(Revised August 30, 2007)

National Type Evaluation Technical Committee
Weighing Sector

September 6-9, 2007, Sacramento, California
DRAFT Meeting Agenda

Glossary of Acronyms			
AWS	Automatic Weighing Systems	NTETC	National Type Evaluation Technical Committee
CC	NTEP Certificate of Conformance	OIML	International Organization of Legal Metrology
CIM	Coupled-in-Motion (Railway Track Scales)	S&T	NCWM Specifications and Tolerances Committee
CLC	Concentrated Load Capacity	SWMA	Southern Weights and Measures Association
EPO	Examination Procedure Outline	W/LRE	Weighing/Load-receiving Element
GIPSA	Grain Inspection Packers and Stockyards Administration	WG	Work Group
NCWM	National Conference on Weights and Measures	WMD	NIST Weights and Measures Division
NIST	National Institute of Standards and Technology	WWMA	Western Weights and Measures Association
NTEP	National Type Evaluation Program		

Unless Otherwise Stated:
- "Handbook 44" (HB 44) means the 2007 Edition of NIST Handbook 44 "Specifications Tolerances, and Other Technical Requirements for Weighing and Measuring Devices"
- "Handbook 130" (HB 130) means the 2007 Edition of NIST Handbook 130 "Uniform Laws and Regulations in the areas of legal metrology and fuel quality."
- "Publication 14" (Pub. 14) means the 2007 Edition of NCWM Publication 14 - Weighing Devices - Technical Policy • Checklists • Test Procedures
- "Sector" means the NTETC Weighing Sector.

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

Railway Track Scale Items

1. CLC Type Evaluation Tests on Railway Track/Vehicle Scales – Technical Policy (Carry-over)

Source: 2006 NTETC Weighing Sector Agenda Item 13 (Carryover Item)

Background: Please see the 2006 NTETC Weighing Sector Meeting Summary for Agenda Item 13 for additional background information on this item.

The Sector reviewed the proposed amendment to Publication 14 technical policies in Section 8.e., and made some editorial suggestions to the proposed language in the 2006 Weighing Sector Summary Appendix A – Attachment to Item 13, and recommended that it be incorporated into Publication 14 Section 8.e.

During the 2006 NTETC Weighing Sector meeting, the NTEP Director, Stephen Patoray, noted that the proposed amendment to Publication 14 technical policies in Section 8.e. applies only to devices submitted for evaluation and could not be applied to previous evaluations without additional testing as it is currently worded. The Sector discussed the impact of the proposal to accept a vehicle scale application on an existing NTEP CC for railway track scales.

The NTEP Director suggested and the Sector agreed that Publication 14 Section E. Modification of Type could be amended to update existing railway track scale CCs to include vehicle-weighing applications without additional testing if:

1. the section test on the railway track scale was performed with 100 000 lb of certified test weights or weight carts;

2. strain load tests were conducted during the original railway track scale evaluation;
3. the design of the load-receiving element is no wider than 12 ft; and
4. the design of the weighing element is "beam and girder" design (this would not be applicable to other scale designs such as composite designs where the strength of the deck is dependent on several individual elements being combined in the design of the scale deck). (See SAP suggestions)

Above items 1-3 were added to the 2007 Edition of Publication 14 as notes to technical policy paragraph 8.2.e. as shown in the highlighted language below:

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 /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. .

2. 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 multiple range weight indicator for combination vehicle/railway track scales.

3. The CLC for the vehicle scale portion of the device must not exceed the maximum test weight used for the section test ~~section capacity~~ of the railway track scale. The CLC listed on the CC shall be no greater than what would be permitted in Section 8. d.).

The Sector also recommended that specific language for Publication 14 Section E. Modifications be developed as a carryover item based on the above discussion (item 4). Stephen Patoray, Todd Lucas and Steve Beitzel agreed to review Section E and develop language to be considered by the Sector during its 2007 Annual Meeting.

Discussion: There has been no additional information on this item at the time the revised agenda was ready to be posted. Therefore the NIST Technical advisor developed that following language for review by the Sector.

E. Modification of Type

10. **Adding a vehicle scale feature or option to an active railway track scale** CC does not require additional evaluation to be listed on the CC provided that:

a. The shift test data can (located over the sections and mid span between sections) can be used to demonstrate compliance with the CLC requirements for the vehicle portion of the scale.

b. The e_{min} for the vehicle scale will be listed as the smallest e_{min} value that was evaluated on the railway track scale certificate.

c. The CLC for the vehicle scale portion of the device must not exceed the maximum test weight used for the section test section capacity of the railway track scale. The CLC listed on the CC shall be no greater than what would be permitted in Section 8. d.).

The Sector is asked to review and comment on the proposed new paragraph for Publication 14 Section E. to determine if is sufficiently developed to recommend that it be added to Publication 14.

During the review of this agenda item, Stephen Patoray and Steven Cook noted that several railway track and combination vehicle/railway track scales existing have the dump-through option listed on the CC without additional evaluation and cited Publication 14 Technical Policy E. Modification of Type paragraph 7. However, the actual policy does not include railway track and combination vehicle/railway track scales in the language. Additionally, paragraphs 8 and 9 do not specify what kind of evaluations is to be conducted.

The Sector is asked to review the proposed amendments to paragraphs 7, 8, and 9 below and:

1. Agree with the proposal to include "railway track, or a combination vehicle/railway track scales,"
2. Recommend that either an initial or complete evaluation be conducted on the scales with composite construction for the "dump-through" option, and
3. Recommend that either an initial or complete evaluation be conducted on the scales with composite construction for the "rotary dump" feature/option.

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

7. **Adding a dump-through option/modification,** without modifying the lever system or load cell placement, to vehicle~~s~~, railway track, or a combination vehicle/railway track scales where the ~~vehicle~~ load support primarily comes from the beams and girders on a scale with a combination steel and concrete weighbridge or all steel weighbridge construction, does **not** require evaluation for an existing CC to apply, however, the modification option must be listed on the CC.

8. **Adding a dump-through option/modification**, to vehicle, railway track, or a combination vehicle/railway track scales with composite construction; unitized steel deck (~~vehicle~~ load support primarily come from the scale deck) does require an (complete or initial?) evaluation to be listed on a new or existing CC. ***(NTEP Director Note:*** *Most, if not all existing CCs adding this feature have gone through a full evaluation.)*

9. **Adding a rotary dump feature/option/modification to a railway track scale** requires an evaluation to be listed on a new or (a complete or initial?) evaluation for an existing CC. ***(NTEP Director Note:*** *All existing CCs adding this feature have gone through a full evaluation.)*

2. In-Motion Railway Track Scale Performance and Permanence - Technical Policy (Carry-over)

Source: 2007 NTETC Weighing Sector Agenda Item 15 (Carry Over)

Background: See 2007 Weighing Sector Agenda Item 15. (a) for additional background information on the sector's discussion on this item. The Sector was unable to come to a consensus, and the Sector Chairman asked for a vote to see if the Sector agrees with the NTEP Committee decision to waive permanence testing for indicators and controllers used in CIM railway track scale type evaluations.

- 8 Sector members voted *to support* the NTEP Committee decision.
- 9 Sector members voted *not to support* the NTEP Committee decision.
- 1 Sector member *abstained* from voting.

The Sector made no recommendation on this item since Don Onwiler reported that the NTEP Committee would reconsider their decision during their October 2006 meeting.

During their 2006 Fall meeting, the NTEP Committee offered several options for direction of the sector in its attached response to the 2006 Sector meeting. The following is the response of the NTEP Committee to the Weighing Sector request to revisit this subject.

At the request of the NTETC Weighing Sector, the NCWM NTEP Committee has revisited its decision earlier this year regarding the necessity of permanence testing in the type evaluation of a controller for coupled-in-motion

(CIM) weighing of railway cars. At its fall 2006 meeting, the committee reaffirmed its position that permanence testing will not be required.

The NTEP Committee recognizes that NTEP has developed permanence testing for the mechanical elements of weighing and measuring systems that are subject to wear over time and use. Certification of a software-based CIM controller more appropriately falls into the categories of devices exempt from permanence testing as provided for in NCWM Publication 14 DES, Section 62, which states, in part:

Scales and weighing/load-receiving elements are generally subject to permanence testing. Examples of devices and elements that may not be subject to these tests are:

- digital electronic indicating elements and load cells
- electronic cash registers
- recording elements, including label printers
- data processing units.

A Certificate of Conformance will be issued for above listed exempt equipment upon the completion of a successful performance evaluation examination without the permanence test or initial field verification. These devices and elements will be required to perform properly when installed and tested in initial field verifications and subsequent verifications. If the performance of the equipment is later found to be unsatisfactory and the cause is determined to be a problem in design, the Certificate of Conformance will be reviewed with the manufacturer and may be withdrawn.

Furthermore, the NTEP Committee recognizes that the Certificate holders for CIM controllers commonly install the controllers in conjunction with any weighing/load-receiving elements certified for static weighing, not just the model used in type evaluation. This methodology would suggest that the permanence test of a specific weighing/load-receiving element in the certification of the CIM controller would be of no value in the marketplace.

The NTEP Committee asks the Weighing Sector to review NCWM Publication 14, DES, Section 68, Performance and Permanence Tests for Railway Track Scales Used to Weigh In-Motion. The opening paragraph of this section states;

Performance tests are conducted to determine compliance with the tolerances. The tests described here apply primarily to the indicating element. It is assumed that the weighing/load-receiving element used during the test has already been examined and been found to comply with applicable requirements. If the design and performance of the weighing/load-receiving element is to be determined during the same test, the applicable requirements for Railway Scales Used to Weigh Statically must also be referenced.

The Sector may come to one of several conclusions, not limited to any of the following:

1. The Sector may agree with the implication of this opening paragraph that a CIM controller may be used in conjunction with any weighing/load-receiving element that is NTEP certified for static weighing. If so, the NTEP Committee recommends Section 68 be modified to eliminate reference to permanence testing.
2. The Sector may determine that NTEP certification of a weighing/load-receiving element as a static scale is not sufficient for its use in commerce in a CIM weighing system. If so, the NTEP Committee recommends a new checklist be developed explicitly for the performance and permanence testing of a CIM weighing/load-receiving element and another checklist be developed explicitly for the performance evaluation of the CIM controller.
3. The Sector may determine that the NTEP certification for CIM weighing should be on an entire system, limiting use of the CIM controller only in connection with the weighing/load-receiving element(s) with which it underwent type approval. If so, the NTEP Committee recommends this clarification be provided. Existing certificates would be amended providing this limitation of use and additional testing may be required to correctly identify and certify these system requirements.

Respectfully submitted by Don Onwiler, NTEP Committee Chairman, on behalf of the NCWM NTEP Committee.

Discussion: At the May 2007 NTEP Laboratory Meeting, the labs reviewed the NTEP Committee's recommendation to the Weighing Sector. The labs agreed with the direction of the NTEP Committee and provided the following recommendation to modify Pub 14 DES, Section 68. This proposal makes Section 68 a checklist for the evaluation of a CIM controller. It recognizes that any weighing/load-receiving element with a NTEP certificate as a static railway track scale may be used in conjunction with the controller. The permanence testing of the weighing/load receiving element has thus been verified in completion of the checklist in Section 69. The Sector is asked to review and discuss the following proposal to amend Publication 14 Section 68 and develop a definition for a CIM controller to forward to the NTEP Committee.

68. Performance Tests for Railway Track Scale Controllers Used to Weigh In-Motion

NTEP Lab Comment: Define what a CIM controller is and that a field test is required to assure that the controller is capable to be correctly installed with representative compatible elements and peripheral devices.

Performance tests are conducted to determine compliance with the tolerances. The tests described here apply primarily to the **~~indicating element/~~ system controller (which may include the indicating element) and recording elements. The system controller performance tests are to be conducted with a railway track scale load-receiving element used in a CIM application without the use of simulation devices (e.g. load cell, sensors, and other digital inputs intended to simulate actual use).** It is assumed that the weighing/load-receiving element used during the test has already been examined and been found to comply with applicable requirements in Section 69. If the design and performance of the weighing/load-receiving element is to be determined during the same test, the applicable requirements for Railway Scales Used to Weigh Statically must also be referenced.

The following checklist provides specific items to be checked on an in-motion railway track scale **system controller.**

68.1.	Insure that the **system controller** ~~scale~~ will not indicate or record a weight when the train speed exceeds the manufacturer's allowable limit.	**Yes ☐ No ☐ N/A ☐**
68.2.		**Yes ☐ No ☐ N/A ☐**
68.8.	On systems where cars are not to be coupled during In-Motion weighing, (i.e., Uncoupled-In-Motion weighing systems) the **system controller ~~instrument~~** must selectively prevent the weight of coupled cars from being recorded.	**Yes ☐ No ☐ N/A ☐**
68.9.	When the digitizer indicates zeros for the weight of a railcar, a message must be printed indicating the nature of the fault.	**Yes ☐ No ☐ N/A ☐ (editorial)**

Handbook Compliance

Laboratory tests of the indicating element must be completed prior to the field performance and permanence testing to assure compliance with the applicable requirements of Handbook 44. If the indicating element to be tested incorporates an indicating element with NTEP approval and the indicating element to be tested processes only digital information (**"remote ~~slave~~** indicators"), then the laboratory test for Influence Factors may be waived.

Test Standards

Performance Test

~~**Permanence Test**~~

~~The permanence test shall be conducted after a minimum of 20 days after successful completion of the initial performance test. It is recommended that the performance tests described above be repeated. However, if the~~

~~original test car is not available, the static test may be conducted with a composite test car. The results of this test must be within the in-motion tolerances specified in Handbook 44. If the device does not meet these tolerance limits, the entire test must be repeated, including successful initial performance testing and a subsequent test after a minimum of 20 days.~~

Determine the Type of Test:
Rail Scale Testing
Inspect the Scale
The Static Test
The In-Motion Test
Recording Results, Coupled-In-Motion Test Individual Car:

3. Vehicle and Railway Track Scale NTEP Capacity - Technical Policy (New)

Source: Don Onwiler, Nebraska

Background: This item questions the necessity basing the NTEP certified capacity limits of vehicle and railway track scales on strain load testing.

- In the Nebraska's experience, performance problems are identified in type evaluations during section tests. By the time a strain load test is conducted, problems related to performance have been identified and corrected (Note: The shift test is usually conducted first because this test frequently reveals accuracy problems.).
- In section testing on vehicle scales, the evaluator is testing to at least 90 % of CLC. This provides a better test of the upper range capabilities of a scale than strain load testing which distributes the load to multiple sections of the scale.
- For railway track scales, the minimum strain load is 200 000 lb, regardless of the desired nominal capacity. If a manufacturer requests to amend a CC for a higher capacity, Publication 14 Technical Policy 8.2.a. (for scales with a capacity greater than 200 000 lb) only obligates the evaluator to repeat the tests completed in the original evaluation since there are no differences in the required load used for the strain-test.
- Handbook 44 provides formulas for maximum nominal capacity of these devices based on CLC and section capacities.

Strain load tests may still have value in demonstrating the abilities of the scale sections to interact with each other and sum together to provide accurate weighments when loads are distributed on the platform.

Nebraska recommends the following:

- Modify the Publication 14 DES Technical Policy for Scales to allow a maximum capacity for vehicle and railway track scales based on the formulas in paragraphs S.6.1 and S.6.4. provided in Handbook 44, and

- Modify the evaluation checklist for vehicle scales to provide some other guidance for minimum strain loads than the traditional nominal capacity provided by the manufacturer or submitter of the device. For example, NTEP could perform a stain-load test to 160 000 lb or 80% of the calculated maximum nominal capacity of the device under evaluation, whichever is less.

The following is additional background information discussing the original justification and history on the development of CLC and section capacity, and the ranges covered on the CC for scales with a capacity greater than 200 000 lb:

From Handbook 44

S.6. Marking Requirements. [See also G-S.1., G-S.4., G-S.6., G-S.7., G-UR.2.1.1., and UR.3.4.1.]

S.6.1. Nominal Capacity; Vehicle and Axle-Load Scales. *- For all vehicle and axle-load scales, the marked nominal capacity shall not exceed the concentrated load capacity (CLC) times the quantity of the number of*

sections in the scale minus 0.5.

As a formula, this is stated as: *nominal capacity ≤ CLC x (N - 0.5)*
where N = the number of sections in the scale.
(See N.1.3.3. and T.N.3.1.)
[Nonretroactive as of January 1, 1989]

[**Note:** When the device is used in a combination railway track and vehicle weighing application, the above formula shall apply only to the vehicle scale application.]
(Added 1988) (Amended 1999 and 2002)

S.6.4. Railway Track Scales. - A railway track scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale. *The nominal capacity of a scale with more than two sections shall not exceed twice its rated section capacity. The nominal capacity of a two-section scale shall not exceed its rated section capacity*.*
*[*Nonretroactive as of January 1, 2002]*
(Amended 1988, 2001, and 2002)

1994 S&T Committee Final Report

320-2 V Concentrated Load Capacity: S.6.5, S.6.5.1., Definition

(This item was adopted.)

Source: Carryover Item 320-13; Mettler-Toledo, Inc.

Recommendation: Amend the definition of the concentrated load capacity to read:

concentrated load capacity (CLC). A capacity rating of a vehicle, axle-load, or livestock scale, specified by the manufacturer, defining the maximum load concentration for which the weighbridge is designed. In the case of vehicle and axle4oad scales, it is the maximum axle-load concentration **(for a group of two axles with a centerline spaced 4 feet apart and an axle width of 8 feet)** for which the weighbridge is designed as specified by the manufacturer. The concentrated load capacity rating is for both test and use.[2.20]

Discussion: The main objectives of defining the concentrated load capacity and requiring its marking are (1) to advise the scale user of the maximum loads that can be accurately weighed on the scale and (2) to establish a uniform method of rating the axle-load capacity of a scale to provide a consistent basis for competition among companies.

History: The recommendation to change the definition of concentrated load capacity (CLC) is another effort to achieve a universal understanding that the CLC is to be equal to the maximum axle load for which the manufacturer has designed the scale and which may be routinely weighed on the scale **as** part of normal use. When this issue was first addressed by the Committee in 1987, there was a concurrent issue regarding the acceptable concentration of test loads on a scale without damaging the scale platform.

The concern in 1987 (Item 320-6) was that the rating of section capacity did not reflect the actual amounts that could be accurately weighed when placed anywhere on the scale platform. Additionally, there was interest in relating the scale capacity to the section capacity and the number of sections in the scale. As a result of further study with the industry, the S&T Committee in 1988 recommended a definition of "concentrated load capacity" to replace the use of section capacity and related the nominal capacity of a scale to the CLC and the number of sections (Item 320 5A).

When designing a scale, the manufacturer must decide what axle loads are to be weighed and for which vehicles and their axle configurations. The Committee wanted the concentrated load capacity to apply to both the axle loads of vehicles and the test loads that could be applied anywhere on the scale; hence, the Committee included the last

sentence of the definition, which reads "This capacity rating is for both test and use." To respond to the concern that test loads up to the CLC be adequately distributed on the scale platform to avoid damage to the platform, a test pattern for block weights was developed to ensure that the load would not be excessively concentrated (Item 320-5B).

The prescribed test pattern was incorporated in the Scales Code test note N.1.3.4. The different ways loads are applied to a scale create different stresses within the weighbridge; the force per unit area is much less for the prescribed test pattern than for a loaded vehicle on wheels.

In 1993 the definition was changed again to further clarify that the CLC is to reflect the axle load for which the scale is to be used. The following sentence was added to the definition of the CLC: "In the case of vehicle and axle-load scales, it is the maximum axle-load concentration for which the weighbridge is designed as specified by the manufacturer." The Committee considered including a statement regarding the different types of vehicles and axle configurations that could be weighed, but the reference was deleted at the Annual Meeting in 1991.

Group of Two Axles Provides Basis for Comparisons

For the 1994 Interim Meeting, the Committee received a proposal to relate axle loads and the different vehicle axle configurations through the Federal Highway Administration Bridge Gross Weight Formula B and an "r factor." The Committee received a second proposal suggesting that a separate definition for a dual axle rating be added to Handbook 44 and that the definition of CLC be modified so that it applied to only the test of a scale. The Committee opposed a separate definition for a dual axle rating because it had always intended for the CLC and axle-load ratings to be the same. However, since the definition of CLC did not address the various axle configurations, the Committee decided to specify in the definition that the CLC is to be established based upon a group of two axles with a specific spacing. This **is** an effort to provide a consistent basis for manufacturers to rate their scales. The axle spacing is for rating the scale with its CLC; it does not restrict the types of vehicles that may be weighed on the scale provided that the loading does not exceed the corresponding axle load weights computed from the Federal Highway Administration Bridge Gross Weight Formula B (see below).

Other Axle Configurations

The Committee concluded that the r factor had merit, but decided not to include it in Handbook 44 due to concern that it may be too complex for field enforcement and the ratings would be difficult to assess. However, the r factor may be a basis for scale purchasers to compare CLC ratings for vehicle scales and to relate the CLC to the types of vehicles and axle configurations that will be weighed by the scale owner. Since the r factor and the Federal Highway Administration Bridge Gross Weight Formula B establishes a way to convert axle ratings for groups of more than two axles to an equivalent rating for a group of two axles, the Committee decided to specie that the CLC be based upon a group of two axles with the specified spacing. Consequently, scale companies may use the r factor to relate the CLC rating to vehicles with other axle configurations to aid the scale purchaser to select the appropriate scale for the application.

To make the relationship of the r factor available for comparison purposes, the relationship of the r factor and the Federal Highway Administration Bridge Gross Weight Formula B is stated below.

Scale Load Limits. - The manufacturer shall specify the scale load limits for consecutive vehicle axles according to the Federal Highway Administration Bridge Gross Weight Formula B, as modified by the "r" factor":

$$W = r \times 500\left[\left(\frac{LN}{N-1}\right) + 12N + 36\right]$$

where:

W is the maximum load in pounds carried on any group of two or more consecutive axles;
r is the factor assigned by the manufacturer that specifies the maximum load;
L is the distance in feet between the first and last axle of that group; and
N is the number of axles of that group, where $N \geq 2$.

For a single axle, the weight limit is W = r x 20,000.

From the 2000 NTETC Weighing Sector Final Report

8. Ranges Covered on the CC for a Railway Track Scale Based on the Device Evaluated

Background: Section B.5. of Pub 14, Digital Electronic Scales, gives a range of parameters which can be covered on a CC for weighing elements greater than 30 000 lb capacity based on the model evaluated. If a vehicle scale with a nominal capacity of 160 000 lb is evaluated, the manufacturer may request the CC include capacities up to 216 000 lb. In the case of railway track scales, 135 percent of the capacity evaluated may be a substantial change. For example, a scale submitted with a capacity of 400 000 lb could be used to cover devices with a capacity up to 540 000 lb. At its October 1999 meeting, the Sector considered whether applying this criteria to railway track scales or placing a limit on the allowable amount of increase is appropriate. The Sector agreed to re-address this issue when the minimum strain load requirement for NTEP evaluation of a railway track scale is resolved and consider any information provided for that issue (see 2000 Sector Agenda Item 2.)

Discussion: One NTEP Laboratory indicated a concern over applying the 135 percent allowance to a railway track scale when the manufacturer is presently only required to have the device evaluated to 100 000 lb. A vehicle scale is required to be tested to at least 80 percent of capacity for the device submitted; however, there is no similar criterion for railway track scales. Lou Cerny (AAR) expressed concern that testing to a higher requirement would place a hardship on the device users and the servicing railroads. One manufacturer stated that the capacity is specified by the manufacturer applying for a CC, and that manufacturer is responsible for providing the equipment necessary to conduct an adequate NTEP evaluation. It was suggested that the capacity listed on the CC be limited to 100 percent of the capacity of the device submitted for evaluation.

Conclusion: By a vote of 11 in favor and 1 opposed the Sector agreed that the nominal capacity range criteria of Publication 14, Digital Electronic Scales, Sections 6.a. and 7.2.a. should not apply to railway track scales. The capacity listed on the CC for a railway track scale or combination vehicle railway track scale will be limited to the capacity of the device submitted for evaluation.

2001 S&T Committee Final Report

320-2 VC S.6.4. Railway Track Scales

(This item was adopted.)

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Modify paragraph S.6.4. as follows:

> **S.6.4. Railway Track Scales. – A railway track scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale.** ***The nominal capacity of a scale with more than two sections shall not exceed twice its rated section capacity. The nominal capacity of a two-section scale shall not exceed its rated section capacity.***
> ***[Nonretroactive as of January 1, 2002.]***

Add the following definition to Handbook 44, Appendix D:

> **section capacity. The section capacity of a scale is the maximum live load that may be divided equally on the load pivots or load cells of a section.**

Discussion: During the 1998 Weighing Sector Meeting, the Scale Manufacturers Association (SMA) was asked for input on the minimum amount of known test standards for evaluating railway track scales. Existing NTEP policy for

modular scales permitted a Certificate of Conformance (CC) to cover 135 percent of the scale capacity evaluated. For example, the evaluation of a scale with a capacity of 400 000 lb would result in a CC which covered devices with a capacity up to 540 000 lb.

At its 1999 meeting, the Weighing Sector questioned the appropriateness of applying the modular criteria to railway track scales. The Sector asked that the SMA consider any limiting factors and avoid conflicts with current American Association of Railroad (AAR) and U.S. Department of Agriculture, Grain Inspection Packers and Stockyard Administration requirements as SMA continued work on the minimum standards for railway track scale evaluations.

At its September 2000 meeting, the Sector heard one suggestion that a capacity limit for railway track scales could be based on criteria similar to the AAR handbook, which for full electronic scales uses the section capacity of the scale, based on the capacity of the individual load cells, to determine the maximum capacity for the scale. The Sector agreed that modifying paragraph S.6.4. and adding a new definition for section capacity to Handbook 44 are needed to clarify how capacity limits apply to railway track scales. The capacity limits are based on load cell criteria and are not intended to conflict with load cell capacity or other scale design principles.

At the 2001 NCWM Annual Meeting, the Committee recognized that there may be devices in use that would not comply with the proposed requirement and, therefore, modified the proposal to become a nonretroactive requirement. The Committee heard recommendations to modify the definition by removing the reference to the "live load" because Handbook 44 contains no definition for the term. The Committee noted that there is a need to distinguish between live and dead loads and believes these terms are understood. The Committee agreed to modify the proposed definition of section capacity by replacing the term "greatest" with "maximum" for consistency with the terminology used in other Scales Code requirements.

Recommendation/Discussion: The Sector is asked to review the background and discuss the recommendation to amend NTEP Technical policies to use CLC or section tests to establish the maximum capacities for vehicle and railway track scales, including scales with capacities greater than 200 000 lb.

Carry-over Items:

4. Recommended Changes to Publication 14 Based on Actions at the 2007 NCWM Annual Meeting

The NIST Technical Advisor, Steve Cook, is providing the Sector with specific recommendations for incorporating test procedures and checklist language based upon actions of the 2007 Annual Meeting of the 92nd NCWM. The Sector is asked to briefly discuss each item and, if appropriate, provide general input on the technical aspects of the issues.

4.(a) G-S.2. Facilitation of Fraud.

Background: See the Interim Report of the 2007 NCWM, S&T Committee Agenda Item 310-1 for additional background information regarding the discussions to amend Handbook 44 General Code paragraph G-S.2. During its 2007 Annual Meeting, the NCWM agreed to amend NIST Handbook 44 1.10 General Code G-S.2. to clarify that the prohibition against facilitating fraud applies to the electronically programmed and coded components of weighing and measuring devices to address electronic manipulation or alteration as follows:

> **G-S.2. Facilitation of Fraud.** - All equipment and all mechanisms, software, and devices attached to or used in conjunction therewith shall be so designed, constructed, assembled, and installed for use such that they do not facilitate the perpetration of fraud.
> (Amended 2007)

Recommendation: The NIST Technical Advisor is not aware of any changes to Publication 14 that are required due to the amended language in G-S.2. and recommends no further action by the Weighing Sector.

4.(b) G-S.5.6.1. Indicated and Recorded Representation of Units – Appropriate Abbreviations and Table 1. Recorded Representation of SI Units on Equipment with Limited Character Sets

Background: See the Interim Report of the 2007 NCWM, S&T Committee Agenda Item 310-2 for additional background information regarding the discussions to amend Handbook 44 General Code paragraph G-S.5.6.1. and Table 1. to require abbreviations for SI units as specified in NIST Special Publication 811 "Guide for the Use of International System of Units (SI) and HB 44 Appendix C – General Tables of Units of Measurement for both indications and recorded representations on new technology. The amendment would also continue to permit exceptions to those guidelines for older equipment with limited character sets as follows:

G-S.5.6.1. Indicated and Recorded Representation of Units **– Appropriate Abbreviations.**

(a) For equipment manufactured on or after January 1, 2008, the appropriate defining symbols are shown in NIST Special Publication SP 811 "Guide for the Use of International System of Units (SI)" and Handbook 44 Appendix C–General Tables of Units of Measurement.

Note: SP 811 can be viewed or downloaded at http://physics.nist.gov/cuu/pdf/sp811.pdf or by going to www.nist.gov/wmd and selecting the link to NIST Special Publication SP 811.
(Added 2007)

(b) The appropriate defining symbols on equipment manufactured prior to January 1, 2008, with limited character sets are shown in Table 1. Representation of SI Units on Equipment Manufactured prior to January 1, 2008, with Limited Character Sets.
(Added 1977) (Amended 2007)

NOTE: Table 1 not included since it is no linger applicable to Publication 14
(Amended 2007)

Discussion: The Sector should review Publication 14 DES Section 76 and HB 44 Appendix C page C-4 since Publication 14 may be in conflict with HB 44:

HB 44 Appendix C (page C-4) states:

[The "grain" (gr) is the same in avoirdupois, troy, and apothecaries units of mass.]

Publication 14 DES Section 76 List of Acceptable Abbreviations/Symbols lists different abbreviations for the word grain as follows:

***Exceptions to Gen'l Tables of W&M, HB44:**	grain	**grain, GRN, grn, or GN**	

Recommendation: The NIST Technical Advisor recommends amending DES Section 12 as follows:

12. Values Defined
Code References: G-S.5.2.4., G-S.5.3.1., G-S.5.6., and G-S.5.6.1.

Graduations, indications, and recorded values that are intended to have specific values shall be adequately identified by a sufficient number of figures, words, and symbols. These defining terms shall be uniformly placed relative to the graduations, indications, and recorded values and as close as practical to them without interfering with their readability. When SI units are used, the symbols shall comply with those given ~~in Table 1 of the General Code (Section 1.10 of Handbook 44). Other symbols shall comply with the abbreviations given~~ in Appendix C (General Tables of Units of Measurement) in Handbook 44 or NIST Special Publication SP 811 "Guide for the Use of International System of Units (SI)." Exceptions are the abbreviations for carat (c or ct), U.S. short ton (ton or TN), and U.S. long ton (LT), and the grain in Publication 14 DES Section 76.

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

Background: See the Interim Report of the 2007 NCWM, S&T Committee Agenda Item 310-3 for additional background information regarding the discussions to add Handbook 44 General Code paragraph G-S.8.1. regarding the identification of adjustments to individual weighing or measuring elements is appropriate regardless of the device type when systems have multiple weighing or measuring elements with a single provision for sealing as follows:

G-S.8.1. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing. – *A change to any metrological parameter (calibration or configuration) of any weighing or measuring element shall be individually identified. [Nonretroactive as of January 1, 2010]*

Note: For devices that utilize an electronic form of sealing, in addition to the requirements in G-S.8.1. any appropriate audit trail requirements in an applicable specific device code also apply. Examples of identification of a change to the metrological parameters of a weighing or measuring element include, but are not limited to:

(1) a broken, missing, or replaced physical seal on an individual weighing, measuring, or indicating element or active junction box;
(2) a change in a calibration factor or configuration setting for each weighing or measuring element;
(3) a display of the date of calibration or configuration event for each weighing or measuring element; or
(4) counters indicating the number of calibration and/or configuration events for each weighing or measuring element.

(Added 2007)

Recommendation: The NIST Technical Advisor recommends adding new language to DES Section 10 as follows:

10. Provision For Metrological Sealing of Adjustable Components or Audit Trail

Code References: G-S.8.1. and S.1.11.

10.11	A change to a sealable metrological parameter (calibration or configuration) of any element shall be individually identified (**Note:** Compliance with this section is required on devices submitted for evaluation and manufactured on or after January 1, 2010).	**Yes ☐ No ☐ N/A ☐**

Examples of acceptable identification of a change to a metrological parameter of an element include but are not limited to: Check which solution is used on the device.

- ☐ A broken, missing, or replaced physical seal on an individual element.
- ☐ A change in a calibration factor or configuration setting for each element.
- ☐ Display of the date of or the number of days since the last calibration event for each element.
- ☐ A counter indicating the number of calibration and/or configuration events per element.
- ☐ Other. Description of solution to identify the method of sealing for each individual element.

_____

_____

4.(d) S.1.1.(d) Zero Indication (Marking Requirements)

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

Background: See the Interim Report of the 2007 NCWM, S&T Committee agenda Item 320-1 for additional background information regarding the justifications for and against the proposed language to amend Scales Code paragraph S.1.1.(c) Zero Indication (Marking Requirements).

At the 2007 Annual Meeting, the Committee heard testimony from the CWMA, NEWMA, and SMA recommending that this item be withdrawn since the current technologies, as allowed by paragraph S.1.1.(c)., is sufficient to prevent facilitation of fraud.

THE WMD commented that NCWM Publication 14 DES Section 11.8.4 and ECRS Section 8 were added in 2004 which specified that a label is required if the scale or ECR display returns to a live weights when the scale is not at a zero-balanced condition. Each section states "scrolling message indicating that the scale is at zero" or similar statements. These changes to Publication 14 were based on a position taken by the 89th S&T Committee (2004) of the 78th NCWM S&T Committee (1993) discussions on paragraph S.1.1.(c). Zero Indication.

The Committee agreed that there has been significant advancement in technology since the topic of other than digital zero indications was discussed, and weights and measures officials are more familiar with the technology. The Committee also heard from regional associations that officials in their region have not received complaints from the general public regarding the lack of a display of digital zero at the start of a transaction. The Committee believes that the opinion of the 1993 S&T Committee interpretation that requires a label stating that a screen saver or scrolling message represents zero is no longer valid or necessary, and that a label is not required if the scale is capable of displaying non-zero information when it is in the sleep mode provided that if the scale is capable of displaying non-zero information when it is in the sleep mode provided that the condition in paragraph S.1.1.(c) is met.

Discussion and Recommendation: The Sector is requested to review and discuss the following amendments to Publication 14 to verify that adequate means are provided to inhibit a weighing operation or to return to a continuous digital indication when the scale is in an out-of-balance condition. Note that the NIST Technical advisor used the requirements and procedures from Measurement Canada to develop the proposed changes to Publication 14.

(add new definition) **sleep mode.** a function of a device that blanks partially or totally indications after a defined period of non use, in order to save the screen or to display information other than weights.

(add new definition) **power save mode.** a function of a device that blanks indications after a defined period of non use in order to save line or battery power. The power may be totally turned off to the entire scale or may operate at reduce power be turning off power the display an operating in a stand-by mode.

11.8.4. Does the scale or indicating element have a ~~screen saver,~~ sleep ~~or~~ mode or power save mode? **Yes ☐ No ☐ N/A ☐**

~~***NOTE:** Other than a continuous zero indication may be used to indicate zero; however, some indication must be used and the indication must be clearly defined. For example, when in the sleep or screen saver mode, a scale may display dashes while on zero.*~~

Manufacturers have been adding ~~screen savers and~~ sleep modes to scales for the purpose of prolonging the useful life of displays or provide promotional or other information on displays during periods of scale inactivity.

Additionally, some scales have automatic shut-off, or power ~~(battery)~~ save modes. These features promote energy conservation or prolong battery life in battery-operated scales. This feature either automatically turns off the scale after a period of inactivity or only turns off the display. If the power or battery save mode only turns off the display to save power, the feature is considered to be a sleep mode and should be evaluated using the screen saver/sleep mode criteria.

The function of a ~~screen saver,~~ sleep mode and power save feature can be metrologically significant because zero information may not be available to the customer and operator at the start of a transaction.

NIST Handbook 44 Scales Code paragraph S.1.1. (c) Zero Indication. states that the zero-balance condition can be indicated by other than a continuous digital zero indication provided that effective means are provided to inhibit a weighing operation or to return to a continuous digital indication when the scale is in an out-of-balance condition.

~~The zero indication must be defined if the zero condition of the scale is represented by other than a digital representation. In this case, a legend must be included as part of, or adjacent to the display to indicate that indications other than a digital zero (e.g. dashes in display or other indications such as scrolling messages) indicate the scale is on zero. (See also General Code Reference G-S.6. Marking Operational Controls, Indications, and Features).~~

A device may go in a power save or sleep mode, or may display non metrological information such as advertisements, greetings, time and date, etc. provided that all of the following conditions are met:

- The device totally or partially blanks its weight indications or displays non metrological information only when the scale is at GROSS load zero (no tare) and has reached a zero-balance condition.
- If the device blanks its indications partially only or displays non metrological information, the displayed information cannot be construed as weight indications.
- The device must be provided with an automatic means to inhibit the weighing operation or return the device to a continuous digital indication when the scale is in an out-of-balance condition.
- Recording and printing functions shall be inhibited when the device is in sleep or power save mode.

The following are examples of acceptable screen saver/sleep mode operations. Checks the method(s) used by the scale or describe the screen saver, sleep mode, or power save feature operation if it is not one of the examples listed below.

- ☐ The primary weight indication is continuously displayed while in the ~~screen saver/~~sleep mode.
- ☐ ~~A clearly defined zero annunciator that is active only when the scale is in a zero gross load condition.~~
- ☐ Activation of the sleep or battery/power save mode turns off the scale requiring the operator to turn on the scale before a weighing operation can be performed.
- ☐ Activation of the sleep or ~~battery/~~power save mode only turns off the primary weight display or the primary weight display is replaced by scrolling messages, dashes or error codes. ~~The method of indicating a zero balance condition must be clearly defined as the zero indication as required by General Code paragraph G.S.6. Marking Operational Controls, Indications, and Features. The legend must state, "Scrolling messages indicates scale is at zero" or similar statement.~~

~~If the scale goes off of zero, the scale must either:~~

- ~~return to the active weight display, or~~
- ~~prevent the initiation of a weighing transaction until the scale has returned to a digital zero indication.~~

Comments:

11.8.4.1. The scale shall not enter the ~~screen saver/~~sleep or power save mode when the scale is at other than at a GROSS load zero (no tare) and has reached a zero-balance condition ~~a zero load condition~~ unless the scale is automatically powered off. **Yes ☐ No ☐ N/A ☐**

	To verify that power has been turned off during the ~~screen saver/~~sleep or power save, apply a test load on the scale and monitor the condition of the display until the ~~screen saver/~~sleep or power save is enabled and the display goes blank. Changing the load on the scale and depressing operator or customer-operated keys cannot activate the display.	
	If the power has not been turned off, verify that the recording and printing functions have been disabled.	**Yes ☐ No ☐ N/A ☐**
	If the scale has been turned off, turn the scale back on with the power switch/button weight on the scale, the scale must return to zero, or display an error code or other meaningless information.	**Yes ☐ No ☐ N/A ☐**
	As soon as the scale is ready to weigh, check the "warm-up" accuracy of the scale by placing a test load of one-half scale capacity (or maximum available weight if one-half capacity is not available). The weight indication shall be within applicable tolerance.	**Yes ☐ No ☐ N/A ☐**
11.8.4.2.	If the primary weight display disappears in the ~~screen saver/~~sleep or power save s with the scale at zero and the power to the scale is not automatically shut off, the display must comply with a or b below:	**Yes ☐ No ☐ N/A ☐**
	~~(a) The zero indication or zero annunciator must be displayed, or defined if zero is indicated by other than a digital zero indication or annunciator.~~	~~**Yes ☐ No ☐ N/A ☐**~~
	~~If a legend is used to define zero, it must be included adjacent to the display to indicate that the information (dashes, scrolling message, and etc.) indicate the scale is on zero.~~	~~**Yes ☐ No ☐ N/A ☐**~~
	(a) The ~~screen saver/~~sleep or power save mode shall be deactivated and the continuous weight display automatically returns under the following conditions unless means are provided to inhibit a weighing transaction until the scale has returned to a digital zero indication:	**Yes ☐ No ☐ N/A ☐**
	The scale drifts above zero	**Yes ☐ No ☐ N/A ☐**
	Weight is added to the scale	**Yes ☐ No ☐ N/A ☐**
	The scale drifts below zero	**Yes ☐ No ☐ N/A ☐**
	The scale is in an overcapacity condition.	**Yes ☐ No ☐ N/A ☐**
	(b) Means are provided to inhibit a weighing transaction until the operator has returned the scale to a digital zero indication.	**Yes ☐ No ☐ N/A ☐**

4.(e) Bench/Counter Scale Shift Test and Definitions

Source: 2006 NTETC Weighing Sector Item 3 (Carryover Item)

Background: See the 2006 Summary of the Weighing Sector Agenda Item 3 and the Interim Report of the 2007 NCWM, S&T Committee Agenda Item 320-6 for additional background information regarding proposed language to amend Scales Code shift test definitions and procedures.

At the 2007 Annual Meeting, the Committee believed that there is sufficient support for this item with the correction of the references to Figures 1 and 2 in proposed paragraphs. Consequently, the Committee agreed to present the item for a vote and the item was adopted.

These adopted changes applies to all types of platform scales with fewer than three sections except for livestock, vehicle, and railway track scales, vehicle on-board weighing systems, and other scales listed as exceptions in Scales Code paragraph N.3.8. These changes include:

1. Deleting paragraph N.1.3.1. Bench and Counter Scales and renumbering subsequent paragraphs;
2. Changing the test load for the shift test from 50% to a range of 30% - 35% of the scale capacity;
3. Changing the shift test pattern for bench and counter scales to be the same as the current test pattern for the other scales listed in paragraph N.3.7. (formerly N.3.8.); and
4. Providing guidance to the application of standards in a manor that is safe for the weights and measures inspector and will not over concentrate the test load on the load-receiving element.

The major revision to the shift test procedures were made to shift test paragraph N.3.8 which has been renumbered to N.3.7. The revised paragraph reads as follows:

> **N.1.3.7. 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. A single field standard weight used as the prescribed test load shall be applied centrally in the prescribed test pattern. When multiple field standard weights are used as the prescribed test load, the load shall be applied in a consistent pattern in the shift test positions throughout the test and applied 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.
>
> (a) For scales with a nominal capacity of 500 kg (1000 lb) or less, a shift test shall be conducted using a one-third nominal capacity test load (defined as test weights in amounts of at least 30 % of scale capacity, but not to exceed 35 % of scale 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.
>
> (b) For scales with a nominal capacity greater than 500 kg (1000 lb), a shift test may be conducted by either using a one-third nominal capacity test load (defined as test weights in amounts of at least 30 % of scale capacity, but not to exceed 35 % of scale 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 by using a one-quarter nominal capacity test load centered as nearly as possible, successively, over each corner of the load-receiving element using the prescribed test pattern as shown in Figure 2.

Discussion and Recommendation: The Sector is requested to review and discuss the following amendments to Publication 14 to amend shift test loads from one-half to 30% to 25% of the scale capacity. Note that the revised shift test procedures do not apply to other type of scales that have been specifically excluded from the revision (e.g., livestock scales, vehicle on-board weighing systems, etc.)

The NIST Technical Advisor also recommends that the remaining references (approximately 12) to bench and counter scales be editorially revised by the NTEP Director and NIST Technical Advisor.

31. Multi-Interval Scales

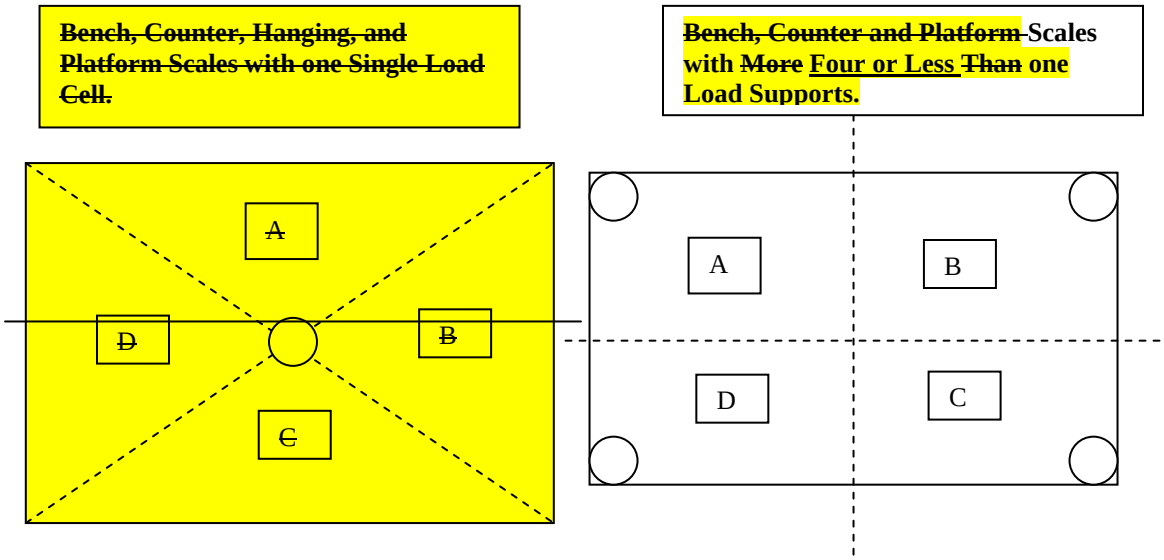
A multi-interval scale is an instrument having one weighing range that is divided into partial weighing ranges (segments). Each weighing range (segment) is defined by its division size, it's minimum capacity, and it's maximum capacity. The selection of the appropriate weighing range (segment) is determined automatically according to the load applied, both on increasing and decreasing loads. The shift test shall be conducted at 30% to 35% ~~one-half~~ the capacity of the scale. Corner tests, if appropriate, shall be run at one-quarter of the scale capacity. The number of scale divisions, n, for each weighing range (segment) is determined by dividing the maximum capacity of the

weighing range (segment) by e of the same weighing range (segment). In the case of multi-interval scales, e must be equal to d (See NIST Handbook 44 Scales section S.5.3.).

63. Performance and Permanence Tests for Platform Scales With No More Than Four Load Supports ~~Counter (Bench) Scales (Including Computing Scales)~~
page DES-90.

63.3. Shift Test

Test with test loads equal to 30% to 35% ~~one-half~~ capacity as specified in N.1.3.~~1~~7. and at test positions as illustrated below



63.7. Field Permanence Tests

Review performance of the width of zero, zone of uncertainty, sensitivity, and discrimination near zero and at or near capacity.

Make certain that movement of the load cell cable does not affect the "live" load.

A minimum of four sets of increasing-load, decreasing-load, and shift tests are to be conducted at the evaluation installation at the start of the field permanence test. The scales are to be tested to capacity using certified test weights. The results of all increasing-load, decreasing-load, and shift tests conducted during the initial tests must be within acceptance tolerances. If scale repeatability is very good (e.g., <0.5d) the fourth test may be waived.

-
- On the first increasing-load test, when 30% to 35% ~~one-half~~ capacity is reached, perform a shift test with the 30% to 35% ~~one-half~~ capacity load located in each quadrant. (Be careful to avoid back-weighing.)
-
- On the third increasing-load test, perform a shift test at 30% to 35% ~~one-half~~ capacity with load located in each quadrant.

64. Performance and Permanence Tests For Platform Scales With No More Than Four Load Supports (Field

Permanence Tests) ~~Floor Scales~~ page DES-93.

64.1. Initial Type Evaluation Performance Test

Initial Review

-

A minimum of four sets of increasing-load, decreasing-load, and shift tests are to be conducted at the evaluation installation as the start of the field permanence test. The scales are to be tested to capacity using certified test weights. The results of all increasing-load, decreasing-load, and shift tests conducted during the initial permanence tests must be within acceptance tolerances. If scale repeatability is very good (e.g., <0.5d), the fourth test may be waived.

- . . .
- On the first increasing-load test, when 30% to 35% ~~one-half~~ capacity is reached, perform a shift test with the 30% to 35% ~~one-half~~ capacity load located in each quadrant. (Be careful to avoid back-weighing.)
- On the second increasing-load test, perform a corner test at 1/4capacity.
- On the third increasing-load test, perform a shift test at 30% to 35% ~~one-half~~ with test load located in each quadrant.

5. Publication 14 Force Transducer (Load Cell) Family and Selection Criteria – Report of the Load Cell Work Group (WG)

Background: During their 2006 annual meeting, the Sector agreed with the suggestion for the NTEP Director to forward the proposal to holders of NTEP CCs for review and comment by December 1, 2006.

Discussion: The NTEP Director will provide the Sector with an update to the status of this item.

6. Report of the Tare Work Group

Source: NTEP Participating Laboratories (Carryover Item):

Background: See the 2006 NTETC Weighing Sector Meeting Summary Agenda Item 5, Tare on Multiple Range Scales, for additional background information on the earlier Sector discussions and WG developing items and recommendations.

During their 2006 annual meeting, the Sector further recommended that the NIST Technical Advisor submit to the SWMA S&T Committee the Tare Work Group recommendations. These items were considered by the 2006 NCWM S&T Committee. The following is a brief recap of their recommendations and actions by the NCWM. Note that there is additional background information is available in the 2007 NCWM Publication 16 in the S&T Committee Interim Report.

6.(a) Add New and Amended Tare Definitions and Tare Requirements

2006 Sector Recommendation: Add new and amended definitions to facilitate a uniform understanding of the terms already used in Handbook 44 (e.g., “tare mechanism,” “tare,” “net,” etc.) in Handbook 44 Appendix D – Definitions.

NCWM Recommendation/Action: This became 2007 NCWM S&T Committee Agenda Item 320-9 and was given “informational” status. The S&T Committee agreed that lengthy discussions on all of the tare proposals demonstrate that although it is necessary to address tare, the matter is too complex to move forward without a more thorough review of all related proposals by the Weighing Sector and jurisdictions. Consequently, the Committee recommended this proposal and other related proposals intended to address tare features remain as Information

Items for further review and development. The Committee also agreed that all tare related items, when ready, should be presented for voting as a block.

Discussion: The NIST Technical Advisor has incorporated the changes to proposed definition of "tare mechanism" as recommended by the S&T Committee, and updated the Tare Work Group Handbook 44 "Tare" recommendations based on their August 7, 2007 conference call. The Sector is asked to review the following Handbook 44 "Tare" recommendations and provide the Tare Work Group and the S&T Committee any comment or suggestions.

Amend the following definition for "tare mechanism:"

tare mechanism. A mechanism (including a tare bar on a weighbeam indicating element) 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:**

1. **by reducing the weighing range for net loads [e.g., subtractive tare where Net Weight + Tare Weight ≤ Gross Weight Capacity], or**
2. **without altering the weighing range for net load on mechanical scales [e.g., additive tare mechanism such as a tare bar on a mechanical scale with a beam indicator)].**

The tare mechanism may function as:

1. **a non-automatic mechanism (load balanced by an operator),**
2. **a semi-automatic mechanism (load balanced automatically following a single manual command),**
3. **an automatic mechanism where the load is balanced automatically without the intervention of an operator. An automatic tare mechanism is only suitable for indirect sales to the customer (e.g., prepackaging scales).**

[2.20**, 2.24**]
(Amended 200X)

Add the following new definitions to Appendix D:

gross weight value. Indication or recorded representation of the weight of a load on a weighing device, with no tare mechanism in operation.[2.20, 2.24]
~~(Added 200X)~~

net weight. The term "net mass" or "net weight" means the weight 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. [2.20, 2.24]
(Added 200X)

net weight value. Indication or recorded representation of the weight of a load placed on a weighing device after the operation of a tare mechanism. [2.20, 2.24]
(Added 200X)

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. [2.20, 2.24]
(Added 200X)

tare weight value. The weight value of a load determined by a tare mechanism. [2.20, 2.24]
(Added 200X)

The Tare Work Group recommends adding to following definitions to above definitions that are already in

S&T Agenda Item 320-9

Calculated weight (gross or tare*) value - Calculated sum or difference of more than one measured weight value and/or calculated net value. ***(* TARE WG Comment – This new HB definition is from the revised version of R 76 and is beyond what is currently required by NTEP)***

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.

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 is loaded.

Preset Tare: A numerical value, representing a weight that is entered into a weighing device (e.g., keyboard, recalling from stored data, or entered through an interface) and is intended to be applied to weighings without determining individual tares.

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 as a net weight. The weighing range for net loads is reduced accordingly.

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

- **Proportional Tare:** A preset tare 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.

The Tare Work Group Recommends the changes to Scales Code

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

S.2.3. ~~Tare~~ Value of Tare Indication and Recorded Representations:

~~*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]*

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

(a) On any scale (except a monorail scale equipped with digital indications ***and multi-interval scales or multiple range scales when the value of tare in determined in a lower range****), the value of the tare division shall be equal to the value of the scale division.**
*[*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)
(Renumbered 200X)

S.2.3.2. Accuracy. – A tare weighing or balancing 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,

± 0.5 d for mechanical weighing devices with a digital indication (e.g., weighbeams with only notched poises and no sliding poises).

On a multi-interval scale, d shall be replaced by d1 (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.

On a single or multiple range scale, the maximum tare capacity can not exceed that maximum capacity of the highest weighing range.

On a multi-interval scale, the maximum tare capacity can not exceed that maximum capacity of the first weighing segment.

S.2.3.4. Visibility of Operation. - Operation of the tare mechanism 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 word "NET" or the symbol "N."

Note: NET may be displayed as "NET", "Net" or "net".

Note: If a scale is equipped with an indicator that allows the gross value to be displayed temporarily while a tare mechanism is in operation, the "NET" symbol shall disappear while the gross value is displayed.

*S.***2.3.5. Subtractive Tare Mechanism.** – After any tare operation and while tare is in effect, an indicating or recording element shall not display nor record any values when the gross load (not counting the initial dead load that has been canceled by an initial zero-setting mechanism) is in excess of 105 % of scale capacity after tare

has been taken.

(TWG Note: Add to paragraph S.1.7. (a) Capacity Indication "Flashing weight values are not acceptable as and overload indication."

S.2.3.6. Semi-automatic or Automatic Tare* Balancing or Weighing 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.

* Automatic Tare Mechanisms are not permitted for direct sales to the public.

S.2.3.7. Combined Zero-setting and Tare-balancing Mechanisms (0/T Key). – (TWG recommends deleting S.2.1.6.Combined Zero-setting and Tare-balancing Mechanisms (0/T Key) in order to keep all tare requirements together). Scales not intended to be used in direct sales to the public may be equipped with a combined zero and tare function key, provided that the device is clearly marked as to how the key functions. If the semi-automatic zero-setting mechanism and the semi-automatic tare-balancing mechanism are operated by the same key, the following apply at any load:

1) After zero/tare setting the effect of accuracy of the zero setting shall be not more than ± 0.25 d.

2) A "center-of-zero" condition shall either automatically be maintain to ± 0.25 scale division or less, or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero-balance condition to ± 0.25 of a scale division or less.

3) A zero-tracking mechanism, if equipped, shall operate only when:

- the indication is at zero, or at a negative net value equivalent to gross zero, and
- the weight indication is stable.

4) The scale must also be clearly marked on or adjacent to the weight display with the statement "Not for Direct Sales."

S.2.3.8. Consecutive Tare Operations. - Repeated operation of a tare mechanism (including preset tare) is permitted. If more than one tare mechanism is operative at the same time, tare weight values shall be clearly designated when indicated or printed.

S.2.**3.9. 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. The complete word or symbol "N" shall be used to designate a net weight. 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 device the calculated weight gross or tare value may be printed with a smaller scale interval.

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

TARE WG Comment: These requirements are from the revised version of R 76 and is beyond what is currently required by HB 44 and NTEP.

S.2.4. Preset Tare Mechanism.

S.2.4.1. Modes of Operation. - A preset tare mechanism may be operated together with one or more tare devices provided that:

- the preset tare mechanism complies with paragraph **S.2.3.8. Consecutive Tare Operations.**, and
- a preset tare operation cannot be modified or cancelled as long as any tare mechanism operated after the preset tare operation is still in use.
- a preset tare associated with a price look-up (PLU) shall be automatically cancelled at the same time a PLU is cancelled.

Preset tare may operate automatically only if the preset tare value is clearly identified with the load to be measured (e.g., part of the product look-up information).

S.2.4.2 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.2.3.9. Indication and Printing of Weighing Results.** applies accordingly provided that the calculated net value is printed and at least the preset tare value is printed, with the exception of:

1. a class II, or a class III instrument with a maximum capacity not greater than 100 kg used in direct sales to the public, or
2. including price computing scales, or
3. 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. ***(TARE WG Comment – This requirements is from the revised version of R 76 and is beyond what is currently required by HB 44 and NTEP. The Tare WG added the class and capacity exception since they felt that the need for providing the additional type of tare information is greater for larger capacity scales and for vehicle scale applications where preset tares are not allowed by some jurisdictions.)***

Note: Paragraph 2.4.2. 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.

6.(b) Amend Scales Code and AWS Code Paragraph S.1.1.1. Digital Indicating Elements

2006 Sector Recommendation: Amend Scales Code and AWS Code paragraph S.1.1.1. Digital Indicating Elements to clarifying that a scale can display a "center-of-zero" indication with a load on the platform provided it has been balanced off by a tare mechanism while the scale is in the net mode of operation.

NCWM Recommendation/Action: This became 2007 NCWM S&T Agenda Item 320-2 and was given "informational" status. This proposal was amended after the 2007 NCWM Interim Meeting to include languages addressing the "center-of-zero" requirements to coincide with 2007 NCWM S&T Agenda Item 320-1, S.1.1.(c) Zero Indication; requirements for markings of indications for other than digital zero indications. Item 320-1 was withdrawn from the agenda making the changes to S.1.1.1.(a) no longer necessary.

At the 2007 NCWM Annual Meeting, the Committee heard testimony from the CWMA, NEWMA, WMD and SMA stating that this item has changed from the original intent to verify that zero tracking could be operable in the net mode, to now include the addition of other language which alters the requirement even more. For example in paragraph S.1.1.1.(a), by stating "and" instead of "or" would make both requirements mandatory. Also, if "or" is used instead of "and" then this proposal lowers the current requirement of ½ e to ¼ e. The SMA further stated that the wording in the proposed paragraph (a) adds a dual requirement that is not consistent with Canadian and OIML requirements. Therefore, the CWMA, NEWMA, and SMA recommended the proposal be moved back to informational for further consideration.

The Committee agreed with comments that the modifications to the originally proposed language in Publication 15 that now appears in Publication 16 significantly changes the original intent of the proposal. Additionally, the changes to the center-of-zero indication requirements are in conflict with OIML recommendations and Canadian requirements.

The Committee recommends the following alternate proposal from the WMD become a carry-over item for the 2008 Committee agenda since that text is consistent with the intent of the original proposal from the NTETC Weighing Sector.

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.
[Nonretroactive as of January 1, 1993]

Note: The "center-of-zero" indication may also work when zero is indicated for gross load zero, or after a tare operation.
(Amended 1992 **and 200X)**

Discussion: The Sector is asked to review the above information and provide the S&T Committee with a position and comments on the revised proposal.

6.(c) Amend Scales Code Paragraph S.1.2.1. Weight Units

2006 Sector Recommendation: Amend Scales Code paragraph S.1.2.1. Weight Units. and AWS Code paragraph S.2.1. Value of Division Units. by adding a note that permits calculated net weights from multi-interval and multiple range scales to be in units other than 0, 1, 2, and 5 in order to maintain the accuracy of tare weights when the gross weights are in a weighing range with a larger scale division.

NCWM Recommendation/Action: This item became 2007 NCWM S&T Committee Agenda Item 320-3. During the 2007 NCWM Annual meeting, the Committee heard comments from the CWMA and NEWMA supporting this

item with recommendations to change the word "value" to "division" and incorporating the SWMA recommendation to modify paragraph S.2.3.

NEWMA pointed out that the proposed amendment to S.1.2.1. appears to be permissive and not a requirement and asked if the intent is to prohibit multi-interval and multiple range scales from rounding indicating calculated net weights in scales divisions to only 1, 2, or 5 when appropriate or allow the rounding the scale divisions of 1, 2, or 5 still allowed? The WMD representative to the NCWM Tare Work Group stated that the intent is for the language to be permissive because there are a significant number of NTEP certified devices in the marketplace that round the tare values before calculating net weights.

The S&T Committee made several modifications to the proposal to clarify;

- the examples in the proposed note to paragraph S.1.2.1., and
- that the SWMA proposed modification to the language in S.2.3 for an exception for multi interval and multiple range scales only applies to the requirement that the value of tare shall be equal the value of the scale division.

The Committee also agreed that the words "scale value" should be changed to "scale division" and recommended that NIST Technical Advisor forward the following amended proposal to the Tare Work Group and NTETC Weighing Sector for their consideration and comment.

> ***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 sub-multiple of 1, 2, or 5.*
> *[Nonretroactive as of January 1, 1989]*
>
> **Note: The requirements that the value of the scale division be expressed only as 1, 2, or 5, or a decimal multiple or submultiples of only 1, 2, or 5 does not apply to net weight indications and recorded representations that are calculated from gross and tare weight indications where the scale division of the gross weight is different from the scale division of the tare weight(s) on multi-interval or multiple range scales.**
>
> **For example, a scale indicating a tare weight of 2 kg in the lower range or segment and a gross weight of 5 kg in the higher range or segment may indicate a net weight of 3 kg, or a scale indicating a tare weight of 20 lb in the lower range or segment and a gross weight of 50 lb in the higher range or segment may indicate a net weight of 30 lb.**
> [Nonretroactive as of January 1, 1989]
> (Added 1987) **(Amended 200X)**
>
> **S.2.3. Tare.** – *On any scale (except a monorail scale equipped with digital indications* ***and multi-interval scales or multiple range scales when the value of tare is determined in a lower range)****, 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 January 1, 1983]*
> **(Amended 200X)**

During their August 7, 2007 conference call, the Tare Work Group agreed with the recommendations of the S&T Committee. The group also recognized that the proposed note in S.2.1. is inconsistent with OIML R 76. The Group also noted that the R 76 solution to similar examples is to indicate and record net weigh calculations where that

would me mathematically incorrect since the net weight display would be rounded to the value of d based on the internal resolution of the gross and tare weights.

Discussion: The Sector is asked to review the above information and provide the S&T Committee with a position and comments on the revised proposal.

6.(d) Amend Scales Code Tolerance Paragraph T.N.2.1. General

2006 Sector Recommendation: Amend Scales Code paragraph T.N.2.1**.** General and AWS Codes paragraph T.2.1. General to clarify that tolerances are also applied to net weight indications from a net indication of zero using any possible tare load.
NCWM Recommendation/Action: This item also became 2007 NCWM S&T Committee Agenda Item 320-3 (See previous recap). The S&T Committee further modified the proposed formula for subtractive tare in subparagraph 1 that appears in the definition of "tare mechanism" to clarify that the combined net and tare net weight value should not exceed the permissible gross weight capacity.

The S&T Committee agreed that lengthy discussions on all of the tare proposals demonstrate that although it is necessary to address tare, the matter is too complex to move forward without a more thorough review of all related proposals by the Weighing Sector and jurisdictions. Consequently, the **S&T Committee recommended this proposal and other related proposals intended to address tare features remain as Information Items for further review and development. The Committee also agreed that all tare related items, when ready, should be presented for voting as a block.**

7. Minimum Size of Weight and Units Indications

Source: 2006 Weighing Sector Item 6 (Carryover Item)

Background: See the 2007 NCWM Specifications and Tolerance Committee Interim Report Item 320-4 "S.1.4.6. Height., Definition of Minimum Reading Distance, UR.2.10 Primary Indicating Elements Provided by the User and Definition of Primary Indications," and the 2006 Weighing Sector Summary 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 2006 Weighing Sector (Item 6) 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 status of this item was changed to **"Developing"** during the January 2007 NCWM Interim Meeting and was moved to Appendix A as Item 360-2: Developing Items Part 1, Item 1 Scales. During the 2007 NCWM Annual Meeting, the Committee was informed that the NTETC Weighing Sector will continue to develop this item.

At its 2007 NTEP Participating Laboratory Meeting, the weighing device labs discussed this item and reviewed the equivalent recommendations in OIML R 76. It was noted that the minimum height requirement for the weight display applied to scales used in direct sale applications with a capacity of 100 kg or less. Additionally, it was noted that R 76 was written to apply to weighing devices that indicated primarily in SI units and that U.S. scales are frequently configured with both SI and inch-pound units. The labs agreed that with the suggestion that the proposed language for the minimum height of the weigh display be limited to scales used in direct sales with a capacity of 100 kg or less. The minimum height of the "units" indication would only be applicable to devices with external lb/kg switching capability since there would be no chance of facilitating fraud using the lb/kg switching capability.

The NIST Technical Advisor contacted a manufacturer about the labs recommendation to revise proposed S.1.4.6. The manufacture believed most products could comply; however he could not speak for other manufacturers. He also stated that this did not address questions about the minimum size of an annunciator that points to a unit legend silkscreen on the scale next to the annunciator.

The WMD adds that there has been little discussion on the clarity of the displays and annunciators and perhaps the proposal should include language similar to Handbook 130 Packaging and Labeling Regulation paragraphs:

- 8.1.2. Style of Type or Lettering that states that the "declaration or declarations of quantity shall be in such a style of type or lettering as to be boldly, clearly, and conspicuously presented with respect to other type, lettering, or graphic material on the package, except that . . . ," and
- 8.1.3. Color Contrast that states that the "declaration of quantity shall be in a color that contrasts conspicuously with its background . . ."

Discussion: The NIST Technical Advisor has amended the proposal to address the concerns and suggestions from the manufacturers, NTEP labs, and the WMD. The NIST Technical Advisor did not develop any changes to the proposed definition of "Primary Indications" and to the proposed User Requirements and associated definition for "Minimum Reading Distance." The Sector is asked to review the following proposed language and provide a recommendation that can be forwarded to the regional weights and measures associations.

S.1.4. Indicators.

S.1.4.6. Direct Sale Primary Indications - Size and Character. Scales designed for direct sale applications with a capacity of 100 kg (200 lb) or less shall comply with the following:

(a) All indications or weight shall be indicated clearly and simultaneously.

(b) All indications and associated descriptive markings (e.g., lb, kg, gross, tare, net, etc.) shall be presented in such a style of type or lettering as to be boldly, clearly, and conspicuously presented with respect to other type, lettering, or graphics.

(c) All indications and associated descriptive markings shall be in a color or shade that contrasts conspicuously with its background.

(d) All primary indications displayed to the customer, including unit price and total price on computing devices, shall be at least 9.5 mm (0.4 in) high,

(e) All units of mass indications, except for devices that can only indicate in a single unit, shall be at least 21 % on the height of the primary weight indications.
[Nonretroactive as of January 1, 200X]
(Added 200X)

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)

New Items

8. Level Indicating Means – Out-of-Level Test

Source: Paul Lewis, Rice Lake Weighing

Background: Rice Lake Weighing has reported that there appears to be some confusion in the weighing industry the level requirements in Handbook 44 and Publication can be misinterpreted. Several individuals believe that the

reference to 5% refers to 5% of 90 degrees. This would make the angle for the requirements 4.5 degrees. Therefore, some manufacturers are stating that their devices are "certified" for use out-of-level up to 4.5 degrees.

Handbook 44 Scales Code paragraph S.2.4. Level-Indicating Means. states:

> Except for portable wheel-load weighers and portable axle-load scales, a portable scale shall be equipped with level indicating means if its weighing performance is changed by an amount greater than the appropriate acceptance tolerance when it is moved from a level position and rebalanced in a position that is out of level in any upright direction by 5 % (approximately three degrees). The level-indicating means shall be readable without removing any scale parts requiring a tool.

Rice Lake reports that the reference to 5% infers this is based on a grade or slope on a 180 degree plane. However, HB 44 does not clearly state it.

The NTEP Director added that 5% out of level means a rise of 5% of a 100% run or, in other words, your increase in height is 5 units for every 100 units of run. That means a 45 degree angle would be a 100% slope. Using this you can calculate the angle by taking the arctangent of 5/100 or 0.05 which is 2.86 degrees or, rounded off, three degrees.

Rice Lake submitted a proposal to amend Publication 14 Digital Electronic Scales Sections 56. Level-Indicating Means - Portable Scales, 63.4. Out-of-Level Test (If Applicable), and 71 Performance and Permanence Tests for Type Evaluation of Electronic Vehicle-On-Board Weighing Systems by adding a new not as follows:

56. Level-Indicating Means - Portable Scales
Code Reference: S.2.4.

Portable wheel-load weighers and portable axle-load scales intended for law enforcement must weigh accurately when placed out-of-level by 5 percent* (approximately 3 degrees).

A portable scale which is intended to be moved must either be equipped with a readily observable level-indicating means (typically a bubble level) or the scale must still weigh accurately when placed out-of-level by 5 percent (approximately 3 degrees). Weighing accurately means that the results must be within acceptance tolerance.

*Note: 5 percent refers to 5 percent slope/grade

63.4. Out-of-Level Tests (If Applicable)

If the scale is not equipped with a level-indicating means, it must be tested in an out-of-level condition to determine compliance with paragraph S.4. Leveling-Indicating Means.

63.4.1. Place one side of the scale 3 degrees (or 5 percent*) out-of-level with respect to the width axis of the scale. Zero the scale. Conduct a shift test[1] and increasing and decreasing load tests.

63.4.2. Place the opposite side or the scale out-of-level, zero, and repeat tests.

63.4.3. Place the front of the scale 3 degrees (or 5 percent*) out-of-level with respect to the length axis of the scale. Zero the scale and conduct the shift, increasing, and decreasing load tests.

63.4.4. Place back of scale out-of-level, zero the scale, and repeat tests. All test results must be within acceptance tolerances. If the scale fails any of these tests, a level-indicating means is needed.

***Note:** 5 percent refers to 5 percent slope/grade

71. Performance and Permanence Tests for Type Evaluation of Electronic Vehicle On-Board Weighing Systems

Out-of-Level Tests

A vehicle on-board weighing system shall operate within tolerance when the weighing system is out-of-level up to 3 degrees or 5 percent (5 percent refers to 5 percent slope/grade). However, beyond the 3 degrees or 5 percent, if the accuracy is affected by out-of-level conditions normal to the use of the device, the system shall be equipped with an out-of-level sensor that inhibits the weighing operation when the system is out-of-level to the extent that the accuracy limits are exceeded.

9. Wireless Communication Information on the Certificate of Conformance (CC)

Source: Stephan Langford, Cardinal Scale Manufacturing Co./Detecto Scales Co.

Background: Please review the 2006 Summary of the Weighing Sector Agenda Item 9 for additional background information regarding the development of the type evaluation procedures for wireless communication for metrological information. At its September 2006 meeting, the Weighing Sector reviewed and recommended an ***ad hoc*** examination procedure for the evaluation of the wireless feature used with indicating devices. The recommended procedures were approved by the NTEP Committee and incorporated into the 2007 Edition on NCWM Publication 14. The procedure examines how the device responds to the loss or degradation of the wireless signal. This procedure would apply to both the indicating device as well as to the device which receives and displays, records, or further processes the weight information. The evaluation ensures that an invalid weight is not displayed or recorded when the wireless signal is interrupted or disturbed in some other fashion (usually the examiner will separate the two devices that are wirelessly connected until there is a loss of signal).

In many instances the wireless component consists of a separate module connected to the serial port on the indicating device. This module is usually a purchased item although in some instances could be contained within the indicating device enclosure. Listing of a specific make or model of the wireless module on the indicating device's NTEP Certificate of Conformance effectively limits the manufacturer to the use of that specific wireless module which was used in the original evaluation. This presents a problem when either the manufacturer is no longer able to purchase that particular device, a more cost-effective substitute is found, or a change is made in the module. In these instances, the manufacturer has no alternative but to have his device re-evaluated in order to maintain the wireless feature on the NTEP certificate.

Cardinal Scale Manufacturing Co./Detecto Scales Co. has recommended that the wireless feature should be listed simply as a "wireless interface" rather than listing a specific model of wireless interface module. This would allow other types of wireless modules to be substituted without having to submit the device for further examination.

The NTEP is concerned with the manner in which the indicating or transmitting device and the peripheral or receiving device responds to the loss or degradation of the wireless signal. NTEP is not concerned with the manner in which the data is transmitted and that the frequency or type of modulation or encryption method is not an issue

The NTEP's primary concern is that an incorrect weight value is not displayed, recorded, or otherwise interpreted as a valid weight. This is a function of the indicating device and/or the receiving device and not that of the wireless module. Therefore, the characteristics of the wireless module itself are not metrologically significant and hence do not need to be listed on the NTEP certificate.

Discussion/Recommendation: The Sector is asked to review the background information and discuss the recommendation to amend the information on the NTEP CC to discontinue the listing of the specific model of the wireless interface and replace the list "wireless interface" as a feature or option on the NTEP CC.

10. Hopper Scale Design Parameters - Technical Policy

Source: NTEP Participating Laboratories

Background: Currently due to changes in some State requirements, hopper scales used in concrete batch plants need to be NTEP Certified. This presents a concern as to what defines the "type" of hopper scales. Also, as the labs discussed, what defines the parameters that define what will be contained on a single NTEP CC.

With concrete batch plants in particular, there can be several different shapes, capacities, numbers of supports, method of load application (tension/compression), and permanent/portable etc. all at one installation site.

No specific information is contained in Publication 14 regarding the tests that are required for the different parameters.

This item was discussed at the May 2007 NTEP Lab Meeting. The labs were not in agreement as to the parameters that would define the device type. The labs were also not in agreement if these different parameters should be contained on a single NTEP CC or each different parameter should be on a separate NTEP CC. The only parameter that is listed in the Pub is rectangular or circular hopper. There is no mention on number of supports, supports above or below (tension or compression) or several other parameters in Publication 14. ***(Note. The current parameters for hopper and tank scales were initially developed during the 1996 NTETC Weighing Sector meeting.)***

During the meeting, the labs discussed this issue and could not reach consensus. The labs did work up a list of possible parameters to consider.

Discussion: It is requested that the Sector consider this item and provide some technical guidance to the NTEP Director and the NTEP Labs.

The following is a list of design (type) and installation parameters regarding Hopper Scales developed by the NTEP Labs during their May 2007 Annual Meeting:

1 Hopper shape (rectangular, round or oval)
2 Load cell type (suspension vs. Compression)
3 Portable vs. Permanent installation
4 Mechanical
5 Electronic
6 Electro-mechanical
7 Number of supports
8 Material input and output mechanism
9 Accuracy class, no. Of divisions, (based on application)
10 Peripherals
11 Tolerance values, (Class III, Class III L, Grain, Construction Material, ABWS etc.)

The Sector is asked to review these (and other items that may not be listed) and discuss if it is a metrologically significant parameter and develop recommendations for to amend Publication 14, Section B.6. "Certificate of Conformance Parameters for Weighing Systems Using a Tank or Hopper Load-Receiving Element."

11. Method of Sealing – Set-up and Verification of Calibration/Configuration Access

Source: NTEP Director

Background: It is requested that the Sector review the following item from the NTETC Weighing Sector Annual Meeting September 11-13, 2003 Fresno, California FINAL Summary, Item 18. Physical Security Seals on Scales with External Calibration Capability.

18. Physical Security Seals on Scales with External Calibration Capability.

Source: NTEP Participating Laboratories

Background: At the 2003 NTEP Participating Laboratory Meeting, the participating labs reported they have come across examples where a device could be sealed with a physical security seal while the device had been configured with access to external means to change calibration and configuration parameters. The labs have been using

Handbook 44 General Code paragraph G-S.2. Facilitation of Fraud to require the applicant to correct this problem.

One laboratory reported that it had to accept this because the applicant stated that "if the operator had followed the operating instructions, this would not happen." Furthermore, the applicant cited Handbook 44 General Code paragraph G-UR.3.1 Method of Operation that states:

> **G-UR.3.1 Method of Operation.** - Equipment shall be operated in the manner that is obviously indicated by its construction or that is indicated by instructions on the equipment.

It was pointed out that Handbook 44 General Code paragraph G-S.8. Provision for Sealing Adjustable Components. and Scale Code paragraph S.1.11. Provision for Sealing. state that provisions shall be made for applying a security seal in a manner that requires **the security seal to be broken before an adjustment can be made to any component affecting the performance of an electronic device**. The participating laboratories believe that external access to the calibration or configuration parameters without breaking a security seal or advancing the event counters does not comply with Handbook 44 regardless of the operator instruction manuals.

Some labs stated that there should be something in Publication 14 that tells the evaluator to look for ways to access the calibration or configuration parameters without breaking a security seal or advancing the event counters. Alternatively, Handbook 44 could be amended to make it clear that the device provide an indication that it is in the calibration mode.

This was considered an appropriate subject for the joint LMD and Weighing Sectors discussion since it involves all devices.

It was also noted that Publication 14, Section 10.10 - Category 1 Devices does not go into detail regarding compliance with Handbook 44 references. Existing language only asks if the device is sealable with a physical seal (Y/N/NA) or equipped with two event counters. Publication 14 does not ask the evaluator to verify if the physical seal is effective (reference G.S.8. and S.1.11.a.).

The NTEP weighing laboratories recommended a proposal be developed and submitted to the NCWM S&T Committee to amend the language for Category 1 devices to require a device to clearly indicate it is in the calibration mode and record such message if capable of printing in this mode (similar to the requirement for Category 2 devices). The language should be consistent with the language used for Category 2 devices. Additionally, the laboratories developed language changing the "notes" on physical seals into a checklist format and suggested additional language requiring the physical seal be "effective." The laboratories further recommended the Sector review and recommended the checklist language be added to Publication 14, paragraphs 10.10 to assure NTEP evaluators physical seals are verifiably effective.

Discussion: The Weighing Sector discussed the amendments to Publication 14 recommended by the participating laboratories. The manufacturers present were concerned the term "effective" in proposed paragraph 10.14 is vague and should be more definitive. There was also discussion that the new language in proposed paragraph 10.14 be effective one year after its incorporation into Publication 14. There was also a suggestion to amend Handbook 44 Method of Sealing for Category 1 weighing devices to require the device to clearly indicate when it is in the "set-up mode." It was reported that there was a commitment from Will Wotthlie (Maryland Measuring Sector laboratory) to submit a proposal to the Southern Weights and Measures Association at its 2003 annual meeting.

Conclusion: The Sector supports the interpretation of Handbook 44 General Code paragraphs G-S.2 Facilitation of Fraud, G-S.8. Provision for Sealing Adjustable Components, and Scale Code paragraph S.1.11. Provision for Sealing that provisions shall be made for applying a security seal in a manner that requires the security seal to be broken before an adjustment can be made to any component affecting the performance of an electronic device regardless of instructions provided in the instruction/service manual for the device. The Sector further agreed to support the concept of the proposal to amend Handbook 44 Category 1 Method of Sealing to require a device clearly indicate that it is in the set-up mode.

The Sector also recommended the following amendments to Publication 14, section 10. The language proposed by

the laboratories and amended by the Sector was given a 2005 effective date to allow NTEP applicants not in attendance sufficient time to comply with the new checklist requirements.

(See Publication 14 Sections 10.11 through 10.19 for the language recommended by the Weighing Sector.)

There is disagreement among the NTEP labs on this topic. If you review the previous item from the Sector, changes were made to Pub 14 in the anticipation of changes to HB 44. The changes to HB 44 did not happen. There may be a problem with Pub 14 since the current procedures and type evaluation requirements are not fully supported by HB44.

The discussion in 2003 was to address a specific deficiency that was found in several devices at that time. At least one device manufacturer attempted to address this deficiency with changes to the device function. This device was evaluated and based on the input from the NTEP lab, the NTEP Committee Chair and the NTEP Director, it was determined that this device did meet the requirements. Currently several NTEP labs do not believe that this "fix" is acceptable.

It is requested that this item be reviewed and discussed by the sector and assist the NTEP Director and the NTEP labs resolve this issue.

The NTEP Director has provided additional the following observations based on a series of email exchanges on this item.

As some of you may know, I have been out of the office since June 1, some of the email exchanges on this item came in before that time, but most after. I will now contribute to the conversation.

First off, I would like to say that such discussions are healthy for NTEP, as long as they are kept positive and productive and focus on objective facts.

Andrea provided a good background on this item from the Sector Meeting of 2003, item 18. Also, Todd provided some email exchanges on this topic from that same time frame.

Pub 14 is not a standard or a regulation; it is a checklist to determine if a device is capable of meeting the applicable requirements of NIST Handbook 44. It is also not design based, it is performance based.

In this particular case, Pub 14 was changed in anticipation of similar changes being made to HB44. In hindsight that was an error on the part of the Sector to recommend such a change. Currently Pub 14 is not in line with HB44. Or, it is not being interpreted in line with HB 44.

Next Sector Meeting

Discussion/Recommendation: Measurement Canada (Ottawa) is the next laboratory location in the rotation of NTEP participating laboratories.

The Sector is asked to discuss these and other locations and make a recommendation for the date and location of the 2008 Annual Meeting of the NTETC Weighing Sector.

Appendix A

Recommendations for Amendments to Publication 14[1] (to be included in the sector report)

Appendix B

2007 NTETC Weighing Sector Attendees (to be included in the sector report)

Appendix C

Attachment for Agenda Item 3

D. Force Transducers (load cells) to be Submitted for Evaluation

Force transducers (load cells) of essentially the same design may be considered to form a family that can be listed on an NTEP CC. If force transducers (load cells) within a family are made from different materials, such as aluminum, alloy steel, or stainless steel, then all material types must be submitted for evaluation. If the force transducers (load cells) within a family are available in either a 4-wire or 6-wire version, then at least one 4-wire version and one 6-wire version must be evaluated. This policy applies to all applications for new or amended NTEP Certificates of Conformance received after January 31, 2007. This policy is non-retroactive for NTEP Certificates of Conformance issued prior to February 1, 2007.

Under the Mutual Acceptance Arrangement (MAA) for the International Organization of Legal Metrology (OIML), it is possible to obtain either an NTEP CC or an OIML R 60 Certificate or both with a single evaluation. NCWM is a utilizing participant under the MAA and as such will accept test data from issuing participants within the MAA. Evaluations performed by NTEP laboratories can only result in an NTEP CC. These certificates can cover a family of force transducers (load cells) based on the evaluation of representative samples from the family. In order to determine which specific models of force transducers (load cells) are to be used for evaluation, the following selection criterion shall be used:

1. *Evaluation of New Force Transducers (load cells) for NTEP Certificates Only*

Required Information

The following information is required from the manufacturer for review and selection of sample force transducers (load cells):

a. Properly completed request for evaluation

b. Drawing of each capacity force transducer (load cell) within the family to substantiate that they are of the same basic design

[1] Recommended changes to Publication 14 are indicated in shaded, ~~strike-out~~, and underlined text.

c. Quality or accuracy class

d. Maximum number of scale divisions requested (n-max)

e. Minimum verification scale division requested (V-min)

f. Force transducer (load cell) capacities

g. The type(s) of material from which the force transducers (load cells) are made

h. As applicable, outline dimensions and general description illustration of any special equipment (loading fixtures, interconnection boxes, etc.) that are intended to accompany the force transducers (load cells) submitted

i. A complete set of test data on the force transducers (load cells) submitted for evaluation. (Test data is only required for those force transducers (load cells) submitted for type evaluation; test data for each capacity model in the family is not required.)

j. The technology employed by the force transducer (load cell); e.g. strain gage (analog or digital), hydraulic, vibrating wire, piezoelectric, or other. Applicants for analog strain gage force transducers (load cells) must indicate on the application whether 4-wire or 6-wire (or both) design force transducers (load cells) are included in the family.

Note: The manufacturer may market force transducers (load cells) with a smaller number of scale divisions (n-max) and/or with a larger V-min value than those listed on the approval certificate; however, the force transducer (load cell) or accompanying documentation must be marked with the appropriate n-max and V-min for which the force transducer (load cell) may be used.

Selection Criteria

A. Selection of force transducers (load cells) from the family shall be based on the following considerations:

1. The selection of force transducers (load cells) shall be such that the number of force transducers (load cells) to be evaluated is minimized.

2. Where force transducers (load cells) of the same capacity belong to different groups within the family, approval of the force transducer (load cell) with the best metrological characteristics (greatest n-max, smallest V-min) implies approval of the force transducers (load cells) with the lesser metrological characteristics. When a choice exists, the force transducers (load cells) with the best metrological characteristics shall be selected for the evaluation.

3. Force transducers (load cells) with a capacity in between the capacities evaluated, as well as those with a capacity greater than the largest capacity model tested, but not over five times the largest capacity evaluated, are deemed to be certified.

4. For any family of force transducers (load cells), the model with a capacity nearest the center of the range of capacities and with the best metrological characteristics shall be selected for evaluation. When the ratio of the largest capacity force transducer (load cell) within the group or family to the smallest capacity force transducer in the same group or family is 10:1 or less, a cell with a capacity nearest the center of the range shall be selected. The capacity of the selected cell shall not have a ratio greater than 5:1 in regard to the capacity of the force transducers (load cells) at the each extreme of the capacity range. If this is not possible, a second force transducer (load cell) must be selected for evaluation (see Item 5 below). If the selected mid-range capacity cell cannot be evaluated due to laboratory limitations, the NTEP representative should be contacted to select the specific model for evaluation.

5. When the ratio of the largest capacity force transducer (load cell) within the group to the smallest capacity force transducer (load cell) within the same group or family significantly exceeds 10:1, then another force

transducer (load cell) shall be selected for evaluation. The selected force transducer (load cell) shall have a capacity between 5 and 10 times that of the first force transducer (load cell) that was selected for evaluation. When no capacity meets this criteria, the selected force transducer (load cell) shall be that having the smallest capacity that exceeds 10 times that of the nearest smaller capacity force transducer (load cell) that has been selected for evaluation. Should the capacity of the selected cell exceed the capacity of the greatest capacity model in the family or group by a ratio greater than 10:1, an additional model must be selected for evaluation.

6. If both 4-wire and 6-wire designs of force transducers (load cells) are included in the family, then at least one of the selected models for evaluation shall be of the 4-wire design and at least one of the remaining models shall be of the 6-wire design.

7. If the family of force transducers (load cells) includes two or more types of material used for construction of the device, then at least one of the selected models for evaluation shall be of each type of material used for construction.

8. If the family of force transducers (load cells) includes two or more means of environmental sealing (potting, welded cups, etc.) then at least one model using each sealing means shall be selected for evaluation.

9. If the family of force transducers (load cells) includes two or more output levels (2 or 3 mV/V), then at least one model with each output level shall be selected for evaluation.

B. Examples of force transducer (load cell) model selection for evaluation:

a. Force Transducer (load cell) Family A characteristics
   1. Both stainless steel and alloy steel models
   2. 2 mV/V and 3 mV/V outputs
   3. Bending beams in smaller capacities and shear beam in larger
   4. 4-wire and 6-wire designs
   5. n-max is 5000 on all models
   6. Potting or welded metal cup sealing variations
   7. All V-min values equal to 0.015 % of cell capacity
   8. All capacities in pounds:
      500, 1000, 2000, 2500, 4000, 5000, 7500, 10 000, 15 000, 20 000

The following cell models would be selected for evaluation:

- One - 500 lb stainless steel, potted, 3 mV/V, 4-wire bending beam cell
- One - 2500 lb alloy steel, potted, 2 mV/V, 4-wire shear beam cell
- One - 15 000 lb stainless steel, welded, 3 mV/V, 6-wire shear beam cell

Note that Item 2 in Part A above is not applicable in this situation since the metrological characteristics (n-max and V-min) for all of the models are equivalent.

Note that Item 3 in Part A above is met since the 20 000 lb model is less than five times the capacity of the greatest capacity model selected for evaluation (15 000 lb).

Note that Item 4 in Part A above is met since the 2500 lb capacity model of force transducer (load cell) is the closest to the center and is able to meet the requirements in both Item 4 and 5 and therefore was selected for evaluation.

Note that Item 5 in Part A above is met since the ratio between the capacities of the models selected for evaluation does not exceed five.

Note that Item 6 in Part A above is met by having at least one of the models selected of a 4-wire design and at least one of the models selected of a 6-wire design.

Note that Item 7 in Part A above is met by having at least one of the models constructed from each type of materials used.

Note that Item 8 in Part A above is met by having at least one of the selected models with each environmental sealing method employed within the family.

Note that Item 9 in Part A above is met by having at least one of the selected models with a 3 mV/V output and at least one with a 2 mV/V output.

b. Force Transducer (load cell) Family B characteristics
   1. Compression cells constructed from either alloy steel or stainless steel
   2. All cells are Class III L
   3. Cells from 10 000 lb to 75 000 lb have an n-max of 7500 and cells from 50 000 lb to 200 000 lb have an n-max of 10 000
   4. All cells are 2 mV/V
   5. All cells have the same environmental sealing
   6. All cells have V-min values equal to 0.018 % of their capacity
   7. All cells are of 6-wire design
   8. Cell capacities are:
      10 000; 25 000; 50 000; 75 000; 100 000; 200 000

The following models would be submitted for evaluation:

- One - 50 000 lb with an n-max of 10 000 in stainless steel
- One - 10 000 lb in alloy steel

Note that Item 2 in Part A above is met with the selection of the 50 000 lb model with an n-max of 10 000 since it has the best metrological characteristics.

Note that Item 3 in Part A above is met with the selection of the 10 000 lb model. Selection of the 200 000 lb model could have taken place but the 10 000 lb model was chosen because of the ease of testing.
Note that Item 4 in Part A above is met with the selection of the 10 000 lb model since it is within the 5:1 capacity ratio of the 50 000 lb model initially selected.

Note that Item 5 in Part A above is met with the selection of the 10 000 lb model since the ratio of its capacity to that of the 50 000 lb model does not exceed 5:1.

Note that Item 6 in Part A above does not apply since all models are of 6-wire design.

Note that Item 7 in Part A above is met with the selection of the 10 000 lb model in stainless steel and the 50 000 lb model in alloy steel thus covering both types of material used for construction of the force transducers (load cells) in the family.

Note that Item 8 in Part A above does not apply since all models use the same means of environmental sealing.

Note that Item 9 in Part A above does not apply since all models use the same output level of 2 mV/V.

2. *Evaluation of New Force Transducers (load cells) for OIML R 60 Certificate or OIML R 60 Certificate and NTEP Certificate of Conformance under the DoMC*

Required Information

The information needed for an OIML R 60 evaluation is listed in OIML Recommendation 60. If the manufacturer is seeking an NTEP Certificate of Conformance for the force transducer (load cell) family or individual model, the information shown in Section 1 above shall also be provided along with a properly completed application for NTEP

evaluation. All NTEP requirements are to be met in this type of evaluation. The manufacturer must make certain that the issuing participant selected for the evaluation of the force transducer(s) (load cell(s)) is aware that the submittal is for both NTEP and OIML R 60. A completed application and copies of all submitted data must be sent to NTEP. Once the evaluation has been successfully completed, the issuing authority will provide an OIML Evaluation Report that may then be used to secure an OIML R 60 Certificate. This report is also sent to NTEP. NTEP will evaluate the OIML Evaluation Report and issue an NTEP Certificate of Conformance based on this evaluation. Note that issuance of an NTEP Certificate of Conformance may require the conduct of other tests not performed by the issuing participant. If this happens, the costs of these tests are the responsibility of the applicant.

Note: Should the force transducers (load cells) submitted fail to comply with all OIML R 60 requirements and the manufacturer then seeks to secure an NTEP Certificate of Conformance based on the OIML Evaluation Report, additional testing may be required in order to fully determine compliance of the device(s) with NTEP requirements. The costs for any additional testing deemed necessary for completion of the NTEP review will be the responsibility of the applicant.

Selection Criteria

Selection of the force transducers (load cells) for evaluation shall be based on the OIML R 60 selection criteria as described in OIML Recommendation 60.

3. *Amendment of an Existing NTEP Certificate of Conformance to Add Capacities and/or Change Metrological Characteristics in Conjunction with an OIML R 60 Evaluation Under the DoMC*

Required Information

The information needed for an OIML R 60 evaluation is listed in OIML Recommendation 60. If the manufacturer is seeking to amend an existing NTEP Certificate of Conformance for the force transducer (load cell) family or individual model, the information shown in Section 1 above shall also be provided along with a properly completed application for NTEP evaluation. All NTEP requirements are to be met in this type of evaluation.

Successfully completed, this type of evaluation will result in a test report and test certificate that may be used to secure an amended OIML R 60 Certificate. The test report will be reviewed by the NTEP and if the appropriate criteria are met a NEW NTEP Certificate of Conformance will be issued. Note that the original NTEP Certificate of Conformance will remain active and will not be amended. The new NTEP Certificate of Conformance resulting from this evaluation will list the new capacities added and/or the change in metrological characteristics. Note that the appropriate NTEP Certificate of Conformance number must be marked on the device in compliance with G-S.1. Marking Requirements of NIST Handbook 44.

Note: Should the force transducers (load cells) submitted fail to comply with all OIML R 60 requirements and the manufacturer then seeks to only amend the existing NTEP Certificate of Conformance based on the test report, additional testing may be required in order to fully determine compliance of the device(s) with NTEP requirements. The costs for any additional testing deemed necessary for completion of the NTEP review will be the responsibility of the applicant.

Selection Criteria

The proper models for evaluation will depend upon the nature of the change or addition to be made. Because of this, NTEP personnel shall be contacted and shall determine which model or models of force transducer (load cell) are to be submitted.

4. *Amendment of an Existing NTEP Certificate of Conformance ONLY*

Required Information

The required information will depend upon the nature of the change being made. If additional models of force transducers (load cells) are being added to a family, then the same information and selection criteria as listed in

Section 1 above apply. If the change is to add another version of the force transducer (load cell) listed on the current NTEP Certificate of Conformance the nature of the change or addition must be fully disclosed in the application.

Selection Criteria

The necessity of an evaluation to implement the requested change will depend upon the nature of the change. In general, addition of new models of force transducers (load cells) with capacities outside the 5:1 ratio of those previously evaluated will require additional evaluation. Addition of a 4-wire design with no change in capacity will require an evaluation while the addition of a 6-wire design with no change in capacity will not. The addition of models constructed from a different material will require the evaluation of at least one model constructed of the new material. NTEP personnel will inform you of what models, if any, require evaluation after review of the application.