



California Electrical Code (CEC) Updates

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CEC 2025 Code Updates:**2023 NFPA 70 updates**

- **New Style Manual (NEC)**
- **Code changes**

**California Amendments**

- **Housekeeping items**
- **Healthcare Microgrids**

**Combo changes NFPA 70 and CEC****CEC 2025 Adopts 2023 NFPA 70 (NEC)****2023 NEC, updates include:**

- **Added code sections**
- **All definitions moved to Chapter 1**
- **New Style Manual conformity**
- **Miscellaneous**
- **Grammar/Editorial changes**



Key				
	New medium voltage sections			
	New product sections			
	New power limited circuits sections			

NFPA
70
National Electrical Code
International Electrical Code Series
2023

[99:3.3.140] (517) (CMP-15)

Article 100

Modified Definitions:



Accessible (as applied to wiring methods).

Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in **or blocked** by the structure, **other electrical equipment, other building systems**, or finish of the building. (CMP-1)

Appliance.

Utilization equipment, generally other than industrial, that is **fastened in place, stationary, or portable**; is normally built in a standardized **size or type**; and is installed or connected as a unit to perform one or more functions such as clothes washing, air-conditioning, food mixing, deep frying, and so forth. (CMP-17)



Article 100

New Definitions:

Commissioning.

The process, procedures, and testing used to set up and verify the initial performance, operational controls, safety systems, and sequence of operation of electrical devices and equipment, prior to it being placed into active service. (CMP-13)

Energized, Likely to Become. (Likely to Become Energized)

Conductive material that could become energized because of the failure of electrical insulation or electrical spacing. (CMP-5)

Power-Supply Cord.

An assembly consisting of an attachment plug and a length of flexible cord connected to utilization equipment. (CMP-6)

Primary Source.

An electric utility or another source of power that acts as the main forming and stabilizing source in an electric power system. (CMP-4)



110.16 Arc-Flash Hazard Warning.**(B) Service Equipment and Feeder Supplied Equipment.**

In other than dwelling units, in addition to the requirements in [110.16\(A\)](#), a permanent **arc flash** label shall be field or factory applied to service equipment **and feeder supplied equipment rated 1000 amperes or more**. The arc flash label shall be in accordance with applicable industry practice and include the date the label was applied. The label shall meet the requirements of [110.21\(B\)](#). (sufficiently durable, effective, permanent)

**NFPA 70E – Standard for Electrical Safety in the Workplace****130.5(H) Equipment Labeling.**

Electrical equipment such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are in other than dwelling units and that are likely to require examination, adjustment, servicing, or maintenance while energized shall be marked with a label containing all the following information:

- (1) Nominal system voltage
- (2) Arc flash boundary
- (3) At least one of the following:
 - a. Available incident energy and the corresponding working distance, or the arc flash PPE category in [Table 130.7\(C\)\(15\)\(a\)](#) or [Table 130.7\(C\)\(15\)\(b\)](#) for the equipment, but not both
 - b. Minimum arc rating of clothing
 - c. Site-specific level of PPE

**110.22 Identification of Disconnecting Means.****(A) General.**

Each disconnecting means shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident. In other than one- or two-family dwellings, the marking shall include the identification **and location of the circuit source** that supplies the disconnecting means unless located and arranged so the identification and location of the circuit source is evident. The marking shall be of sufficient durability to withstand the environment involved.



Part II. 1000 Volts, Nominal, or Less

110.26 Spaces About Electrical Equipment.

Working space, and access to and egress from working space, shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment. Open equipment doors shall not impede access to and egress from the working space. Access or egress is impeded if one or more simultaneously opened equipment doors restrict working space access to be less than 610 mm (24 in.) wide and 2.0 m (6 1/2 ft) high.

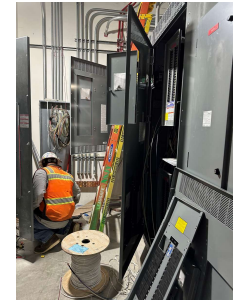


Table 110.26(A)(1) Working Spaces			
Nominal Voltage to Ground	Minimum Clear Distance		
	Condition 1	Condition 2	Condition 3
0-150	900 mm (3 ft)	900 mm (3 ft)	900 mm (3 ft)
151-600	900 mm (3 ft)	1.0 m (3 ft 6 in.)	1.2 m (4 ft)
601-1000	900 mm (3 ft)	1.2 m (4 ft)	1.5 m (5 ft)



Part II. 1000 Volts, Nominal, or Less

110.26 Spaces About Electrical Equipment.

(A) Working Space.

4) Limited Access.

Where equipment operating at 1000 volts, nominal, or less to ground and likely to require examination, adjustment, servicing, or maintenance while energized is required by installation instructions or function to be located in a space with limited access, all of the following shall apply:

...

(4) The space in front of the enclosure shall comply with the depth requirements of [Table 110.26\(A\)\(1\)](#) and shall be unobstructed to the floor by fixed cabinets, walls, or partitions. Space reductions in accordance with [110.26\(A\)\(1\)\(b\)](#) shall be permitted. The maximum height of the working space shall be the height necessary to install the equipment in the limited space. A horizontal ceiling structural member or access panel shall be permitted in this space provided the location of weight-bearing structural members does not result in a side reach of more than 150 mm (6 in.) to work within the enclosure.



Part II. 1000 Volts, Nominal, or Less

110.26 Spaces About Electrical Equipment.

(A) Working Space.

(6) Grade, Floor, or Working Platform.

The grade, floor, or platform in the required working space shall be kept clear, and the floor, grade, or platform in the working space shall be as level and flat as practical for the entire required depth and width of the working space



Part II. 1000 Volts, Nominal, or Less

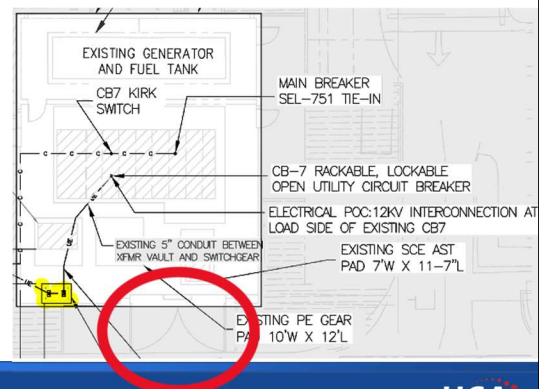
110.26 Spaces About Electrical Equipment.

...

(C) Entrance to and Egress from Working Space.

(3) Personnel Doors

Where equipment rated 800 amperes or more that contains overcurrent devices, switching devices, or control devices is installed and there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the door(s) shall open at least 90 degrees in the direction of egress and be equipped with listed panic hardware or listed fire exit hardware.



Part II. 1000 Volts, Nominal, or Less

110.29 In Sight From (Within Sight From, Withing Sight)..

Where this Code specifies that one equipment shall be "in sight from," "within sight from," or "within sight of," and so forth, another equipment, the specified equipment is to be visible and not more than 15 m (50 ft) distant from the other. (CMP-1)

Definition

In Sight From (Within Sight From) (Within Sight).

Equipment that is visible and not more than 15 m (50 ft) distant from other equipment is *in sight from* that other equipment. (CMP-1)

Informational Note: See [110.29](#) for additional information.



Part III. Over 1000 volts, Nominal

110.33 Entrance to Enclosures and Access to Working Space.

(A) Entrance.

At least one entrance to enclosures for electrical installations as described in [110.31](#) not less than 610 mm (24 in.) wide and 2.0 m (6 1/2 ft) high shall be provided to give access to the working space about electrical equipment.

Open equipment doors shall not impede access to and egress from the working space. Access or egress is impeded if one or more simultaneously opened equipment doors restrict working space access to be less than 610 mm (24 in.) wide and 2.0 m (6 1/2 ft) high

(3) Personnel Doors

Where there are personnel doors intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the doors shall open at least 90 degrees in the direction of egress and be equipped with listed panic hardware or listed fire exit hardware.





Part III. Over 1000 volts, Nominal

110.34 Work Space and Guarding.

(A) Working Space.

Except as elsewhere required or permitted in this *Code*, equipment likely to require examination, adjustment, servicing, or maintenance while energized shall have clear working space in the direction of access to live parts of the electrical equipment and shall be not less than specified in [Table 110.34\(A\)](#). Distances shall be measured from the live parts, if such are exposed, or from the enclosure front or opening if such are enclosed. **The grade, floor, or platform in the required working space shall be kept clear, and the floor, grade, or platform in the working space shall be as level and flat as practical for the entire depth and width of the working space.**



210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. **A listed Class A GFCI shall provide protection in accordance with 210.8(A) through (F).** The GFCI shall be installed in a readily accessible location.

(B) Other Than Dwelling Units.

All 125-volt through 250-volt receptacles supplied by single-phase branch circuits rated **150 volts or less to ground, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less, installed in the following locations shall be provided with GFCI protection:**

(B) Other Than Dwelling Units.

- (1) Bathrooms
- (2) Kitchens**
- (3) **Areas with sinks** and permanent provisions for food preparation, **beverage preparation**, or cooking
- (4) Buffet serving areas with permanent provisions for food serving, beverage serving, or cooking**
- (5) Rooftops
- (6) Outdoors
- (7) Sinks **where receptacles or cord-and-plug-connected fixed or stationary appliances** are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink
- (8) Indoor damp **or** wet locations
- (9) Locker rooms with associated showering facilities
- ...
- (14) Laundry areas
- (15) Bathtubs and shower stalls where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall



"Photo courtesy of Eaton"



210.8 (D) Specific Appliances.

GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single- or 3-phase:

- (1) Automotive vacuum machines
- (2) Drinking water coolers and bottle fill stations
- (3) High-pressure spray washing machines
- (4) Tire inflation machines
- (5) Vending machines
- (6) Sump pumps
- (7) Dishwashers
- (8) Electric ranges
- (9) Wall-mounted ovens
- (10) Counter-mounted cooking units
- (11) Clothes dryers
- (12) Microwave ovens



"Photo courtesy of Eaton"

**210.12 Arc-Fault Circuit-Interrupter Protection.**

Arc-fault circuit-interrupter (AFCI) protection shall be installed in accordance with 210.12(B) through (E) by any of the means described in 210.12(A)(1) through (A)(6). The AFCI shall be listed and installed in a readily accessible location.

...

(D) Other Occupancies

All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

- (1) Guest rooms and guest suites of hotels and motels
- (2) Areas used exclusively as patient sleeping rooms in nursing homes and limited-care facilities
- (3) Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations



215.15 Barriers.

Barriers shall be placed such that no energized, uninsulated, ungrounded busbar or terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing load terminations in panelboards, switchboards, switchgear, or motor control centers supplied by feeder taps in 240.21(B) or transformer secondary conductors in 240.21(C) when the disconnecting device, to which the tap conductors are terminated, is in the open position.

**210.23 Permissible Loads, Multiple-Outlet Branch Circuits.****(A) 10-Ampere Branch Circuits**

A 10-ampere branch circuit shall comply with the requirements of 210.23(A)(1) and (A)(2).

(1) Loads Permitted for 10-Ampere Branch Circuits.

A 10-ampere branch circuit shall be permitted to supply one or more of the following:

- (1) Lighting outlets
- (2) Dwelling unit exhaust fans on bathroom or laundry room lighting circuits
- (3) A gas fireplace unit supplied by an individual branch circuit

(2) Loads Not Permitted for 10-Ampere Branch Circuits.

A 10-ampere branch circuit shall not supply any of the following:

- (1) Receptacle outlets
- (2) Fixed appliances, except as permitted for individual branch circuits
- (3) Garage door openers
- (4) Laundry equipment



"Photo courtesy of Eaton"



Table 210.24(1) & 210.24(2) Summary of Branch-Circuit Requirements — Copper (Aluminum and Copper-Clad Aluminum) Conductors

Circuit Rating	10 A	15 A	20 A	30 A	40 A	50 A
Conductors (min. size):						
Circuit wires	14 (12)	14 (12)	12 (10)	10(8)	8 (6)	6 (4)
Taps	14 (12)	14 (12)	14	14	12	12
Fixture wires and cords			See 240.5.			
Overcurrent Protection						
	10 A	15 A	20 A	30 A	40 A	50 A
Outlet devices:						
Lampholders permitted	Any type	Any type	Any type	Heavy duty	Heavy duty	Heavy duty
Receptacle rating ¹	Not applicable ²	15 max. A	15 A or 20 A	30 A	40 A or 50 A	50 A
Maximum Load						
	10 A	15 A	20 A	30 A	40 A	50 A
Permissible load	See 210.23(A).	See 210.23(B).	See 210.23(B).	See 210.23(C).	See 210.23(D).	


215.18 Surge Protection.
(A) Surge-Protective Device.

Where a feeder supplies any of the following, a surge-protective device (SPD) shall be installed:

- 1) Dwelling units
- 2) Dormitory units
- 3) Guest rooms and guest suites of hotels and motels
- 4) Areas of nursing homes and limited-care facilities used exclusively as patient sleeping room

(B) Location.

The SPD shall be installed in or adjacent to distribution equipment, connected to the load side of the feeder, that contains branch circuit overcurrent protective device(s) that supply the locations specified in 215.18(A).



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Part VI. Health Care Facilities - added:

220.110 Receptacle Loads.

Receptacle loads calculated in accordance with [220.14\(H\)](#) and (I) and supplied by branch circuits not exceeding 150 volts to ground shall be permitted to be subjected to the demand factors provided in [Table 220.110\(1\)](#) and [Table 220.110\(2\)](#) for health care facilities.

834 receptacles - Category 1 or Category 2 patient care spaces						
<u>112.5 kVA Transformer</u>						
		5,000	10,000	140,000		
150,000	180		10,000	70,000	80,000	
<u>50kVA transformer</u>						
		5,000	5,000	140,000		
150,000	180	5,000	2,500	35,000	37,500	



Part VI. Health Care Facilities

220.110 Receptacle Loads.

Receptacle loads calculated in accordance with [220.14\(H\)](#) and (I) and supplied by branch circuits not exceeding 150 volts to ground shall be permitted to be subjected to the demand factors provided in [Table 220.110\(1\)](#) and [Table 220.110\(2\)](#) for health care facilities.

Table 220.110(1) Demand Factors for Receptacles Supplied by General-Purpose Branch Circuits in Category 1 and Category 2 Patient Care Spaces	
Portion of Receptacle Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (%)
First 5000 or less	100
From 5001 to 10,000	50
Remainder over 10,000	25

Table 220.110(2) Demand Factors for Receptacles Supplied by General-Purpose Branch Circuits in Category 3 and Category 4 Patient Care Spaces	
Portion of Receptacle Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (%)
First 10,000 or less	100
Remainder over 10,000	50



220.70 Energy Management Systems (EMSs).

If an energy management system (EMS) is used to limit the current to a feeder or service in accordance with **750.30**, a single value equal to the maximum ampere setpoint of the EMS shall be permitted to be used in load calculations for the feeder or service.

The setpoint value of the EMS shall be considered a continuous load for the purposes of load calculations

Article 750 Energy Management Systems

750.6 Listing.
Energy management systems shall be one of the following:

- (1) Listed as a complete energy management system
- (2) Listed as a kit for field installation in switch or overcurrent device enclosures
- (3) Listed individual components assembled as a system

750.30 Load Management.

(C) Capacity of Branch Circuit, Feeder, or Service.
An energy management system shall not cause a branch circuit, feeder, or service to be overloaded. If an EMS is used to limit the current on a conductor, **750.30(C)(1)** through (C)(4) shall apply:

(1) Current Setpoint.
A single value equal to the maximum ampere setpoint of the EMS shall be permitted for one or more of the following:

- (1) For calculating the connected load per **220.70**
- (2) For the maximum source current permitted by EMS control





230.67 Surge Protection.

(A) Surge-Protective Device.

All services supplying the following occupancies shall be provided with a surge-protective device (SPD):

- (1) Dwelling units
- (2) Dormitory units
- (3) Guest rooms and guest suites of hotels and motels
- (4) Areas of nursing homes and limited-care facilities used exclusively as patient sleeping rooms

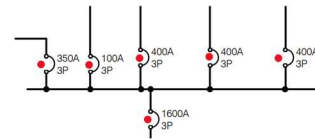
(B) Location.
The SPD shall be an integral part of the service equipment or shall be located immediately adjacent thereto.





240.11 Selective Coordination.

If one or more feeder overcurrent protective devices are required to be selectively coordinated with a service overcurrent protective device by other requirements in this Code, all feeder overcurrent protective devices supplied directly by the service overcurrent protective device shall be selectively coordinated with the service overcurrent protective device.

**215.10 Ground-Fault Protection of Equipment.**

Each feeder disconnect rated 1000 amperes or more and installed on solidly grounded wye electrical systems of more than 150 volts to ground, but not exceeding 1000 volts phase-to-phase, shall be provided with ground-fault protection of equipment in accordance with **230.95**

517.17 (B) Feeders.

Where ground-fault protection of equipment is provided for operation of the service disconnecting means or feeder disconnecting means as specified by **230.95** or **215.10**, an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load. Such protection shall consist of overcurrent devices and current transformers or other protective equipment that shall cause the feeder disconnecting means to open.

The additional levels of ground-fault protection of equipment shall not be installed on the load side of an essential electrical system transfer switch.

**Article 242 Overvoltage Protection****Part II. Surge-Protective Devices (SPDs), 1000 Volts or Less****242.9 Indicating.**

An SPD shall provide indication that it is functioning properly



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Article 250 Grounding and Bonding

250.64 Grounding Electrode Conductor Installation.

Grounding electrode conductors at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at a separately derived system shall be installed as specified in [250.64\(A\)](#) through (G).

(G) Enclosures with Ventilation Openings.

Grounding electrode conductors shall not be installed through a ventilation opening of an enclosure



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Article 300 General Requirements for Wiring Methods and Materials

300.25 Exit Enclosures (Stair Towers).

Where an exit enclosure is required to have a fire resistance rating, only electrical wiring methods serving equipment permitted by the authority having jurisdiction in the exit enclosure shall be installed within the exit enclosure.

Exception: Where egress lighting is required on outside exterior doorways from the exit enclosure, luminaires shall be permitted to be supplied from the inside of the exit enclosure.



406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in following locations shall be listed tamper-resistant receptacles:

- (1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings, and common areas
 - ...
 - (5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces:
 - a. Business offices accessible to the general public
 - b. Lobbies, and waiting spaces
 - c. Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)
 - (6) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
 - (7) Dormitory units
 - (8) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes
 - (9) Foster care facilities, nursing homes, and psychiatric hospitals
 - (10) Areas of agricultural buildings accessible to the general public and any common areas
- locations shall be listed tamper-resistant receptacles.

**Article 408 Switchboards, Switchgear, and Panelboards****408.4 Descriptions Required.****(A) Circuit Directory or Circuit Description.**

Every circuit and circuit modification shall be provided with a legible and permanent description that complies with all of the following conditions as applicable:

- (1) Located at each switch or circuit breaker in a switchboard or switchgear
- (2) Included in a circuit directory that is located on the face of, inside of, or in an approved location adjacent to the panel door in the case of a panelboard
- (3) Clear, evident, and specific to the purpose or use of each circuit including spare positions with an unused overcurrent device
- (4) Described with a degree of detail and clarity that is unlikely to result in confusion between circuits
- (5) Not dependent on transient conditions of occupancy
- (6) Clear in explaining abbreviations and symbols when used

(B) Description of Source of Supply.

All switchboards, switchgear, and panelboards supplied by a feeder(s) in other than one- or two-family dwellings shall be permanently marked in accordance with the following:

- (1) With the identification and physical location of where the power originates
- (2) With a label that is permanently affixed and of sufficient durability to withstand the environment involved
- (3) Using a method that is not handwritten



408.9 Replacement Panelboards.

Replacement panelboards shall be permitted to be installed in existing enclosures in accordance with **408.9(A)** or (B).

(A) Panelboards Listed for the Specific Enclosure.

If the replacement panelboard is listed for the specific enclosure identified by either catalog number or dimensional information, the panelboard shall be permitted to maintain its short-circuit current rating.

(B) Panelboards Not Listed for the Specific Enclosure.

If the available fault current is greater than 10,000 amperes, the completed work shall be field labeled. If the available fault current is 10,000 amperes or less, the replacement panelboard shall be identified for the application. Any previously applied listing marks on the cabinet that pertain to the panelboard shall be removed.



"Photo courtesy of Eaton"

**Part XVII. Special Provisions for Germicidal Irradiation Luminaires****410.190 General.****410.193 Installation.**

Luminaires shall be installed in accordance with the manufacturer's instructions and equipment markings.

410.195 Locations Not Permitted.**(A) General Lighting.**

Luminaires shall not be installed as lighting for general illumination unless such use is indicated in the manufacturer's instructions.

(B) Installed Location.

Luminaires shall not be installed where likely to be subject to physical damage.

...

(D) Mounting Height.

Luminaires installed in a building space that will be occupied during luminaire operation shall not be mounted below the minimum height specified by its listing and installation instructions.



Part XVII. Special Provisions for Germicidal Irradiation Luminaires**410.197 Germicidal Irradiation Systems.****(A) Listing.**

A germicidal irradiation system intended to provide a safeguard against UV exposure by ensuring that a building space will not be occupied during luminaire operation shall be listed and identified as a germicidal system.

(B) System Components.

All system components shall be provided by the system manufacturer or clearly specified in the installation instructions as a component that the installer is required to source separately.

(C) Installation.

A germicidal irradiation system shall be installed in accordance with the manufacturer's installation instructions and installation markings.

**Article 440 Air-Conditioning and Refrigerating Equipment****440.14 Location.**

Disconnecting means shall be located within sight from, and readily accessible from, the air-conditioning or refrigerating equipment. The disconnecting means shall be permitted to be installed on or within the air-conditioning or refrigerating equipment. Disconnecting means shall meet the working space requirements of [110.26\(A\)](#).

The disconnecting means shall not be located on panels that are designed to allow access to the air-conditioning or refrigeration equipment or where it obscures the equipment nameplate(s).



Article 445 Generators

445.18 Disconnecting Means.

(A) Disconnecting Means.

Generators other than cord-and-plug-connected portable generators shall have one or more disconnecting means. Each disconnecting means shall simultaneously open all associated ungrounded conductors. Each disconnecting means shall be lockable open in accordance with [110.25](#).

The disconnecting means shall be permitted to be located within the generator behind a hinged cover, door, or enclosure panel. Where the generator disconnecting means is located within the generator, a field applied label meeting the requirements of [110.21\(B\)](#) shall be provided indicating the location of the generator disconnecting means.



Article 445 Generators

445.19 Emergency Shutdown of Prime Mover.

(B) Remote Emergency Shutdown.

For other than one- and two-family dwelling units, generators with greater than 15 kW rating shall be provided with a remote emergency stop switch to shut down the prime mover. The remote emergency stop switch shall be located outside the equipment room or generator enclosure at a readily accessible location and shall also meet the requirements of [445.19\(A\)\(1\)](#) and (A)(2).

The remote emergency stop switch shall be permitted to be mounted on the exterior of the generator enclosure. The remote emergency stop switch shall be labeled Generator Emergency Shutdown, and the label shall meet the requirements of [110.21\(B\)](#).



517.10 Applicability.**B) Not Covered.**

Part II shall not apply to the following:

- (1) Business offices, corridors, waiting rooms, and the like in clinics, medical and dental offices, and outpatient facilities
- (2) Spaces of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this Code where these spaces are used exclusively as patient sleeping rooms, as determined by the health care facility's governing body

Informational Note No. 1: See 406.12(5) for receptacles located in health care facility business offices, corridors, and waiting rooms that are required to be tamper resistant.

Informational Note No. 2: See 210.12(D) for branch circuits supplying outlets and receptacles located in patient sleeping rooms in nursing homes and limited care facilities that are connected to arc-fault circuit-interrupter circuits.

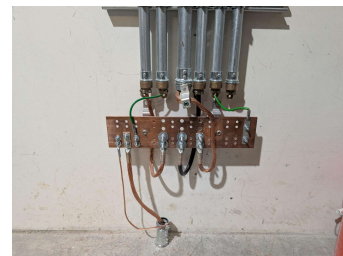
- (3) Areas used exclusively for any of the following purposes:

- a. Intramuscular injections (immunizations)
- b. Psychiatry and psychotherapy
- c. Alternative medicine
- d. Optometry
- e. Pharmacy services not contiguous to health care facilities

**517.14 Panelboard Bonding.**

The equipment grounding terminal buses of the normal and essential branch-circuit panelboards serving the same individual patient care vicinity shall be connected together with an insulated continuous copper conductor not smaller than 10 AWG. Where two or more panelboards serving the same individual patient care vicinity are served from separate transfer switches on the essential electrical system, the equipment grounding terminal buses of those panelboards shall be connected together with an insulated continuous copper conductor not smaller than 10 AWG. This conductor shall be permitted to be broken in order to terminate on the equipment grounding terminal bus in each panelboard.

Exception: The insulated continuous copper conductor not smaller than 10 AWG shall be permitted to be terminated on listed connections to aluminum or copper busbars not smaller than 6 mm thick × 50 mm wide (1/4 in. thick × 2 in. wide) and of sufficient length to accommodate the number of terminations necessary for the bonding of the panelboards. The busbar shall be securely fastened and installed in an accessible location.





700.3 Tests and Maintenance.

(A) Commissioning Witness Test.

The authority having jurisdiction shall conduct or witness **the commissioning** of the complete system upon installation and periodically afterward. Informational Note:

See NECA 90, Standard for Commissioning Building Electrical Systems.

Commissioning Plan

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517.1 Scope. ...

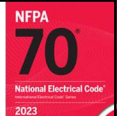
(C) Electrical Equipment Schedules [OSHPD 1, 2, 5 & 6]. ~~Electrical equipment schedules in the construction documents shall clearly indicate which equipment will be part of the essential electrical system sources and distribution equipment and [OSHPD 2] alternate source of power or provide appropriate documentation for special seismic certifications for all components of these systems.~~





517.4 [OSHPD 1, 1R, 2, 4 & 5] Electric Power Sources, Feeders and Services. One source (or sets of sources) shall be sized to supply the entire healthcare facility electrical load and shall be permitted to be located on-site or off-site.. The sources shall be one of the following:

- a. An off-site public utility service to the site
- b. On-site resources (PV's Batteries, fuel cells, etc.)
- c. A combination of both to meet calculated load



517.22 Demand Factors.

Demand factors for receptacle loads supplied by branch circuits not exceeding 150 volts to ground and installed in Category 1, Category 2, Category 3, and Category 4 patient care spaces shall be in accordance with **220.110**.





~~517.22~~ (Relocated to 517.8) [~~OSHPD 1, 2, 3, 4 & 5~~]
~~Artificial Lighting. ...~~
~~517.24~~ (Relocated to 517.9) [~~OSHPD 1, 1R, 2, 3, 4 & 5~~]
~~Mobile Medical Facilities. ...~~

517.8 [~~OSHPD 1, 2, 3, 4 & 5~~] *Artificial Lighting. ...*
517.9 [~~OSHPD 1, 1R, 2, 3, 4 & 5~~] *Mobile Medical Facilities. ...*



517.10 Applicability.

(A) Applicability. Part II shall apply to patient care space of all health care facilities.

(B) Not Covered. Part II shall not apply to the following:

- (1) Business offices...
- (2) Spaces of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this Code where these spaces are used exclusively as patient sleeping rooms, as determined by the health care facilities governing board.

Not adopted by [~~OSHPD 1, 2, 3, 4 & 5~~]





517.29 Type 1 Essential Electrical Systems. ...

...

(A.1) [OSHPD 1, 2, 3 (Surgical Clinics only), 4 & 5]

Applicability. The requirements of Part III, 517.29 through 517.35, shall apply to hospitals, facilities subject to the requirements of CEC 517.40(B), clinics subject to the requirements of CEC 517.45(B) or (C), correctional treatment centers and acute psychiatric hospitals providing critical care (Category 1) services.



517.30 Sources of Power.

(A) Two Independent Power Sources. Essential electrical systems (EES) shall have two or more independent sources (or sets of sources). One on-site source (or sets of sources) shall be sized to supply the entire EES. The other independent source (or sets of sources) shall be sized to supply the entire EES and shall be permitted to be located on-site or off-site. Additional sources other than the first two independent sources shall be permitted to be sized to supply the intended load.

(A.1) [OSHPD 1, 3 (Surgical Clinics only), 4 & 5] Two Independent Power Sources. The Essential Electrical System (EES) shall be served by two or more independent sources (or sets of sources). In addition to the Electric Power Sources called out in 517.4 each healthcare facility shall have one on-site source (or sets of sources) sized to supply the entire EES.

Both sources (entire site and EES) may share resources, however neither source (or sets of sources) shall depend on resources from the other to meet calculated load values for loads they are designated to feed.

Clearly indicate all EES components on the design documents.

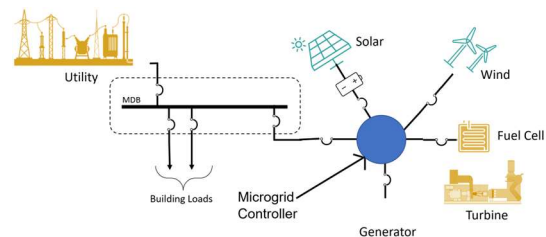
The two independent sources (or sets of sources) shall be located to reduce the likelihood of simultaneous interruption of EES components and non-EES components.



517.30 Sources of Power. (continued)

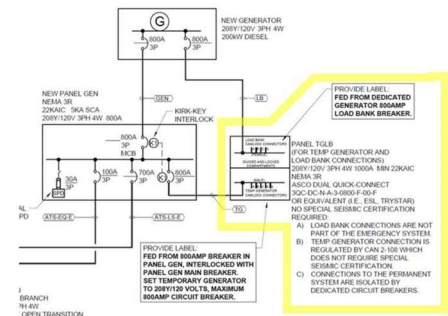
(B) Power Sources for the EES. Power sources for the EES shall be permitted to be any of those specified in 517.30(B)(1) through (B)(5).

- (1) Utility Supply Power. ...
- (2) Generating Units. ...
- (3) Fuel Cell Systems. ...
- (4) Energy Storage Systems. ...
- (5) Health Care Microgrid.... [OSHPD 1, 2, 3 (Surgical Clinics only), 4 & 5] EES Health Care Microgrids shall meet the installation and commissioning requirements called out in NFPA 99 Section 6.10.7



517.30 Sources of Power. (continued)

(D) [OSHPD 1, 4, & 5]: Temporary Source of Power for Maintenance or repair of the Alternate Source of Power. The Essential Electrical System (EES) shall include permanent switching means to connect temporary or permanent on-site resources (energy sources or stored energy power supply systems) configured and sized adequately to provide power for the EES, such that additional resources can be connected (without rewiring) to meet essential power requirements for individual equipment replacement, failures or maintenance.





517.31 Requirements for the Essential Electrical System....

(D) Capacity of Systems. The essential electrical system shall have the capacity and rating to meet the maximum actual demand likely to be produced by the connected load.

Feeders shall be sized in accordance with 215.2 and Part III of Article 220. The alternate power source(s) required in 517.30 shall have the capacity and rating to meet the demand produced by the load at any given time.

Demand calculations for sizing of the alternate power source(s) shall be based on any of the following:

(1) Prudent demand factors and historical data

(2) Connected load

(3) Feeder calculation

(4) Any combination of the above

The sizing requirements in 700.4 and 701.4 shall not apply to alternate sources.

~~(D.1) [OSHPD 1, 1R, 2, 3, 4 & 5] Capacity of Systems. The essential electrical system shall have the capacity and rating to meet the maximum actual demand likely to be produced by the connected load.~~



517.31 Requirements for the Essential Electrical System....

...

(H) [OSHPD 1, 4 & 5] On-site energy storage systems and fuel supply. The on-site Essential Electrical System (EES) sources (or set of sources) shall have sufficient resources on-site to provide continuous essential power as follows:

(1) [SFM, OSHPD 1 & 4] For correctional treatment centers that provide optional services, resources shall be available at all times sufficient to support not less than 24 hours full-demand operation. For acute care hospital facilities required to meet NPC-5, the on-site resources shall be sufficient for no less than 72 hours at full output of the required Emergency Power Supply System (EPSS). On-site fuel for redundant power sources is not required (i.e., for N+1 generators fuel is required for N generators only.)

(2) [SFM, OSHPD 4 & 5] For the following health facilities of seven or more beds: correctional treatment centers that provide only basic services and acute psychiatric hospitals, on-site resources shall be available at all times sufficient to support not less than 6 hours at full output of the required Emergency Power Supply System (EPSS). On-site fuel for redundant power sources is not required (i.e., for N+1 generators fuel is required for N generators only.)



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5.5.3* Fuel Tank Capacity.

5.5.3.1

For classifications of 24 hours or less, as specified in [Table 4.1\(a\)](#), the main fuel tank shall have a minimum capacity of at least 133 percent of the low-fuel sensor quantity specified in [5.5.2](#).

5.5.3.2

For classifications greater than 24 hours, the main fuel tank shall have a minimum capacity of at least 100 percent of the low-fuel sensor quantity specified in [5.5.2](#).



517.41 Required Power Sources.

~~(A) **Independent Power Sources.** Essential electrical systems (EES) shall have two or more independent sources (or sets of sources). One on-site source (or sets of sources) shall be sized to supply the entire EES. The other independent source (or sets of sources) shall be sized to supply the entire EES and shall be permitted to be located on-site or off-site. Additional sources other than the first two independent sources shall be permitted to be sized to supply the intended load.~~

(A.1) [QSHPD 2, 4 & 5] (A.1) Two Independent Power Sources. *The Essential electrical systems (EES) shall be served by two or more independent sources (or sets of sources). In addition to the Electric Power Sources called out in 517.4, each healthcare facility shall have one on-site source (or sets of sources) sized to supply the entire EES. Both sources (entire site and EES) can share resources, however neither source (or sets of sources) shall depend on resources from the other to meet calculated values for loads they are designed to feed.*

Clearly indicated on design documents all EES components.

The two independent source (or sets of sources) shall be located to reduce the likelihood of simultaneous interruption of EES components and non-EES components.



517.41 Required Power Sources. (Continued)**(B) Location of EES Components.**

EES components shall be located to minimize interruptions caused by natural forces common to the area (e.g., storms, floods, earthquakes, or hazards created by adjoining structures or activities). [99:6.2.4.1]

Installations of electrical services shall be located to reduce possible interruption of normal electrical services resulting from similar causes as well as possible disruption of normal electrical service due to internal wiring and equipment failures. [99:6.2.4.2]

Feeders shall be located to provide physical separation of the feeders of the alternate source and from the feeders of the normal electrical source to prevent possible simultaneous interruption. [99:6.2.4.3]

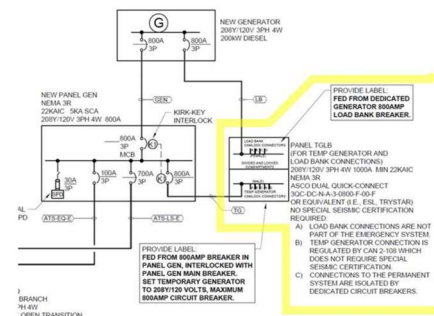
~~(B.1) [OSHPD 2, 4 & 5] Power Sources for the EES. Power sources for the EES shall be permitted to be any of those specific in 517.41(B)(1) through (B)(4). One on-site power source (or set of sources) that is sized to supply the entire EES shall meet the on-premises fuel or battery stored energy requirements specified in Article 700.12.~~

~~Exception No. 1 to B.1 [OSHPD 2 & 4]: Where the normal source consists of generating units on the premises, the alternate source shall be either another generator set or an external utility service.~~

**517.41 Required Power Sources. (Continued)**

(C) [OSHPD 2, 4 & 5] Power Sources for the EES. Power sources for the EES shall be permitted to be any of those specific in 517.30(B)(1) through (B)(5).

(D) [OSHPD 2, 4 & 5] Permanent Connection(s) Points for ESS Maintenance and Repairs. Permanent connection(s) points shall be provided for the connection of temporary or permanent on-site storage or power sources configured and sized adequately to provide power for the EES, such that additional resources can be connected (without rewiring) to meet essential power requirements for equipment failures or maintenance.





517.42 Essential Systems for Nursing Homes and Limited Care Facilities.

(G) [SFM, OSHPD 2, 4 & 5] On-site energy storage systems and fuel supply. The on-site Essential Electrical System sources (or set of sources) shall have sufficient resources on-site to provide continuous essential power as follows:

(1) [SFM, OSHPD 2, 4 & 5] For the following health facilities of seven or more beds: correctional treatment centers that provide only basic services, acute psychiatric hospitals, intermediate care facilities, and skilled nursing facilities, on-site resources shall be available at all times sufficient to support not less than 6 hours at full output of the required Emergency Power Supply System (EPSS). On-Site fuel for redundant power sources is not required (i.e., for N+1 generators fuel is required for N generators only).

(2) [SFM, OSHPD 2] For skilled nursing facilities that have an alternate source of power that is independent of the EES that provides power for mechanical equipment required to maintain safe temperatures, life-saving equipment and oxygen generating devices to meet requirements of CEC 517.1(B), sufficient onsite fuel (or contractual arrangement) shall be provided to operate the EPSS for 96 hours.



517.45 Essential Electrical Systems for Other Health Care Facilities. ...

(E.1) [OSHPD 3 (Surgical Clinics only). Ambulatory surgical clinics shall be provided with a generator with on-site fuel. The essential electrical systems for Ambulatory Surgical Clinics shall be as described in 517.29 through 517.35.

...

~~(G) [OSHPD 3] Ambulatory Surgical Clinics. The essential electrical systems for Ambulatory Surgical Clinics shall be as described in 517.29 through 517.35.~~

~~(HG)...~~

(H) [SFM, OSHPD 3 (Surgical Clinics only)] For ambulatory surgical clinics, sufficient resources on-site and shall be available at all times to provide not less than 4 hours at full output of the required Emergency Power Supply System (EPSS).





517.63 Grounded Power Systems in Anesthetizing Locations.

(A) Battery-Powered Lighting Units. One or more battery-powered lighting units shall be provided and shall be permitted to be wired to the critical lighting circuit in the area and connected ahead of any local switches. **[OSHPD 1, 3 (Surgical Clinics only) & 4] Units shall be capable of providing lighting for 1-1/2 hours.**

NFPA 99

6.3.2.6 Battery-Powered Lighting Units.

6.3.2.6.1

One or more battery-powered lighting units shall be provided within locations where deep sedation and general anesthesia is administered.

6.3.2.6.7

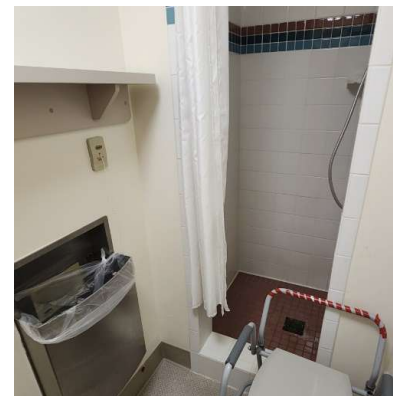
Units shall be capable of providing lighting for 1 1/2 hours.



517.123 [OSHPD 1, 2, 3, 4 & 5] Call Systems

(C) Bath Stations. Bath stations shall meet the following requirements:

- (1) Shall be accessible to a patient lying on the floor. Pull cords shall be provided that extend to within 12 inches (304.8 mm) of the floor.
- (2) The call may be reset only at the location where it was initiated.
- (3) In shower stalls and tubs, the station shall be located between 5 and 6 feet (1524 to 1829 mm) above the floor, within normal view of the user and within reach of staff without the need to step into the stall or tub.
- (4) At toilets, the call station shall be located to the side, within 12 inches (304.8 mm) of the front of the toilet bowl and shall maintain a clearance of 12 inches (304.8 mm) above the horizontal grab bar.





700.12 General Requirements . . . (continued)

Exception No. 1: [SFM, OSHPD 1, 2, 3, 4 & 5] The on-premises fuel supply shall be sufficient for not less than 24 hours full-demand operation in acute general care hospitals and correctional treatment centers that provide optional services. For acute care hospital facilities required to meet NPC-5, the on-premise fuel supply shall be sufficient for no less than 72 hours full-demand operations.

Exception No. 2: [SFM, OSHPD 1, 2, 3, 4 & 5] The on-premises fuel supply shall be sufficient for not less than 6 hours full-demand operation in the following health facilities of seven or more beds: correctional treatment centers that provide only basic services, acute psychiatric hospitals, intermediate care facilities, and skilled nursing facilities.

Exception No. 3: [SFM, OSHPD 1, 2, 3, 4 & 5] The on-premises fuel supply shall be sufficient for not less than 4 hours full-demand operation in ambulatory surgical clinics.



700.11 Wiring, Class-2-Powered Emergency Lighting Systems.

(A) General.

Line voltage supply wiring and installation of Class 2 emergency lighting control devices shall comply with 700.10. Class 2 emergency circuits shall comply with 700.11(B) through (D).

(B) Identification.

Emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system by the following methods:

(1) All boxes and enclosures for Class 2 emergency circuits shall be permanently marked as a component of an emergency circuit or system.

(2) Exposed cable, cable tray, or raceway systems shall be permanently marked to be identified as a component of an emergency circuit or system, within 900 mm (3 ft) of each connector and at intervals not to exceed 7.6 m (25 ft).

(C) Separation of Circuits.

Class 2 emergency circuits shall be wired in a listed, jacketed cable or with one of the wiring methods of Chapter 3. If installed alongside nonemergency Class 2 circuits that are bundled, Class 2 emergency circuits shall be bundled separately. If installed alongside nonemergency Class 2 circuits that are not bundled, Class 2 emergency circuits shall be separated by a nonconductive sleeve or nonconductive barrier from all other Class 2 circuits. Separation from other circuits shall comply with 725.136.

(D) Protection.

Wiring shall comply with the requirements of 300.4 and be installed in a raceway, armored or metal-clad cable, or cable tray.

Exception No. 1: Section 700.11(D) shall not apply to wiring that does not exceed 1.83 m (6 ft) in length and that terminates at an emergency luminaire or an emergency lighting control device.

Exception No. 2: Section 700.11(D) shall not apply to locked rooms or locked enclosures that are accessible only to qualified persons.



