

**National Type Evaluation Technical Committee (NTETC)  
Grain Analyzer Sector  
August 19-20, 2009 - Kansas City, Missouri  
Meeting Agenda**

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**1. Report on the 2009 NCWM Interim and Annual Meetings**

The Interim Meeting of the 94<sup>th</sup> National Conference on Weights and Measures (NCWM) was held January 11-14, 2009, in Daytona Beach, Florida. At that meeting the NTEP Committee accepted the Sector's recommended amendments and changes to the 2008 Edition of NCWM Publication 14. These changes appear in the 2009 Edition of Publication 14. No Grain Moisture Meter (GMM) or Near Infrared (NIR) Grain Analyzer items appeared in the Specifications and Tolerances (S&T) Committee Interim Report for consideration by the NCWM at the 2009 Annual Meeting held July 12-16, 2009, in San Antonio, Texas. Jim Truex, NTEP Administrator will report on other items that may be of interest to the Sector.

**2. Report on NTEP Type Evaluations and OCP (Phase II) Testing**

Cathy Brenner of the Grain Inspection, Processors and Stockyards Administration (GIPSA), the NTEP Participating Laboratory for Grain Analyzers, will bring us up to date on the progress of NTEP Type Evaluations and the collection and analysis of Grain Moisture Meter OCP (Phase II) data on the 2008 crop. She will also identify, for the 2009 harvest, the models enrolled in Phase II.

**3. Review of Ongoing Calibration Program (Phase II) Performance Data**

At the Sector's August 2005 meeting it was agreed that comparative OCP data identifying the Official Meter and listing the average bias for each NTEP meter type should be available for annual review by the Sector. Accordingly, Cathy Brenner, representing GIPSA, the NTEP Participating Laboratory for Grain Analyzers, will present data showing the performance of NTEP meters compared to the air oven. These data are based on the last three crop years (2006–2008) using calibrations updated for use during the 2009 harvest season. See the attached 2006-2008 GMM Phase II comparison graphs.

#### 4. Software Requirements That May Impact Grain Analyzers

**Background:** In October 2008 the International Committee of Legal Metrology (CIML) approved the new OIML Document **D 31 *General requirements for software-controlled measuring instruments*** that is intended to serve as guidance for software requirements in International Recommendations under development by OIML technical committees. Sector members are urged to study this document which provides a thorough discussion of the requirements for software-based electronic measuring instruments with examples given to illustrate how requirements might be implemented. Document D 31 can be downloaded free of charge from:

<http://www.oiml.org/publications/D/D031-e08.pdf>

In 2005 the NCWM Board of Directors established an NTETC Software Sector. One of the tasks assigned to the Sector was to develop a clear understanding of the use of software in today's weighing and measuring instruments. A good overview of the work of the Software Sector is contained in the Meeting Summary of the Sector's Annual Meeting held March 11-12, 2009, in Reynoldsburg, Ohio. The Summary can be downloaded from the NCWM web page:

[http://www.ncwm.net/events/pdf/09\\_Software\\_Sector\\_Summary.pdf](http://www.ncwm.net/events/pdf/09_Software_Sector_Summary.pdf) .

Two NTEPTC Software Sector items have been accepted as Information items by the S&T Committee for inclusion in the Committee Reports for the NCWM 94<sup>th</sup> Annual Meeting in 2009. Information Items report on subjects and/or actions under consideration by the committee but not proposed for voting. The Committee Reports can be downloaded from the NIST Weights and Measures Division (WMD) web page:

<http://ts.nist.gov/WeightsAndMeasures/Publications/upload/11-ST-09-Pub16-FINAL.doc>

The two Information items and several other Software Sector item are summarized below (This information was included to facilitate discussion on the possible impact of these recommendations on Grain Moisture Meters (GMMs) and Near Infrared (NIR) Grain Analyzers.):

##### **4.a Item 310-2: Appendix D – Definition of Electronic Devices, Software-Based and Built-For-Purpose Device**

**Background:** At the Software Sector's October 2007 meeting, it was initially suggested that the term "not-built-for-purpose" be removed from the wording in NIST HB 44 paragraph G-S.1.1., because there is no definition for a not-built-for-purpose device in HB 44. After a lengthy discussion related to the terms "built-for-purpose" and "not-built-for-purpose," the Sector agreed these terms were not clear and should be replaced with definitions based on the revision of **OIML R 76 *Non-automatic Weighing Instruments***, Subsections 5.5.1. (Type P) and 5.5.2. (Type U).

At the 2009 NCWM Interim Meeting, the S&T Committee received comments from the Scale Manufacturers Association (SMA) stating that it now opposes this item since there is no technological justification for making a distinction in software-based device types. Other comments were received taking issue with the SMA position arguing that significant physical differences make the distinction necessary. (Type P with designed for purpose hardware using embedded software vs. Type U with generic multi-purpose hardware and loaded software). Software Sector Co-chair Jim Pettinato (FMC Technologies) added that international recommendations recognize the differences between embedded software and programmable/loadable software. The Software Sector recommended that this item remain Informational to allow further review. Following is the definition as it appeared the S&T Committee Report for the 94<sup>th</sup> Annual Meeting:

**Electronic devices, software-based. – Weighing and measuring devices or systems that use metrological software to facilitate compliance with Handbook 44. This includes:**

- (a) Embedded software devices (Type P), aka built-for-purpose. – A device or element with software used in a fixed hardware and software environment that cannot be modified or uploaded via any interface without breaking a security seal or other approved means for providing security, and will be called a “P,” or**
- (b) Programmable or loadable metrological software devices (Type U), aka not-built-for-purpose. – A personal computer or other device and/or element with PC components with programmable or loadable metrological software, and will be called “U.” A “U” is assumed if the conditions for embedded software devices are not met.**

**Software-based devices – See Electronic devices, software-based.**

At the Software Sector’s March 2009 meeting, some discussion on the wording of the definitions resulted in the proposal of a slightly modified version (see below), but no consensus was reached on the language change shown below.

**Electronic devices, software-based. Weighing and measuring devices or systems that use metrological software to facilitate compliance with Handbook 44. This includes:**

- (a) Type ‘P’ (aka built-for-purpose) software-based electronic devices. A device or element with software used in a fixed hardware and software environment that cannot be modified or uploaded via any interface without breaking a security seal or other approved means for providing security;**
- (b) Type ‘U’ (aka not-built-for-purpose) software-based electronic devices. All metrological software-based devices not meeting the conditions of a Type ‘P’ device. Example: a personal computer or other device and/or element with PC components with programmable or loadable metrological software.**

**Software-based devices – See Electronic devices, software-based.**

**Discussion:** The differentiation between software embedded in a built-for-purpose measuring instrument (Type P) and software for measuring instruments using a universal computer (Type U) is well established in the European Community. See **WELMEC Software Guide (Measuring Instruments Directive 2004/22/EC)**. The designations Type P and Type U are also expected to be used in the General Code section of NIST Handbook 44 (HB 44). The Grain Analyzer Sector is asked for comments on the definition proposed by the Software Sector at their March 2009 meeting.

**4.b Item 310-3: G-S.1. Identification. – (Software)**

**Background:** Starting at the October 2007 meeting, the Software Sector has discussed the value and merits of required markings for software. After several iterations, the Sector developed a table to reflect their positions. This table was submitted to NCWM S&T Committee and was assigned Developing status in 2008. However, the Software Sector did not include a recommendation on how to incorporate the proposal into existing G-S.1. and G-S.1.1. language. In particular, WMD was

concerned about properly addressing the various existing requirements and multiple non-retroactive dates.

Prior to the NCWM 2009 Interim Meeting, NIST WMD commented on this item, and presented an alternate proposal with significant modifications, which were included in the Interim Meeting Agenda background for the item (See 2009 Pub 15 for more details). In brief, the WMD proposal divided the identification and marking location requirements for all devices and separable elements into two groups according to whether they were manufactured prior to or after a date adopted by the Conference.

The WMD proposal was subsequently accepted by the S&T Committee as Information Item 310-3 in the Committee Reports for the 94<sup>th</sup> Annual Meeting of the NCWM. The WMD proposal is reproduced below:

**G-S.1. Identification. – For the purposes of identification, all equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect and manufactured on or after January 1, 201X, shall be clearly marked as specified in Table G-S.1. Identification and explained in the accompanying notes in Table G-S.1. Notes:**

All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect **and manufactured prior to January 1, 201X**, shall be clearly and permanently marked for the purposes of identification with the following information:

- (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 **Type U (not-built-for-purpose) software-based** devices;*  
[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 **Type U (not-built-for-purpose) software-based** 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)

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- (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 Certificate of Conformance (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 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
- (b) The Certificate of Conformance (CC) Number shall be:
- (1) permanently marked on the device;
  - (2) continuously displayed; or
  - (3) accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, “Help,” “System Identification,” “G-S.1. Identification,” or “Weights and Measures Identification.”

**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)

<b>Table G-S.1. Identification for Devices Manufactured on or after January 1, 201X (For applicable notes, see Table G-S.1. Notes on Identification)</b>			
<b><u>Required Marking</u></b>	<b><u>Full Mechanical Devices and Separable Mechanical Elements</u></b>	<b><u>Type P Electronic Devices and Separable Elements</u></b>	<b><u>Type U Electronic Devices and Separable Elements</u></b>
<b><u>Name, initials, or trademark of the manufacturer or CC holder</u></b>	<b><u>Hard-Marked</u></b>	<b><u>Hard-Marked or Continuously Displayed</u></b>	<b><u>Hard-Marked, Continuously Displayed, or Via Menu (display) or Print Option (8)</u></b>
<b><u>Model identification information that positively identifies the pattern or design of the device (1)</u></b>	<b><u>Hard-Marked</u></b>	<b><u>Hard-Marked or Continuously Displayed</u></b>	<b><u>Hard-Marked, Continuously Displayed, or Via Menu (display) or Print Option (8)</u></b>
<b><u>Non-repetitive serial number (2)</u></b>	<b><u>Hard-Marked</u></b>	<b><u>Hard-Marked or Continuously Displayed</u></b>	<b><u>Not Acceptable</u></b>
<b><u>Software version or revision (3)</u></b>	<b><u>Not Applicable</u></b>	<b><u>Hard Marked (5), Continuously Displayed, or by Command (operator action) (6)</u></b>	<b><u>Continuously Displayed or Via Menu (display) or Print Option (8)</u></b>
<b><u>Certificate of Conformance number or corresponding CC Addendum (4)</u></b>	<b><u>Hard-Marked</u></b>	<b><u>Hard-Marked or Continuously Displayed</u></b>	<b><u>Hard-Marked (7) or Continuously Displayed</u></b>
<b><u>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.</u></b>			

**(Added 201X)**

**Table G-S.1. Notes on Identification  
For Devices Manufactured on or after January 1, 201X**

- 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.
- 2) Except for equipment with no moving or electronic parts, the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.
  - 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.).
- 3) Metrologically significant software shall be clearly identified with the software version. The identification may consist of more than one part but one part shall be dedicated to the metrologically significant portion.
  - 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.
  - 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.).
- 4) An NTEP Certificate of Conformance (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.).
- 5) If the manufacturer declares that the primary sensing element “software” is integral, has no end user interface and no print capability, the version/revision shall be hard-marked on the device. Example: Primary sensing element may be Positive Displacement (P.D.) meter with integral correction, digital load cell (only for reference, not limiting).
- 6) Information on how to obtain the Version/Revision shall be included on the NTEP CC.
- 7) Hard-marking of the CC Number is permitted if no means of displaying this information is available.
- 8) Information on how to obtain the name, initials, or trademark of the manufacturer or CC holder, model designation, and software version/revision information shall be included on the NTEP CC.

**(Added 201X)**

At the Software Sector’s March 2009 meeting several members were of the opinion that the perceived scope of their original proposal had been extended by the modifications proposed by WMD and had actually made the Sector’s intent less clear. The Sector chairman proposed revisiting the current text of G-S.1. to determine exactly what changes would be required to reflect the Sector’s position. It was also noted that there was some validity to the Scale Manufacturers Association argument that there is no justification for differentiation of marking requirements based on device type (P or U). After additional lengthy discussions, the following modified versions of G-S.1/G-S.1.1 were drafted. Although the Sector believed that a table was now unnecessary, they also suggested what the table should look like if one was desired. They also pointed out that the second table of “Notes” as proposed by WMD was now redundant because the notes were incorporated in their suggested table.

The Software Sector’s March 2009 proposal is shown below:

**G-S.1. Identification.** – All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect and manufactured after January 1, 201X, shall be clearly and permanently marked for the purposes of identification with the following information:

- (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 lower case.*  
[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 devices~~ software that is not part of a Type P (built-for-purpose) device;*  
[Nonretroactive as of January 1, 1968]  
(Amended 2003 and 201X)
  - (3) *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]
  - (4) *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)
  - (3) *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)
  - (4) *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 Certificate of Conformance (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)

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

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

(1) *permanently marked on the device;*

(2) *continuously displayed; or*

(3) *accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, “Help,” “System Identification,” “G-S.1. Identification,” or “Weights and Measures Identification.”*

***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**)

<b><u>Table G-S.1. Identification for Devices Manufactured on or after January 1, 201X</u></b>		
<b><u>Required Marking</u></b>	<b><u>Full Mechanical Devices and Separable Mechanical Elements</u></b>	<b><u>Electronic Devices, Software Based</u></b>
<b><u>Manufacturer or CC holder ID</u></b>	<b><u>Hard-Marked</u></b>	<b><u>Hard-Marked, Continuously Displayed, Via Menu (display) or by command (operator action)</u></b>
<b><u>Model identification</u></b>	<b><u>Hard-Marked</u></b>	<b><u>Hard-Marked, Continuously Displayed, Via Menu (display) or by command (operator action)</u></b>
<b><u>Serial number</u></b>	<b><u>Hard-Marked</u></b>	<b><u>Hard-Marked, Continuously Displayed<sup>1</sup></u></b>
<b><u>Metrologically Significant Software version</u></b>	<b><u>Not Applicable</u></b>	<b><u>Continuously Displayed, Via Menu (display) or by command (operator action)<sup>2</sup></u></b>
<b><u>Certificate of Conformance number</u></b>	<b><u>Hard-Marked</u></b>	<b><u>Hard-Marked, Continuously Displayed, Via Menu (display) or by command (operator action)<sup>3</sup></u></b>
<p><b><u><sup>1</sup>Type ‘U’ devices need not have a non-repetitive serial number.</u></b></p> <p><b><u><sup>2</sup>If the manufacturer declares that the primary sensing element “software” is integral, has no end user interface and no print capability, the version/revision shall be hard-marked on the device. Example: Primary sensing element may be Positive Displacement (P.D.) meter with integral correction, digital load cell (only for reference, not limiting).</u></b></p> <p><b><u><sup>3</sup>If the Certificate of Conformance number is to be displayed via menu and/or submenu, the means of access must be easily recognizable. In addition, instructions on how to obtain the remaining required information not hard-marked or continuously displayed shall be included on the NTEP CC.</u></b></p>		

**Discussion:** All GMMs and NIR Grain Analyzers currently holding active CCs are of Type P. For these devices it would appear that the requirement for marking the Software Version/Revision of the metrologically significant portion would be the only change required to comply with the proposed marking for Type P devices. The Sector is asked to comment on the two proposals for changes to G-S.1. and G-S.1.1., specifically:

Is the Sector in favor of endorsing the WMD’s proposed wording as it appeared in the S&T Committee Report for the 94<sup>th</sup> Annual Meeting or the Software Sector’s March 2009 proposed wording for G-S.1. and G-S.1.1.?

**4.c Identification of Certified Software**

**Background:** The Software Sector’s work on this item originated as an attempt to answer the question, “How does the field inspector know that the software running in the device is the same software that was evaluated and approved by the lab.” Both WELMEC and OIML have already addressed this issue.

From WELMEC:

**Required Documentation:**

The documentation shall list the software identifications and describe how the software identification is created, how it is inextricably linked to the software itself, how it may be accessed for viewing and how it is structured in order to differentiate between version changes with and without requiring a type approval.

From OIML D 31 *General Requirements for Software Controlled Measuring Instruments:*

**Software identification**

Sequence of readable characters (e.g. version number, checksum) that is inextricably linked to the software or *software module* under consideration. It can be checked on an instrument whilst in use.

Legally relevant software of a measuring instrument / electronic device / sub-assembly shall be clearly identified with the software version or another token. The identification may consist of more than one part but at least one part shall be dedicated to the legal purpose. The identification shall be inextricably linked to the software itself and shall be presented or printed on command or displayed during operation or at start up for a measuring instrument that can be turned off and on again.

From OIML R 76-1 *Non-automatic weighing instruments:*

**Devices with embedded software**

For instruments and modules with embedded software, the manufacturer shall describe or declare that the software of the instrument or module is embedded, i.e. it is used in a fixed hardware and software environment and cannot be modified or uploaded via any interface or by other means after securing and/or verification. In addition to the documentation required in 8.2.1.2 the manufacturer shall submit the following documentation:

- Description of the legally relevant functions;
- Software identification that is clearly assigned to the legally relevant functions;
- Securing measures foreseen to provide for evidence of an intervention.

The software identification shall be provided by the instrument and listed in the OIML Certificate.

**Acceptable solution:**

The software identification is provided in the normal operation mode by either:

- a clearly identified operation of a physical or soft key, button, or switch; or
- a continuously displayed version number or checksum, etc.

accompanied in both cases by clear instructions on how to check the actual software identification against the reference number (as listed in the OIML Certificate) marked on or displayed by the instrument.

The Software Sector is developing language to be added to HB 44 that will include requirements similar to those developed by OIML. It was anticipated that a work group would be designated by the Sector Co-Chairs prior to the NCWM 94<sup>th</sup> Annual Meeting to further promote the state of this item to be discussed at the Software Sector's next meeting.

Initial DRAFT of the Software Sector’s proposed language (for G-S.1.1.):

**Identification of Certified Software:**

**Software-based electronic devices shall be designed such that the metrologically significant software is clearly identified. The identification of the software shall be inextricably linked to the software itself.**

- **Unique identifier must be displayable/printable on command or during operation, etc. (marking req’t in addition )**
- **At a minimum, a version/revision indication (1.02.09, rev 3.0 a, etc). Could also consist of / contain checksum, etc (crc32, for example)**

**Discussion:** The following requirements are taken from the WELMEC document:

**4.2 Specific Requirements for Type P**

Risk Class B	Risk Class C	Risk Class D
<p><b>P2: Software identification</b>  <i>The legally relevant software shall be clearly identified. An identification of the software shall be inextricably linked to the software itself. It shall be presented on command or during operation.</i></p>		
<p><b>Specifying Notes:</b>                      1. Changes to metrologically relevant software require information of the NB. The NB decides whether a new unique software identification is necessary or not. A new software identification is only required if the software changes lead to changes of the approved functions or characteristics.</p>	<p><b>Specifying Notes:</b>                      In addition to 1B: Each change to legally relevant software defined as fixed at type approval requires a new software identification.</p>	
<p>2. The software identification shall have a structure that clearly identifies versions that require type approval and those that do not.                      3. If functions of the software can be switched by type-specific parameters, each function or variant may be identified separately or, alternatively, the complete package may be identified as a whole.</p>		
<p><b>Example of an Acceptable Solution:</b></p> <ul style="list-style-type: none"> <li>• The identification of legally relevant software comprises two parts. Part (A) has to be changed, if changes to the software require a new approval. Part (B) indicates only minor changes to the software e.g. bug fixes, which need no new approval.</li> <li>• The identification is generated and displayed on command.</li> </ul>		
<ul style="list-style-type: none"> <li>• Part (A) of the identification consists of a version number or the number of the TAC.</li> </ul>	<ul style="list-style-type: none"> <li>• Part (A) of the identification consists of an automatically generated checksum over the legally relevant software that has been declared fixed at type approval. For other legally relevant software, part (A) is a version number or the number of the TAC.</li> <li>• An example of an acceptable solution for performing the checksum is the CRC-16 algorithm</li> </ul>	

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In order for software to have a unique identifier that is “inextricably linked to the software itself” the software must be “Fixed” so that any change made after certification is reflected by a change in the unique identifier. Note that the WELMEC document requires that the National Body (NB) be notified of changes to metrologically relevant software. In turn, the NB decides whether a new unique software identification is necessary or not. Additionally, for Risk Class C parts of the software may be declared as “fixed” at type approval.

Assuming that the WELMEC approach can be applied to software identification for GMMs and NIR analyzers in the NTEP program, the metrologically significant (legally relevant) software of Grain Analyzers might be subdivided into the following elements:

- Main Program<sup>1,2</sup>
- Associated subroutines<sup>1,2</sup>
- Type Specific Parameter tables<sup>1,2</sup> (set by the manufacturer)
- Device specific Parameter tables (set by the manufacturer or a competent service representative.)
- Site Specific Parameter tables (set by user and verified by field inspection)
- Individual Grain Calibrations<sup>2</sup> (periodically changed – frequently by user, verified by field inspection.)

Notes:

1. “Fixed” portion of metrologically significant software.
2. Some types may have the capability to download revisions of these items either remotely via a communications link or locally from a computer or USB memory device.

Although it is not practical to include individual grain calibrations in the “fixed” portion of software because of their frequent changes, the calibrations are individually identified and are required to be “self-checking” against data corruption or alteration (see **HB44, §5.56.(a)** paragraphs **S.2.4.1. Calibration Version** and **S.2.4.2. Calibration Corruption** and **HB44, §5.57.** paragraphs **S.2.5.2. Calibration Version** and **S.2.5.3. Calibration Corruption.**)

It is also obvious that Site Specific Parameters cannot be included in the “Fixed” portion of metrologically significant software.

The Sector is asked to consider the practicality of making Device specific Parameter tables part of the “Fixed” portion of metrologically significant software and to discuss if the approach to software identification outlined above is reasonable for Grain Analyzers.

**4.d Software Protection/Security**

**Background:** The Software Sector derived a trial Pub 14 checklist based on the OIML checklist to verify that the software adequately protected against fraudulent modification as well as accidental or unintentional changes. The checklist has been distributed to current NTEP labs for use on a trial basis for new type approval applications.

Devices with embedded software TYPE P (aka built-for-purpose)		
	Declaration of the manufacturer that the software is used in a fixed hardware and software environment, and	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	cannot be modified or uploaded by any means after securing/verification	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	<i>Note: It is acceptable to break the "seal" and load new software, audit trail is also a sufficient seal.</i>	
	The software documentation contains:	

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	description of the (all) metrologically significant functions OIML states that there shall be no undocumented functions	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	description of the securing means (evidence of an intervention)	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	software identification	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	description how to check the actual software identification	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	The software identification is:	
	clearly assigned to the metrologically significant software and functions	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	provided by the device as documented	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
<b>Personal computers, instruments with PC components, and other instruments, devices, modules, and elements with programmable or loadable metrologically significant software TYPE U (aka not built-for-purpose)</b>		
	The <i>metrologically significant</i> software is:	
	documented with all relevant (see below for list of documents) information	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	protected against accidental or intentional changes	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	Evidence of intervention (such as, changes, uploads, circumvention) is available until the next verification / inspection (e.g. physical seal, Checksum, CRC, audit trail, etc. means of security)	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
<b>Software with closed shell (no access to the operating system and/or programs possible for the user)</b>		
	Check whether there is a complete set of commands (e.g. function keys or commands via external interfaces) supplied and accompanied by short descriptions	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	Check whether the manufacturer has submitted a written declaration of the completeness of the set of commands	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
<b>Operating system and / or program(s) accessible for the user:</b>		
	Check whether a checksum or equivalent signature is generated over the machine code of the metrologically significant software (program module(s) subject to legal control W&M jurisdiction and type-specific parameters)	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	Check whether the metrologically significant software will detect and act upon any unauthorized alteration of the metrologically significant software using simple software tools e.g. text editor.	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
<b>Software interface(s)</b>		
	Verify the manufacturer has documented:	
	the program modules of the metrologically significant software are defined and separated	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	the protective software interface itself is part of the metrologically significant software	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	the <i>functions</i> of the metrologically significant software that can be accessed via the protective software interface	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	the <i>parameters</i> that may be exchanged via the protective software interface are defined	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	the description of the functions and parameters are conclusive and complete	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	there are software interface instructions for the third party (external) application programmer.	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>

**Discussion:** The Sector is asked to review and comment on the checklist’s applicability to Grain Analyzers with emphasis on Type P devices.

#### 4.e Software Maintenance and Reconfiguration

**Background:** The Software Sector has followed the lead of OIML in defining two procedures used to check software updates for authenticity and integrity and has agreed upon the following language:

**Verified Update:** A verified update is the process of installing new software where the security is broken and the device must be re-verified. Checking for authenticity and integrity is the responsibility of the owner/user.

**Traced Update:** A traced update is the process of installing new software where the software is automatically checked for authenticity and integrity, and the update is recorded in a software update log or audit trail.

The Software Sector has worked on language for defining the requirements for a Traced Update. Their draft specifies, “For a Traced Update, an event logger is required . . .” The draft goes on to say that the use of a Category 3 audit trail is acceptable for the software update logger. The requirements the Software Sector has proposed for Category 3 audit trails are quite similar to the requirements for Category 3 audit trails in the GMM and NIR sections of HB 44 and Pub 14.

The Software Sector also proposed the addition of new text to the General Code section of HB 44:

##### **G-S.9. Metrologically Significant Software Updates**

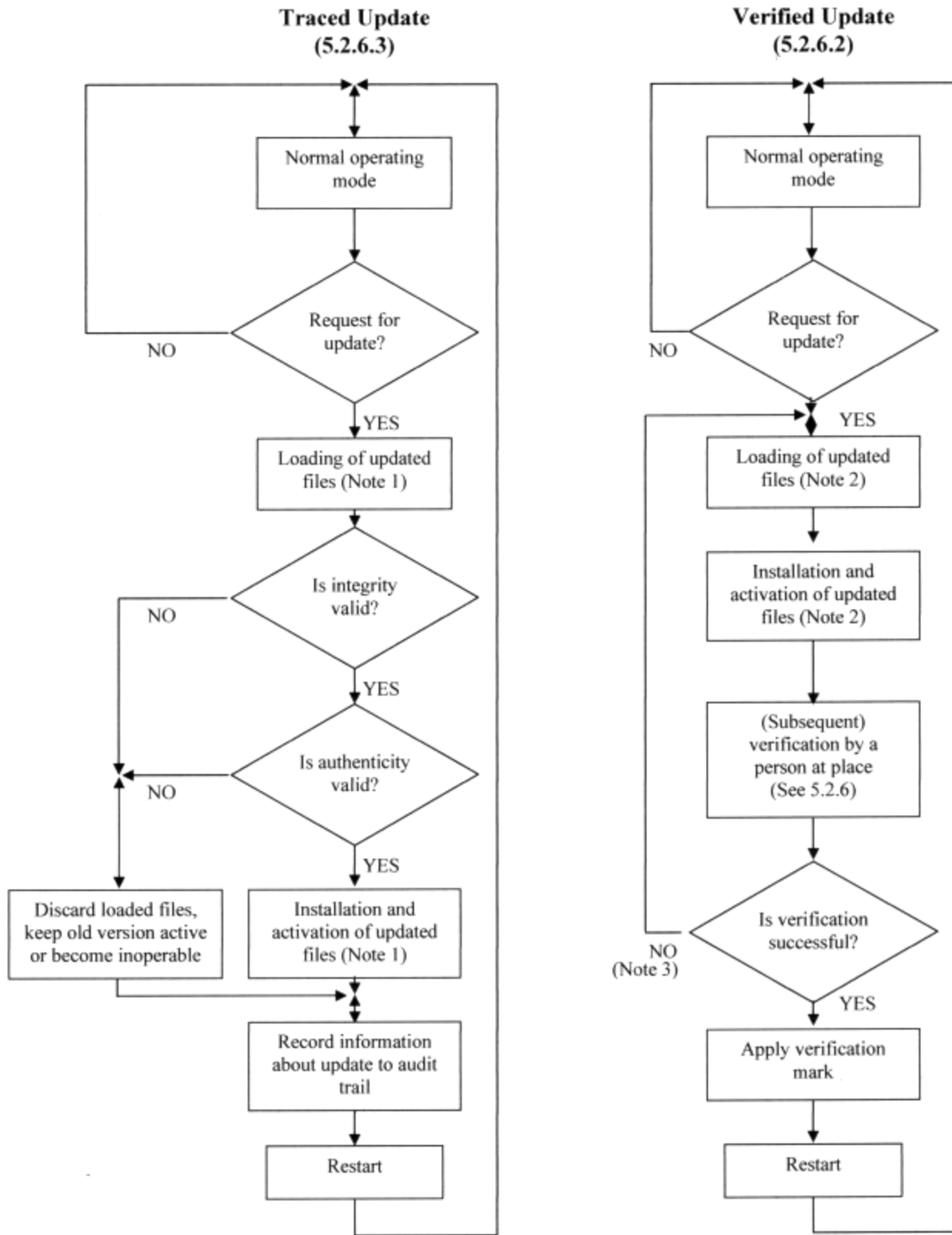
The updating of metrologically significant software shall be considered a sealable event.

Metrologically significant software that does not conform to the approved type is not allowed for use.

The NTEP Administrator was of the opinion that the proposed G-S.9. was unnecessary, because G-S.8. already requires that any changes that affect metrological function are sealable. The Software Sector felt that the explicit language proposed for G-S.9. is clearer than any implied requirement in G-S.8. The Software Sector decided to ask for clarification/interpretation from the S&T Committee.

**Discussion:** OIML D 31:2008 (E) includes flow charts illustrating the implementation of Traced and Verified Updates (see next page). It is likely that the Software Sector will include similar flow charts in their recommendations. Grain Analyzer Sector members are asked to consider the following questions:

- What practical problems does a Verified Update pose to users and field inspectors? [Note: Calibration updates installed by the user and later verified by field inspection are a form of Verified Update.]
- What problems does a Traced Update pose for manufacturers?



Software Update Procedure – from OIML D 31:2008 (E)



*Notes:*

- (1) In the case of a Traced Update updating is separated into two steps: “loading” and “installing/activating”. This implies that the software is temporarily stored after loading without being activated because it must be possible to discard the loaded software and revert to the old version, if the checks fail.
- (2) In the case of a Verified Update , the software may also be loaded and temporarily stored before installation but depending on the technical solution loading and installation may also be accomplished in one step.
- (3) Here, only failure of the verification due to the software update is considered. Failure due to other reasons does not require re-loading and re-installing of the software, symbolized by the NO-branch.

**5. Report on New GIPSA/NIST Interagency Agreement for 2010 - 2014**

The present five-year Interagency Agreement that provides funding for the Grain Moisture Meter On-going Calibration Program (OCP) expires at the end of the Federal Government’s Fiscal Year 2009 (September 30, 2009). Under the proposed terms of the new agreement NIST and GIPSA each contribute one-third the cost of the program subject to an annual maximum of \$30,000 each. The balance of costs is borne by manufacturers and depends on the number of meter models in the NTEP "pool" according to a fee schedule (see table below). Diane Lee, representing NIST, and Rich Pierce, representing GIPSA, will brief the sector on other details of the new agreement and will bring the sector up to date on its approval status.

Proposed NTEP On-going Calibration Program Fee Schedule For Year 2010 to 2014							
(1) Total Meters (including official meter)	(2) Meters In NTEP Pool	(3) Cost Per Pool Meter	(4) Total Program Cost	Funding Contribution From Participants			
				(5) NIST	(6) GIPSA	(7) Mfg’s (total funding from mfg’s)	(8) Cost Per Meter Type
2	1	22,500	22,500	7,500	7,500	7,500	3,750
3	2	22,500	45,000	15,000	15,000	15,000	5,000
4	3	22,500	67,500	22,500	22,500	22,500	5,625
5	4	22,500	90,000	30,000	30,000	30,000	6,000
6	5	22,500	112,500	30,000	30,000	52,500	8,750
7	6	22,500	135,000	30,000	30,000	75,000	10,715
8	7	22,500	157,500	30,000	30,000	97,500	12,185
9	8	22,500	180,000	30,000	30,000	120,000	13,335

Explanation of columns in the Fee Schedule table:

Column	Explanation (or formula for calculating)
(1) Total Meters	The number of meter types (including the Official GIPSA meter) that will share in the NTEP calibration costs.
(2) Total Meters in NTEP Pool	The number of meter types other than the Official meter that will share in the NTEP calibration costs.
(3) Cost per Pool Meter	The cost associated with each pool meter in the program.
(4) Total Program Cost	A per meter type cost of \$22,500 times the number of NTEP "pool" meters.
(5) NIST Contribution	One-third the total program cost up to a maximum of \$30,000.
(6) GIPSA Contribution	One-third the total program cost up to a maximum of \$30,000.
(7) Manufacturers Contributions (total funding from manufacturers)	Total Program Cost minus NIST Contribution minus GIPSA Contribution.
(8) Cost per Meter Type	Manufacturers' Contributions divided by Total Meters (including the Official meter).

**6. Report on OIML TC17/SC1 R59 “Moisture Meters for Cereal Grains and Oilseeds”**

**Background:** This item was included on the Sector’s agenda to provide a summary of the activities of OIML TC17/SC1. In October 2008, the Secretariat of TC 17/SC 1 was jointly allocated to China and the United States. The Co-Secretariats (China and the United States) are working closely with the with an IWG to revise OIML R 59 “Moisture meters for cereal grains and oilseeds.” The 5 CD of **OIML R 59**, revised to comply with OIML’s Guide *Format for OIML Recommendations* and to incorporate tests for the recommended disturbances of **OIML D 11 General Requirements for Electronic Measuring Instruments**, was distributed to the U.S. National Working Group (USNWG) in March 2009 with a request for comments by May 21, 2009. The changes to R59 5 CD are summarized below:

- Extensive reformatting to comply with OIML’s Guide *Format for OIML Recommendations*, OIML B 6-2 *Directives for Technical Work – Part 2*, and the April 2008 OIML Secretariat training.
- Changes to address the comments received to 4 CD
- Changes to the MPE tables
- Added requirements for software
- Added OIML D11 tests
- Added test report section - B
- Added new section 3, Description of instruments
- Added definitions
- Revised the bibliography section
- Explanatory notes includes a history of the TC17/SC1 meetings and committee draft revisions.
- Added cross reference table of OIML R59 5 CD and OIML *Directives for Technical Work*
- Added cross reference table of OIML R59 5 CD and OIML D11

**Discussion:** Diane Lee, NIST/WMD, has stressed the importance of a thorough review of 5 CD. This may be the last opportunity to provide comments, because the next step for this draft recommendation will be voting for its acceptance as an approved OIML Recommendation. Special attention should be paid to the “disturbance” tests from OIML D 11. The following table lists the tests in question and shows where their test procedures are located in 5 CD of R59.

Immunity tests of IEC 61326 and/or Recommended Disturbances in OIML D 11	Test Procedure Section (As appropriate, severity levels are included in test procedures, Annex A)
Sand and Dust	A.4.1
Short time power reduction	A.4.2
Bursts	A.4.3
Radiated radiofrequency, electromagnetic susceptibility	A.4.4
Conducted radiofrequency fields	A.4.5
Electrostatic discharges	A.4.6
Mechanical shock	A.4.7

Diane Lee, NIST/WMD, will brief the Sector on comments received to date on the 5 CD.

**7. Report on OIML TC17/SC8 Draft IR “Protein Measuring Instruments for Cereal Grain”**

**Background:** This item was included on the Sector’s agenda to provide a summary of the activities of OIML TC17/SC8. A new subcommittee has been formed to study the issues and write a working draft document “Measuring instruments for protein determination in grains.” Australia is the Secretariat for this new subcommittee. A TC 17/SC 8 meeting was hosted by NIST in September 2007 to discuss the 2 CD. Discussions on 2 CD dealt mostly with maximum permissible errors (MPEs) and harmonization of the TC 17/SC 8 Recommendation for protein with the TC 17/SC 1 Recommendation for moisture.

**Discussion:** Diane Lee, NIST/WMD, will bring the Sector up to date on the status of 2 CD.

**8. Air-Oven Collaborative Study**

**Background:** NIST-WMD’s laboratory measurement traceability program requires that laboratories participate in interlaboratory and other collaborative experiments. A structured collaborative air oven study was last conducted following the 2000 harvest. Results of that study were reported at the Sector’s August 2001 meeting. At its August 2008 meeting, the Sector agreed that a collaborative study was long overdue. It was also noted that such a study addresses the measurement traceability requirements of *ISO 17025 General requirements for the competence of testing and calibration laboratories*. Two manufacturers, Dr. Hurburgh of Iowa State University, and the two state weights and measures representatives present expressed a desire to participate in the study. Karl Cunningham subsequently agreed that the State of Illinois Moisture Meter Laboratory would serve as the “pivot” laboratory.

**Discussion:** Karl Cunningham will report on the status of the collaborative study.

**9. Item 310-1: G-S.8. Provision for Sealing Electronic Adjustable Components, G-S.8.1. Access to Calibration and Configuration Adjustments, and G-S.8.2. Automatic or Semi-automatic Calibration Mechanism**

**Background:** At its 2007 Annual Meeting, the SWMA received a proposal to add requirements to G-S.8. to assure that a device could not be sealed in the configuration mode and continue to operate

normally. Such a condition could facilitate fraud. The proposal as submitted required that a device continuously indicate when access to the set-up mode was not disabled.

At the 2008 Interim Meeting, the S&T Committee reviewed comments received during the open hearing and discussed alternate proposals provided by WMD and SMA. At the 2008 Annual Meeting, the WMD suggested that the S&T Committee amend the recommendation to address some of the concerns noted by the CWMA, NTEP participating laboratories, and WMD since the 2008 Interim Meeting.

During the open hearings at the 2009 Interim Meeting, WMD stated that it had received comments questioning how the application of a physical seal (as recommended by the manufacturer and listed on the CC) ensures that the calibration and configuration modes are disabled. What does that presence of the physical seal (pressure sensitive or lock and wire) do to the device that disables the calibration and configuration modes?

The Committee agreed with the comments that the proposal *is not ready* to become a Voting item and suggested that further development to the proposal addresses the following concerns:

1. Avoid language that allows the indication of usable metrological values while in the adjustment mode for devices that do not have an event logger.
2. Recognize that more than one method of sealing is acceptable on a single device, such as using a lock and wire seal for the mechanical adjustments and an audit trail for electronic adjustments.
3. Recognize that other codes in HB 44 do not have language for device categories and corresponding methods of sealing.
4. Require an obvious indication when a device is being adjusted if it is provided with a physical security seal.
5. Clarify that the application of a physical security seal to a specially designed and sealable plate or cover that disables external access to the configuration and adjustment mode is not the only method to seal adjustable components.

Consequently, the S&T Committee recommended that this item remain Informational.

After the 2009 Interim Meeting, the NIST technical advisor developed the following language for further development by the regional weights and measures associations, NTETC sectors, and other interested parties with the intent that a revised proposal can be forwarded to the S&T Committee for consideration at the 2010 NCWM Interim Meeting.

***G-S.8. Provision for Sealing Electronic Adjustable Components.*** – *A device shall be designed with provision(s) for: ~~applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.~~*

***(a) applying a physical security seal that must be broken, or***

**(b) using other approved means of providing security (e.g., data change audit trail available at the time of inspection)**

**before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.**

*[Nonretroactive as of January 1, 1990]*

**(Amended 201X)**

A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.

(Added 1985) (Amended 1989 and 1993)

***G-S.8.1. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing. - (Unchanged)***

**G-S.8.2. Multiple Sealing Methods. – Weighing and measuring devices may be approved for use with multiple methods for sealing adjustable components such as physical seals for calibration adjustment (e.g., load cells, meters, etc.) and event counters or event logger for the configuration parameters (e.g., capacity, interval size, octane blend settings, etc.).**

*[Nonretroactive as of January 1, 1990]*

**(Added 201X)**

**G S.8.3. Adjustment Mode Indications. – During the calibration and configuration adjustment mode, the device shall:**

**(a) Not provide metrological indications that can be interpreted, or transmitted into memory, or printed while it is in the calibration and/or configuration adjustment mode as a correct measurement value, or**

**(b) Clearly and continuously indicate that it is in the calibration and/or configuration adjustment mode, and record such message if capable of printing in this mode.**

**Nonretroactive as of January 1, 201X)**

**(Added 201X)**

**Discussion:** The proposed changes to **G-S.8.** and the proposed language of **G-S.8.2.** don't appear to affect the provisions for sealing GMMs and NIR Grain Analyzers (see **HB 44, Section 5.56.(a)**, paragraph **S.2.5. Provision for Sealing** and **HB 44 Section 5.57.**, paragraph **S.2.6. Provision for Sealing.**) The requirements of **G-S.8.3.**, however, may affect some instruments. Sector members are requested to study **G-S.8.3.** and be prepared to discuss any concerns they may have with the proposed language.

## **10. Time and Place for Next Meeting**

A tentative date and location will be selected for the next meeting. A late August meeting in Kansas City is suggested.