Solar Photovoltaic System
2010 CEC Residential Inspection Checklist (3.10.11)

This is not a comprehensive list of requirements, only a general guide for installation

Reference Information

- ☐ San Jose Building Division Requirements for Photovoltaic-Systems. http://www.sanjoseca.gov/building/PDFHandouts/1-10Solar.pdf
- ☐ 2010 California Electrical Code, 2010 California Building Code, Chapter 15.

Design Guidelines

- ☐ Electrical office plan check is required for multi family, commercial and industrial installations.
- ☐ Building permit is required if the total panel weight is greater than 5 lbs. per square foot, or the maximum concentrated load at each point of support exceeds 40 lbs., or the maximum height above the roof exceeds 18 inches.
- ☐ Re-roof permit is required if the photovoltaic system is installed in conjunction with roofing material replacement.
- ☐ Planning adjustments are not required for commercial, industrial or residential buildings.

Plan Check Office and Field Required Information

- ☐ Minimum 8.5"X11" layout of system configuration. Site drawing with locations of PV and UTILITY interconnection point. Location of modules, array, equipment configuration. Balance of System (BOS) shall be indicated. Conduit sizes and routing, location of disconnecting means, and overcurrent devices required.
- ☐ Number of series modules, or number of parallel strings clearly indicated and summarized.
- ☐ Calculate Voc with correction factor of the listed module temperature coefficients.
- ☐ Calculate conductor current at 156% of Isc value. Indicate derating for wire fill and apply operating temperature correction factors.
- ☐ Systems shall be calculated as continuous duty.
- ☐ Indicate attachment points for array mounting. Provide roof penetration detail ensuring roof integrity will be maintained. All penetrations weather tight.

Inspection

- ☐ Permit Card Available. Call 535-3555 for inspection.
- ☐ For Residential Systems all design layout and installation calculations will be plan checked by the field inspector.
- ☐ Manufacturer installation instructions shall be made available to the City of San Jose's Electrical Inspector at time of inspection. (i.e. inverter, modules, rated combiner boxes, and DC disconnect)
- ☐ Access to the roof must be provided. Inspectors DO NOT carry ladders. Provisions shall be made to verify the information located on the modules.

Utility Service/AC Power Source

- ☐ Supply side connection shall be made using an approved method and shall not void the manufacturer listing of equipment or lugs.
- ☐ Supply side taps shall not void UL listing. Provide manufacturer approval if bus is drilled or tapped.
- ☐ Supply side connection shall have all service disconnecting means grouped together. Disconnecting means shall have a minimum 60amp rating.
- ☐ Load side connection ampere ratings of over current devices shall not exceed the rating of the bus bar or conductor. The sum shall not exceed 120 percent.
- ☐ Back-fed breakers shall be sized at 125% of the continuous output current rating of the inverter. The breaker is not required to be clamped to the bus if the front cover secures it in place.
- ☐ The disconnecting means for all current carrying conductors shall be able to be reached quickly at a readily accessible location. The use of portable ladders, removing or climbing over obstacles is not acceptable.
- ☐ AC panel, inverter and disconnects, shall maintain unobstructed restricted clearances 30" wide, 36" deep from the ground to a height of at least 6'6".
- ☐ Materials used outdoors shall be sunlight/UV resistant; NEMA approved and rated for outdoor locations.
- ☐ All components shall be protected from physical damage where necessary.
- ☐ Signage shall be provided per attached City of San Jose handout.

Inverter

- ☐ The required listed disconnect for the DC source at the inverter shall be remote from the inverter unless the installation instructions clearly show the internal components can be removed for servicing without removing the enclosure.
- ☐ No disconnecting of the grounded conductor.
- ☐ Inverters shall be listed utility interactive (UL1741) and have a label identifying maximum continuous Output Power, and Input DC voltage range.
- ☐ Conductors and overcurrent protection sized at 125% of Output Power rating.
- ☐ The grounded conductor and termination point shall be clearly identified at the inverter.
- ☐ DC wiring from the modules to the utility interactive inverter may be run inside the building in a metallic raceway. MC cable is not a metallic raceway.

Arrays/Modules

- ☐ Module information will be verified by the field inspector. The module shall be removed by the installer or adequate information provided to verify module nameplate information.
- ☐ The equipment ground shall be installed per the manufacturer instructions. Any alternate bonding means shall be verified by the manufacturer installation information.
- ☐ Module effectively attached and wiring adequately supported.
- ☐ Single conductor cables shall be protected and connected to devices preventing damage or tension. Strain relief connectors required.
- ☐ USE-2 conductors under roofing tiles of Building Integrated Photovoltaic systems shall be considered concealed under the surface of the building and will be required to be protected by a metallic raceway.
- ☐ Wiring methods shall be listed to operate in the installed environment. (Sunlight resistant, -2 rating on conductors, NEMA 3R weather rated termination devices)
- ☐ Where more than two strings are combined, potential Isc back feed may require fuse protection sized per module series rating.
- ☐ Maximum allowable system design and application shall not exceed 600V for a dwelling. Verification of field assembled strings shall match the drawings.

Grounding/Bonding

- ☐ The required DC grounding electrode conductor shall not be terminated at the AC service terminal bar. The conductor shall terminate at a grounding electrode.
- ☐ AC and DC grounding electrodes shall be interconnected.
- ☐ A minimum #8 grounding electrode conductor is required. If a #8 conductor is used, it shall be protected. Size per installed system.
- ☐ Provide evidence that the photovoltaic separately derived system is bonded to the dwelling water piping system.
- ☐ Grounded conductor shall be identified white or gray.
- ☐ The Grounded conductor and equipment grounding conductors size #6 and smaller shall be identified continuous for the entire length.
- ☐ For all systems over 250 volts, concentric and eccentric knockouts shall be properly bonded.
- ☐ All exposed non current carrying metal parts of module frames, equipment, and conductor enclosures shall be bonded regardless of system voltage. (Tin plated copper or stainless steel)

2010 CEC Article 690 Solar Photovoltaic Systems

Required Field Labels		
2002 NEC Art.	**Location of label**	**Verbiage (or equal)**
690.5(C)	Near Ground Fault Indicator	Warning Electric Shock Hazard If a ground fault is indicated, the normally grounded conductors may be energized and ungrounded
690.14(C)(2)	On the Photovoltaic Disconnect	Required Photovoltaic Disconnect
690.17 705.22(4)	At the disconnect where all terminals may be energized in the open position	Warning: Electric Shock Hazard. Do not touch terminals. Terminals on both the line and load sides may be energized in the open position.
690.51	On each module	Open-circuit voltage___, Operating voltage___, Maximum permissible system voltage___, Operating current___, Short-circuit current___, Maximum power ___
690.53	On the Photovoltaic Disconnect	Rated maximum power-point current ____, Rated maximum power-point voltage ____, Maximum system voltage ____, Short circuit current ____
690.54	At interactive points of interconnection. Usually the main service.	Power Source - AC operating current _____ and operating voltage _____
690.56(B)	At the AC service disconnect and the DC service disconnect if not grouped together	The DC Photovoltaic Disconnect is located ____ The AC Service Disconnect is located _____
690.64(B)(4)	At the service or sub-panel with overcurrent devices connected to photovoltaic output supplying power to busbar	The following power sources are present at this location ____
690.64(B)(7)	At the service or sub-panel PV overcurrent device	Warning Inverter output connection Do not relocate this overcurrent device
705.10	At the electrical service and the location of the photovoltaic power source	The following power sources are capable of being interconnected _____