



# Starling Madison Lofquist, Inc.

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Chula Vista, CA 91910

June 20, 2018

page 1 of 28

Attn: Mr. Takashi Chiyoda, General Manager

## **Subject: Roof Tech RT-[E] Mount Mini – Structural Analysis**

SML Job No.: 471-13

Dear Mr. Chiyoda:

We have analyzed the Roof Tech RT-[E] Mount Mini photovoltaic (PV) panel roof mount system and determined that, for the configurations and criteria described below, it is in compliance with the applicable sections of the following Reference Documents:

- Codes: ASCE/SEI 7-10 Min. Design Loads for Buildings & Other Structures  
International Building Code 2015 Edition  
International Residential Building Code 2015 Edition
- Other: Aluminum Design Manual, 2015 Edition

The Roof Tech RT-[E] Mount Mini photovoltaic (PV) panel roof mount system is comprised of a 6000 series aluminum [E] Mount Mini base. An appropriately load rated 'L-Foot', by others, may be attached to the [E] Mount Mini base with a stainless steel SS304 8.0 mm bolt, and flange nut. An appropriately load rated rail, by others, may be attached to the 'L-Foot' per the rail manufacturer's installation instructions. The installation of the RT-[E] Mount Mini must be with the long direction parallel to the roof framing and in accordance with Roof Tech's Installation Manual. The system is attached to the roof wood substrate with SS304 5.0 mm x 60 mm wood screws.

Three wood substrates were tested with the fasteners also passing through two layers of composite asphalt roof shingles and 2 layers of building paper. The first tested wood substrate consisted of 7/16" thick sheathing over a 2x4 DF #2 rafter (2x truss top chord OK by inspection), the second tested wood substrate consisted of 7/16" thick OSB only, and the third tested wood substrate consisted of 15/32" thick plywood only. See Exhibit 'A' – attached. **Two wood screws are required at the rafter installations and five wood screws are required at the OSB and plywood only installations.**

The testing data provided by Institute of Building Technology (IBT) report no.: 2426-18005 project no.: 29702 dated March 21, 2018, shows that the critical failure occurs in one of three ways; pullout of the wood screws from the 2x rafter, yielding of the attached components in shear, or pullout of the nails attaching the OSB/Plywood to the 2x rafter. Maximum allowable values for these failure conditions were derived using a safety factor of 2.0 on the ultimate loads resulting in aluminum failure and a safety factor of 3.0 on the loads resulting in wood failure. The testing was performed in general accordance with IAPMO Uniform Evaluation Services *Evaluation Criteria for Joist Hangers and Miscellaneous Connectors*, EC002 adopted June 2007, revised January 2016 and ASTM D1761-2012, *Standard Test Methods for Mechanical Fasteners in Wood*.

Compression load capacity on the OSB and plywood installations were determined by testing conducted at Western Technologies Inc. (WT). The data is represented in job no. 2163XD260 event no. G260-3 (OSB) dated January 3, 2014 and job no. 2163XD260 event no. G260-6 (Plywood) dated May 30, 2014. The safety factor for downward compression on the sheathing is 2.0.

The results of the above testing are presented below:

The maximum allowable uplift and shear force for 7/16" thick sheathing over a 2x4 DF #2 rafter is 447 lb and 355 lb respectively. The maximum allowable uplift, down force, and shear force for 7/16" thick OSB only is 153 lb, 258 lb, and 192 lb respectively. The maximum allowable uplift, down force, and shear force for 15/32" thick plywood only is 180 lb, 556 lb, and 277 lb respectively.

The attached tables below show the maximum spacing of the RT [E] Mount Mini for the combined loading criteria of wind speed, roof slope, and snow loads which produce reaction loads less than the allowable loads listed above. The effect of seismic loads (for all design categories A-F) have been determined to be less than the effect due to wind loads in all load conditions and combinations. The assumed topography is flat with a  $K_{zt} = 1.0$ . Therefore, the maximum allowable spacing for common load cases due to dead, wind and snow loads are the controlling load cases.

**‘Rail Option’:**

The maximum height for the ‘Rail Option’ is measured from the bottom of the [E] Mount Mini base to the top of the rail. See Exhibit ‘A’ – attached, for the allowable ‘Rail Option’ PV panel layouts and ‘L-Foot’ and rail configuration. The maximum rail cantilever shall be limited to the smaller of 40% of the maximum rail span in the ‘Rail Option’ tables below and the rail manufacturer’s specified maximum cantilever. It is the responsibility of the contractor to verify that the ‘L-Foot’ and rails that are used have a span rating greater than that shown in the ‘Rail Option’ tables below. Provide thermal expansion splices along the rail at intervals not to exceed 14 feet and refer to the rail manufacturer’s thermal expansion splice detailing for proper installation.

RT1	RT-[E] Mount Mini Rafter Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet												
	Portrait Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
0 PSF	B	0 to 6	1	8	8	8	8	8	8	7	6	5	
		Degrees	2	8	8	7	6	5	4	3	3	3	
		7 to 27	1	8	8	8	8	8	8	7	6	6	
		Degrees	2	8	7	7	6	5	4	4	3	3	
	C	28 to 45	1	8	8	8	8	8	8	7	6	5	5
		Degrees	2	8	8	8	8	7	6	5	4	4	
		0 to 6	1	8	8	8	8	6	5	5	4	4	
		Degrees	2	6	5	5	4	3	3	2	2	2	
	D	7 to 27	1	8	8	8	8	7	6	5	4	4	
		Degrees	2	6	5	5	4	3	3	2	2	2	
		28 to 45	1	8	8	8	7	6	5	4	4	3	
		Degrees	2	8	7	6	5	4	3	3	3	3	
1-10 PSF	B	0 to 6	1	8	8	8	8	8	8	7	6	5	
		Degrees	2	8	8	7	6	5	4	3	3	3	
		7 to 27	1	8	8	8	8	8	8	7	6	6	
		Degrees	2	8	7	7	6	5	4	4	3	3	
	C	28 to 45	1	8	8	8	8	8	7	6	5	5	
		Degrees	2	8	8	8	8	7	6	5	4	4	
		0 to 6	1	8	8	8	8	6	5	5	4	4	
		Degrees	2	6	5	5	4	3	3	2	2	2	
	D	7 to 27	1	8	8	8	8	7	6	5	4	4	
		Degrees	2	6	5	5	4	3	3	2	2	2	
		28 to 45	1	8	8	8	7	6	5	4	4	3	
		Degrees	2	8	7	6	5	5	4	3	3	3	
11-20 PSF	B	0 to 6	1	8	8	8	8	8	8	7	6	5	
		Degrees	2	8	8	7	6	5	4	3	3	3	
		7 to 27	1	8	8	8	8	8	8	7	6	6	
		Degrees	2	8	7	7	6	5	4	4	3	3	
	C	28 to 45	1	8	8	8	8	8	8	7	6	5	
		Degrees	2	8	8	8	8	7	6	5	4	4	
		0 to 6	1	8	8	8	8	6	5	5	4	4	
		Degrees	2	6	5	5	4	3	3	2	2	2	
	D	7 to 27	1	8	8	8	8	7	6	5	4	4	
		Degrees	2	6	5	5	4	3	3	2	2	2	
		28 to 45	1	8	8	8	7	6	5	4	4	3	
		Degrees	2	8	7	6	5	5	4	3	3	3	
D	0 to 6	1	8	8	8	6	5	4	4	3	3		
	Degrees	2	5	4	4	3	3	2	2	2	0		
	7 to 27	1	8	8	8	7	6	5	4	4	3		
	Degrees	2	5	4	4	3	3	2	2	2	0		
	28 to 45	1	8	7	7	6	5	4	4	3	3		
	Degrees	2	7	6	5	5	4	3	3	2	2		
	0 to 6	1	8	8	8	8	8	8	7	6	5		
	Degrees	2	8	8	8	8	7	6	5	4	4		

RT1	RT-[E] Mount Mini Rafter Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet											
	Portrait Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
21-30 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	7	6	5
		2	8	8	7	6	5	4	3	3	3	
		7 to 27 Degrees	1	8	8	8	8	8	8	7	6	6
		2	8	7	7	6	5	4	4	3	3	
	C	28 to 45 Degrees	1	8	8	8	8	8	8	7	6	5
		2	8	8	8	8	7	6	5	4	4	
		0 to 6 Degrees	1	8	8	8	8	6	5	5	4	4
		2	6	5	5	4	3	3	2	2	2	
	D	7 to 27 Degrees	1	8	8	8	8	7	6	5	4	4
		2	6	5	5	4	3	3	2	2	2	
		28 to 45 Degrees	1	8	8	8	7	6	5	4	4	3
		2	8	7	6	5	4	3	3	3	3	
31-40 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	7	6	5
		2	8	8	7	6	5	4	3	3	3	
		7 to 27 Degrees	1	8	8	8	8	8	8	7	6	6
		2	8	7	7	6	5	4	4	3	3	
	C	28 to 45 Degrees	1	8	8	8	8	8	7	6	5	5
		2	8	8	8	8	7	6	5	4	4	
		0 to 6 Degrees	1	8	8	8	8	6	5	5	4	4
		2	6	5	5	4	3	3	2	2	2	
	D	7 to 27 Degrees	1	8	8	8	8	7	6	5	4	4
		2	6	5	5	4	3	3	2	2	2	
		28 to 45 Degrees	1	8	8	8	7	6	5	4	4	3
		2	8	7	6	5	5	4	3	3	3	
41-50 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	7	6	5
		2	8	8	7	6	5	4	3	3	3	
		7 to 27 Degrees	1	8	8	8	8	8	8	7	6	6
		2	8	7	7	6	5	4	4	3	3	
	C	28 to 45 Degrees	1	8	8	8	8	8	7	6	5	5
		2	8	8	8	8	7	6	5	4	4	
		0 to 6 Degrees	1	8	8	8	8	6	5	5	4	4
		2	6	5	5	4	3	3	2	2	2	
	D	7 to 27 Degrees	1	8	8	8	8	7	6	5	4	4
		2	6	5	5	4	3	3	2	2	2	
		28 to 45 Degrees	1	8	8	8	7	6	5	4	4	3
		2	8	7	6	5	5	4	3	3	3	
D	0 to 6 Degrees	1	8	8	8	6	5	4	4	3	3	
	2	5	4	4	3	3	2	2	2	0		
	7 to 27 Degrees	1	8	8	8	7	6	5	4	4	3	
	2	5	4	4	3	3	2	2	2	0		
D	28 to 45 Degrees	1	8	7	7	6	5	4	4	3	3	
	2	7	6	5	5	4	3	3	2	2		

RT1	RT-[E] Mount Mini Rafter Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet											
	Portrait Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
51-60 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	7	6	5
		2	8	8	7	6	5	4	3	3	3	
		7 to 27 Degrees	1	7	7	7	7	7	7	7	6	6
		2	7	7	7	6	5	4	4	3	3	
	C	28 to 45 Degrees	1	7	7	7	7	7	7	6	5	5
		2	7	7	7	7	7	6	5	4	4	
		0 to 6 Degrees	1	8	8	8	8	6	5	5	4	4
		2	6	5	5	4	3	3	2	2	2	
	D	7 to 27 Degrees	1	7	7	7	7	7	6	5	4	4
		2	6	5	5	4	3	3	2	2	2	
		28 to 45 Degrees	1	7	7	7	6	5	4	4	3	3
		2	7	7	6	5	4	3	3	2	2	
61-70 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	7	6	5
		2	8	8	7	6	5	4	3	3	3	
		7 to 27 Degrees	1	6	6	6	6	6	6	6	6	6
		2	6	6	6	6	5	4	4	3	3	
	C	28 to 45 Degrees	1	6	6	6	6	6	6	6	5	5
		2	6	6	6	6	6	6	5	4	4	
		0 to 6 Degrees	1	8	8	8	6	5	4	4	3	3
		2	6	5	5	4	3	3	2	2	2	
	D	7 to 27 Degrees	1	6	6	6	6	6	6	5	4	4
		2	6	5	5	4	3	3	2	2	2	
		28 to 45 Degrees	1	6	6	6	6	6	5	4	4	3
		2	6	6	6	5	5	4	3	3	3	

RT2	RT-[E] Mount Mini Rafter Installations Cont. (72 Cell PV Panels) Maximum Mount Spacing in Feet												
	Portrait Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
0 PSF	B	0 to 6	1	8	8	8	8	8	7	6	5	5	
		Degrees	2	7	7	6	5	4	3	3	3	2	
		7 to 27	1	8	8	8	8	8	8	7	6	6	5
		Degrees	2	7	7	6	5	4	4	3	3	3	2
	C	28 to 45	1	8	8	8	8	8	7	6	5	5	4
		Degrees	2	8	8	8	7	6	5	4	4	4	3
		0 to 6	1	8	8	8	7	6	5	4	3	3	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
	D	7 to 27	1	8	8	8	7	6	5	4	4	4	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
		28 to 45	1	8	7	7	6	5	4	4	3	3	3
		Degrees	2	7	6	6	5	4	3	3	3	3	2
1-10 PSF	B	0 to 6	1	8	8	8	8	8	7	6	5	5	
		Degrees	2	7	7	6	5	4	3	3	3	2	
		7 to 27	1	8	8	8	8	8	8	7	6	6	5
		Degrees	2	7	7	6	5	4	4	3	3	3	2
	C	28 to 45	1	8	8	8	8	7	6	5	4	4	4
		Degrees	2	8	8	8	7	6	5	4	4	4	3
		0 to 6	1	8	8	8	7	6	5	4	3	3	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
	D	7 to 27	1	8	8	8	7	6	5	4	4	4	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
		28 to 45	1	8	7	7	6	5	4	4	3	3	3
		Degrees	2	7	6	6	5	4	3	3	3	3	2
11-20 PSF	B	0 to 6	1	8	8	8	8	8	7	6	5	5	
		Degrees	2	7	7	6	5	4	3	3	3	2	
		7 to 27	1	8	8	8	8	8	8	7	6	6	5
		Degrees	2	7	7	6	5	4	4	3	3	3	2
	C	28 to 45	1	8	8	8	8	7	6	5	4	4	4
		Degrees	2	8	8	8	7	6	5	4	4	4	3
		0 to 6	1	8	8	8	7	6	5	4	3	3	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
	D	7 to 27	1	8	8	8	7	6	5	4	4	4	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
		28 to 45	1	8	7	7	6	5	4	4	3	3	3
		Degrees	2	7	6	6	5	4	3	3	3	3	2
D	0 to 6	1	8	7	7	5	5	4	3	3	3	2	
	Degrees	2	4	4	3	3	2	2	2	2	0	0	
	7 to 27	1	8	8	7	6	5	4	4	4	3	3	
	Degrees	2	4	4	3	3	2	2	2	2	0	0	
	28 to 45	1	7	6	6	5	4	4	3	3	3	2	
	Degrees	2	6	5	5	4	3	3	2	2	2	2	
	0 to 6	1	8	8	8	8	8	7	6	5	5	4	
	Degrees	2	6	5	5	4	3	3	2	2	2	2	

RT2	RT-[E] Mount Mini Rafter Installations Cont. (72 Cell PV Panels) Maximum Mount Spacing in Feet												
	Portrait Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
21-30 PSF	B	0 to 6	1	8	8	8	8	8	7	6	5	5	
		Degrees	2	7	7	6	5	4	3	3	3	2	
		7 to 27	1	8	8	8	8	8	8	7	6	6	5
		Degrees	2	7	7	6	5	4	4	3	3	3	2
	C	28 to 45	1	8	8	8	8	8	7	6	5	5	4
		Degrees	2	8	8	8	7	6	5	4	4	4	3
		0 to 6	1	8	8	8	7	6	5	4	4	3	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
	D	7 to 27	1	8	8	8	7	6	5	4	4	4	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
		28 to 45	1	8	7	7	6	5	4	4	4	3	3
		Degrees	2	7	6	6	5	4	3	3	3	3	2
31-40 PSF	B	0 to 6	1	8	8	8	8	8	8	7	6	5	5
		Degrees	2	7	7	6	5	4	3	3	3	3	2
		7 to 27	1	8	8	8	8	8	8	7	6	6	5
		Degrees	2	7	7	6	5	4	4	3	3	3	2
	C	28 to 45	1	8	8	8	8	7	6	5	5	5	4
		Degrees	2	8	8	8	7	6	5	4	4	4	3
		0 to 6	1	8	8	8	7	6	5	4	4	3	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
	D	7 to 27	1	8	8	8	7	6	5	4	4	4	3
		Degrees	2	4	4	3	3	2	2	2	2	0	0
		28 to 45	1	8	7	7	6	5	4	4	4	3	3
		Degrees	2	7	6	6	5	4	3	3	3	3	2
41-50 PSF	B	0 to 6	1	8	8	8	8	8	8	7	6	5	5
		Degrees	2	7	7	6	5	4	3	3	3	3	2
		7 to 27	1	7	7	7	7	7	7	7	6	6	5
		Degrees	2	7	7	6	5	4	4	3	3	3	2
	C	28 to 45	1	7	7	7	7	7	7	6	5	5	4
		Degrees	2	7	7	7	7	6	5	4	4	4	3
		0 to 6	1	8	8	8	7	6	5	4	4	3	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
	D	7 to 27	1	7	7	7	6	5	4	4	4	3	3
		Degrees	2	5	4	4	3	3	2	2	2	2	0
		28 to 45	1	7	7	7	6	5	4	4	4	3	3
		Degrees	2	7	6	6	5	4	3	3	3	3	2
D	0 to 6	1	8	7	7	5	5	4	3	3	3	2	
	Degrees	2	4	4	3	3	2	2	2	2	0	0	
	7 to 27	1	7	7	7	6	5	4	4	4	3	3	
	Degrees	2	4	4	3	3	2	2	2	2	0	0	
D	28 to 45	1	7	6	6	5	4	4	3	3	3	2	
	Degrees	2	6	5	5	4	3	3	2	2	2	2	

RT2	RT-[E] Mount Mini Rafter Installations Cont. (72 Cell PV Panels) Maximum Mount Spacing in Feet												
	Portrait Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
51-60 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	7	6	5	5	
			2	7	7	6	5	4	3	3	2		
		7 to 27 Degrees	1	6	6	6	6	6	6	6	6	6	5
			2	6	6	6	5	4	4	3	3	2	
		28 to 45 Degrees	1	6	6	6	6	6	6	6	5	5	4
			2	6	6	6	6	6	5	4	4	4	3
	C	0 to 6 Degrees	1	8	8	8	7	6	5	4	3	3	
			2	5	4	4	3	3	2	2	2	0	
		7 to 27 Degrees	1	6	6	6	6	6	5	4	4	4	3
			2	5	4	4	3	3	2	2	2	0	
		28 to 45 Degrees	1	6	6	6	6	5	4	4	4	3	3
			2	6	6	6	5	4	3	3	3	3	2
	D	0 to 6 Degrees	1	8	7	7	5	6	4	3	3	2	
			2	4	4	3	3	2	2	2	0	0	
		7 to 27 Degrees	1	6	6	6	6	5	4	4	4	3	3
2			4	4	3	3	2	2	2	0	0		
28 to 45 Degrees		1	6	6	6	5	4	4	3	3	2		
		2	6	5	5	4	3	3	2	2	2		
61-70 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	7	6	5	5	
			2	7	7	6	5	4	3	3	3	2	
		7 to 27 Degrees	1	5	5	5	5	5	5	5	5	5	
			2	5	5	5	5	4	4	3	3	2	
		28 to 45 Degrees	1	5	5	5	5	5	5	5	4	4	4
			2	5	5	5	5	5	5	4	4	3	3
	C	0 to 6 Degrees	1	8	8	8	7	6	5	4	3	3	
			2	5	4	4	3	3	2	2	2	0	
		7 to 27 Degrees	1	5	5	5	5	5	5	4	4	4	3
			2	5	4	4	3	3	2	2	2	0	
		28 to 45 Degrees	1	5	5	5	5	5	4	4	3	3	
			2	5	5	5	5	4	3	3	3	2	
	D	0 to 6 Degrees	1	8	7	7	5	5	4	3	3	2	
			2	4	4	3	3	2	2	2	0	0	
		7 to 27 Degrees	1	5	5	5	5	5	4	4	3	3	
2			4	4	3	3	2	2	2	0	0		
28 to 45 Degrees		1	5	5	5	5	4	4	3	3	2		
		2	5	5	5	4	3	3	2	2	2		



RT3	RT-[E] Mount Rail Plywood Only Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet											
	Portrait Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
0 PSF	B	0 to 6 Degrees	1	7	6	5	4	4	3	3	2	2
		2	3	3	2	2	0	0	0	0	0	
		7 to 27 Degrees	1	7	6	6	5	4	3	3	2	2
		2	3	3	3	2	2	0	0	0	0	
	C	28 to 45 Degrees	1	6	5	5	4	3	3	2	2	2
		2	5	4	4	3	3	2	2	2	2	0
		0 to 6 Degrees	1	4	4	3	3	2	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	0
	D	7 to 27 Degrees	1	5	4	4	3	3	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	0
		28 to 45 Degrees	1	4	3	3	3	2	2	0	0	0
		2	3	3	2	2	0	0	0	0	0	0
1-10 PSF	B	0 to 6 Degrees	1	7	6	5	4	4	3	3	2	2
		2	3	3	2	2	0	0	0	0	0	
		7 to 27 Degrees	1	7	6	6	5	4	3	3	2	2
		2	3	3	3	2	2	0	0	0	0	
	C	28 to 45 Degrees	1	6	5	5	4	3	3	2	2	2
		2	5	4	4	3	3	2	2	2	2	0
		0 to 6 Degrees	1	4	4	3	3	2	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	0
	D	7 to 27 Degrees	1	5	4	4	3	3	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	0
		28 to 45 Degrees	1	4	3	3	3	2	2	0	0	0
		2	3	3	2	2	2	0	0	0	0	0
11-20 PSF	B	0 to 6 Degrees	1	6	6	5	4	4	3	3	2	2
		2	3	3	2	2	0	0	0	0	0	
		7 to 27 Degrees	1	5	5	5	5	4	3	3	2	2
		2	3	3	3	2	2	0	0	0	0	
	C	28 to 45 Degrees	1	6	5	5	4	3	3	2	2	2
		2	5	4	4	3	3	2	2	2	2	0
		0 to 6 Degrees	1	4	4	3	3	2	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	0
	D	7 to 27 Degrees	1	5	4	4	3	3	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	0
		28 to 45 Degrees	1	4	3	3	3	2	2	0	0	0
		2	3	3	2	2	2	0	0	0	0	0
D	0 to 6 Degrees	1	3	3	3	2	2	0	0	0	0	
	2	2	0	0	0	0	0	0	0	0	0	
	7 to 27 Degrees	1	4	3	3	2	2	2	0	0	0	
	2	2	0	0	0	0	0	0	0	0	0	
	28 to 45 Degrees	1	3	3	2	2	2	0	0	0	0	
	2	2	2	2	2	0	0	0	0	0	0	
	0 to 6 Degrees	1	3	3	3	2	2	0	0	0	0	
	2	2	0	0	0	0	0	0	0	0	0	

RT3	RT-[E] Mount Rail Plywood Only Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet												
	Portrait Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
21-30 PSF	B	0 to 6 Degrees	1	5	5	5	4	4	3	3	2	2	
		2	3	3	2	2	2	0	0	0	0		
		7 to 27 Degrees	1	4	4	4	4	4	3	3	2	2	
		2	3	3	3	2	2	0	0	0	0		
	C	28 to 45 Degrees	1	5	5	5	4	3	3	2	2	2	
		2	5	4	4	3	3	2	2	2	0		
		0 to 6 Degrees	1	4	4	3	3	2	2	2	0	0	
		2	2	2	2	0	0	0	0	0	0		
	D	7 to 27 Degrees	1	4	4	4	3	3	2	2	0	0	
		2	2	2	2	0	0	0	0	0	0		
		28 to 45 Degrees	1	4	3	3	3	2	2	0	0	0	
		2	3	3	2	2	0	0	0	0	0		
31-40 PSF	B	0 to 6 Degrees	1	4	4	4	4	4	3	3	2	2	
		2	3	3	2	2	2	0	0	0	0		
		7 to 27 Degrees	1	3	3	3	3	3	3	3	2	2	
		2	3	3	3	2	2	0	0	0	0		
	C	28 to 45 Degrees	1	4	4	4	4	3	3	2	2	2	
		2	4	4	4	3	3	2	2	2	0		
		0 to 6 Degrees	1	4	4	3	3	2	2	2	0	0	
		2	2	2	2	0	0	0	0	0	0		
	D	7 to 27 Degrees	1	3	3	3	3	3	2	2	0	0	
		2	2	2	2	0	0	0	0	0	0		
		28 to 45 Degrees	1	4	3	3	3	2	2	0	0	0	
		2	3	3	2	2	2	0	0	0	0		
41-50 PSF	B	0 to 6 Degrees	1	3	3	3	3	3	3	3	2	2	
		2	3	3	2	2	2	0	0	0	0		
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	2	
		2	2	2	2	2	2	0	0	0	0		
	C	28 to 45 Degrees	1	3	3	3	3	3	3	3	2	2	
		2	3	3	3	3	3	2	2	2	0		
		0 to 6 Degrees	1	3	3	3	3	2	2	2	0	0	
		2	2	2	2	0	0	0	0	0	0		
	D	7 to 27 Degrees	1	2	2	2	2	2	2	2	0	0	
		2	2	2	2	0	0	0	0	0	0		
		28 to 45 Degrees	1	3	3	3	3	2	2	0	0	0	
		2	3	3	2	2	2	0	0	0	0		

RT3	RT-[E] Mount Rail Plywood Only Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet											
	Portrait Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
51-60 PSF	B	0 to 6 Degrees	1	3	3	3	3	3	3	3	2	2
		2	3	3	2	2	2	0	0	0	0	
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	2
		2	2	2	2	2	2	0	0	0	0	
		28 to 45 Degrees	1	3	3	3	3	3	3	2	2	2
		2	3	3	3	3	3	2	2	2	0	
	C	0 to 6 Degrees	1	3	3	3	3	2	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	
		7 to 27 Degrees	1	2	2	2	2	2	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	
		28 to 45 Degrees	1	3	3	3	3	2	2	0	0	0
		2	3	3	2	2	2	0	0	0	0	
D	0 to 6 Degrees	1	3	3	3	2	2	0	0	0	0	
	2	2	0	0	0	0	0	0	0	0		
	7 to 27 Degrees	1	2	2	2	2	2	2	0	0	0	
	2	2	0	0	0	0	0	0	0	0		
	28 to 45 Degrees	1	3	3	2	2	2	0	0	0	0	
	2	2	2	2	2	0	0	0	0	0		
61-70 PSF	B	0 to 6 Degrees	1	2	2	2	2	2	2	2	2	2
		2	2	2	2	2	2	0	0	0	0	
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	2
		2	2	2	2	2	2	0	0	0	0	
		28 to 45 Degrees	1	2	2	2	2	2	2	2	2	2
		2	2	2	2	2	2	2	2	2	2	
	C	0 to 6 Degrees	1	2	2	2	2	2	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	
		7 to 27 Degrees	1	2	2	2	2	2	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	
		28 to 45 Degrees	1	2	2	2	2	2	2	0	0	0
		2	2	2	2	2	2	0	0	0	0	
D	0 to 6 Degrees	1	2	2	2	2	2	0	0	0	0	
	2	2	0	0	0	0	0	0	0	0		
	7 to 27 Degrees	1	2	2	2	2	2	2	0	0	0	
	2	2	0	0	0	0	0	0	0	0		
	28 to 45 Degrees	1	2	2	2	2	2	0	0	0	0	
	2	2	2	2	2	0	0	0	0	0		

RT4	RT-[E] Mount Mini Plywood Only Installations (72 Cell PV Panels) Maximum Mount Spacing in Feet											
	Portrait Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
0 PSF	B	0 to 6	1	6	5	5	4	3	3	2	2	2
		Degrees	2	3	2	2	2	0	0	0	0	0
		7 to 27	1	6	5	5	4	3	3	2	2	2
		Degrees	2	3	2	2	2	0	0	0	0	0
	C	28 to 45	1	5	4	4	3	3	2	2	2	0
		Degrees	2	4	3	3	3	2	2	2	0	0
		0 to 6	1	4	3	3	2	2	2	0	0	0
		Degrees	2	2	0	0	0	0	0	0	0	0
	D	7 to 27	1	4	4	3	3	2	2	0	0	0
		Degrees	2	2	2	0	0	0	0	0	0	0
		28 to 45	1	3	3	3	2	2	0	0	0	0
		Degrees	2	3	2	2	2	0	0	0	0	0
1-10 PSF	B	0 to 6	1	6	5	5	4	3	3	2	2	2
		Degrees	2	3	2	2	2	0	0	0	0	0
		7 to 27	1	6	5	5	4	3	3	2	2	2
		Degrees	2	3	2	2	2	0	0	0	0	0
	C	28 to 45	1	5	4	4	3	3	2	2	2	0
		Degrees	2	4	3	3	3	2	2	2	0	0
		0 to 6	1	4	3	3	2	2	2	0	0	0
		Degrees	2	2	0	0	0	0	0	0	0	0
	D	7 to 27	1	4	4	3	3	2	2	0	0	0
		Degrees	2	2	2	0	0	0	0	0	0	0
		28 to 45	1	3	3	3	2	2	0	0	0	0
		Degrees	2	3	2	2	2	0	0	0	0	0
11-20 PSF	B	0 to 6	1	5	5	5	4	3	3	2	2	2
		Degrees	2	3	2	2	2	0	0	0	0	0
		7 to 27	1	4	4	4	4	3	3	2	2	2
		Degrees	2	3	2	2	2	0	0	0	0	0
	C	28 to 45	1	5	4	4	3	3	2	2	2	0
		Degrees	2	4	3	3	3	2	2	2	0	0
		0 to 6	1	4	3	3	2	2	2	0	0	0
		Degrees	2	2	0	0	0	0	0	0	0	0
	D	7 to 27	1	4	4	3	3	2	2	0	0	0
		Degrees	2	2	2	0	0	0	0	0	0	0
		28 to 45	1	3	3	3	2	2	0	0	0	0
		Degrees	2	3	2	2	2	0	0	0	0	0
D	0 to 6	1	3	3	2	2	2	0	0	0	0	
	Degrees	2	0	0	0	0	0	0	0	0	0	
	7 to 27	1	3	3	3	2	2	0	0	0	0	
	Degrees	2	0	0	0	0	0	0	0	0	0	
D	28 to 45	1	3	2	2	2	0	0	0	0	0	
	Degrees	2	2	2	2	0	0	0	0	0	0	
	0 to 6	1	3	3	2	2	2	0	0	0	0	
	Degrees	2	2	2	2	0	0	0	0	0	0	

RT4	RT-[E] Mount Mini Plywood Only Installations (72 Cell PV Panels) Maximum Mount Spacing in Feet											
	Portrait Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
21-30 PSF	B	0 to 6 Degrees	1	5	5	5	4	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
		7 to 27 Degrees	1	4	4	4	4	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
	C	28 to 45 Degrees	1	4	4	4	3	3	2	2	2	0
		2	4	3	3	3	2	2	2	0	0	
		0 to 6 Degrees	1	4	3	3	2	2	2	0	0	0
		2	2	0	0	0	0	0	0	0	0	
	D	7 to 27 Degrees	1	4	4	3	3	2	2	0	0	0
		2	2	2	0	0	0	0	0	0	0	
		28 to 45 Degrees	1	3	3	3	2	2	0	0	0	0
		2	3	2	2	2	0	0	0	0	0	
31-40 PSF	B	0 to 6 Degrees	1	3	3	3	3	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
		7 to 27 Degrees	1	3	3	3	3	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
	C	28 to 45 Degrees	1	3	3	3	3	3	2	2	2	0
		2	3	3	3	3	2	2	2	0	0	
		0 to 6 Degrees	1	3	3	3	2	2	2	0	0	0
		2	2	0	0	0	0	0	0	0	0	
	D	7 to 27 Degrees	1	3	3	3	3	2	2	0	0	0
		2	2	2	0	0	0	0	0	0	0	
		28 to 45 Degrees	1	3	3	3	2	2	0	0	0	0
		2	3	2	2	2	0	0	0	0	0	
41-50 PSF	B	0 to 6 Degrees	1	3	3	3	3	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	2
		2	2	2	2	2	0	0	0	0	0	
	C	28 to 45 Degrees	1	3	3	3	3	3	2	2	2	0
		2	3	3	3	3	2	2	2	0	0	
		0 to 6 Degrees	1	3	3	3	2	2	2	0	0	0
		2	2	0	0	0	0	0	0	0	0	
	D	7 to 27 Degrees	1	2	2	2	2	2	2	0	0	0
		2	2	2	0	0	0	0	0	0	0	
		28 to 45 Degrees	1	3	3	3	2	2	0	0	0	0
		2	3	2	2	2	0	0	0	0	0	
D	0 to 6 Degrees	1	3	3	2	2	2	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0		
	7 to 27 Degrees	1	2	2	2	2	2	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0		
D	28 to 45 Degrees	1	3	2	2	2	0	0	0	0	0	
	2	2	2	2	2	0	0	0	0	0		

RT4	RT-[E] Mount Mini Plywood Only Installations (72 Cell PV Panels) Maximum Mount Spacing in Feet												
	Portrait Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
51-60 PSF	B	0 to 6 Degrees	1	2	2	2	2	2	2	2	2	2	2
		2	2	2	2	2	0	0	0	0	0	0	
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	2	2
		2	2	2	2	2	0	0	0	0	0	0	
	C	28 to 45 Degrees	1	2	2	2	2	2	2	2	2	2	0
		2	2	2	2	2	2	2	2	2	0	0	
		0 to 6 Degrees	1	2	2	2	2	2	2	0	0	0	
		2	2	0	0	0	0	0	0	0	0	0	
	D	7 to 27 Degrees	1	2	2	2	2	2	2	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	0	
		28 to 45 Degrees	1	2	2	2	2	0	0	0	0	0	
		2	2	2	2	0	0	0	0	0	0		
61-70 PSF	B	0 to 6 Degrees	1	2	2	2	2	2	2	2	2	2	
		2	2	2	2	2	0	0	0	0	0		
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0	
		2	0	0	0	0	0	0	0	0	0		
	C	28 to 45 Degrees	1	2	2	2	2	2	2	2	2	0	
		2	2	2	2	2	2	2	2	2	0	0	
		0 to 6 Degrees	1	2	2	2	2	2	2	0	0	0	
		2	2	0	0	0	0	0	0	0	0		
	D	7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0	
		2	0	0	0	0	0	0	0	0	0		
		28 to 45 Degrees	1	2	2	2	2	0	0	0	0	0	
		2	2	2	2	0	0	0	0	0	0		

RT5	RT-[E] Mount Mini OSB Only Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet											
	Portrait Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
0 PSF	B	0 to 6 Degrees	1	6	5	4	4	3	2	2	2	0
		2	3	2	2	2	0	0	0	0	0	
		7 to 27 Degrees	1	5	5	5	4	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
	C	28 to 45 Degrees	1	5	4	4	3	3	2	2	2	0
		2	4	3	3	2	2	2	0	0	0	
		0 to 6 Degrees	1	4	3	3	2	2	2	0	0	0
		2	2	0	0	0	0	0	0	0	0	
	D	7 to 27 Degrees	1	4	3	3	2	2	2	0	0	0
		2	2	0	0	0	0	0	0	0	0	
		28 to 45 Degrees	1	3	3	2	2	2	0	0	0	0
		2	2	2	2	2	0	0	0	0	0	
1-10 PSF	B	0 to 6 Degrees	1	3	3	2	2	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	
		7 to 27 Degrees	1	3	3	2	2	2	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	
	C	28 to 45 Degrees	1	2	2	2	2	0	0	0	0	0
		2	2	2	2	2	0	0	0	0	0	
		0 to 6 Degrees	1	4	4	4	4	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
	D	7 to 27 Degrees	1	4	4	4	4	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
		28 to 45 Degrees	1	4	4	4	3	3	2	2	2	0
		2	4	3	3	2	2	2	0	0	0	
11-20 PSF	B	0 to 6 Degrees	1	4	4	4	4	3	3	2	2	0
		2	3	2	2	2	0	0	0	0	0	
		7 to 27 Degrees	1	4	4	4	4	3	3	2	2	2
		2	3	2	2	2	0	0	0	0	0	
	C	28 to 45 Degrees	1	4	4	4	3	3	2	2	2	0
		2	4	3	3	2	2	2	0	0	0	
		0 to 6 Degrees	1	4	3	3	2	2	2	0	0	0
		2	2	0	0	0	0	0	0	0	0	
	D	7 to 27 Degrees	1	4	3	3	2	2	2	0	0	0
		2	2	0	0	0	0	0	0	0	0	
		28 to 45 Degrees	1	3	3	2	2	2	0	0	0	0
		2	2	2	2	2	0	0	0	0	0	
D	0 to 6 Degrees	1	3	3	2	2	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0		
	7 to 27 Degrees	1	3	3	2	2	2	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0		
	28 to 45 Degrees	1	2	2	2	2	0	0	0	0	0	
	2	2	2	2	2	0	0	0	0	0		
	0 to 6 Degrees	1	3	3	2	2	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0		

RT5	RT-[E] Mount Mini OSB Only Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet												
	Portrait Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
21-30 PSF	B	0 to 6	1	2	2	2	2	2	2	2	2	2	0
		Degrees	2	2	2	2	2	0	0	0	0	0	0
		7 to 27	1	2	2	2	2	2	2	2	2	2	2
		Degrees	2	2	2	2	2	0	0	0	0	0	0
	C	28 to 45	1	3	2	2	2	2	2	2	2	2	0
		Degrees	2	3	2	2	2	2	2	0	0	0	0
		0 to 6	1	2	2	2	2	2	2	0	0	0	0
		Degrees	2	2	0	0	0	0	0	0	0	0	0
	D	7 to 27	1	2	2	2	2	2	2	0	0	0	0
		Degrees	2	2	0	0	0	0	0	0	0	0	0
		28 to 45	1	2	2	2	2	2	0	0	0	0	0
		Degrees	2	2	2	2	2	0	0	0	0	0	0
31-40 PSF	B	0 to 6	1	2	2	2	2	2	2	2	2	0	
		Degrees	2	2	2	2	2	0	0	0	0	0	
		7 to 27	1	0	0	0	0	0	0	0	0	0	
		Degrees	2	0	0	0	0	0	0	0	0	0	
	C	28 to 45	1	2	2	2	2	2	2	2	2	0	0
		Degrees	2	2	2	2	2	2	2	0	0	0	0
		0 to 6	1	2	2	2	2	2	0	0	0	0	0
		Degrees	2	2	0	0	0	0	0	0	0	0	0
	D	7 to 27	1	0	0	0	0	0	0	0	0	0	0
		Degrees	2	0	0	0	0	0	0	0	0	0	0
		28 to 45	1	2	2	2	2	2	0	0	0	0	0
		Degrees	2	2	2	2	0	0	0	0	0	0	0
41-50 PSF	B	0 to 6	1	0	0	0	0	0	0	0	0	0	
		Degrees	2	0	0	0	0	0	0	0	0	0	
		7 to 27	1	0	0	0	0	0	0	0	0	0	
		Degrees	2	0	0	0	0	0	0	0	0	0	
	C	28 to 45	1	2	2	2	2	2	0	0	0	0	
		Degrees	2	2	2	2	2	0	0	0	0	0	
		0 to 6	1	0	0	0	0	0	0	0	0	0	
		Degrees	2	0	0	0	0	0	0	0	0	0	
	D	7 to 27	1	0	0	0	0	0	0	0	0	0	
		Degrees	2	0	0	0	0	0	0	0	0	0	
		28 to 45	1	2	2	0	0	0	0	0	0	0	
		Degrees	2	2	2	0	0	0	0	0	0	0	



RT6	RT-[E] Mount Mini OSB Only Installations (72 Cell PV Panels) Maximum Mount Spacing in Feet												
	Portrait Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
0 PSF	B	0 to 6	1	5	4	4	3	3	2	2	0	0	
		Degrees	2	2	2	2	0	0	0	0	0	0	
		7 to 27	1	5	4	4	3	3	2	2	2	0	
		Degrees	2	2	2	2	0	0	0	0	0	3	
	C	28 to 45	1	4	4	3	3	2	2	2	2	0	0
		Degrees	2	3	3	3	2	2	0	0	0	0	0
		0 to 6	1	3	3	2	2	2	0	0	0	0	0
		Degrees	2	0	0	0	0	0	0	0	0	0	0
	D	7 to 27	1	3	3	3	2	2	0	0	0	0	0
		Degrees	2	0	0	0	0	0	0	0	0	0	0
		28 to 45	1	3	2	2	2	0	0	0	0	0	0
		Degrees	2	2	2	2	0	0	0	0	0	0	0
1-10 PSF	B	0 to 6	1	3	3	3	3	3	2	2	0	0	
		Degrees	2	2	2	2	0	0	0	0	0	0	
		7 to 27	1	3	3	3	3	3	2	2	2	2	0
		Degrees	2	2	2	2	0	0	0	0	0	0	0
	C	28 to 45	1	3	3	3	3	2	2	2	2	0	0
		Degrees	2	3	3	3	2	2	0	0	0	0	0
		0 to 6	1	3	3	2	2	2	0	0	0	0	0
		Degrees	2	0	0	0	0	0	0	0	0	0	0
	D	7 to 27	1	3	3	3	2	2	0	0	0	0	0
		Degrees	2	0	0	0	0	0	0	0	0	0	0
		28 to 45	1	3	2	2	2	0	0	0	0	0	0
		Degrees	2	2	2	2	0	0	0	0	0	0	0
11-20 PSF	B	0 to 6	1	2	2	2	2	2	2	2	0	0	
		Degrees	2	2	2	2	0	0	0	0	0	0	
		7 to 27	1	2	2	2	2	2	2	2	2	2	0
		Degrees	2	2	2	2	0	0	0	0	0	0	0
	C	28 to 45	1	2	2	2	2	2	2	2	2	0	0
		Degrees	2	2	2	2	2	2	0	0	0	0	0
		0 to 6	1	2	2	2	2	2	0	0	0	0	0
		Degrees	2	0	0	0	0	0	0	0	0	0	0
	D	7 to 27	1	2	2	2	2	2	0	0	0	0	0
		Degrees	2	0	0	0	0	0	0	0	0	0	0
		28 to 45	1	2	2	2	2	0	0	0	0	0	0
		Degrees	2	2	2	2	0	0	0	0	0	0	0

RT6	RT-[E] Mount Mini OSB Only Installations (72 Cell PV Panels) Maximum Mount Spacing in Feet											
	Portrait Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
21-30 PSF	B	0 to 6 Degrees	1	2	2	2	2	2	2	2	0	0
		2	2	2	2	0	0	0	0	0	0	
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	0
		2	2	2	2	0	0	0	0	0	0	
		28 to 45 Degrees	1	2	2	2	2	2	2	2	0	0
		2	2	2	2	2	0	0	0	0	0	
	C	0 to 6 Degrees	1	2	2	2	2	2	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	0
		7 to 27 Degrees	1	2	2	2	2	2	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	0
		28 to 45 Degrees	1	2	2	2	2	0	0	0	0	0
		2	2	2	2	0	0	0	0	0	0	
D	0 to 6 Degrees	1	2	2	2	2	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0	0	
	7 to 27 Degrees	1	2	2	2	2	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0	0	
	28 to 45 Degrees	1	2	2	2	0	0	0	0	0	0	
	2	2	0	0	0	0	0	0	0	0		
31-40 PSF	B	0 to 6 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	
		28 to 45 Degrees	1	2	2	2	2	0	0	0	0	0
		2	2	2	2	0	0	0	0	0	0	
	C	0 to 6 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	0
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	0
		28 to 45 Degrees	1	2	2	0	0	0	0	0	0	0
		2	2	2	0	0	0	0	0	0	0	
D	0 to 6 Degrees	1	0	0	0	0	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0	0	
	7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0	0	
	28 to 45 Degrees	1	0	0	0	0	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0		
41-50 PSF	B	0 to 6 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	
		28 to 45 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	
	C	0 to 6 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	0
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	
D	0 to 6 Degrees	1	0	0	0	0	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0	0	
	7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0	0	
	28 to 45 Degrees	1	0	0	0	0	0	0	0	0	0	
	2	0	0	0	0	0	0	0	0	0		

RT7	RT-[E] Mount Mini Rafter Installations Cont. Maximum Mount Spacing in Feet												
	Landscape Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
0 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	8	8	8	
		2	8	8	8	8	8	8	7	6	5	5	
		7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	8
		2	8	8	8	8	8	8	7	6	6	5	
	C	28 to 45 Degrees	1	8	8	8	8	8	8	8	8	8	8
		2	8	8	8	8	8	8	8	8	8	8	7
		0 to 6 Degrees	1	8	8	8	8	8	8	8	8	7	6
		2	8	8	8	8	7	6	5	4	4	3	
	D	7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	7
		2	8	8	8	7	6	5	4	4	4	3	
		28 to 45 Degrees	1	8	8	8	8	8	8	8	8	7	6
		2	8	8	8	8	8	7	6	5	5	5	
1-10 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	8	8	8	
		2	8	8	8	8	8	8	7	6	5	5	
		7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	8
		2	8	8	8	8	8	8	7	6	6	5	
	C	28 to 45 Degrees	1	8	8	8	8	8	8	8	8	8	8
		2	8	8	8	8	8	8	8	8	8	8	7
		0 to 6 Degrees	1	8	8	8	8	8	8	8	8	7	6
		2	8	8	8	8	7	6	5	4	4	3	
	D	7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	7
		2	8	8	8	8	7	6	5	4	4	3	
		28 to 45 Degrees	1	8	8	8	8	8	8	7	6	6	5
		2	8	8	8	8	8	7	6	5	5	4	
11-20 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	8	8	8	
		2	8	8	8	8	8	8	7	6	5	5	
		7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	8
		2	8	8	8	8	8	8	7	6	6	5	
	C	28 to 45 Degrees	1	8	8	8	8	8	8	8	8	8	8
		2	8	8	8	8	8	8	8	8	8	8	7
		0 to 6 Degrees	1	8	8	8	8	8	8	8	8	7	6
		2	8	8	8	8	7	6	5	4	4	3	
	D	7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	7
		2	8	8	8	8	7	6	5	4	4	3	
		28 to 45 Degrees	1	8	8	8	8	8	8	8	8	7	6
		2	8	8	8	8	8	7	6	5	5	5	
D	0 to 6 Degrees	1	8	8	8	8	8	8	8	7	6	5	
	2	8	8	7	7	6	5	4	3	3	3		
	7 to 27 Degrees	1	8	8	8	8	8	8	8	7	6	6	
	2	8	8	8	7	6	5	4	4	3	3		
D	28 to 45 Degrees	1	8	8	8	8	8	8	7	6	6	5	
	2	8	8	8	8	8	7	6	5	5	4		

RT7	RT-[E] Mount Mini Rafter Installations Cont. Maximum Mount Spacing in Feet												
	Landscape Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
21-30 PSF	B	0 to 6	1	8	8	8	8	8	8	8	8	8	
		Degrees	2	8	8	8	8	8	7	6	5	5	
		7 to 27	1	8	8	8	8	8	8	8	8	8	8
		Degrees	2	8	8	8	8	8	7	6	6	5	
		28 to 45	1	8	8	8	8	8	8	8	8	8	8
		Degrees	2	8	8	8	8	8	8	8	8	8	7
	C	0 to 6	1	8	8	8	8	8	8	8	8	7	6
		Degrees	2	8	8	8	7	6	5	4	4	3	
		7 to 27	1	8	8	8	8	8	8	8	8	8	7
		Degrees	2	8	8	8	7	6	5	4	4	3	
		28 to 45	1	8	8	8	8	8	8	8	8	7	6
		Degrees	2	8	8	8	8	8	7	6	5	5	
D	0 to 6	1	8	8	8	8	8	8	8	7	6	5	
	Degrees	2	8	7	7	6	5	4	3	3	3		
	7 to 27	1	8	8	8	8	8	8	8	7	6	6	
	Degrees	2	8	8	7	6	5	4	4	3	3		
	28 to 45	1	8	8	8	8	8	8	7	6	6	5	
	Degrees	2	8	8	8	8	7	6	5	5	4		
31-40 PSF	B	0 to 6	1	8	8	8	8	8	8	8	8	8	
		Degrees	2	8	8	8	8	8	7	6	5	5	
		7 to 27	1	8	8	8	8	8	8	8	8	8	
		Degrees	2	8	8	8	8	7	6	6	5		
		28 to 45	1	8	8	8	8	8	8	8	8	8	
		Degrees	2	8	8	8	8	8	8	8	8	7	
	C	0 to 6	1	8	8	8	8	8	8	8	8	7	6
		Degrees	2	8	8	8	7	6	5	4	4	3	
		7 to 27	1	8	8	8	8	8	8	8	8	8	7
		Degrees	2	8	8	8	7	6	5	4	4	3	
		28 to 45	1	8	8	8	8	8	8	8	8	7	6
		Degrees	2	8	8	8	8	8	7	6	5	5	
D	0 to 6	1	8	8	8	8	8	8	8	7	6	5	
	Degrees	2	8	7	7	6	5	4	3	3	3		
	7 to 27	1	8	8	8	8	8	8	8	7	6	6	
	Degrees	2	8	8	7	6	5	4	4	3	3		
	28 to 45	1	8	8	8	8	8	8	7	6	6	5	
	Degrees	2	8	8	8	8	7	6	5	5	4		
41-50 PSF	B	0 to 6	1	8	8	8	8	8	8	8	8	8	
		Degrees	2	8	8	8	8	8	7	6	5	5	
		7 to 27	1	8	8	8	8	8	8	8	8	8	
		Degrees	2	8	8	8	8	8	7	6	6	5	
		28 to 45	1	8	8	8	8	8	8	8	8	8	
		Degrees	2	8	8	8	8	8	8	8	8	7	
	C	0 to 6	1	8	8	8	8	8	8	8	8	7	6
		Degrees	2	8	8	8	7	6	5	4	4	3	
		7 to 27	1	8	8	8	8	8	8	8	8	8	7
		Degrees	2	8	8	8	7	6	5	4	4	3	
		28 to 45	1	8	8	8	8	8	8	8	8	7	6
		Degrees	2	8	8	8	8	8	7	6	5	5	
D	0 to 6	1	8	8	8	8	8	8	8	7	6	5	
	Degrees	2	8	7	7	6	5	4	3	3	3		
	7 to 27	1	8	8	8	8	8	8	8	7	6	6	
	Degrees	2	8	8	7	6	5	4	4	3	3		
	28 to 45	1	8	8	8	8	8	8	7	6	6	5	
	Degrees	2	8	8	8	8	7	6	5	5	4		

RT7	RT-[E] Mount Mini Rafter Installations Cont. Maximum Mount Spacing in Feet													
	Landscape Orientation - ASCE 7-10													
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)										
				110	115	120	130	140	150	160	170	180		
51-60 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	8	8	8	8	
			2	8	8	8	8	8	7	6	5	5		
		7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	8	8
			2	8	8	8	8	8	8	7	6	6	5	
		28 to 45 Degrees	1	8	8	8	8	8	8	8	8	8	8	8
			2	8	8	8	8	8	8	8	8	8	8	7
	C	0 to 6 Degrees	1	8	8	8	8	8	8	8	8	7	6	
			2	8	8	8	7	6	5	4	4	4	3	
		7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	8	7
			2	8	8	8	7	6	5	4	4	4	3	
		28 to 45 Degrees	1	8	8	8	8	8	8	8	8	8	7	6
			2	8	8	8	8	8	8	7	6	5	5	5
	D	0 to 6 Degrees	1	8	8	8	8	8	8	8	7	6	5	
			2	8	7	7	6	5	4	3	3	3	3	
		7 to 27 Degrees	1	8	8	8	8	8	8	8	7	6	6	
2			8	8	7	6	5	4	4	3	3	3		
28 to 45 Degrees		1	8	8	8	8	8	8	7	6	6	5		
		2	8	8	8	8	7	6	5	5	5	4		
61-70 PSF	B	0 to 6 Degrees	1	8	8	8	8	8	8	8	8	8	8	
			2	8	8	8	8	8	7	6	5	5		
		7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	8	
			2	8	8	8	8	8	7	6	6	6	5	
		28 to 45 Degrees	1	8	8	8	8	8	8	8	8	8	8	
			2	8	8	8	8	8	8	8	8	8	7	
	C	0 to 6 Degrees	1	8	8	8	8	8	8	8	8	7	6	
			2	8	8	8	7	6	5	4	4	4	3	
		7 to 27 Degrees	1	8	8	8	8	8	8	8	8	8	8	
			2	8	8	8	7	6	5	4	4	4	3	
		28 to 45 Degrees	1	8	8	8	8	8	8	8	8	7	6	
			2	8	8	8	8	8	7	6	5	5	5	
	D	0 to 6 Degrees	1	8	8	8	8	8	8	8	7	6	5	
			2	8	7	7	6	5	4	3	3	3	3	
		7 to 27 Degrees	1	8	8	8	8	8	8	8	7	6	6	
2			8	8	7	6	5	4	4	3	3	3		
28 to 45 Degrees		1	8	8	8	8	8	8	7	6	6	5		
		2	8	8	8	8	7	6	5	5	5	4		

RT8	RT-[E] Mount Mini Plywood Only Installations Maximum Mount Spacing in Feet											
	Landscape Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
0 PSF	B	0 to 6 Degrees	1	8	8	8	8	6	5	5	4	3
		2	6	5	5	4	3	2	2	2		
		7 to 27 Degrees	1	8	8	8	8	7	6	5	4	4
		2	6	5	5	4	3	3	2	2	2	
	C	28 to 45 Degrees	1	8	8	8	7	6	5	4	4	3
		2	8	7	7	6	5	4	3	3	3	
		0 to 6 Degrees	1	8	7	6	5	4	4	3	3	2
		2	4	3	3	2	2	2	0	0	0	
	D	7 to 27 Degrees	1	8	7	7	5	5	4	3	3	3
		2	4	3	3	3	2	2	2	0	0	0
		28 to 45 Degrees	1	7	6	6	5	4	3	3	2	2
		2	6	5	5	4	3	3	2	2	2	
1-10 PSF	B	0 to 6 Degrees	1	8	8	8	8	6	5	5	4	3
		2	6	5	5	4	3	3	2	2	2	
		7 to 27 Degrees	1	8	8	8	8	7	6	5	4	4
		2	6	5	5	4	3	3	2	2	2	
	C	28 to 45 Degrees	1	8	8	8	7	6	5	4	4	3
		2	8	7	7	6	5	4	3	3	3	
		0 to 6 Degrees	1	8	7	6	5	4	4	3	3	2
		2	4	3	3	2	2	2	0	0	0	
	D	7 to 27 Degrees	1	8	7	7	5	5	4	3	3	3
		2	4	3	3	3	2	2	2	0	0	0
		28 to 45 Degrees	1	7	6	6	5	4	3	3	2	2
		2	6	5	5	4	3	3	2	2	2	
11-20 PSF	B	0 to 6 Degrees	1	6	6	5	4	3	3	2	2	2
		2	3	3	2	2	2	0	0	0	0	
		7 to 27 Degrees	1	7	6	5	5	4	3	3	2	2
		2	3	3	3	2	2	0	0	0	0	
	C	28 to 45 Degrees	1	6	5	5	4	3	3	2	2	2
		2	5	4	4	3	3	2	2	2	0	
		0 to 6 Degrees	1	8	8	8	8	6	5	5	4	3
		2	6	5	5	4	3	3	2	2	2	
	D	7 to 27 Degrees	1	8	8	8	8	7	6	5	4	4
		2	6	5	5	4	3	3	2	2	2	
		28 to 45 Degrees	1	8	8	8	7	6	5	4	4	3
		2	8	7	7	6	5	4	3	3	3	
11-20 PSF	B	0 to 6 Degrees	1	8	7	6	5	4	4	3	3	2
		2	4	3	3	2	2	2	0	0	0	
		7 to 27 Degrees	1	8	7	7	5	5	4	3	3	3
		2	4	3	3	3	2	2	2	0	0	0
	C	28 to 45 Degrees	1	7	6	6	5	4	3	3	2	2
		2	6	5	5	4	3	3	2	2	2	
		0 to 6 Degrees	1	6	6	5	4	3	3	2	2	2
		2	3	3	2	2	2	0	0	0	0	
	D	7 to 27 Degrees	1	7	6	5	5	4	3	3	2	2
		2	3	3	3	2	2	0	0	0	0	
		28 to 45 Degrees	1	6	5	5	4	3	3	2	2	2
		2	5	4	4	3	3	2	2	2	0	

RT8	RT-[E] Mount Mini Plywood Only Installations Maximum Mount Spacing in Feet											
	Landscape Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
21-30 PSF	B	0 to 6	1	8	8	8	8	6	5	5	4	3
		Degrees	2	6	5	5	4	3	3	2	2	2
		7 to 27	1	7	7	7	7	7	6	5	4	4
		Degrees	2	6	5	5	4	3	3	2	2	2
	C	28 to 45	1	8	8	8	7	6	5	4	4	3
		Degrees	2	8	7	7	6	5	4	3	3	3
		0 to 6	1	8	7	6	5	4	4	3	3	2
		Degrees	2	4	3	3	2	2	2	0	0	0
	D	7 to 27	1	7	7	7	5	5	4	3	3	3
		Degrees	2	4	3	3	3	2	2	0	0	0
		28 to 45	1	7	6	6	5	4	3	3	2	2
		Degrees	2	6	5	5	4	3	3	2	2	2
31-40 PSF	B	0 to 6	1	7	7	7	7	6	5	5	4	3
		Degrees	2	6	5	5	4	3	3	2	2	2
		7 to 27	1	6	6	6	6	6	6	5	4	4
		Degrees	2	6	5	5	4	3	3	2	2	2
	C	28 to 45	1	7	7	7	7	6	5	4	3	3
		Degrees	2	7	7	7	6	5	4	3	3	3
		0 to 6	1	7	7	6	5	4	4	3	3	2
		Degrees	2	4	3	3	2	2	2	0	0	0
	D	7 to 27	1	6	6	6	5	5	4	3	3	3
		Degrees	2	4	3	3	3	2	2	0	0	0
		28 to 45	1	7	6	6	5	4	3	3	2	2
		Degrees	2	6	5	5	4	3	3	2	2	2
41-50 PSF	B	0 to 6	1	6	6	6	6	6	5	5	4	3
		Degrees	2	6	5	5	4	3	3	2	2	2
		7 to 27	1	5	5	5	5	5	5	5	4	4
		Degrees	2	5	5	5	4	3	3	2	2	2
	C	28 to 45	1	6	6	6	6	6	5	4	4	3
		Degrees	2	6	6	6	6	5	4	3	3	3
		0 to 6	1	6	6	6	5	4	4	3	3	2
		Degrees	2	4	3	3	2	2	2	0	0	0
	D	7 to 27	1	5	5	5	5	5	4	3	3	3
		Degrees	2	4	3	3	3	2	2	0	0	0
		28 to 45	1	6	6	6	5	4	3	3	2	2
		Degrees	2	6	5	5	4	3	3	2	2	2
D	0 to 6	1	6	6	5	4	3	3	2	2	2	
	Degrees	2	3	3	2	2	2	0	0	0	0	
	7 to 27	1	5	5	5	5	4	3	3	2	2	
	Degrees	2	3	3	3	2	2	0	0	0	0	
D	28 to 45	1	6	5	5	4	3	3	2	2	2	
	Degrees	2	5	4	4	3	3	2	2	2	0	

RT8	RT-[E] Mount Mini Plywood Only Installations Maximum Mount Spacing in Feet											
	Landscape Orientation - ASCE 7-10											
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
51-60 PSF	B	0 to 6 Degrees	1	5	5	5	5	5	5	5	4	3
		2	5	5	5	4	3	2	2	2		
		7 to 27 Degrees	1	4	4	4	4	4	4	4	4	4
		2	4	4	4	4	3	3	2	2	2	
	C	28 to 45 Degrees	1	5	5	5	5	5	5	4	4	3
		2	5	5	5	5	5	4	3	3	3	
		0 to 6 Degrees	1	5	5	5	5	4	4	3	3	2
		2	4	3	3	2	2	2	0	0	0	
	D	7 to 27 Degrees	1	4	4	4	4	4	4	3	3	3
		2	4	3	3	3	2	2	2	0	0	0
		28 to 45 Degrees	1	5	5	5	5	4	4	3	3	2
		2	5	4	4	3	3	2	2	2	2	
61-70 PSF	B	0 to 6 Degrees	1	4	4	4	4	4	4	4	4	3
		2	4	4	4	4	3	3	2	2	2	
		7 to 27 Degrees	1	3	3	3	3	3	3	3	3	3
		2	3	3	3	3	3	3	2	2	2	
	C	28 to 45 Degrees	1	4	4	4	4	4	4	4	4	3
		2	4	4	4	4	4	4	3	3	3	3
		0 to 6 Degrees	1	4	4	4	4	4	4	3	3	2
		2	4	3	3	2	2	2	0	0	0	
	D	7 to 27 Degrees	1	3	3	3	3	3	3	3	3	3
		2	3	3	3	3	2	2	2	0	0	0
		28 to 45 Degrees	1	4	4	4	4	4	4	3	3	2
		2	4	4	4	4	4	3	3	2	2	2
D	0 to 6 Degrees	1	4	4	4	4	4	3	3	2	2	
	2	3	3	2	2	2	0	0	0	0		
	7 to 27 Degrees	1	3	3	3	3	3	3	3	2	2	
	2	3	3	3	2	2	0	0	0	0		
D	28 to 45 Degrees	1	4	4	4	4	4	3	3	2	2	
	2	4	4	4	4	3	3	2	2	2	0	



RT9		RT-[E] Mount Mini OSB Only Installations Cont. Maximum Mount Spacing in Feet										
Landscape Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
0 PSF	B	0 to 6 Degrees	1	8	8	8	6	5	5	4	3	3
		2	5	4	4	3	3	2	2	2	0	
		7 to 27 Degrees	1	8	8	8	7	6	5	4	4	3
		2	5	4	4	3	3	2	2	2	0	
	C	28 to 45 Degrees	1	8	7	7	6	5	4	3	3	3
		2	7	6	5	5	4	3	3	2	2	
		0 to 6 Degrees	1	6	6	5	4	4	3	3	2	2
		2	3	3	2	2	2	0	0	0	0	
	D	7 to 27 Degrees	1	7	6	5	5	4	3	3	2	2
		2	3	3	3	2	2	0	0	0	0	
		28 to 45 Degrees	1	6	5	5	4	3	3	2	2	2
		2	5	4	4	3	2	2	2	2	0	
1-10 PSF	B	0 to 6 Degrees	1	7	7	7	6	5	5	4	3	3
		2	5	4	4	3	3	2	2	2	0	
		7 to 27 Degrees	1	7	7	7	7	6	5	4	4	3
		2	5	4	4	3	3	2	2	2	0	
	C	28 to 45 Degrees	1	7	7	7	6	5	4	3	3	3
		2	7	6	5	5	4	3	3	2	2	
		0 to 6 Degrees	1	6	6	5	4	4	3	3	2	2
		2	3	3	2	2	2	0	0	0	0	
	D	7 to 27 Degrees	1	7	6	5	5	4	3	3	2	2
		2	3	3	3	2	2	0	0	0	0	
		28 to 45 Degrees	1	6	5	5	4	3	3	2	2	2
		2	5	4	4	3	3	2	2	2	0	
11-20 PSF	B	0 to 6 Degrees	1	5	5	5	5	5	5	4	3	3
		2	5	4	4	3	3	2	2	2	0	
		7 to 27 Degrees	1	4	4	4	4	4	4	4	4	3
		2	4	4	4	3	3	2	2	2	0	
	C	28 to 45 Degrees	1	5	5	5	5	4	4	3	3	3
		2	5	5	5	5	4	3	3	2	2	
		0 to 6 Degrees	1	5	5	5	4	4	3	3	2	2
		2	3	3	2	2	2	0	0	0	0	
	D	7 to 27 Degrees	1	4	4	4	4	4	3	3	2	2
		2	3	3	3	2	2	0	0	0	0	
		28 to 45 Degrees	1	5	5	4	4	3	3	2	2	2
		2	5	4	4	3	3	2	2	2	0	

RT9	RT-[E] Mount Mini OSB Only Installations Cont. Maximum Mount Spacing in Feet												
	Landscape Orientation - ASCE 7-10												
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)									
				110	115	120	130	140	150	160	170	180	
21-30 PSF	B	0 to 6	1	4	4	4	4	4	4	4	3	3	
		Degrees	2	4	4	4	3	3	2	2	2	0	
		7 to 27	1	4	4	4	4	4	4	4	4	3	3
		Degrees	2	4	4	4	3	3	2	2	2	2	0
		28 to 45	1	5	5	4	4	4	4	4	3	3	3
		Degrees	2	5	5	4	4	4	4	3	3	2	2
	C	0 to 6	1	4	4	4	4	4	4	3	3	2	2
		Degrees	2	3	3	2	2	2	2	0	0	0	0
		7 to 27	1	4	4	4	4	4	4	3	3	2	2
		Degrees	2	3	3	3	2	2	2	0	0	0	0
		28 to 45	1	4	4	4	4	4	3	3	2	2	2
		Degrees	2	4	4	4	3	3	2	2	2	2	0
D	0 to 6	1	4	4	4	3	3	2	2	2	2	0	
	Degrees	2	2	2	2	2	0	0	0	0	0	0	
	7 to 27	1	4	4	4	4	3	3	2	2	2	2	
	Degrees	2	3	2	2	2	0	0	0	0	0	0	
	28 to 45	1	4	4	4	3	3	2	2	2	2	0	
	Degrees	2	4	3	3	3	2	2	0	0	0	0	
31-40 PSF	B	0 to 6	1	3	3	3	3	3	3	3	3	3	
		Degrees	2	3	3	3	3	3	2	2	2	0	
		7 to 27	1	3	3	3	3	3	3	3	3	3	
		Degrees	2	3	3	3	3	2	2	2	2	0	
		28 to 45	1	4	4	4	4	3	3	3	3	3	
		Degrees	2	4	4	4	4	3	3	3	2	2	
	C	0 to 6	1	3	3	3	3	3	3	3	2	2	
		Degrees	2	3	3	2	2	2	0	0	0	0	
		7 to 27	1	3	3	3	3	3	3	3	2	2	
		Degrees	2	3	3	3	2	2	0	0	0	0	
		28 to 45	1	4	3	3	3	3	3	2	2	2	
		Degrees	2	4	3	3	3	3	2	2	2	0	
D	0 to 6	1	3	3	3	3	3	2	2	2	0		
	Degrees	2	2	2	2	2	0	0	0	0	0		
	7 to 27	1	3	3	3	3	3	3	2	2	2		
	Degrees	2	3	2	2	2	0	0	0	0	0		
	28 to 45	1	3	3	3	3	3	2	2	2	0		
	Degrees	2	3	3	3	3	2	2	0	0	0		
41-50 PSF	B	0 to 6	1	3	3	3	3	3	3	3	3	3	
		Degrees	2	3	3	3	3	3	2	2	2	0	
		7 to 27	1	2	2	2	2	2	2	2	2	2	
		Degrees	2	2	2	2	2	2	2	2	2	0	
		28 to 45	1	3	3	3	3	3	3	3	3	2	
		Degrees	2	3	3	3	3	3	3	3	2	2	
	C	0 to 6	1	3	3	3	3	3	3	3	2	2	
		Degrees	2	3	3	2	2	2	0	0	0	0	
		7 to 27	1	2	2	2	2	2	2	2	2	2	
		Degrees	2	2	2	2	2	2	0	0	0	0	
		28 to 45	1	3	3	3	3	3	2	2	2	2	
		Degrees	2	3	3	3	3	3	2	2	2	0	
D	0 to 6	1	3	3	3	3	3	2	2	2	0		
	Degrees	2	2	2	2	2	0	0	0	0	0		
	7 to 27	1	2	2	2	2	2	2	2	2	2		
	Degrees	2	2	2	2	2	0	0	0	0	0		
	28 to 45	1	3	3	3	3	2	2	2	2	0		
	Degrees	2	3	3	3	3	2	2	0	0	0		

Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)								
				110	115	120	130	140	150	160	170	180
<b>RT-[E] Mount Mini OSB Only Installations Cont.</b>												
<b>Maximum Mount Spacing in Feet</b>												
<b>Landscape Orientation - ASCE 7-10</b>												
51-60 PSF	B	0 to 6 Degrees	1	2	2	2	2	2	2	2	2	2
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	2
		28 to 45 Degrees	1	3	3	3	3	3	2	2	2	2
		0 to 6 Degrees	1	2	2	2	2	2	2	2	2	2
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	2
		28 to 45 Degrees	1	3	3	3	2	2	2	2	2	2
	C	0 to 6 Degrees	1	2	2	2	2	2	0	0	0	0
		7 to 27 Degrees	1	2	2	2	2	2	0	0	0	0
		28 to 45 Degrees	1	3	3	3	2	2	2	2	2	2
		0 to 6 Degrees	1	2	2	2	2	2	2	2	2	0
		7 to 27 Degrees	1	2	2	2	2	2	2	2	2	2
		28 to 45 Degrees	1	3	2	2	2	2	2	2	2	0
D	0 to 6 Degrees	1	2	2	2	2	2	0	0	0	0	
	7 to 27 Degrees	1	2	2	2	2	2	0	0	0	0	
	28 to 45 Degrees	1	3	2	2	2	2	2	2	2	0	
	0 to 6 Degrees	1	2	2	2	2	2	2	2	2	2	
	7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0	
	28 to 45 Degrees	1	2	2	2	2	2	2	2	2	2	
61-70 PSF	B	0 to 6 Degrees	1	2	2	2	2	2	2	2	2	2
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0
		28 to 45 Degrees	1	2	2	2	2	2	2	2	2	2
		0 to 6 Degrees	1	2	2	2	2	2	2	2	2	2
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0
		28 to 45 Degrees	1	2	2	2	2	2	2	2	2	2
	C	0 to 6 Degrees	1	2	2	2	2	2	0	0	0	0
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0
		28 to 45 Degrees	1	2	2	2	2	2	2	2	2	2
		0 to 6 Degrees	1	2	2	2	2	2	2	2	2	0
		7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0
		28 to 45 Degrees	1	2	2	2	2	2	2	2	2	0
D	0 to 6 Degrees	1	2	2	2	2	2	0	0	0	0	
	7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0	
	28 to 45 Degrees	1	2	2	2	2	2	2	2	2	0	
	0 to 6 Degrees	1	2	2	2	2	2	2	2	2	0	
	7 to 27 Degrees	1	0	0	0	0	0	0	0	0	0	
	28 to 45 Degrees	1	2	2	2	2	2	2	2	2	0	

Table Notes for Tables RT1 to RT9 – Tabulated values are based on the following criteria:

1. Building mean roof height = 30 ft maximum.
2. Risk Category = II.
3. Solar panel maximum width = 40 in for Landscape, 68 in for Portrait 60 Cell & 77.5 in for Portrait 72 Cell.
4. Solar panel & rail dead load = approximately 4.0 psf.
5. ASCE 7-10.
6. OSB shall be 24/16 APA rated sheathing minimum (7/16" thick).
7. Plywood shall be 32/16 APA rated sheathing minimum (15/32" thick).
8. Sheathing shall be free of defects including, but not limited to water damage and delamination.
9. Roof rafters or trusses spaced at 24" on center maximum.
10. PV panels must be supported per the manufacturer's required orientation, location and/or spacing.
11. Through a maximum of 2 layers of composite asphalt roof shingles or maximum 20 gage metal decking provided the metal is predrilled as wood screws are not designed to penetrate the metal decking. Not valid on concrete roof tile.
12. Maximum height from bottom of base mount to top of rail shall not exceed 5" for the OSB & Plywood only installation options and 7" for the rafter installation option. Ref. Exhibit 'A' detail 2.

Our analysis assumes that the connections and associated hardware are installed in a workmanlike manner in accordance with the RT-[E] Mount Mini Installation Manual and generally accepted standards of construction practice. It is the responsibility of the contractor to verify that the strength of the roof framing meets the minimum properties used in the tests and can safely support the maximum imposed loads stated within this document. Starling Madison Lofquist, Inc. and Roof Tech assume no liability beyond what is specifically shown in this letter. Additional information is available at the Roof Tech web site, <http://www.roof-tech.us/>.

Please feel free to contact me at your convenience if you have any questions.

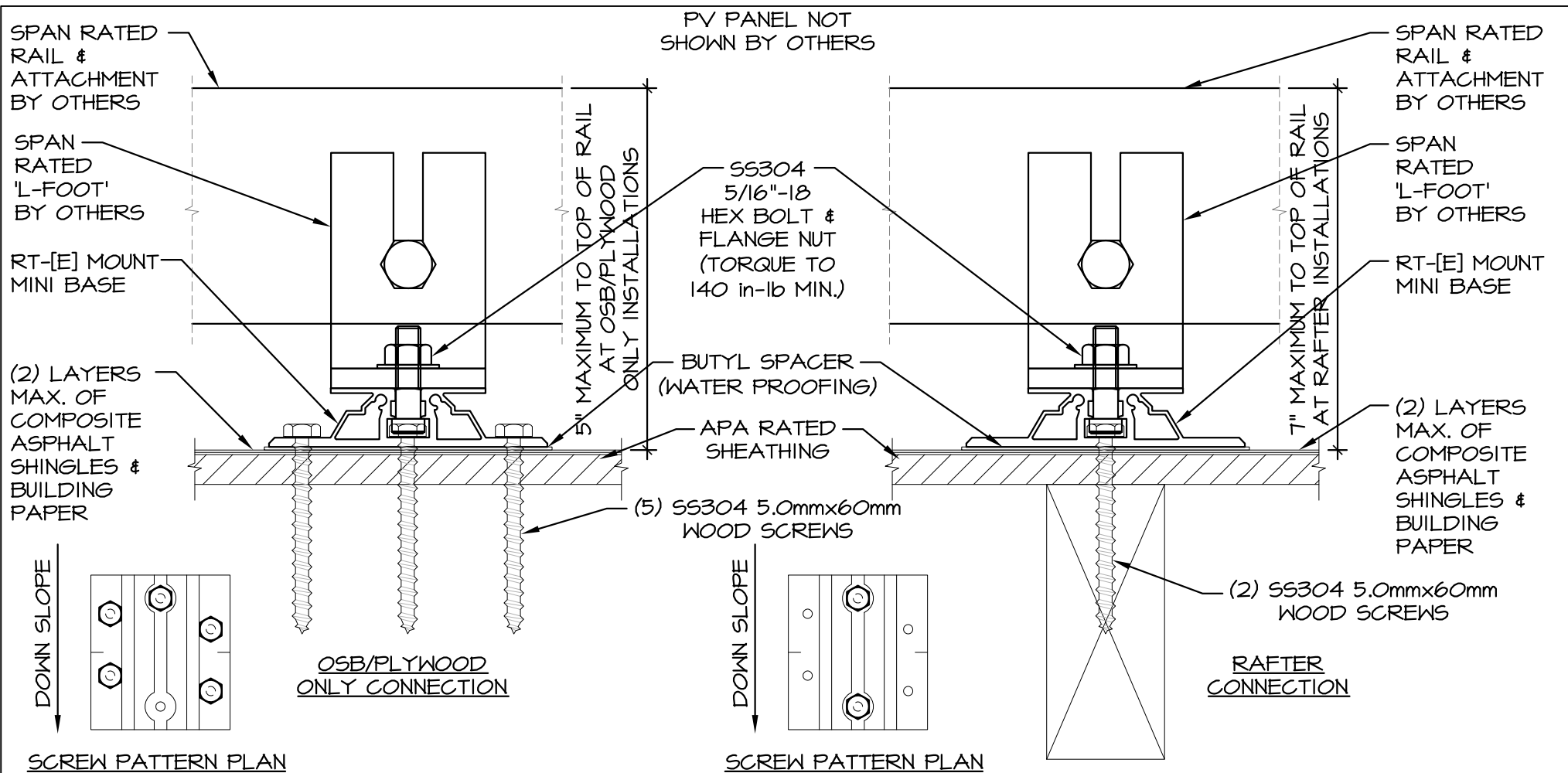
*"Professional Certification. I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota".*

Respectfully yours,

Tres J. Warner, P.E.  
Design Division Manager



Jesse Light, P.E.  
Sr. Structural Engineer



1 'RAIL OPTION' - RAIL AND 'L-FOOT' ORIENTATION

SCALE: N.T.S.



Starling Madison Lofquist, Inc.  
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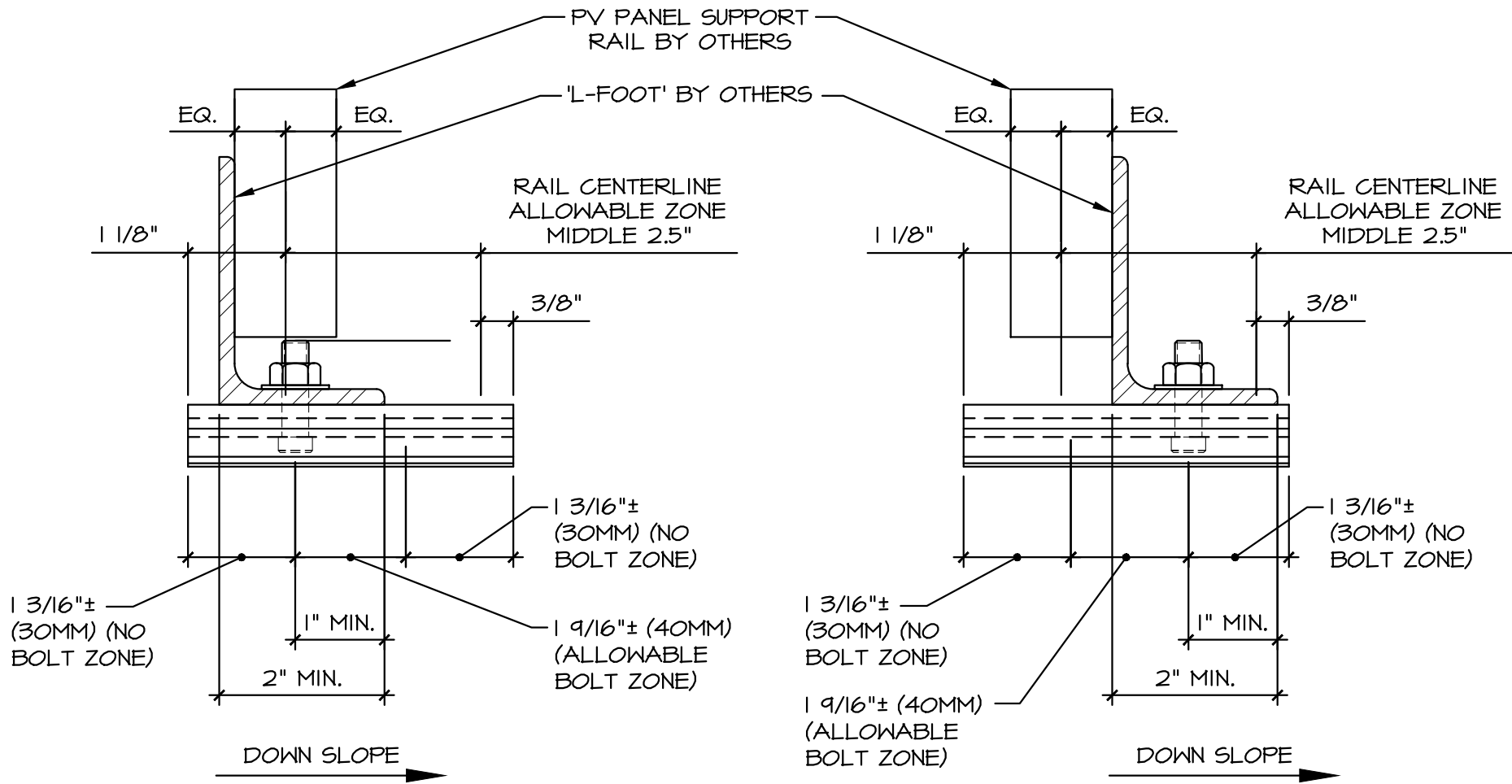
DRAWN BY: J.S.  
 DESIGNED BY: D.H.

DATE: 7-3-18  
 JOB NO: 471-13

ROOF TECH  
 RT-[E] MOUNT MINI + RAIL  
 STRUCTURAL ANALYSIS

ROOF TECH, INC.  
 333 H STREET, SUITE 5000  
 CHULA VISTA, CA 91910

EXHIBIT A  
 1 OF 4



② 'RAIL OPTION' - RAIL AND 'L-FOOT' ORIENTATION  
SCALE: N.T.S.



Consulting Structural and Forensic Engineers

Starling Madison Lofquist, Inc.

5224 S. 39th Street  
Phoenix, Arizona 85040  
(602) 438-2500  
fax. (602) 438-2505

DRAWN BY:

J.S.

DATE:

7-3-18

DESIGNED BY:

D.H.

JOB NO:

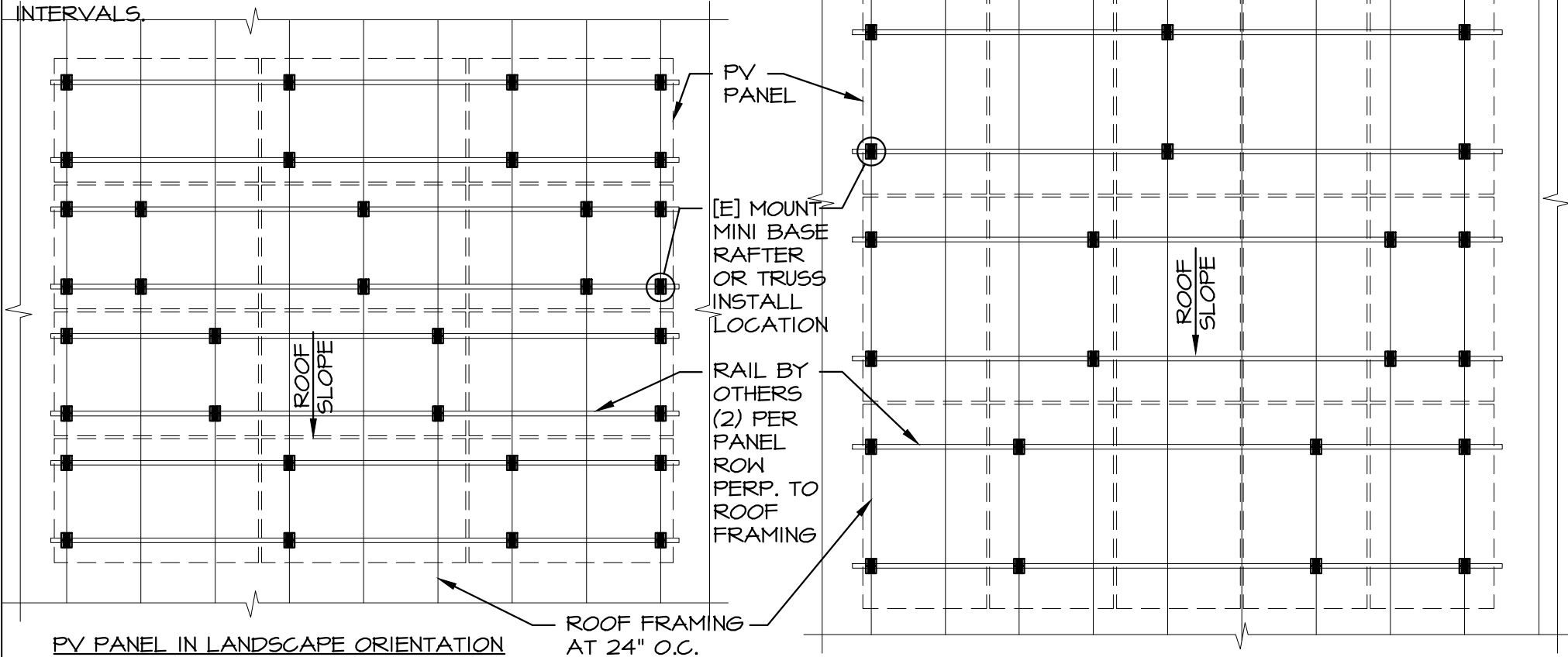
471-13

ROOF TECH  
RT-[E] MOUNT MINI + RAIL  
STRUCTURAL ANALYSIS

ROOF TECH, INC.  
333 H STREET, SUITE 5000  
CHULA VISTA, CA 91910

EXHIBIT A  
2 OF 4

NOTE: [E] MOUNT MINI BASE TO BE ORIENTED WITH LONG DIRECTION DOWN ROOF SLOPE AS SHOWN. SKIP LOAD ROOF WHERE POSSIBLE TO EVENLY DISTRIBUTE LOAD TO ROOF FRAMING. THERMAL EXPANSION SPLICE RAILS AT 14 FOOT MAXIMUM INTERVALS.



### PARTIAL FRAMING PLAN (RAFTER INSTALLATION)

3

SCALE: N.T.S.



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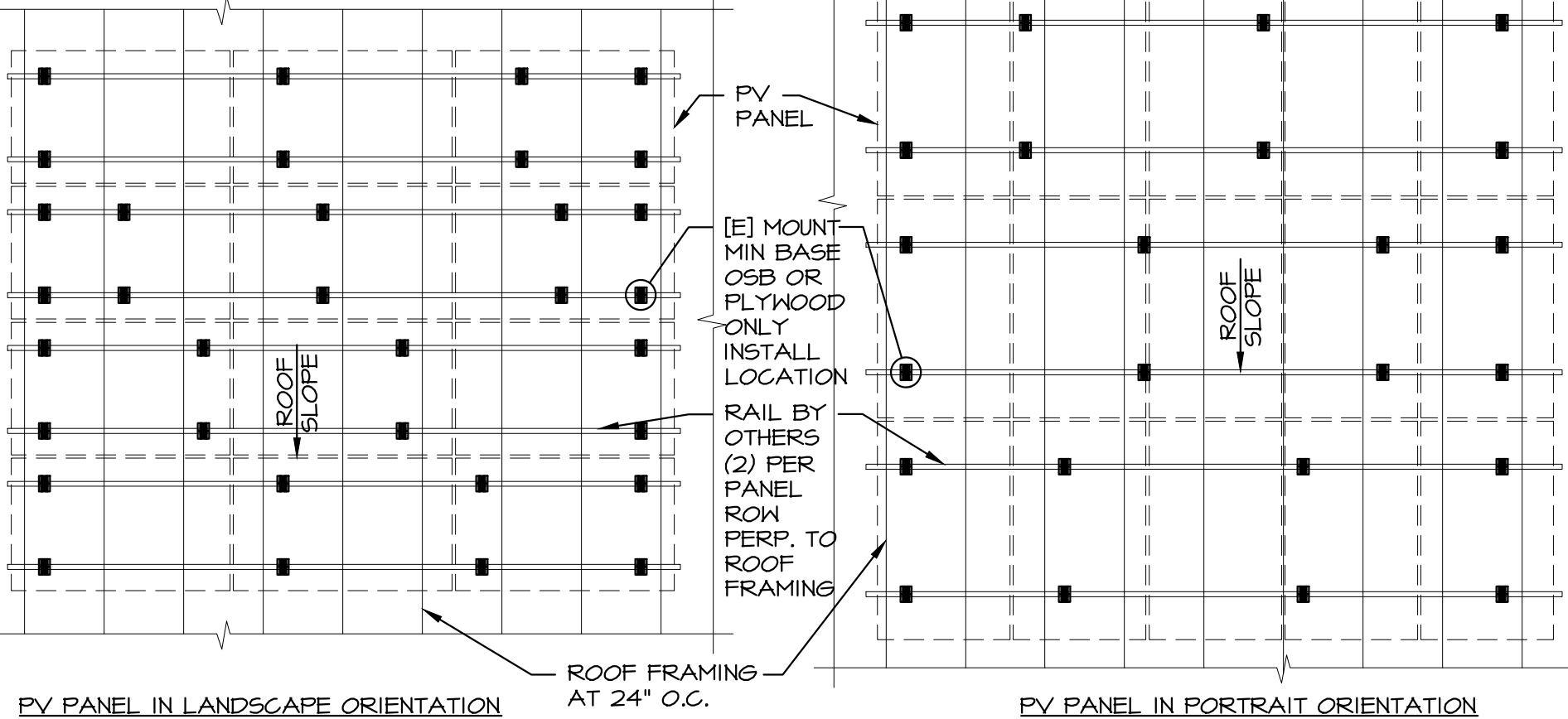
DATE: 7-3-18  
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ROOF TECH  
 RT-[E] MOUNT MINI + RAIL  
 STRUCTURAL ANALYSIS

ROOF TECH, INC.  
 333 H STREET, SUITE 5000  
 CHULA VISTA, CA 91910

EXHIBIT A  
 3 OF 4

NOTE: [E] MOUNT MINI BASE TO BE ORIENTED WITH LONG DIRECTION DOWN ROOF SLOPE AS SHOWN. SKIP LOAD ROOF WHERE POSSIBLE TO EVENLY DISTRIBUTE LOAD TO ROOF FRAMING. THERMAL EXPANSION SPLICE RAILS AT 14 FOOT MAXIMUM INTERVALS.



PV PANEL IN LANDSCAPE ORIENTATION

ROOF FRAMING AT 24" O.C.

PV PANEL IN PORTRAIT ORIENTATION

**PARTIAL FRAMING PLAN  
(OSB/PLYWOOD ONLY INSTALLATION)**

4

SCALE: N.T.S.



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4 OF 4