

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 chapter the installation shall be in compliance with the applicable provisions of the Oregon Building Code as defined in ORS 455.020.

Exception: Where applicable provisions are specified, compliance with the Oregon Residential Specialty Code (ORSC) 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.

SECTION 302  
DEFINITIONS

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 ORSC as applicable.

**CUTOUT.** An area adjacent to a pathway for use by firefighters to cut a vent if needed. Cutouts shall not be less than 30 inches (762 mm) in any dimension.

**NON-OCCUPIED ACCESSORY STRUCTURE.** A structure normally not occupied such as a garage, carport, shed, or agricultural building.

**PATHWAY.** Unobstructed route provided within or around the PV array to provide unimpeded access and egress for firefighting purposes.

**RACKING.** A system of components that directly supports the PV modules and transfers the applied loads to the building structure or ground-supported structure

SOLAR ROOF. A roof on which a solar array is installed.

### 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 manufacturer's installation instructions.

303.2 Type of Construction. PV systems, including supporting structure, shall comply with the requirements of OSSC Chapter 6 for the structures required to be of non-combustible type of construction or the ORSC as applicable.

303.3 Material standards. PV modules shall be certified in accordance with UL1703 and shall be installed in accordance with the manufacturer's installation instructions.

303.4 Certification Requirements. PV racking and attachments shall comply with one of the following:

1. Certified to UL 1703 by a Nationally Recognized Testing Laboratory and installed in accordance with the manufacturers installation instructions.
2. Designed by an Oregon Licensed Engineer or Architect.
3. Field evaluation by an Approved Field Evaluation Firm.
4. Approval by the Authority Having Jurisdiction.

303.5 Fire classification. Rooftop mounted PV systems shall have a fire classification that is equal to or greater than the roof assembly required by OSSC Section 1505.1.

303.6 Weather protection. All components of the PV system 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 OSSC or ORSC Section R324 as applicable.

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 and emergency escape and rescue. The means of egress shall comply with Chapter 10 of the OSSC or ORSC Section R310 and R311 as applicable.

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 OSSC Chapter 12 or ORSC Section R303 as applicable.

304.6 Rooftop Vent and Drain Clearances. PV systems shall not be installed in locations that would restrict the function of plumbing or mechanical vents, skylights, drains or other rooftop features.

304.7 Mechanical Equipment Clearances. PV systems shall be installed with not less than a 30 inch clearance around mechanical equipment requiring service or maintenance. Provisions of the Oregon Mechanical Specialty Code and Oregon Electrical Specialty code apply to installations of PV systems.

304.8 Roof Drainage. PV systems shall not be installed in a manner that would obstruct roof drainage. No vertical supports or roof penetrations shall be allowed within 12 inches (305 mm) of each side of the low point of the valley. The PV modules or racking may extend into the valley no more than 6 inches from the valley low point provided that a minimum 3 inch clearance above the surface of the roof is maintained.

304.9 Fire Fighter Access and Escape. To provide access and escape for Fire Fighters the location of roof-mounted PV modules shall comply with the requirements of this section.

304.9.1 General Pathway Requirements. All PV installations shall include a 36 inch wide (914mm) pathway maintained along three sides of the solar roof. The bottom edge of a sloped roof shall not be used as a pathway. All pathways shall be located over a structurally supported area and measured from edge of the roof and horizontal ridge to the solar array or any portion thereof.

A. Except:

On structures with a PV array area of 1,000 square feet or less installed on a sloped roof with an intersecting adjacent roof and where no section is larger than 150 feet measured in length or width:

1. Where the PV array does not exceed 25% as measured in plan view of total roof area of the structure, a minimum 12 inch unobstructed pathway, shall be maintained along each side of any horizontal ridge.

2. Where the solar array area exceeds 25% as measured in plan view of total roof area of the structure, a minimum of one 36" unobstructed pathway from ridge to eave, over a structurally supported area, must be provided in addition to a minimum 12 inch unobstructed pathway along each side of any horizontal ridge.

3. Pathways are not required on *non-occupied accessory structures* provided they are separated from occupied structures by a 6 feet (3048 mm) minimum separation distance or by a minimum two-hour fire rated assembly.

B. Townhouses separated in accordance with ORSC R317.2 may be considered one structure and comply with the provisions of 304.9.1(A) where the units are under common ownership or an access easement for a required pathway is provided.

**NOTE: See section 304.10 for alternate installations.**

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304.9.3 Intermediate Pathway Locations.

A. Systems that include a solar array section that is larger than 150 feet (mm) measured in length or width shall have additional intermediate pathways. An intermediate pathway not less than 36” (914mm) wide separating the array shall be provided for every 150 feet (45720 mm) of array including offset modules or angled installations. The maximum square footage of an array shall not exceed 22,500 ft<sup>2</sup>. (2090 m<sup>2</sup>) without the installation of an intermediate pathway.

B. Where a system is required to have intermediate pathways, all pathways shall have one or more cutouts located adjacent to the pathway. No point on the pathway shall be more than 25 feet (7620) from a cutout.

304.9.4 Prohibited Locations. Pathways shall not be located within 12 inches of the low point of a valley.

304.9.5 Smoke and heat vents. In structures where smoke and heat vents have been installed to comply with the requirements of the IFC Chapter 9 Smoke and Heat Vents and Chapter 23 High Piled Storage a 36 inch wide pathway to and around each vent shall be provided for fire department access, maintenance and testing of these vents.

304.9.6 Electrical Component Location.

304.9.4.1 Disconnects, j-boxes, combiner boxes or gutters shall not be located in any required pathway or cutout.

304.9.4.2 Raceways on flat roofs that cross a required pathway shall be bridged to avoid tripping hazards. Raceways shall not be permitted in required pathways on sloped roofs.

304.10 Alternate Installations. In accordance with section 104.11, an alternative material, design, location or method of construction may be approved by the building official.

## 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. PV modules shall be attached in accordance with the manufacturer's installation instructions and to account for all loads, including dead loads, snow loads, wind loads and seismic loads, as prescribed by the OSSC.

305.3 Racking. Racking shall comply with this section.

305.3.1 Building Penetrations. All penetrations shall be flashed or sealed in a manner that prevents moisture from entering the wall and roof.

305.3.2 Structural Support and Attachment. Racking and racking supports shall be positively attached to the structural components or blocking in accordance with Figure 2 through the use of screws, bolts, j-bolts, or other approved means. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. 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. Racking and racking supports installed in accordance with manufacturer's specifications or be designed in accordance with the OSSC and shall be mounted in accordance with one of the following:

1. Installed in accordance with manufacturer's specifications and be designed in accordance with the OSSC.
2. Installed in accordance with section 305.4.
3. Positively attached to the structural components or blocking in accordance with Figure 2 through the use of screws, bolts, j-bolts, or other approved means such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. 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.
4. Attached to standing seam metal roofs with connectors in accordance with manufacturer's installation instructions.
5. Certified non-penetrating or minimally penetrating systems installed in accordance with the manufacturer's installation instructions.

305.3.3 Roof mounted racking. Roof-mounted supporting structures shall be certified in accordance with section 303.4, and 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 or in accordance with section 305.4.

305.3.4 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 modules shall be at least 18 inches (457 mm) clear from ground level.

305.4 Prescriptive Installations. Roof installations on conventional light-frame construction which complies with this section shall qualify as prescriptive and shall not require an engineered design 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 at a spacing of 24 (610 mm) inch on center maximum that comply with the applicable allowable span in Table 305.4.1 for the specific loads including snow loads not exceeding 50 psf and wind loads that do not exceed 100 MPH or 110 MPH in exposure B.

Exception: Roof framing in compliance with the applicable allowable span in Table 305.4.2 for the specific loads including snow loads not exceeding 70 psf and wind exposure is limited to exposure A, B or C 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 metal, single layer wood shingle or shake, or not more than two layers of composition shingle.

3. Loading: Installation shall comply with Figure 305.4(1) or 305.4(2). The combined weight of the PV modules and racking shall not exceed 4.5 pounds per square foot (xxx kPa). PV modules or racking shall be directly attached to the roof framing or blocking installed in accordance with Figure 2. These attachments must be spaced no greater than 48 inches (1219 mm) on center in any direction. Attachments shall be spaced no greater than 24 inches on center in any direction where:

A. Snow loads exceed 25 psf;

B. Located within 3 feet of a roof edge, hip, eave or ridge; or

C. Wind exposure is B or less and wind speed 100 MPH or less or wind exposure is exposure C and wind speed is 85 MPH or less.

Exception: PV modules or racking may be attached directly to standing seam metal panels using clamps and roofing materials which meet the following:

The allowable uplift capacity of clamps shall not be less than 115 pounds for clamps spaced at 60 inches on center or less as measured along the seam or not be less than 75 pounds for clamps spaced at less than 48 inches on center. Clamp spacing between seams shall not be less than 24-inches. Spacing of clamps along a seam shall not exceed 60-inches. See attached Figures #5 and #6.

Roofing panels shall comply with all of the following:

1. Shall be a minimum of 26 gage steel,

2. Shall be a maximum of 18-inches in width,
3. Shall be attached with a minimum of #10 screws at 24-inches on center,
4. Shall be installed over minimum 1/2-inch nominal wood structural panels attached to framing with 8d nails at 6-inches on center at panel edges and 12-inches on center field nailing.

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4. Height: Maximum module height above roof shall be 18” from top of module to roof surface and in accordance with Figure 305.

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

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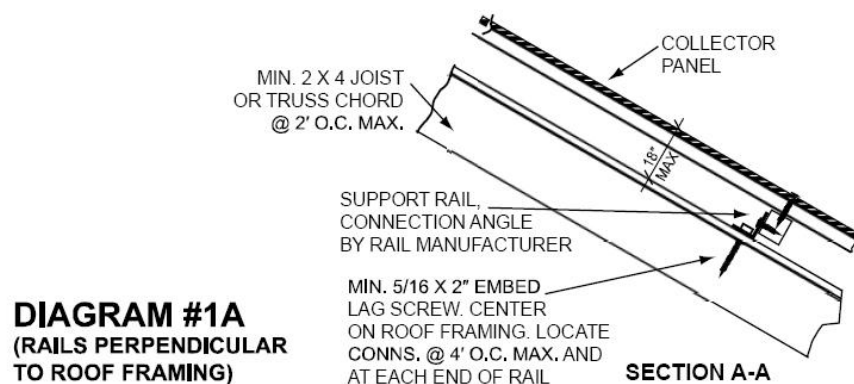


Figure 305.3.3.1.1(1) Installation – Rails perpendicular to framing members

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Figure 305.3.3.1.1(2) Installation – Rails parallel to framing members