National Type Evaluation Technical Committee
Weighing Sector Annual Meeting
September 26-28, 2006
Annapolis, MD
DRAFT Agenda – Revised

Carry-Over Items

1. Recommended Changes to Publication 14 Based on Actions at the 2006 NCWM Annual Meeting

The NTEP technical advisor is providing the Sector with specific recommendations for incorporating test procedures and checklist language based upon actions of the 2006 NCWM Annual Meeting. The Sector is asked to briefly discuss each item and provide general input on the technical aspects of the issues.

1(a). G-S.1. (d) Identification and G-S.1.1. Location of Marking Information for Not-Built-for-Purpose Devices

Background: See 2006 NCWM Publication 16 Committee Reports of the 91st National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Items 310-1 and 310-2 for additional background information. During its 2006 Annual Meeting, the NCWM agreed to addend NIST Handbook 44 Section 1.10. paragraph G-S.1. (d) Identification to include requirements for identifying the required software version designation for not-built-for-purpose devices using acceptable words, abbreviations, or symbols and amend G-S.1.1. to clarify the location requirements for the required information in G-S.1. as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, 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 ~~designation~~ **identifier** that positively identifies the pattern or design of the device;

*1.The model ~~designation~~ **identifier** shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "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;
[Nonretroactive as of January 1, 1968]
(Amended 2003)

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** ~~designation~~ **identifier** for not built-for-purpose, software-based devices;
[Nonretroactive as of January 1, 2004]
(Added 2003)

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 term Number. Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be

followed by the term Number. The abbreviation for the term "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 term "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, ~~and~~ 2003, and 2006)

G-S.1.1. Location of Marking Information for Not built-For-Purpose, Software Based Devices. *- For not built-for-purpose, software based devices, the* ***~~following shall apply:~~ required information in G-S.1. Identification. (a), (b), (d), and (e) shall:***

(a) ***~~the manufacturer or distributor and the model designation~~*** *be continuously displayed* ***~~or marked on the device (see note below),~~*** *or*

(b) the Certificate of Conformance (CC) Number shall be continuously displayed or ***permanently*** *marked on the device (see note below), or*

(c) ***~~all required information in G-S.1. Identification. (a), (b), (d), and (h) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.~~*** *shall be accessible through ~~the "Help"~~* **an easily recognized** *menu,* ***and if necessary a submenu; or***

(dc) have the G-S.1. identification permanently marked on the device.

Note: 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: *Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that 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)**

Recommendation: The Weighing Sector is asked to consider amending the following proposed amendments to NCWM Publication 14 Technical Policy, Checklists, Test Procedures for Weighing Devices, Electronic Cash Registers Interfaced to Scales, Automatic Bulk-Weighing Systems, and Automatic Weighing Systems.

*(**NOTE:** The only changes to be made are to change model designation to model identifier in the Force Transducers and MDMD sections of Publication 14 since there are currently no "not-built-for-purpose, software-based" identification requirements.)*

(DES 2) B.Certificate of Conformance Parameters

Certificates of Conformance (CC) shall detail the main elements, load cells, and auxiliary devices used during an evaluation, including model ~~designation~~ **identifier** and other significant parameters, under the "Test Conditions" portion of the CC. Only the standard features and options that have been evaluated will be included on the CC.

(DES 6) 8. Weighing Systems, Scales or Weighing/load-receiving elements Greater than 30 000 lb Capacity

In the case of a weighbridge design where the deck is integrated into the weighbridge to be structurally significant, both concrete and steel decks must be tested separately to cover both options on an NTEP Certificate of Conformance. Full NTEP tests are required on both options unless NTEP decides otherwise. A composite scale consisting of a minimum of two decks,

(i.e., two spans), one span deck being of steel construction and the other of concrete may be submitted and tested to include both types of decks. Concrete-deck and steel-deck scales should be marked with unique model ~~designations~~ **identifier** to indicate the difference in platform material.

(DES 17) 1. Marking - Applicable to Indicating, Weighing/Load-Receiving Elements and Complete Scales

Virtually all weighing and measuring equipment (except separate parts necessary to the measurement process but not having any metrological effect) must be clearly and permanently marked with the manufacturer's name or trademark, model ~~designation~~ **identifier**, and serial number. "Permanent" markings addresses two aspects: (1) the printed information will withstand wear and cleaning, and (2) if the markings are on a plate or badge, then the marking badge must be "permanently" attached to the device. Permanence of it must be obvious that the badge or plate containing this information has been removed. All markings must be clear and attachment of the badge means that the identification information required by G-S.1. is not easily removed, if it is removed, then easily readable. The following test procedure shall be used to determine the permanence of the identification markings.

The system must be clearly and permanently marked on an exterior surface, visible after installation, as follows:

1.1 The name, initials, or trademark of the manufacturer or distributor. A remote display is required to have the manufacturer's name or trademark and model ~~designation~~ **identifier**. (Code Reference G-S.1.) **Yes ☐ No ☐ N/A ☐**

1.2 A model ~~designation~~ **identifier** that positively identifies the pattern or design of the device. The Model ~~designation~~ **identifier** shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the term "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." (Code Reference G-S.1.) **Yes ☐ No ☐ N/A ☐**

(DES 23) 3. Additional Marking Requirements- Not Built-for-Purpose Software-Based Devices

For software-based, not built–for–purpose devices, the required G-S.1. marking information shall be:

- permanently marked on the device, or continuously displayed, or
- displayed in a clearly identified "System Identification", "G-S.1. Identification", or
- Weights and Measures Identification" that is accessible through the "Help" menu or submenu.

3.1. At least one of the following methods must be used:

3.1.1. The manufacturer or distributor and the model identifier ~~designation~~ are permanently marked on the device according to Section 1 Markings - Applicable to Indicating, Weighing/Load-Receiving Elements and Complete Scales. **Yes ☐ No ☐ N/A ☐**

3.1.2. The manufacturer or distributor and the model identifier ~~designation~~ are continuously displayed on the device. **Yes ☐ No ☐ N/A ☐**

3.1.3. The manufacturer or distributor and the model identifier ~~designation~~ are accessible through the "Help" menu or submenu. Clear instructions for accessing the remaining required information shall be listed on the CC. **Yes ☐ No ☐ N/A ☐**

3.1.4. The software is identified with a software identifier, and the current version or revision number that is sufficient to identify that the software is the same type evaluated. ***(Moved from 3.5.)*** **Yes ☐ No ☐ N/A ☐**

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 term Number.
- Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the term Number.
- The abbreviation for the term "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).

3.2. At least one of the following methods must be used:

3.2.1. The Certificate of Conformance (CC) Number is permanently marked on the **Yes ☐ No ☐ N/A ☐**

device.

3.2.2. The Certificate of Conformance (CC) Number is continuously displayed on the device. **Yes ☐ No ☐ N/A ☐**

3.2.3. The Certificate of Conformance (CC) Number is accessible through the "Help" menu or submenu. Clear instructions for accessing the remaining required information shall be listed on the CC. **Yes ☐ No ☐ N/A ☐**

3.3. All required marking information that is not permanently marked on the device or not continuously displayed must be accessible in an easily recognized ~~clearly identified~~ "System Identification", "G-S.1. Identification", or "Weights and Measures Identification" that is accessible through the "Help" menu or submenu. **Yes ☐ No ☐ N/A ☐**

3.4. If the "Help" menu or submenu is used to access the required marking information, the "Help" menu or submenu must be a part of the main operator screen that is used during normal operation of the device. **Yes ☐ No ☐ N/A ☐**

~~3.5. The software is identified with a software version that is sufficient to identify that the software is the same type evaluated.~~ ***(Moved to 3.1.4.)*** **~~Yes ☐ No ☐ N/A ☐~~**

3.6. If the "Help" menu or submenu is used to access required marking information it must be limited to view only access. **Yes ☐ No ☐ N/A ☐**

3.7. Clear instructions for accessing the remaining required information shall be listed on the CC. **Yes ☐ No ☐ N/A ☐**

List instructions for accessing the required G-S.1. markings:

_____

_____

(ECRS 3) 5. Identification

Code Reference: G-S.1., G-S.5.1., S.6.3.

Each register must comply with the appropriate Handbook 44 identification requirements. Identification data must be marked permanently and clearly on the device with the manufacturer's name or trademark, model ~~designation~~ identifier, and serial number.

Example Modular System: . . .

"Dumb" indicators with no intelligence (such as remote displays on point-of-sale system) do not require marking in accordance with S.6.3. unless they are the primary indicator for the system. Primary indicators must be marked with or display a manufacturer's ID, model ~~designation~~ identifier, serial number and prefix, accuracy class, and n_{max}. The capacity by division statement must be indicated in a clear and conspicuous manner and be readily apparent when viewing the reading face of the scale indicator

Additional information may be required for software (i.e., version or revision identifier~~number~~).

Visibility of required marking may be addressed through the use of duplicate identification badges.

Note: Components not required to be marked in accordance with S.6.3. will frequently have the name of the manufacturer of the component and a model number.

(ECRS 5-6)

5.1. The cash register, shall be clearly and permanently marked for the purposes of identification with the following information.

5.1.1. The name, initials, or trademark of the manufacturer or distributor. **Yes ☐ No ☐ N/A ☐**

5.1.2. A model ~~designation~~ identifier that positively identifies the pattern or design of the device. The Model ~~designation~~ identifier shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "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.". (Effective January 1, 2003). **Yes ☐ No ☐ N/A ☐**

	5.1.4.	For not built-for-purpose, software based devices the current software version or revision identifier~~designation~~.	**Yes ☐ No ☐ N/A ☐**
5.2.		The other components of the system are permanently marked consistent with the above description.	**Yes ☐ No ☐ N/A ☐**
	5.3.2.	Permanently ~~M~~marked on a surface that is an integral part of the chassis.	**Yes ☐ No ☐ N/A ☐**
5.4.		If the required marking is on a plate or badge, the plate must be permanent. (See criteria above for Permanence of Attachment of Badge.) ***(renumber 5.5 to 5.3)***	**Yes ☐ No ☐ N/A ☐**
5.6~~7~~.		For not built-for-purpose, software-based devices, the following shall apply:	
	5.6~~7~~.1.	The manufacturer or distributor and the model ~~designation~~ identifier and the current software version or revision are permanently marked on the device shall be continuously displayed or marked on the device, or	**Yes ☐ No ☐ N/A ☐**
	5.6~~7~~.2.	~~The Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device, or~~ *(renumbered to 5.7.4.)* The software is identified with a software identifier, and the current-version or revision number that is sufficient to identify that the software is the same type evaluated. 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 term Number. ▪ Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the term Number. The abbreviation for the term "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).	**Yes ☐ No ☐ N/A ☐**
	5.6~~7~~.3.	All required information in G-S.1.Identification. (a), (b), (c), and (e), shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification may~~shall~~ be accessible through the "Help" menu or submenu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.	**Yes ☐ No ☐ N/A ☐**
	5.6.4.	The Certificate of Conformance (CC) Number shall be continuously displayed or permanently marked on the device, or ***(this language was moved and renumbered from 5.7.2.)***	**Yes ☐ No ☐ N/A ☐**

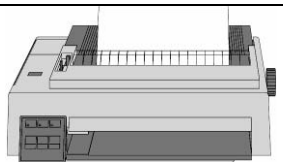
(Renumber remaining paragraphs)

(ECRS 8-9) 7. Marking Requirements

Figure 1.
Example of Marking Requirements for Various System Components

COMMON COMPONENTS
Electronic Cash Register
-Model ~~Designation~~ Identifier
Cash Acceptor, Card Reader, Etc. Which Authorizes Sales
-Model ~~Designation~~ Identifier

Printer
• G-S.1.
-Manufacturer's ID
-Model ~~Designation~~ Identifier
-Serial Number and Prefix



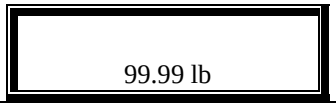


Figure 2.

WEIGHING SYSTEM

Weighing/load receiving element
-~~Designation~~ Identifier

Indicating Element
-Model ~~Designation~~ Identifier
-Serial Number and Prefix

(BCS 8 -10) 8.Marking Requirements
Code References: G-S.1., S.4., G-S.6.

8.1.1.	The name, initials, or trademark of the manufacturer or distributor	**Yes ☐ No ☐ N/A ☐**
8.1.2.	A model identifier ~~designation~~ that positively identifies the pattern or design of the device. The Model designation shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "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.". (Effective January 1, 2003).	**Yes ☐ No ☐ N/A ☐**
8.1.3.	Except for equipment with no moving or electronic component parts and not-built-for-purpose, software-based devices, a nonrepetitive serial number.	**Yes ☐ No ☐ N/A ☐**
8.1.4.	For not built-for-purpose, software based devices the current software version ~~designation~~ identifier. The software is identified with a software identifier, and the current-version or revision number that is sufficient to identify that the software is the same type evaluated. 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 term Number. ▪ Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the term Number. The abbreviation for the term "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).	**Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.1.1. Location of Marking Information for Not built-for-Purpose, Software-Based Devices. ~~Effective January 1, 2004~~
For not built-for-purpose, software-based devices, the following shall apply:

8.1.8.	The manufacturer or distributor and the model ~~designation~~ **identifier** and the current software version or revision ~~are marked on the device~~ shall be continuously displayed or permanently marked on the device, or	**Yes ☐ No ☐ N/A ☐**
8.1.9.	The Certificate of Conformance (CC) Number shall be continuously displayed or permanently marked on the device, or	**Yes ☐ No ☐ N/A ☐**
8.1.10.	All required information in G-S.1.Identification. (a), (b), (c), ~~(c),~~ and (~~c~~h) shall	**Yes ☐ No ☐ N/A ☐**

be continuously displayed or permanently marked on the device. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification may~~shall~~ be accessible through the "Help" menu or submenu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.

(AWS 3-4) B.Software-based not built-for-purpose weighing equipment

Software-based not built-for-purpose weighing equipment or accessories used in conjunction with weighing equipment or systems submitted for evaluation must be evaluated with a complete weighing system and will be evaluated using the same Publication 14 criteria applicable to built-for-purpose weighing equipment or accessories.

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The CC must include the following information:

- Application software version or revision identifier XXXXX evaluated and higher
- A statement such as "The software-based not built-for-purpose device or system may be interfaced with compatible weighing equipment that has a CC (ex. complete scale(s), or separable indicating and load-receiving elements)."

C.Certificate of Conformance Parameters

Certificates of Conformance (CC) shall detail the main elements, load cells, and auxiliary devices used during an evaluation, including model ~~designation~~ identifier and other significant parameters, under the "Test Conditions" portion of the CC. Test conditions will include the number of chains, the type, number, and material of the belts. Only the standard features and options that have been evaluated will be included on the CC.

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(AWS 8 -9) 1.General Code Requirements, Identification

Virtually all weighing and measuring equipment (except separate parts necessary to the measurement process but not having any metrological effect) must be clearly and permanently marked with the manufacturer's name or trademark, model ~~designation~~ identifier, and serial number.

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The system must be clearly and permanently marked on an exterior surface, visible after installation, as follows:

1.Marking - General

1.1.	The name, initials or trademark of the manufacturer. A remote display is required to have the manufacturer's name or trademark and model ~~designation~~ identifier. (Code Reference G-S.1.)	**Yes ☐ No ☐ N/A ☐**
1.2.	A model ~~designation~~ identifier that positively identifies the pattern or design of the device. The Model ~~designation~~ identifier shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the term "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." (Code Reference G-S.1.)	**Yes ☐ No ☐ N/A ☐**
1.3.	Except for equipment with no moving parts and not built-for-purpose software-based devices, a~~A~~ unique serial number. The serial number shall be prefaced by words, an abbreviation, or a symbol that clearly identifies the number as the required serial number.	**Yes ☐ No ☐ N/A ☐**
1.7.	If the information required by G-S.1. is placed on a badge or plate, the badge or plate must be permanently attached to the device. (See criteria above for permanence of Attachment of Badge.)	**Yes ☐ No ☐ N/A ☐**
1.8.	For not-built-for-purpose, software-based devices the current software version identifier. The software is identified with a software identifier, and the current version or revision number that is sufficient to identify that the software is the same type evaluated.	**Yes ☐ No ☐ N/A ☐**

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 term Number.

- Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the term Number.

The abbreviation for the term "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).

1.8.1. All required information in G-S.1.Identification. (a), (b), (c), and (e) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification may be accessible through the "Help" menu or submenu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated. **Yes ☐ No ☐ N/A ☐**

ABWS

17. Marking - General

17.1.2. A model identifier ~~designation~~ that positively identifies the pattern or design of the device. The Model identifier ~~designation~~ shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "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." ~~(Effective January 1, 2003).~~ **Yes ☐ No ☐ N/A ☐**

17.1.3. Except for equipment with no moving or electronic component parts and not built-for-purpose, software-based devices, a nonrepetitive serial number. **Yes ☐ No ☐ N/A ☐**

17.1.4. The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. 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.). Code Reference G-S.1. (g). ~~Effective January 1, 2003~~ **Yes ☐ No ☐ N/A ☐**

17.1.~~5~~4. For not built-for-purpose, software based devices the current software version or revision identifier~~designation~~. **Yes ☐ No ☐ N/A ☐**

For not-built-for-purpose, software-based devices the current software version identifier. **Yes ☐ No ☐ N/A ☐**

The software is identified with a software identifier, and the current-version or revision number that is sufficient to identify that the software is the same type evaluated.

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 term Number.

- Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the term Number.

The abbreviation for the term "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).

Code Reference: G-S.1.1. Location of Marking Information for Not Built-for-Purpose, Software-Based Devices.
~~Effective January 1, 2004~~

For not built-for-purpose, software-based devices, the following shall apply:		
17.3	The manufacturer or distributor and the model identifier~~designation~~ shall be continuously displayed or permanently marked on the device, or	**Yes** ☐ **No** ☐ **N/A** ☐
17.4	The Certificate of Conformance (CC) Number shall be continuously displayed or permanently marked on the device, or	**Yes** ☐ **No** ☐ **N/A** ☐
17.5	All required information in G-S.1.Identification. (a), (b), (c~~d~~), and (e)~~, and (h)~~ shall be continuously displayed or permanently marked on the device. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification may~~shall~~ be accessible through the "Help" menu or submenu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.	**Yes** ☐ **No** ☐ **N/A** ☐

1(b). Time Dependence – Non-automatic Weighing Instruments

Background: See the 2006 NCWM Publication 16 Committee Reports of the 91st National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 320-6 for additional background information. During its 2006 Annual Meeting, the NCWM agreed to amend NIST Handbook 44 2.20. Scales Code paragraph T.N.4.5.1. Time Dependence; Class II, III, and IIII Non-automatic Weighing Instruments as follows to harmonize further the type evaluation test conditions with procedures included in OIML requirements.

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

Discussion/Recommendation: The Weighing Sector is asked to consider amending the following proposed amendments to NCWM Publication 14 Technical Policy, Checklists, Test Procedures for Weighing Devices.

(DES-78) 58.Time Dependence Test
This test shall be conducted on Class II, III and IIII complete scales and weighing/load-receiving elements in a laboratory. The applied load shall be between 90 percent and 100 percent of capacity for scales with capacities of 2000 lb or less. For scales with capacities greater than 2000 lb, the load cell or load cells shall be tested individually. The test shall be conducted at 20 °C ± 2 °C (68 °F ± 4 °F) ~~the temperature extremes specified for the device under test (DUT)~~.

For Class III L scales . . .

Technical Advisor's Note: No changes to the Time Dependence Test Form are necessary.

1(c). Time Dependence – Load Cells

Background: See the 2006 NCWM Publication 16 Committee Reports of the 91st National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 320-7 and the 2005 NTETC Weighing Sector Meeting Summary agenda item 1 (e) for additional background information. During its 2006 Annual Meeting, the NCWM agreed to amend NIST Handbook 44 2.20. Scales Code paragraph T.N.4.6. Time Dependence (Creep) for Load Cells During Type Evaluation, Table T.N.4.6., and add a new paragraph T.N.4.7. Creep Recovery for Load Cells During Type Evaluation. These changes are intended to harmonize further the type evaluation test conditions with procedures included in OIML requirements, add creep recovery requirements and the appropriate apportionment factors for Class III L load cells that were inadvertently omitted from the language added to NIST Handbook 44 in 2005, and add definitions for the terms and abbreviations used in paragraph T.N.4.7.

T.N.4.6. Time Dependence (Creep) for Load Cells During Type Evaluation. – A load cell (force transducer) marked with an accuracy class shall meet the following requirements at constant test conditions:

(a) Permissible Variations of Readings. –

(b) Apportionment Factors. – The mpe for creep shall be determined from Table T.N.4.6. Maximum Permissible Error (mpe)* for Load Cells using the following apportionment factors (p_{LC}):
p_{LC} = 0.7 for load cells marked with S (single load cell applications), ~~and~~
p_{LC} = 1.0 for load cells marked with M (multiple load cell applications)**, and**

p_{LC} = 0.5 for Class III L load cells marked with S or M
(Amended 2006)
(Added 2005)

Table T.N.4.6.
Maximum Permissible Error (mpe)* for Load Cells
During Type Evaluation

mpe in Load Cell Verifications Divisions (v) = p_{LC} x Basic Tolerance in v			
Class	p_{LC} x 0.5 v	p_{LC} x 1.0 v	p_{LC} x 1.5 v
-	-	-	-

v represents the load cell verification interval
p_{LC} represents the apportionment factors applied to the basic tolerance
p_{LC} = 0.7 for load cells marked with S (single load cell applications)
p_{LC} = 1.0 for load cells marked with M (multiple load cell applications)
p_{LC} = 0.5 for Class III L load cells marked with S or M
* mpe = p_{LC} x Basic Tolerance in load cell verifications divisions (v)

(Table Added 2005) **(Amended 2006)**

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 (~~E~~ D_{max}) having been applied for 30 min shall not exceed:

0.5 times the value of the load cell verification interval (0.5 v) for Class I, II, III, and IIII load cells, or

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

(Added 2006)

D_{min} (minimum load of the measuring range). Smallest value of a quantity (mass) which is applied to a load cell during test or use. This value shall not be less than E_{min}.[2.20]
(Added 2006)

E_{min} (minimum dead load). Smallest value of a quantity (mass) which may be applied to a load cell during test or use without exceeding the mpe.[2.20]
(Added 2006)

Discussion/Recommendation: The Weighing Sector is asked to consider amending the following proposed amendments to NCWM Publication 14 Technical Policy, Checklists, Test Procedures for Force Transducers (Load Cells).

(FT 13 – 14) II. Determination of Creep

1. At 20 °C ambient, insert the force transducer (load cell) into the force generating system and load to the minimum dead load. If Procedure I. (which includes increasing and decreasing load tests) has just been completed, wait 1 hour. If a separate creep test is being conducted, exercise the force transducer (load cell) as in Procedure I.5 and then wait 1 hour.

2. If the indicating element for the force transducer (load cell) is provided with a convenient means for checking itself, conduct the self-test at this time.

3. Monitor minimum load output until stable.

4. ~~There are two test methods to determine the creep characteristics of force transducers (load cells). The 1 hour creep test at the maximum load (step 4. (a)) is the preferred form of the creep test; run the return to zero creep test (step 4. (b)) only when justified by limitations in the test equipment. The NTEP will conduct step 4. (a) creep tests whenever possible.~~

~~Take readings at 1 minute time intervals for the first 10 minutes and every 10 minutes thereafter.~~

   a. **Test for Creep:** Apply a load equal to 90 percent to 100 percent of the maximum capacity of the force transducer (load cell) and record the indication 20 seconds after reaching the load. The time to load test

weights and read the indicator shall be as short as possible and shall not exceed the time specified in Table 5. With the load remaining on the load cell, c~~C~~ontinue to record indications periodically, thereafter, at time intervals over a 30-minute ~~1 hour~~ period.

~~*Note: A 30-minute test is acceptable if the creep test is performed in accordance to OIML R60 tolerances.*~~

b. **Test for Creep Recovery** Remove a load equal to 90 percent to 100 percent of the maximum capacity of the force transducer (load cell) that has been applied for 1 hour. Record the indication after 20 seconds. The time to unload test weights and read the indicator shall be as short as possible and not exceed the time specified in Table 5. Continue to record indications periodically thereafter at time intervals over a ~~1 hour period (or~~ 30-minute period ~~if the creep test is conducted according to OIML R60 requirements).~~

Table 5
Loading Times

Load		Time
Greater than	**To and including**	
0 kg	10 kg	10 seconds
10 kg	100 kg	15 seconds
100 kg	1000 kg	20 seconds
1000 kg	10 000 kg	30 seconds
10 000 kg	100 000kg	50 seconds
100 000 kg	----------	60 seconds

5. Repeat the operations described in steps 2 through 4 at the high and low temperature limits for the accuracy class~~.~~ ~~i~~If the manufacturer has specified a smaller or a larger range, repeat operations at the limits marked on the cell, provided the temperature range is at least the range required for the accuracy class.

6. With the resulting data, and accounting for the effect of barometric pressure changes, determine the magnitude of the creep and compare it to the tolerance in NIST Handbook 44 Scales Code Table T.N.4.6.2.

Table T.N.4.6.
Maximum Permissible Error (mpe) * for Load Cells
During Type Evaluation

mpe in Load Cell Verifications Divisions (v) = p_{LC} x Basic Tolerance in v			
Class	p_{LC} x 0.5 v	p_{LC} x 1.0 v	p_{LC} x 1.5 v
I	0 - 50 000 v	50 001 v - 200 000 v	200 001 v +
II	0 - 5 000 v	5 001 v - 20 000 v	20 001 v +
III	0 - 500 v	501 v - 2 000 v	2 001 v +
IIII	0 - 50 v	51 v - 200 v	201 v +
III L	0 - 500 v	501 v - 1 000 v	(Add 0.5 v to the basic tolerance for each additional 500 v or fraction thereof up to a maximum load of 10 000 v)

v represents the load cell verification interval
p_{LC} represents the apportionment factors applied to the basic tolerance
p_{LC} = 0.7 for load cells marked with S (single load cell applications)
p_{LC} = 1.0 for load cells marked with M (multiple load cell applications)
p_{LC} = 0.5 for Class III L load cells marked with S or M
* mpe = p_{LC} x Basic Tolerance in load cell verifications divisions (v)

2. S.1.1.(c). Zero Indication (Marking Requirements)

Source: 2004 Weighing Sector Agenda Item 4 - S.1.1.(c). Zero Indication (Marking Requirements).

Background: See the 2005 Report of the 89th National Conference on Weights and Measures, Specifications and Tolerances Committee Report, the 2003 NTETC Weighing Sector Meeting Summary agenda item 19, and the 2005 NCWM Annual Report agenda Item 320-1, NCWM Publication 16 S&T Committee Report on Item 320-1, and the following recommendation from the 2005 NTETC Weighing Sector Summary on this item for additional background information.

Recommendation: The discussion was concluded since there was no clear consensus on a position that the Sector could report to the NCWM S&T Committee on the agenda item. The Sector Chairman held two votes on this subject. The results of the vote will be forwarded to the NCWM S&T Committee.

The first vote was to determine if the Sector agreed with the proposal on the NCWM S&T agenda to amend Handbook 44 paragraph S.1.1. (c) to clarify that additional markings *are required* for devices that have an effective automatic means to inhibit a weighing operation or return the device to a continuous digital indication when the scale is in an out-of-balance condition. Two Sector members voted to support the S&T Committee proposal and eleven Sector members voted against supporting the proposal.

The second vote was to establish a Sector position that states that additional markings *should not be not required during type evaluation* on devices that have an effective automatic means to inhibit a weighing operation, or return the device to a continuous digital indication when the scale is in an out-of-balance condition. The results of the second vote: two Sector members voted to oppose this position and twelve Sector members voted to support this position.

The result of the second vote means that such markings would not be required during type evaluation. It should be noted that WMD continues to believe that field officials may require such markings citing General Code paragraph G-S.6. Marking Operational Controls, Indications, and Features and the interpretation of the 78th NCWM S&T Committee unless Scales Code paragraph S.1.1. (c). is amended to clearly state that no additional markings are required when a device, where zero is indicated by other than a continuous digital zero, has effective means to inhibit a weighing transaction when the scale is in an out-of-balance condition.

During the 2006 NCWM Annual Meeting, the S&T Committee change the status of the item from voting to informational and stated that they believe that provisions should be in place for all devices to clearly indicate a zero-balance condition either with a digital zero, annunciator, or using some other accepted means. The Committee is concerned there are no definitive guidelines available for the field official to verify a zero-balance condition on software-based devices that are modified after type evaluation.

The Committee continues to believe the proposal has merit, but modified the language in response to concerns about the marking and indications. The Committee made changes to S.1.1.(c) to (1) specify that markings and indications must be visible to the customer and (2) clarify one instance where markings and indications are not required.

The Committee heard further opposition to the proposal from the public and private sector members who believe the wording in paragraph S.1.1.(c) is adequate to prevent fraud. Consequently, the Committee changed the status of the proposal from a voting item to an information item. The Committee asks that the regional weights and measures associations consider the proposal during their fall 2006 sessions.

Discussion/Recommendation: This item is on the agenda to provide the Weighing Sector with an update on the status of this item. No additional discussion or recommendations are required unless the Weighing Sector believes it has additional information to provide the S&T Committee or wishes to amend their position on this subject.

3. Bench/Counter Scale Shift Test and Definitions

Source: NIST WMD and 2005 NTETC Weighing Sector (Carryover item)

Background: This item has been added to the agenda as an update to the 2005 Weighing Sector Agenda Item 4. Please refer to the 2005 NTETC Weighing Sector Meeting Summary agenda Item 4 and the 2006 NCWM Publication 16 S&T Committee Report agenda Item 320-3 for additional background information.

After receiving test data supporting the proposed changes to the shift test procedures at the 2006 Interim Meeting, the Committee agreed this item should move forward for a vote.

During the 2006 NCWM Annual Meeting, the Committee addressed concerns about the lack of a guideline for a minimum test load and the extensive nature of modifications to livestock scale requirements. As a result, the Committee reorganized the livestock scale requirements. The Committee further modified proposed new paragraph (c) to specify a minimum shift test load of one-half nominal capacity to ensure sufficient test weights are used during the test. Industry acknowledged that although the shift test loads for other scale types were reduced from one-half to one-third, the rated nominal capacity for the newly proposed test load patterns for the lighter test load can create a more stringent test of the scale's performance. Comments during the open hearing voting sessions of the 2006 NCWM Annual Meeting stated that the Committee's changes to the proposal may not have adequately clarified the minimum load for 2-section livestock scales, the remaining proposed language was difficult to follow, the Committee should consider a similar proposal discussed at an earlier Annual Meeting of the Western Weights and Measures Association, and the change in the test load for bench and counter scales is not consistent with auditing procedures used by the Nebraska Department of Agriculture. Additionally, it was stated that the U.S. should recommend that the current Handbook 44 shift test load and test positions for bench and counter scales should by submitted for the next revision of OIML R76. The results of the voting indicated insufficient votes to either adopt or reject the proposal. NCWM procedures dictate the item be returned to the Committee. NIST WMD has since received the following information regarding the technical justification that was used to develop the current procedures in OIML R76 from Michael Denzel, Physikalisch-Technische Bundesanstalt (PTB) Department 1.1 "Mass":

> "The test procedure described in OIML R76 Nos. 3.6.2 / A.4.7 is applied since many years. It was established considering different approaches of several countries. But the test load and its position on the load receptor has not been chosen arbitrary. The technical background is that a load of 1/3 Max is a realistic value for the barycenter (center-of-gravity) of a mass placed not centrally on the load receptor. In addition a single load cell of the load receptor may not be overloaded (1/2 Max might already be too much for one load cell). After dividing the surface of the load receptor into 4 segments, this test load has to be placed in the center of each segment. Compared to the method taking half the distance between the center of the platform and each corner of the platform, the OIML R76-method allows testing each load cell of the load receptor (when having 4 load cells)."

Based on the comments received during the 2006 NCWM Annual Meeting, the NIST technical advisor to the Weighing Sector amended the proposal as follows:

Summary of Proposed Changes

1. Make it clear that no significant changes are being made to 2-section livestock scales,
2. Simplify the language for the shift test on "Other" scales,
3. Group the livestock scale shift test requirements together,
4. Change the order of the test notes so that the more common type of scales are listed first, and
5. Minor editorial suggestions on existing language.

H44 Paragraph	**Description**
N.1.1.	Editorial – - Delete the term "known" in the first sentence to be consistent with the use of the term "test load." - Added the term "available" in the second sentence in front of "test load" for clarification.
N.1.2.	No Changes
N.1.2.1.	No Changes
N.1.2.2.	No Changes
N.1.3.	Added new title and language taken from the first sentence from existing paragraph N.1.3.8.
N.1.3.1.	- Amended Title by deleting the terms "Bench and Counter scales" consistent with the purpose of 2006 Publication 16 Item 320-3. - Added language from 2006 Publication 16 Item 320-3 amending shift test procedures. - Amended and renumbered shift test position figures by adding a circular load-receiving element. - Added reference to Table 4 test loads for testing corners at ¼ capacity. Therefore, corner testing at ¼ capacity would be acceptable for scales with a nominal capacity greater than 450 kg (1000 lb).
N.1.3.2.	Renumbered existing paragraph N.1.3.4.
N.1.3.2.1.	Renumbered reference in (a).
N.1.3.2.2.	Renumbered existing paragraph N.1.4.2. in order to keep like devices together.

N.1.3.2.3. - Propose new paragraph to clarify that there are no significant changes to current shift test procedures for livestock scales with less than 3 sections. The added language is paraphrased from the second sentence in existing N.1.3.8. (a) and (b).
- Add references to test position diagrams in N.1.3.1. and deleting diagrams in existing paragraph N.1.3.8.

N.1.3.3. Renumbered existing paragraph N.1.3.5.
N.1.3.4. Renumbered existing paragraph N.1.3.6.
N.1.3.4.1. Renumbered existing paragraph N.1.3.6.1.
N.1.3.5. Renumbered existing paragraph N.1.3.7.
N.1.3.6. Renumbered existing paragraph N.1.3.2.
N.1.3.7. Renumbered existing paragraph N.1.3.3.
N.1.3.8. Deleted existing paragraph N.1.3.8. and moved the existing language in the 2006 Publication 16 Item 320-3 to proposed paragraphs N.1.3.1. and N.1.3.2.2.

N.1. Test Procedures.

N.1.1. Increasing-Load Test. - The increasing-load test shall be conducted on all scales with the test loads approximately centered on the load-receiving element of the scale, except on a scale having a nominal capacity greater than the total available ~~known~~ test load. When the total available test load is less than the nominal capacity, the test load is used to greatest advantage by concentrating it, within prescribed load limits, over the main load supports of the scale.

N.1.2. Decreasing-Load Test (Automatic Indicating Scales). -

N.1.3. Shift Test. The shift test shall be conducted on all scales as outlined in the subparagraphs of N.1.3. Shift tests are not required for crane scales, hanging scales, hopper scales, wheel load weighers, and portable axle-load weighers.

N.1.3.1. Prescribed Test Pattern for Scales with Two Sections or Less (One to Four Load Supports). ~~Bench or Counter Scales.~~ ~~A shift test shall be conducted with a half capacity test load centered successively at four points equidistant between the center and the front, left, back, and right edge of the load receiving element.~~ Except for livestock scales, the shift test shall be conducted and the test load shall be applied in a consistent pattern in the shift test positions throughout the test using either:

(a) A test load in the amount of 30 % to 35 % of the nominal capacity centered as nearly as possible at the center of each quadrant of the load-receiving element using the prescribed test pattern as shown in Figure 1 or 2, or

(b) A test load in the amount of 25 % of the nominal capacity test load centered as nearly as possible, successively, over each main load support as shown in Figure 3 below when the total available test load required in Table 4 is less than the 30 % to 35 % of the nominal capacity

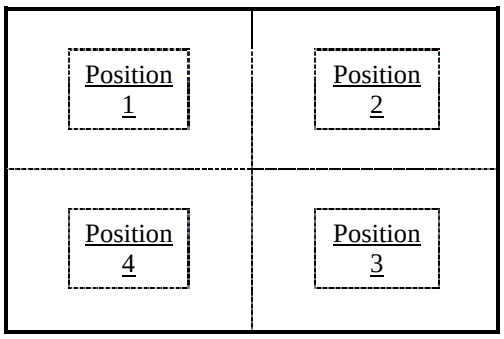

Figure 1

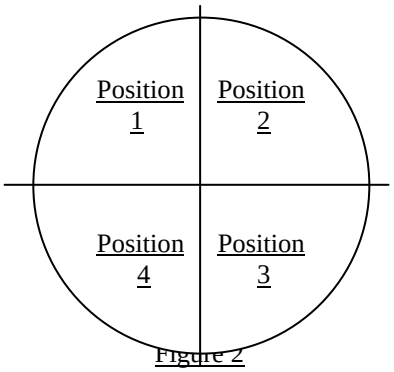

Figure 2

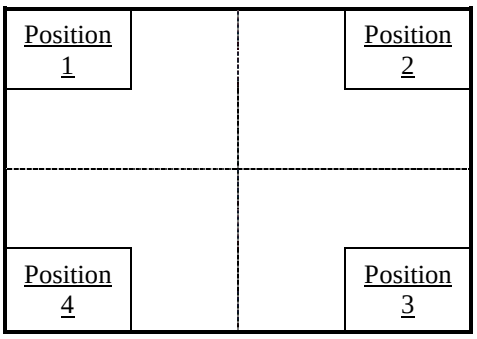

Figure 3

Note: A single field standard weight is preferred. When multiple field standard weights are used, smaller weights should be placed on top of larger weights and stacked safely in a manner that does not concentrate the load in a test pattern that is less than when that same load is a single field standard weight on the load-receiving element (e.g. Two 2-kg and one 1-kg cylindrical weights should not be stacked for a 5-kg shift test load and seven 50-lb test weights should not be stacked more than three levels for a 350-lb shift test load).

(Added 2003)
(Amended 1987, ~~and~~ 2003, and 200X) (Renumbered 200X)

N.1.3.2.4. Vehicle Scales, Axle-Load Scales, and Livestock Scales.
(Renumbered 200X)

N.1.3.2.1.~~4.1.~~ Vehicle Scales, Axle-Load Scales, and Combination Vehicle/Livestock Scales. -

(a) **Minimum Shift Test.** . . . . (Combination Vehicle/Livestock Scales shall also be tested consistent with N.1.3.2.2.~~4.2.~~) . . .
(b) Prescribed Test Pattern and Loading for Vehicle Scales, Axle-Load Scales, and Combination Vehicle/Livestock Scales. – . . .
(c) Loading Precautions for Vehicle Scales, Axle-Load Scales, and Combination Vehicle/Livestock Scales. – . . .
(d) Multiple Pattern Loading. – . . .
(e) Other Designs. - . . .

N.1.3.2.2~~4.2.~~ Prescribed Test Pattern and Test Loads for Livestock Scales with More Than Two Sections and Combination Vehicle/Livestock Scales. . . . (Two-section livestock scales shall be tested consistent with **N.1.3.2.3.** ~~N.1.3.8.~~)

N.1.3.2.3. Prescribed Test Pattern and Test Loads for Two-Section Livestock Scales. For livestock scales, the shift test load shall not exceed one-half the rated section capacity or one-half the rated concentrated load capacity, whichever is applicable. A shift test shall be conducted using either:

(a ~~b~~) A one-half nominal capacity test load centered as nearly as possible, successively at the center of each quarter of the load-receiving element as shown in N.1.3.1. Figure 1 above ~~the diagram below~~, or
(Added 2003)

(b ~~a~~) A one-quarter nominal capacity lest load centered as nearly as possible, successively over each main load support as shown in N1.3.1. Figure 3 above when the total available test load is less than one-half of the nominal capacity ~~the diagram below~~.

(Amended 1987, ~~and~~ 2003, and 200X)
(Renumbered 200X)

N.1.3.3~~5~~. Railway Track Scales Weighing Individual Cars in Single Drafts. -

N.1.3.4~~6~~. Monorail Scales, Static Test. -

N.1.3.4.1.~~6.1.~~ Dynamic Monorail Weighing Systems. -

N.1.3.5~~7~~. Vehicle On-Board Weighing Systems. -

N.1.3.6~~2~~. Dairy-Product-Test Scales. -

N.1.3.7~~3~~. Equal-Arm Scales. - A shift test shall be conducted with a half-capacity test load positioned on each pan as prescribed in N.1.3.1 Figure 2. An equal test load shall be centered on the other pan.
(Renumbered 200X)

~~**N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers.** A shift test shall be conducted using the following prescribed test loads and test patterns. Livestock scales, the shift test load shall not exceed one-half the rated section capacity or one-half the rated concentrated load capacity whichever is applicable. A shift test shall be conducted using:~~

~~(a) A one-quarter nominal capacity test load centered as nearly as possible, successively over each main load support as shown in the diagram below; or~~

~~Diagram~~ ***(see new language in N.1.3.2.3. (b))***

~~(b) A one-half nominal capacity test load centered as nearly as possible, successively at the center of each quarter of the load-receiving element as shown in the diagram below.~~

~~Diagram~~ ***(see new language in N.1.3.2.3. (a))***

~~(Added 2003)~~
~~(Amended 1987 and 2003)~~

Discussion/Recommendation: This item is on the agenda to provide the Weighing Sector with an update on the status of this item. No additional discussion or recommendations are required unless the Weighing Sector believes it has additional information to provide the S&T Committee or wishes to amend their position on this the S&T Committee Item 320-3.

4. Publication 14 Force Transducer (Load Cell) Family and Selection Criteria

Source: NTEP Committee Technical Advisor. (Carryover item)

Background: During the 2005 NTETC Weighing Sector Meeting Summary discussion of agenda item 5, Stephen Patoray, NTEP Director, updated the Sector on the status of the project. He described a proposal that has been forwarded to the small load cell workgroup. In summary, the proposal has the potential for an applicant to submit only one load cell for a basic load cell family to be covered on an NTEP Certificate of Conformance. However, taking into consideration possible groups within the family (e.g., material construction, methods of mounting, strain gauge bonding, output rating, input impedance, supply voltage, cable details, etc.), there will be no significant difference in the number of load cells that have to be submitted for evaluation. Please refer to Appendix C - Attachment to Item 4 for additional background information on R60 terminology, definitions, and family selection criteria for additional background information that will be used to develop that NTEP Load Cell Selection Criteria.

One of the questions that must be addressed in any proposed change to the selection criteria is how the criteria will affect applications to amend and expand existing Certificates of Conformance.

Discussion: The NTEP director and the NIST technical advisor will update the Sector on the status of the project.

5. Report of the Tare Work Group (Tare on a Multiple Range Scales)

Source: NTEP Participating Laboratories (Carryover item):

Background: See the 2005 NTETC Weighing Sector Meeting Summary agenda item 10 in Appendix C - Attachment to Item 5 for additional background information on the earlier sector discussions and recommendations.

During the 2005 meeting, the Sector voted 13 to 4 in favor of modifying Publication 14 to make tare rounding consistent with Handbook 44 General Code paragraph G-S.5.2.2.(c) Digital Indication and Representation for multi-interval and multiple range scales. The NIST technical advisor developed amendments to Publication 14 sections 31, 32, and 45-51 for Tare and other possible sections that would consistently apply the rounding of tare throughout the digital electronic scales checklist. The Sector was to be balloted on the proposed modifications to Tare in Publication 14. The Sector also agreed to consider the OIML R76 examples of tare rounding at a later date once the revision of the R76 has been completed.

During the development of the letter ballot language, it was noted that some items (e.g., tare annunciator and terminology) required further discussion by the Sector. Additionally, there is a developing (D) item in the 2006 NCWM S&T Agenda that may have an impact on the Sector recommendation. The NIST technical advisor developed an alternate proposal that would address the operation of the "tare entered" annunciators, give examples demonstrating tare rounding in different scenarios, and add definitions clarifying the differences between semi-automatic tare and preset tare. Based on these concerns above, the NIST technical advisor did not believe that the language to amend Publication 14 was sufficiently developed to be submitted to the Sector as a letter ballot.

The NIST technical advisor consulted with the NCWM chairman, NTEP Committee chairman, Sector chairman, and NCWM technical advisor on both proposals to amend Publication 14 tare requirements. As a result, it is recommended that a small workgroup review the proposals, review tare operation and requirements in general, and make recommendations on how tare is applied to single range, multiple range and multi-interval scale operation. The workgroup was asked to develop a recommendation(s) for changes to Publication 14 based on the Sector's 2005 recommendation, Handbook 44 and Handbook 130 (if necessary) and provide the Weighing Sector guidance on checklist requirements. It is anticipated that the group could perform the tasks though the use of e-mail correspondences and conference calls. The members of the workgroup are;

Scott Davidson, Chairman (Mettler Toledo)
Andrea Buie (Maryland NTEP Laboratory)
Jim Truex (Ohio NTEP Laboratory)
Todd Lucas (Ohio NTEP Laboratory)

Steve Cook (NIST Technical Advisor) Stephen Patoray (NTEP Technical Advisor)

Discussion: The workgroup having met on five occasions through conference calls developed a list of action items which is summarized below with the proposed amendments to Publication 14 sections 31, 32, and 45 to 51 based on the recommendation in the 2005 Weighing Sector Summary for agenda item 10. A full copy of the report of the Tare Work Group, including the status of the action items, can be found in Appendix C - Attachment to Item-5.

1. Amend Publication 14 Sections 31, 32, and 45 to 51.
2. Discuss a request the S&T Committee revisit the 1980 discussion.
3. Propose adding definitions of Tare and Preset tare to H44.
4. Propose adding a definition of "net" based on H130.
5. Propose adding requirements for tare and preset tare to H44.
6. Propose adding indication and printing requirements for tare values to H44.
7. Propose adding a tolerance for scale accuracy in the net mode to H44.
8. Consider the OIML allowance for 1e deviation of (calculated) indicated and printed net weights due to the rounding of tare.
9. Propose amending Scales Code paragraph S.1.2.1. to clarify that indicated and printed net weights calculated from gross and tare weights on multi-interval, multiple range scales, and weights determined from two different scales may have an apparent interval other than 0, 1, 2, or 5.
10. Agree on a position that paper/plastic zeroed off by AZT be interpreted as net weight without a net or tare indication based on the definition of net of H130 (when the bag or paper remains on the scale when the product is added to the scale instead of using the paper or bag to pick up the item and place it back on the scale).
11. Discuss recommending policy on tare less than 0.5 e?
    - Single range scales?
    - Multi-interval and multiple range scales?

    Or recommend suitability and minimum number of tare intervals? (e.g. 2 e for single range scales and 5 e1 for MI and MR scales)
12. Discuss and develop a position on SWMA Developing S&T agenda item on the rounding of tare for multiple range scales.

The Sector is asked to review and discuss action item one to amend Publication 14 Sections 31 and 32 and recommend changes to Publication 14 if the Sector agrees with the workgroup's recommendations. Additionally, the Sector may want to discuss the remaining recommendations to amend NIST Handbook 44 by adding new definitions relating to tare and tare requirements to the Scales Code in Handbook 44.

Tare WG Action Item 1:

31.Multi-Interval Scales

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There are several considerations regarding the proper operation of tare on multi-interval scales.

- All tares must be taken in the minimum increment. Therefore, the maximum tare allowed is the maximum capacity of the smallest weighing segment (WS).
- Whenever gross and tare weights fall in different weighing segments, (hence the scale divisions for the gross and tare weights differ), the net weight must be in mathematical agreement with the gross and tare weights that are indicated and recorded, (i.e., net = gross - tare).
- Scales that display or record only net weight values (e.g., most computing scales) may semi-automatically (pushbutton) take tare values to either the internal resolution or the displayed scale division. (*Technical Advisor note: This is already permitted in Pub 14 Section 47)*
- Manually entered keyboard, thumb-wheel, and digital tare values, and programmable tare values stored in memory for multiple transactions must be entered to the displayed scale division.

In applying these principles, it is acceptable to:

- round the indicated and printed tare values ~~(in the upward direction to the nearest)~~ to the nearest appropriate net weight scale division.

- or display net weight values in scale divisions other than the scale division used in the display of gross weight, as when the gross and tare weights are in different ranges of the device. For example, a scale indicating in 2-lb divisions in the lower range and 5-lb divisions in the next higher range may result in net values ending in three or eight in the higher range.

In every case, it is required to maintain the mathematically correct equation:

~~net + tare = gross~~ net = gross – tare
*(Technical Advisor Note: The above recommendation is intended to clarify that the result of the equation is **"net"**.)*

For multi-interval instruments, all tares, except for semi-automatic tare, must be taken in the minimum increment. Therefore, the maximum tare allowed is the maximum capacity of the smallest weighing range.

Semi-automatic tare may be taken to the internal resolution of the scale and any indications or recorded representations of tare shall be rounded to the nearest verification scale division.

31.1. The requirements for the displayed scale division and the mathematical agreement of gross, tare, and net values depend on the information that can be displayed or recorded by the weighing system and may be summarized as follows:

31.1.1.	The number of scale divisions in each weighing range (segment) must meet Table 3 of the Scales Code.	**Yes** ☐ **No** ☐ **N/A** ☐
31.1.2.	For all weighing segments, e must equal d.	**Yes** ☐ **No** ☐ **N/A** ☐
31.1.3.	The scale division for gross and positive or negative net, weights for both increasing and decreasing loads must be displayed in scale divisions consistent with the weighing segment in which the weight falls.	**Yes** ☐ **No** ☐ **N/A** ☐
31.1.4.	Weight indications at the break-over point of weighing ranges (segments) must be displayed properly.	**Yes** ☐ **No** ☐ **N/A** ☐
31.1.5.	Tare may be taken to the maximum capacity of the smallest weighing range (segment) of the scale.	**Yes** ☐ **No** ☐ **N/A** ☐
31.1.6.	Keyboard, programmable, and digital, tare entries, and tare stored in memory for multiple transactions must be consistent with the displayed division size. Incorrect entries may be rounded to the nearest displayed scale division or rejected.	**Yes** ☐ **No** ☐ **N/A** ☐
31.1.7.	Devices equipped with a tare capability must, at all times, indicate and record values that satisfy the equation net = gross - tare.	**Yes** ☐ **No** ☐ **N/A** ☐
31.1.8.	Devices equipped with a semi-automatic (push-button) tare must meet the tolerances for net loads for any tare value.	**Yes** ☐ **No** ☐ **N/A** ☐
31.1.9.	Scales that display or record only net weight values (e.g., most computing scales)	
	• may take semi-automatic (push-button) tare and gross values to ~~either~~ the internal resolution of the scale. Printed and displayed net weights shall be rounded to the nearest division, or ~~the displayed scale division.~~	**Yes** ☐ **No** ☐ **N/A** ☐
	• may take all tare values to ~~either the internal resolution or~~ the displayed scale division, and~~.~~	**Yes** ☐ **No** ☐ **N/A** ☐
	• must always begin with the lowest weighing segment on the device regardless of the amount of tare that is taken.	**Yes** ☐ **No** ☐ **N/A** ☐

31.2. For scales that indicate in only one mode (gross or net) while under load, the scale division for the net weight, whether positive or negative, must be displayed in scale divisions consistent with the weighing range in which the net weight falls.

31.2.1.	The number of scale divisions in each weighing range must meet Table 3 of the Scales Code.	**Yes** ☐ **No** ☐ **N/A** ☐
31.2.2.	The scale divisions for both increasing and decreasing loads must be the same.	**Yes** ☐ **No** ☐ **N/A** ☐
31.2.3.	Devices equipped with a tare capability must indicate and record values that	**Yes** ☐ **No** ☐ **N/A** ☐

satisfy the equation net = gross - tare.

31.2.4.	Devices equipped with semi-automatic (push-button) tare must meet the tolerances for net loads for any tare taken up to the tare capacity of the scale.	**Yes ☐ No ☐ N/A ☐**
31.2.5.	Whenever semi-automatic (push-button) tare is taken and a scale is equipped with only a net display mode, the net weight values must always begin with the lowest weighing range on the device.	**Yes ☐ No ☐ N/A ☐**
31.2.6.	Keyboard, tare entries, must be consistent with the displayed division size.	**Yes ☐ No ☐ N/A ☐**
31.2.7.	The scale division for the net weight, whether positive or negative, must be displayed in scale divisions consistent with the weighing range in which the net weight falls.	**Yes ☐ No ☐ N/A ☐**
31.2.8.	Weight indications at the break-over point of weighing ranges must be displayed properly.	**Yes ☐ No ☐ N/A ☐**
31.2.9.	For all weighing segments ~~ranges,~~ e must equal d.	**Yes ☐ No ☐ N/A ☐**

32. Multiple Range Scales

A multiple range scale is an instrument having two or more weighing ranges with different maximum capacities and different scale intervals for the same load receptor, each range extending from zero to its maximum capacity. The weighing ranges may be either manually or automatically selected. Each weighing range is considered to be an individual scale and evaluated accordingly.

The nominal capacity by minimum division for each weighing range shall be marked in a clear and conspicuous manner and be readily apparent when viewing the reading face of the scale indicator unless already apparent by the design of the device. ~~The capacity and verification scale division for each weighing range must be conspicuously marked near the weight display.~~ The range in use must be clearly indicated. If a scale has a decimal point and a different number of decimal places in each weighing range, the position of the decimal point and the number of digits following is an adequate definition of the weighing range in use. If the weighing ranges do not utilize a decimal point and differing numbers of decimal places, (e.g., scale division are 20 lb, 50 lb, and 100 lb), another method such as an external range indicator must be provided to indicate the weighing range in use.

Whenever gross and tare weights fall in different weighing ranges so that the scale divisions for the gross and tare weights differ, the net weight must agree mathematically with the gross and tare weights that are indicated or recorded (i.e., net = gross - tare)

On a multiple range instrument, a tare value may only be transferred from one weighing range to another one with a larger verification scale interval and ~~but~~ shall then be rounded ~~in the upward direction~~ to the nearest scale division of the latter verification interval.

32.1.	The range in use shall be conspicuously indicated.		**Yes ☐ No ☐ N/A ☐**
32.2.	Ranges may be changed:		
32.2.1.	Manually		**Yes ☐ No ☐ N/A ☐**
32.2.1.1.	from a smaller to greater range at any load.		**Yes ☐ No ☐ N/A ☐**
32.2.1.2.	from a greater to a smaller weighing range, when there is no load on the load receptor, and the indication is zero or at a negative net value; the tare operation shall either be canceled or revert to the original value and zero shall be set, both automatically.		**Yes ☐ No ☐ N/A ☐**
32.2.2.	Automatically		
32.2.2.1.	from a smaller to the following greater weighing range when the load exceeds the maximum gross weight of the range being operative.		**Yes ☐ No ☐ N/A ☐**
32.2.2.2.	only from a greater to the smallest weighing range when there is no load on the load receptor and the indication is zero or at a negative net value; the tare operation shall either be canceled or revert to the original value and zero shall be set, both automatically.		**Yes ☐ No ☐ N/A ☐**
32.3.	Devices with a tare capability must indicate and record values that satisfy the equation net = gross - tare and round the tare value ~~up~~ to the nearest ~~larger~~ division size when entering the larger division. Example, 2 g changes to ~~5~~0 g not ~~0~~5 g and 3 g changes to 5 g not 0 g.		**Yes ☐ No ☐ N/A ☐**

32.4.	Keyboard tare entries must be consistent with the displayed scale division.	**Yes ☐ No ☐ N/A ☐**
32.5.	For manual multiple range scales, the maximum weight value indicated in each range must not exceed:	
32.5.1.	105 percent of the rated capacity for the weighing range, or	**Yes ☐ No ☐ N/A ☐**
32.5.2.	maximum capacity plus 9 d.	**Yes ☐ No ☐ N/A ☐**
32.6.	For all weighing ranges, e must equal d.	**Yes ☐ No ☐ N/A ☐**
32.7.	On a multiple range instrument, the deviation on returning to zero from Max shall not exceed 0.5 e. Furthermore, for automatic range changing devices, after returning to zero from any load greater than Max and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than e during the following 5 minutes.	**Yes ☐ No ☐ N/A ☐**

6. Minimum Size of Weight and Units Indications

Source: New York NTEP Participating Laboratory (Carryover item)

Background: Please refer to the 2006 NCWM Publication 16 S&T Committee Item 320-2 in Appendix C - Attachment to Item 6 for additional background information.

This proposal was originally developed to address a growing problem with the readability of weight indications and the values that define transaction information. Field and laboratory officials indicate that both are becoming increasingly smaller, as demonstrated in the following example of a weight display where the actual size of the weight values are 23 mm in height, but the unit of measurement (g) is 4 mm in height.

During their 2005 meeting, the Sector agreed that any proposal to specify the height of the weight display and units indications in NIST Handbook 44 should be limited to the Scales Code and should align with OIML R76 to the extent possible. The size requirements should be limited to weight indications visible to the customer in direct sale applications, the weight display should be no smaller than 9.5 mm, and the units display or marking should be no smaller that 2 mm.

During the 2006 NCWM Interim Meeting, the Committee received feedback that the definition and illustration of a minimum reading distance were confusing. The Weighing Sector learned that it did not have a consensus on the proposal on the language for corresponding user requirements for primary indicating elements that are provided by the user. Likewise, the November 2005 SMA position opposed the "minimum reading distance" originally proposed designation as a device "specification" paragraph because it believed the language was unenforceable. As a result, the minimum reading distance paragraph was designated as a "user requirement" in Publication 16 and was generally supported in the April 2006 SMA position.

The S&T Committee also received comments from a measurement consultant that the proposal is unnecessary. General Code paragraph G S.5.1. Indicating and Recording Elements can be applied in type approval and thus eliminates the need to borrow any corresponding language from R76 or add any language to Handbook 44. Comments suggested that the United States should stick to performance-based requirements, noting that the proposal does not adhere to that principal.

The Committee agreed that although the clarity and readability of indications are a growing issue, the proposal has only limited support from the public and private sectors. The Committee recognized the proposal requires a significant amount of work before the language is clear, technically correct, and deemed applicable to the different types of installations and technologies in use. The Committee agreed to make the proposal an information item since the Weighing Sector has a group actively working on the language.

Discussion/Recommendation: The Weighing Sector is asked to review the background information and the original proposal and recommend either the proposal be withdrawn or further developed. If the Sector recommends the proposal move forward, the NIST technical advisor recommends that it be separated into two items: 1) the display height device specifications, and 2) the maximum reading distance user requirements.

7. Automatic Weighing Systems Influence Factor Temperature Ranges that Exceed -10 °C to 40 °C

Source: Ohio NTEP Participating Laboratory. (Carryover item)

Background: Please refer to the following 1991 and 1999 NCWM S&T Committee Reports and the 2005 NTETC Weighing Sector Meeting Summary agenda item 18 in Appendix C - Attachment to Item 7 for additional background information.

Juana Williams (NIST), Steve Cook (NIST), and Darrell Flocken (Mettler Toledo) agreed to develop a summary paragraph, with points that need to be addressed (e.g., temperature testing at the time of the NTEP evaluation vs. ambient temperature during subsequent verifications and the marked temperature range).

During the research of this item for the summary paragraph, NIST WMD discovered that the technical policy recommended by the 2005 Weighing Sector conflicts with the position of the 1991 S&T Committee Item 320-3 (I) S.6.3. Marking Requirements; Temperature Range that states **"If a device is marked with a temperature range greater than 14 °F to 104 °F, then the device is tested over the wider range during type evaluation."** The following are extracts from the 1991 S&T position.

1991 Specifications and Tolerances Committee

320-3 I S.6.3. Marking Requirements; Temperature Range

Discussion: Paragraph 8.6.3. requires class III and III L devices not marked with a temperature range to be accurate over a temperature range of 14 °F to 104 °F (-10 °C to 40 °C. The selection of 14 °F to 104 °F was based upon industry standards and normal practices. The temperature range is typical of many outside environments.

Many people interpret the language of S.6.3. to mean that if a scale has no temperature markings, then it is suitable for use only in environments where the temperature range is between 14 °F to 104 °F.

Devices without a temperature range marking are expected to perform within tolerance over the temperature range of 14 °F to 104 °F. Although these limits are specified in Handbook 44 and used for type evaluation, devices must still be accurate in the environment in which they are used, even if the temperatures of the environment exceed the temperature range of 14 °F to 104 °F (T.N.3.2.). Some devices may be accurate over a wider temperature range, but the device has not been tested over a wider range during type evaluation. **If a device is marked with a temperature range greater than 14 °F to 104 °F, then the device is tested over the wider range during type evaluation.**

If a device does not have a wider temperature range marked on the device, there is no assurance that a device will be accurate over a temperature range greater than 14 °F to 104 °F. It may be necessary to adjust a scale for accuracy when used at temperatures outside the marked or implied limits.

When a scale is adjusted near one of the temperature limits, it is logical to expect the scale to perform accurately with a sufficient range about that point. The expected accuracy is a result of the broad compensation range (14 °F to 104 °F) and because the compensation is generally a continuous functional relationship with temperature. Hence, adjustment shifts the compensation range to a more optimum position relative to the temperature limit.

A device marked with a temperature range smaller than 14 °F to 104 °F, but used in an environment in which the temperature exceeds the marked temperature range, is not suitable for use in that environment. A device with an operating temperature range of at least 14 °F to 104 °F must be used in an application in which the temperature of the environment varies at least from 14 °F to 104 °F, since other scales are readily available for such an application. Scales marked with a temperature range less than 14 °F to 104 °F are designed to be accurate only within the range marked on the scale.

Recommendation: The Committee is not recommending any change to Handbook 44, but is providing explanations of the proper interpretation of temperature ranges whether or not they are marked on scales. The discussion addresses class III and

III L scales, but the concept is applicable to scales of other classes.

It is the intent of the requirement that any operating temperature range designated by the manufacturer that is different from 14 °F to 104 °F (-10 °C to 40 °C), either larger or smaller, be marked on the device. The different cases of marking and not marking temperature ranges are addressed. The following interpretations of the temperature ranges for scales should be added to the appropriate training modules, such as Module 5 on vehicle scales.

Case 1: Temperature range of 14 °F to 104 °F
This case has two parts. The conclusion is the same whether or not the temperature range is marked on the device.

A. If temperature range is not be marked on a scale, the device must be accurate over the range of 14 °F to 104 °F. If a temperature range is not marked on a device with an NTEP Certificate of Conformance, it was tested over a temperature range of 14 °F to 104 °F. The device may be used outside the specified temperature range, but the device must be accurate in the environment in which it is used, since T.N.2.3. applies.

B. If a device is marked with a temperature range of 14 °F to 104 °F, the marking is not considered to be a limitation on its application. The device may be used outside the specified temperature range, but the device must be accurate in the environment in which it is used, since T.N.2.3. applies. The marking of the temperature range of 14 °F to 104 °F is optional.

Case 2: Marked temperature range is less than 14 °F to 104 °F
If a device is marked with a temperature range less than 14 °F to 104 °F, then the environment in which the device is used must be evaluated to determine if the device is suitable for use in that application. The device cannot be used in an environment in which the temperatures exceed the temperature limits marked on the device.

Case 3: Marked temperature range is greater than 14 °F to 104 °F
If a device is marked with a temperature range greater than 14 °F to 104 °F this indicates higher quality than a scale without a temperature marking for devices within the same accuracy class and of the same scale division value. This fact may be used as a marketing tool in the same manner as the maximum number of scale divisions, n_{max}. A scale marked with a wider temperature range is tested during type evaluation over the marked temperature range.

1999 Specifications and Tolerances Committee

320-6 VC Table S.6.3.b. Notes For Table S.6.3.a.; Temperature Limits

(This item was adopted as part of the consent calendar.)

Source: National Type Evaluation Technical Committee Weighing Sector

Recommendation: Modify Table S.6.3.b. Notes For Table S.6.3.a., Note 5. to read as follows:

Required only on Class III, III L, and IIII ~~scales~~ devices if the temperature range on the NTEP CC is ~~other~~ narrower than and within –10 °C to 40 °C (14 °F to 104 °F).
[Nonretroactive as of January 1, 1986]

Discussion: The Weighing Sector identified a discrepancy between Handbook 44 and Publication 14 National Type Evaluation Program Administrative Procedures, Technical Policy, Checklists, and Test Procedures in the requirement for marking temperature ranges on scales. Handbook 44 requires that Class III, III L, and IIII devices be marked with a temperature range if the temperature limits are other than –10 °C to +40 °C. However, some sections of Publication 14 state that these devices must be marked with a temperature range if the temperature range is narrower than –10 °C to +40 °C.

The Weighing Sector discussed instances where is it permissible to use a device if the device is marked with a specific temperature range, or a range is listed on a CC. The Sector agreed that, if possible, the requirement should harmonize with OIML. OIML R76 Clause 3.9.2.1. Prescribed Temperature Limits states "If no particular working temperature is stated in the descriptive markings of an instrument, this instrument shall maintain its metrological properties within the following temperature limits: –10 °C, +40 °C."

The Committee agreed that although the modifications to Note 5 are less restrictive, they appear to more adequately describe the temperature marking requirements and eliminate any conflict between Handbook 44 and Publication 14.

During the 1999 Annual Meeting, there were no unfavorable comments on this item.

Discussion/Recommendation: The Sector is requested to consider:

1. Developing a recommendation to amend the temperature requirements in the Belt-Conveyor Scale Systems, Automatic Bulk-Weighing Systems, Automatic Weighing Systems, Multiple Dimension Measuring Devices, and Grain Moisture Meter (GMM) codes to be similar to the following Scales Code language to be considered by the NCWM S&T Committee:

   T.X.X.. Operating Temperature. - Except for Class X and XX devices, an indicating or recording element shall not display nor record any usable values until the operating temperature necessary for accurate weighing and a stable zero balance condition have been attained.

   Table S.X.X. Marking Requirements Note X. *Required only on Class . . . . devices if the temperature range on the NTEP CC is narrower than and within 10 °C to 40 °C (14 °F to 104 °F). [Nonretroactive as of January 1, 1986]*

   (Extracts for the applicable Handbook 44 Code temperature and marking paragraphs are in Appendix C - Attachment to Item "Attachment to Item 7")

2. Developing and recommending a technical policy to address the 1991 S&T position for devices submitted with a temperature range where the minimum and/or maximum temperature exceeds the limit specified in Scales Code paragraph T.N.8.1. Temperature.

New Items

8. GIPSA Grain Test Scale Requirements

Source: GIPSA (Grain Inspection Packers and Stockyards Administration (GIPSA) and the NTEP Committee.

Background: GIPSA is responsible for approval of equipment used to inspect grain under the USDA official system. They have reviewed the NTEP requirements for official grain test scales in an effort to simplify and harmonize with NTEP requirements for commercial grain test scales.

GIPSA, in consultation with the American Association of Grain Inspection and Weighing Agencies, Ohaus, Mettler Toledo, and Seedburo Equipment Company, revised its rules for official grain test scales and user requirements in the GIPSA Equipment Handbook Chapter 2, GRAIN TEST SCALES (page 6) effective February 2002 (http://archive.gipsa.usda.gov/reference-library/handbooks/equipment/eq2-scal.pdf).

GISPA recommends the following amendments to NCWM Publication 14 DES as follows in order to align Publication 14 with their requirements:

37. Grain Test Scales
Code Reference: G-S.2., S.2.1.2., and S.2.3., UR.1.4.

Grain test scales are those used for weighing grain samples to determine moisture content, dockage, weight per unit volume, etc. These scales may compute percentages based upon a stored sample weight and a load placed on the scale platform. The scale may also compute a weight per bushel or hectoliter based upon a specified volume of grain placed on the platform.

If a scale is to be used by the Grain Inspection Packers and Stockyards Administration (GIPSA, formerly the Federal Grain Inspection Service, U.S. Department of Agriculture), for the official grading of grain, the scales must meet more stringent requirements than are necessary for Handbook 44 applications**, and listed on the NTEP CC**. These differences are given in items ~~7, 8, and 9~~ 37.8. and 37.9.

37.7. **For Handbook 44 (non-GIPSA) applications**, percent calculations may not be displayed unless the value of the scale division is less than or equal to 0.2 g for loads up to 500 g and less than or equal to 1.0 g for loads greater than 500 g. (See NIST Handbook 44 Scales UR.1.4.) **Yes ☐ No ☐ N/A ☐**

37.8. **For GIPSA grain test scale applications to be listed on the CC,** calculations for test weight must be based on a sample size of one quart only. Calculations are not to be based on a sample size of one pint nor shall the capability to compute the test weight per bushel on the basis of 1 pint ~~to be permitted on scales for use by the GIPSA~~. **Yes ☐ No ☐ N/A ☐**

37.9. **For GIPSA grain test scale applications to be listed on the CC,** the following requirements must be satisfied**:**

37.9.1. The percent values shall be rounded and displayed to at least 0.1 %. ~~To calculate and display percent values, the verification scale division cannot exceed 0.01 g for loads up to 120 g and 0.5 g for loads in excess of 120 g through 1000 g.~~ **Yes ☐ No ☐ N/A ☐**

37.9.2. The verification scale division (e) for grain-test scales shall not exceed: **Yes ☐ No ☐ N/A ☐**

- 0.1 g for separations from loads through 500 g, and
- 1.0 g for separations from loads above 500 g through 1000 g.

For scales used to weigh separations from loads of 100 g and less, d shall be less than or equal to 0.01 g, but may utilize expanded resolution. ~~The percent values shall be rounded and displayed to at least 0.1 percent.~~

37.9.3. Selection of a scale with an appropriate division size shall be a user requirement, based on the work portion size, and both the work portion and the separation shall be weighed using a scale with the same (or better) maximum division size. For example: :~~To calculate and display test weight values, the verification scale division cannot exceed 0.5 g.~~ **Yes ☐ No ☐ N/A ☐**

GIPSA Required Division Sizes		
Work Portion	**Division Requirement**	**Accuracy Class**
≤ 100 g	e ≤1 g d ≤ 0.01 g	II (expanded resolution*)
>100 g	e ≤ 0.1 g d ≤ 0.1 g	II, III
>500 g	e ≤ 1 g d ≤ 1 g	II, III
* The words "(expanded resolution)" are offered as an option that most users will take advantage of, because of scale cost		

~~37.9.4. For official weighing, the GIPSA has three categories of electronic laboratory scales used as grain test scales: precision, moisture, and general. The accuracy classes and scale divisions used for these scale categories shall not exceed those given in the following table.~~ ~~**Yes ☐ No ☐ N/A ☐**~~

~~**Category**~~	~~**Accuracy Class**~~	~~**Scale Division**~~
~~Precision~~	~~II~~	~~e ≤ 0.01 g d ≤ 0.01 g~~
~~Moisture~~	~~II, III~~	~~e ≤ 0.1 g d ≤ 0.1 g~~
~~General~~	~~II, III~~	~~e ≤ 0.5 g d ≤ 0.5 g~~
~~***NOTE:** For Class III scales e d. GIPSA requires that e = d for Moisture and General Categories, Class II grain scales used in GIPSA applications.~~		

~~List the models and capacities that satisfy the requirements for each category.~~

9. *Ad Hoc* Procedures for Wireless Communication of Metrological Information

Source: **NTEP Laboratories**

Background: NTEP has received several inquiries about the suitability of scales with wireless communication capability between the weighing/load-receiving element and the indicating (and recording element, if applicable). Several NTEP applicants had this feature reviewed, evaluated, and listed on their CCs according to NTEP Technical Policy in Publication 14 Section A that states that "All options and features to be included on the CC must be submitted for evaluation. Nonmetrological features may be listed on a CC, but only if the feature has been evaluated and operates as intended." Other holders of NTEP CCs did not have the feature evaluated and listed on the CC. Because of this discussion, it was noted that there are no specific procedures in Publication 14 and that the participating laboratories were evaluating this feature based on interpretations of language in Publication14 Section 11. Indicating and Recording Elements - General. Therefore, the Participating Laboratories developed the following *ad hoc* procedures specifically for weighing devices using wireless communication to transmit weight values between the load-receiving element and a receiver (i.e., indicating element and/or printing element).

Discussion/Recommendation: The Sector is asked to 1) review and recommend the following proposed ***ad hoc*** language to be added to Publication 14 Section 11 Indicating and Recording Elements – General and 2) discuss situations where after-market or third parties are adding wireless communication capability to weighing equipment that already has an NTEP CC and if additional NTEP policies or procedures are needed to address this scenario.

11. Indicating and Recording Elements - General

Code References: G-S.2., G-S.5.1., G-S.5.2.2., and S.1.2.

There are several general requirements to facilitate the reading and interpretation of displayed weight values. Other requirements address the proper operation of indicating and recording elements.

11.19 ***Technical Advisor Note:*** *The introductory sentence submitted in the* ***ad hoc*** *language is not typically used in Publication 14 and suggests that the paragraph just introduce the evaluation of an indicator with wireless communication feature.*

~~The NTEP Laboratories are being asked to evaluate more devices that use some form of wireless communication. The following checklist items will be used to evaluate the suitability of these devices:~~ The following procedures shall be used to evaluate indicating elements that communicate digital weight and other information from a separable load-receiving elements ~~If the indicating element receives the weight signal from the weighing element or receives a metrological command from~~ or other peripheral equipment (i.e., PC or remote control) by means of a radio transmitter/receiver (or other wireless communication device), at least two (2) indicating elements shall be evaluated to insure:

11.19.1	There is no interference from one device to another device of the same type.		**Yes ☐ No ☐ N/A ☐**
11.19.2	The signal from a weighing element is sent to the **appropriate** (correct) indicator.		**Yes ☐ No ☐ N/A ☐**
11.19.3	The indicator displays an error message or displays meaningless information that could not be mistaken for a valid weight indication, when the signal from the weighing element (or the metrologically significant peripheral equipment) is interrupted or blocked by all of the following actions:		**Yes ☐ No ☐ N/A ☐**
	11.19.3.1	-turning the power off to the weighing element ,	**Yes ☐ No ☐ N/A ☐**
	11.19.3.2	-turning the power off to the metrologically significant peripheral equipment,	**Yes ☐ No ☐ N/A ☐**
	11.19.3.3	-blocking the signal with a steel plate,	**Yes ☐ No ☐ N/A ☐**
	11.19.3.4	-moving the indicator away from the weighing element, or	**Yes ☐ No ☐ N/A ☐**
	11.19.3.5	-moving the indicator away from the metrologically significant peripheral equipment.	**Yes ☐ No ☐ N/A ☐**
	For informational purposes, record the maximum range (distance) at which an accurate indication is maintained		
11.19.4	If the indicator can be connected to more than one weighing element at the same time, by means of a radio link or other wireless means, the indicator will be		**Yes ☐ No ☐ N/A ☐**

	evaluated with at least 2 weighing elements (placed side by side) with the wireless communication capability and shall meet all the same requirements as an indicator using physical connection to the weighing elements.	
11.19.5	If more than one indicator can be connected to one weighing element at the same time using the wireless communication method, the evaluation will be performed with at least 2 indicators (placed side by side) and connected to the weighing element using the wireless communication method and shall meet all the same requirements as indicators using physical connection to the weighing element.	**Yes ☐ No ☐ N/A ☐**
11.19.6	If the wireless communication is battery powered, the device continues to perform within applicable tolerance when the DC voltage to the device is lowered to the lowest DC voltage where a weight display is available and the highest voltage recommended by the device manufacturer. If the manufacturer does not specify the highest DC voltage, the device will be tested with a DC power supply equal to the nominal DC voltage. The device will then be tested with a DC power supply equal to the nominal DC voltage plus 10 percent. The low power supply testing will be conducted at the maximum range (distance) determined at the nominal DC voltage which an accurate indication is maintained.	**Yes ☐ No ☐ N/A ☐**

10. Procedures for Percentage and Proportional Tare

Source: NTEP Laboratories

Background: During the April 2000 NTEP Participating Laboratories Technical Session, the weighing devices laboratories discussed the use of percentage and proportional tare. A workgroup was formed to create an addition to Pub 14. The assignment fell through the cracks and the procedures were never addressed by the Weighing Sector. The New York and Maryland labs have developed definitions and test criteria for addressing percentage and proportional tare.

Discussion/Recommendation: The workgroup developed the following definitions for consideration by the Sector in order to facilitate a consistent understanding of the terms used in the proposed language:

Proportional tare - A value, automatically calculated by a scale, proportional to the gross weight indicated by the scale. A proportional tare can be a percentage tare or a fixed tare value proportional to a range of gross weights (i.e., a 0.10 lb tare for gross weights between 0 and 2 lb, a 0.20 lb tare for gross weights between 2 and 4 lb, etc.). A proportional tare is, therefore, not limited to being a percentage tare.

Percentage tare - A form of proportional tare expressed as a percentage (e.g. 5.6 %), that represents the percentage of tare material compared to the gross weight (or initial net weight if fixed tare is also used) of the commodity. A percentage tare is one form of proportional tare.

The 2000 percentage tare workgroup also developed a proposal to amend NCWM Publication 14 for the test and evaluation of Proportional and Percentage Tares. The Sector is asked to review and comment on the following proposed definitions and procedures and discuss the recommendation that the definitions be added to Publication14.

51. Proportional and Percentage Tare

Code References: G-S.2, G-S.5.1, G-S.5.5.2.2, G-S.5.6

Proportional tare is a value, automatically calculated by the scale, proportional to the gross weight indicated by the scale. A proportional tare can be a percentage tare or a fixed tare value proportional to a range of gross weights (i.e., a 10 g tare for gross weights between 0 and 2 kg, a 20 g tare for gross weights between 2 and 4 kg, etc.). A proportional tare is, therefore, not limited to being a percentage tare.

Percentage tare is a value, expressed as a percentage (i.e., 5.6 %), that represents the percentage of tare material compared to the gross/net weight of the commodity. A percentage tare is one form of proportional tare.

The following terms and abbreviations will be used in determining percentage tare:

GW1= First Gross Weight
FTW=Fixed Tare Weight
GW2=Final Gross Weight
%TV=Percentage Tare Value (example: 2%, 5%)
%TW=Percentage Tare Weight
NW=Net Weight

51.1 The scale does not accept negative values for percentage tare. The tare shall operate only in the backward direction. **Yes ☐ No ☐ NA ☐**

51.2 Percentage tare values may only be entered through the keyboard when the device is at gross load zero and in a "configuration" mode. **Yes ☐ No ☐ NA ☐**

Percentage and/or proportional tares may be preprogrammed into PLU codes. PLU codes may be entered or changed at any time, whether or not a load is on the platter.

Both fixed and percentage tares may be deducted from the gross weight to obtain the final net weight for a transaction. For instance, a PLU code may be preprogrammed with fixed and percentage tares; or a platter or keyboard tare may be manually entered first. Then a percentage tare may be applied, through a PLU code.

51.3 The tare weight shall not be rounded prior to subtracting the tare weight value from the gross weight. The tare value(s) must be deducted first and then the final net weight value rounded off to the nearest scale interval. Rounding of the net weight is not performed until the last mathematical operation. **Yes ☐ No ☐ NA ☐**

51.4 The visual confirmation that a tare has been applied (i.e., "Net" annunciator) must only be enabled if the percentage tare multiplied by the final gross weight represents one or more scale intervals after the appropriate rounding. The turning on of the "Net" annunciator must only occur if tare has actually been applied to the gross weight. **Yes ☐ No ☐ NA ☐**

51.5 Percentage tare shall be manually entered or preprogrammed as part of a PLU in units of percent (or as a decimal fraction, e.g., 1 % = 0.01). Percentage tare shall not exceed 99.9 %. **Yes ☐ No ☐ NA ☐**

51.6 Except for POS systems, the net weight must be displayed when a percentage or proportional tare is entered. **Yes ☐ No ☐ NA ☐**

51.7 If the device deducts both a fixed tare and a percentage tare from the gross weight, the fixed tare shall be deducted first. **Yes ☐ No ☐ NA ☐**

When percentage tare is used, the preferred method of calculating the net weight is*:
Net Weight = **(GW1–FTW) – GW2 (%TV/100)**

The net weight of the following example is:

Scale	GW1	FTW	GW2	%TV	%TW=%TV * GW2	NW
15 kg x 5 g	355 g	10 g	345 g	10	34.5 g	310.5 g

Net Weight = **(GW1 – FTW) – [GW2 (%TV/100)]**
= (355 g – 10 g) – [345 g (%10/100)]
= (345 g) – 345 g (0.10)
= 345 g – 34.5 g
= 310.5 g Rounded to the nearest scale division=310 g

*Note: Another acceptable method of calculating the net weight is based on the percentage of net weight (% NW). The percentage of net weight = **[1 - (%TV/100)]**).

Net Weight = **GW2 [1–(%TV/100)]**

The net weight of the following example is:

Scale	GW1	FTW	GW2	%TV	%TW=%TV * GW2	NW
15 kg x 5 g	355 g	10 g	345 g	10	34.5 g	310.5 g

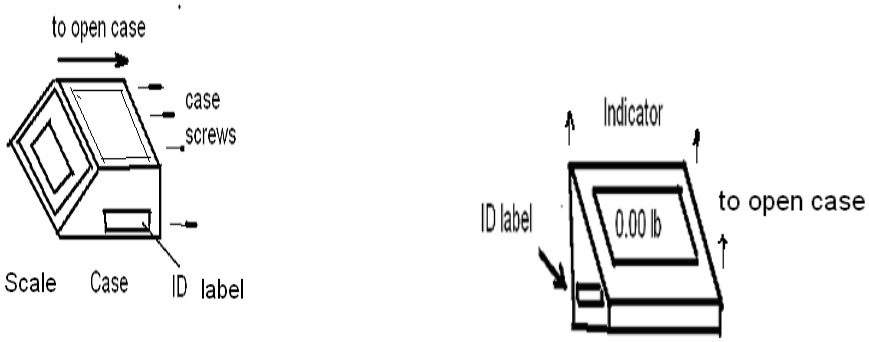
Net Weight = **(GW1–FTW) [1–(%TV/100)]**
= 345 g [1–(10/100)]
= 345 g [1–(.10)]
= 345 g [.90]
= 310.5 g Rounded to the nearest scale division = 310 g

11. Permanence of Identification When an Audit Trail is the "Security Means"

Source: New York NTEP Laboratory

Background: The New York NTEP Laboratory has stated that audit trails may not always be the appropriate method of sealing for a scale or indicator. This is true if the identification information marked on the device is on a removable part of the weighing (or measuring) device such as a cover or outer case. The identification information marked on the device should not be considered "permanent" according to NIST Handbook 44 paragraph G-S.3. Permanence if it is on a removable part of the device unless the cover can be physically sealed to an integral part of the scale.

(1) If an audit trail is the means of sealing, then the outer case or cover containing the ID information can be removed and replaced with that of another scale or indicator, making the information not permanent.



(2) If an audit trail is the approved method of sealing for this case, the case base containing the ID plate can be switched with the ID plate on another case.

The New York NTEP Laboratory recommends that a scale with the identification located on an easily removed cover and electronic means of sealing still should have a physical security means to seal the cover to an integral part of the scale.

The NIST technical advisor would like to make the Sector aware of the following 1989 NTEP Committee discussions on identification information located on a removable part of a scale, such as a cover:

From the June 1989 Meeting of the NTETC Weighing Sector

4.Permanence of identification badges (plates) on scales and load cells

Permanence

The criteria for "permanence" of identification badges on scales and load cells was submitted to the Technical Committee for clarification. Several manufacturers have disagreed with the interpretation of this requirement by the type evaluation laboratories. The interpretation has been that the identification badge must be destroyed (be removed in pieces) when it is removed.

The reasons given for the requirement that identification badges be destroyed upon removal were:

1.the badges provide a unique identification of the devices for weights and measures records, to identify a device for court cases, maintain a history on each device, and for manufacturer warranty,

2. to prevent the transfer of a badge to another device;

3. to identify stolen equipment; and

4. to establish the date of manufacture of a device to determine if nonretroactive requirements apply. This last objective usually involves contacting the manufacturer for assistance in determining the date of manufacture.

It was suggested that the fraud aspects of manipulating identification badges were not valid. Many other possibilities exist for fraud and are easier to perpetrate if someone chooses to do so. Tampering was not considered significant relative to the marking requirement.

The consensus of the Committee was that "permanent" should mean that the identification information must be sufficiently durable to withstand normal wear and tear throughout the life of the device. An identification badge must be difficult to remove. Blind rivets to attach a badge to a device are acceptable, but removable screws are not.

Location

Objections were raised to the checklist requirement that the identification badge be an integral part of the device. Additionally, an objection was raised to require a security seal to attach the cover of a device to the chassis when the identification information is on the cover.

To provide some standardization in the location of the identification information, the following locations were suggested.

1. The identification information shall be located near the point where the signal leaves the weighing element of vehicle, axle-load, livestock, and railway track scales. This would be on the transverse lever on a mechanical scale.

2. The information should be on or- near the junction box nearest the point where the signal leaves the scale on an above-ground scale.

The Committee concluded that the second sentence in the second paragraph on page 69 of NCWM Publication 14 shall be deleted.

From the January 1989 Edition of Publication 14, Page 69:

GENERAL CODE REQUIREMENTS, IDENTIFICATION

Code Reference: G-S.1.

Virtually all weighing and measuring equipment must be clearly and permanently marked with the manufacturer's name or trademark, model designation, and serial number. As a practical matter, remote weight displays are not required to have serial numbers because they typically do not use any electronics to analyze the weight signal received from the weighing element. Similarly, the various "slave" modules in a modular point-of-sale system (e.g., printer, keyboard module and cash drawer) have not been required to have serial numbers because they do not have any "intelligence". Only the electronic modules that control the "slave" modules must be marked with a serial number.

If the required information is located on the back of a device, the same information must also appear on the side, front, or top. **It may be installed on a removable cover if the cover can be fitted with a security seal.** The bottom of a device is not an acceptable surface. **This information may be located under, but separate from, the scale platform on a scale or weighing element installed at a checkout stand, provided the platter can be easily removed without the use of a tool. The identification plate must be permanent and attached with pop rivets or adhesive or equivalent permanent means. Removable bolts or screws are not permitted. A foil badge may be used provided that it is destroyed in any attempt to remove it. Additionally, the printing on a foil badge must be easily read and not easily obliterated by rubbing with a relatively soft object (e.g., the wood of a pencil).**

Discussion: The Sector is requested to review the background information and discuss if there is sufficient justification for this subject to be revisited. The Sector should then develop additional language for Publication 14 that can be recommended to the NTEP Committee if the Sector agrees with the New York NTEP Laboratory.

12. e_{min} and Other on Markings on Load-Receiving Elements.

Source: California NTEP Laboratory

Background: The California NTEP Laboratory has reported that applicants are using abbreviations for minimum verification scale interval, maximum number of scale division, and load cell verification interval that are used in NIST Handbook 44 Scales Code Table S.6.3.a. and in the applicable definitions in Appendix D. That is, the applicants are using the letters in both upper and lower text cases and without the appropriate subscript. The incorrect case and lack of the subscript min or max completely changes the definition of the symbol or abbreviation. For example, a lower can "n" by itself indicated the number of divisions configured for a specific instrument and not the maximum number of divisions evaluated in permitted on its Certificate of Conformance and an uppercase E is a symbol used for a load cells to define the dead load of a load cell in a specific instrument.

Discussion/Recommendation: The California NTEP Laboratory requests that the sector consider the following proposal to amend NCWM Publication 14 Section 4. Additional Marking Requirements – Weighing/Load-Receiving Elements and Section 76.List of Acceptable Abbreviations/Symbols as follows *(**NIST Technical Advisor Note**: The Sector may want to review other sections of Publication 14 for other symbols and abbreviations that are not permitted in Handbook 44 such as markings for load cells and separable indicating elements and clearly stating that Class IV is or is not an acceptable Marking for Class IIII instruments)*:

4.Additional Marking Requirements – Weighing/Load-Receiving Elements

Code References: S.6., Table S.6.3.a., and Table S.6.3.b.

Weighing/load-receiving elements and indicators that are; (1) in the same housing, or (2) permanently hard wired together, or (3)sealed with a physical seal or an electronic link, shall have markings that comply with section "1 Markings - Applicable to Indicating, Weighing/Load-Receiving Elements and Complete Scales". This does not apply to indicating elements that have no input or effect on weighing/load-receiving element calibrations or configurations.

Weighing/load-receiving elements that are not permanently attached to the indicator may be interfaced with many different

indicators. Consequently, these weighing/load-receiving elements must be marked with information that clearly identifies the manufacturer, the model, and the capacity of the weighing/load-receiving element.

Since the United States permits indicating and weighing/load-receiving elements to be evaluated separately with different indicating and weighing/load-receiving elements to be assembled at the time of scale installation, additional marking requirements were adopted in 1987. To facilitate the proper installation of equipment and to permit verification by the enforcement official, a weighing/load-receiving element not permanently attached to an indicating element must be marked with;

1) its accuracy class,
2) the maximum number of scale divisions, n_{max}, and
3) minimum verification scale division, e_{min}, for which the weighing/load-receiving element complies with the applicable requirements.

Weighing/load-receiving elements not permanently attached to an indicating element shall be clearly and permanently marked with:

4.1.	The nominal capacity of the weighing/load-receiving element.	**Yes ☐ No ☐ N/A ☐**
4.2.	Its accuracy class. Indicate class: _____	**Yes ☐ No ☐ N/A ☐**
4.3.	The maximum number of scale divisions for which it complies with requirements (n_{max}). Note: N or n (number of scale intervals) is not an acceptable marking for n_{max}.	**Yes ☐ No ☐ N/A ☐**
4.4.	The minimum verification scale division for which it complies with requirements (e_{min}). Note: E (load cell dead load) or e (verification interval) is not an acceptable marking for e_{min}.	**Yes ☐ No ☐ N/A ☐**
4.5.	The weighing/load-receiving element shall be marked with the operating temperature range if the temperature range is other than 14 °F to 104 °F (-10 °C to 40 °C).	**Yes ☐ No ☐ N/A ☐**

Device Application	Term	Acceptable	Not Acceptable
General:			
Values Defined:			
***Exceptions to Gen'l Tables Of W&M, HB44:**			
Weighing and Indicating Elements:			
	maximum number of scale divisions	n_{max}	N
	Section Capacity	Sec C or Sec Cap	SC
Weighing/load-receiving elements	minimum value of verification scale division	e_{min}	E
Load Cells	maximum number of scale divisions	n_{max}	N
	single or multiple cell applications	S = Single; M = Multiple	
	load cell verification interval	v_{min}	V

Railway Track Scale Items

13. CLC Type Evaluation Tests on Railway Track/Vehicle Scales – Technical Policy

Source: Brechbuhler Scales Inc. (Carryover item)

Background: During their 2005 meeting, the NTETC Weighing Sector agreed that NCWM Publication 14 Technical Policies and Test Criteria for vehicle scales and railway track scales should be reviewed and that separate test criteria should be developed for combination vehicle/railway track scales. The new criteria should include technical policies and test procedures for:

1)New NTEP applications,
2)Amendments to existing Certificates of Conformance (CCs) for railway track scales to include the vehicle weighing feature including:
   a. CLC ratings,
   b. CLC testing using field standard weight (center vs. off-center),
   c. Permanence tests for amending railway track CCs to include a vehicle weighing option, and
3)Test using the vehicle scale e_{min} for new NTEP applications and existing CCs.

Ed Luthy agreed to develop a draft proposal and distribute it for review and comment to Stephan Langford, Darrell Flocken, and Bob Feezor. The procedures and technical policies were due to the NIST technical advisor by March 1, 2006, in order that the proposal could be reviewed by the NTEP laboratories prior to it being submitted to the NTETC Weighing Sector for their September 2006 meeting. However, the NIST technical advisor did not have sufficient time to develop proposed language for consideration by the NTEP laboratories.

Ed Luthy submitted the following for review and comment by the Sector [*The NIST Technical Advisor suggests the submitted language be listed as notes in section 8.2 page DES-6 and-7 since CLCs and e_{mins} are not addressed in 8.1 a. through e,). No additional test procedures were recommended by Ed Luthy, Stephen Langford, Darrell Flocken, and Bob Feezor]*:

8.2. Additional criteria for vehicle scales, railway track scale, combination vehicle/railway track scale, and other platform scales greater that 200 000 lb.

A CC will apply to all models having:

e. **spans** between sections of not more than 20 percent greater than the equipment evaluated; (for vehicle scale no greater than the device evaluated)

Notes for e:

1. On a combination Vehicle Scale/Railway Track Scale, a test of the CLC for the vehicle portion of the scale is not required provided the scale has been evaluated as a Railway Track Scale with a minimum of a 100 000 lb section capacity.

2. If the device under evaluation has not been previously evaluated as a vehicle scale, the vehicle scale evaluation must be conducted in addition to the railway track scale evaluation.

3. The device must be evaluated using the smallest e_{min} value that will be listed on the certificate. This may require the use of a multi-range weight indicator for combination vehicle/railway track scales.

4. The device manufacturer may establish the CLC for the vehicle scale portion of the device, but it must not exceed the section capacity of the railway track scale (***The NIST technical advisor recommends adding:*** The CLC listed on the CC shall be no greater than what would be permitted in Section 8. d.).

Discussion/Recommendation: The Sector is requested to review and comment on the above-proposed technical policies and discuss the impact on railway track scales with existing CCs (e.g., CLC tests between sections) and existing Publication 14 test procedures. Additionally, GIPSA has submitted a railway scale test form they used for NTEP testing when using the GISPA rail test car. This has been submitted to the Sector due to last year's amendment to the test procedures recognizing other test

equipment (weight carts) that are suitable for use in NTEP tests by other NTEP laboratories. The copy of the modified GIPSA test form can be reviewed in Appendix C Attachment for Agenda Item 13.

14. Railway Track Scales with a Rotary Dump Feature Technical Policy.

Source: Bob Feezor, Norfolk Southern Corporation

Background: The following is from the 2005 Annual Meeting of the NTETC Weighing Sector Agenda Item 19 Discussion and Recommendation on the lack of documentation and test procedures for railway track scales with the rotary dump feature that facilitates emptying loose bulk material (e.g., coal) from a railway car while still on the load-receiving element.

Manufacturers of rotary dump mechanisms for railway track cars offer a weighing option where a railway track scale is built into, or installed in the rotary dump mechanism. The manufacturers of these systems frequently believe that the railway track scale is approved for this application (or in some cases, just the load cells and indication elements), and is covered by an NTEP CC. Additionally, there are many existing rotary dump mechanisms that were installed prior to the formation of NTEP that are nearing the end of their useful life and the users of these devices are requesting that the railway track scales be covered by NTEP CCs. The submitter of this item is concerned there are no documented policies and test criteria for these devices, and therefore promotes inconsistent enforcement of the NTEP requirements on these devices.

NTEP and the laboratories have consistently stated that a railway track scale CCs must include the rotary dump mechanism must be verified by NTEP and subsequently listed on the CC. The problem is that this policy is not documented in NCWM Publication 14, nor are there any documented procedures to test the rotary dump scales.

Robert Feezor recommend recommended that *ad hoc* policies and test criteria should be developed to add the rotary dump mechanism as a feature on the.

Recommendation: **The Sector agreed with the submitter that the rotary dump option should be included on CCs for railway track scales, and that NTEP Technical Policies and test criteria are needed for Pub 14. Robert Feezor and Steve Cook agreed to draft technical policies and test criteria will be developed and submitted for the 2006 meetings of the NTEP Labs and Weighing Sector.**

Discussion/Recommendation: Bob Feezor and William Bates (GIPSA) submitted a test form and procedures for testing railway track scales with a "rotary dump" feature. Steve Cook was not able to develop the proposed language into a Publication 14 format in time for review by the NTEP weighing laboratories during their 2006 NTEP technical session in April 2006.

The NIST technical advisor recommends that the "Railway Track Scale Rotary Unloading (Dump)" feature be added to the "Features and Options - Characteristics of Each Models/Types or Sub-Groups" section of the NTEP application for scales.

The Weighing Sector is asked to review the following proposed amendment to Publication 14 Section E. Modification of Type and the proposed procedure for discussion and recommendation.

E. Modification of Type (DES-12-13)

9. Adding a rotary dump feature/option/modification to a railway track scale requires an evaluation to be listed on a new or existing CC.

69a. Additional Tests for Railway Track Scales with a "Dump" Feature: Repeatability Test

In addition to the tests in Section 69, an additional "return to zero" and "section" test using the available test load test shall be conducted on railway track scales with a dump feature.

69a.1 After the strain tests have been completed have been completed according to section 69.7: **Yes ☐ No ☐ NA ☐**

1. With the zero-tracking mechanism disabled, zero the indicator;
2. Move a loaded car on to the scale and record the gross weight;
3. Dump the loaded car using all the installed equipment that is used in the dumping process including retarders, vibrators, car ejector, etc., and record the tare weight;
4. Move the empty car off the scale.

69a.2	The indications shall return to zero within applicable tolerances. To verify repeatability of the scale accuracy, 1. Rezero the scale if necessary; 2. Perform a complete section test in both directions using the same maximum test load that was used in paragraph 69.5. The results of the section test after dumping a loaded car shall repeat the indications of the initial test within acceptance tolerances.	**Yes ☐ No ☐ NA ☐**

15. In-Motion Railway Track Scale Technical Policy – Developing Issue

15(a). Lack of Minimum Use Criteria for Permanence Tests

Source: NTEP Director

Background: There are no criteria specified in the permanence test paragraph on page DES-100 of Section 68 of NCWM Pub 14 - Performance and Permanence Tests for Railway Track Scales Used to Weigh-In-Motion, other than repeating the tests after a minimum of 20 days after the performance test. There needs to be specific "minimum use" requirements in the permanence test similar to permanence test requirements for other weighing devices. For example, the permanence section should include a minimum number of cars (or hours) to be run across the device during the 20-day period.

Discussion/Recommendation: The Sector requested to discuss this item and either recommend amending Section 68 by adding "minimum use" criteria for permanence test or recommend that permanence testing be deleted from Section 68.

15(b). Permanence Test Paragraph: page DES-110

Background: During recent months, there has been extensive discussion by the NTEP Committee, the NTEP Director and several NTEP CC holders regarding this device type. The question has been raised to the necessity of a permanence test, or more appropriately, the value of a permanence test, for this device type.

The current Section 68 appears to be written to evaluate an entire system, including a previously NTEP certified weighing/load-receiving element (W/LRE) and NTEP-certified indicating element.

It has been suggested that the coupled-in-motion (CIM) device is actually an electronic device that is software-based, which in many cases, is added onto the existing indicating element. It has been further suggested that other electronic devices such as separable indicating elements or a POS systems are not required to be subjected to a permanence test in Publication 14. So the question is raised, should this type of device be required to go through a permanence test when both the W/LRE and indicating element already have an NTEP CC and the W/LRE has already gone through a permanence test.

Discussions on the permanence requirements for the W/LRE state that the method of loading does not change with this type of device whether it is a static or a CIM device. (The rail car must still travel on the rail over the scale.)

However, arguments against the above position indicate that the CIM device is subject to other factors that 1) can only be evaluated as an actual system; 2) cannot be simulated in the laboratory; and 3) must be subjected to some type of both actual performance tests and permanence tests to determine if the device can gather and perform the necessary calculations to estimate the weight of both the individual cars and the unit train. Other factors may include, but are not limited to, something in the W/LRE "working loose" in the time between the initial performance test and the permanence test causing additional vibrations that would not effect static weighing but would have an impact of the software's ability to determine a weight while the railway car is in motion.

In summary, questions that need to be addressed are:

1. Should an in-motion type of device be required to go through a permanence test when the W/LRE is covered by an NTEP CC and has already been tested for permanence for static weighing applications?

2. Should there be different permanence test requirements for W/LRE that are evaluated for static or CIM weighing applications?

3. Should there be different permanence test requirements for CIM or uncoupled in-motion weighing applications?

Additionally, it may be necessary to review the entire Section 68 to clarify several sections applicable to the in-motion indicators and controllers that are not currently clear (e.g., the three sentences before the recording Data table on page DES 113 in the *Actual In-Motion Test* paragraph that state that the system is to be tested under normal operating conditions and then specifies tests that are outside of the normal operation conditions).

Jim Truex submitted the following comments in an email to Stephen Patoray dates September 9, 2006:

As you are aware, the NTEP Committee ruled on an issue pertaining to the need for a permanence test on a CIM railway system controller. Section 68 of Pub. 14, in present form, appears to require a full permanence test (initial and follow-up). The decision by the NTEP Committee was that a full permanence test was not necessary. A one time test, if the controller passed, would be sufficient. In effect, the decision was an ad hoc type decision as it needs to be addressed and "red stamped" by the NTETC Weighing Sector. Ohio NTEP laboratory personnel discussed the issue and provided input prior to the decision of the NTEP Committee. The Ohio NTEP laboratory agrees with the decision of the NTEP Committee and is recommending a change to Pub. 14 to reflect the decision of the NTEP Committee. The following represents our position and rationale.

1) The manufacturer is requesting an evaluation and CC for the controller only. If the request was for a complete railway system CC, a permanence test would be necessary.

2) If the manufacturer was requesting to have their CC for the weighing element amended to cover in motion weighing, a permanence test would be necessary. It is our understanding that a CC will only be issued for the controller upon successful completion of the evaluation. NTEP does not perform permanence tests on scale indicators and controllers (e.g., hopper scale controllers, vehicle scale controllers / weigh-in & weigh-out system controllers, cash registers, etc.) in the laboratory.

3) Yes, in this case we are evaluating and testing a system, as necessary to evaluate the performance of the controller in the system, but in this case, we are only issuing a CC for the controller. We do not perform permanence tests on electronics.

4) What purpose would the permanence test serve? If the system fails the permanence test, but we determine the system failed because a load cell went haywire, what would be our rational for failing the controller and refusing to issue a CC?

5) It goes without saying Pub. 14 needs to be addressed and clarified. It is appropriate to direct any changes to Pub. 14 through the appropriate sector. In this case the weighing sector.

Discussion/Recommendation: The Weighing Sector is asked to discuss the pros and cons of this item and work toward an understanding of the requirements of this system, develop a consensus on what are the true requirements to certify this type of device, and clarify several sections that are unclear. This may require a workgroup to complete this task.

Next Sector Meeting

Discussion/Recommendation:

Appendix A - Recommendations for Amendments to Publication 14

(To be inserted in the Sector Summary)

Appendix B – 2006 NTETC Weighing Sector Members List

First Name	Last Name	Organization	Email Address
Cary	Ainsworth	c/o USDA GIPSA	L.Cary.Ainsworth@usda.gov
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Appendix C

Attachment for Agenda Item 4

During its 2004 Meeting, the Weighing Sector agreed to assign a work group (Stephen Patoray (NTEP), Steven Cook (NIST), the NIST Force Group, Joseph Antkowiak (Flintec), Frank Rusk (Coti), and the California NTEP laboratory) to complete the following tasks:

1. Develop the definition of a family, determine load cell selection criteria, and develop an example of a load cell selection for 2005 NCWM Interim Meeting.
2. Review and adapt OIML R60 language for incorporation into Publication 14 for the next meeting of the Weighing Sector.

Terminology from OIML R 60

2.1.2 Load cell
Force transducer which, after taking into account the effects of the acceleration of gravity and air buoyancy at the location of its use, measures mass by converting the measured quantity (mass) into another measured quantity (output).

2.2.3 Load cell family
For the purposes of type evaluation/pattern approval, a load cell family consists of load cells that are of:

the same material or combination of materials (for example, mild steel, stainless steel or aluminum);
the same design of the measurement technique (for example, strain gauges bonded to metal);
the same method of construction (for example, shape, sealing of strain gauges, mounting method, manufacturing method, bending/shear/compression, etc);
the same set of specifications (for example, output rating, input impedance, supply voltage, cable details [e.g. 4 or 6 wire]); and one or more load cell groups.

Note: The examples provided are not intended to be limiting.

2.2.3.1 Load cell group
All load cells within a family possessing identical metrological characteristics (for example, class, nmax, temperature rating, etc.).

Note: The examples provided are not intended to be limiting.

7.3 Selection of load cells within a family
Where a family composed of one or more groups of load cells of various capacities and characteristics is presented for pattern evaluation, the following provisions shall apply.

7.3.1 Number of load cells to be tested
The selection of load cells to be tested shall be such that the number of load cells to be tested is minimized (see practical example in Annex B [not included in this proposal]).

7.3.2 Load cells of the same capacity belonging to different groups
Where load cells of the same capacity belong to different groups, approval of the load cell with the best metrological characteristics implies approval of the load cells with the lesser characteristics. Therefore, when a choice exists, the load cells with the best metrological characteristics shall be selected for test.

7.3.3 Load cells with a capacity in between the capacities tested
Load cells with a capacity in between the capacities tested, as well as those above the largest capacity tested, but not over 5 times above the largest capacity tested, are deemed to be approved.

7.3.4 Smallest capacity load cell from the group
For any family, the smallest capacity load cell from the group with the best characteristics shall be selected for testing. For any group, the smallest capacity load cell in the group shall always be selected for test unless that capacity falls within the range of

allowed capacities of selected load cells having better metrological characteristics according to the requirements of 7.3.2 and 7.3.3.

7.3.5 Ratio of largest capacity to the nearest smaller capacity
When the ratio of the largest capacity load cell in each group to the nearest smaller capacity having been selected for test is greater than 5, then another load cell shall be selected. The selected load cell shall have a capacity between 5 and 10 times that of the nearest smaller capacity load cell which has been selected. When no capacity meets this criterion, the selected load cell shall be that having the smallest capacity exceeding 10 times that of the nearest smaller capacity load cell which has been selected.

~~*7.3.6 Humidity test*~~
~~If more than one load cell of a family has been submitted for testing, only one cell shall be tested for humidity when applicable, and only one cell shall be subjected to the additional tests for load cells equipped with electronics when applicable, that being the load cell with the most severe characteristics (for example, the greatest value of nmax or the lowest value of vmin).~~

Example: only an example of possible choices, not limiting.

- Family of load cells
- Both Stainless Steel and Alloy Steel
- 2 mV/V and 3 mV/V
- Bending on smaller capacities and shear on larger capacities
- Sealing method, potting and welded metal cup
- 4 wire and 6 wire
- Asking for 5000 d on all capacities
- All in pound
- 500, 1000, 2000, 2500, 4000, 5000, 7500, 10 000, 15 000 20 000

Test:

1) 500 Stainless, potted, 3 mV/V, 4 wire, (this is bending)
1) 2500 Alloy, potted, 2 mv/v, 4 wire, (this is shear)
1) 15 000 Stainless, welded, 3mV/V, 6 wire (this is shear)

At a minimum: This will meet the 5:1 requirement, testing of both materials, both constructions, both sealing methods, both outputs, both cable designs.

OIML R 76 (1992)	**OIML R76 Revised**
3.9.2.1 Prescribed temperature limits If no particular working temperature is stated in the descriptive markings of an instrument, this instrument shall maintain its metrological properties within the following temperature limits: – 10 °C, + 40 °C	**3.9.2.1 Prescribed temperature limits** If no particular working temperature is stated in the descriptive markings of an instrument, this instrument shall maintain its metrological properties within the following temperature limits: - 10 °C / + 40 °C
3.9.2.2 Special temperature limits An instrument for which particular limits of working temperature are stated in the descriptive markings shall comply with the metrological requirements within those limits. The limits may be chosen according to the application of the instrument. The ranges within those limits shall be at least equal to: 5 °C for instruments of class I , 15 °C for instruments of class II , 30 °C for instruments of classes III and IIII.	**3.9.2.2 Special temperature limits** An instrument for which particular limits of working temperature are stated in the descriptive markings shall comply with the metrological requirements within those limits. The limits may be chosen according to the application of the instrument. The ranges within those limits shall be at least equal to: 5 °C for instruments of class I, 15 °C for instruments of class II, 30 °C for instruments of classes III and IIII.

7.1.2 (Markings) Compulsory if applicable: – the special temperature limits within which the instrument complies with the prescribed conditions of correct operation in the form: … °C/… °C	**7.1.2 (Markings) Compulsory if applicable:** - the special temperature limits according to 3.9.2.2
A.5.3.1 Static temperatures (3.9.2.1 and 3.9.2.2) The test consists of exposure of the equipment under test (EUT) to constant (*) temperatures within the range stated in 3.9.2, under free air conditions, for a 2 hour period after the EUT has reached temperature stability. The weighing tests (loading and unloading) shall be carried out according toA.4.4.1: – at a reference temperature (normally 20 °C but for class instruments the mean value of the specified temperature limits), – at the specified high temperature, – at the specified low temperature, – at a temperature of 5 °C, if the specified low temperature is below 10 °C, and – at the reference temperature. The change of temperature shall not exceed 1 °C/min during heating and cooling down. For class instruments, changes in barometric pressure shall be taken into account. The absolute humidity of the test atmosphere shall not exceed 20 g/m3, unless the operating manual gives different specifications. Reference to IEC Publications: see Bibliography /1/ (**)	**A.5.3.1 Static temperatures (3.9.2.1 and 3.9.2.2)** The test consists of exposure of the equipment under test (EUT) to constant (see A.4.1.2) temperatures within the range stated in 3.9.2, under free air conditions, for a 2 hour period after the EUT has reached temperature stability. The weighing tests (loading and unloading) shall be carried out according to A.4.4.l: - at a reference temperature (normally 20 °C but for class instruments the mean value of the specified temperature limits), - at the specified high temperature, - at the specified low temperature, - at a temperature of 5 °C, if the specified low temperature is ≤ 0 °C, and - at the reference temperature. The change of temperature shall not exceed 1 °C/min during heating and cooling down. For class instruments, changes in barometric pressure shall be taken into account. For weighing tests at the specified high temperature the relative humidity shall not exceed 50% (dry heat conditions). Reference: /4/

Attachment for Agenda Item 5

The Work Group reviewed the following in order to have a consistent understanding of the terms and definitions applicable to this discussion.

TERM	DEFINITION	SOURCE
Sale from Bulk	1.6. The term "sale from bulk" means the sale of commodities when the quantity is determined at the time of sale.	Handbook 130 – Uniform Weights and Measures Law – Section 1 Definitions
Net Weight (Mass)	1.10. The term "net mass" or "net weight" means the weight [NOTE 1, below] of a commodity excluding any materials, substances, or items not considered to be part of the commodity. Materials, substances, or items not considered to be part of the commodity include, but are not limited to, containers, conveyances, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, and coupons, except that, depending on the type of service rendered, packaging materials may be considered to be part of the service. For example, the service of shipping includes the weight of packing materials. (Added 1988; Amended 1989, 1991, 1993) NOTE 1: When used in this law, the term "weight" means "mass." (See paragraph V. and W. in Section I., Introduction, of NIST Handbook 130 for an explanation of these terms.) (Note added 1993)	Handbook 130 – Uniform Weights and Measures Law – Section 1 Definitions
Section 15	**Misrepresentation of Quantity** No person shall: a. sell, offer, or expose for sale a quantity **less** than the quantity represented, nor b. take more than the represented quantity when, as buyer, he/she furnishes the weight or	Handbook 130 – Uniform Weights and Measures Law – Section 15

	measure by means of which the quantity is determined, nor c. represent the quantity in any manner calculated or tending to mislead or in any way deceive another person. (Amended 1975, 1990)	
Section 22.	**Prohibited Acts** No person shall: a. use or have in possession for use in commerce any incorrect weight or measure; b. sell or offer for sale for use in commerce any incorrect weight or measure; c. remove any tag, seal, or mark from any weight or measure without specific written authorization from the proper authority; d. hinder or obstruct any weights and measures official in the performance of his or her duties; or e. violate any provisions of this Act or regulations promulgated under it.	Handbook 130 – Uniform Weights and Measures Law – Section 22

	Action Item	Status
1	Amend Publication 14 Sections 31, 32, and 45 to 51 as necessary.	The majority of the WG agrees that rounding to the nearest division rules apply. **The minority position will be presented at the Sector Meeting.** The proposed amendments are located in Agenda Item 5.
2	Request the S&T Committee revisit the 1980 discussion.	No recommendation yet. S&T will need specific proposals, confirm or amend previous position, how does it apply to MI/MR devices
3	Propose adding definitions of Tare and Preset tare to H44?	Agree: See proposed definitions in the attachments to clarify the differences between the different types of tare and tare setting mechanisms to provide a consistent understanding of the terms.
4	Propose adding a definition of "net" based on H130?	Agree: See proposed changes in action item 3.
5	Propose adding requirements for tare and preset tare to H44?	Agree: See proposed changes in action item 5.
6	Propose adding indication and printing requirements for tare values to H44?	Agree: See proposed changes in action item 5.
7	Propose adding a tolerance for scale accuracy in the net mode to H44.	Agree: Language proposal to amend in T and N sections are in action item 5.
8	Consider the OIML allowance for 1e error of (calculated) indicated and printed net weights due to the rounding of tare.	The WG believes it would be too confusing to the customer to be mathematically incorrect. (i.e., net = gross-tare ± 1 d)

Example: **Metrologically correct** net weight but mathematically incorrect (Capacity 120 000 x 20 lb)	
Load perceived by the scale to the internal resolution	Indicated & Recorded Value Rounded to the Nearest d
45011 lb gross 20009 lb tare 25002 lb net	45020 lb G 20000 lb T 25000 lb N

Example: **Mathematically correc**t but incorrect net weight (Capacity 120 000 x 20 lb)	
Load perceived by the scale to the internal resolution	Indicated Recorded Value Rounded to the Nearest d
45011 lb gross 20009 lb tare 25002 lb net	45020 lb G 20000 lb T 25020 lb N

9	Propose amending Scales Code paragraph S.1.2.1. to clarify that indicated and printed net weights calculated from gross and tare weights on multi-interval, multiple range scales, and weights determined from two different scales may have an apparent interval other than 0, 1, 2, or 5	Agree: See below.

Action Item 9

S.1.2.1. Weight Units. *- Except for postal scales, a digital-indicating scale shall indicate weight values using only a single unit of measure. Weight values shall be presented in a decimal format with the value of the scale division expressed as 1, 2, or 5, or*

a decimal multiple or submultiples of 1, 2, or 5. **Note:** *The requirements that the value of the scale division be expressed as 1, 2, or 5, or a decimal multiple or submultiples of 1, 2, or 5 does not apply to net weights that are calculated from gross and tare weight indications where the scale value of the gross weight is different than the scale value of the tare weight(s) on multi-interval or multiple range scales. For example, a scale indicating in 2-kg divisions in the lower range or segment and 5-kg divisions in the higher range or segment may result in net values ending in three (3) or eight (8) or a scale indicating in 20-lb divisions in the lower range and 50-lb divisions in the higher range or segment may result in net values in 30 or 80.* *[Nonretroactive as of January 1, 1989]* (Added 1987) (Amended 200X)		
10	Paper/plastic zeroed off by AZT be interpreted as net weight without a net or tare indication based on the definition of net of H130 (when the bag or paper remains on the scale when the product is added to the scale instead of using the paper or bag to pick up the item and place it back on the scale).	Agree. This is base on the H130 definition of "net weight" and no additional actions are recommended.
11	Recommend policy on tare less than 0.5 e? - Single range scales? - Multi-interval and multiple range scales? Or recommend suitability and minimum number of tare intervals? (e.g. 2 e for single range scales and 5 e_1 for MI and MR scales)	WG agreed not to address this item at this time.
12	Discuss and develop a position on SWMA Developing S&T agenda item on the rounding of tare for multiple range scales.	The majority of the WG did not support the SWMA proposal to round tare in the upward directions (like a weight classifier) because of applications where the customer would not always be the buyer (e.g., recycling applications, and other receiving scales) and that it would not promote purchasing a suitable scale or scales. Andrea Buie (Maryland) will present a minority position during the 2006 meeting of the weighing sector.

Tare WG - Action Item 3

Term	Proposed Definitions	Source
Tare	The weight of packaging material, containers, vehicles, or other materials that are not intended to be part of the commodity included in net weight determinations.	Recommendation of the WG
Tare Mechanism	A mechanism (including a tare bar) designed for determining or balancing out the weight of packaging material, containers, vehicles, or other materials that are not intended to be included in net weight determinations and setting the indication to zero when the tare object is on the load-receiving element: - reducing the weighing range for net loads (subtractive tare mechanism) - without altering the weighing range for net load on mechanical scales (additive tare mechanism [e.g. tare bar on a mechanical scale] The tare mechanism may function as: - a non-automatic mechanism (load balanced by an operator), - a semi-automatic mechanism (load balanced automatically following a single manual command), - an automatic mechanism that is not suitable for direct sales to the customer (e.g. prepackaging scales where the load balanced automatically without the intervention of an operator).	Handbook 44, Appendix D – WG Recommendation to Amend existing definition.
Tare-balancing mechanism	A tare mechanism with an indication that tare has been taken and without an indication of the tare value (weight) when the instrument is loaded. A negative net weight is assumed to be the tare value when the weighing instrument is unloaded.	Based on OIML R76 T.2.7.4.1
Tare-weighing mechanism	A tare ***balancing*** mechanism that stores the tare value and is capable of displaying (continuously or upon command) or printing the value whether or not the instrument	Based on OIML R76 T.2.7.4.2

	is loaded.	
Preset Tare Mechanism	A part of a weighing system for subtracting a preset tare value from a gross or net weight value and indicating the result of the calculation. Types of preset tare mechanisms include: - Keyboard Tare - The operation of keys on a keyboard; e.g., with a typical 10-key keyboard with values 0 through 9, by the pushing of a key numbered 5, the number 5 is entered as a tare value. - Digital Tare - By the repeated operation of a particular key, tare values are entered in amounts equal to the value of a scale division. For example, on a 25 pound x 0.01 pound scale, each time a specifically marked key is depressed; a tare is entered equal to 0.01 pound. If that key were depressed five times, the tare value would be equal to 0.05 pound. - Programmable Tare: Preset (predetermined) tare values that are stored in memory for multiple transactions. They may be part of the product information on PLU (product look-up), preset product, or tare keys. - Stored Tare: Preset (predetermined) tare values that are stored in memory for multiple transactions and are used predominately in vehicle scale applications. - Percentage Tare: ***Refer to agenda item 10 in the 2006 NTETC WS agenda*** - Proportional Tare: ***Refer to agenda item 10 in the 2006 NTETC WS agenda***.	Based on OIML R76 T.2.7.5 NCWM 1980 S&T NCWM 1980 S&T NCWM Publication 14 NCWM Publication 14 APB and 2000 % tare WG APB and 2000 % tare WG
Gross Value	Indication of the weight value of a load on a weighing device, with no tare or preset tare mechanism in operation.	Based on OIML R76 T.5.2.1
Net Weight (Mass)	The term "net mass" or "net weight" means the weight [NOTE 1, below] of a commodity excluding any materials, substances, or items not considered to be part of the commodity. Materials, substances, or items not considered to be part of the commodity include, but are not limited to, containers, conveyances, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, and coupons, except that, depending on the type of service rendered, packaging materials may be considered to be part of the service. For example, the service of shipping includes the weight of packing materials. (Added 1988; Amended 1989, 1991, 1993) NOTE 1: When used in this law, the term "weight" means "mass." (See paragraph V. and W. in Section I., Introduction, of NIST Handbook 130 for an explanation of these terms.) (Note added to in H 130 1993)	H 130 WG Recommends repeating this term and definition in H44
Net Value	Indication of the weight value of a load placed on a weighing device after the operation of a tare mechanism.	Based on OIML R76 T.5.2.2
Tare Value	The weight value of a load determined by a tare weighing mechanism.	Based on OIML R76 T.5.2.3
Preset Tare Value	Numerical value, representing a weight that is introduced into the instrument. It is a preset tare value that is used for one or several weighings. - "Introduced" includes procedures such as: keying in, recalling from data storage, or inserting via an interface. - "Preset" means that a tare value is determined once and is applied to other weighings without determining the individual tare values.	Based on OIML R76 T.5.3.1

Tare WG Action Item 5

Example of how H44 would look like incorporating new terminology and recommendations from R 76:
S.1.1.1. Digital Indicating Elements.

(a) A digital zero indication shall represent a balance condition that is within ± ½ the value of the scale division.

(b) A digital indicating device shall either automatically maintain a "center-of-zero" condition to ± ¼ scale *division or less, or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero balance condition to ± ¼ of a scale division or less.* *The auxiliary or supplemental "center-of-zero" indicator may be operable with a zero net weight indication.*

[Nonretroactive as of January 1, 1993]
(Amended 1992 and 200X)

S.2. Design of Balance, Tare, Level, Damping, and Arresting Mechanisms.

S.2.3. Tare - General:

*(a) On any scale (except a monorail scale equipped with digital indications), the value of the tare division shall be equal to the value of the scale division.** The tare mechanism shall operate only in a backward direction (that is, in a direction of underregistration) with respect to the zero-load balance condition of the scale. *A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.**
(Amended 1985)
*[**Note**: - On a computing scale, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a complete weighing operation, including tare, net, and gross weight determination]**
*[*Nonretroactive as of January1, 1983]*

(b) ~~S.2.3.1. Monorail Scales Equipped with Digital Indications. –~~ On a static monorail weighing system equipped with digital indications, means shall be provided for setting any tare value of less than 5 % of the scale capacity to within 0.02 % of scale capacity. On a dynamic monorail weighing system, means shall be provided to automatically maintain this condition.
(Amended 1999)

S.2.3.1 Scale Interval. – The interval (d) of a tare weighing mechanism shall be equal to the scale interval of the weighing device for any given load.

S.2.3.2. Accuracy. – A tare mechanism shall permit setting the indication to zero with an accuracy equal to or better than ± 0.25 d for electronic weighing devices and any weighing device with an analog indication,

On a multi-interval scale, d shall be replaced by d_1 (division value of the first weighing segment).

S.2.3.3. Operating Range. - The tare mechanism shall be such that it cannot be used at or below its zero effect or above its maximum indicated effect.

S.2.3.4. Visibility of Operation. - Operation of the tare device shall be visibly indicated on the instrument. In the case of instruments with digital indication, this shall be done by marking the indicated net weight with the word "NET" or the symbol "N."

(a) NET may be displayed as "NET", "Net" or "net".

(b) If an instrument is equipped with a device that allows the gross weight and/or tare weight to be displayed temporarily while a tare device is in operation, the "NET" symbol shall disappear while the gross value is displayed.

S.2.3.5. Subtractive Tare Mechanism. - When the use of a subtractive tare mechanism does not allow the value of the residual weighing range to be known, a device shall prevent the use of the instrument above its maximum capacity according to S.1.7. Capacity Indication, Weight Ranges and Unit Weights.

S.2.3.6. Multiple Range Scale. - On a multiple range instrument the tare operation shall be effective also in the greater weighing ranges if switching to a greater weighing range is possible while the instrument is loaded. In that case the tare weight values shall be rounded to the scale interval of the actual weighing range which is in operation.

S.2.3.7. Semi-automatic Tare-Setting Mechanisms. - These mechanisms shall be operable or accessible only by a tool outside of and separate from this mechanism or it shall be enclosed in a cabinet, or it shall be operable only when the indication is stable within:

(a) ± 3 scale divisions for scales of more than 2000 kg (5000 lb) capacity in service prior to January 1, 1981, and for all axle load, railway track, and vehicle scales; or

(b) ± 1 scale division for all other scales.

S.2.3.8. Combined Zero-setting and Tare-balancing Devices (0/T Key). - If the semi-automatic zero-setting device and the semi-automatic tare-balancing device are operated by the same key, the following apply at any load:

1. Accuracy - After zero setting the effect of zero deviation on the result of the weighing shall be not more than ± 0.25 d.

2. If equipped, a zero-tracking device shall operate only when:
   -the indication is at zero, or at a negative net value equivalent to gross zero, and
   -the equilibrium is stable.

Note: The device must be clearly marked according to S.2.1.6. Combined Zero-setting and Tare-balancing Devices (0/T Key).

S.2.3.9. Consecutive Tare Operations. - Repeated operation of a tare mechanism is permitted. If more than one type of tare mechanism is operative at the same time (e.g., tare and preset tare), tare weight values shall be clearly designated as preset tare (PT) when indicated or printed.

S.2.3.10. Indication and Printing of Weighing Results.

a). Gross weight values may be printed without any designation or by complete word or symbol. For a designation by a symbol, only "G" is permitted.

b). If only net weight values are printed without corresponding gross or tare values, they may be printed without any designation or by a complete word or symbol. A symbol for designation shall be "N". This applies also where semi-automatic zero-setting and semi-automatic tare balancing are initiated by the same key.

c). Gross, net, or tare values determined by a multiple range instrument or by a multi-interval instrument need not be marked by a special designation referring to the (partial) weighing range.

d). If net weight values are printed together with the corresponding gross and/or tare values, the net and tare values shall at least be identified by the corresponding symbols "N" and "T" or by complete words.

e). If net weight values and tare values determined by different tare mechanisms are printed separately, they shall be suitably identified.

f). When gross, net, and tare values are printed together, one of these values may be calculated from two actual determinations of mass. In the case of a multi-interval instrument the calculated weight value may be printed with a smaller scale interval.

g). The printout of a calculated weight value shall be clearly identified. This should be done preferably by the symbol "C" in addition to the symbols mentioned above, if applicable, or by complete words.

h). The displayed and printed weighing results (gross, tare weighing, net) shall be rounded each to the actual d and the d can be different depending on the actual weighing range or segment for multi-interval and multiple range scales. To be metrologically correct, a deviation of one d may be possible between the gross weighing result and the calculation of net and tare values.

S.2.4. Preset Tare Mechanism.

S.2.4.1 Scale Interval. - Regardless of how a preset tare value is introduced into the device, its scale interval shall be equal or automatically rounded to the scale interval of the instrument.

- On a multiple range instrument a preset tare value may be transferred only from one weighing range to another one with a larger verification scale interval but shall then be rounded to the actual weighing range that is in operation.

- For a multi-interval instrument, the preset tare value shall be rounded to the smallest verification scale interval (e_1) of the instrument, and the maximum preset tare value shall not be greater than Max_1.

- The displayed or printed calculated net value shall be rounded to the scale interval of the instrument for the same net weight value.

S.2.4.2 Modes of Operation. - A predetermined tare mechanism may be operated together with one or more tare devices (e.g., keyboard, programmable, or percentage tare) provided that:

- the preset tare mechanism complies with paragraph **S.2.3.9. Consecutive Tare Operations.**,

- a preset tare operation cannot be modified or cancelled as long as any tare device operated after the preset tare operation is still in use, and

- preset tare values are designated by the symbol "PT"; however, it is permitted to replace the symbol "PT" with complete words in an official language of the country where the instrument is used.

Preset tare may operate automatically only if the preset tare value is clearly identified with the load to be measured (e.g., by bar code identification on the container).

S.2.4.3. Percentage Tare. A percentage tare mechanism may be operated together with one or more tare devices (e.g., keyboard or programmable) provided that the:

(a) percentage tare values may only be entered through the keyboard when the device is at gross load zero or preprogrammed in a in a product look-up "configuration" mode,

(b) visual confirmation that a tare has been applied (i.e., "Net" annunciator) must only be enabled if the percentage tare value, in weight, represents one or more scale intervals after the appropriate rounding,

(c) percentage tare value shall be entered in units of 1 % or the decimal submultiple of 0.01.

(d) percentage tare shall not exceed 99.9% of the scale capacity, and

(e) indications and recorded representations of tare shall be rounded to the nearest scale interval.

Unless the total tare weight is displayed and recorded, the total value of the tare weights shall not be rounded prior to subtracting the tare weight value from the gross weight. The total tare value must be deducted first and then the final net weight value rounded off to the nearest scale interval. Rounding of the net weight is not performed until the last mathematical operation.

S.2.4.4 Indication of Operation. - Operation of the preset tare device shall be visibly indicated on the instrument. In the case of instruments with digital indication, this shall be done by marking the indicated net value with the sign "NET", "Net" or "net." If an instrument is equipped with a device that allows the gross value to be displayed temporarily while a tare device is in operation, the "NET" symbol shall disappear while the gross value is displayed. It shall be possible to temporarily indicate the preset tare value.

Paragraph **S.2.3.10. Indication and Printing of Weighing Results.** applies accordingly provided that:

- if the calculated net value is printed, at least the preset tare value is printed as well, with the exception of an instrument used in direct sales to the public, including price computing scales or nonautomatic weigh/price labeling scales;

- preset tare values are designated by the symbol "PT"; however, it is permitted to replace the symbol "PT" with complete words in an official language of the country where the instrument is used.

Note: Paragraph 2.4.3. also applies to weighing devices with a combined semi-automatic zero-setting device and a semi-automatic tare-balancing device operated by the same key.

N.1.3. Tare Weighing Test. - Increasing-load and decreasing-load tests according to N.1.1. and N.1.2. shall be conducted with at least 2 different tare values.

T.N.2.1. General. – The tolerance values are positive (+) and negative (-) with the weighing device adjusted to zero at no load. When tare is used, the tolerance values are applied from the tare zero reference (zero net indication); the tolerance values apply to the net weight indication for every possible tare load using certified test loads ~~only~~.

Attachment for Agenda Item 6

320-2 I S.1.4.6. Height and Definition of Minimum Reading Distance, UR.2.10. Primary Indicating Elements Provided by the User, UR.2.11. Minimum Reading Distance, and Definitions of Minimum Reading Distance and Primary Indications

Source: National Type Evaluation Technical Committee Weighing Sector

Discussion: The Committee considered the Weighing Sector's first attempt at a proposal that adds new paragraphs S.1.4.6., UR.2.10., and UR.2.11. to the Scales Code and adds new definitions of "minimum reading distance" and "primary indications" to Appendix D as follows**:**

S.1.4. Indicators.

S.1.4.6. Height. - All primary indications shall be indicated clearly and simultaneously.

(a) ***On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 mm (0.4 in) high.***

(b) ***The units of mass and other descriptive markings or indications, such as lb, kg, gross, tare, net, etc., shall be clearly and easily read and shall be at least 2 mm (0.08 in) high.***

[Nonretroactive as of January 1, 2007]

(Added 200X)

UR.2. Installation Requirements

UR.2.10. Primary Indicating Elements Provided by the User. – Primary indicating elements that are not the same as the primary indicating elements provided by the original equipment manufacturer (e.g., video display monitors) shall comply with the following:

(a) ***On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 mm (0.4 in) high.***

(b) ***The units of mass and other descriptive information, such as gross, tare, net, etc., shall be displayed or marked on the device and shall be at least 2 mm (0.08 in) high.***

(Added 200X)

UR.2.11. Minimum Reading Distance – On digital devices that display primary indications, the height of the numbers expressed in millimeters should be not less than 3 times the minimum reading distance expressed in meters, without being less than 2 mm (0.08 in). (Example: If the height of the primary indications is 10 mm, then the minimum reading distance should not be greater than 30 m).
(Added 200X)

minimum reading distance. The shortest distance that an observer is freely able to approach the indicating device to take a reading under normal conditions of use. This approach is considered to be free for the observer if there is a clear

space of at least 0.8 m in front of the indicating device. However, if the minimum reading distance "S" in Figure X is less than 0.8 m, then the minimum reading distance is "L" in Figure X. [2.20]
(Added 200X)

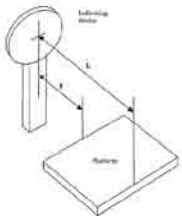

Figure X

primary indications. Weight or other units of measurement values that are displayed by a primary indicating element. The primary indications are used as the determining factor in arriving at the sale representation when the device is used commercially. (Examples of primary indications include the measurement value, unit price or count, and total price on instruments capable of price computing. Primary indications do not include indications from auxiliary indicating devices such as totalizing registers and pre-determined stop mechanisms.) [1.10], [2.20]
(Added 200X)

This proposal was developed to address a growing problem with the readability of weight indications and the values that define transaction information. Field and laboratory officials indicate that both are becoming increasingly smaller, as demonstrated in the following example of a weight display where the actual size of the weight values are 23 mm in height, but the unit of measurement (g) is 4 mm in height.

The field and laboratory officials need more specific requirements in order to consistently determine if indications are suitable for the environment in which the device is used. Currently only the Taximeters, Grain Moisture Meters, and Near-Infrared Grain Analyzers Codes include requirements that specify the minimum height of figures, words, and symbols. NIST Handbook 44 and NCWM Publication 14 include no uniform size requirements or guidelines on how to evaluate display information for clarity and readability. The size requirements for all three device technologies were developed primarily because of concerns about the visibility of indications from the customer's position.

The Weighing Sector developed and voted on a proposal which provides guidelines for determining whether or not indications are appropriate in a particular installation. The Weighing Sector's proposal was aligned with OIML R 76 requirements for visibility of indications to the customer in direct sale applications, minimum height of lettering for identification information, and the minimum height of numbers for analog indicating devices.

In 1999 a similar proposal to amend General Code paragraph G-S.5.2.3. Size and Character to include minimum height requirements was considered but later withdrawn. GPMA expressed strong opposition to the 1999 proposal because many of the liquid-measuring and metering devices were equipped with quantity displays that would not meet the proposed 9.5 mm size requirement. While the Committee agreed at the time that officials need uniform guidelines that are not ambiguous as to which transaction information must meet size requirements. The Committee also believed that any future proposals should address a specific device technology since it is difficult to address all device configurations and the environmental conditions that exist at each installation site.

After its September 2005 meeting, the Weighing Sector agreed to further develop the proposal for a requirement that specifies the height of the weight results and its corresponding unit of measurement indications to ensure that information is adequately visible to the customer in direct sale applications. The Weighing Sector agreed that any proposed language should be aligned with OIML R 76 height requirements to the extent possible. After submitting the proposed language to the Committee, the Weighing Sector balloted its members with expectations of only minor changes to the proposal. The Weighing Sector supported the proposed new definition of "primary indications" and alternate wording for proposed new paragraph S.1.4.6. as follows:

S.1.4.6. Height. - All primary indications shall be indicated clearly.

(a) On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 mm high.

(b) The units of mass and other descriptive information such as gross, tare, net, etc., shall be displayed or marked on the

device and shall be at least 2 mm high.
[Nonretroactive as of January 1, 2007]
(Added 2006)

Receiving feedback that the definition and illustration of a minimum reading distance were confusing, the Weighing Sector learned that it did not have a consensus on the proposal or the language for corresponding user requirements for primary indicating elements that are provided by the user. Likewise, the SMA opposed the proposal because it believed a reading distance requirement is unenforceable.

The Committee also received comments from a measurement consultant that the proposal is unnecessary. General Code paragraph G S.5.1. Indicating and Recording Elements can be applied in type approval and thus eliminates the need to borrow any corresponding language from R 76 or add any language to Handbook 44. Comments suggested that the United States should stick to performance-based requirements, noting that the proposal does not adhere to that principal.

The Committee agreed that although the clarity and readability of indications is a growing issue, the proposal has only limited support from the public and private sectors. The Committee recognized the proposal requires a significant amount of work before the language is clear, technically correct, and deemed applicable to the different types of installations and technologies in use. The Committee agreed to make the proposal an information item since the Weighing Sector has a group actively working on the language.

Attachment for Agenda Item 7

NIST Handbook 44 – 1.10 General Code and Section 2 Weighing Device Codes - Temperature

1.10. General Code

G-N.2. Testing With Nonassociated Equipment. - Tests to determine conditions, such as radio frequency interference (RFI), that may adversely affect the performance of a device shall be conducted with equipment and under conditions that are usual and customary with respect to the location and use of the device.
(Added 1976)

2.20. Scales

Table S.6.3.a. Marking Requirements Note 5. *Required only on Class III, III L, and IIII devices if the temperature range on the NTEP CC is narrower than and within -10 °C to 40 °C (14 °F to 104 °F). [Nonretroactive as of January 1, 1986]*

T.N.2.2. Type Evaluation Examinations. - For type evaluation examinations, the tolerance values apply to increasing and decreasing load tests within the temperature, power supply, and barometric pressure limits specified in T.N.8.

T.N.2.3. Subsequent Verification Examinations. - For subsequent verification examinations, the tolerance values apply regardless of the influence factors in effect at the time of the conduct of the examination. (Also see G-N.2.)

T.N.8. Influence Factors. - The following factors are applicable to tests conducted under controlled conditions only, provided that:

(a) types of devices approved prior to January 1, 1986, and manufactured prior to January 1, 1988, need not meet the requirements of this section, and

(b) new types of devices submitted for approval after January 1, 1986, shall comply with the requirements of this section, and

(c) all devices manufactured after January 1, 1988, shall comply with the requirements of this section.
(Amended 1985)

T.N.8.1. Temperature. - Devices shall satisfy the tolerance requirements under the following temperature conditions:

T.N.8.1.1. If not specified in the operating instructions for Class I or II scales, or if not marked on the device for Class III, III L, or IIII scales, the temperature limits shall be: -10° C to 40° C (14° F to 104° F).

T.N.8.1.2. If temperature limits are specified for the device, the range shall be at least that specified in Table

T.N.8.1.2.

Table T.N.8.1.2. Temperature Range by Class	
Class	**Temperature Range**
I	5 EC (9° F)
II	15 EC (27° F)
III, III L, & IIII	30 EC (54° F)

T.N.8.1.3. Temperature Effect on Zero-Load Balance. - The zero-load indication shall not vary by more than:

(a) three divisions per 5° C (9° F) change in temperature for Class III L devices; or

(b) one division per 5° C (9° F) change in temperature for all other devices.
~~(Amended 1990)~~

T.N.8.1.4. Operating Temperature. - Except for Class I and II devices, an indicating or recording element shall not display nor record any usable values until the operating temperature necessary for accurate weighing and a stable zero balance condition have been attained.

2.21. Belt-Conveyor Scale Systems

S.4. Marking Requirements. - A belt-conveyor scale shall be marked with the following: (Also see G-S.1.)
(e) the operational temperature range if other than -10 °C to 40 °C (14 °F to 104 °F).
[Nonretroactive as of January 1, 1986]

T.3.1. Temperature. - Devices shall satisfy the tolerance requirements at temperatures from -10 °C to 40 °C (14 °F to 104 °F).

T.3.1.2. Temperature Limits. *- If a temperature range other than -10 °C to 40 °C (14 °F to 104 °F) is specified for the device, the range shall be at least 30 °C (54 °F).*
[Nonretroactive as of January 1, 1990]
(Added 1989)

2.22. Automatic Bulk Weighing Systems

S.5.3. Temperature Limits. *- Unless the temperature range is -10 °C to +40 °C (14 °F to 104 °F), the temperature range shall be marked on the device.*
[Nonretroactive as of January 1, 1986]
(Added 1985)

T.7.1. Temperature. *- Devices shall satisfy the tolerance requirements under the following temperature conditions:*

T.7.1.1. *If not marked on the device, the temperature limits shall be:*

-10 ºC to 40 ºC (14 ºF to 104 ºF)

T.7.1.2. *If temperature limits are specified for the device, the range shall be at least 30 °C (54 °F).*

T.7.1.4. Operating Temperature. *- An indicating or recording element shall not display or record any usable values until the operating temperature necessary for accurate weighing and a stable zero-balance condition has been attained.*
[Nonretroactive as of January 1, 1986]

2.24. Automatic Weighing Systems

T.2.2. Type Evaluation Examinations. - For type evaluation examinations, the tolerance values apply to increasing and decreasing load tests within the temperature, and power supply limits specified in T.7. Influence Factors.
(Amended 2004)

Table S.7.a. Marking Requirements Note 5. Required only on automatic weighing systems if the range is other than -10 °C to 40 °C (14 °F to 104 °F).

T.7.1. Temperature. - Devices shall satisfy the tolerance requirements under the following temperature conditions:

T.7.1.1. - If not specified in the operating instructions or if not marked on the device, the temperature limits shall be: -10 °C to 40 °C (14 °F to 104 °F).

T.7.1.2. - If temperature limits are specified for the device, the range shall be at least 30 °C (54 °F).

T.7.1.4. Operating Temperature. - The indicating or recording element shall not display nor record any usable values until the operating temperature necessary for accurate weighing and a stable zero balance condition have been attained.

Other NIST Handbook 44 Codes with Temperature Limit Requirements

5.56.(a) Grain Moisture Meters

S.1.3. Operating Range. - A meter shall automatically and clearly indicate when the operating range of the meter has been exceeded. The operating range shall specify the following:

(a)**Temperature Range of the Meter.** - The temperature range over which the meter may be used and still comply with the applicable requirements shall be specified. The minimum temperature range shall be 10 °C to 30 °C. No moisture value may be displayed when the temperature range is exceeded. An appropriate message shall be displayed when the temperature of the meter is outside its specified operating range.

(b) **Temperature Range of each Grain or Seed.** - The temperature range for each grain or seed for which the meter is to be used shall be specified. The minimum temperature range for each grain shall be 0 °C to 40 °C. No moisture value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the grain sample exceeds the specified temperature range for the grain.

(c) **Moisture Range of the Grain or Seed. -** The moisture range for each grain or seed for which the meter is to be used shall be specified. Moisture and test weight per bushel values may be displayed when the moisture range is exceeded if accompanied by a clear indication that the moisture range has been exceeded. (Amended 2003)

(d) **Maximum Allowable Meter/Grain Temperature Difference. -** The maximum allowable difference in temperature between the meter and the sample for which an accurate moisture determination can be made shall be specified. The minimum temperature difference shall be 10 °C. No moisture value may be displayed when the maximum allowable temperature difference is exceeded. An appropriate error message shall be displayed when the difference in temperature between the meter and the sample exceeds the specified difference.

(Added 1993) (Amended 1995)

S.1.5. Operating Temperature.

(a) Warm up period: When a meter is turned on it shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.

(b) A meter shall meet the requirements of T.2. - Tolerance Values when operated in the temperature range of 10 °C to 30 °C (50 °F to 86 °F) or within the range specified by the meter manufacturer.

(c) If the manufacturer specifies a temperature range, the range shall be at least 20 °C (36 °F).

(Added 1993) (Amended 1995 and 1996)

S.4. Operating Instructions and Use Limitations. - The manufacturer shall furnish operating instructions for the device and accessories that include complete information concerning the accuracy, sensitivity, and use of accessory equipment necessary in obtaining a moisture content. Operating instructions shall include the following information:

(a) the limitations of use, including but not confined to the moisture measurement range, grain or seed temperature, maximum allowable temperature difference between grain sample and meter, kind or class of grain or seed, moisture meter temperature, voltage and frequency ranges, electromagnetic interferences, and necessary accessory equipment.
(Added 1984)

UR.3.10. Posting of Meter Operating Range. - The operating range of the grain moisture meter shall be clearly and conspicuously posted in the place of business such that the information is readily visible from a reasonable customer position. The posted information shall include the following:

(a) The temperature range over which the meter may be used and still comply with the applicable requirements. If the temperature range varies for different grains or seed, the range shall be specified for each.

(b) The moisture range for each grain or seed for which the meter is to be used.

(c) The temperature range for each grain or seed for which the meter is to be used.

(d) The maximum allowable difference in temperature that may exist between the meter and the sample for which an accurate moisture determination can be made.
(Added 1988)

5.56.(b) Grain Moisture Meters

S.1.6.2. Operating Range. *- A meter shall automatically and clearly indicate when the operating range of the meter has been exceeded or the manufacturer shall:*

(a) clearly and conspicuously mark the operating ranges on the meter; or

(b) furnish the operating ranges of the meter and the means to clearly and conspicuously display this information on or immediately adjacent to the device.

The operating range shall specify the following:

(a) <u>the temperature range over which the meter may be used and still comply with the applicable requirements;</u>

(b) the moisture range for each grain or seed for which the meter is to be used;

(c) the temperature range for each grain or seed for which the meter is to be used; and

(d) the maximum allowable difference in temperature between the meter and the sample for which an accurate moisture determination can be made.

S.1.9. Operating Temperature.

(a) A meter shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.

(b) A meter shall meet the requirements of T.2. - Tolerance Values when operated in the temperature range of 2 °C to 40 °C (35 °F to 104 °F) or within the range specified by the meter manufacturer.

(c) If the manufacturer specifies a temperature range, the range shall be at least 10 °C (20 °F) and shall be marked on the device.

[Nonretroactive as of January 1, 1989]
(Added 1988)

UR.3.11. Posting of Meter Operating Range. - The operating range of the grain moisture meter shall be clearly and conspicuously posted in the place of business such that the information is readily visible from a reasonable customer position. The posted information shall include the following:

(a) The temperature range over which the meter may be used and still comply with the applicable requirements. If the temperature range varies for different grains or seed, the range shall be specified for each.

(b) The moisture range for each grain or seed for which the meter is to be used.

(c) The temperature range for each grain or seed for which the meter is to be used.

(d) The maximum allowable difference in temperature that may exist between the meter and the sample for which an accurate moisture determination can be made.

(Added 1988)

5.57. Near-Infrared Grain Analyzers

S.1.3. Operating Range. - *An analyzer shall automatically and clearly indicate when the operating range of the device has been exceeded. The statement of the operating range shall be specified in the operator's manual and shall operate as follows:*

(a) The ambient temperature range over which the analyzer may be used and still comply with the applicable requirements shall be specified. The minimum temperature range shall be 10 °C to 30 °C. No constituent value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the analyzer is outside its specified operating range.

(b) The constituent range at the moisture basis specified in Table N.1.1. shall be specified for each grain or seed for which the analyzer is to be used. A constituent value may be displayed when the constituent range is exceeded if accompanied by a clear indication that the constituent range has been exceeded.

(Amended 2001)

(c) For whole grain analyzers only, the temperature range shall be specified for each grain or seed for which an analyzer is to be used. The minimum temperature range for each grain shall be 10 °C to 30 °C. No constituent value may be displayed when the temperature range is exceeded. An appropriate error message shall be displayed when the temperature of the grain sample exceeds the temperature range for the grain. The requirements of this subsection (c) are not applicable to ground grain analyzers.

(d) For whole grain analyzers, the maximum allowable difference in temperature between the instrument environment (ambient temperature) and the sample for which an accurate constituent determination can be made shall be specified. The minimum temperature range shall cover at least 10 EC. No constituent value may be displayed when the maximum allowable temperature difference is exceeded. An appropriate error message shall be displayed when the difference between the ambient temperature and the sample temperature exceeds the specified difference. The requirements of this subsection (d) are not applicable to ground grain analyzers.

[Nonretroactive and effective as of January 1, 2003]

S.1.4. Operating Temperature.

(a) An analyzer shall not display or record any usable values until the internal operating temperature necessary to meet tolerance requirements has been attained, or the analyzer shall bear a conspicuous statement adjacent to the indication stating that the analyzer shall be turned on for a time period specified by the manufacturer prior to use.

(b) If an instrument does not meet tolerance requirements because there is an upper internal operating temperature limit that could be exceeded when operating within the ambient temperature range specified by the manufacturer, then a means of sensing and indicating an over-temperature condition must be provided.

[Nonretroactive as of January 1, 2003]

5.58. Multiple Dimension Measuring Devices

S.1.9. Operating Temperature. - An indicating or recording element shall not display nor record any usable values until the operating temperature necessary for accurate measuring and a stable zero reference or ready condition have been attained.

T.2.1. Type Evaluation. - For type evaluations, the tolerance values apply to tests within the influence factor limits of temperature and power supply voltage specified in T.5.1. and T.5.2.

T.2.2. Subsequent Verification. - For subsequent verifications, the tolerance values apply regardless of the influence factors in effect at the time of the verification. (Also see G-N.2.)

T.5. Influence Factors. - The following factors are applicable to tests conducted under controlled conditions only.

T.5.1. Temperature. - Devices shall satisfy the tolerance requirements under the following temperature conditions.

T.5.1.1. Temperature Limits. - If not marked on the device, the temperature limits shall be -10 °C to 40 °C (14 °F to 104 °F).

T.5.1.2. Minimum Temperature Range. - If temperature limits are specified for the device, the range shall be at least 30 °C or 54 °F.

T.5.1.3. Temperature Effect on Zero Indication. - The zero indication shall not vary by more than 1 division per 5 °C (9 °F) change in temperature.

Table S.4.1.a. Marking Requirements for Multiple Dimension Measuring Systems

4. Required if the range is other than -10 °C to 40 °C (14 °F to 104 °F).

Attachment for Agenda Item 13

NATIONAL TYPE EVALUATION PROGRAM EVALUATION OF A RAILROAD TRACK WEIGHING (LOAD RECEIVING) ELEMENT (WEIGHBRIDGE) conducted by USDA/Grain Inspection and Packers & Stockyards Administration.

(An evaluation that complies with all the NTEP requirements does not imply that the design and construction of the weighbridge meets the requirements of the railroad)

1. GENERAL INFORMATION: **Date:_____**

Performance Test: 1st □ 2nd □ 3rd □. Permanence Test: 1st □ 2nd □ 3rd □. (Check one).

NTEP application control number: _____ Test Number: _____

Applicant Company Name: _____

Applicant address: _____

Applicant contact name and phone:_____

Scale owner Company Name: _____

Scale owner address: _____

Scale location address: _____

Scale owner contact name and phone:_____

2. DIGITAL INDICATOR INFORMATION:

Indicator Manufacturer Name: _____ Model Number:_____

CC Number: _____ Serial Number: _____

Nominal Capacity: _____, Division size: _____, Number of divisions _____

Metrological physical seal number(s): _____

Metrological audit trail parameters: Configuration No. _____ Calibration No. _____

Summing or Junction Box physical seal number(s): _____

H-44 marking requirements met: Yes □, No □ - explain _____

_____

Marking requirements include the following: Manufacturer name, Model Number, Serial Number, CC Number, Accuracy Class, Nominal Capacity, Sectional Capacity, Scale Division Value, Value of "e", Maximum Number of Scale Divisions and Temperature Limitations. Note: A remote display must have Manufacture name, and Model Number.

3. WEIGHING/LOAD RECEIVING ELEMENT (WEIGHBRIDGE)

Weighbridge Manufacturer Name: _____ Model Number_____

Weighbridge Nominal Capacity: _____ Sectional Capacity_____

Type of checking; Check Rods, Flexure Plate, Bumper Plates: _____

Weighrail:___lb.rail, ScaleA: length____sections____, ScaleB: length____sections____

H-44 marking requirements met: Yes □, No □ - explain _____

_____

Marking requirements include the following: Manufacturer name, Model Number, Serial Number and Sectional Capacity.

4. LOAD CELLS

Load Cell Manufacturer Name: _____Model Number _____

CC Number: _____Capacity:_____ Number of Divsions:_____

Excitation Voltage _____ Output MV/V_____ Vmin value _____

Load Cell Serial Numbers/position: _____/____, _____/____,

_____/____, _____/____, _____/___, _____/____,

_____/____, _____/____, _____/___, _____/____,

_____/____, _____/____, _____/___, _____/____,

_____/____, _____/____, _____/___, _____/____

Load Cell Verification Internal Value calculation: ***(Note: the result of the calculation, division value divided by the square root of the number of load cells, must be greater than the Vmin Value marked on the load cells.)***

Vmin (marked on load cell) $\leq d \div \sqrt{N}$ (d = division value, N = number of load cells)

Vmin (marked on load cell) _____ must be less than or equal to (d ÷ √N)_____

H-44 marking requirements met: Yes □, No □ - explain _____

_____

Marking requirements include the following: Manufacturer name, Model Number, Serial Number, CC Number, Accuracy Class, Maximum Number of Scale Divisions, "S" or "M", Loading Direction if not obvious, Temperature Limits, Minimum Dead Load, , Maximum Capacity, Vmin value and Safe Load Limit.

5. CONDITION OF THE INSTALLATION:

Explain any conditions or concerns that would fall under the H-44 requirements regarding facilitation of fraud, installation, permanence or testing with non-associated equipment (i.e. RFI or EMI), etc**:**

_____

_____

_____

6. TEST EQUIPMENT and EVALUATOR INFORMATION:

NTEP evaluator name and phone number: _____

Test Equipment Owner: _____ Equipment I.D. Number _____

Test Equipment type: Test weight cart _____ lbs. or RR Test car_____ lbs.

Date of calibration: _____, Name/Loc of Calibration Lab: _____

Attach latest report of calibration.

7. DISCRIMINATION TEST/ZONE OF UNCERTAINTY TEST RESULTS:

Complies with 69.2.2.;
At zero load; **Yes** □ **, No** □ the zone of uncertainty tests to be _.___ **d** wide
At maximum test load; **Yes** □ **, No** □ the zone of uncertainty tests to be _.___ **d** wide

8. WIDTH OF ZERO TEST RESULTS:

Complies with 69.2.3.; Yes □ **, No** □ _____Amount of error weights added to turn off center of zero indication.
.25d added to the load receiving element should cause the center of zero indication to turn off.

9. AUTOMATIC ZERO SETTING MECHANISM TEST RESULTS:

Complies with 69.2.4.; Yes □ **, No** □ _____ Divisions can be zeroed off by AZSM. This feature should not automatically zero off more than 3d.

10. INCREASING LOAD TEST RESULTS: Acceptance Tolerance is .5d for every 500 divisions or fraction thereof. See below. Mark small "x" in corner of error box if error weights were used to determine if the indication is within tolerance.

Test Load	Tolerance		Test Load	Tolerance	
	d = 50	d = 100		d = 50	d = 100
30,000	50	50	70,000	75	100
40,000	50	50	80,000	100	100
50,000	50	50	90,000	100	100
60,000	75	100	100,000	100	100

Increasing load test results:

Test Weight Amt	**Error +/-**	**Zero Balance change**	**Test Weight Amt**	**Error +/-**	**Zero Balance change**
0			**80,000**		
30,000			**90,000**		
40,000			**100,000**		
50,000			**110,000**		
60,000			**120,000**		
70,000			**0**		

11. SECTION TEST RESULTS: Acceptance Tolerance is .5d for every 500 divisions or fraction thereof, see Item 10 for Tolerance Table. Mark small "x" in corner of error box if error weights were used to determine if the indication is within tolerance. Record error +/- in box.
Each section test result must be within Acceptance Tolerance and the range of results between the sections with the highest and lowest error shall not exceed the absolute value of the Maintenance Tolerance.

Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal

Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal

Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction L to R →																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal
Test Load ___________ lbs. Direction R to L ←																
bal	1R	C	2L	2R	C	3L	3R	C	4L	4R	C	5L	5R	C	6L	bal

12. STRAIN LOAD TEST RESULTS: Acceptance Tolerance is .5d for every 500 divisions or fraction thereof, see Item 10 for Tolerance Table. Mark small "x" in corner of error box if error weights were used to determine if the indication is within tolerance.

Strain Load description	Strain Load indication	Test cart (car) Amount	Indication, Strain + T.W.	Error +/-	Tol.

13. DECREASING LOAD TEST RESULTS: After the strain load test is completed remove one half of the load from the test weight cart and move the test weight cart on an end section. Acceptance Tolerance is .5d for every 500 divisions or fraction thereof, see Item 10 for Tolerance Table. Mark small "x" in corner of error box if error weights were used to determine if the indication is within tolerance.

Test weight cart Amount	Weight Indication	Error +/-	Tolerance

14. EVALUATION SUMMARY: Scale meets NTEP evaluation requirements:

Yes □ , No □ – explain _____

_____

_____

_____

_____

NTEP Evaluator Organization or Company Name:_____

Evaluator's names: _____