




December 29, 2022

MEMORANDUM FOR NCWM Specifications and Tolerances (S&T) Committee

From: Tina G. Butcher, Chairman 
U.S. National Work Group (USNWG) on Electric Vehicle Fueling and Submetering (EVF&S)
Electric Vehicle Fueling Equipment (EVFE) Subgroup

Subject: Recommended Modifications and Comments to S&T Committee Agenda Items and the Related Topic of
Test Standards - Traceability:

EVF-23.1 S.2.5.1. Money-Value Divisions Digital, S.8. Minimum Measured Quantity (MMQ), S.5.3.(d)
Abbreviations and Symbols; Joule, N.1. No Load Test, T.5. No Load Test, N.2. Starting Load Test, T.6.
Starting Load and Definition of “megajoule”;

EVF-23.4 S.5. Markings and N.5. Test of an EVSE System;

EVF-23.5 S.5.2. EVSE Identifications and Marking Requirements and T.2. Load Accuracy Test
tolerances;

EVF-23.6 S.5.2. EVSE Identification and Marking Requirements and T.2. Tolerances; and

Test Standards - Traceability

The USNWG EVF&S’s Electric Vehicle Fueling Equipment (EVFE) Subgroup respectfully submits the following
recommendations for consideration of NCWM S&T Committee on 2023 S&T Agenda Items. The EVFE
Subgroup’s decisions on feedback to provide to the Committee were reached over the course of the group’s October
6, 18, and December 8, 2022 meetings and are outlined below:

**EVF-23.1 S.2.5.1. Money-Value Divisions Digital, S.8. Minimum Measured Quantity (MMQ), S.5.3.(d)
Abbreviations and Symbols; Joule, N.1. No Load Test, T.5. No Load Test, N.2. Starting Load
Test, T.6. Starting Load and the Definition of “megajoule”**

- The SG asks the S&T Committee to replace its recommended changes to paragraph S.2.5.1. Money-Value
Divisions Digital to further clarify the point in the process when mathematical agreement occurs with the
following:

S.2.5.1. Money-Value Divisions Digital. – An EVSE with digital indications shall comply with
the requirements of paragraph G-S.5.5. Money-Values, Mathematical Agreement, and the total
price computation at the end of the transaction shall be based on quantities not exceeding ~~0.5~~
~~MJ~~ or 0.01 kWh.

(Amended 202X)

- The SG considered recommending a definition for the term “transaction” that would be specifically
applicable to Section 3.40 possibly based on the definition published September 2022 in OIML G 22 the

corresponding international EVSE guide. The SG did not reach a conclusion on a proposed definition; however, the SG may come back with a recommendation at some point in the future as part of a separate proposal. Two points to consider should the SG revisit the proposed definition is whether the term should apply to the 14 other NIST HB 44 codes where the term is also cited and further clarify whether it is the customer, the electric vehicle fueling system, or some other intelligence that provides acknowledgement of receipt of information relevant to the transaction process.

EVF-23.4 S.5. Markings, and N.5. Test of an EVSE System

- The SG agrees with the proposed changes to: (1) paragraph S.5.2.(b) EVSE Identification and Marking Requirements for clarity and consistency in the expression of current values across the EVFS Code and to properly identify the highest current value or level at which the manufacturer has specified for the operation of the EVSE, the EVFE SG supports identifying this marking information as the “maximum deliverable ampere” rather than the currently stated “maximum current deliverable”, and (2) paragraph S.5.3.(d) Abbreviations and Symbols which removes the “joule” unit of measurement and its corresponding abbreviation and further modifies that subparagraph to include the “kilowatt-hour” as well as recognize that unit’s abbreviation “kWh”.
- The SG agrees with the proposed changes to N.5.1. Performance Verification in the Field and N.5.2. Accuracy Testing in concept, but the SG is *not* in concurrence with specific recommendations in the proposal. The SG would like to share the following points from its discussions of these items.
 - Some members of the SG would like to take a closer look at the test points.
 - The SG would like to ask the SG’s Test Procedures Subcommittee to take a look at the criteria and provide feedback to the SG and the S&T Committee before the item moves ahead.
 - There are concerns about the limitations of available test standards and how the proposed test criteria might impact this.
 - Regarding N.5.2. Accuracy Testing (Field) subparagraph (2)(i), the SG has concerns about testing to less than 10% of maximum current or maximum deliverable amperes which could be significantly below typical levels of operation.
 - There were some questions about whether type evaluation criteria should be included in Handbook 44.
 - Specifying field test criteria that only apply if a device holds type evaluation certification. Exactly what test criteria apply to devices that do not have a certificate? Must those devices first undergo the proposed more stringent test criteria specified to be performed under laboratory conditions?

Items EVF-23.5 and EVF-23.6:

EVF-23.5 S.5.2. EVSE Identifications and Marking Requirements, N.5.2. Accuracy Testing, and T.2. Load Accuracy Test tolerances

and

EVF-23.6 S.5.2. EVSE Identification and Marking Requirements., and T.2. Tolerances

- The SG agreed to forward the results of its June 2022 ballot (in which it proposed changes to the tolerances and the addition of marking requirements) to the S&T Committee and recommend the Committee consider these recommendations as it considers Items EVF-23.5 and EVF-23.6.
- In a June 2022 ballot, the SG agreed to recommend the following changes to the tolerances and marking requirements in Section 3.40. The SG asks that the Committee consider the SG’s recommendations presented below as it deliberates on S&T Agenda Items EVF-23.5 and EVF-23.6 which include proposed changes to these same handbook code paragraphs. The changes agreed to by the SG in its June 2022 ballot are shown below.

- Additionally, some device users on the SG indicated that there remains a desire to recognize and then maintain a 5% tolerance for DC legacy (i.e., installed prior to 2024) equipment.

T.2. ~~Load Accuracy~~ Test Tolerances.

T.2.1. EVSE ~~Load Accuracy~~ Test Tolerances for AC Systems. – The tolerances for EVSE load tests for AC systems ~~are~~ shall be as follows:

(a) Acceptance Tolerance: 1.0 %; and

(b) Maintenance Tolerance: 2.0 %.

(Amended 202X)

T.2.2. EVSE Accuracy Test Tolerances for DC Systems. – **The tolerances for EVSE load tests on DC systems shall be as follows:**

(a) For DC systems installed prior to 2024 and that bear the notice specified in paragraph S.5.2.1. Marking of Accuracy Limits, DC EVSEs Installed Prior to 2024, acceptance and maintenance tolerances are: 5.0 %.

(b) For DC systems installed on or after January 1, 2024 or that do not bear the notice specified in paragraph S.5.2.1. Marking of Accuracy Limits, DC EVSEs Installed Prior to 2024 tolerances are:

(1) Acceptance Tolerance: 1.0 %; and

(2) Maintenance Tolerance: 2.0 %.

(Added 202X)

S.5.2. EVSE Identification and Marking Requirements. – In addition to all the marking requirements of Section 1.10. General Code, paragraph G-S.1. Identification, each EVSE shall have the following information conspicuously, legibly, and indelibly marked:

- (a) voltage rating;
- (b) maximum current deliverable;
- (c) type of current (AC or DC or, if capable of both, both shall be listed);
- (d) minimum measured quantity (MMQ); and
- (e) temperature limits, if narrower than and within – 40 °C to + 85 °C (– 40 °F to + 185 °F).

S.5.2.1. Marking of Accuracy Limits, DC EVSEs Installed Prior to 2024. – **DC EVSEs installed prior to 2024 shall be marked with the following:**

NOTICE:

“This charger operates at a tolerance of +/- 5 percent versus newer chargers which operate at a maximum tolerance of +/- 2 percent.”

This marking shall be conspicuously, legibly, and indelibly marked, in a position plainly visible to a person accessing a charging port of the EVSE.

This marking requirement does not apply to DC EVSEs that are capable of meeting an acceptance tolerance of 1 % and a maintenance tolerance of 2 %.

(Added 202X)

(Amended 2021)

Test Standards – Traceability

- The SG notes there have been a lot of discussions about the need to establish traceable test standards for testing DC EVFS. The SG would like to see a workgroup on a new handbook in the NIST Handbook 105 series to address test standards.
 - NIST agreed to undertake this work as it does for other NIST Handbook 105s.
 - NIST will keep the subgroup apprised of this work and invite participation from those interested in assisting with this effort.

For questions about these suggested modifications and comments to S&T Committee Agenda Items listed above, please contact me by email at: tina.butcher@nist.gov or by telephone at: (301) 975-2196 or Juana Williams (NIST OWM), USNWG EVFE Subgroup Technical Advisor, by email at juana.williams@nist.gov or by telephone at: (301) 975-3989. We can also be reached via postal mail at:

National Institute of Standards and Technology (NIST)
Physical Measurement Laboratory (PML), Office of Weights and Measures (OWM)
100 Bureau Drive M/S 2600
Gaithersburg, MD 20899-2600