OWM Technical Analysis

NIST | OFFICE OF WEIGHTS AND MEASURES

Specifications and Tolerances (S&T) Committee Agenda Items:

Executive Summary

In preparation for the 2025 Interim Meeting of the National Council on Weights and Measures (NCWM) on January 12 – 15, 2025

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Executive Summaries from NIST Office of Weights and Measures (OWM) Analysis Specifications and Tolerances (S&T) Committee 2025 NCWM Interim Meeting Agenda

The NIST OWM Executive Summary Report is submitted to assist the Weights and Measures community as it deliberates on items before the Council. NIST OWM offers these comments and recommendations based on information and input available as of the date of this report. This does not address information received after this date.

Language shown in a boldface print by ~~**striking out**~~ information to be deleted and **<u>underlining</u>** information to be added. Requirements that are proposed to be nonretroactive are printed in ***boldface italics***.

Assessment of items contained within this report is as the date of this report and does not address information received after this date.

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Subject Series List for the Specifications and Tolerances Committee

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GEN – General Code

NIST OWM Executive Summary for GEN-25.1 – G-S.5.6. Recorded Representations

NIST OWM Recommendation: Developing or Withdraw

- The current language in G-S.5.6. Recorded Representations seems to suggest that all forms of delivering electronic transaction data is allowed. Therefore, amendment of this requirement seems unnecessary.

  However, this item does raise some concerns with the current language regarding recorded representations:

  - The intent of G-S.5.6. is to ensure that the commercial transaction provides an accurate record of the transaction (receipt of purchase).

  - The current language in NIST Handbook 44, nor the item under consideration provides assurance that the customer receives a permanent record to be held in their possession of all relevant transaction data. A QR code by itself is not a receipt.

  - The current language in NIST Handbook 44, nor the item under consideration provides assurance that the customer has unrestricted access to the relevant transaction data. There are no safeguards to prevent limited access through a paid subscription or app, or exchange of personal information.

NIST OWM recommends either to Withdraw this item or make it Developing. OWM also recommends revising the current language in NIST Handbook 44 to include the necessary safeguards with respect to recorded representations.

SCL – Scales

NIST OWM Executive Summary for SCL-24.2 – Multiple Sections Regarding Tare

NIST OWM Recommendation: Developing

- NIST OWM recognizes the issues raised by the submitter. The error introduced to the measurement under the current requirements can be as much as the acceptance tolerance for single interval scales, and a multiple of the acceptance tolerance for multi-interval scales.
- NIST OWM believes that the proposed amendments may help solve these issues. However, as the submitter already indicated, the item is not yet fully developed. NIST OWM supports further development of the item.
- Some of the points identified by NIST OWM that may add clarification to the item:
    - The proposal should emphasize that mathematical agreement can only be obtained in the case of a net calculation based on two independent weighing results (e.g., weigh-in-weigh-out systems). Mathematical agreement cannot be guaranteed with any tare operation without introducing an error in either the gross, tare, or net weight.
    - Omit the proposed requirement S.1.18 as it is confusing and has no added value.
    - To amend the current language in S.1.2.1 and include examples that illustrate the proper net weight determination when tare is determined in various ways.
    - Review the terms used in S.1.16. and S.1.17. and consider whether they could be combined to apply to indications and recorded representations, as the information is repetitive (See the Detailed Analysis).

NIST OWM Executive Summary for SCL-22.2 – UR.3.1.X. Required Minimum for Cannabis Products

[1]**NIST OWM Recommendation:** Assigned

- OWM has multiple concerns with the proposed parts (b) and (c) of UR.3.1.X.
    - Part (b) would require a minimum load as specified in Table 8 when weighing cannabis and cannabis products. Part (c) requires a verification scale interval (e) of 0.01 g or less when 3 ounces or less of cannabis or cannabis products are weighed. 3 ounces is roughly 85 g. This effectively requires a load of 8500 e for weighments conducted at 3 oz (85 g) and greatly exceeds the minimum load of 20 e which Table 8 specifies for scales with an e of 0.01 g
    - Part (c) also requires a Class II scale that is traceable to a National Type Evaluation Program Certificate of Conformance (NTEP CC) when weighing *cannabis* and *cannabis* products.
        - The requirement that a scale have an NTEP CC is addressed by each state's weights and measures law and this conflicts with some states.
- For all of the reasons above, OWM recommends this item remain assigned to the Task Group. OWM offers to assist the Cannabis Task Group in developing a technically sound proposal.

[1] In contrast to hemp, marijuana remains a Schedule I substance under the Controlled Substances Act. NIST does not have a policy role related to the legalization of the production, sale, distribution, or use of cannabis (including hemp and marijuana). NIST participates in the National Council of Weights and Measures (NCWM) as part of NIST's statutory mission to promote uniformity in state laws, regulations, and testing procedures.

NIST OWM Executive Summary for SCL-25.1 – S.5.2. Parameters for Accuracy Class, S.6. Marking Requirements and UR.3. User Requirements

NIST OWM Recommendation: Informational

- This item makes a distinction between the minimum capacity (a characteristic of the classification) and the minimum load (the actual load placed on the scale).
- It clarifies that the minimum capacity of the scale depends on the scale division.
- It ties the minimum capacity to the classification.
- It requires the minimum capacity to be marked on the scale, which makes it easier for the user and inspector to determine the scale's minimum capacity.
- This proposal brings the Scales Code in line with OIML R 76 regarding the markings of the minimum capacity and its relationship to the scale division.
- In the Justification, to be clear, part 4. should read "4. Amendment of UR.3.1. and **Removal of** Table 8".

NIST OWM Executive Summary for SCL-25.2 – Table S.6.3.a. Marking Requirements and Definitions

NIST OWM Recommendation: Voting

- When SCL-23.3 was adopted at the 2024 NCWM Annual Meeting, the term Verification Scale Division was amended to Verification Scale Interval throughout the Scale Code (2.20), but the term remains in the AWS Code (2.24).
- The reference to e_{min} in Table S.6.3.a. in the Scales Code and the definition of e_{min} in Appendix D, were inadvertently left out of the group of items included in SCL-23.3.
- Because e_{min} is referenced in both the Scales Code and the AWS Code, there need to be separate definitions for each section.
- OWM views this as a housekeeping item.
- Because it is "new", the format for the definition applicable to section 2.20. is formatted incorrectly and should appear in the Item Under Consideration as shown below:

  e_{min} (minimum verification scale interval). – The smallest verification scale interval for which a weighing element complies with the applicable requirements. [2.20]

(Added 20XX).

NIST OWM Executive Summary for SCL-25.3 – UR.3.14. Zero-Balance Recorded Weight for Forklift Scales

NIST OWM Recommendation: Developing

NIST OWM recognizes the issues with reweighs in the transport sector. However, OWM has some concerns about the proposal.

- Forklift scales are not defined in NIST Handbook 44 (HB 44) and fall under the category of on-board weighing systems. This could be interpreted as extending the requirement to apply to all on-board weighing systems which may have unforeseen consequences.
- As written, the requirement deals with the design of the instrument, i.e.," the scale shall indicate and record a zero-balance condition", which is a specification not a user requirement. As a specification, this requirement will have a significant impact on the certification of on-board weighing systems.
- Other types of scales don't record the zero-balance condition. The justification does not explain why this is a problem specific to forklift scales used in the transport sector but not for other types of scales or applications. A better understanding may lead to alternative solutions to the submitter's problem.
- The submitter should consider working with the NCWM Uniform Shipment Law Task Group to coordinate their efforts with this group.

NIST OWM Executive Summary for SCL-25.4 – S.1.2.2.2. Class III, III L, and IIII Scales, and S.1.2.2.2.2. Weight Classifiers

NIST OWM Recommendation: Voting

- Per the submitters, which include representatives of NTEP, the SMA, and regulators, there are no weight classifiers with an accuracy class other than class III that have a verification scale interval (e) different from the scale divisions (d).
- Because weight classifiers round up to the next division, there is no advantage to have different values displayed for e and d.
- This would align NIST HB 44 with OIML R 76 requirements.

NIST OWM Executive Summary for SCL-25.5 – T.N.2.4. Multi-Interval and Multiple Range (Variable Division-Value) Scales

NIST OWM Recommendation: Voting

- Item SCL-23.3 was adopted at the 2024 NCWM Annual Meeting. That item amended NIST Handbook 44 to correctly reference the verification scale interval in certain specification and tolerance paragraphs that incorrectly referenced the scale division.
- This paragraph should have been included in that group of items as it references the scale division which is incorrect.
- Because S.5.3. requires multi-interval and multiple range scales to have an e equal to d, the application of tolerance will not change for these devices.

AWS – Automatic Weighing Systems Code

NIST OWM Executive Summary for AWS-24.1 – N.1.5. Test Loads., N.1.5.1. Initial Verification., Table N.1.5.1. Initial Verification Test Loads, N.1.5.2. Subsequent Verification., N.2. Test Procedures ~~-Weigh-Labelers~~., N.2.1. Non-Automatic Tests., N.2.1.3. Shift Test., N.2.2.1. Automatic Tests ~~Non-Automatic~~ for Weigh-Labelers., N.2.2.2. Automatic Tests for Automatic Checkweighers., ~~N.3. Test Procedures -Automatic Checkweigher.~~, ~~N.3.1. Tests Non-Automatic.~~, ~~N.3.2. Automatic Tests.~~, Table N.23.2.2. Number of Sample Weights per Test for Automatic Checkweighers

NIST OWM Recommendation: Voting

- OWM agrees with the submitter that the language in paragraph N.1.5. can be interpreted in different ways and needs clarification.
- Paragraph N.1.5. Test Loads and Table N.1.5. Test Loads apply to all Automatic Weighing Systems.
- The subsequent paragraphs, N.2. Test Procedures – Weigh-Labelers & N.3. Test Procedures – Automatic Checkweighers apply to Weigh-Labelers and Automatic Checkweighers, respectively.
- Paragraph N.1.5. currently specifies the amount and number of test loads to be applied to all devices covered by this code, but it conflicts with the tests specified in N.3. paragraphs which apply to Weigh-Labelers and requires additional tests when compared to tests specified in the N.2. paragraphs that apply to Checkweighers, specifically:
    - Paragraph N.1.5, which refers to Table N.1.5, specifies four different test loads, which conflicts with paragraph N.3.2. Automatic Tests, which specifies "Test runs shall be conducted using two test loads."
    - There is also a potential for misinterpretation with paragraph N.2.2.2. Automatic Tests, which specifies, "Test runs should be conducted using at least two test loads."
- There were other gaps in the language proposed in this item and the language currently in NIST Handbook 44.
- This proposal reorganizes the notes section:
    - The N.1. paragraphs will now specify the amount and number of test loads, separated by tests for initial verification and tests for subsequent verification.
    - The N.2. paragraphs will now specify test procedures.
        - N.2.1. specifies procedures for devices designed to operate non-automatically.
        - N.2.2. specifies procedures for devices that only operate automatically.
    - The reorganization of the N.2 paragraphs incorporated procedures that were specified in the N.3. paragraphs allowing for the elimination of N.3. and its sub-paragraphs

LMD – Liquid Measuring Devices

NIST OWM Executive Summary for LMD-24.2 – N.4.1. Normal Tests

NIST OWM Recommendation: Voting if the example is removed and the language suggested in the Detailed Analysis is incorporated into the Item Under Consideration.

- Although examples can be helpful, OWM believes NIST HB 44 is not the correct place for them and discourages their use in the handbook for a number of reasons:
  - The handbook is adopted as law and any additional information must be carefully considered as it can affect the application of the paragraph
  - Paragraphs that include unclear language should be amended to provide clarification to allow for uniform interpretation without the inclusion of this type of information
  - Additional guidance regarding the interpretation and application of the handbook is typically provided in documents such as Examination Procedure Outlines, training materials, etc.
  - Tina Butcher is currently updating NIST Handbook 112, Examination Procedures Outlines, and OWM intends to have the updated version available soon
- If the weights and measures community agrees that paragraph N.4.1, as written, is unclear in its application, OWM suggests amending it to provide further clarity. See the suggested language in the Detailed Analysis section of the NIST OWM Analysis.
- The following formula was added to this paragraph editorially for inclusion in the 2024 version of NIST Handbook 44 with the intent of providing additional clarity:

$$\frac{MDFR + RMDFR}{2} = minimum\ discharge\ flow\ rate\ for\ additional\ tests$$

- If the weights & measures community chooses to move forward with the example proposed by the submitter, to be consistent with other examples currently in NIST Handbook 44 and to be more relevant to the devices to which the formula is typically applied, OWM suggests the following format and values replace those proposed by the submitter:

  Example: If, under the conditions of installation, a device has a maximum discharge flow rate of 60 gpm and a rated minimum discharge flow rate of 20 gpm, using the above formula the minimum flow rate at or above which normal tests are conducted is calculated as follows:

$$\frac{\mathbf{60\ gpm + 20\ gpm}}{\mathbf{2}} = \mathbf{40\ gpm}$$

  For this device, any test conducted at a flow rate of 60 gpm down to and including 40 gpm is considered a normal test.

  Any tests conducted below the calculated minimum discharge flow rate for normal tests of the device as specified in N.4.1. Normal Tests and not below the rated minimum discharge flow rate are considered "special" tests and shall be conducted as prescribed in paragraph N.4.2. Special Tests.

VTM – Vehicle Tank Meters

NIST OWM Executive Summary for VTM-25.1 – UR.2.2. Recording Element

NIST OWM Recommendation: Voting

- When Item Block 4 was adopted in 2023, which amended NIST Handbook 44 to further allow "electronic" receipts, the title of paragraph UR.2.2. was changed from "Ticket Printer, Customer Ticket" to "Recording Element" but the corresponding title in UR.2.2.1. was not amended.
- OWM views this as an oversight and submitted this as a housekeeping item to correct this issue.

HGV – Hydrocarbon Gas Vapor-Measuring Devices

NIST OWM Executive Summary for HGV-25.1 – S.1.1.4. Advancement of Indicating and Recording Elements, S.1.1.5. Proving Indicator, S.2.2. Provision for Sealing, Table S.2.2. Categories of Device and Methods of Sealing, S.4.3. Temperature Compensation, S.4.4. Badge, N.3. Test Drafts, N.4.1. Normal Tests, and Appendix D. Definitions – register

NIST OWM Recommendation: OWM recommends a Developing status to allow further vetting of the newer technologies to fully develop comprehensive design and user requirements for the next generation of metering equipment used in this application.

- Fully vett to ensure handbook requirements address: (1) the mechanisms in use for metrological features in these next generation measuring devices; and (2) the electronic options for all device applications that can be used to provide information such as audit trail security records and the measured quantity readings through remote indications.
- The "intended" design of a device although envisioned as fully compliant may not meet the full intent of basic weights and measures principles and OWM therefore recommends not including the term intended as a qualifier for how the advancement of indication must operate (i.e., as intended). Proper design and functioning of the more complex alternative newer digital electronic technologies should include all the elements which make it possible for these devices to meet performance requirements under all operating conditions. Recognize the use of these newer technologies in two ways:

  (1) Consider alternative modifications to paragraph S.1.1.4. Advancement of Indicating and Recording Elements by removing the term "mechanical" or use an alternate term such as "normal" operation which includes mechanical and electronic advancement of indications; and

  (2) Initially address the electronic meter designs in a new general design requirement which specifies the meter measurement technology shall adjust and correct for any design element or other factors that adversely affect measurements as stated in a new paragraph S.2.5. as shown below:

  S.2.5. Adjustments and Corrections for Measuring Elements and Measuring Systems. – A device shall be equipped with automatic means to determine and correct for changes in the product's properties or variations in other parameters having a significant metrological affect that results in a delivered quantity in excess of allowable limits. The device shall provide an indication when these feature are not operating properly.

- Retitle and reorganize paragraph S.4.4. ~~Badge~~Marking Requirements to specify: (1) General requirements for the marking information's permanence and prominent location on the front of the device and also specify it be either "clear" or preferably "legible"; (2) Method for Affixing Information i.e., the option for a Badge or if permissible external label, imprinting, stamping, etc. into the body of the device, (3) the list of the required information; and (4) the relationship of this information to G-S.1. marking information. In addition, the use of the word "badge" appears in other code paragraphs as the prescribed location for meter operating conditions that should be operational during the meter test.

For meters in operation where the primary indications are not reasonably viewable in the typical manner utility type meters are accessible to the customer, further modify Section 3.33 to include two new nonretroactive user requirements such as those shown on pages 85-86 in the NIST OWM Detailed Technical Analysis that provide for meter reading information displayable to the customer in real time indications that clearly identifies the customer's premise that is the source for billable information.

HGM – Hydrogen Gas-Measuring Devices

NIST OWM Executive Summary for HGM-23.1 – UR.3.8. Safety Requirement

NIST OWM Recommendation: OWM has no recommendation until additional data is submitted.

- It has not been part of the weights and measures standards development process to include prescriptive safety requirements into handbook legal metrology standards.
- The dispenser's design features regardless of their function should not affect the metrological integrity of the equipment.
- Traditional fueling applications have established mechanisms to address the safety features of dispenser installations not typically within the scope of the weights and measures authority.
- Groundwork is not outlined in the proposal detailing key elements that must be established for an SAE J2601 verification program and what standards if any apply to equipment in operation before the effective date.
- NIST OWM looks forward to the reporting from CA DMS and CARB as well as any updates from other interested parties to clarify the types of test data available that are the result of compliance testing to the SAE J2601 standard and impact on metrological parameters of these dispensers.

FMT – Farm Milk Tanks

NIST OWM Executive Summary for FMT-25.1 – UR.1. Installation

NIST OWM Recommendation: Developing

- The Item Under Consideration originally incorrectly referenced the Milk Meter Code. It was edited to correctly reference the Farm Milk Tanks Code.
- The submitter of this item requests that the legs be permanently cemented as a requirement for installing a farm milk tank and notes that States in the Northeast, specifically NY, PA, and VT, have this requirement:
    - VT provided a copy of their weights and measures law which include "and the tank legs are cemented to the floor."
    - NY requirement states that foundations shall be of sufficient strength to support the fully liquid-laden tank without change in level and that the legs must be permanently cemented.
    - PA non-regulatory recommendation is that bulk tanks are cemented to concrete footer on the back-end of the tank.
- At the Southern, it was noted that permanently cemented legs may cause an issue with cleanliness standards. Are cleanliness standards uniform in all states, and if so, how do Northeastern States comply with these standards?
- NIST OWM acknowledges the workload and safety conditions, but questions whether there are other plausible flooring options that would meet the demands of the farm milk tank environment and/or for maintaining the metrological integrity of the equipment.
- Although there are other User Requirements in the Farm Milk Tank Code that address maintaining the level condition of the tank, NIST OWM provides suggested alternative language for the proposal which is less prescriptive. See that suggested language in the "NIST OWM Detailed Technical Analysis" Section of this report.

MDM – Multiple Dimension Measuring Devices

NIST OWM Executive Summary for MDM-25.1 – A.2. Other Devices Designed to Make Multiple Measurement Automatically to Determine Volume

NIST OWM Recommendation: Developing

- Items MDM-25.1, MDM-25.2, and MDM-25.3 cannot be evaluated and adopted separately. Therefore, NIST OWM suggests combining these three proposals into a single proposal, MDM-25.1.
- In order to include volume measurement devices, more requirements in Section 5.58. need revision than just A.2., N.1.1. and T.3.
- NIST OWM recommends a thorough investigation of other requirements that need amendment to apply to devices designed to make multiple measurements automatically to determine a volume as opposed to multiple dimension measuring devices.
- OWM has identified 10 specification, 4 note, 2 tolerance, and 2 user requirement paragraphs that meet this criterion and are included in the detailed analysis.

NIST OWM Executive Summary for MDM-25.2 – N.1 Test Procedures

NIST OWM Recommendation: Developing

- Items MDM-25.1, MDM-25.2, and MDM-25.3 cannot be evaluated and adopted separately. Therefore, NIST OWM suggests combining these three proposals into a single proposal, MDM-25.1.
- In order to include volume measurement devices, more requirements in Section 5.58 need revision than just A.2., N.1.1. and T.3.
- NIST OWM recommends a thorough investigation of the requirements that need amendment as specified in the detailed analysis, at a minimum.
- This item should be reworded to require the means of conveyance used during testing be representative of the those normally used when the device is in operation.
- As proposed, it requires the test itself to "be representative of the conveyance normally measured" which is is unclear as to what is required.

NIST OWM Executive Summary for MDM-25.3 – T.3. Tolerance Values

NIST OWM Recommendation: Developing

- Items MDM-25.1, MDM-25.2, and MDM-25.3 cannot be evaluated and adopted separately. Therefore, NIST OWM suggests combining these three proposals into a single proposal, MDM-25.1.
- In order to include volume measurement devices, more requirements in Section 5.58 need revision than just A.2., N.1.1. and T.3.

- NIST OWM recommends a thorough investigation of the requirements that need amending as specified in the detalied anlaysis for item MDM-25.1, at a minimum.
- The proposed new paragraph T.3.1. specifies, "maintenance and acceptance tolerance shall be as shown in Table XX". The new Table XX only specifies maintenance tolerances. This item needs further editing to provide clarity.
- OWM suggests removing the sentence "The maintenance and acceptance tolerance shall be as shown in Table XX" from T.3.1. For Volume Devices, as maintenance tolerances are specified in part (a) of T.3.1. and acceptance tolerances are specified in part (b) of T.3.1.

OTH – Other Items

NIST OWM Executive Summary for OTH-25.1 – 2.26. Weigh-in-Motion Systems Used for Vehicle Direct Enforcement

NIST OWM Recommendation: Voting

- The submitters have demonstrated the need for direct and permanent enforcement, and that WIM installations are suitable and extremely effective.
- The submitters have addressed the concerns expressed during meetings of the Council by
  - Drastically reducing the number of test runs during subsequent verifications, and
  - Introducing a class with tighter tolerances which gives states more flexibility to implement WIM systems as they see fit.
- They have also submitted an updated proposal to the S&T Committee, which is included as a supporting document on the NCWM website. This update addresses concerns expressed by the regions during the fall meeting cycle.
- The changes provide additional clarification but are not significant in nature.
- NIST OWM is of the opinion that the updated item is fully vetted and supports a voting status.

ITEM BLOCK 1 (B1) TRANSPORTATION-FOR-HIRE SYSTEMS

(Note: See information regarding TNS-25.1, which proposes to remove Section 5.60., below)

NIST OWM Executive Summary for B1-TXI-25.1 – 5.54 ~~Taximeters~~ Transportation-For-Hire Systems

NIST OWM Recommendation: Informational

- OWM recognizes this is a new agenda item whereby two codes have substantial changes. The submitter is recommending the removal of the tentative status of the Transportation Network Measurement Systems (TNS) -Tentative Code (5.60) from NIST Handbook 44 and incorporating this code (TNS) into the Taximeters Code (5.54). The Taximeters Code will then be renamed

Section 5.54. Transportation for Hire Systems Code deleting Section 5.60 from NIST Handbook 44.

- The goal is to provide a unified code that will be applied to all transportation systems including taximeters and ride share app based companies.
- An updated 10/15/24 document has been supplied to the NCWM for publication into Pub 15. This update provides editorial and housekeeping changes.

ITEM BLOCK 3 (B3) MILK METER TOLERANCES

NIST OWM Executive Summary for B3-VTM-20.2 – Table T.2. Tolerances for Vehicle Mounted Milk Meters

NIST OWM Recommendation: NIST OWM has no recommendation.

- The proposed tolerances are those currently used in OIML standards and seem to be a good starting point for changes to the tolerances. Generally we support, wherever possible, efforts to harmonize with OIML standards, but care should be taken to examine the increased tolerance and any adverse results that arise compared to the previously used tolerances. In 2020 several milk industries sent letters of opposition to the original POUL TARP proposal for an increase of the tolerances in NIST HB 44 Section 3.31. VTM Code for milk meter applications. The initial POUL TARP proposal included wider tolerances than those in the current alternative proposal based on OIML standards. Below is POUL TARP's original proposal for changes to vehicle-mounted milk meter tolerances which were to increase the tolerances:

Table 2. Tolerances for Vehicle-Mounted Milk Meters

Indication (gallons)	Maintenance Tolerance (gallons)	Acceptance Tolerance (gallons)
100	~~**0.5**~~ **0.6**	~~**0.3**~~ **0.5**
200	~~**0.7**~~ **1.2**	~~**0.4**~~ **1.0**
300	~~**0.9**~~ **1.8**	~~**0.5**~~ **1.5**
400	~~**1.1**~~ **2.4**	~~**0.6**~~ **2.0**
500	~~**1.3**~~ **3.0**	~~**0.7**~~ **2.5**
Over 500	**Add ~~0.002~~ 0.006 gallons per indicated gallon over 500**	**Add ~~0.001~~ 0.005 gallons per indicated gallon over 500**

- The opposition to the original proposal can be found in the S&T archive folder for VTM-20.1 and the opposition included the following:
  - increasing the tolerance allows for unpredictable results creating more inaccurate results during the milk metering process,
  - increasing the tolerance between buyer and seller,
  - broadening tolerances introducing more uncertainty into the transaction between buyer and seller,
  - meters having a greater tolerance difference than plant scales or meters,

  - we believe tolerance should be set according to the needs of industry and not to accommodate one specific measuring system.
  - given that it has been demonstrated that another vehicle-mounted milk meter can successfully meet the current standards, we believe that the tolerances should be set according to the needs of the industry.

- At a previous conference, it was noted that a manufacturer received an NTEP CC based on the existing vehicle-mounted milk meter tolerances, but after reviewing the certificate, it was noted that the device was tested at a limited volume.
- The current milk meter tolerances in the Vehicle Tank Meters Code and the Milk Meters Code reduce the applicable percentage tolerance as the delivered volume increases.
  - For example at 100 gal the maintenace tolerance is 0.5 gallons which is a 0.5%, at 200 gal the maintenance tolerance is 0.7 gallons which is a 0.35% tolerance, and at 300 gallons the maintenace tolerance is 0.9 gallons which is a 0.3% tolerance.
- OIML tolerances permit a 0.5% percent tolerance for a system and 0.3% percent tolerance for the meter only.
- The current OIML tolerances are smaller than those originally proposed by POUL Tarp but are higher than the current tolerances.
- Charlie Stutesman, the previous chair, provided a comparison of the tolerances, which are available in the S&T archive folder on the NCWM website for various tolerances, along with current NTEP certificates that have been issued for these types of devices.
- The S&T Committee at the 2024 Interim Meeting agreed to combine VTM-20.2 and MLK-23.1. Aaron Yankers (Colorado) held task group meetings on March 6 and April 24, 2024, to discuss the proposal. The Task Group reviewed and discussed various tolerances applied to milk meter applications in NIST HB 44, and Aaron continues to collect feedback from the Task Group concerning the proposed changes.
- The Milk Meter Tolerance Task Group also met on June 11, 2024 prior to the 2024 NCWM Annual Meeting.
- The Task Group discussion during its three 2024 meetings included the direction for the milk meters items:
  - possibly combining the milk meter requirements from all other codes in NIST Handbook 44 into a new code section
  - reaching out to the original submitters of B3 items for clarity
  - and an update to be provided for the Block 3 items at the 2024 Annual meeting.
- The codes in NIST HB 44 that address the measurement of milk are sections 3.31, .3.35, 3.37, and 4.42.
- Sections 3.31 Vehicle-Tank Meters and 3.35 Milk Meters currently have the same tolerances. Section 3.37 Mass Flow Meters has a different tolerance. Section 4.42 Farm Milk Tanks Code applies to farm milk tanks that are used for the commercial measurement of milk. The farm milk tank tolerances are different than the meter tolerances.

- If the Task Group plans to combine all milk measuring device and system requirements from all the handbook codes into a single code, the group should consider:
    - For a VTM milk meter the product depletion test is considered as part of the official test of this meter type
    - The tolerances for a farm milk tank are different than tolerances that apply to milk meters in the Vehicle-Tank Meters Code, Milk Meters Code, and Mass Flow Meters Code.

NIST OWM Executive Summary for B3-MLK-23.2 – Table T.1. Tolerances for Milk Meters

NIST OWM Recommendation: NIST OWM has no recommendation.

The proposed tolerances are those currently applied in OIML standards and seem to be a good starting point for discussion. We generally support, whenever possible, efforts to harmonize with OIML standards, but care should be taken to examine the increased tolerance and any adverse results that arise compared to the previously used tolerances. The S&T Committee at the 2024 Interim Meeting agreed to combine VTM-20.2 and MLK 23.1. NCWM Milk Meter Tolerance Task Group Chair Aaron Yankers (Colorado) held task group meetings March 6 and April 24, 2024 to discuss the proposal. The Task Group is reviewing and discussing various tolerances being applied for milk meter applications and Aaron continues to collect feedback from the Task Group concerning the proposed changes.

- The Task Group held two meetings to discuss the direction for the milk meters items. The Task Group discussed combining the milk meter requirements from all other codes in NIST Handbook 44 into a single new code section and is also reaching out to the original submitters of Block 3 items for clarity.
- The codes in NIST HB 44 that address the measurement of milk are NIST HB 44 Sections 3.31., 3.35., 3.37., and 4.42.
- Sections 3.31. Vehicle-Tank Meters and 3.35. Milk Meters currently have the same tolerances. Section 3.37. Mass Flow Meters has a different tolerance. Section 4.42. Farm Milk Tanks applies to farm milk tanks used for the commercial measurement of milk. The farm milk tank tolerances are different than the meter tolerances.
- NIST OWM supports the update of milk meter tolerances in NIST HB 44 for clarity. If OIML tolerances are adopted care should be taken to adopt those tolerances that are appropriate for this application where the U.S. only tests the complete system.
- If the Task Group plans to combine all milk measuring codes the group should consider:
    - For a VTM milk meter the product depletion test is considered as part of the official test of this meter type.
    - The tolerances for a farm milk tank are different than tolerances for the milk metering applications in NIST HB 44.