



DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
DIVISION OF CODES AND STANDARDS

MANUFACTURED HOME
SOLAR PHOTOVOLTAIC SYSTEM REQUIREMENTS

INSTRUCTIONS

Manufactured Home (MH)
Solar Photovoltaic (PV) System Checklist
Title 24 Code of Federal Regulations Part 3280
Title 25 California Code of Regulations
2005 National Electric Code

The attached checklist was developed for Department of Housing and Community Development (HCD) District Representatives (DRs) and interested parties to use as a guideline when reviewing plans and inspecting the installation of a Photovoltaic (PV) system on MH units. An HCD 415 application shall be submitted to the appropriate HCD area office when installing a new PV system on an existing MH. PV system installation on MH units is required to be constructed in accordance with several sets of standards under different sets of laws and regulations as follows: Title 24 Code of Federal Regulations (T24 CFR), HCD Title 25 California Code of Regulations (T25 CCR), 2005 National Electrical Code (NEC) and other applicable articles within the 2005 NEC.

T24 CFR Section 3280.1, “covers all equipment and installations in the design, construction, transportation, fire safety, plumbing, heat-producing and electrical systems of manufactured homes which are designed to be used as dwelling units. This standard seeks to the maximum extent possible to establish performance requirements. In certain instances, however, the use of specific requirements is necessary.”

T25 CCR Section 4050(b)-(c) covers, “All alterations, additions, or conversions relating to construction or fire-safety of mobilehomes, used manufactured homes and used multifamily manufactured homes up to two dwelling units, shall comply with the California Residential Code. The provisions [T24 CFR] of the federal Manufactured Home Construction and Safety Standards relating to plumbing, heating, cooling, fuel burning, and electrical equipment and installations are applicable to the alteration, conversion, or addition of any plumbing, heating, cooling, fuel burning, and electrical equipment and installations in any mobile home manufactured after September 1, 1958, bearing or required to bear a department insignia or Title VI (24 C.F.R.) label.”

T24 CFR Section 3280.801(a)-(b) – “Subpart I of this part and Part II of Article 550 of the National Electrical Code (NFPA No. 70–2005) cover the electrical conductors and equipment installed within or on manufactured homes and the conductors that connect manufactured homes to a supply of electricity. In addition to the requirements of this part and Part II of Article 550 of the National Electrical Code (NFPA No. 70–2005), the applicable portions of other Articles of the National Electrical Code must be followed for electrical installations in manufactured homes.”

T24 CFR, T25 CCR and 2005 NEC codes noted in the following checklist are for informational purposes only and are intended to provide a review of the general requirements for the installation of a PV system on MH units. This is not intended to be an all-inclusive checklist as other MH statutes, not mentioned in this list, may also be applicable. A DR may require other violations discovered during the inspection be corrected which are in violation of the applicable codes.



DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
DIVISION OF CODES AND STANDARDS

**MANUFACTURED HOME
SOLAR PHOTOVOLTAIC (PV) SYSTEM REQUIREMENTS**

This is not intended to be an all-inclusive checklist

General Requirements:

- HCD 415 Application for Permit with the required fees shall be submitted and accompanied by three sets of plans and supporting documentation.
- Structural engineering is required for additional load placed on the MH roof for the solar panels and roof support structures. The engineering analysis is required to have a licensed engineer or architect stamp and signature. The engineering analysis shall be in compliance with Title 24 (T24) of the Code of Federal Regulations (CFR) section 3280.305 for Manufactured Home structural design requirements.
- All work shall comply with; T24CFR Part 3280 Subpart I, Title 24 (T24) of the California Code of Regulations (CCR) Part 2, the 2005 National Electrical Code (NEC) Article 550, and all other applicable portions of the NEC.
- Provide a Point of Interconnection Approval Letter between the Mobilehome Park ownership and the local utility entity; for example, PG&E, SMUD, and Southern California Edison.
- If the PV system installation is in a Mobilehome Park where the park owns the electrical system, the park must sign an HCD 50 Application for Permit to Construct with a \$196.00 fee.
- Over-the-counter approval will only be considered for residential roof mounted utility interactive systems with a maximum rating of 8kW.
- Residential ground mount systems designed for battery charging and all commercial PV systems will require a standard plan review by an HCD area office.
- Photovoltaic system equipment shall be identified and listed for the application pursuant to T24CFR section 3280.807(a) and 2005 NEC Article 690.4(D). System component numbers and locations must match the approved plans.

Electrical Documentation Requirements:

- Provide a complete standard electrical diagram including the PV source circuit, PV output circuit, and power conditioning unit output circuit for the proposed PV system.
- Include the module and inverter manufacturer's specifications and/or provide the PV equipment cut sheets in the application submittal.

Structural Documentation Requirements:

- Provide drawings which show the roof support for the added weight caused by the PV system to include PV array support structure and its connection to roof, including the weight of the support structure.
- The roof framing plan shall include the roofing material and number of overlays (if applicable).
- The panel-to-roof attachments shall be according to the manufacturer's approved details. Alternate attachments require HCD approval and may require engineering. All installation instructions/details must be onsite during construction.

On the Roof:

- Provide a roof layout diagram detailing the locations of all PV panels.
- The structural supports shall be installed and sealed according to manufacturer's installation requirements.
- The PV module equipment grounding connection to the manufacturer's identified grounding point shall be installed with a listed device pursuant to T24CFR section 3280.809(a)(d) and 2005 NEC Article 690.43. Exposed non-current carrying metal parts of module frames, equipment, and

conductor enclosures shall be grounded in accordance with the 2005 NEC Article 250.134 or 250.136(A) regardless of voltage.

- Verify that all exposed PV wiring is rated for wet locations and sunlight resistant pursuant to the 2005 NEC Articles 300.6(C)(1), 310.8(C) and 690.31.
- Where direct-current PV source circuits are run inside a building, they shall be contained in metal raceways from the surface penetration point of the building to the first readily accessible disconnecting means pursuant to the 2005 NEC Article 690.31(E).
- Panels and modules installed on one- and two-family dwellings (Group R) with hip and single ridge roofs shall be located in a manner that provides a 3-foot-wide clear access pathways from the eave to the ridge on each roof slope where panels and modules are located per California Residential Code Section R331.2.2. These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

Disconnects:

- DC and AC disconnecting means shall comply with applicable provisions of Article 690 Part III.
- Permanently marked, readily accessible DC and AC disconnecting means shall be installed within sight of or in the inverter as required by 2005 NEC Article 690.14.
- Where all terminals of the disconnecting means may be energized in the open position, a warning sign shall be mounted on or adjacent to the disconnecting means. The sign shall be clearly legible and have the following words or equivalent pursuant to 2005 NEC Article 690.17:

WARNING ELECTRIC SHOCK HAZARD. DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

- Disconnects and the interactive system point of interconnection shall be marked with the system ratings as required by 2005 NEC Article 690 Part VI.

Point of Connection:

- The output of a utility interactive inverter shall be connected to the load side of the service disconnecting means as permitted by 2005 NEC Article 690.64(B).
- The interconnection shall be made at a dedicated circuit breaker. Circuit breakers, if back-fed, shall be identified for such operation pursuant to the 2005 NEC Article 690.64(B)(1), 690.64(B)(5).
- The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed the rating of the busbar or conductor pursuant to the 2005 NEC Article 690.64(B)(2).
- The inverter output of a stand-alone PV system shall be permitted to supply 120 volts to single-phase, 3-wire, 120/240-volt service equipment or distribution panels where there are no 240-volt outlets and where there are no multi-wire branch circuits. In all installations, the rating of the overcurrent device connected to the output of the inverter shall be less than the rating of the neutral bus in the service equipment. This equipment shall be marked with the following words or equivalent pursuant to the 2005 NEC Article 690.10(C):

WARNING SINGLE 120-VOLT SUPPLY. DO NOT CONNECT MULTIWIRED BRANCH CIRCUITS!

Grounding:

- PV system grounding shall comply with all applicable provisions of the 2005 NEC Article 690 Part V and the 2005 NEC Article 250 requirements.
- Equipment grounding shall comply with the 2005 NEC Article 690.43 and Article 690.45 (for sizing).
- PV systems with both alternating-current (ac) and direct-current (dc) grounding requirements shall be permitted to be grounded pursuant to the 2005 NEC Article 690.47(C)(1) or (2).