

	<h2 style="margin: 0;">PHOTOVOLTAIC PRE-SUBMITTAL CHECKLIST</h2> <p style="margin: 0;">City of Palo Alto Building Inspection Division 285 Hamilton Ave. Inspection Request: 650 329-2496</p>	Revision Date:09/10/09
		General Requirements/Checklist for: <b>Residential</b>
		Codes Enforced: 2007 CBC, CEC, NEC Palo Alto Municipal Code (PAMC)

**APPLICATION**

- Pre-Submittal checklist requirements for **residential** photovoltaic permits.

**PROJECT ADDRESS:** \_\_\_\_\_

**COMPANY:** \_\_\_\_\_

- Photovoltaic permit applications shall be submitted to the building department.

- **Complete submittals will be reviewed within 5 working days.**
- **Incomplete submittals will be review once all the documentation has been submitted.**
- **Additional review time is required when new technology is part of the design.**

**All revisions shall be clouded on the plans and indicate date and revision number in the title block.**

- Field installation shall be per code/plan. Changes shall be submitted to the city for approval prior to 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.**

**Please verify by checking the box that each item has been verified and reference a sheet number to the items below.**

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>

**PRE-SUBMITTAL CHECKLIST REQUIREMENTS**

- Provide a photo of residential electrical services with the dead front removed. \_\_\_\_\_
- A **completed** utility photovoltaic electric load sheet must accompany the submittal. \_\_\_\_\_
- Plan size shall be 18" x 24" minimum and a maximum of 30" x 42". Font size shall be a minimum of #10 for viewing and micro filming. Provide 3 sets. Note: all information must be suitable / legible for micro filming.
- Provide the available short circuit current on electrical equipment for services 400amps and larger for all supply side taps. This information is available from CPA electrical utilities @ (650) 566-4551 for Mike Mintz or (650) 566-4516 for Gopal Jagannath.
- \_\_\_\_\_
- Provide most current and complete manufacturer's installation instructions for all equipment (i.e. inverters, modules, combiner boxes, racking systems, junction/transition boxes, disconnects, transformers, batteries, generators, etc..) provide 1 copy. **All documents shall be distinct and separate to allow ready review.**
- Site and roof plans shall clearly show the location of the electrical service, modules, (each string shall be identified), combiner box, inverter, ac & dc disconnects, conduit, junction boxes and battery banks. \_\_\_\_\_
- All equipment on the roof requiring servicing shall meet the required clearances of CEC 110.26. Plans shall show the required clearances. \_\_\_\_\_
- Submit roof calculations for array mounting posts or submit plans showing rafter size, length, species and grade of wood, spacing of rafters, size and spacing of the ceiling joists, size of the ridge board/beam and type of roof sheathing, size of roof sheathing, and sizes of roof areas to receive the PV arrays (roof dimensions) to determine compliance with CBC 2308.10.3. Show roof pitch and type of roof covering. Provide rating (weight) of composition shingles and indicate number of roof overlays. Indicate when the roof framing is an engineered truss system. \_\_\_\_\_
- Provide detail on plans showing structural support load path. Detail shall include the spans. \_\_\_\_\_
- Provide detail on the plans for the attachment of the PV array supports to the roof framing. Include method of weather proofing and water proofing. Detail shall include flashing and counter flashing. \_\_\_\_\_
- Provide three copies of a three line diagram showing all system components, wire sizes, conductor insulation type, method of protection (i.e. EMT) wire distances between each piece of equipment, grounding electrode system, equipment ground (and size) and disconnects. Clearly indicate (in writing along with the diagram) the number of modules per string, strings per array and number of modules total. \_\_\_\_\_
- Indicate where dc wiring will be installed inside and outside of the structure. Identify DC/PV wiring locations on site plan. \_\_\_\_\_

- Submit complete calculations for maximum system voltage, system string current, wire sizing, fuse/circuit breaker sizing, conduit fill, voltage drop, ambient temperature and terminal temperature. Calculations show all integers not just the end result. (example: system voltage >  $11 \times 44.4 \times 1.13 = 551.8 \text{ v}$  (# of modules x voc x cold temperature factor) \_\_\_\_\_)
- 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)** \_\_\_\_\_
- Plans shall identify listed means of bonding for photovoltaic modules. Provide device listings. (Method of grounding shall reflect the method of grounding specified by the module manufacturer.) \_\_\_\_\_
- Palo Alto utilities requires an ac disconnect to be located within sight and within 10 feet from the main electrical service. The ac disconnect shall be readily accessible, visible-blade, and lockable.
- The city of Palo Alto requires separate ac and dc disconnects at the inverter. Integrated disconnects are not accepted.
- Where strings are combined, a combiner box shall be installed. The combiner box shall be listed (to UL standard 1741) by an accredited testing laboratory (NRTL) and be factory assembled.
- Show location, type and number of batteries to be used. Show all ventilation requirements. Show how batteries are secured to prevent movement. \_\_\_\_\_
- Do not install batteries in living areas or at electrical equipment/enclosures (CEC 110.26)**
- Provide a disconnect at the batteries where located in a separate room or more than 5' away from the inverter.** \_\_\_\_\_
- Live parts of the batteries shall be guarded. Specify method of protection. (CEC 690.71 (b)(2))** \_\_\_\_\_
- Conductors between the inverter and battery enclosure are required to be installed in conduit.**
- Generators: 1) Provide disconnect at the generator and another disconnect at the inverter. 2) Provide disconnect with in sight/within 10' of generator (CEC 240.21). These conductors shall be rated 115% of the generator nameplate current rating (CEC 445.12). 3) Install automatic transfer switch. Switch shall be rated and listed for the use. (CEC 702.6)**
- Show size and location of all overcurrent protection devices. \_\_\_\_\_
- Grounding electrode system must be illustrated on the plans. \_\_\_\_\_
- Plans shall specify type, size and location of existing ac grounding electrode. \_\_\_\_\_
- Where the grounding electrode system is a UFER, each electrical service must attach separately to the UFER with a continuous grounding electrode conductor. If the attachment is to a UFER, a listed rebar clamp is required. \_\_\_\_\_
- Wire diagram shall show bonding from the PV grounding electrode system to the existing ac grounding electrode. Specify grounding electrode conductor size to comply with article 690.47. \_\_\_\_\_

- Plans shall include a torque schedule for all the equipment connections. The schedule shall include the following: inverter mounting hardware, inverter connections, disconnects, combiner boxes, breakers, and module clips, racking system, lug and panel hardware. The torque specifications shall be in inch/lbs or ft./lbs per the manufacturer's listing. Include connector torque specifications for devices such as Burndy, Polaris and all crimping devices. \_\_\_\_\_
- Photovoltaic installations west of 280 require modules to carry a minimum class "A" fire rating. \_\_\_\_\_

I am the project PV designer/engineer and have read and verified that all information has been provided for review as specified above.

Name \_\_\_\_\_ Date \_\_\_\_\_  
Address \_\_\_\_\_  
Designer cell phone # \_\_\_\_\_  
Designer e-mail \_\_\_\_\_  
Designer signature \_\_\_\_\_