



**Building Permit Application**  
**City of Portland, Oregon - Bureau of Development Services**  
 1900 SW 4th Avenue, Portland, Oregon 97201 • www.portlandonline.com/bds

12-139507-25

**Type of work**

New construction  Addition/alteration/replacement  
 Demolition  Other:

**Category of construction**

1 & 2 family dwelling  Commercial/Industrial  Accessory building  
 Multifamily  Master builder  Other:

**Job site information and location**

Job no.: \_\_\_\_\_ Job address: 5214 NE 27th Ave  
 City/State/ZIP: Portland / OR / 97211  
 Suite/bldg./apt. no.: \_\_\_\_\_ Project name: \_\_\_\_\_  
 Cross street/directions to job site: \_\_\_\_\_  
 Subdivision: \_\_\_\_\_ Lot no. \_\_\_\_\_ Tax map/parcel no. \_\_\_\_\_

**Description of work**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Reference RS / Combination  Permit no. \_\_\_\_\_  
 Property owner  Tenant  
 Name: Travis Lovejoy  
 Address: Same  
 City/State/ZIP: \_\_\_\_\_  
 Phone: \_\_\_\_\_ FAX: \_\_\_\_\_

**Owner Installation:** This installation is being made on property that I own, which is not intended for sale, lease, rent, or exchange.  
 Owner signature: \_\_\_\_\_ Date: \_\_\_\_\_

Contractor  
 Business name: RS Energy, LLC  
 Address: 20915 SW 105th Ave  
 City/State/ZIP: Portland, OR 97062  
 Phone: 503-752-2885 FAX: 503-228-2770  
 CCB lic. no. 185408  
 Authorized signature: \_\_\_\_\_  
 Print name: \_\_\_\_\_ Date: \_\_\_\_\_

Applicant  Contact Person  
 Business name: RS Energy, LLC  
 Contact name: David Richards  
 Address: 20915 SW 105th Ave  
 City/State/ZIP: Portland, OR 97062  
 Phone: 503-752-2885 FAX: 503-228-2770  
 E-mail: \_\_\_\_\_  
 Authorized signature: \_\_\_\_\_  
 Print name: \_\_\_\_\_ Date: \_\_\_\_\_

**Office Use Only**

Permit no: \_\_\_\_\_  
 Date received: \_\_\_\_\_  
 By: \_\_\_\_\_

**Required Data: One and Two Family Dwelling**

Permit fees\* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation:	<u>\$4000</u>
Number of bedrooms:	
Number of bathrooms:	
Total number of floors:	
New dwelling area:	square feet
Garage/carport area:	square feet
Covered porch area:	square feet
Deck area:	square feet
Other structure area:	square feet

**Required Data: Commercial Use**

Permit fees\* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation:	
Existing building area:	square feet
New building area:	square feet
Number of stories:	
Type of construction:	
Occupancy groups	
Existing:	
New:	

**Notice**

All contractors and subcontractors are required to be licensed with the Oregon Construction Contractors Board under ORS 701 and may be required to be licensed in the jurisdiction in which work is being performed. If the applicant is exempt from licensing, the following reasons apply.

\_\_\_\_\_

\_\_\_\_\_

**Building Permit Fees\***

Please refer to fee schedule

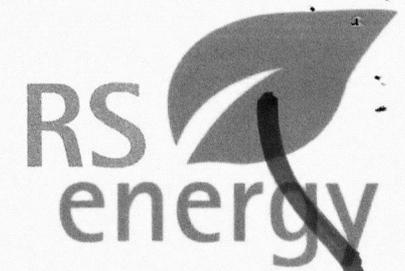
Fees due upon application	
Amount received	
Date received	

This permit application expires if a permit is not obtained within 180 days after it has been accepted as complete

\* Fee methodology set by Tri-County Building Industry Service Board

Gutter Height- 15'

Sale Person- Chet Zimmer (503) 964-770



City of Portland  
Bureau of  
Development Services

By VAF Date 5/10/12

Approved by  
Planning and Zoning Review

City of Portland  
REVIEWED FOR CODE  
COMPLIANCE

Permit Number

MA1 10 2012

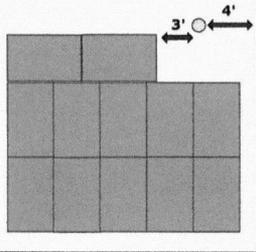
Property Line 55'  
NE 27th Avenue

Driveway

Tilt-23  
Az-177  
TOF-98  
TSR-91  
South ↓

19'

17'



(12) SolarWorld 255 watt  
modules (3.06kW)  
(12) Enphase M215-60-240

Meter  
Breaker  
SunRun Meter

Property Line 96'

**Contractor:**  
RS Energy, LLC  
20915 SW 105<sup>th</sup> AVE  
Tualatin, OR 97062  
503-752-2885

**Client:**  
Travis Lovejoy  
5214 NE 27th Ave  
Portland, OR 97211  
(503) 220-8262

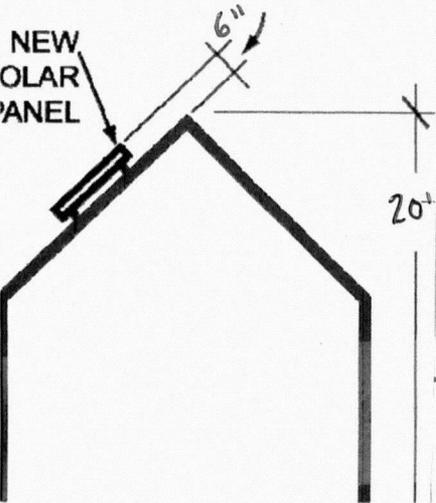
**Project:**  
359

**Issue Date:**  
3/29/2012

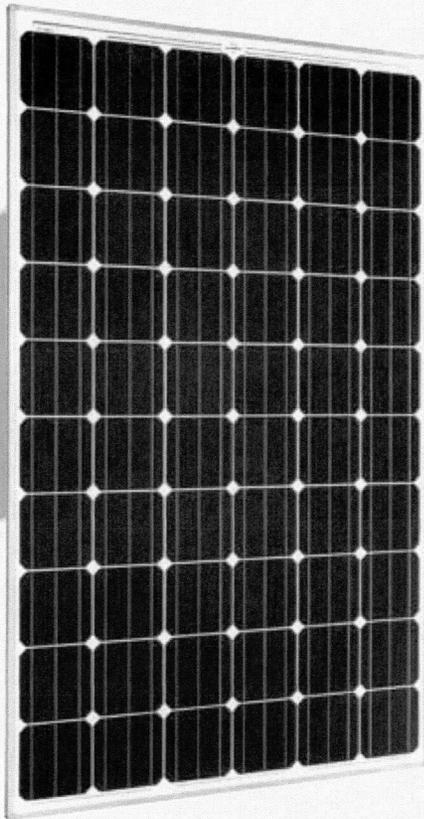
**Install Date:**  
Est. 5/2012

**Scale:**  
1"=18'

**Notes:**  
-(12)SolarWorld 255 watt  
modules(3.06kW)  
-(12)Enphase M215-60-  
240  
-Comp Roof Single Layer  
-Rafters= 16" on center"  
Standoffs= 24"/48"



12-139507-RS



# Sunmodule<sup>+</sup>™

## SW 255 mono / Version 2.0

### World-class quality

Fully-automated production lines and seamless monitoring of the process and material ensure the quality that the company sets as its benchmark for its sites worldwide.

### SolarWorld Plus-Sorting

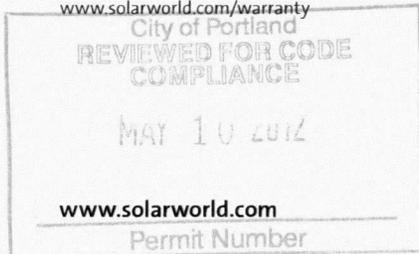
Plus-Sorting guarantees highest system efficiency. SolarWorld only delivers modules that have greater than or equal to the nameplate rated power.

### 25 years linear performance guarantee and extension of product warranty to 10 years

SolarWorld guarantees a maximum performance degradation of 0.7% p.a. in the course of 25 years, a significant added value compared to the two-phase warranties common in the industry. In addition, SolarWorld is offering a product warranty, which has been extended to 10 years.\*

\*in accordance with the applicable SolarWorld Limited Warranty at purchase.

[www.solarworld.com/warranty](http://www.solarworld.com/warranty)



Qualified, IEC 61215  
Safety tested, IEC 61730  
Periodic Inspection



We turn sunlight into power.

# Sunmodule<sup>+</sup>™

## SW 255 mono / Version 2.0

SW-02-5015US 08-2011 US

### PERFORMANCE UNDER STANDARD TEST CONDITIONS (STC)\*

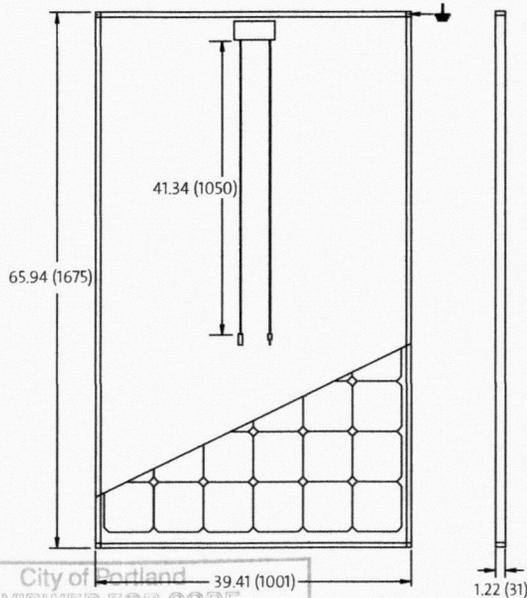
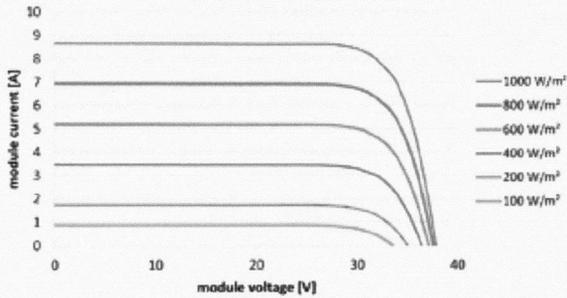
		SW 255
Maximum power	$P_{max}$	255 Wp
Open circuit voltage	$V_{oc}$	37.8 V
Maximum power point voltage	$V_{mpp}$	31.4 V
Short circuit current	$I_{sc}$	8.66 A
Maximum power point current	$I_{mpp}$	8.15 A

\*STC: 1000W/m<sup>2</sup>, 25°C, AM 1.5

### THERMAL CHARACTERISTICS

NOCT	47 °C
$TC I_{sc}$	0.042 %/K
$TC V_{oc}$	-0.33 %/K
$TC P_{mpp}$	-0.45 %/K

IV-curves for SolarWorld Sunmodule Plus SW 255 mono at 25°C cell temperature



### PERFORMANCE AT 800 W/m<sup>2</sup>, NOCT, AM 1.5

		SW 255
Maximum power	$P_{max}$	184.1 Wp
Open circuit voltage	$V_{oc}$	34.0 V
Maximum power point voltage	$V_{mpp}$	28.3 V
Short circuit current	$I_{sc}$	6.99 A
Maximum power point current	$I_{mpp}$	6.52 A

Minor reduction in efficiency under partial load conditions at 25°C: at 200W/m<sup>2</sup>, 95% (+/-3%) of the STC efficiency (1000 W/m<sup>2</sup>) is achieved.

### COMPONENT MATERIALS

Cells per module	60
Cell type	Mono crystalline
Cell dimensions	6.14 in x 6.14 in (156 mm x 156 mm)
Front	tempered glass (EN 12150)
Frame	Clear anodized aluminum
Weight	46.7 lbs (21.2 kg)

### SYSTEM INTEGRATION PARAMETERS

Maximum system voltage SC II	1000 V
Max. system voltage USA NEC	600 V
Maximum reverse current	16 A
Number of bypass diodes	3
UL Maximum Test Load**	45 psf (2.1 kN/m <sup>2</sup> )
IEC Maximum Snow Test Load**	113 psf (5.4 kN/m <sup>2</sup> )

\*\*Please apply the appropriate factors of safety according to the test standard and local building code requirements when designing a PV system.

### ADDITIONAL DATA

Measuring tolerance <sup>2)</sup>	+/- 3 %
SolarWorld Plus-Sorting <sup>3)</sup>	$P_{Flash} \geq P_{max}$
Junction box	IP65
Connector	MC4
Module efficiency	15.2 %
Fire rating (UL 790)	Class C



#### VERSION 2.0 FRAME

- Compatible with "Top-Down" mounting methods
- ↓ Grounding Locations: 4 corners of the frame

City of Portland  
REVIEWED FOR CODE  
COMPLIANCE

- 1) Sunmodules dedicated for the United States and Canada are tested to UL 1703 Standard and listed by a third party laboratory. The laboratory may vary by product and region. Check with your SolarWorld representative to confirm which laboratory has a listing for the product.
- 2) Measuring tolerance is used conjunctions with the SolarWorld Limited Warranty. SolarWorld AG reserves the right to make specification changes without notice.
- 3) The output identified by SolarWorld ( $P_{Flash}$ ) is always higher than the nominal output ( $P_{max}$ ) of the module. PFlash is the power rating flashed at a SolarWorld manufacturing facility.
- 4) All units provided are imperial. SI units provided in parentheses.

Permit Number



March 31, 2011

Mr. Tony Liu  
Sunmodo Corp.  
1915 E 5<sup>th</sup> Street, Suite C  
Vancouver, WA 98661

RE: Sunmodo EZ Mount Roof System  
Lincoln City, OR

Dear Tony:

Attached please find calculation sheets 1 through A18, dated March 29, 2011, which verify the structural adequacy of the EZ Roof Mount System, as shown on attached Sunmodo drawings dated January 4, 2011 and March 30, 2011 in the appendix to the calculations. Design is based on the requirements of the 2010 Oregon Solar Installation Specialty Code (OSISC) and the 2010 Oregon Structural Specialty Code (OSSC), based on the 2009 International Building Code (IBC).

Per our conversation with Sunmodo Corp. we have reviewed the system assuming common conditions for non-hurricane regions in the United States. The design criteria is as follows:

- Maximum roof snow load = 25 psf
- Maximum 3-second gust wind speed = 110 mph, exposure C as defined in ASCE 7-05
- Maximum building height = 60 ft
- Roof angle range of 0° to 45°
- Maximum solar panel weight = 2.6 psf
- Attachments to roof at 4'-0" o.c. in the long direction and 4'-0" in the short direction
- Maximum stand-off height of 5" above roof
- Attachments assumed centered into minimum 2x4 wood members
- Rail splice locations assumed 8" from an interior support
- All roof members need to be evaluated on a project by project basis for adequacy

The system needs to be designed by an engineer on a project by project basis and the applicability of the above design criteria shown shall be verified.

If you have any questions or need further information, please call me.

Sincerely,

Michael J. Dutton, P.E.

Attachments

City of Portland  
REVIEWED FOR CODE  
COMPLIANCE  
[MJD/bd210666.01-calc-3-31-11.docx]

111 SW Fifth Avenue, Suite 2500 Portland, Oregon 97204-3628 (503) 227-3251 Fax (503) 227-7980

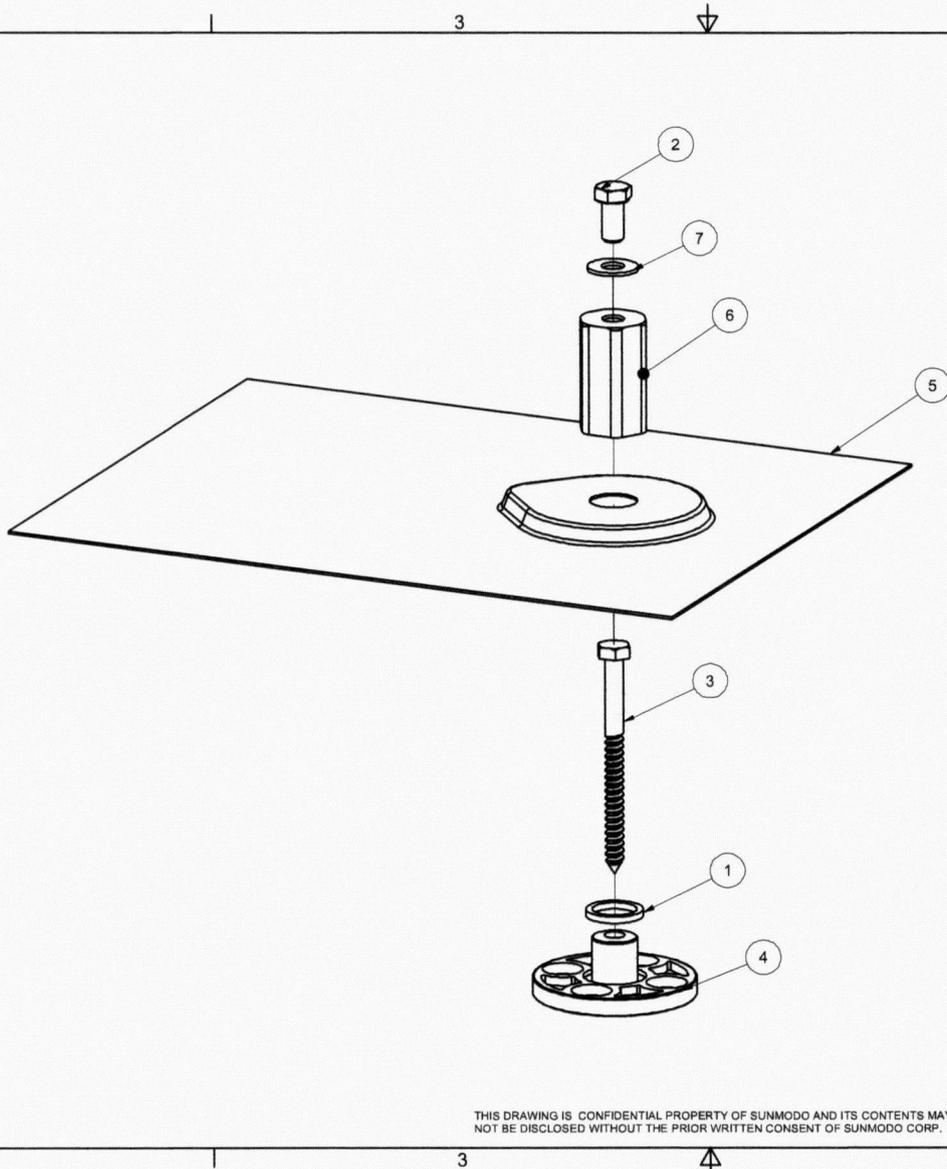
Seattle Tacoma Portland Eugene San Francisco Sacramento Los Angeles Irvine San Diego Phoenix Denver St. Louis New York

Permit Number



EXPIRES: 12-31-2012

City of Portland  
 REVIEWED FOR CODE  
 COMPLIANCE  
 MAY 10 2012  
 Permit Number



KIT NUMBER	A20049-0XX	L INCH (mm)
K10039-002	A20049-002	2 IN(50.8mm)
K10039-003	A20049-003	3 IN(76.2mm)
K10039-005	A20049-005	5 IN(127mm)
K10039-007	A20049-007	7 IN(177.8mm)
K10039-009	A20049-009	9 IN(228.6mm)

ITEM	PART NUMBER	DESCRIPTION	QTY
7	B15013-001	FLAT WASHER FOR 3/8	1
6	A20049-0XX	HEX STANDOFF	1
5	A20052-001	ROOF MOUNT FLASHING	1
4	A20065-001	ROOF MOUNT SHOE	1
3	B15015-002	HEX LAG BOLT 5/16 X 4.00	1
2	B15018-001	HEX CAP SCREW 3/8-16 X 3/4	1
1	C10006-001	FLAT WASHER 19.5mm ID X 3.0mm	1

MATERIAL		SEE NOTES	
Third Angle Projection:			
GENERAL SPECIFICATIONS All Dimensions in inches (millimeters)			
Tolerances			
X.XXX ±0.01 (0.25mm)		Break all sharp edges	
X.XX ±0.02 (0.50mm)		010-020 unless	
X.X ±0.039 (1.0mm)		otherwise specified.	
Unless otherwise spec'd			
DRAWN BY	DATE	TITLE	
LWF	09/21/2010	EZ ROOF STANDOFF KIT	
CHECKED BY		DRAWING NUMBER	
		B	K10070-XXX
APPROVALS		SCALE:	NONE SHEET 1 of 1

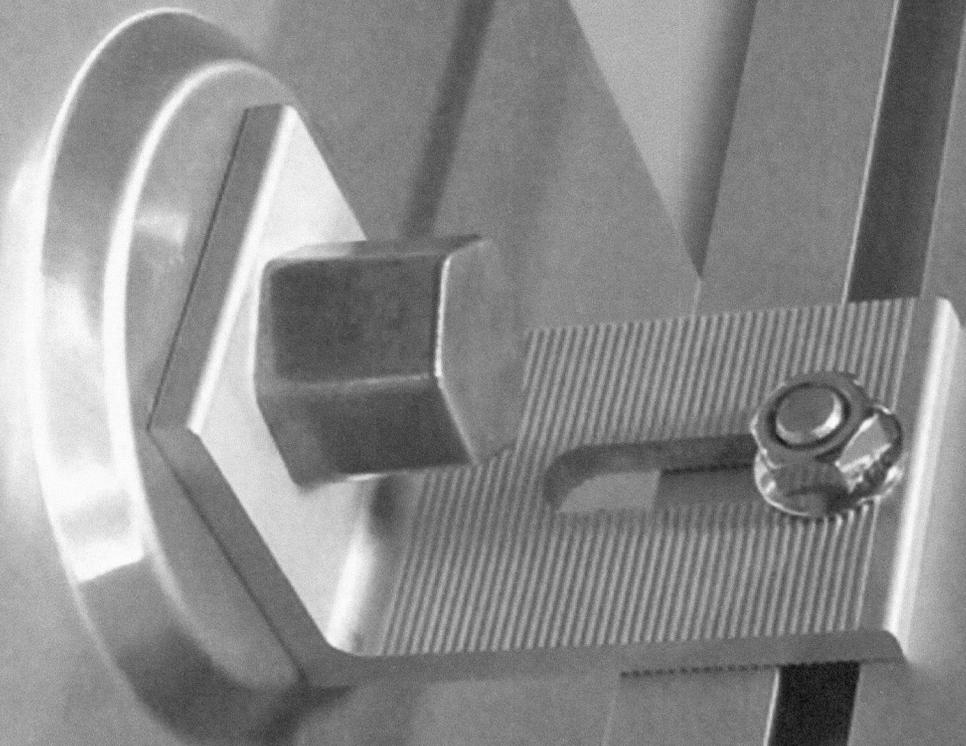
THIS DRAWING IS CONFIDENTIAL PROPERTY OF SUNMODO AND ITS CONTENTS MAY NOT BE DISCLOSED WITHOUT THE PRIOR WRITTEN CONSENT OF SUNMODO CORP.

# Ez Roof Mount

\* Patent Pending

## Installation Guide

3.1.11



City of Portland  
REVIEWED FOR CODE  
COMPLIANCE

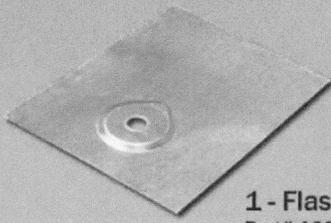
# SUNMODE

Permit Number  
[www.sunmodo.com](http://www.sunmodo.com)

# Installer's Responsibility

It is the Installer's responsibility to ensure proper placement of penetration points. Comply with all local, state, and national building codes that may supersede this installation. Ensure the structural support members for mounting the Ez Mount can withstand all code loading conditions. Consult with a licensed professional engineer for the appropriate loading conditions. Use only Sunmodo parts and other specified parts by Sunmodo. Substitute parts may void the warranty. Follow all regional safety requirements during installation.

## Parts List for the Ez Roof Mount



1 - Flashing  
Part# A20052-001



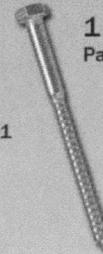
1 - AI Shoe  
Part# A20065-001



1 - Hex Cap  
Part# A20066-001



1 - Ez L Foot  
Part# A20064-001



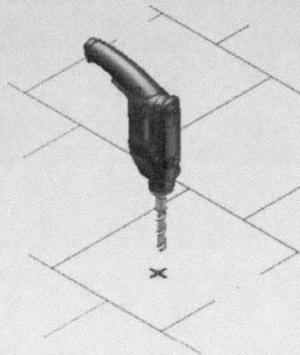
1 - Lag Bolt SS 5/16 x 4  
Part# A20064-001



1 - Bolt 3/8 - 16 x 3/4"  
1 - Flange Nut 3/8"

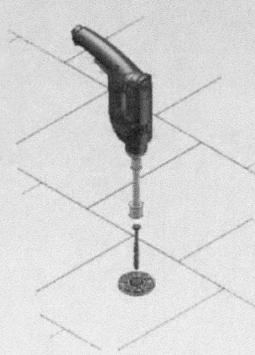
### Step 1

Drill a pilot hole at the predetermined penetration mark. Use a 7/32 drill bit and drill down 3 inches. Make sure the holes are 90 degrees from the pitch of the roof surface.



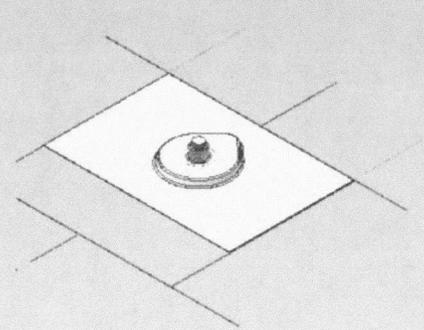
### Step 2

Clear sawdust and fill hole with approved sealant. Install the AI Shoe to the roof using the 5/16 x 4" lagbolt.



### Step 3

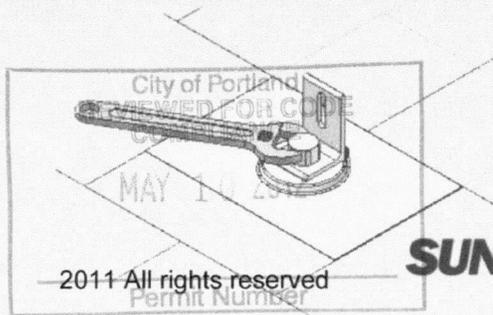
Use a roofer bar to lift roof shingle. Slide the flashing under the shingle and place flashing over the shoe.



### Step 4

Place "L" Foot on top of the flashing and shoe. Screw on Hex Cap on the shoe and tighten cap.

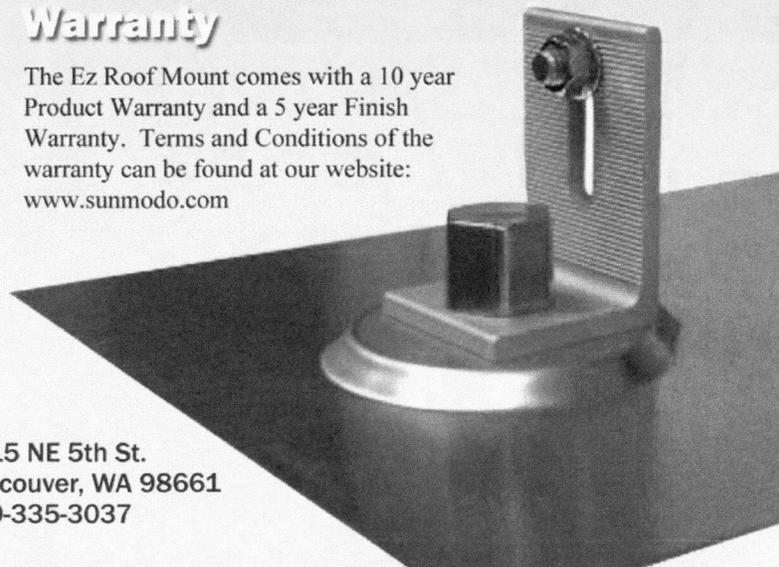
Your Ez Roof Mount is now ready to have rail mounted to the L Foot with the Stainless Steel Nut and Bolt provided.



### Warranty

The Ez Roof Mount comes with a 10 year Product Warranty and a 5 year Finish Warranty. Terms and Conditions of the warranty can be found at our website: [www.sunmodo.com](http://www.sunmodo.com)

1915 NE 5th St.  
Vancouver, WA 98661  
360-335-3037



# Roof Trac™

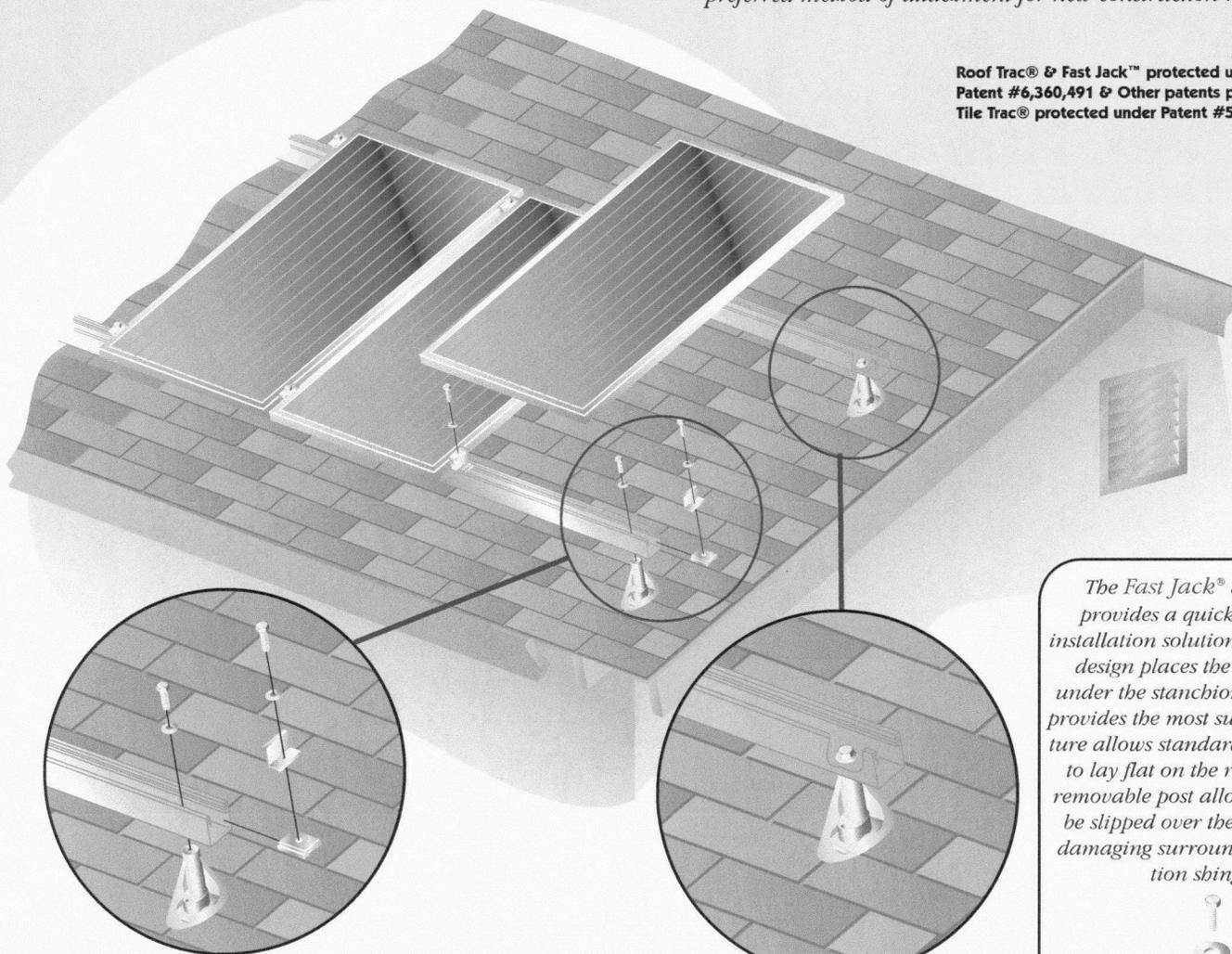
Patent #6,360,491

The Original "Top-Down" PV Mounting System.

Integrated with Fast Jack® attachments

The patented Roof Trac™ system installed with the Fast Jack® attachment method provides an ideal solution for installations where a flashing is desired. The Fast Jack® is also the solar industries preferred method of attachment for new construction roofs.

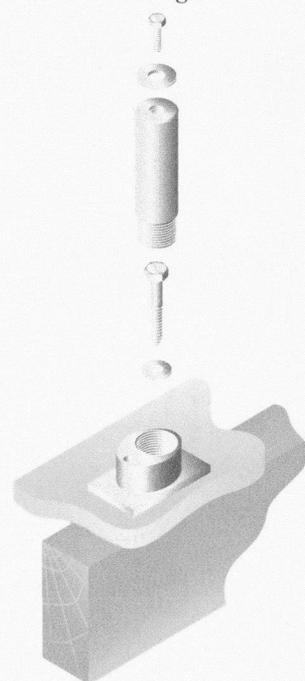
Roof Trac® & Fast Jack™ protected under Patent #6,360,491 & Other patents pending.  
Tile Trac® protected under Patent #5,646,029.



Illustrated above is how the Fast Jack® attachment seamlessly integrates with the Roof Trac™ mounting system.

All attachment hardware is concealed within the support rail leaving an aesthetically pleasing solar array.

The Fast Jack® attachment provides a quick and strong installation method. Our patented design places the bolt directly under the stanchion post where it provides the most support. This feature allows standard roof flashings to lay flat on the roof deck. The removable post allows flashings to be slipped over the base without damaging surrounding composition shingles.



## Splice Kit

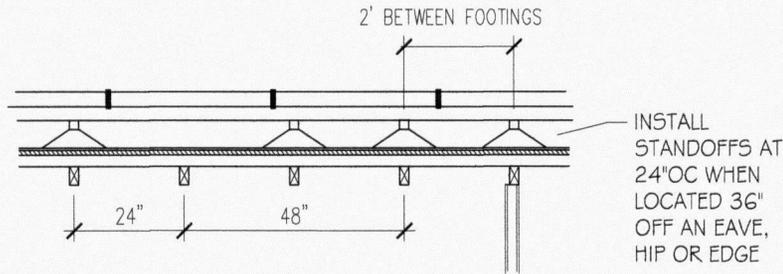
The splice kit provides a solution to rigidly lock multiple rail sets together. The splice kit has a feature that allows for thermal expansion/contraction of the rails without damaging the roof-top!



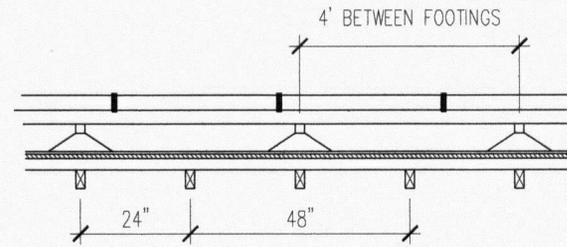
City of Portland  
REVIEWED FOR CODE  
COMPLIANCE

professional  
**SOLAR**  
products  
Permits & Inspections  
(800) 84-SOLAR  
(805) 383-0802-fax  
4630 Calle Quetzal  
Camarillo, CA 93012

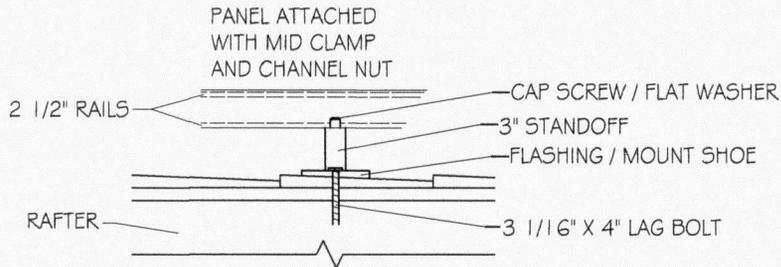
For more information you  
can visit us on the web at  
[www.RoofTrac.com](http://www.RoofTrac.com)



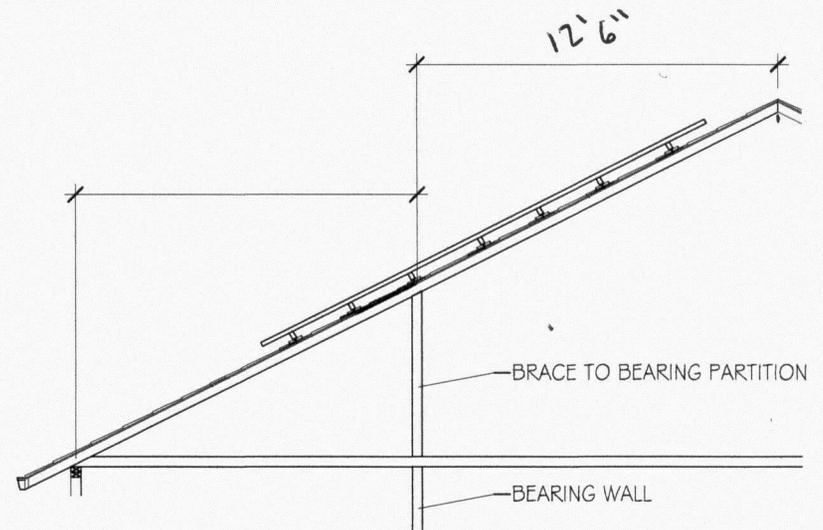
1 FRONT VIEW



2 FRONT VIEW



3 ROOF CONNECTION



4 VIEW OF MOUNTING PLANE

Douglas #1

RS ENERGY

INSTALLATION GUIDE

20915 SW 105TH AVE  
TUALATIN, OR 97062

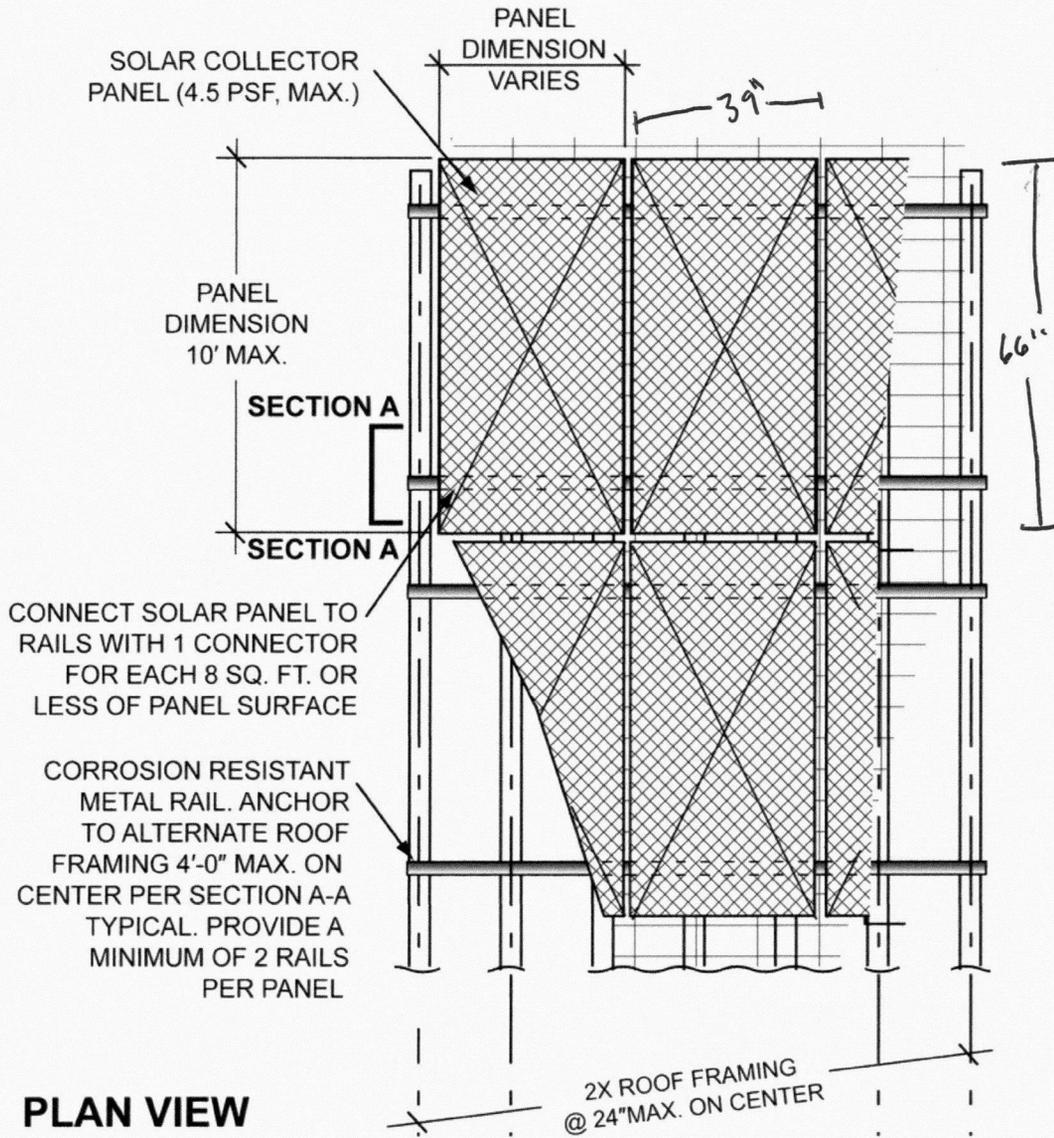
503-752-2885 (P)  
503-692-9008 (F)

PRESCRIPTIVE PATH INSTALLATION PRACTICE:

- ① ESTABLISH RAFTER, MARK AND DRILL INITIAL HOLE.
- ② PLACE ROOF SHOE, FLAT WASHER, AND FLASHINGS OVER INITIAL HOLE.
- ③ SECURE FLASHING WITH A 5/16" X 4" LAG BOLT.
- ④ TIGHTEN STANDOFF TO MOUNT SHOES.
- ⑤ RAILS ATTACHED WITH 3/8" FLAT WASHER AND 3/8" X 3/4" CAP SCREW

City of Portland  
REVIEWED FOR CODE COMPLIANCE  
Permit Number

**Bureau of Development Services  
Program Guide – Solar Water Heating and Photovoltaic Electric Generators  
Installed on One or Two Family Dwellings  
Page 10 of 14  
December 1, 2010**



**PLAN VIEW**

FIG. 1

City of Portland  
REVIEWED FOR CODE  
COMPLIANCE  
MAY 10 2012  
Permit Number

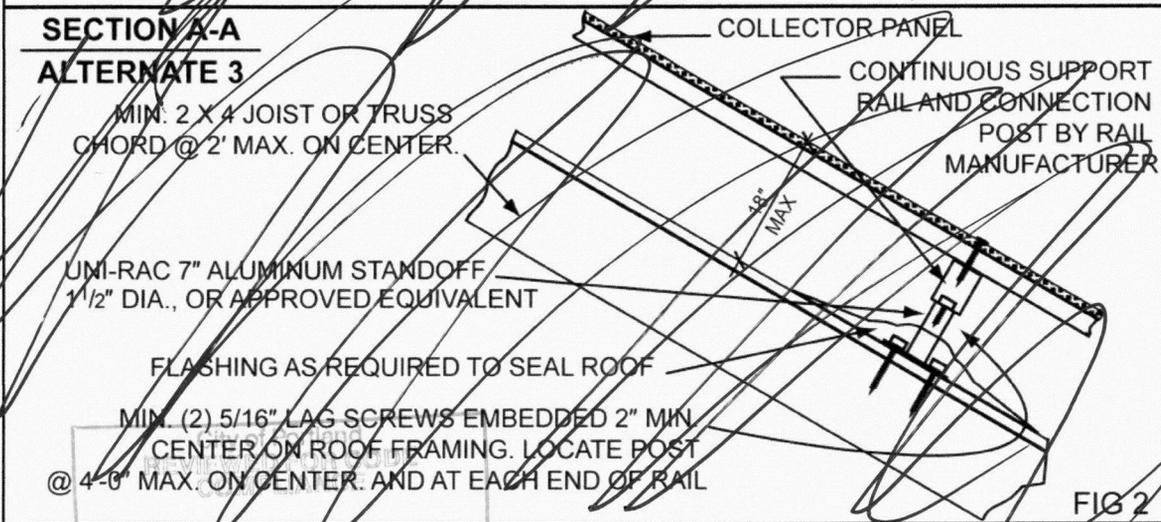
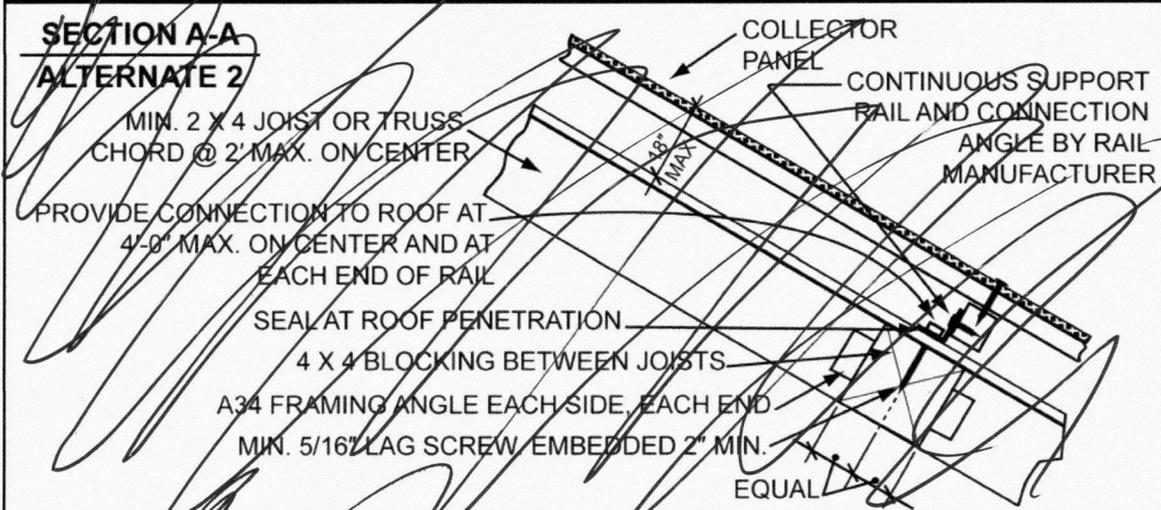
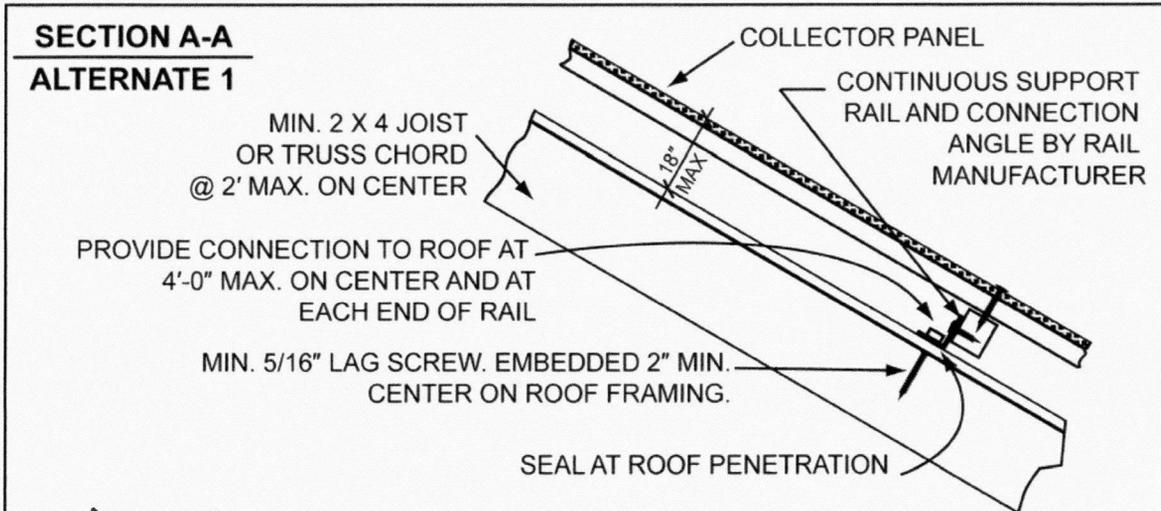


FIG 2

MAY 10 2012

Permit Number



City of Portland, Oregon - Bureau of Development Services

1900 SW Fourth Avenue • Portland, Oregon 97201 • 503-823-7300 • www.portlandoregon.gov/bds



Checklist and Submittal Requirements for Prescriptive Installations  
of Solar Photovoltaic and Solar Water Heating Systems in accordance  
with Oregon Solar Installation Specialty Code (OSISC)

Instructions

Complete the following with all the information requested. This form must be submitted along with the application for installation.

Property Owner Information

Property Owner Name: Travis Covejoy Installation Address: 5214 NE 27th Ave  
Day Phone: (503) 220-8262 Evening Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
Contractor: RS Energy CCB#: 185408  
Day Phone: (503) 752-2885 Evening Phone: \_\_\_\_\_ Email: Chris.presicci@rs-525.com

PV Modules or Solar Water Heating Collectors

Manufacturer: Solarworld Model Number: SW 255 Listing Agency: \_\_\_\_\_

Site Plan and Structural Plan

- Attach a simple site plan showing the location of the PV or solar water heating system in relation to buildings, structures, property lines, and, as applicable, flood hazard areas.
- Attach a simple structural plan showing the roof framing (rafter size, type and spacing) and PV module system racking attachment. Plans must be shown in sufficient detail to assess whether the requirements of section 304.9 of OSISC or one of the exceptions have been met.
- Attach simple building elevation.
- The plans must be on 8.5 x 11 or larger paper.

Structural Information

Roof Design and Attachment

- Roof rafter size: 2 x 6 inches OR Manufactured Trusses
- Rafter or manufactured roof truss spacing 16 inches o.c.
- For roof rafters, maximum rafter span allowed per table 305.4.1 (Appendix "B") of the Oregon Solar Installation Specialty Code (OSISC) ([www.oregonbcd.org/programs/solar/solar\\_code/100110\\_OSISC.pdf](http://www.oregonbcd.org/programs/solar/solar_code/100110_OSISC.pdf)) for the size and spacing of roof rafters is 12 ft 9 inches.

Checklist to determine if your installation qualifies for prescriptive path

Yes  No Is this conventional light framed wood construction?

Yes  No Does the structure have pre-engineered trusses?

OR

Does structure have roof framing members spaced at 24" o.c. maximum AND comply with the applicable allowable span in table 305.4.1 (Appendix "B") of the Oregon Solar Installation Specialty Code (OSISC)?

**Bureau of Development Services**  
**Program Guide – Solar Water Heating and Photovoltaic Electric Generators**  
**Installed on One or Two Family Dwellings**  
**Page 14 of 14**  
**December 1, 2010**

- Yes  No Is the roofing material metal, single layer wood shingle, or not more than two layers of composition shingle?  
 Yes  No Is the weight of the modules and racking less than 4.5 pounds per square foot?  
 Yes  No Is the module height less than 18 inches above the roof in accordance with section 305.4?

**For Standing Seam Metal Roofs Only (If not applicable please skip this section)**

- Yes  No Is the metal gauge 26 or heavier?  
 Yes  No Clamp design: Are clamps designed to withstand uplift of at least 115 pounds for clamps spaced at 60 inches on center or less or at least 75 pounds for clamps spaced at 48 inches on center or less?  
 Yes  No Is the spacing of the clamps as measured along the seam greater than or equal to 24" o.c. and less than 60" o.c. AND the spacing perpendicular to the seam not greater than 24" o.c.?  
 Yes  No Is the roofing panel width 18-inches or greater?  
 Yes  No Is the roofing panel attached with at least #10 screws at 24" o.c.?  
 Yes  No Is the roofing panels installed over minimum 1/2-inch nominal wood structural panels attached to framing with 8d nails at 6" o.c. at panel edges and 12" o.c. field nailing?

If you have indicated "No" on any of these requirements above, the project may not be submitted using the prescriptive path.

**Fire Fighter Access and Escape**

Access and escape pathways are not required when the array is located on a non-occupied accessory structures that is separated from occupied structures by a 6 foot minimum separation distance or by a minimum two-hour fire rated assembly.

**General Requirements:** For all other roof mounted systems, a minimum 36" wide pathway is required along three sides of the solar roof, located over a structurally supported area. Any roof with a slope greater than 2:12 can not use the bottom roof edge as a pathway. Pathways and solar panels shall be located outside 12" of the low point of a valley.

If the array is greater than 150 feet in length or width, additional 36" wide intermediate pathways and cutouts are required. See code for details.

If the roof has smoke and/or heat vents, a 36" pathway shall be provided to and around each vent.

**Exceptions to General Requirements:**

- Yes  No Is the roof slope greater than 2:12?  
 Yes  No Is the array area 1,000 sq ft or less?  
 Yes  No Is the array 150 feet or less in length or width?

If you have indicated "No" to any of the items above, exceptions do not apply, provide a simple plan conforming with the general requirements.

If you have indicated "Yes" to all of the items above, see below for reduced access and escape pathway requirements.

Is the array 25% or less of the roof area?  Yes  No

- If Yes, a 12" pathway along each side of any horizontal ridge is required.
- If No, a 12" pathway along each side of any horizontal ridge is required and a minimum of one 36" pathway is required from ridge to eave over a structurally supported area.

Provide a simple plan showing conformance to the reduced access pathway requirements.

As the property owner or authorized representative of the above listed property, I certify that I have verified the information provided above and that the roof rafters (if applicable to the project), meet the span requirements of Table 305.4.1 (Appendix B) of the Oregon Solar Installation Specialty Code.

Applicant name (please print) Kor Hester

Signature [Signature]

Date 3/10/12