

CITY OF MILPITAS

Office of Building Safety
455 E. Calaveras Blvd.
Milpitas, CA 95035
408-586-3240
www.milpitas.gov



INSPECTION CHECKLIST PHOTOVOLTAIC ELECTRICAL POWER SYSTEMS

Referenced Codes:

This checklist is only a guide and applies to any component used or installed in a photovoltaic (PV) system other than a listed, factory-assembled component.

This list should be used in conjunction with Article 690 and other applicable articles of the CEC and includes inspection requirements for both stand-alone and utility-interactive PV systems. Where Article 690 differs from other articles of the NEC, Article 690 takes precedence [CEC 690.3].

**Unless otherwise noted, code references are to the 2022 editions of the California Electrical Code, California Residential Code, and California Building Code.*

Code Requirements		Code Section
PV ARRAYS		
1.	Are PV modules listed to UL Standard 1703?	CRC R324.3.1 CBC 3111.3.1 CEC 110.3 CEC 690.4(B)
MECHANICAL ATTACHMENT		
2.	Are modules attached to the mounting structure according to the manufacturer's instructions?	CRC R324.3 CBC 3111.3
3.	Are roof penetrations secure and weather tight?	CRC R324.4.3 CBC 1503.2
GROUNDING		
4.	Is each module grounded using the supplied hardware, the grounding point identified on the module, and the manufacturer's instructions? <i>Note: Bolting the module to a 'grounded' structure will usually not meet CEC requirements.</i>	CEC 690.43
5.	Are properly sized equipment grounding conductors (EGCs) routed with the circuit conductors?	CEC 690.45
CONDUCTOR TYPE		
7.	Are single-conductor cables in exposed outdoor dc circuits PV wire or cable, or marked sunlight resistant and Type USE-2 or Type RHW-2?	CEC 690.31
8.	Are conductors in conduit Type RHW-2, THWN-2, or XHHW-2 (90°C, wet-rated)?	CEC 300.9 CEC 310.10(C) CEC 310.15 UL-1703
CONDUCTOR INSULATION		
9.	Is conductor insulation rated at 90°C to allow for operation at 70°C+?	UL-1703
10.	If cables or conduits exposed to direct sunlight on or above the rooftop are within 7/8 in. of the roof surface, has 33°C been added to the ambient temperature for derating purposes or have Type XHHW-2 insulated conductors been used?	CEC 310.15(B)(2)

Code Requirements		Code Section
TEMPERATURE DERATING AMPACITIES		
11.	Are the temperature-derated ampacity calculations based on 156% of short-circuit current?	CEC 690.8(A)(1)(a)(1) CEC 690.8(B)(1)
	<i>Note: Suggest temperature derating factors of 65°C in installations where the backs of the module receive cooling air (6" or more from the roof deck) and 75° where no cooling air can get to the backs of the modules. Ambient temperatures exceeding 40°C may require different derating factors.</i>	
12.	Portable power cords are used only for tracker connections?	CEC 400.10 CEC 690.31
13.	Are strain-reliefs, cable clamps, or conduit used for all cables and cords?	CEC 300.4 CEC 400.14
14.	Are all components listed for the application and environment?	CEC 690.4(B)
OVERCURRENT PROTECTION		
15.	Are overcurrent devices used in PV system dc circuits listed for use in PV systems?	CEC 690.9(B)
16.	Are overcurrent protection devices rated at 156% of short-circuit current?	CEC 690.8(A)(1)(a)(1) CEC 690.8(B)(1)
17.	Does each module or series string of modules have any overcurrent protection devices required as part of its listing?	CEC 110.3(B) UL-1703
ELECTRICAL CONNECTIONS		
18.	Are pressure terminals tightened to the recommended torque specification?	CEC 110.14
19.	Are crimp-on terminals listed, and installed per the crimping tool specified in their listing?	CEC 110.14
20.	Are the twist-on wire connectors listed for the environment (i.e., dry, damp, wet, or direct burial) and installed per the manufacturer's instructions?	CEC 110.14
21.	Are the pressure lugs or other terminals listed for the environment (i.e., inside, outside, wet, direct burial)?	CEC 110.14
22.	Are the power splicing blocks <i>listed</i> rather than just UL Recognized?	CEC 230.46
23.	Are terminals containing more than one conductor listed for multiple conductors?	CEC 110.14
24.	Are the connectors or terminals using flexible, <i>fine-stranded</i> conductors listed for use with such conductors (there are different requirements and listing for <i>fine strands</i>)?	CEC 110.14
CHARGE CONTROLLERS		
25.	Is the charge controller listed to UL Standard 1741?	CEC 110.3
26.	Are the exposed energized terminals located as to not be readily accessible?	CEC 422.4
27.	Does a diversion charge controller have a second independent means to prevent overcharging?	CEC 706.33(B)
DISCONNECTS		
28.	Are disconnects in dc circuits listed and labeled for dc operation? <i>Note: Automotive, marine, and telecom devices are not acceptable.</i>	CEC 712.37
29.	Is the PV system disconnecting means installed in a readily accessible location?	CEC 690.13(A)
30.	Are PV wires run outside the building or inside a raceway until the first readily accessible disconnect?	CEC 690.31(C)
31.	Do the disconnects control all current carrying conductors from the PV source?	CEC 690.13

Code Requirements		Code Section
32.	Is there a disconnect for PV equipment including modules, fuses, converters, inverters, and charge controllers?	CEC 690.15
33.	Are disconnects manually operable switches, circuit breakers, pull out switches, or another approved type?	CEC 690.13(E)
INVERTERS (UTILITY-INTERACTIVE SYSTEMS)		
34.	Is the inverter listed to UL 1741 and identified for use in interactive PV power systems?	CEC 110.3
35.	Is there a backup charge controller to regulate the batteries [<i>if applicable</i>] when the grid fails?	CEC 690.71 CEC 706.33(B)(3)
36.	Are the inverter output conductors and equipment protected against overcurrent?	CEC 690.9(A)
37.	Are the disconnects and overcurrent protection listed for dc and ac?	CEC 110.3
38.	Is the sum of 125% of the power source(s) output circuit current and the rating of the overcurrent device protecting the busbar less than the ampacity rating of the busbar?	CEC 705.12(B)
GROUNDING		
39.	Are equipment grounding conductors properly sized and connected?	CEC 690.43
40.	Are there disconnects and overcurrent protection in both of the ungrounded conductors in each circuit on 12-volt, ungrounded systems?	CEC 240.15 CEC 690.13
41.	For dc circuits more than 250 volts dc, has the electrical continuity of metal conduit been ensured using bonding fittings?	CEC 250.97
CONDUCTORS (GENERAL)		
42.	Were standard building wire cables and wiring methods used?	CEC 300.1(A)
43.	Were wet-rated conductors used in conduits in locations exposed to weather?	CEC 310.10(C)
44.	Are dc conductors correctly color-coded? <i>Note – This is the same as for ac conductors.</i>	CEC 200.6