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Installation Standards for Photovoltaic Systems

Please be advised that the City has adopted the California Fire Code which includes standards for the installation of photovoltaic systems. These standards relate to life safety requirements for the safety of firefighters during fire suppression activities.

CFC Chapter 12, CEC Section 690 & 705
Solar Photovoltaic Installations

Chapter 12 (CFC) General. Solar photovoltaic power systems shall be installed in accordance with sections 1204.1 through 1204.5 The installation shall also comply with the California Building & Residential Code, California Electrical Code and NFPA 70. Grounding & bonding per CEC Article 250, 2 ground rods and a water bond or equivalent.
Exception: *Detached, nonhabitable Group U structures including, but not limited to, detached garages serving R-3 buildings, parking shade structures, carports, solar trellises and similar structures.*
Roof access, pathways, and spacing requirements need not be provided where the fire code official has determined rooftop operations will not be employed.

690.12 Rapid Shutdown of PV Systems on Buildings. PV system circuits installed on or in buildings shall include a rapid shutdown function to reduce shack hazard for emergency responders in accordance with 690.12(A) through (D).

690.13(B) Marking. Each PV system disconnecting means shall be permanently marked to identify it as a **"PV SYSTEM DISCONNECT".**

690.31(E)(3) Marking or Labeling Required. Wiring methods and enclosures that contain PV system dc circuit conductors to include all conduit bodies, covers or enclosures of pull boxes and junction boxes shall be marked with the wording **"WARNING: PHOTOVOLTAIC POWER SOURCE".**

690.31(E)(4) Location of marking. Labels or markings shall be visible, reflective capitalized white on red minimum 3/8" in height. PV system dc circuit labels shall be placed not more than every 10 feet and shall appear on every section of the wiring system separated by enclosures, walls, partitions, ceilings, or floors. Labels shall be suitable for the environment they are installed.

690.56 Identification of Power Sources. A plaque identifying the location of all customer self-generation equipment, the service point and DC disconnects must be installed on the enclosure for the service disconnect and at each source disconnect location. The plaque shall be attached to the exterior of the enclosure by a permanent means acceptable to the AHJ. (San Diego Area Electrical Newsletter 2020)

1204.2 Access and pathways. Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 1204.2.1 through 1204.3.3.
Exception: These requirements shall not apply to roofs with slopes of 2/12 or less. 1204.2.1

1204.2.1.1 Pathways to ridge. A minimum of two 3 foot wide pathways on separate roof planes, from lowest edge to ridge, shall be provided on all buildings. At least one pathway shall be provided on the street or driveway side. Each roof plane with a PV array at least one 3 ft. wide pathway from lowest edge to ridge shall be provided on the same roof plane, on an adjacent roof plane, **or** straddling the same and adjacent roof plane.

1204.2.1.2 Setbacks at ridge. For PV arrays occupying 33 percent or less of the plan view total roof area, a minimum 18 inch wide setback is required on both sides of the ridge. For PV arrays more than 33 percent of the total roof area, a 3 ft. setback is required on both sides of the ridge.

1204.2.1.3 Alternate setbacks with Sprinkler System. Where a sprinkler system is installed setbacks shall conform to one of the following:
(1) For PV arrays occupying 66 percent or less of the total roof area, a minimum 18 inch setback is required on both sides of the ridge.
(2) For PV arrays occupying more than 66 percent of total roof area, a 3 ft. setback is required on both sides of the ridge.

1204.2.2 Emergency escape and rescue openings. Panels/modules shall not be placed below emergency escape and rescue openings such as windows. A 3 ft. path shall be provided to the escape and rescue opening.

1204.3 Other than residential buildings. Access to systems for occupancies other than group R-3 shall be provided in accordance with Sections 1204.3.1 through 1204.3.3
Exception: Where it is determined by the fire code official that the roof configuration is similar to that of an R-3 occupancy, the residential access and ventilation requirements in Sections 1204.2.1.1 through 1204.2.1.3 are a suitable alternative.

1204.3.1 Perimeter pathways. There shall be a minimum 6-foot-wide clear perimeter around the edges of the roof.

> **Exception:** Where either axis of the building is 250 feet or less, there shall be a minimum 4-foot-wide clear perimeter around the edges of the roof.

1204.3.2 Interior pathways. Interior pathways shall be provided to meet the following requirements:
1. Pathways shall be provided at no greater than 150 ft. intervals throughout the length and width of the roof.
2. A minimum 4 ft. wide path in a straight line to standpipes or ventilation hatches.
3. A minimum 4 ft. wide path around roof access hatches with not less than one pathway 4 feet clear to a parapet or roof edge.

1204.3.3 Smoke ventilation. The solar installation shall be designed to meet the following requirements:
1. Where nongravity-operated smoke and heat vents occur, provide 4 ft pathway bordering all sides.
2. Smoke ventilation options between array sections shall be one of the following:
2.1. A pathway 8 feet or greater in width.
2.2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 ft on not less than one side.
2.3 A pathway not less than 4 ft wide bordering 4 ft x 8 ft venting cutouts every 20 ft on alternating sides of the pathway.

1204.3.4 Location of DC conductors. Conduit, wiring systems, and raceways for photovoltaic circuits shall be located as close as possible to the ridge or hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities. Conduit runs between sub arrays and to DC combiner boxes shall be installed in a manner that minimizes the total amount of conduit on the roof by taking the shortest path from the array to the DC combiner box.

The DC combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays. DC wiring shall be installed in metallic conduit or raceways when located within enclosed spaces in a building. Conduit shall run along the bottom of load bearing members.

1204.4 Ground-mounted photovoltaic panel arrays. Ground-mounted photovoltaic panel systems shall comply with Section 1204.1 and this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays. A clear, brush-free area of 10 feet shall be required for ground mounted photovoltaic arrays.

An ADDITIONAL GROUND ROD is required per section 250.53(A)(2) unless an exception applies.

GROUNDING: All exposed non-current carrying metal parts shall be grounded with listed hardware compatible with panels, racks and other equipment as approved by the equipment manufacturer and installed per the instillation instructions. Documentation shall be provided to the field inspector showing that grounding hardware is approved for the application for which it is used. WEEB clips shall not be used unless the panel manufacturer's cut sheets and the racking system cut sheets indicate WEEB clips are approved.

PLEASE BE ADVISED: Panel bus ratings may be exceeded by the position of the inverter disconnect breaker. P V breaker shall be at the opposite end of the utility supply but when the bus is center fed, the breakers shall comply with section 705.12 or a panel upgrade may be required. A permanent warning label shall be applied to the distribution equipment with the following or equivalent marking:

WARNING!
INVERTER OUTPUT CONNECTION.
DO NOT RELOCATE THIS OVERCURRENT DEVICE.