

Appendix F-4

Purpose and Rationale

§ 1962.3. Electric Vehicle Charging Requirements.

Subsection 1962.3(a)(1). Applicability.

Purpose

The purpose of this amendment is to state which vehicles are subject to the proposed requirements for charging equipment and capacities for ZEVs and distinguish them from vehicles, like neighborhood electric vehicles (NEVs), that are not.

Rationale

The amendments are necessary to maintain consistency with the amended and newly proposed ZEV requirements. New requirements are intended for full-function ZEVs, PHEVs, and extended range battery electric vehicles, and have been crafted to ensure those vehicles are meeting appropriate technical minimums. NEVs are used in limited applications and do not typically use public infrastructure, and so are not subject to the requirements of this section for model years 2006-2013 and 2026 and subsequent.

Currently, there are no ZEVs in California that do not earn ZEV credit through section 1962.2, title 13, California Code of Regulations. Into the future, along with other changes proposed throughout this rulemaking, certified ZEVs for sale in California will automatically count toward a manufacturer's ZEV requirement, and ZEV credits will no longer be the correct currency for the proposed regulation. It is therefore necessary to amend the current applicability to vehicles that qualify for ZEV credit and apply these requirements to all certified ZEVs.

The amendments also add PHEV applicability to this subsection instead of solely having it in subsection (a)(2). Though the existing language in subsection (a)(2) supported applicability for PHEVs, it describes these vehicles in terms of off-charge capability rather than explicitly calling them "plug-in hybrid electric vehicles". The proposed amendments are necessary for clarity and ensuring the correct terminology is being used across regulations, rather than having multiple definitions through various sections of California Code of Regulations. The proposed language links PHEVs that are defined by the existing ZEV regulations found in 1962.1 and 1962.2.

Subsection 1962.3(a)(2). Applicability.

Purpose

The purpose of this amendment is to apply this section to model year 2026 and subsequent PHEVs and ZEVs certified for sale in California.

Rationale

This amendment is necessary to ensure this section is applicable to all 2026 and subsequent model year ZEVs and PHEVs certified for sale in California under proposed California Code of Regulations, title 13, section 1962.4.

Subsection 1962.3(b). Definitions.

Purpose

The purpose of this subsection is to make applicable the definitions used in the new ZEV regulation (proposed section 1962.4) and test procedures to this section.

Rationale

This amendment is necessary to ensure the definitions in the new ZEV regulation and associated test procedures apply to section 1962.3 for 2026 and subsequent model years. This ensures terms are used and understood consistently throughout the ZEV requirements.

Subsection 1962.3(c)(1). Alternating Current Charger Requirements.

Purpose

The purpose of the proposed amendments is to update the SAE J1772 version referenced and required on-board charger sizes for 2026 and subsequent model year PHEVs and BEVs. SAE has since updated its J1772 document from the version included in the current section. For 2026 and subsequent model year BEVs and PHEVs, the on-board minimum output is updated to 5.76 kilowatts, or sufficient power to charge the vehicle to full in less than 4 hours.

Rationale

The amendment to this subsection is necessary to update to the latest SAE J1772 revision, adopted in October 2017, which was adopted since section 1962.3 was last updated in 2012. The 2017 version has further defined Alternating Current (AC) and Direct Current (DC) charging functions and sequences. It has also further defined the plug dimensions, tactile feel and performance requirements.

Current BEVs and PHEVs are required to be equipped with an on-board charger (OBC) with a charging capability of 3.3 kW or higher. This was intended to ensure the vehicle could be charged within a reasonable time period with a Level 1 or 2 connection given the typical battery size (and electric range) of BEVs and PHEVs planned at that time. However, as battery technology has improved, BEVs and PHEVs are being produced and designed with increasingly larger batteries to meet the market demands for longer range and the higher minimum electric ranges required by regulation. Accordingly, as discussed in section III.C.3.c of the Staff Report, the minimum capability of the OBC must also be correspondingly increased to maintain a reasonable charging time and reduce the risk of consumer dissatisfaction. Additionally, in the case of PHEVs, excessive charge times could lead to reduced usage of the

electric capacity and increased usage of the gasoline engine, undermining the needed air quality and greenhouse gas reductions.

A subheading is also added for consistency with the rest of subsection (c). Similarly, “subdivision” is changed to “subsection,” a non-substantive change for consistency.

Subsection 1962.3(c)(2). Alternative for AC Charger Inlet.

Purpose

The purpose of this subsection is to allow manufacturers to use an alternative to the AC inlet in subsection (c)(1), provided two conditions are met, without first having to apply for and secure Executive Officer approval.

Rationale

This amendment is necessary to provide manufacturers some flexibility in meeting the AC inlet requirement (provided the existing two required conditions are satisfied). Removing Executive Officer approval of alternatives beforehand is necessary to remove an additional burden without harming the integrity of the requirement, as compliance will still be reviewed during certification. The term “subdivision” is changed to “subsection” for consistency across the section.

Subsection 1962.3(c)(3). Charging Cord Requirements.

Purpose

The addition of this subsection is to set forth requirements that the manufacturer must supply a charging cord for all 2026 and subsequent model year applicable vehicles and define the required characteristics of the cord.

Rationale

This subsection is necessary to set a new requirement for charging cords for 2026 and subsequent model year BEVs and PHEVs, as described in section III.C.3.d of the Staff Report. With today’s BEV and PHEV offerings, the included charging cords commonly only have Level 1 charging capability and are not selectable or customizable by the user to work with the circuits and outlets available to that user. As a result, many BEV and PHEV drivers have needed to purchase separate Level 2 charging equipment with longer cords either offered by the OEM or by a third-party, and many have needed electrical modifications to their home or garage to match the needs of the cord. As the market expands to vehicles with larger batteries and a wider range of consumers with higher driving needs and less optimal parking situations, the need for Level 2 capable charging is expanding. Absent changes to the included cord, this could become a larger barrier to adoption for consumers not willing to purchase additional charging equipment.

By requiring all vehicles to have an included charging cord that is Level 1 and Level 2 capable, at various amperages, and with a minimum 20-foot length, the cord can meet the charging needs of a much larger portion of vehicle owners. Further, as a basic cord is already included, the incremental cost to upsize that cord to be more capable is less

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than the costs a consumer would face to purchase separate Level 2 equipment to meet their needs. And by allowing the consumer to select a lower amperage for charging, the need to modify the home's electrical circuit to be compatible with the cord is virtually eliminated.

Surveys show drivers with access to Level 2 charging are more satisfied with their electric vehicles and are more likely to purchase an electric vehicle for their next vehicle. As the market expands to lower price point vehicles to appeal to more diverse vehicle owners including used vehicle purchasers, it is important to reduce any barriers, perceived or real, that would discourage selection of a BEV or PHEV. BEV and PHEV acceptance is critical in order to achieve the necessary emission reductions of criteria pollutants, greenhouse gases, and air toxics. If BEVs and PHEVs become the predominant technologies, it is essential those vehicles, in addition to meeting the technical minimum range requirements, described in Section III.C.2. and 3., are able to be charged reasonably quickly which necessarily means at Level 2 speeds in both residential and non-residential settings.

Subsection 1962.3(c)(3)(A).

Purpose

The purpose of this proposed subsection is to set a minimum length for charging cords that meet requirements in section 1962.3.

Rationale

Cords issued with BEVs and PHEVs to date greatly vary in cord length. In order to achieve the necessary emission reductions of criteria pollutants, greenhouse gases, and air toxics through electric vehicle market growth, it is necessary that driver demographics expand beyond primarily residents of single-family homes with dedicated garages to greater numbers of residents of rental units and multi-unit dwellings with varied parking and charging situations, as described in section III.C.3.d of the Staff Report. Short convenience cords will not serve customers in non-garage or garage adjacent parking situations. It is necessary to mandate a minimum length to ensure drivers without dedicated parking entering the market at all price points are more likely able to make use of the supplied convenience cord. Directionally, the requirement of twenty feet is necessary to support a greater number of drivers to adequately provide charging in various parking situations.

Subsection 1962.3(c)(3)(B)1. through 3.

Purpose

The purpose of this proposed subsection is to require charging cords to have dual amperage capability between Level 1 and Level 2, and to set minimum amperage for each charging level.

Rationale

Requiring cords to have dual charging capability is needed to reduce costs to drivers and reduce barriers to access Level 2 charging. Industry leaders are already supplying charging cords with dual capability with the most popular EV models available.

With today's BEV and PHEV offerings, the included charging cords commonly only have Level 1 charging capability and are not selectable or customizable by the user to work with the circuits and outlets available to that user. For consumers that do not have a dedicated circuit with sufficient amperage to connect the cord to, they are unable to use the cord at all. Together, the limitations of slower Level 1 charging, need for a dedicated circuit, and shorter cord length meet the driving (and thus, charging) needs of only a small subset of total vehicle owners. As a result, many BEV and PHEV drivers have needed to purchase separate Level 2 charging equipment with longer cords either offered by the OEM or by a third-party, and many have needed electrical modifications to their home or garage to match the needs of the cord. As the market expands to vehicles with larger batteries and a wider range of consumers with higher driving needs and less optimal parking situations, the need for Level 2 capable charging is expanding. Absent changes to the included cord, this could become a larger barrier to adoption for consumers not willing to purchase additional charging equipment, as described in section III.C.3.d of the Staff Report.

The minimum amperage requirements ensure the cord can deliver a sufficient amperage rate to take advantage of each level. The lowest amperage 240 Volt circuit commonly found in residences is a 30 Amp circuit (such as one used for a clothes dryer). The minimum required amperage for the Level 2 selected charge rate is 24 Amps (80-percent of the circuit rating as allowed by California Electrical Code) at 240 Volts. This ensures the included cord will likely be compatible with any existing 240 Volt circuits in a residence and give the largest number of consumers a reasonably fast maximum charging speed without having to upgrade the cord or the residence wiring. Similar to the minimum amperage requirements for Level 2, minimum requirements of 12 amps is 80-percent of the circuit rating (16 amps) at 120 Volts.

Subsection 1962.3(c)(3)(C)1. through 3.

Purpose

The purpose of this proposed subsection is to require charging cords to have user select-ability to downgrade amperage during charging. Manufacturers may comply with this requirement by putting that select-ability either on the charging cord itself or through the vehicle interface.

Rationale

The access and availability of an adequate electrical circuit to connect a charging cord to varies greatly among vehicle owners and where they routinely park their vehicle. In many situations, vehicle owners do not have a dedicated electrical circuit of sufficient power to meet the maximum charging rate of the included charging cord. Without the ability for such a consumer to select a lower rate of charging (on-cord or, more likely,

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in vehicle), the consumer would be forced to separately purchase less capable Level 1 or Level 2 charging equipment to use in lieu of the included cord or, if possible, to have electrical modifications made to their residence to add a more powerful or dedicated circuit. Both options entail additional expenditure by the consumer to be able to charge the vehicle and can represent a significant obstacle to BEV adoption, as described in section III.C.3.d of the Staff Report. It is necessary to require a feature to allow the consumer to select a lower amperage so the consumer may utilize the included cord with whatever electrical circuit they have access to, albeit in concert with the slower charging speed of the amperage selected. This is necessary to avoid the consumer being compelled to incur additional cost and to make recharging these vehicles more accessible. The user select-ability minimum for Level 1 is necessary to set at 8 amps to account for a consumer who only has access to a shared 110V circuit and needs to draw at less than 12 amps to ensure the added load of charging will not exceed the circuit capacity. The user select-ability of 24 amps is necessary for consumers where the cord is capable of greater than 24 amps but the consumer only has access to a 30 amp 240V circuit.

Subsection 1962.3(c)(3)(D).

Purpose

The purpose of this proposed subsection is to require charging cords to be certified by a nationally recognized testing laboratory (NRTL) to the UL 2594 safety standard for electric vehicle supply equipment (EVSE).

Rationale

UL 2594 is an industry-recognized standard for charging cords. Although all charging cords included on vehicles today are certified to this standard, this requirement is necessary to ensure all charging cords going forward will meet minimum safety standards regardless of price point.

Subsection 1962.3(c)(4). Direct Current (DC) Charger Inlet.

Purpose

The purpose of this proposed subsection is to add requirements for all 2026 and subsequent model year ZEVs to be equipped with a DC fast charging (DCFC) inlet that adheres to SAE J1772 REV OCT 2017.

Rationale

This subsection is necessary to ensure that all 2026 and subsequent model year ZEVs are capable of fast charging. As discussed in section III.C.3.e of the Staff Report, without this requirement, some ZEVs will not be able to charge in the shorter times that are more comparable to conventional vehicles, and thus may not be suitable for use by drivers in a way that displaces conventional engines and their associated emissions. Though initially targeted primarily for travel corridors to facilitate longer distance traveling and not previously forecasted to be the main medium for routine charging, DCFC will likely become more prevalent in the future for a few reasons:

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1) BEV electric range is growing, as evidenced by the description of technologies found explained in Section III.A.2. With greater range, vehicles will need to be charged in shorter times in order to be functionally useful to consumers and suitable replacements for conventional engines.

2) As vehicle electric range grows, consumer expectations of the time it takes to charge a vehicle are unlikely to change. According to recent surveys, drivers expect to have a similar refueling experience as gasoline vehicles. This would suggest more drivers may utilize DCFC as a means to recharge longer range BEVs in times closer to refueling a conventional gasoline vehicle.

3) Demographics of ZEV buyers are expanding. The majority of current ZEV buyers are affluent, single-family homeowners. However, as sales increase to meet staff's proposal for 100% zero-emission by 2035, drivers living in rentals and multi-unit dwellings without control over the property to install charging systems will become more common. These drivers may have limited access to Level 1 or 2 charging infrastructure that can require eight or more hours to charge a vehicle and will become more reliant on public DCFC to meet routine charging needs.

The existence of three different DCFC systems leads to inconsistent and complex charging experiences for consumers. Currently in California, the majority of DCFC connectors are CCS and Tesla, though CHAdeMO has significant availability. This variation complicates expansion of the market for publicly available charging infrastructure at a time when rapid growth is needed for the vehicles that will be produced to meet the proposed ZEV standards. Consumers already have a hard time with their public charging experience, as evidenced by surveys showing the number one reason for consumers choosing to buy a non-ZEV after owning a ZEV is frustration with infrastructure and charging. Provisions that simplify, increase consistency, and increase robustness are essential, especially as the ZEV-buying population will continue to expand to include more drivers dependent on public DCFC.

The California Energy Commission (CEC) projects that in order to meet the Governor's N-79-20 goals for 2030, 1.2 million public and private chargers will need to be deployed, with 37,000 of those being DCFCs.¹ If vehicles do not have a standardized DCFC inlet, the deployment of this additional infrastructure will be more complex to protect for the various connectors that vehicles may be equipped with, and consumers would need to take additional steps when planning to ensure their vehicle is compatible with the DCFC station they intend to use. If vehicles do not have DCFC capability at all, their ability to be used to replace a gasoline vehicle will be greatly limited to vehicle owners who have very specific travel needs and access to charging. Standardizing to one DCFC inlet will support private and public investment in public DCFC charging equipment and greatly simplify the future charging experience for consumers by ensuring compatibility with their vehicle.

¹ California Energy Commission, 2021. "Implementation of AB 2127 Electric Vehicle Charging Infrastructure Assessments" Docket Number 19-AB-2127. Posted July 14, 2021. Accessed January 4, 2022.

Subsection 1962.3(c)(5)(A) through (B).

Purpose

The purpose of this subsection is to establish an alternative compliance method for manufacturers who will continue to outfit BEVs with non-SAE J1772-compliant DCFC inlets. Subsection (A) provides that OEMs using the alternative option must supply an adapter to enable the vehicle to utilize a charging station that is equipped with a SAE J1772 charging cord and plug. Subsection (B) requires the adapter and alternate inlet to be tested and approved by a NRTL to ensure the adaptor sufficiently works its intended purpose.

Rationale

Like subsection (c)(2), this subsection is necessary to provide an alternative and outline requirements for a manufacturer to outfit a BEV with a non-SAE J1772 DCFC inlet, providing some flexibility to the manufacturers. Manufacturers such as Tesla have spent the last 10 years building out a proprietary supercharging network for its consumer base. Drivers have even claimed this factored into their decision when choosing a Tesla model. Tesla consumer satisfaction with charging ranks among the highest of all electric vehicle manufacturers, notably because of this network of superchargers. This option is necessary to allow manufacturers who have invested heavily into infrastructure a path forward without stranding investments. In order to ensure drivers of these vehicles can also access other types of stations (which also increases convenience and therefore promotes ZEV adoption), staff is proposing subsection (A) as a way for stations outside the proprietary network to be accessed. The requirement in subdivision (B) mirrors the existing requirement in subsection (c)(2)(B) for manufacturers who provide an adapter to comply with section 1962.3 for Level 1 and 2 to have the adapter tested and approved by a NRTL to ensure it serves its intended purpose.

Subsection 1962.3(d) Severability

Purpose

The purpose of this subsection is to establish that if one or more of the provisions in the proposed regulation are deemed invalid or unenforceable, the remainder shall continue to be in effect.

Rationale

This subsection is necessary to preserve the intent of the proposed regulations to maximize emission reductions, even if unforeseen issues arise with enforcing any individual term of the proposed regulation.