completely	Yes	Yes	Yes	Yes

<b>S&amp;T Agenda Item 310-3: Examples of Repaired Devices/Repaired Elements</b>				
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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.				
<b>II-7-M</b> 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. <b>NOTE:</b> The remanufacturer made no design change.	No	Yes	Yes	Yes (Element only)
<b>II-8-M</b> 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
<b>Section III</b>				
<b>Examples of Remanufacturing/Repairs/Modifications that Constitute a Metrological Design Change or a Violation of NTEP Policy</b>				
	<b>Remanufactured Device</b>	<b>Remanufactured Element</b>	<b>Still Traceable to NTEP CC</b>	<b>Marking Required</b>
<b>Weighing Activity</b>				
<b>III-1-W</b> A company disassembles a scale, cleans the scale and checks for worn parts, then replaces hydraulic load cells with shear beam load cells. <b>NOTE:</b> Requires different mounting due to different type of cells.	Not Applicable	Not Applicable	No	Yes*
<b>III-2-W</b> A metrological change to Original Equipment Manufacturer (OEM) design of a weighing device or element.	Not Applicable	Not Applicable	No	Yes*
<b>III-3-W</b> Structural modifications to weighbridges. Scale changes that do not comply with UR. 4.3. Scale Modification	Not Applicable	Not Applicable	No	Yes*
<b>III-4-W</b> Replacing a lever system with load cells.	Not Applicable	Not Applicable	No	Yes*
<b>III-5-W</b> 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*
<b>III-6-W</b> 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*
<b>Measuring Activity</b>				



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<b>III-1-M</b> A metrological change to the Original Equipment Manufacturer (OEM) design of a measuring device or element.	Not Applicable	Not Applicable	No	Yes*
<b>III-2-M</b> 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 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.

<b>S&amp;T Agenda Item 310-3: Examples of Repaired Devices/Repaired Elements</b>
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<b>III-2-M</b> 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-

**S&T Agenda Item 310-3: HB 44 (2010) General and Scales Code List of Nonretroactive requirements.**

<b>Code Section</b>	<b>Nonretroactive paragraph</b>	<b>Effective Date</b>	<b>Subject</b>	<b>Comment</b>
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	

Code Section	Nonretroactive paragraph	Effective Date	Subject	Comment
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?)
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	<b>Retroactive exemption</b> 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 <b>retroactive</b> 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

Code Section	Nonretroactive paragraph	Effective Date	Subject	Comment
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
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.

<b>Code Section</b>	<b>Nonretroactive paragraph</b>	<b>Effective Date</b>	<b>Subject</b>	<b>Comment</b>
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
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.

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## Appendix C – Correspondences

### S&T Agenda Item 310-3: 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 have 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 for equipment that is passed on to the consumer from a retail location that sells 250,000 gallons per month versus 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 rebuilt and move to another grocery store.

**S&T Agenda Item 310-3: Letter from PMP**

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

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 fill 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 of 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: 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,

GRAFFCO, INC.  
Dan Graff President  
13957 Lake Drive Forest Lake,  
MN 55025

651-464-1079

**S&T Agenda Item 310-3: Stakeholders Letter from Graffco**

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

Letter from Remanufacturing Stakeholders July 2, 2010  
 Page 2

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**S&T Agenda Item 310-3: Stakeholders Letter from Graffco**

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

Letter from Remanufacturing Stakeholders July 2, 2010

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**S&T Agenda Item 310-3: Stakeholders Letter from Graffco**

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

Letter from Remanufacturing Stakeholders July 2, 2010  
Page 4

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**S&T Agenda Item 310-3: 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:

- **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

**S&T Agenda Item 310-3: Letter from Dresser Wayne**

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

(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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[www.dresserwayne.com](http://www.dresserwayne.com)

**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



501 90<sup>th</sup> Avenue N.W.  
Minneapolis, MN 55433

PH: 800-445-3503  
Fax: 763.783.2525  
www.thermofisher.com

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 an 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 be 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 Serrico – 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.



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

**(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.

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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		

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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
8/7/08	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		
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
<b>Con't</b>							
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	
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

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September-DAA							
Date	Tank check/ calibration	(Prover) Cu/Inches Start	(Display) Meter Reading	(Prover) Cu/Inches Finish	(Display) Meter Reading	Water Temp (F)	Comments
9/16/08	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	
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	

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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
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

Mass Flow Meter Calibration Data					
Date	Time	Temp °F	Meter Gal	Prover Gal	Diff in cc
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
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

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Mass Flow Meter Calibration Data					
Date	Time	Temp °F	Meter Gal	Prover Gal	Diff in cc
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
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



Mass Flow Meter Calibration Data					
Date	Time	Temp °F	Meter Gal	Prover Gal	Diff in cc
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
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

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Mass Flow Meter Calibration Data					
Date	Time	Temp °F	Meter Gal	Prover Gal	Diff in cc
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
6/7/2007	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
	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

Mass Flow Meter Calibration Data					
Date	Time	Temp °F	Meter Gal	Prover Gal	Diff in cc
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)
7/9/2007	2:10	72.30	50.00	49.98	(0.02)
	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
	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

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Mass Flow Meter Calibration Data					
Date	Time	Temp °F	Meter Gal	Prover Gal	Diff in cc
	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
	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

Mass Flow Meter Calibration Data					
Date	Time	Temp °F	Meter Gal	Prover Gal	Diff in cc
	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
	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

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Mass Flow Meter Calibration Data					
Date	Time	Temp °F	Meter Gal	Prover Gal	Diff in cc
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
9/12/2007	3:00	64.40	50.00	50.02	0.02
	12:00	68.40	50.00	50.00	0.00
9/14/2007	2:00	68.60	50.00	50.00	0.00
	9:00	68.10	50.00	50.01	0.01
9/14/2007	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)
	1:20	69.00	50.00	49.98	(0.02)
	9/18/2007	10:00	67.20	50.00	50.00
9/18/2007	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