

Addendum Sheet

Specifications and Tolerances (S&T) Committee Interim Report

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Colorado

300 INTRODUCTION

The Specifications and Tolerances Committee (hereinafter referred to as “Committee”) submits its Interim Report to the National Conference on Weights and Measures. The Report consists of the Interim Report offered in Publication 16, “NCWM Committee Reports,” and this Addendum. Page numbers in tables below refer to pages in Publication 16.

Presented below is a list of voting and information items. Voting items are indicated by the suffix **V** or, if the voting item is part of the Consent calendar, by the suffix **VC**. If the item is an Information item, it is indicated by the suffix **I**; if the item is Withdrawn, it is indicated by the suffix **W**. Items marked with a **D** after the key numbers are Developing items. The developing designation indicates an item has merit; however, the item is returned to the submitter for further development before any action at the national level. The Committee’s Final Report is proposed to be grouped in the following order:

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Withdrawn Item(s)

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Details of All Items
(In order by Reference Key)

310 HANDBOOK 44 - GENERAL CODE

310-1 VC G-S.1. Identification. – (Software)

The Committee agreed to insert parenthesis around the words “or equipment” in (d) of the proposal as suggested by OWM as follows:

the current software version or revision identifier for not-built-for-purpose software-based devices;
manufactured as of January 1, 2004 and all software-based devices (or equipment) manufactured as of January 1, 2022;

310-2 VC G-S.9. Metrologically Significant Software Updates

No changes.

320 SCALES

320-1 W S.1.1.3. Automated Batching Systems (See Related Item 360-3)

No changes.

320-2 VC S.5.4. Relationship of Load Cell Verification Interval to the Scale Division

No changes. The Committee agreed to add a statement to its final report reinforcing the 1990 Committee’s interpretation of how HB-44 requirements are to apply to multi-platform vehicle scale systems consisting of three or more independent weighing/load-receiving elements used simultaneously to determine a gross weight for commercial transactions.

320-3 VC N.1.3.3.2. Prescribed Test Pattern and Test Loads for Livestock Scales with More Than Two Sections and Combination Vehicle/Livestock Scales and N.1.3.3.3. Prescribed Test Patterns and Test Loads for Two-Section Livestock Scales.

No changes.

322 AUTOMATIC BULK WEIGHING SYSTEMS

322-1 D A. Application, S Specifications, N. Notes, UR. User Requirements

No changes. Proposal will be removed from Item Under Consideration and inserted into the Background/Discussion section of the agenda item.

322-2 D N.1. Testing Procedures. and T. Tolerances

325 WEIGH-IN-MOTION SYSTEMS USED FOR VEHICLE ENFORCEMENT SCREENING

325-1 D A. Application. and Sections Throughout the Code to Address Commercial and Law Enforcement Applications

330 LIQUID MEASURING DEVICES

330-1 VC S.1.6.3. Return to Zero (See Related Items 331-1 and 332-1)

No changes.

330-2 VC S.X.X Card Operated Retail Motor Fuel Devices

No change.

330-3 VC N.4.5 Verification of Linearization Factors.

The Committee heard comments in support of removing the words, “at the discretion of the official with statutory authority” from the language proposed in paragraph UR.4.1. Use of Adjustments. Based on these comments, the Committee agreed to amend the proposal as follows:

N.4.5. Verification of Linearization Factors. - All enabled linearization factors shall be verified. The verification of enabled linearization factors shall be done through physical testing, or a combination of physical testing and empirical analysis at the discretion of the official with statutory authority.

UR.4. Maintenance Requirements

UR.4.1. Use of Adjustments. - Whenever a device is adjusted, all enabled linearization factors shall be verified to determine that the errors are in tolerance and any adjustments which are made, shall be made so as to bring performance errors as close as practicable to zero value. The verification of enabled linearization factors shall be done through physical testing, or a combination of physical testing and empirical analysis. at the discretion of the official with statutory authority.

330-4 D Recognized the Use of Digital Density Meters

No changes.

331 VEHICLE-TANK METERS

331-1 VC S.1.1.5. Return to Zero, S.1.1.6. Initial Zero Indication – Electronic Devices (See Related Items 330-1 and 332-1)

No changes.

331-2 VC Table S.2.2. Categories of Sealing and Methods of Sealing (See Related Items 332-4, 334-1, 335-1, 337-1, 338-1 and 339-1)

No changes.

331-3 D S.3.7. Manifold Hose Flush System

No changes.

331-4 VC N.4.6 Verification of Linearization Factors.

The Committee heard comments in support of removing the words, “at the discretion of the official with statutory authority” from the language proposed in paragraph UR.3.1. Use of Adjustments. Based on these comments, the Committee agreed to amend the proposal as follows:

N.4.6. Verification of Linearization Factors. - All enabled linearization factors shall be verified. The verification of enabled linearization factors shall be done through physical testing, or a combination of physical testing and empirical analysis at the discretion of the official with statutory authority.

UR.3. Maintenance Requirements

UR.3.1. Use of Adjustments. - Whenever a device is adjusted, all enabled linearization factors shall be verified to determine that the errors are in tolerance and any adjustments which are made, shall be made so as to bring performance errors as close as practicable to zero value. The verification of enabled linearization factors shall be done through physical testing, or a combination of physical testing and empirical analysis. at the discretion of the official with statutory authority.

332 LPG AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES

332-1 VC S.1.4.2. Return to Zero, S.1.4.3. Initial Zero Indication – Electronic Devices. (See Related Items 330-1 and 331-1)

No changes.

332-2 VC S.1.4.3. Provisions for Power Loss, S.1.5.1.1. Unit Price., S.1.5.1.2. Product Identity., S.1.6. For Retail Motor Vehicle Fuel Devices Only., S.1.7. For Wholesale Devices Only. , UR.2.7. Unit Price and Product Identity., and UR.2.8. Computing Device.

No changes.

332-3 VC S.2.1. Vapor Elimination

No changes.

332-4 VC Table S.2.2. Categories of Sealing and Methods of Sealing (See Related Items 331-2, 334-1, 335-1, 337-1, 338-1 and 339-1)

No changes.

332-5 D N.3. Test Drafts.

No changes.

332-6 I N.4.2.3. For Wholesale Devices

The Committee agreed to change the status of this item from “Voting” to “Information” based on a recommendation made by OWM and the Meter Manufacturers Association during the Open Hearings.

332-7 VC UR.2.3. Vapor-Return Line

No changes.

334 CRYOGENIC LIQUID-MEASURING DEVICES

334-1 VC Table S.252. Categories of Sealing and Methods of Sealing (See Related Items 331-2, 332-4, 335-1, 337-1, 338-1 and 339-1)

No changes.

335 MILK METERS

335-1 VC Table S.2.2. Categories of Sealing and Methods of Sealing (See Related Items 331-2, 332-4, 334-1, 337-1, 338-1 and 339-1)

No changes.

337 MASS FLOW METERS

337-1 VC Table S.3.5. Categories of Sealing and Methods of Sealing (See Related Items 331-2, 332-4, 334-1, 335-1, 338-1 and 339-1)

No changes.

337-2 V **Appendix D – Definitions: Diesel Liter Equivalent (DLE) and Diesel Gallon Equivalents (DGE) for Compressed Natural Gas and Liquefied Natural Gas; Definition of Gasoline Gallon Equivalent and Gasoline Liter Equivalent for Compressed Natural Gas; S.1.2. Compressed Natural Gas and Liquefied Natural Gas Dispensers; S.1.3.1.1. Compressed Natural Gas Used as an Engine Fuel; S.1.3.1.2. Liquefied Natural Gas Used as an Engine Fuel; S.5.2. Marking of Diesel and Gasoline Volume Equivalent Conversion Factor; Compressed Natural Gas, S.5.3. Marking of Diesel Volume Equivalent Conversion Factor; Liquefied Natural Gas, UR.3.1.1. Marking of Equivalent Conversion Factor for Compressed Natural Gas, UR.3.1.2. Marking of Equivalent Conversion Factor for Liquefied Natural Gas, and UR.3.8. Return of Product to Storage, Retail Compressed Natural Gas and Liquefied Natural Gas**

The Committee agreed to amend paragraph S.6. Printer of the Item Under Consideration as indicated below. No additional changes were made by the Committee. The following represents the entire proposal agreed to by the Committee:

Amend NIST Handbook 44 Appendix D to include the following new definition:

diesel gallon equivalent (DGE). – Diesel gallon equivalent (DGE) means 6.384 pounds of compressed natural gas or 6.059 pounds of liquefied natural gas. [3.37]
(Added 2016)

Amend NIST Handbook 44 Appendix D definitions as follows:

gasoline gallon equivalent (GGE). – Gasoline gallon equivalent (GGE) means 5.660 pounds of compressed natural gas. [3.37]
(Added 1994) (Amended 2016)

Delete the following NIST Handbook 44 Appendix D definition as shown:

gasoline liter equivalent (GLE). – Gasoline liter equivalent (GLE) means 0.678 kilograms of natural gas. [3.37]
(Added 1994)

Amend NIST Handbook 44 Mass Flow Meters Code paragraphs S.1.2., S.1.3.1.1., S.5.2., and UR.3.8. and add new paragraphs S.1.3.1.2., S.5.3., UR.3.1.1. and UR.3.1.2. as follows:

S.1.2. Compressed Natural Gas and Liquefied Natural Gas Dispensers. – Except for fleet sales and other price contract sales, a compressed **or liquefied** natural gas dispenser used to refuel vehicles shall be of the computing type and shall indicate the quantity, the unit price, and the total price of each delivery. The dispenser shall display the mass measured for each transaction either continuously on an external or internal display accessible during the inspection and test of the dispenser, or display the quantity in mass units by using controls on the device.
(Added 1994) (Amended 2016)

S.1.3. Units.

S.1.3.1.1. Compressed Natural Gas Used as an Engine Fuel. – When compressed natural gas is dispensed as an engine fuel, the delivered quantity shall be indicated in **“gasoline liter equivalent (GLE) units” or “gasoline gallon equivalent (GGE) units” or diesel gallon equivalent units (DGE), or in mass.** (Also see Appendix D definitions.)
(Added 1994) (Amended 2016)

S.1.3.1.2. Liquefied Natural Gas Used as an Engine Fuel. – When liquefied natural gas is dispensed as an engine fuel, the delivered quantity shall be indicated in diesel gallon equivalent units (DGE) or in mass. (Also see definitions.)
(Added 2016)

S.5.2. Marking of Gasoline Volume Equivalent Conversion Factors for Compressed Natural Gas. –
A device dispensing compressed natural gas shall have either the statement “1 Gasoline Liter Equivalent (GLE) is Equal to 0.678 kg of Natural Gas” or “1 Gasoline Gallon Equivalent (GGE) is Equal means 5.660 lb of Compressed Natural Gas” or “1 Diesel Gallon Equivalent (DGE) means 6.384 lb of Compressed Natural Gas” permanently and conspicuously marked on the face of the dispenser according to the method of sale used.
(Added 1994)(Amended 2016)

S.5.3. Marking of Equivalent Conversion Factors for Liquefied Natural Gas. – A device dispensing liquefied natural gas shall have the statement “1 Diesel Gallon Equivalent (DGE) means 6.059 lb of Liquefied Natural Gas” permanently and conspicuously marked on the face of the dispenser according to the method of sale used.
(Amended 2016)

S.6. Printer. – When an assembly is equipped with means for printing the measured quantity, the following conditions apply:

- (a) the scale interval shall be the same as that of the indicator;
- (b) the value of the printed quantity shall be the same value as the indicated quantity;
- (c) the printed quantity shall also include the mass value if mass is not the indicated quantity: [Nonretroactive as of January 1, 2021](Amended 2016);**
- (e d) a quantity for a delivery (other than an initial reference value) cannot be recorded until the measurement and delivery has been completed;
- (d e) the printer is returned to zero when the resettable indicator is returned to zero; and
- (e f) the printed values shall meet the requirements applicable to the indicated values.

UR.3.1.1. Marking of Equivalent Conversion Factors for Compressed Natural Gas. – A device dispensing compressed natural gas shall have either the statement “1 Gasoline Gallon Equivalent (GGE) means 5.660 lb of Compressed Natural Gas” or “1 Diesel Gallon Equivalent (DGE) means 6.384 lb of Compressed Natural Gas” permanently and conspicuously marked on the face of the dispenser according to the method of sale used.
(Added 2016)

UR.3.1.2. Marking of Equivalent Conversion Factors for Liquefied Natural Gas. – A device dispensing liquefied natural gas shall have the statement “1 Diesel Gallon Equivalent (DGE) means 6.059 lb of Liquefied Natural Gas” permanently and conspicuously marked on the face of the dispenser according to the method of sale used.
(Added 2016)

UR.3.8. Return of Product to Storage, Retail Compressed and Liquefied Natural Gas Dispensers. –
Provisions at the site shall be made for returning product to storage or disposing of the product in a safe and timely manner during or following testing operations. Such provisions may include return lines, or cylinders adequate in size and number to permit this procedure.
(Added 1998) (Amended 2016)

337-3 D N.3. Test Drafts.

No changes.

338 CARBON DIOXIDE LIQUID-MEASURING DEVICES

338-1 VC Table S.2.5. Categories of Sealing and Methods of Sealing (See Related Items 331-2, 332-4, 334-1, 335-1, 337-1 and 339-1)

No changes.

338-2 VC S.3.1. Vapor Elimination

No changes.

339 HYDROGEN GAS-METERING DEVICES

339-1 VC Table S.3.3. Categories of Sealing and Methods of Sealing (See Related Items 331-2, 332-4, 334-1, 335-1, 337-1 and 338-1)

No changes.

339-2 VC Table T.2. Accuracy Classes and Tolerances for Hydrogen Gas-Measuring Devices.

The Committee agreed to amend the proposal as shown below based on comments received during the Open Hearings:

Table T.2. Accuracy Classes and Tolerances for Hydrogen Gas-Measuring Devices			
Accuracy Class	Application or Commodity Being Measured	Acceptance Tolerance	Maintenance Tolerance
2.0	Hydrogen gas as a vehicle fuel	1.5 %	2.0 %
10.0 ¹ 7.0		5.0 %	10.0 7.0%

¹~~The tolerance values for Accuracy Class 10.0 hydrogen gas measuring devices are applicable only until January 1, 2020. Effective January 1, 2020, all hydrogen gas measuring devices shall meet the tolerance values for Accuracy Class 2.0 and Accuracy Class 10.0 and its associated maintenance and acceptance~~

354 TAXIMETERS

354-1 VC S.1.2. Advancement of Indicating Elements.

The Committee agreed to the following three changes to the proposal based on comments it received during the Open Hearings:

1. Amend the language in proposed sub-paragraph A.2.(b) that it apply to devices rather than entities;
2. Amend the 2nd sentence of paragraph S.1.2. from retroactive to non-retroactive and provide an effective date of January 1, 2017;
3. Strike the word “Note” appearing in advance of the last sentence of paragraph S.1.2.

The following represents the proposal to be presented for vote as agreed to by the Committee:

A.2. Exceptions. – This code does not apply to:

(a) Odometers ~~odometers~~ on vehicles that are rented on a distance basis (for which see Section 5.53. Code for Odometers).

(b) ~~Entities that only charge a~~ Devices that only display a flat rate or negotiated rate.

(Amended 1977 and 201X)

S.1.2. Advancement of Indicating Elements. – Except when a taximeter is being cleared, the primary indicating and recording elements shall be susceptible of advancement only by the movement of the vehicle or by the time mechanism.

At the conclusion of a transaction (i.e., following the totalizing of all accrued charges and having a customer receipt made available), no other advancement of fare, extras or other charges shall occur until the taximeter has been cleared.

Note: Where permitted, a flat rate or negotiated rate shall be displayed in the “fare” indicating mechanism, provided that once a flat rate or negotiated rate is entered the fare may no longer be advanced by movement of the vehicle or the time mechanism.

[Nonretroactive as of January 1, 2017] (Amended 1988 and 201X)

354-2 VC S.2. Basis of Fare Calculations

The Committee agreed to delete the word “Note” from the proposal as follows based on comments it received during the Open Hearings:

S.2. Basis of Fare Calculations. – A taximeter shall calculate fares only upon the basis of:

- (a) distance traveled;
- (b) time elapsed; or
- (c) a combination of distance traveled and time elapsed.

Note: A taximeter may utilize more than one rate to calculate the fare during a trip. Any change in the applied rate must occur at the completion of the current interval.
(Amended 1977 **and 20XX**)

354-3 VC S.3.2. Flag

No changes.

354-4 VC Appendix D - Definitions: Flat Rate and Negotiated Rate

The Committee agreed to the following two changes to the proposal based on comments it received during the Open Hearings:

1. Amend the language in proposed sub-paragraph A.2.(b) that it apply to devices rather than entities;
2. Amend the proposed definition of “negotiated rate” that it more closely mirrors the definition of “flat rate.”

The following represents the proposal to be presented for vote as agreed to by the Committee:

A.2. Exceptions. – This code does not apply to:

(a) Odometers ~~odometers~~ on vehicles that are rented on a distance basis (for which see Section 5.53. Code for Odometers).

(b) Entities that only charge a Devices that only display a flat rate or negotiated rate.

(Amended 1977 **and 201X**)

Add the following definitions to NIST Handbook 44 Appendix D:

flat rate. – a rate selection that when applied results in the indication of a fixed (non-incrementing) amount for passenger charges. This rate shall be included on the statement of established rates that is required to be posted in the vehicle. [5.54]

(Added 201X)

negotiated rate. – a rate selection that when applied results in ~~passenger charges of a fixed (non-incrementing) amount for passenger charges and is based on a value that has been agreed upon by the operator and passenger. The amount set by a negotiated rate does not increment.~~ [5.54]

(Added 201X)

354-5 D USNWG on Taximeters – Taximeter Code Revisions and Global Positioning System-Based Systems for Time and Distance Measurement

No changes.

354-6 W Transportation Network Systems – Draft code

The Committee agreed to withdraw this item based on a recommendation made by the submitter.

358 MULTIPLE DIMENSION MEASURING DEVICES

358-1 VC Table S.4.1.a. Marking Requirements for Multiple Dimension Measuring Systems, Table S.4.1.b. Multiple Dimension Measuring Systems Notes for Table S.4.1.a.

No changes.

358-2 VC Table S.4.1.a. Marking Requirements for Multiple Dimension Measuring Systems, Table S.4.1.b. Multiple Dimension Measuring Systems Notes for Table S.4.1.a.

During its Open Hearings, the Committee received a request by the submitter of the item to amend the new footnote proposed for addition to Table S.4.1.b. by eliminating the option that would allow the required marking information associated with footnote 9 to appear on an accompanying document, yet continuing to permit that information to be readily accessible via the display. The following amended version of the proposal was provided by the submitter for consideration:

- 9. This marking information may be readily accessible via the provided by a display. Instructions for displaying the information shall be described in the NTEP CC. ~~or accompanying document. If an accompanying document is provided, the accompanying document shall include the manufacturers name and model designation.~~**

The Committee agreed that the amendments to the proposal are appropriate and recommended the amended proposal for vote.

358-3 VC S.2.2.1. Maximum Value of Tare for Multi-Interval (Variable Division Value) Devices. S.2.2.2. Net Values, Mathematical Agreement, Table 1: Examples of Acceptable Altering of Tare to Achieve Accurate Net Indication, Table 2: Examples of Acceptable Rounding of the Net Result (Following the Subtraction of Tare) to Achieve Accurate Net Indication, Table S.4.1.a., Marking Requirements for Multiple Dimension Measuring Systems, T.2.3. Multi-interval (Variable Division-Value) Devices., T.2.4. Mixed-interval Devices.

No changes.

360 OTHER ITEMS

360-1 D Electric Watthour Meters Code under Development

No changes.

360-2 W Appendix A – Fundamental Considerations, 2.1. Acceptance and Maintenance Tolerances

No changes.

360-3 I Appendix D – Definitions: Batching System (See Related Item 320-1)

The Committee agreed to change the status of this item to Informational on the recommendation to do so by the submitter.

360-4 VC Appendix D – Definitions: calibration parameter

No changes.

360-5 D Appendix D – Definitions: Remote Configuration Capability

The Committee agreed to change submitter of item from NTEP to OWM.

Mr. Mahesh Albuquerque, Colorado | Committee Chair



Ms. Jane Zulkiewicz, Town of Barnstable, MA | Member

Dr. Matthew Curran, Florida | Member

Mr. Ivan Hankins, Iowa | Member

Ms. Rachelle Miller, Wisconsin | Member

Mr. Luciano Burtini, Measurement Canada | Canadian Technical Advisor

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