

## First Certificate of Type Approval for Electric Vehicle Supply Equipment Issued by the California Division of Measurement Standards

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The California (CA) Department of Food and Agriculture Division of Measurement Standards (DMS) took an important first step in the recognition of Electric Vehicle Supply Equipment (EVSE) for commercial use in the U.S. On February 25, 2021, the CA DMS issued the first CA Type Evaluation Program (CTEP) Certificate of Approval to the manufacturer of a specific model of EVSE. An EVSE is a device or system designed and used specifically to transfer electrical energy to an electric vehicle (EV) through either a physical or wireless connection. EVSEs have been installed at various locations throughout the U.S. for the public to fuel their electric vehicles for a fee. With the issuance of the first type evaluation certificate by CA DMS to an EVSE, state and local officials in a number of jurisdictions across the country may soon begin routine inspections to ensure commercially-used EVSEs are accurate, well-constructed, properly designed and installed, and suited for use in commercial transactions.

Most weights and measures jurisdictions in the U.S. require that commercial weighing or measuring devices such as gas pumps, grocery scales, and propane metering devices undergo a type evaluation before those devices can be used to buy or sell products and services. This includes EVSEs in fueling stations or parking lot facilities that are used to buy or sell electrical energy to fuel an EV. A certificate is issued to a device manufacturer when a specific model of weighing or measuring device has successfully completed rigorous evaluation to determine it conforms to a set of design and performance code requirements. This process takes place before the device is used commercially in the marketplace.

In 2012, the NIST U.S. National Working Group on Electric Vehicle Fueling and Submetering began work on legal metrology standards for EVSE equipment and a corresponding method of sale. CA DMS was at the forefront of this work, joining this group of experts, comprised of state and local weight and measures officials, manufacturers, members of the electrical energy community, federal government agencies, and other technical experts to develop what was incorporated into NIST Handbooks 44 (EVSE equipment) and 130 (method of sale/signage) in 2015 and later into a NIST Examination Procedure Outline (field test procedures). CA DMS played a pivotal role in this process, not only bringing to the table its extensive expertise at the county and state levels, but also hosting the bulk of the Work Group meetings and championing the adoption of these standards across the country. This work serves as a great example of state and federal collaboration with stakeholders working together to build the weights and measures infrastructure to support this important alternative fueling application.

Except for a few types of devices regulated by specific Federal agencies, the regulatory authority for commercial weighing and measuring devices rests largely with state and local weights and measures jurisdictions. Most states adopt and enforce the provisions of NIST Handbooks 130 and 44 as the requirements for commercial weighing and measuring devices and practices in their states.

The first EVSE to receive CTEP approval met California Code of Regulations (CCR) requirements which are closely based on NIST Handbook 44 Section 3.40 Electric Vehicle Fueling Systems – Tentative Code. The CCR EVSE regulation was adopted by CA in 2019 and became effective on January 1, 2020. The CCR permissible errors for the EVSE's delivery of electrical energy to an EV during type evaluation is  $\pm 1.0$  percent. Commercial EVSEs installed in California prior to certain installation dates do not have to comply with requirements. California has phase-in enforcement dates of:

- January 1, 2021 for all commercial EVSE AC Systems installed on or after January 1, 2021 making those devices fully subject to the regulation on January 1, 2021.
- All commercial EVSE AC Systems installed prior to January 1, 2021 shall comply with the regulation by January 1, 2031.
- All commercial EVSE DC Fast Charging Systems installed on or after January 1, 2023 will be fully subject to the regulation.

- All commercial EVSE DC Fast Charging Systems installed prior to January 1, 2023 shall comply with the regulation by January 1, 2033.

The type evaluation process for EVSEs assesses the: (1) accuracy and correctness of the displayed and recorded transaction information when the EVSE is charging an EV or in the event of a power loss; (2) security placed on components that can alter measurement results; (3) marking of electrical rating information; (4) method of sale (by the kilowatt-hour) for deliveries of electrical energy; (5) charge(s) for *other* services connected with the fueling process based on time (if an EVSE has this feature); and (6) the likelihood the device maintains proper operations and settings under conditions of typical commercial use. When the U.S. National Type Evaluation Program (NTEP) administered by the National Conference on Weights and Measures (NCWM) begins accepting EVSEs for type evaluation those devices must comply with all requirements in NIST Handbook 44 Sections 1.10 General Code and 3.40 Electric Vehicle Fueling Systems – Tentative Code and, where applicable, Section 5.55 Timing Devices.

With the adoption of requirements for EVSEs and the issuance of type evaluation certificates for these devices, the U.S. Weights and Measures community is moving into a new area of legal metrology. Instead of refueling a light duty vehicle with gasoline/diesel the trend is for battery/fuel cell vehicle fueling with alternative fuels such as electricity through Retail Electric Vehicle Fueling Systems (aka Electric Vehicle Supply Equipment (EVSE) or Electric Vehicle Chargers). State and local authorities have been operating programs set up to verify compliance of traditional fuel dispensers for over a century. Electrical energy commercial sales are new to most weights and measures jurisdictions except for California. For decades California county and state officials have routinely verified wathour type electric “submeters” used by landlords in apartment buildings, mobile home parks, campgrounds, marinas, and malls to bill tenants for power usage. Electricity metering and its verification has been under the domain of the utility companies and the public service/utility commissions, except for those “submeter” applications where weights and measures jurisdictions have exercised their regulatory authority. Nevertheless, public fueling of vehicles with electricity for a fee is new to the entire country and continues to grow. Once again California takes the lead on commercial electrical energy applications and there will be global benefits because of their actions. All signs point to more type approval certifications of EVSEs to come.