



Pacific Gas and
Electric Company®



October 8, 2012

Michael L. Nearman, Deputy Executive Director
California Building Standards Commission
2525 Natomas Park Drive, Suite 130
Sacramento, CA 95833
Via email: CBSC@dgs.ca.gov

Subject: Title 24 update and California Electrical Code section 625.13

Dear Mr. Nearman:

We recommend that the Building Standards Commission directly incorporate the NFPA Tentative Interim Agreement (TIA 11-2) of the 2011 version of the National Electrical Code into California Electrical Code Title 24, Part 3 section 625.13.

TIA 11-2 specifically allows the use of plug and cord connected electric vehicle supply equipment of 250 Volts and less as long as it meets certain conditions contained in the TIA. This TIA is already effective,¹ but by directly incorporating the TIA into the text of the California Electrical Code, the extra step of looking up the TIA could be avoided. Inspectors that refer only to the California Electrical Code without referring to the TIAs could think that only electric vehicle supply equipment rated for 125 Volts and less are allowed to be plugged into the building electrical supply. This confusion could occur in many jurisdictions; this committee could prevent this confusion by directly adopting the TIA language into the California Electrical Code.

Sample proposed language with strikeouts and underlines for deleted and added language is contained in Attachment 1 to this letter. Attachment 2 contains the NFPA TIA 11-2 without strikeouts and underlines.

Attachment 3 documents that a careful reading of Article 625.13 allows plug and cord connection of not only 125 Volt EVSEs but also those electric vehicle charging systems that are “part of a system identified and listed as suitable for the purpose and meeting the requirements of 625.18, 625.19, and 625.29 shall be permitted to be cord and- plug-connected.” Thus we think this clarifying change to the 2011 NEC is editorial and is not a substantive change to the intent of the standard.

¹ “An official NFPA Document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect.” Notice and Disclaimer of Liability Concerning the Use of NFPA Documents. 2012
<http://www.nfpa.org/itemDetail.asp?categoryID=787&itemID=20324&URL=Codes%20&%20Standards/Standards%20development%20process/Disclaimers&cookie%5Ftest=1>

Given the significant role that Plug-in Electric Vehicles will play in reducing transportation impacts on local air quality and greenhouse gas emissions in California, we believe that this change will be desirable from a state policy perspective by removing administrative barriers from the permitting of plug-in electric vehicle supply equipment. Thank you for the opportunity to provide comments.

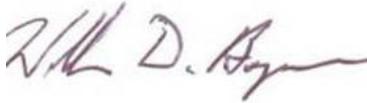
Sincerely,



Rajiv Dabir
Manager, Customer Energy Solutions
Pacific Gas and Electric Company



Chip Fox
Residential Programs & Codes
Standards Manager
San Diego Gas and Electric Company



Bill Boyce
Supervisor, Electric Transportation
Sacramento Municipal Utility District



Alok Singh
Manager, Design & Engineering
Services
Southern California Edison

Attachment 1: Proposed Modifications to California Electrical Code Section 625.13

The following is the 2011 NEC Section 625.13 with proposed modifications illustrated as ~~strikethrough font~~ for deletions and underlined font for additions.

625.13 Electric Vehicle Supply Equipment Connection. Electric vehicle supply equipment shall be permitted to be cord and plug connected to the premises wiring system in accordance with one of the following:

(A) Electric vehicle supply equipment intended for connection to receptacle outlets rated at 125 volts, single phase, 15 and 20 amperes.

(B) Electric vehicle supply equipment that is rated 250 volts maximum and complies with all of the following:

(1) It is ~~installed indoors and or part of a system identified and listed system as suitable for the purpose and meeting the requirements of 625.18, 625.19, and 625.29 shall be permitted to be cord and plug connected.~~

(2) It is intended for connection to receptacle outlets rated no more than 50 amperes.

(3) It is installed to facilitate any of the following:

a. Ready removal for interchange

b. Facilitate maintenance and repair

c. Repositioning of Portable, movable, or EVSE fastened in place

(4) Power supply cord length for electric vehicle supply equipment fastened in place is limited to 6 ft (1.8 m).

(5) Receptacles are located to avoid physical damage to the flexible cord.

All other electric vehicle supply equipment shall be permanently connected to the premises wiring system ~~and fastened in place.~~ This The electric vehicle supply equipment shall have no exposed live parts.

Attachment 2: 2011 NFPA 70 (National Electrical Code) TIA 11-2²

**NFPA 70
National Electrical Code
2011 Edition**

Reference: 625.13

TIA 11-2

(SC 11-10-4/TIA Log #1037)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 70, National Electrical Code, 2011 edition. The TIA was processed by Code Making Panel 12 and the National Electrical Code Technical Correlating Committee, and was issued by the Standards Council on October 19, 2011, with an effective date of November 8, 2011.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

625.13 Electric Vehicle Supply Equipment Connection. Electric vehicle supply equipment shall be permitted to be cord and plug connected to the premises wiring system in accordance with one of the following:

(A) Electric vehicle supply equipment intended for connection to receptacle outlets rated at 125 volts, single phase, 15 and 20 amperes.

(B) Electric vehicle supply equipment that is rated 250 volts maximum and complies with all of the following:

- (1) It is part of a listed system meeting the requirements of 625.18, 625.19, and 625.29.
- (2) It is intended for connection to receptacle outlets rated no more than 50 amperes.
- (3) It is installed to facilitate any of the following:
 - a. Ready removal for interchange
 - b. Facilitate maintenance and repair
 - c. Repositioning of Portable, movable, or EVSE fastened in place
- (4) Power supply cord length for electric vehicle supply equipment fastened in place is limited to 6 ft (1.8 m).
- (5) Receptacles are located to avoid physical damage to the flexible cord.

All other electric vehicle supply equipment shall be permanently connected to the premises wiring system. The electric vehicle supply equipment shall have no exposed live parts.

Issue Date: October 19, 2011

Effective Date: November 8, 2011

² http://iaei-western.org/Files/Code/2011/TIA_11-2_625.13.pdf

Attachment 3: 2011 NFPA 70 (National Electrical Code) Article 625

Narrative: Article 625.13 says that EVSE's rated at 125 V and either 20 or 15 Amps are allowed to be plug and cord connected. However this section indicates that plug and cord connection is allowed for the 125 V EVSE's "***or part of a system identified and listed as suitable for the purpose and meeting the requirements of 625.18, 625.19, and 625.29 shall be permitted to be cord and- plug-connected.***"

These three sections indicate that higher voltage EV supply is allowed if:

- the chargers are designed to deenergize once the cable is disconnected from the electric vehicle (§625.18);
- EVSE and cable are designed to de-energize the cable conductors and electric vehicle connector upon exposure to strain that could result in either cable rupture or separation of the cable from the electric connector and exposure of live parts (§625.19); and
- equipment is ventilated if labeled as suitable for charging vehicles that require venting when charging indoors (but not required for nonvented batteries), and the equipment is mounted between 18" and 48" above the floor (§625.29).

Text of 2011 NFPA 70 (National Electrical Code) Article 625.13, 625.15, 625.18, 625.19 and 625.29

625.13 Electric Vehicle Supply Equipment. Electric vehicle supply equipment rated at 125 volts, single phase, 15 or 20 amperes or part of a system identified and listed as suitable for the purpose and meeting the requirements of 625.18, 625.19, and 625.29 shall be permitted to be cord and- plug-connected. All other electric vehicle supply equipment shall be permanently connected and fastened in place. This equipment shall have no exposed live parts.

625.15 Markings. The electric vehicle supply equipment shall comply with 625.15(A) through (C).

(A) General. All electric vehicle supply equipment shall be marked by the manufacturer as follows:
FOR USE WITH ELECTRIC VEHICLES

(B) Ventilation Not Required. Where marking is required by 625.29(C), the electric vehicle supply equipment shall be clearly marked by the manufacturer as follows:

VENTILATION NOT REQUIRED

The marking shall be located so as to be clearly visible after installation.

(C) Ventilation Required. Where marking is required by 625.29(D), the electric vehicle supply equipment shall be clearly marked by the manufacturer, "Ventilation Required." The marking shall be located so as to be clearly visible after installation.

625.18 Interlock. Electric vehicle supply equipment shall be provided with an interlock that de-energizes the electric vehicle connector and its cable whenever the electrical connector is uncoupled from the electric vehicle. An interlock shall not be required for portable cord-and-plug-connected electric vehicle supply equipment intended for connection to receptacle outlets rated at 125 volts, single phase, 15 and 20 amperes.

625.19 Automatic De-Energization of Cable. The electric vehicle supply equipment or the cable-connector combination of the equipment shall be provided with an automatic means to de-energize the cable conductors and electric vehicle connector upon exposure to strain that could result in either cable rupture or separation of the cable from the electric connector and exposure of live parts. Automatic means to de-energize the cable conductors and electric vehicle connector shall not be required for portable cord-and-plug-connected electric vehicle supply equipment intended for connection to receptacle outlets rated at 125 volts, single phase, 15 and 20 amperes.

625.29 Indoor Sites. Indoor sites shall include, but not be limited to, integral, attached, and detached residential garages; enclosed and underground parking structures; repair and nonrepair commercial garages; and agricultural buildings.

(A) Location. The electric vehicle supply equipment shall be located to permit direct connection to the electric vehicle.

(B) Height. Unless specifically listed for the purpose and location, the coupling means of the electric vehicle supply equipment shall be stored or located at a height of not less than 450 mm (18 in.) and not more than 1.2 m (4 ft) above the floor level.

(C) Ventilation Not Required. Where electric vehicle nonvented storage batteries are used or where the electric vehicle supply equipment is listed or labeled as suitable for charging electric vehicles indoors without ventilation and marked in accordance with 625.15(B), mechanical ventilation shall not be required.

(D) Ventilation Required. Where the electric vehicle supply equipment is listed or labeled as suitable for charging electric vehicles that require ventilation for indoor charging, and is marked in accordance with 625.15(C), mechanical ventilation, such as a fan, shall be provided. The ventilation shall include both supply and exhaust equipment and shall be permanently installed and located to intake from, and vent directly to, the outdoors. Positive pressure ventilation systems shall be permitted only in buildings or areas that have been specifically designed and approved for that application. Mechanical ventilation requirements shall be determined by one of the methods specified in 625.29(D)(1) through (D)(4).

(1) Table Values. For supply voltages and currents specified in Table 625.29(D)(1) or Table 625.29(D)(2), the minimum ventilation requirements shall be as specified in Table 625.29(D)(1) or Table 625.29(D)(2) for each of the total number of electric vehicles that can be charged at one time.

(2) Other Values. For supply voltages and currents other than specified in Table 625.29(D)(1) or Table 625.29(D)(2), the minimum ventilation requirements shall be calculated by means of the following general formulas as applicable:

(1) Single phase: Ventilation _{single phase} in cubic meters/minute (m³/min) = [ROP 12-67]

$$\frac{(\text{volts})(\text{amperes})}{1718}$$

Ventilation _{single phase} in cubic feet/minute (cfm) = [ROP 12-67]

$$\frac{(\text{volts})(\text{amperes})}{48.7}$$

(2) Three phase: Ventilation _{three phase} in cubic meters/minute (m³/min) = [ROP 12-67]

$$\frac{1.732(\text{volts})(\text{amperes})}{1718}$$

Ventilation _{three phase} in cubic feet/minute (cfm) = [ROP 12-67]

$$\frac{1.732(\text{volts})(\text{amperes})}{48.7}$$

(3) Engineered Systems. For an electric vehicle supply equipment ventilation system designed by a person qualified to perform such calculations as an integral part of a building's total ventilation system, the minimum ventilation requirements shall be permitted to be determined in accordance with calculations specified in the engineering study.

[ROP 12-69]

(4) Supply Circuits. The supply circuit to the mechanical ventilation equipment shall be electrically interlocked with the electric vehicle supply equipment and shall remain energized during the entire electric vehicle charging cycle. Electric vehicle supply equipment shall be marked in accordance with 625.15. Electric vehicle supply

equipment receptacles rated at 125 volts, single phase, 15 and 20 amperes shall be marked in accordance with 625.15(C) and shall be switched, and the mechanical ventilation system shall be electrically interlocked through the switch supply power to the receptacle.

Table 625.29(D)(1) Minimum Ventilation Required in Cubic Meters/Minute (m³/min) for Each of the Total Number of Electric Vehicles That Can Be Charged at One Time [ROP 12-66]

Branch-Circuit Ampere Rating	Branch-Circuit Voltage						
	Single Phase			3 Phase			
	120 V	208 V	240 V or 120/240 V	208 V or 208Y/120 V	240 V	480 V or 480Y/277 V	600 V or 600Y/347 V
15	1.1	1.8	2.1	—	—	—	—
20	1.4	2.4	2.8	4.2	4.8	9.7	12
30	2.1	3.6	4.2	6.3	7.2	15	18
40	2.8	4.8	5.6	8.4	9.7	19	24
50	3.5	6.1	7.0	10	12	24	30
60	4.2	7.3	8.4	13	15	29	36
100	7.0	12	14	21	24	48	60
150	—	—	—	31	36	73	91
200	—	—	—	42	48	97	120
250	—	—	—	52	60	120	150
300	—	—	—	63	73	145	180
350	—	—	—	73	85	170	210
400	—	—	—	84	97	195	240