

PHOTOVOLTAIC INSPECTION (COMMERCIAL) CHECKLIST

REVISED 10/14/09

- PERMIT: # _____
- PROJECT ADDRESS: _____
- DATE: _____

***PRIOR TO INSTALLATION PLANS SHALL BE SUBMITTED AND APPROVED**

- THE INFORMATION PROVIDED IS GENERAL AND INTENDED AS A GUIDE ONLY. EACH PROJECT IS UNIQUE AND ADDITIONAL REQUIREMENTS MAY BE ENFORCED AS DEEMED APPROPRIATE.

REQUIRED INSPECTIONS:

- STRUCTURAL ATTACHMENT
- ROUGH WIRING/CONDUIT
- FINAL

***WE RECOMMEND APPROVED PLANS FOR PV BE PLACED IN A 4" PVC STORAGE TUBE AND SECURED TO WALL NEAR EQUIPMENT AT THE ELECTRICAL EQUIPMENT LOCATION.**

- The plans, permit and installation instructions shall be on site at time of inspection.
- Field installation shall be per code/plan. Changes shall be submitted to the city for approval prior to inspection.
- Structural attachments must be inspected prior to cover.
- When modules are supplied with j-boxes that require field assembly (i.e. BP solar), a separate inspection of module pre wiring is required at time of attachment inspection.
- If a new roofing system is going to be installed, a separate roofing permit and inspections are required. See checklist for specific roof being installed. Flashing and counter flashings are required.
- Where dc wiring is installed inside the structure a separate rough inspection must be scheduled.
- Dc wires installed inside the structure shall be installed in a metallic raceway. *CEC 690.31 (e)*
- Ground bushing is required around prepunched concentric or eccentric knockouts on the dc side. (*CEC 250.97*)

- Installer shall have ladder on site and set up at time of inspection. The ladder shall be extended 36” above the roof and ladder shall be secured at roof.
- All equipment shall be open and ready for inspection.
- All underground conduits shall be sealed per 2007 **CEC 300.5(g) & 230.8.** (example: duct seal)

GENERAL

FOLLOW THE SFM GUIDELINES FOR SIGNAGE AND CLEARANCES. THE CA STATE FIRE MARSHALL PV GUIDELINES ARE LOCATED AT: <http://www.osfm.fire.ca.gov/training/pdf/photovoltaics/solarphotovoltaicguideline.pdf>. TO VIEW THE CITY OF PALO ALTO’S AMENDMENTS TO THESE GUIDELINES PLEASE GO TO THE FOLLOWING LINK. <http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=13907>

- Verify green sticker from utilities is posted on main electrical service. Call *the meter shop* at 650-496-6987 for inspection.
- Contractor shall be on site with torque wrench and torque screwdriver of the audible type. (ratcheting)
- Check torque at all connections per manufacturer’s specifications at all equipment including module clips and racking system.
- All connections shall be secure.
- All metallic raceways and equipment shall be bonded and electrically continuous.
- Where dc conductors are installed underground, conductors shall be buried 18” or more below grade and a warning tape installed 12” above the conduit. **CEC 300.5 (d) (1)** _____
- Label fuse size inside dc disconnects.

MAIN ELECTRIC SERVICE

- The inspector shall check existing panel for hot spots or unsafe conditions. If existing panel is found to be unsafe, it may be necessary for the property owner to hire a licensed electrician to make repairs or replace equipment. repairs/replacement shall happen prior to photovoltaic hook up.

- Verify utility ac disconnect is located within sight and within 10 feet of main electrical service. Ac disconnect shall be readily accessible with visible-blades, and lockable.
- Verify utility point of interconnection (circuit breaker) is per plan and does not exceed 20% of the bus rating (*CEC 690.64 for residential. for commercial the bus rating shall not exceed 100% of its rating*)
- Circuit breakers shall be of the same manufacturer as the main electrical service.
- When a backfed breaker is the method of utility interconnection, breaker **shall not** read “line and load”
- All underground conduits shall be sealed. Sealants must be listed for such use. (example: duct seal) *CEC 300.5, 230.8*
- Verify existing ac grounding electrode system (ufer or driven ground rod). The connection to the grounding electrode shall remain accessible. (*CEC 250.68 (a)*)
- If there is not an existing ac grounding electrode, pv contractor shall install a second ground rod at the main electrical service per *CEC 250.52(5)*.
- Verify grounding electrode system from inverter to second ground rod then bonded to existing ac grounding electrode or provide grounding electrode conductor directly from inverter to existing grounding electrode with separate attachment.
- Where an existing grounding electrode system is a driven ground rod, an additional ground rod shall be driven. Ground rods shall be a minimum of 6' apart. (*CEC 250.56*)

INVERTER LOCATION

- Ac and dc disconnects shall be located at inverter (*cec 690.14 (a)-(c)*)
- Verify maximum/minimum height requirements per mfg.
- At ac utility disconnect, top/lineside terminals will have circuit from ac load center/main service connected to terminals, bottom/load side terminals will have circuit from inverter connected to these terminals.
- Verify clear plastic barrier is returned to its original position separating the ac/dc wiring from the communication wires.

- If electrical equipment is located near the gas meter, verify clearances are met. See gas meter standard drawing # std-gd-02 for clearance requirements.

ROOF TOP INSPECTION

- All equipment on the roof requiring servicing shall meet the required clearances of CEC 110.26.
- When a new roof is being installed or where the connections of the supports are going to be covered up, an inspection is required to verify connections.
- Verify roof penetrations are flashed and counter flashed.
- Modules shall be of the same manufacturer per manufacturer's listing.
- Verify bonding means at modules is installed per the module installation instructions.
- Verify grounding lugs are located where specified by manufacturer.
- Surfaces for bonding of metal module frames shall be scratched to get good contact.
- Module wiring shall be properly secured and protected from damage.
- Equipment on dc side of inverter shall be rated 600vdc.
- Where three or more strings are being combined, combiner box shall be listed/factory assembled. 600vdc fuses are required.
- Array conductors must be connected to the line side input terminals at the top of the main dc disconnect and conductors to inverter input shall be connected to the load side output terminals (bottom) of dc disconnect.

SIGNAGE

LANGUAGE OF SIGNAGE IS UNDERLINED

- Marking is required on dc conduit, raceways, enclosures, cable assemblies and junction boxes. **“CAUTION: SOLAR CIRCUIT”**. Marking shall be reflective, weather resistant and suitable for the environment. Marking shall be every 10', at turns and above and/or below penetrations and at all dc combiner and junction boxes. Labels should be red background, white lettering 3/8" high minimum, and capitalize all letters (not bold).

MAIN ELECTRICAL SERVICE

- Install a permanent phenolic plaque at the service entrance equipment denoting all electrical power sources and location of onsite emergency power sources (CEC 705.10) **““WARNING” 2 SOURCES OF POWER PV/AC DISCONNECT @ ADJACENT LOCATION”** signage shall be red background with white engraved letters. minimum size shall be 3”x4” (indicate this on plans)
- Buildings or structures with both utility service and a photovoltaic system shall have a permanent plaque or directory providing the location of the service disconnecting means and the photovoltaic system disconnecting means, if not located at the same location. (CEC 690.56 (B))
- A permanent phenolic plaque shall be placed at the point of interconnection stating the **MAXIMUM AC OUTPUT OPERATING CURRENT** and the **OPERATING AC VOLTAGE**. (CEC 690.54)
- Provide a permanent phenolic plaque at the main electrical service when a supply side tap is necessary. **“CAUTION! SUPPLY SIDE TAP. OPEN AND LOCK AC DISCONNECT BEFORE REMOVING THE METER.”**

AC DISCONNECT

- Provide a permanent phenolic plaque at all ac disconnects (CEC 690.14 (C) (2)) **“PHOTOVOLTAIC ARRAY AC DISCONNECT SWITCH”**.
- Load centers used as photovoltaic combiner boxes shall be labeled... **“PHOTOVOLTAIC CIRCUITS ONLY. NO ADDITIONAL CIRCUITS ALLOWED”**.

DC DISCONNECT

- Provide a permanent phenolic plaque at all dc disconnects (CEC 690.14 (C) (2)) **“PHOTOVOLTAIC ARRAY DC DISCONNECT SWITCH”**. Additional signage is required at dc disconnects providing **OPERATING CURRENT and VOLTAGE, MAXIMUM SYSTEM VOLTAGE and SHORT-CIRCUIT CURRENT**. (CEC 690.53)

INVERTERS

- Where inverters are located other than @ the main electrical service locations, a permanent phenolic plaque or directory denoting all electrical power sources shall be installed. (CEC 690.14 (D), 705.10)