

CHAPTER 3 INSTALLATION REQUIREMENTS

SECTION 301 GENERAL

301.1 Scope. The provisions of this chapter shall govern the installation of photovoltaic (PV) components including location, materials and structural support. Where the installation of PV systems is not covered by this code the installation shall be in compliance with the Oregon Structural Specialty Code.

SECTION 302 DEFINITIONS

(1502.1) **302.1 General.** The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

CONVENTIONAL LIGHT-FRAME WOOD CONSTRUCTION. A type of construction whose primary structural elements are formed by a system of repetitive wood-framing members in accordance with OSSC Section 2308 or the Oregon Residential Specialty Code.

RACKING. A system of structure that directly supports the PV modules and transfers the applied loads to the building structure or ground-supported structure. *(This is a first stab at a def. and may need additional work.)*

SECTION 303 MINIMUM STANDARDS AND QUALITY

303.1 General. Photovoltaic (PV) components, racking, support structures and attachments shall be in accordance with the provisions of this chapter. PV systems shall be designed and installed in accordance with this code and the approved manufacturer's instructions. Where the installation of PV systems does not comply with the prescriptive provisions of this section the installation shall comply with the OSSC

(1509.6) **303.2 Roof mounted photovoltaic modules.** Photovoltaic panels and modules installed on a roof shall be listed and labeled in accordance with UL 1703 and shall be installed in accordance with the manufacture's installation instructions. *(Add from S13- 09/10)*

303.3 Type of Construction.. PV systems, including supporting structure, shall comply with the requirements of OSSC Chapter 6 for the buildings applicable type of construction.

303.4 Material standards. Photovoltaic modules shall be listed and labeled in accordance with UL1703.

303.4.1 Testing. Rooftop installed photovoltaic systems that are adhered or attached to the roof covering shall be labeled to identify their fire classification in accordance with the testing required in Section **1505.1**

303.4.2 Wind resistance. Photovoltaic modules/shingles shall be tested in accordance with procedures adapted from ASTM D 3161. Photovoltaic modules/shingles shall comply with the classification requirements of Table **1507.2.7.1(2)** for the appropriate maximum basic wind speed. Photovoltaic modules/shingle packaging shall bear a label to indicate compliance with the procedures adapted from ASTM D 3161 and the required classification from Table **1507.2.7.1(2)**. *(S28-09/10 1509.6.1) Rooftop*

mounted PV systems shall be designed for wind loads for component and cladding in accordance with OSSC Chapter 16 using an effective wind area based on the dimensions of a single unit frame.

303.5 Weather protection. Frames, braces and attaching devices exposed to the weather shall be constructed of materials approved for exterior locations and protected from corrosion or deterioration.

SECTION 304 LOCATION.

304.1 General. The location of Photovoltaic (PV) components, racking, support structures and attachments shall be in accordance with the provisions of this chapter.

304.2 Zoning requirements. The installation of PV systems shall comply with the requirements of the zoning requirements of the Authority Having Jurisdiction (AHJ).

304.3 Flood Hazard Areas. Installation of PV systems within flood hazard areas, as defined by the AHJ, shall comply with the following;

304.3.1 Protection of mechanical and electrical systems. Electrical systems, equipment and components shall be located above the design flood elevation. If replaced as part of a substantial improvement, electrical systems, equipment and components shall meet the requirements of this section. Systems, fixtures, equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Electrical systems, equipment and components are permitted to be located below the design flood elevation provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in compliance with the flood-resistant construction requirements of the OSSC. Electrical wiring systems are permitted to be located below the design flood elevation provided they conform to the provisions of the Oregon Electrical Specialty Code for wet locations.

Refer to zoning, solar access, flood hazard areas, height, etc.

304.3.2 Flood-Resistant Installation. PV systems and support structures constructed in whole or in part in flood hazard areas (including A or V Zones) as identified by the local jurisdiction shall be designed and constructed in accordance with the provisions contained in this section.

Exception: PV systems and support structures located in whole or in part in identified floodways as established by the local jurisdiction shall be designed and constructed as stipulated in the OSSC or equivalent design methods based on nationally recognized standards.

304.3.3 Structural systems. All PV systems and structural support systems shall be designed, connected and anchored to resist flotation, collapse or permanent lateral movement resulting from hydrodynamic and hydrostatic loads and stresses including the effects of buoyancy.

304.3.4 Protection of PV systems from flood. PV systems and support structures shall be located above the design flood elevation. Systems shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: PV systems are permitted to be located below the design flood elevation provided that they are designed and installed to prevent water from entering or accumulating within the

components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in compliance with the flood-resistant construction requirements of the OSSC. Electrical wiring systems are permitted to be located below the design flood elevation permitted to be below the design flood elevation provided they conform to the provisions of the OESC for wet locations.

R304.3.5 Flood-resistant materials. Materials used below the elevation required in Section R322.2 (flood hazard areas including A Zones) or R322.3 (coastal high-hazard areas including V Zones) shall comply with the following:

1. All wood, including floor sheathing, shall be pressure-preservative-treated in accordance with AWWA U1 for the species, product, preservative and end use or be the decay-resistant heartwood of redwood, black locust or cedars. Preservatives shall be listed in Section 4 of AWWA U1.
2. Materials and installation methods used for flooring and interior and exterior walls and wall coverings shall conform to the provisions of FEMA/FIA-TB-2.

304.4 Building Egress. PV systems shall not be installed in locations that would restrict, or otherwise prevent the use of, the required means of egress. The means of egress shall comply with Chapter 10 of the OSSC.

304.5 Light and Ventilation. PV systems shall not be installed in locations that would restrict the required light and ventilation. Light and ventilation shall comply with Chapter 12 of the OSSC.

304.6 Fire Fighter Access PV systems installed on roofs shall be located in accordance with this section.

SECTION 305 STRUCTURAL

305.1 General. Photovoltaic (PV) components, racking, support structures and attachments shall be in accordance with the provisions of this section.

305.2 Module Attachment. Photovoltaic modules shall be attached in accordance with the manufacturer's installation instructions or shall be designed in accordance the OSSC..

305.3 Racking. *Racking* shall comply with this section.

305.3.1 Materials. Frames, braces and attaching devices exposed to the weather shall be constructed of materials approved for exterior locations and protected from corrosion or deterioration.

305.3.2 Structural Support. Racking and racking supports shall be mounted to structural components and shall not be attached to wall or roof coverings, trim or structural sheathing as a means of structural support.

305.3.3 Connection to structural members. Racking and racking supports shall be attached to the structural components through the use of screws, bolts, j-bolts, or other approved means in accordance with manufacturer's specifications or be designed in accordance in accordance with the OSSC.

305.3.3.1 Roof mounted racking Roof-mounted supporting structures, and all parts thereof, shall be designed in accordance with accepted engineering practice, constructed and installed to safely support all loads, including dead loads, snow loads, wind loads and seismic loads as prescribed by the OSSC.

305.3.3.1.1 Roof installation on conventional light-frame construction. Installations that comply with this section shall qualify as a prescriptive installation and shall not require if all of the following criteria are met:

1. Roof structure: The supporting roof framing shall be *conventional light framed wood construction* with pre-engineered trusses or roof framing members that comply with the applicable allowable span charts of OSSC Section 2308.10 for the specific loads including snow.

Exception: Roof framing in compliance with the provisions of Section 802 or 804 of the Oregon Residential Specialty Code shall satisfy the requirements of this section when the PV system is installed on;

1.1 Detached one and two family dwellings and townhouses classified as Group R-3, and Group U Occupancies; and

1.2 Residences used for family daycare or foster care in accordance with ORS Chapters 418, 443 and 657A; and

1.3 Detached Congregate residences (each accommodating 10 persons or less) and detached lodging houses containing not more than five guest rooms.

2. Roof materials. Roofing material shall be standing seam metal, single layer wood shingle or shake, or not more than two layers of composition shingle.

3. Loading: Collectors are either directly attached to the roof framing or are mounted to continuous rails that are attached directly to the roof framing. These attachments must be anchored to roof framing at a spacing no greater than 48 inches (1219 mm) on center maximum and not exceed 45 pounds (20.4 kg) of combined dead plus live or snow load at each support. The combined weight of the PV modules and racking shall not exceed 4.5 pounds per square foot (xxx kPa). See Figure 305.3.3.1.1(1).

(Do we want to include the figures or similar ones or have the text speak for itself?)

4. Height: Maximum panel height above roof shall be 18” from top of panel to roof surface and in accordance with Figure 305.3.3.1.1(1).. For installations where the panels will not be mounted flush with the roof, a building elevation showing the height of the installation will be required. The elevation must be to scale and show the height of the building and the height of the solar installation but need not show other building details, unless a Design Review will be required.

5. Submittal Requirement. *(Include a fill-in-the-blank form to be submitted stating rafter size/spacing/span, panel weight (psf), etc.*

305.3.3.2 Ground mounted racking. Ground-mounted supporting structures, and all parts thereof, shall be designed, constructed and installed to safely support all loads, including dead loads, flood loads, snow loads, wind loads and seismic loads as prescribed by the OSSC.

The bottom of panels shall be at least ? (?) inches (? mm) clear from ground level.

UL 1703-02 Flat-Plate Photovoltaic Modules and Panels – with revisions through April 2008

End of Chapter 3

Protection: Any portion of the solar system installed where it may be subjected to mechanical damage shall be guarded against such damage by being installed behind barriers such as bollards, fences, or other approve means or when located within a garage be elevated a minimum of 48” above finished garage floor or located out of the normal path of a vehicle.

For reference, section 305 is formatted as follows:

305.1 GENERAL

305.2 MODULE ATTACHMENT

305.3 RACKING

305.3.1 MATERIALS

305.3.2 STRUCTURAL SUPPORT

305.3.3 CONNECTION TO STRUCTURAL MEMBERS

305.3.3.1 ROOF MOUNTED RACKING

305.3.3.1.1 ROOF INSTALLATION ON CONVENTIONAL LIGHT FRAME CONSTRUCTION

1. Roof structure
2. Roof materials
3. Loading
4. Height
5. Submittal Requirements

305.3.3.2 GROUND MOUNTED

