ENERGY STAR® Program Requirements for Electric Vehicle Supply Equipment

Eligibility Criteria
Draft 1, Version 2.0

Following is the Draft 1 Version 2.0 ENERGY STAR product specification for Electric Vehicle Supply Equipment. A product shall meet all the identified criteria if it is to earn the ENERGY STAR.

1 DEFINITIONS

A) Electric Vehicle Supply Equipment (EVSE): The conductors, including the ungrounded, grounded, and equipment grounding conductors, the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatuses installed specifically for the purpose of transferring energy between the premises wiring (if available) to the electric vehicle. Charging cords with NEMA 5-15P and NEMA 5-20P attachment plugs are considered EVSEs. Excludes conductors, connectors, and fittings that are part of the vehicle.[1]

1) Level 1: A galvanically connected EVSE with a single-phase input voltage nominally 120 volts AC and maximum output current less than or equal to 50 amperes AC.[2]

Note: The EPA updated the Level 1 EVSE definition to harmonize with the revised SAE J1772 standard.

2) Level 2: A galvanically connected EVSE with a single-phase input voltage range from 208 to 240 volts AC and maximum output current less than or equal to 80 amperes AC.[2]

3) DC-output: A method that uses dedicated direct current (DC) electric vehicle/plug-in hybrid electric vehicle (EV/PHEV) supply equipment to provide energy from an appropriate off-board charger to the EV/PHEV in either private or public locations.[3]

4) Wireless / Inductive: An EVSE which transfers energy to the vehicle without a galvanic connection between the vehicle and EVSE.

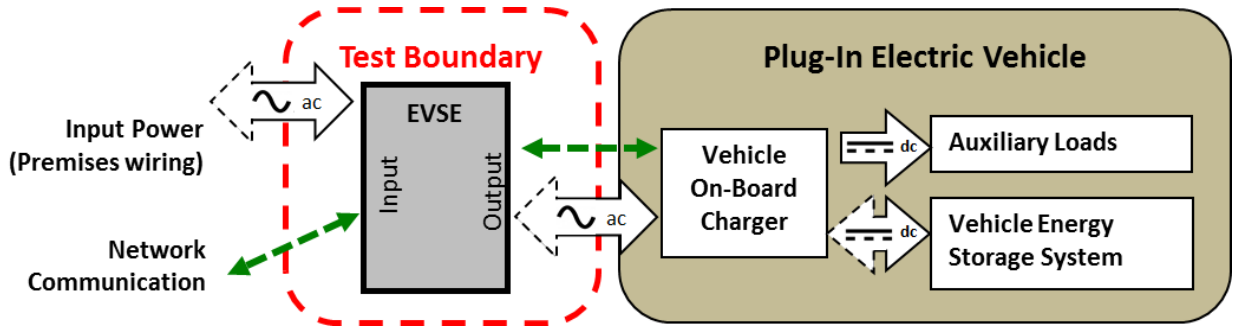


Figure 1: Schematic of Overall Plug-In Vehicle Charging System Detailing EVSE Test Boundary

[1] SAE J2894-1 Section 3.10.
[2] This definition is intended to be consistent with the requirements in SAE J1772, with some additional clarifications.
[3] SAE International, Surface Vehicle Standard J1772, "SAE Electric Vehicle and Plug in Hybrid Electric Vehicle Conductive Charge Coupler", Jan. 2024, Section 3.11.

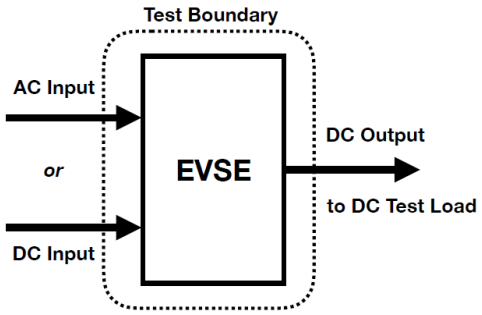


Figure 2: Schematic of DC-Output EVSE Test Boundary

B) EVSE Functions:

1) Primary Function: Providing current to a connected load.

2) Secondary Function: Function that enables, supplements, or enhances a primary function. For EVSE, examples of Secondary Functions are:

a) Automatic Brightness Control (ABC): The self-acting mechanism that controls the brightness of a display or lamp as a function of ambient light.

b) Full Network Connectivity: The ability of the EVSE to maintain network presence while in Partial On Mode.

Note: Presence of the EVSE's network services, its applications, and possibly its display is maintained even if some components of the EVSE are powered down. The EVSE can elect to change power states based on receipt of network data from remote network devices but should otherwise stay in a low power mode absent a demand for services from a remote network device.

c) Occupancy Sensing: Detection of human or object presence in front of or in the area surrounding an EVSE.

d) Communicating with the vehicle;

e) Illumination of display, indicator lights, or ambient lighting;

f) Public access control (RFID card, authorization, etc.);

g) Control Pilot Signal; and

h) Wake-up function.

3) Tertiary Function: Function other than a primary or a secondary function.

Example: An EMC filter and status indication provides their function in No Vehicle Mode, Partial On Mode, and On Mode.

4) In-use: Indicates the presence of a feature that is enabled and ready to provide a service in standby mode even if other components of the EVSE are powered down. The feature must not be disabled by hardware or software during testing.

C) DC-output EVSE Product Configurations:

1) Distributed Product Configuration: A DC-output EVSE that has its functional components distributed between more than one separate enclosure.

a) Minimum Distributed Product Configuration: The minimum configuration of a DC-output EVSE which provides current to a connected load. The product may have more than one port.

2) All-in-One Product Configuration: A DC-output EVSE that has all its components in one enclosure.

D) EVSE Operational Modes and Power States:

Note: The transition period to a different mode; whether automatically initiated, or via user action; does not constitute a mode.

1) Disconnected: Condition of the equipment during which all connections to power sources supplying the equipment are removed or galvanically isolated and no functions depending on those power sources are provided. The term power source includes power sources external and internal to the equipment.

2) No Vehicle Mode: Condition during which the equipment is connected to external power and the product is physically disconnected from vehicle (mode can only be entered or exited through manual intervention). No Vehicle Mode is intended to be the lowest-power mode of the EVSE.

Note: The vehicle-EVSE interface is in State A of SAE J1772, where the vehicle is not connected.[4]

3) On Mode: Condition during which the equipment provides the primary function or can promptly provide the primary function.

a) Operation Mode: Condition during which the equipment is performing the primary function.

Note: The vehicle-EVSE interface is in State C, where the vehicle is connected and accepting energy.[4]

b) Idle Mode: Condition during which the equipment can promptly provide the primary function but is not doing so.

Note: Idle Mode is the condition within On Mode where the EVSE is connected to the vehicle or vehicle simulator but is not actively providing current. The vehicle-EVSE interface is in State C, where the vehicle is connected and ready to accept energy.[4]

4) Partial On Mode: Condition during which the equipment provides at least one secondary function but no primary function.

Note: The vehicle-EVSE interface is in State B1 or B2, where the vehicle is connected but not ready to accept energy and the EVSE is or is not ready to supply energy.[4]

[4] This mode is intended to be associated with a vehicle/EVSE interface state (e.g., A, B, or C) as defined in SAE J1772.

Table 1: Operational Modes and Power States

Operational Modes	Most closely related Interface State as Defined in SAE J1772	Further Description
No Vehicle Mode	State A	No Vehicle Mode is associated with State A, or where the EVSE is not connected to the EV. The EVSE is connected to external power.
Partial On Mode	State B1 or State B2	Partial On Mode is associated with State B1 or State B2 where the vehicle is connected but is not ready to accept energy. Sub-state B1 is where the EVSE **is not** ready to supply energy and sub-state B2 **is** where the EVSE is ready to supply energy.
Idle Mode	State C	Idle Mode is associated with State C, where the vehicle is connected and ready to accept energy and the EVSE is capable of promptly providing current to the EV but is not doing so.
Operation Mode	State C	Operation Mode is associated with State C, where the EVSE is providing the primary function, or providing current to a connected load (i.e., the relay is closed, and the vehicle is drawing current).

E) Other:

1) Apparent power (S): The product of RMS voltage and RMS current, which is equal to magnitude of the complex power, and measured in volt-amperes (VA).

2) Average Power (P) (also Real Power): The power in a circuit which is transformed from electric to non-electric energy and is measured in watts (W). For a two-terminal device with instantaneous current and voltage waveforms i(t) and v(t) which are periodic with period T, the real or average power P is[5]:

$$P = \frac{1}{T}\int_0^T v(t)i(t)dt$$

3) Power Factor (PF): The ratio of the average power (P) in watts to the apparent power (S) in volt-amperes.

$$PF = \frac{P}{S}$$

4) Unit Under Test (UUT): The specific sample of a representative model undergoing measurement which includes the base product and any accessories packaged with it.

5) Illuminance: The luminous flux per unit area of light illuminating a given surface, expressed in units of lux (lx).

6) Luminance: The photometric measure of the luminous intensity per unit area of light travelling in a given direction, expressed in candelas per square meter (cd/m^2).

[5] Average power is intended to align with the definition of real power in SAE J2894.

7) High Resolution Display: A screen device that converts a video signal into a visual output and is capable of displaying a minimum of 480x234 native resolution and has a backlight (e.g., LCD panel, OLED panel).

8) Speaker: A transducer that transforms electromagnetic waves into audio output.

9) Power Line Communication (PLC) Board: Allows power lines to be used for data communication by transferring data over existing power lines.

10) Credit Card Reader: A scanner, reader, or any other electronic device that is used to access, read, scan, obtain, memorize, or store, temporarily or permanently, information encoded on the magnetic strip or stripe of a payment card or via information transferred via a contactless connection using radio frequency identification (RFID) technology or near-field communication (NFC)[6].

11) Radio Frequency Identification Card (RFID): A card that communicates with a reader through radio-frequency electromagnetic fields and is capable of transmitting payment information[7].

12) Revenue Grade Meter (RGM): A meter that meets the requirements outlined in the NIST Handbook 44: Specifications, Tolerances, and Other Technical Requirements for Weighting and Measuring Devices, Section 3.40, Electric Vehicle Fueling Systems.[8]

13) Plug and Charge: A method of initiating charging, whereby an EV charging customer plugs a connector into their vehicle and their identity is authenticated through digital certificates defined by ISO-15118, a charging session initiates, and a payment is transacted automatically, without any other customer actions required at the point of use[10].

Note: The EPA added a definition for Plug and Charge to harmonize with the National Electric Vehicle Infrastructure (NEVI) – 23 CFR 680

F) Product Family: A group of product models that are (1) made by the same manufacturer, (2) subject to the same ENERGY STAR certification criteria, and (3) of a common basic design. Product models within a family differ from each other according to one or more characteristics or features that either (1) have no impact on product performance with regard to ENERGY STAR certification criteria, or (2) are specified herein as acceptable variations within a Product Family. For EVSE, including Distributed Product Configuration DC-output EVSE, acceptable variations within a Product Family include the following, as long as the variation does not impact the product's ability to meet all requirements:

1) Color,

2) Output cable,

3) Housing,

4) Electronic components other than the motherboard, and

5) Firmware updates,

G) **Acronyms:**

1) A: Ampere

2) ABC: Automatic Brightness Control

3) AC: Alternating Current

4) DC: Direct Current

5) DOE: U.S. Department of Energy

[6] 23 CFR 680.104 and 23 CFR 680.106(f)
[7] EVSE Att A - Final Reg. Order (ca.gov)
[8] NIST Handbook 44: Specifications, Tolerances, and Other Technical Requirements for Weighting and Measuring Devices, Section 3.40, Electric Vehicle Fueling Systems

6) DR: Demand Response
7) EPA: Environmental Protection Agency
8) EVSE: Electric Vehicle Supply Equipment
9) IEC: International Electrotechnical Commission
10) IEEE: Institute of Electrical and Electronics Engineers
11) NEMA: National Electrical Manufacturers Association
12) SAE: Society of Automotive Engineers
13) UUT: Unit Under Test
14) V: Volt
15) W: Watt

2 SCOPE

2.1 Included Products

2.1.1 Products that meet the definition for EVSE as specified herein are eligible for ENERGY STAR certification, with the exception of products listed in Section 2.2. In addition, eligible EVSE shall fall into one of the following categories:

i. Level 1 EVSE.

ii. Level 2 EVSE.

iii. Dual Input Level 1 and Level 2 EVSE.

iv. DC-output EVSE with output power less than or equal to 850 kW.

Note: The EPA is proposing to expand the scope of the DC EVSE standard up to 850kW due to the rapidly growing installation of high-powered charging systems. Two test labs have the capacity to test EVSEs with output power up to 800kW with others in the process of developing similar capabilities. The EPA understands that the existing test methodology can be extended to products up to maximum output power of 850kW as the high-powered units have multiple smaller modular power converters put together. Beyond 850kW, products are subject to different safety requirements which would require development of a new test procedure. The utility requirements for transformers and protection equipment for testing EVSE beyond 850kW are different and also have a higher output power rating beyond 1MVA in terms of sizing.

2.2 Excluded Products

2.2.1 Products that are covered under other ENERGY STAR product specifications are not eligible for certification under this specification. The list of specifications currently in effect can be found at www.energystar.gov/specifications.

2.2.2 The following products are not eligible for certification under this specification:

i. DC-output EVSE with power greater than 850 kW.

ii. Pantograph EVSE (chargers with an automated connection system, or ACS).

iii. Wireless/Inductive EVSE.

iv. Medium voltage AC input supply EVSE (13.2 kV).

v. Power electronic components inside the vehicle.

3 CERTIFICATION CRITERIA

3.1 Significant Digits and Rounding

3.1.1 All calculations shall be carried out with actual measured (unrounded) values. Only the final result of a calculation shall be rounded.

3.1.2 Unless otherwise specified within this specification, compliance with specification limits shall be evaluated using exact values without any benefit from rounding.

3.1.3 Directly measured or calculated values that are submitted for reporting on the ENERGY STAR website shall be rounded to the nearest significant digit as expressed in the corresponding specification limit.

3.2 General Requirements

3.2.1 Each EVSE shall be Listed by a Nationally Recognized Testing Laboratory (NRTL) for safety in order to be eligible to receive ENERGY STAR certification.

3.2.2 Dual Input Level 1 and Level 2 EVSE shall meet all requirements and report information in both configurations.

3.3 No Vehicle Mode Requirements for Level 1 and Level 2 EVSE

Note: These requirements refer to the SAE J1772 State A.

3.3.1 Measured No Vehicle Mode power ($P_{NO\_VEHICLE}$) for Level 1 and Level 2 EVSE shall be less than or equal to the Maximum No Vehicle Mode Power Requirement ($P_{NO\_VEHICLE\_MAX}$), as calculated per Equation 1, subject to the following requirements.

i. For products with ABC enabled by default, the average No Vehicle Mode power in high and low illuminance conditions shall be used in place of $P_{NO\_VEHICLE}$, above.

ii. For products capable of network connection with multiple protocols (e.g., Wi-Fi and Cellular), at least one connection must be enabled.

Equation 1: Calculation of Maximum No Vehicle Mode Power Requirement

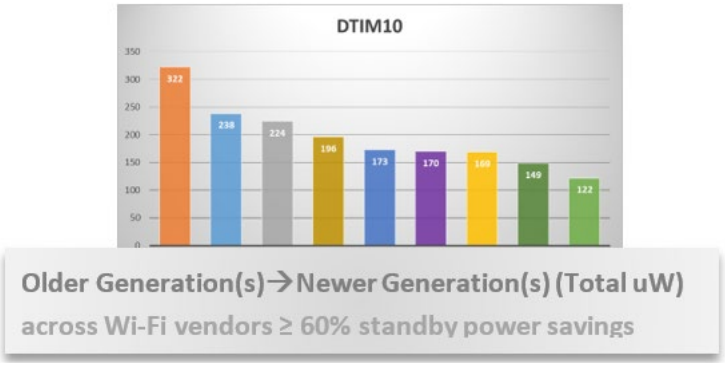
$$P_{NO\_VEHICLE\_MAX} = 4.95 + P_{ISO\ 15118}$$

Where:

- $P_{NO\_VEHICLE\_MAX}$ *is the Maximum No Vehicle Mode Power Requirement;*
- $P_{ISO\ 15118}$ *is the ISO 15118 PLC board power allowance of 1W per port.*

Note: The EPA reviewed existing data for standby mode energy consumption and observed that 187 of the 354 models certified had actual energy consumption that is 30% below the energy consumption limit for No Vehicle Mode. While determining the revised base allowance, the EPA also ensured that both public and private models meet the revised requirements. Most models in the dataset have a display and as such the same has been factored into the revised base allowance eliminating the need for the display adder. The proposed criteria result in a pass rate of 70% of the already certified models (not accounting for the ISO 15118 adder) with at least 1 certified model from 119 unique manufacturers. All the 9 models demonstrating ISO 15118 readiness per the Version 1.2 requirements in the dataset meet the Version 2.0 proposed criteria once the ISO 15118 adder is added.

During stakeholder conversations the EPA also received feedback that energy consumption of Wi-Fi has dropped significantly with the newer chipsets as outlined in the graph below. The feedback also indicated that the EVSE equipped with Wi-Fi can operate with DTIM10 mode. DTIM10 means that devices will wake up to receive the beacons within 3 milliseconds after sleeping for 102ms X 10 = ~1s. The figure below from Infineon Technologies shows that energy consumption for the majority of Wi-Fi chip vendors with a typical configuration of 2x 2 MIMO, 80MHz Bandwidth, 5GHz Band at DTIM10 mode is much less than 0.1W, or orders of magnitude lower than 0.1W, eliminating the need for connectivity adders. Similar updates are also made to Partial On Mode adders for Level 1 and Level 2 EVSE.



3.4 Partial On Mode Requirements for Level 1 and Level 2 EVSE

Note: These requirements refer to the SAE J1772 State B1 or State B2.

3.4.1 Measured Partial On Mode power ($P_{PARTIAL\_ON}$) for Level 1 and Level 2 EVSE shall be less than or equal to the Maximum Partial On Mode Power Requirement ($P_{PARTIAL\_ON\_MAX}$), as calculated per Equation 2, subject to the following requirements.

i. For products with ABC enabled by default, the average Partial On Mode power in high and low illuminance conditions shall be used in place of $P_{PARTIAL\_ON}$, above.

ii. For products capable of network connection with multiple protocols (e.g., Wi-Fi and Cellular), at least one connection must be enabled.

Equation 2: Calculation of Maximum Partial On Mode Power Requirement

$$P_{PARTIAL_{ON_{MAX}}} = 4.95 + P_{ISO\ 15118}$$

Where:

- $P_{PARTIAL\_ON\_MAX}$ *is the Maximum Partial On Mode Power Requirement;*
- $P_{ISO\ 15118}$ *is the ISO 15118 PLC board power allowance of 1W per port.*

3.5 Idle Mode Requirements for Level 1 and Level 2 EVSE

Note: These requirements refer to the SAE J1772 State C.

3.5.1 Measured Idle Mode power (P_{IDLE}) for Level 1 and Level 2 EVSE shall be less than or equal to the Maximum Idle Mode Power Requirement (P_{IDLE_MAX}), as calculated per Equation 3, subject to the following requirements.

i. For products with ABC enabled by default, the average Idle Mode power in high and low illuminance conditions shall be used in place of P_{IDLE}, above.

ii. For products capable of network connection with multiple protocols (e.g., Wi-Fi and Cellular), at least one connection must be enabled.

Equation 3: Calculation of Maximum Idle Mode Power Requirement

$$P_{IDLE\_MAX} = (0.07 \times Max\ Current) + 4.95 + P_{ISO\ 15118}$$

Where:

- P_{IDLE_MAX} *is the Maximum Idle Mode Power Requirement, in watts;*
- *Max Current is the Nameplate Maximum Output Current, in amperes;*
- $P_{ISO\ 15118}$ *is the ISO 15118 PLC board power allowance of 1W per port.*

Note: The EPA observed that the actual energy consumption for 318 of the 354 certified models was more than 50% lower than the current energy consumption limit in the Idle Mode. This can be attributed to the technological advancements and use of better solid-state relays over time. Hence, the EPA is proposing more efficient Idle Mode requirements to ensure recognition of models with the newer technology.

3.6 No Vehicle Mode Requirements for DC-output EVSE

Note: These requirements refer to SAE J1772 State A (No Vehicle Mode).

3.6.1 Measured No Vehicle Mode Power ($P_{NO\_VEHICLE}$) shall be less than or equal to the Maximum No Vehicle Mode Power ($P_{NO\_VEHICLE\_MAX}$) as calculated per Equation 4, subject to the following requirements.

i. For products with ABC enabled by default, the average No Vehicle Mode power in high and low illuminance conditions shall be used in place of $P_{NO\_VEHICLE}$, above.

ii. For Distributed Product Configuration DC-output EVSE, No Vehicle Mode Power shall be tested and reported for the Minimum Distributed Product Configuration.

Equation 4: Calculation of Maximum No Vehicle Mode Requirement for DC-output EVSE

$$P_{NO\_VEHICLE\_MAX} = (31 \times \ln(Max\ Power)) - 54.3 + P_{BMS}$$

Where:

- $P_{NO\_VEHICLE\_MAX}$ *is the Maximum No Vehicle Mode Power Requirement, in watts;*
- *Max Power is the Nameplate Maximum Output Power, in kilowatts;*
- P_{BMS} *is the No Vehicle Mode power allowance for a battery management system in EVSE with integrated battery pack that cannot be disabled during testing.*

Table 2: No Vehicle Mode Power Allowances for DC-output EVSE

Product Function	No Vehicle Mode Power Allowance (watts, rounded to the nearest 0.1 W for reporting)
Battery Management System (P_{BMS})	15 W for DC EVSE with integrated battery that cannot be disabled.

Note: Most DC EVSE in the market have a display for user convenience. The EPA analyzed No Vehicle Mode data and updated the equation to eliminate display adders. The proposed standby mode requirements result in additional savings with 80% pass rate among the already certified models. Similar updates are made to the Partial On Mode equation.

3.7 Partial On Mode Requirements for DC-output EVSE

Note: These requirements refer to SAE J1772 State B1 or B2 (Partial On Mode).

3.7.1 Partial On Mode Power ($P_{PARTIAL\_ON}$) for DC-output EVSE shall be less than or equal to the Maximum Partial On Mode Power ($P_{PARTIAL\_ON\_MAX}$) as calculated per Equation 5, subject to the following requirements.

i. For products with ABC enabled by default, the average Partial On Mode power in high and low illuminance conditions shall be used in place of ($P_{PARTIAL\_ON}$), above.

ii. For Distributed Product Configuration DC-output EVSE, Partial On Mode Power shall be tested and reported for the Minimum Distributed Product Configuration.

Equation 5: Calculation of Maximum Partial On Mode Requirement for DC-output EVSE

$$P_{PARTIAL\_ON\_MAX} = (31 \times \ln(Max\ Power)) - 54.3 + P_{BMS}$$

Where:

- $P_{PARTIAL\_ON\_MAX}$ *is the Maximum Partial On Mode Power Requirement, in watts;*
- *Max Current is the Nameplate Maximum Output Power, in kilowatts;*
- P_{BMS} *is the Partial On Mode power allowance for a battery management system in EVSE with integrated battery pack that cannot be disabled during testing.*

Table 3: Partial On Mode Power Allowances for DC-output EVSE

Product Function	Partial On Mode Power Allowance (watts, rounded to the nearest 0.1 W for reporting)
Battery Management System (P_{BMS})	15 W for DC EVSE with integrated battery that cannot be disabled.

3.8 Operation Mode Requirements for DC-output EVSE

3.8.1 Average loading-adjusted efficiency (Eff_{AVG}) for all DC-output EVSE as calculated per Equation 6, shall be greater than or equal to the Minimum Average Efficiency (Eff_{AVG_MIN}) in Table 7.

i. For Distributed Product Configuration DC-output EVSE, average loading-adjusted efficiency shall be tested and reported for the Minimum Distributed Product Configuration.

3.8.2 The average loading-adjusted efficiency (Eff_{AVG}) shall be calculated per Equation 6.

Equation 6: Calculation of Average Loading-Adjusted Efficiency

$$Eff_{AVG} = 0.25 \times Eff_{25\%} + 0.25 \times Eff_{50\%} + 0.25 \times Eff_{75\%} + 0.25 \times Eff_{100\%}$$

Where:

- *$Eff_{25\%}$ is the efficiency at the 25% loading condition (Loading Condition 1 per Table 3 of the ENERGY STAR Test Method),*
- *$Eff_{50\%}$ is the efficiency at the 50% loading condition (Loading Condition 2 per Table 3 of the ENERGY STAR Test Method),*
- *$Eff_{75\%}$ is the efficiency at the 75% loading condition (Loading Condition 3 per Table 3 of the ENERGY STAR Test Method), and*
- *$Eff_{100\%}$ is the efficiency at the 100% loading condition (Loading Condition 6 per Table 3 of the ENERGY STAR Test Method).*

Table 4: Minimum Average Loading-Adjusted Efficiency requirement for DC-output EVSE with Output Power ≤ 850 kW

Minimum Average Efficiency (Eff_{AVG_MIN})
0.945

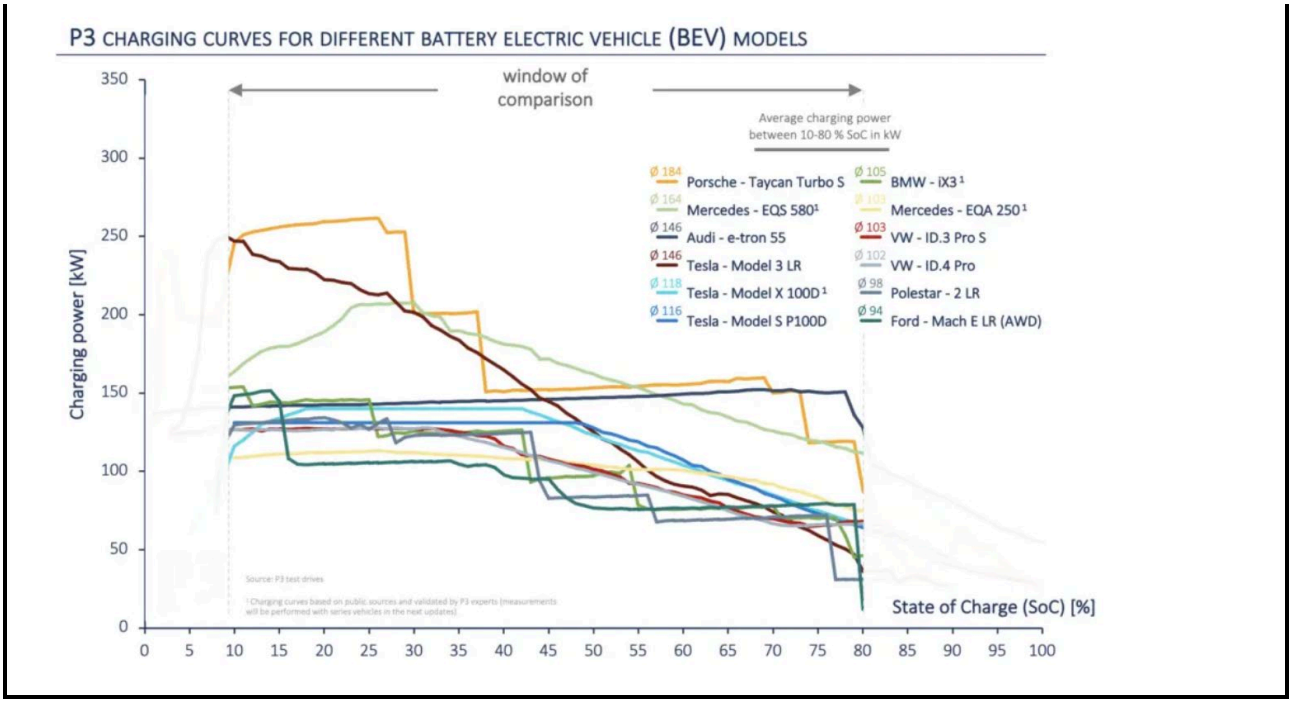
Table 5: Minimum Efficiency requirement for DC-output EVSE with Output Power > 200 kW

Minimum Average Efficiency at 50kW loading condition
0.925

Note: The EPA is proposing to extend On Mode requirements across the scope of the DC EVSE specification instead of the previous 65kW limit. Most EVSE's are comprised of modular power converter units making it possible to extend the criteria to 850kW using the same test methodology. The EPA is also intending to test products only in temperate climate conditions (68° F) which will reduce testing burden. Test data collected over the course of Version 1 specification indicated that the product efficiency does not vary significantly with climatic conditions eliminating the need for temperature testing. The EPA proposes to increase the minimum average loading adjusted efficiency limit in the On Mode to 94.5% allowing 55% of the already certified models to meet the revised requirements.

The EPA understands that the weightings associated with the current loading conditions are not representative of actual use. The Version 1.0 specification placed a 78% weighting on the 100% load condition and far lower weights on the other load conditions. Because EVs rarely arrive at DCFCs with completely empty battery packs and at optimum temperatures for maximum charge rates and with the internal circuitry needed to accept a large DCFC's maximum output, ENERGY STAR has found this 78% weighting to be increasingly unrealistic. Research data from Edmunds.com and P3 show that typical average charge rates for current generation EVs between 10% and 80% State of Charge (SOC) are closer to 157 kW, even if peak charge rates average 210 kW. To address this inconsistency between previous weightings and real-world usage, the EPA is proposing equal weightings at the different loading conditions. Input is welcome on more appropriate weightings based on current charger loading conditions. To ensure reasonable performance at the low load conditions that the large chargers will experience based on the charging curves of battery electric vehicle models as shown in the graph below[9], the EPA is also proposing a 92.5% minimum efficiency requirement in the On Mode at 50kW loading condition for EVSE with maximum rated output power greater than 200kW.

[9] P3 Charging Index - Report 04/21 - P3 group GmbH



3.9 ISO 15118 Requirements

3.9.1 The EVSE shall have the necessary hardware and software that supports the following functionality as defined by the National Electric Vehicle Infrastructure (NEVI) Final Rule – 23 CFR 680.

i. Powerline Carrier (PLC) capability for communication and is capable of Plug and Charge.

Note: To demonstrate compliance with the above requirement, the EVSE must conform to ISO 15118-3 and must have hardware capable of implementing both ISO 15118-2 and ISO 15118-20. The EVSE software must conform to ISO 15118-2. Conformance testing for EVSE software and hardware should follow ISO 15118-4 and ISO 15118-5, respectively. Partners must clearly document this in product manual and/ or technical specification sheets with PLC board schematics and an explanation of how solutions are integrated into the EVSE to meet the requirements of the smart charging standard.

Note: Plug and Charge is an important feature for user convenience. In an effort to harmonize with the NEVI Final Rule, the EPA plans to require models to include all capabilities needed for compliance with ISO 15118 requirements as laid out in the 23 CFR 680.108 (Interoperability of electric vehicle charging infrastructure).

3.10 OCPP 2.0 Requirements

3.10.1 Open Charge Point Protocol (OCPP) means an open-source communication protocol that governs the communication between chargers and the charging networks that remotely manage the chargers[10].

i. EVSEs must conform to OCPP 2.0.1 or higher.

Note: The OCPP certificate is the official certificate delivered to a vendor by the Open Charge Alliance (OCA) that can be provided as proof of the OCPP compliance and is separate from ENERGY STAR certification. For further details on OCPP certification process visit this webpage.

[10] Federal Register :: National Electric Vehicle Infrastructure Standards and Requirements

Note: OCPP 2.0 enables seamless communication between charging stations and central management systems and offers improved scalability enabling operators to manage advanced setups like multi-output EVSEs. To be eligible for ENERGY STAR Version 2.0 certification, the EPA requires that EVSEs are certified to OCPP 2.0.1 or higher in harmonization with the NEVI 23 CFR 680

3.11 Additional Reporting Requirements

3.11.1 Report the measured Idle Mode Power for DC-output EVSE per the ENERGY STAR DC-output EVSE Test Method.

3.11.2 Report whether the EVSE supports V2X (bi-directional charging) capability through compliance with the UL 9741 and/ or UL 1741 SA/ SB standards.

3.11.3 Report whether the EVSE is capable of communicating with other charging networks in accordance with the Open Charge Point Interface (OCPI) 2.2.1 or higher.

3.11.4 Report whether the EVSE has the transceiver and/or necessary hardware to support smart charging for energy management (i.e., beyond simple managed charging with pulse width modulation or CAN bus) using any of the following station-to-vehicle protocols: ISO 15118-2 or later, SAE J1772, IEC 61851-1 or CHADEMO 2.0.

3.11.5 Report whether the EVSE meets the following ISO 15118 requirements.

i. Secure management and storage of keys and certificates.

ii. Transport Layer Security (TLS) version 1.2; additional support for TLS 1.3 or subsequent versions is recommended to prepare for future updates to the ISO 15118 standard.

iii. Remotely receiving updates to activate or enable ISO 15118 use cases.

iv. Connecting to a backend network.

v. Selecting the appropriate communication protocol used by the vehicle.

3.11.6 Report whether the EVSE conforms to CTA-2045 or (when connected to a network) to OpenADR, or to a similar protocol for grid service requests.

Note: The EPA added reporting requirements in Section 3.11.5 to support the updated ISO 15118 requirements defined by the CaleVIP program. To ensure the safety of consumers and support various State / Utility programs, the EPA will only include bi-directional capability for products that conform to the UL 9741 and/ or UL 1741 SA/ SB standards. The EPA seeks stakeholder feedback whether any other relevant requirements should be required to indicate V2X capability. The EPA also proposes to require reporting of OCPI 2.2.1 which indicates that a charging network will be capable of communicating with other charging networks. This will enable an EV driver to use a single method of identification to charge at Charging Stations that are a part of multiple charging networks[10].

The EPA removed the Optional Connected Criteria but will collect information on the capability to connect to a network and the connected features along with other product information through the certification body. The EPA is making this adjustment to simplify the process for sharing information about connected features. Because the DR Protocol is not necessarily available along with other product information, the EPA is calling this out as a separate reporting requirement since it is valuable information for utilities.

4 TESTING

4.1 Test Methods

4.1.1 Test methods identified in Table 8 shall be used to determine certification for ENERGY STAR.

Table 6: Test Methods for ENERGY STAR Certification

Product Type	Test Method
Level 1 and Level 2 Electric Vehicle Supply Equipment	ENERGY STAR Level 1 and Level 2 Electric Vehicle Supply Equipment Test Method (Rev. Jan-2025)
DC-output Electric Vehicle Supply Equipment	ENERGY STAR DC-output Electric Vehicle Supply Equipment Test Method (Rev. Jan-2025)
Electric Vehicle Supply Equipment with Display	ENERGY STAR Displays Test Method (Rev. Nov-2021)
Electric Vehicle Supply Equipment with Full Network Connectivity	Section 6.7.5.2 of Consumer Electronics Association (CEA) 2037-A, Determination of Television Set Power Consumption

Note: The EPA is updating both the AC and DC EVSE test methods. The changes are summarized in the note boxes within the associated documents. The EPA also updated references to the most recent version of the Displays Test Method for testing products with a high-resolution display.

4.2 Number of Units Required for Testing

4.2.1 Representative Models shall be selected for testing per the following requirements:

i. For certification of an individual product model, the Representative Model shall be equivalent to that which is intended to be marketed and labeled as ENERGY STAR.

ii. For certification of a Product Family, the highest energy using model within that Product Family must be tested and serve as the Representative Model. Models within a Product Family may have multiple rated output currents; however, the highest consuming model shall be tested, and all models within the certified family shall meet all requirements for certification to this specification. In the case of multi-output units, testing shall be conducted with all the outputs populated and any lesser configurations would be able to be certified.

iii. Products tested with networking capabilities shall have a connection enabled during testing per Section 4.1B of the AC and DC EVSE Test Methods. However, if the model is available without networking capability, this variation shall meet the requirements of this specification without respective network allowances in order to be certified within the same Product Family as the network capable model.

iv. Any subsequent testing failures (e.g., as part of verification testing) of any model in the family will have implications for all models in the family.

4.2.2 A single unit of each Representative Model shall be selected for testing.

4.2.3 All units/configurations for which a Partner is seeking ENERGY STAR certification must meet the ENERGY STAR requirements. However, for DC-output EVSE only, if a Partner wishes to certify configurations of a model for which non-ENERGY STAR certified alternative configurations exist, the Partner must assign the certified configurations an identifier in the model name/number that is unique to ENERGY STAR certified configurations. This identifier must be used consistently in association with the certified configurations in marketing/sales materials and on the ENERGY STAR list of certified products (e.g., model A1234 for baseline configurations and A1234-ES for ENERGY STAR certified configurations).

Note: There may be cases—as described in the paragraph above—where not all units/configurations will meet ENERGY STAR requirements. If so, the worst-case configuration for the test will be the worst-case certified configuration, and not one of the presumably even higher energy consuming non-certified configurations.

Note: Partner must ensure that all configurations certified as ENERGY STAR continue to meet the certification criteria through subsequent firmware, software, or other changes to the certified product.

5 EFFECTIVE DATE

5.1.1 Effective Date: Version 2 ENERGY STAR Electric Vehicle Supply Equipment specification shall take effect on **TBD**. To certify for ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on the model's date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.

Note: Version 2.0 will be effective nine months after the specification is finalized. However, manufacturers will be able to certify to Version 2.0 immediately upon finalization.

5.1.2 Future Specification Revisions: The EPA reserves the right to change this specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through stakeholder discussions. In the event of a specification revision, please note that the ENERGY STAR certification is not automatically granted for the life of a product model. Considerations for future revisions include:

i. The EPA will continue to monitor the market for wireless EVSE and evaluate the opportunity to differentiate such products based on energy performance. Should the potential for significant energy savings exist among these products, The EPA will consider expanding the scope of this EVSE specification to include them in a future revision. The UL 2750 and SAE J2954 standards define acceptable criteria for testing wireless power transfer (WPT) in light-duty plug-in electric vehicles and would be relevant should the EPA address wireless charging in future specifications.

ii. The EPA will continue to monitor development of ISO 15118 standard adoption and harmonize with the National Electric Vehicle Infrastructure standards and requirements as the market evolves.