

Design Criteria for Span Tables:

Values in the maximum allowable rail span tables provided herein are subject to the following general criteria and additional criteria shown on individual span tables sheets. Values in span tables are based on the same engineering methodology and calculation algorithms used for U-Builder and are provided here for reference.

Building Assumptions

- Building Risk Category: II
- Mean Roof Height: 30 ft
- Roof Pitch: 0°-45°
- Site Elevation: 0 ft

Wind Design Assumptions

- Wind loads used are based on ASCE 7-22 Sec. 29.4.4
- Exposure Category B, C, or D
- Basic Wind Speed = 90 – 180 mph
- Level terrain. Topographic factor, $k_{zt} = 1.0$
- $\gamma_E = 1.0$ for ‘Interior’ spans, $\gamma_E = 1.5$ for ‘Exposed’ spans (ASCE 7-22, Fig. 29.4-7)

Snow Design Assumptions

- Ground Snow Load = 0-100 psf
- Exposure Factor coefficients of Partially Exposed condition
- Thermal Factor = 1.0
- Results based on uniform snow load

Seismic Design Assumptions

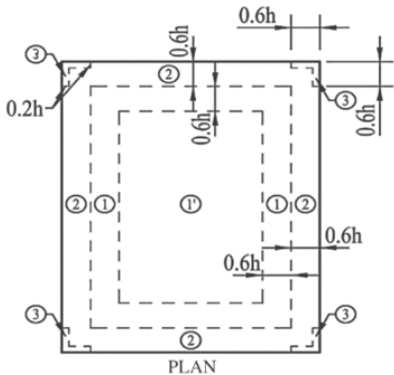
- 0.2-s Spectral Response Acceleration
- $S_s = 1.25$ and 3 with $S_{ds} = 1, 2.4$ respectively per criteria shown on individual span tables sheets.
- $S_1 = 0.5$ & $S_{d1} = 0.6$
- Seismic site class D

Array Assumptions

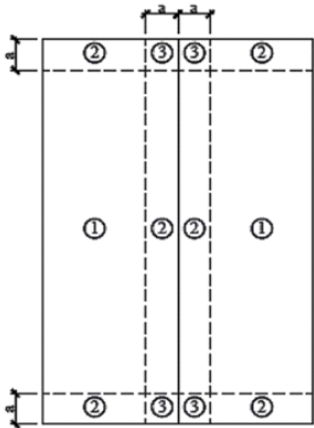
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1” x 67” (~19 sq.ft, 47.65 lbs) and 41” x 80” (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at least twice the module height above roof surface.
- Modules are parallel to roof surface and maximum height above roof surface is 5” to 10” depending on attachment type.
- Gaps between module rows and columns is 0.25” in to 1” depending on clamp type.
- The most restrictive of all roof zone spans shall be used when any part of the module is attributed to that span.
- ‘Exposed’ spans as defined in ASCE 7-22 sec. 29.4.4 shall be used when any part of an exposed module or panel as is attributed to that span.

Span Tables

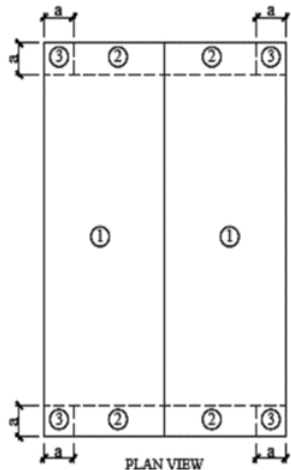
Zone should be considered as per ASCE 7-22, Fig. 30.3-2A to 30.3-2D



Gable Roofs $\theta \leq 7^\circ$

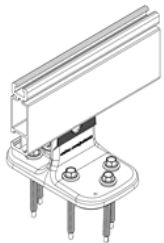


Gable Roofs $7^\circ < \theta \leq 27^\circ$



Gable Roofs $27^\circ < \theta \leq 45^\circ$

Rails can be installed in these possible orientations.

*Flashloc DUO for OSB	
Y+	
Y-	Alternate orientation not allowed

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																															
				90			95			100			105			110			115			120			130			140			150			160			170			180											
				Roof Wind Zone																																															
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3												
0	B	0-7	Interior	34	34	34	34	34	31	34	34	28	34	34	25	34	32	22	34	29	20	34	26	18	31	22	15	26	19	13	23	16	11	20	14	10	17	12	9	15	11	8									
			Exposed	34	32	22	34	28	20	34	25	18	32	23	16	29	20	14	26	19	13	24	17	12	20	14	10	17	12	8	14	10	6	11	8	5	10	7	12	8											
		7-20	Interior	34	34	30	34	34	27	34	33	24	34	30	22	34	27	19	34	24	18	31	22	16	26	19	14	22	16	12	19	14	10	16	12	9	14	10	8	13	9	7									
			Exposed	34	27	19	33	24	17	29	21	15	26	19	14	24	17	13	22	16	11	20	14	10	16	12	9	14	10	7	12	9	6	10	8	6	9	7	7	8	6	7									
			Interior	34	34	34	34	34	33	34	34	29	34	32	26	34	29	24	34	26	21	34	24	20	34	20	16	30	17	14	26	15	12	22	13	10	19	11	9	17	10	8									
	27-45	Exposed	34	29	24	34	26	21	34	23	19	34	21	17	33	19	15	30	17	14	27	15	13	23	13	11	19	11	9	16	9	8	14	8	7	13	7	6	11	6	8										
		Interior	35	35	35	35	35	35	35	35	35	35	35	31	35	35	28	35	33	26	34	30	24	28	25	20	24	21	17	21	18	15	18	16	13	16	14	11	14	12	10										
		Exposed	35	35	28	35	32	25	32	29	22	29	26	20	26	23	18	24	21	17	22	19	15	18	16	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6										
	C	0-7	Interior	34	34	23	34	30	21	34	27	19	34	24	17	30	22	15	28	20	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	6	10	7	8									
			Exposed	30	22	15	27	19	13	24	17	12	21	15	11	19	14	10	18	13	9	16	12	8	13	10	7	11	8	6	10	7	8	9	6	7	5	6	7	7	5										
7-20		Interior	34	28	21	34	25	18	31	22	16	28	20	15	25	18	13	23	16	12	21	15	11	17	13	9	15	11	8	13	9	7	11	8	6	10	7	8	9	6	7										
		Exposed	25	18	13	22	16	12	20	14	10	18	13	9	16	12	9	15	11	8	13	10	7	11	8	6	10	7	8	8	6	7	7	8	6	7	5	6	6	4											
		Interior	34	31	25	34	27	22	34	24	20	34	22	18	34	20	16	31	18	15	28	16	13	24	14	11	20	12	10	17	10	8	15	9	7	13	8	6	12	7	6										

* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

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Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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			Exposed	56	54	38	56	48	33	56	43	30	54	38	27	49	35	24	44	32	22	40	29	20	34	24	17	29	21	14	25	18	12	21	15	11	19	14	10	17	12	13																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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[illegible]

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Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

[illegible]

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ASCE 7-22
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

23 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

SM
Rail Type

PRO SERIES
Clamp

Flashloc DUO OSB
Attachment

SPAN TABLES

Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				90						95						100						105						110															
				Roof Wind Zone																																							
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3										
0	B	0-7	Interior	28	28	28	28	28	26	28	28	23	28	28	21	28	27	19	28	24	17	28	22	15	26	18	13	22	16	11	19	13	9	16	12	8	14	10	7	13	9	6	
			Exposed	28	27	18	28	24	16	28	21	15	27	19	13	24	17	12	22	15	11	20	14	10	16	12	8	14	10	7	12	9	6	10	7	5	9	7	7	8	6	6	
		7-20	Interior	28	28	25	28	28	22	28	28	20	28	25	18	28	22	16	28	20	15	26	18	13	21	15	11	18	13	10	16	11	8	14	10	7	12	9	6	10	8	5	
			Exposed	28	22	16	28	20	14	25	18	13	22	16	12	20	14	10	18	13	9	16	12	9	14	10	7	12	8	6	10	7	5	9	6	7	8	5	6	7	5		
		20-27	Interior	29	29	29	29	29	27	29	29	24	29	27	22	29	24	20	29	22	18	29	20	16	29	17	14	25	14	12	21	12	10	19	11	9	16	9	8	14	8	7	
			Exposed	29	24	20	29	21	17	29	19	16	29	17	14	27	15	13	25	14	11	22	13	10	19	11	9	16	9	7	14	8	6	12	7	6	10	6	8	9	5	7	
	27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	27	21	28	25	20	24	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8	
		Exposed	29	29	24	29	27	21	27	24	19	24	21	17	22	19	15	20	18	14	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	8	8	6	7	7	5	5	
	C	0-7	Interior	28	28	20	28	25	17	28	22	16	28	20	14	25	18	13	23	16	11	21	15	10	17	13	9	15	11	7	13	9	6	11	8	5	10	7	7	9	6	7	
			Exposed	25	18	13	22	16	11	20	14	10	18	13	9	16	12	8	15	10	7	13	10	7	11	8	6	9	7	7	8	6	6	7	8	5	6	7	5	6	4	4	
		7-20	Interior	28	24	17	28	21	15	26	19	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	8	12	9	6	11	8	6	9	7	7	8	6	7	7	5	6	
			Exposed	21	15	11	19	13	10	17	12	9	15	11	8	13	10	7	12	9	6	11	8	6	11	8	6	9	7	7	8	6	6	7	8	5	6	4	7	5	6	4	
		20-27	Interior	29	26	21	29	23	18	29	20	17	29	18	15	29	16	13	26	15	12	24	14	11	20	11	9	17	10	8	15	8	7	13	7	6	11	6	5	10	6	7	
			Exposed	19	16	13	25	14	12	23	13	11	20	12	10	18	11	9	17	10	8	15	9	7	13	7	6	11	6	8	9	5	7	6	7	6	6	5	10	6	4		
	D	0-7	Interior	29	29	25	29	28	22	28	25	20	26	23	18	23	16	21	16	21	19	15	19	17	13	12	9	15	11	13	12	10	12	11	8	10	9	7	9	8	6	7	6
			Exposed	23	20	16	20	18	14	18	16	13	16	15	13	10	13	12	9	12	11	9	10	9	7	9	8	6	7	9	8	6	8	7	5	7	6	5	6	7	5	5	
		7-20	Interior	28	23	16	28	21	14	26	18	13	23	17	11	21	15	10	19	14	9	17	12	9	14	10	7	12	9	6	11	8	6	11	8	5	9	7	7	8	6	7	
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	7	12	9	6	10	7	5	9	6	7	8	5	6	7	5	6	7	5	5	
		20-27	Interior	17	12	9	15	11	8	14	10	7	12	9	6	11	8	6	10	7	5	9	7	7	8	6	6	7	7	5	9	6	6	6	6	6	5	8	5	4	7	5	3
			Exposed	29	21	17	29	19	15	29	17	14	26	15	12	24	14	11	22	12	10	20	11	9	16	9	8	14	8	7	12	7	6	10	6	8	9	5	7	8	7	6	
	B	0-7	Interior	24	13	11	21	12	10	19	11	9	17	10	8	15	9	7	14	8	6	13	7	6	11	6	8	9	5	6	8	7	6	5	6	6	5	4	5	5	4	4	
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	8	6	7	7	5	7	6	7	
		7-20	Interior	19	17	13	17	15	12	15	13	11	14	12	10	12	11	9	11	10	8	10	9	7	9	8	6	7	6	8	6	6	7	5	7	6	7	5	6	6	5	5	
			Exposed	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	23	17	23	22	15	23	18	13	22	16	11	19	13	9	16	12	8	14	10	7	13	9	6	
		20-27	Interior	23	23	23	23	23	22	23	23	20	23	23	18	23	22	16	23	20	15	23	18	13	21	15	11	18	13	10	16	11	8	14	10	7	12	9	6	10	8	5	
			Exposed	26	24	20	26	21	17	26	19	16	26	17	14	26	15	13	25	14	11	22	13	10	19	11	9	16	9	7	14	8	6	12	7	6	10	6	8	9	5	7	
10	B	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	21	28	25	20	24	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
			Exposed	28	28	24	28	27	21	27	24	19	24	21	17	22	19	15	20	18	14	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	8	8	6	7	7	5	5
		7-20	Interior	23	23	20	23	23	17	23	22	16	23	20	14	23	18	13	23	16	11	21	15	10	17	13	9	15	11	7	13	9	6	11	8	5	10	7	7	9	6	7	
			Exposed	23	18	13	22	16	11	20	14	10	18	13	9	16	12	8	15	10	7	13	10	7	11	8	6	9	7	7	8	6	6	7	8	5	6	7	5	6	4	4	
		20-27	Interior	23	23	17	23	21	15	23	19	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	8	12	9	6	11	8	6	9	7	7	8	6	7	7	5	6	
			Exposed	21	15	11	19	13	10	17	12	9	15	11	8	13	10	7	12	9	6	11	8	6	9	7	7	8	6	6	7	8	6	6	7	5	6	4	7	5	4		
	C	0-7	Interior	26	26	21	26	23	18	26	20	17	26	18	15	26	16	13	26	15	12	24	14	11	20	11	9	17	10	8	15	8	7	13	7	6	11	6	5	10	6	7	
			Exposed	26	16	13	25	14	12	23	13	11	20	12	10	18	11	9	17	10	8	15	9	7	13	7	6	11	6	8	9	5	7	8	7	6	5	6	6	4	4		
		7-20	Interior	28	28	25	28	28	22	28	25	20	26	23	18	23	16	21	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	23	20	16	20	18	14	18	16	13	16	15	13	10	13	12	9	12	11	9																					

Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

[illegible]

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10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

[illegible]

Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				Roof Wind Zone																																							
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3							
0	B	0-7	Interior	34	34	34	34	34	31	34	34	28	34	34	25	34	32	22	34	29	20	34	26	18	31	22	15	26	19	13	23	16	11	20	14	10	17	12	9	15	11	8	
			Exposed	34	32	22	34	28	20	34	25	18	32	23	16	29	20	14	26	19	13	24	17	12	20	17	12	8	14	10	7	13	9	6	11	8	5	10	7	8			
		7-20	Interior	34	34	30	34	34	27	34	33	24	34	30	22	34	27	19	34	24	18	31	22	16	26	19	14	22	16	12	19	14	10	16	12	9	14	10	8	13	9	7	
			Exposed	34	27	19	33	24	17	29	21	15	26	19	14	24	17	13	22	16	11	20	14	10	16	12	9	14	10	7	12	9	6	10	8	6	9	7	7	8	6	7	
		20-27	Interior	34	34	34	34	34	33	34	34	29	34	32	26	34	29	24	34	26	21	34	24	20	34	20	16	30	17	14	26	15	12	22	13	10	19	11	9	17	10	8	
			Exposed	34	29	24	34	26	21	34	23	19	34	21	17	33	19	15	30	17	14	27	15	13	23	13	11	19	11	9	16	9	8	14	8	7	13	7	6	11	6	8	
	C	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	36	34	30	24	28	25	20	24	21	17	21	18	15	18	16	13	16	14	11	14	12	10	
			Exposed	35	35	28	35	32	35	32	29	22	29	26	20	26	23	18	24	21	17	22	19	15	18	16	13	26	14	11	13	12	9	12	10	8	10	9	7	9	8	6	
		7-20	Interior	34	34	23	34	30	21	34	27	19	34	24	17	30	22	15	28	13	9	16	12	8	13	10	7	11	8	13	9	15	11	8	13	10	7	12	8	6	10	7	8
			Exposed	34	28	21	34	25	18	31	22	16	28	20	15	25	18	13	23	16	12	21	15	11	17	13	9	15	11	8	13	9	15	11	8	13	9	6	10	7	8	9	6
		20-27	Interior	25	18	13	22	16	12	20	14	10	18	13	9	16	12	9	15	11	8	13	10	7	11	8	6	10	7	8	6	10	7	11	8	6	10	7	8	9	6	7	
			Exposed	34	31	25	34	27	22	34	24	20	34	22	18	34	22	18	34	20	16	31	18	15	28	16	13	24	14	11	20	12	10	17	10	8	15	9	7	13	8	6	12
D	0-7	Interior	34	20	16	31	17	14	27	16	13	24	14	11	22	13	20	10	20	11	9	18	10	9	15	9	7	13	7	6	11	6											

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Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																			
				90												95												100														105													
				110												115												120																130											
				Roof Wind Zone																																																			
0	B	0-7	Interior	56	56	56	56	56	52	56	56	47	56	56	42	56	55	38	56	49	34	56	45	31	53	38	26	45	32	22	38	27	19	33	24	17	29	21	15	26	19	13													
			Exposed	56	54	38	56	48	33	56	43	30	54	38	27	49	35	24	44	32	22	40	29	20	34	24	17	29	21	14	25	18	12	21	15	11	19	14	10	17	12	13													
		7-20	Interior	56	56	51	56	56	46	56	56	41	56	50	37	56	45	33	56	41	30	52	37	27	44	31	23	37	27	20	32	23	17	28	20	15	24	18	13	21	16	11													
			Exposed	56	45	33	56	40	29	50	36	26	45	32	24	40	29	21	37	26	19	33	24	18	28	20	15	24	17	13	21	15	11	18	13	10	16	11	13	14	10	11													
		20-27	Interior	57	57	57	57	57	56	57	57	50	57	54	44	57	49	40	57	44	36	57	40	33	57	34	28	51	29	24	43	25	21	38	22	18	33	19	16	29	17	14													
			Exposed	57	49	40	57	43	35	57	39	32	57	35	29	55	31	26	50	29	23	45	26	21	38	22	18	32	19	15	28	16	13	24	14	12	21	12	10	19	11	9													
	C	0-7	Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58				
			Exposed	58	58	48	58	54	43	54	48	38	49	44	34	44	39	31	40	36	28	37	33	26	31	28	22	26	24	19	23	20	16	20	18	14	17	16	12	15	14	11													
		7-20	Interior	56	56	40	56	51	35	56	45	32	56	41	28	52	37	26	47	33	23	42	30	21	36	26	18	30	22	15	27	20	14	23	17	12	20	14	10	17	12	13	15	11	13	9									
			Exposed	56	48	35	56	42	31	53	38	28	47	34	25	43	31	23	39	28	21	35	25	19	30	21	16	25	18	13	22	16	12	19	14	10	17	12	14	15	11	12													
		20-27	Interior	43	31	22	38	27	20	34	24	18	30	22	16	27	20	15	25	18	13	23	17	12	19	14	10	16	12	13	14	10	12	12	14	10	11	12	9	10	11	8													
			Exposed	57	52	42	57	46	38	57	41	34	57	37	30	57	33	27	53	30	25	48	28	23	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11	20	12	10													
10	B	0-7	Interior	57	57	57	57	57	56	57	57	50	57	54	44	57	49	40	57	44	36	57	40	33	57	34	28	51	29	24	43	25	21	38	22	18	33	19	16	29	17	14													
			Exposed	57	49	40	57	43	35	57	39	32	57	35	29	55	31	26	50	29	23	45	26	21	38	22	18	32	19	15	28	16	13	24	14	12	21	12	10	19	11	9													
		7-20	Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58					
			Exposed	47	42	33	41	37	29	37	33	26	33	30	24	30	27	21	27	25	19	25	22	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	13	11	9	11													
		20-27	Interior	56	47	33	56	42	29	52	37	26	47	34	24	42	30	21	38	28	19	35	25	18	29	21	15	25	18	13	22	16	11	19	14	10	16	12	13	15	11	11													
			Exposed	42	30	21	37	27	19	33	24	17	30	22	15	27	20	14	25	18	13	23	16	11	19	14	10	16	12	13	14	10	11	12	13	9	11	12	8	9	10	7													
	C	0-7	Interior	55	39	29	49	35	26	44	31	23	39	28	21	35	25	19	32	23	17	29	21	16	25	18	13	21	15	11	18	13	10	16	11	13	14	10	11	12	14	10													
			Exposed	35	25	19	31	23	17	28	20	15	25	18	13	23	16	12	21	15	11	19	14	10	16	12	13	14	10	11	12	13	10	10	11	8	9	10	7	12	9	6													
		7-20	Interior	57	43	35	57	38	31	57	34	28	53	30	25	48	28	23	44	25	21	40	23	19	33	19	16	28	16	14	25	14	12	21	12	10	19	11	9	17	10	12													
			Exposed	48	27	23	43	24	20	38	22	18	34	20	16	31	18	15	28	16	13	26	15	12	22	13	10	18	11	13	16	9	12	14	12	10	12	11	9	11	10	8													
		20-27	Interior	58	53	42	53	47	37	48	42	33	43	38	30	39	35	27	35	31	25	32	29	23	27	24	19	23	21	16	20	18	14	17	16	12	15	14	11	14	12	10													
			Exposed	39	34	27	34	31	24	31	27	22	28	25	20	25	22	18	23	20	16	21	19	15	18	16	12	15	13	11	13	12	9	11	10	12	10	14	11	13	12	10													
20	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46					
			Exposed	46	46	38	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46				
		7-20	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46				
			Exposed	46	45	33	46	40	29	46	36	26	45	32	24	40	29	21	37	26	19	33	24	18	28	20	15	24	17	13	21	15	11	18	13	10	16	11	13	14	10	11	12	14	10										
		20-27	Interior	52	52	52	52	52	52	52	52	50	52	52	44	52	49	40	52	44	36	52	40	33	52	34	28	51	29	24	43	25	21	38	22	18	33	19	16	29	17	14													

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

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[illegible]

Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3						
0	B	0-7	Interior	28	28	28	28	28	26	28	28	23	28	28	21	28	27	19	28	24	17	28	22	15	26	18	13	22	16	11	19	13	9	16	12	8	14	10	7	13	9	6
			Exposed	28	27	18	28	24	16	28	21	15	27	19	13	24	17	12	22	15	11	20	14	10	16	12	8	14	10	7	12	9	6	10	7	5	9	7	7	8	6	6
		7-20	Interior	28	28	25	28	28	22	28	28	20	28	25	18	28	22	16	28	20	15	26	18	13	21	15	11	18	13	10	16	11	8	14	10	7	12	9	6	10	8	5
			Exposed	28	22	16	28	20	14	25	18	13	22	16	12	20	14	10	18	13	9	16	12	9	14	10	7	12	8	6	10	7	5	9	6	7	8	5	6	7	7	5
		20-27	Interior	29	29	29	29	29	27	29	29	24	29	27	22	29	24	20	29	22	18	29	20	16	29	17	14	25	14	12	21	12	10	19	11	9	16	9	8	14	8	7
			Exposed	29	24	20	29	21	17	29	19	16	29	17	14	27	15	13	25	14	11	22	13	10	19	11	9	16	9	7	14	8	6	12	7	6	10	6	8	9	5	7
	C	0-7	Interior	28	28	20	28	25	17	28	22	16	28	20	14	25	18	13	23	16	11	21	15	10	17	13	9	15	11	7	13	9	6	11	8	5	10	7	7	9	6	7
			Exposed	25	18	13	22	16	11	20	14	10	18	13	9	16	12	8	15	10	7	13	10	7	11	8	6	9	7	7	8	6	6	7	7	5	5	6	4	6	7	
		7-20	Interior	28	24	17	28	21	15	26	19	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	8	12	9	6	11	8	6	9	7	7	8	6	7	7	5	6
			Exposed	21	15	11	19	13	10	17	12	9	15	11	8	13	10	7	12	9	6	11	8	6	9	7	8	6	9	7	7	8	6	6	7	7	5	5	6	4	6	7
		20-27	Interior	29	26	21	29	23	18	29	20	17	29	18	15	29	16	13	26	15	12	24	14	11	20	11	9	17	10	8	15	8	7	13	7	6	11	6	5	10	6	7
			Exposed	29	16	13	25	14	12	23	13	11	20	12	10	18	11	9	17	10	8	15	9	7	13	7	6	11	6	8	9	5	7	8	7	6	7	6	5	6	6	4
D	0-7	Interior	29	29	25	29	28	22	28	25	20	26	23	18	23	21	16	21	15	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
		Exposed	23	20	16																																					

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[illegible]

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Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																													
				90						95						100						105						110						115						120						130						140						150						160						170						180					
				Roof Wind Zone																																																																													
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3																																							
0	B	0-7	Interior	55	55	55	55	55	51	55	55	46	55	55	41	55	53	37	55	48	33	55	44	30	51	37	26	44	31	22	37	27	19	32	23	16	28	21	14	25	18	13																																							
			Exposed	55	53	37	55	47	33	55	42	29	53	38	26	48	34	24	43	31	22	39	28	20	33	24	17	28	20	14	24	17	12	21	15	11	18	13	14	16	12	13																																							
		7-20	Interior	55	55	50	55	55	45	55	55	40	55	49	56	55	44	32	55	40	29	51	37	27	43	31	22	36	26	19	31	23	17	27	20	14	24	17	13	21	15	11																																							
			Exposed	55	44	32	55	39	29	49	35	26	44	31	23	39	28	21	36	26	19	33	24	17	27	20	15	23	17	12	20	15	11	18	13	9	15	11	13	14	10	11																																							
		20-27	Interior	56	56	56	56	56	54	56	56	48	56	53	43	56	48	39	56	43	36	56	40	32	56	33	27	50	28	23	43	24	20	37	21	17	32	19	15	29	17	14																																							
			Exposed	56	48	39	56	42	35	56	38	31	56	34	28	54	31	25	49	28	23	44	25	21	37	21	18	32	18	15	27	16	13	24	14	11	21	12	10	18	11	13																																							
	27-45	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	54	56	50	39	47	42	33	40	35	28	34	31	24	30	27	21	26	23	18	23	21	16																																								
		Exposed	57	57	47	57	53	42	53	47	37	48	43	34	43	39	30	39	35	28	36	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	14	11																																								
	C	0-7	Interior	55	55	39	55	50	35	55	44	31	55	40	28	50	36	25	46	33	23	41	30	21	35	25	18	30	21	15	25	18	13	22	16	11	19	14	10	17	12	13																																							
			Exposed	50	36	25	44	32	22	40	28	20	36	26	18	32	23	16	29	21	15	27	19	13	22	16	11	19	14	10	16	12	13	14	10	11	13	14	10	11	12	9																																							
		7-20	Interior	55	47	34	55	41	30	52	37	27	46	33	24	42	30	22	38	27	20	35	25	18	29	21	15	25	18	13	21	15	11	19	13	10	16	12	13	14	10	12																																							
			Exposed	42	30	22	37	27	20	33	24	18	30	21	16	27	19	14	24	18	13	22	16	12	19	14	10	16	12	13	14	10	11	12	13	10	11	12	9	10	8																																								
20-27		Interior	56	51	41	56	45	37	56	40	33	56	36	30	56	33	27	52	30	24	47	27	22	40	23	19	34	19	16	29	17	14	25	15	12	22	13	11	20	11	9																																								
		Exposed	56	32	27	51	29	24	45	26	21	40	26	33	19	37	21	17	33	19	16	30	17	14	25	15	12	22	13	10	19	11	14	16	9	12	14	13	10	11	9																																								
27-45	Interior	57	57	50	57	56	44	56	50	39	51	45	35	46	41	32	42	37	29	38	34	27	32	29	22	27	24	19	24	21	17	21	18	14	18	16	13	16	14	11																																									
	Exposed	46	41	32	41	36	28	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	12	15	14	11	13	12	9	12	10	13	10	14	11																																									
D	0-7	Interior	55	46	32	55	41	29	51	37	26	46	33	23	41	30	21	38	27	19	34	25	17	29	21	15	24	18	12	21	15	11	18	13	14	16	12	12	14	10	11																																								
		Exposed	41	30	21	37	26	18	33	24	17	29	21	15	27	19	13	24	17	12	22	16	11	19	13	14	16	11	12	14	10	11	12	13	9	10	12	8	14	10	7																																								
	7-20	Interior	54	39	28	48	34	25	43	31	22	38	28	20	34	25	18	31	23	17	29	21	15	24	17	13	20	15	11	18	13	9	15	11	13	14	10	11	12	13	10																																								
		Exposed	34	25	18	31	22	16	27	20	15	25	18	13	22	16	12	20	15	11	18	13	10	16	11	13	13	10	16	11	11	13	9	10	11	8	13	10	7	12	9	6																																							
	20-27	Interior	56	42	34	56	37	30	56	33	27	52	30	24	47	27	22	43	25	20	39	22	18	33	19	16	28	16	13	24	14	11	21	12	10	18	11	13	16	9	12																																								
		Exposed	47	27	22	42	24	20	37	21	18	33	19	16	30	17	14	27	16	13	25	14	12	21	12	10	18	10	13	16	14	11	14	12	10	12	11	9	11	9	8																																								
27-45	Interior	57	52	41	52	46	36	47	42	33	42	37	29	38	34	27	34	31	24	31	28	22	26	24	19	23	20	16	20	17	14	17	15	12	15	13	11	13	12	14																																									
	Exposed	38	34	27	34	30	24	30	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	14	11	10	12	10	13	10	13	12	9																																									
10	B	0-7	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45																																								
			Exposed	45	45	37	45	45	33	45	42	29	45	38	26	45	34	24	43	31	22	39	28	20	33	24	17	28	20	14	24	17	12	21	15	11	18	13	14	16	12	13																																							
		7-20	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45																																						
			Exposed	45	44	32	45	39	29	45	35	26	44	31	23	39	28	21	36	26	19	33	24	17	27	20	15	23	17	12	20	15	11	18	13	9	15	11	13	14	10	11																																							
		20-27	Interior	51	51	51	51	51	51	51	51	51	48	51	51	43	51	48	39	51	43	36	51	40	32	51	33	27	50	28	23	43	24	20	37	21	17	32	19	15	29	17	14																																						
			Exposed	51	48	39	51	42	35	51	38	31	51	34	28	51	31	25	49	28	23	44	25	21	37	21	18	32	18	15	27	16	13	24	14	11	21	12	10	18	11	13																																							
	27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55																																							
		Exposed	55	55	47	55	53	42	53	47	37	48	43	34	43	39	30	39	35	28	36	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	14	11																																								
	C	0-7	Interior	45	45	39	45	45	35	45	44	31	45	40	28	45	36	25	45	33	23	41	30	21	35	25	18	30	21	15	25	18	13	22	16	11	19	14	10	17	12	13																																							
			Exposed	45	36	25	44	32	22	40	28	20	36	26	18	32	23	16	29	21	15	27	19	13	22	16	11	19	14	10	16	12	13	14	10	11	13	14	10	11	12	9																																							
		7-20	Interior	45	45	34	45	41	30	45	37	27	45	33	24	42	30	22	38	27	20	35	25	18	29	21	15	25	18	13	21	15	11	19	13	10	16	12	13	14	10	12																																							
			Exposed	42	30	22	37	27	20	33	24	18	30	21	16	27	19	14	24	18	13	22	16	12	19	14	10	16	12	13	14	10	11	12	13	10	11	12	9	10	8																																								
20-27		Interior	51	51	41	51	45	37	51	40	33	51	36	30	51	33	27	51	30	24	47	27	22	40	23	19	34	19	16	29	17	14	25	15	12	22	13	11	20	11	9																																								
		Exposed	51	32	27	51	29	24	45	26	21	40	26	33	19	37	21	17	33	19	16	30	17	14	25	15	12	22	13	10	19	11	14	16	9	12	14	13	10	11	9																																								
27-45	Interior	55	55	50	55	55	44	55	50	39	51	45	35	46	41	32	42	37	29	38	34	27	32	29	22	27	24	19	24	21	17	21	18	14	18	16	13	16	14	11																																									

* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

[illegible]

* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

Ground Snow Load (psf)				Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																															
							Roof Wind Zone																															
							90			95			100			105			110			115			120			130			140			150			160	
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
90	B	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	17	23	16	13
	27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	25	
		Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29		
	C	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	13	
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12		
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12		
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	17	23	16	
	27-45	Interior	29	29	29</																																	

* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

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* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																													
				90						95						100						105						110						115						120						130						140						150						160						170						180					
				Roof Wind Zone																																																																													
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3																																							
0	B	0-7	Interior	56	56	54	56	56	48	56	56	43	56	56	38	56	50	35	56	45	31	56	41	29	48	35	24	41	29	21	35	25	18	31	22	15	27	19	14	24	17	12	8																																						
			Exposed	56	50	35	56	44	31	55	39	27	50	35	25	45	32	22	40	29	20	37	26	19	31	22	16	26	19	13	23	16	11	20	14	10	17	13	9	15	11	8																																							
		7-20	Interior	56	56	47	56	56	42	56	52	37	56	46	34	56	42	30	53	38	28	48	34	25	40	29	21	34	25	18	29	21	16	26	18	14	22	16	12	20	14	11																																							
			Exposed	56	41	30	51	37	27	46	33	24	41	30	22	37	27	20	34	24	18	31	22	16	26	19	14	22	16	12	19	14	10	17	12	9	15	11	8	13	9	10																																							
		20-27	Interior	57	57	57	57	57	51	57	56	46	57	50	41	57	45	37	57	41	34	57	37	31	55	31	26	47	27	22	40	23	19	35	20	16	30	18	14	27	16	13																																							
			Exposed	57	45	37	57	40	33	57	36	29	56	32	26	51	29	24	46	26	22	42	24	20	35	20	17	30	17	14	26	15	12	22	13	11	20	11	9	17	10	8																																							
	C	0-7	Interior	58	58	58	58	58	58	58	58	54	58	58	49	58	56	44	57	51	40	52	47	37	44	39	31	37	33	26	32	29	23	28	25	20	25	22	17	22	20	15																																							
			Exposed	58	56	44	56	50	39	50	45	35	45	40	32	41	36	29	37	33	26	34	30	24	28	25	20	24	22	17	21	19	15	18	16	13	16	14	11	14	13	10																																							
		7-20	Interior	56	53	37	56	47	33	56	42	29	53	38	26	47	34	24	43	31	21	39	28	20	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	12	8																																							
			Exposed	47	34	24	42	30	21	37	27	19	33	24	17	30	22	15	27	20	14	25	18	13	21	15	11	18	13	9	16	11	8	14	10	10	12	9	10	12	8																																								
		20-27	Interior	56	44	32	55	39	29	49	35	26	44	31	23	39	28	21	36	26	19	32	23	17	27	20	15	23	17	12	20	15	11	17	13	9	15	11	8	14	10	11																																							
			Exposed	39	28	21	35	25	18	31	22	17	28	20	15	25	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	10	11	8	9	10	11	8	9	10	7																																							
D	0-7	Interior	57	48	39	57	42	35	57	38	31	57	34	28	54	31	25	49	28	23	44	25	21	37	21	18	32	18	15	27	16	13	24	14	11	21	12	10	18	11	9																																								
		Exposed	54	31	25	47	27	22	42	24	20	38	22	18	34	20	16	31	18	15	28	16	14	24	14	11	20	12	10	18	10	8	15	9	11	14	8	10	12	11	9																																								
	7-20	Interior	58	58	47	58	53	41	53	47	37	48	43	33	43	38	30	39	35	28	36	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11																																								
		Exposed	43	38	30	38	34	27	34	31	24	31	28	22	28	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	13	11	9	11	10	8	10	9	11																																								
	20-27	Interior	56	43	30	54	39	27	48	34	24	43	31	22	39	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	10																																								
		Exposed	39	28	20	34	25	17	31	22	16	28	20	14	25	18	13	23	16	12	21	15	11	17	13	9	15	11	8	13	9	10	11	8	9	10	11	8	9	10	7																																								
10	B	0-7	Interior	51	36	27	45	32	24	40	29	21	36	26	19	32	23	17	29	21	16	27	19	14	23	16	12	19	14	10	17	12	9	15	11	8	13	9	10	11	8	9																																							
			Exposed	32	23	17	29	21	15	26	19	14	23	17	12	21	15	11	19	14	10	17	13	9	15	11	8	13	9	10	11	8	9	9	10	8	8	9	7	11	8	6																																							
		7-20	Interior	57	39	32	57	35	29	55	31	26	49	28	23	44	25	21	40	23	19	37	21	17	31	18	15	26	15	12	23	13	11	20	11	9	17	10	8	15	9	11																																							
			Exposed	44	25	21	39	23	19	35	20	17	31	18	15	28	16	14	26	15	12	24	14	11	20	12	9	17	10	8	15	8	11	13	11	9	11	10	8	10	9	7																																							
		20-27	Interior	55	49	39	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	26	21	25	22	18	21	19	15	18	16	13	16	14	11	14	13	10	13	11	9																																							
			Exposed	36	32	25	32	28	22	28	25	20	26	23	18	23	21	16	21	19	15	19	17	14	16	15	11	14	12	10	12	11	8	10	9	11	9	8	10	8	11	9																																							
	C	0-7	Interior	46	46	37	46	46	46	46	46	46	46	38	46	46	35	46	45	31	46	41	29	46	35	24	41	29	21	35	25	18	31	22	15	27	19	14	24	17	12																																								
			Exposed	46	46	35	46	44	31	46	39	27	46	35	25	45	32	22	40	29	20	37	26	19	31	22	16	26	19	13	23	16	11	20	14	10	17	13	9	15	11	8																																							
		7-20	Interior	46	46	46	46	46	42	46	46	37	46	46	34	46	42	30	46	38	28	46	34	25	40	29	21	34	25	18	29	21	16	26	18	14	22	16	12	20	14	11																																							
			Exposed	46	41	30	46	37	27	46	33	24	41	30	22	37	27	20	34	24	18	31	22	16	26	19	14	22	16	12	19	14	10	17	12	9	15	11	8	13	9	10																																							
		20-27	Interior	52	52	52	52	52	51	52	52	46	52	50	41	52	45	37	52	41	34	52	37	31	52	31	26	47	27	22	40	23	19	35	20	16	30	18	14	27	16	13																																							
			Exposed	52	45	37	52	40	33	52	36	29	52	32	26	51	29	24	46	26	22	42	24	20	35	20	17	30	17	14	26	15	12	22	13	11	20	11	9	17	10	8																																							
D	0-7	Interior	56	56	56	56	56	56	56	56	54	56	56	49	56	56	44	56	51	40	52	47	37	44	39	31	37	33	26	32	29	23	28	25	20	25	22	17	22	20	15																																								
		Exposed	56	56	44	56	50	39	50	45	35	45	40	32	41	36	29	37	33	26	34	30	24	28	25	20	24	22	17	21	19	15	18	16	13	16	14	11	14	13	10																																								
	7-20	Interior	46	46	37	46	46	33	46	42	29	46	38	26	46	34	24	43	31	22	39	28	20	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	12	8																																								
		Exposed	46	34	24	42	30	21	37	27	19	33	24	17	30	22	15	27	20	14	25	18	13	21	15	11	18	13	9	16	11	8	14	10	10	12	9	10	12	8																																									
	20-27	Interior	46	44	32	46	39	29	46	35	26	44	31	23	39	28	21	36	26	19	32	23	17	27	20	15	23	17	12	20	15	11	17	13	9	15	11	8	14	10	11																																								
		Exposed	39	28	21	35	25	18	31	22	17	28	20	15	25	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	10	11	8	9	10	11	8	9	10	7																																								
20	B	0-7	Interior	52	48	39	52	42	35	52	38	31	52	34	28	52	31	25	49	28	23	44	25	21	37	21	18	32	18	15	27	16	13	24	14	11	21	12	10	18	11	9																																							
			Exposed	52	31	25	47	27	22	42	24	20	38	22	18	34	20	16	31	18	15	28	16	14	24	14	11	20	12	10	18	10	8	15	9	11	14	8	10	12	11	9																																							
		7-20	Interior	55	49	39	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	26	21	25	22	18	21	19	15	18	16	13	16	14	11	14	13	10	13	11	9																																							
			Exposed	36	32	25	32	28	22	28	25	20	26	23	18	23	21	16	21	19	15	19	17	14	16	15	11	14	12	10	12	11	8	10	9	11	9	8	10	8	11	9																																							
		20-27	Interior	46	46	37	46	46	33	46	42	29	46	38	26	46	34	24	43	31	22	39	28	20	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	12	8																																							
			Exposed																																																																														

* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

[illegible]

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10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

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10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

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* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

Ground Snow Load (psf)				Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																															
							Roof Wind Zone																															
							90			95			100			105			110			115			120			130			140			150			160	
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
90	B	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
		20-27	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
	27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	
		Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29		
	C	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12		
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12		
		20-27	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
	27-45	Interior	29	29	29	29	29</																															

* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.



ASCE 7-22
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

19 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

SM
Rail Type

UAF
Clamp

Flashloc DUO OSB
Attachment

SPAN TABLES

Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																													
				90						95						100						105						110						115						120						130						140						150						160						170						180					
				Roof Wind Zone																																																																													
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3																																				
0	B	0-7	Interior	34	34	32	34	34	28	34	34	25	34	33	23	34	30	20	34	27	19	34	24	17	29	20	14	24	17	12	21	15	10	18	13	9	16	11	8	14	10	7	5	6	4	6	5																																		
			Exposed	34	29	20	34	34	26	18	33	23	16	29	21	15	26	19	13	24	17	12	22	16	11	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5	9	6	4	6	5																																				
		7-20	Interior	34	34	28	34	34	25	34	30	22	34	27	20	34	25	18	31	22	16	28	20	15	24	17	12	20	14	11	17	12	9	15	11	8	13	10	7	12	8	6	10	7	12	8	6																																		
			Exposed	34	24	18	30	22	16	27	19	14	24	17	13	22	16	12	20	14	10	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	6	4	6	5																																				
		20-27	Interior	34	34	34	34	34	30	34	33	27	34	30	24	34	27	22	34	24	20	34	22	18	32	18	15	28	16	13	24	14	11	20	12	10	18	10	8	16	9	7	12	8	6																																				
			Exposed	34	27	22	34	24	19	34	21	17	33	19	15	30	17	14	27	16	13	25	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5	10	6	5																																				
	C	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35																																			
			Exposed	35	33	26	33	30	23	30	26	21	27	24	19	24	21	17	22	19	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6	7	6																																					
		7-20	Interior	34	31	22	34	28	19	34	25	17	31	22	15	28	20	14	25	18	13	23	16	12	19	14	10	16	12	8	14	10	7	12	9	6	11	8	5	9	7	5	6	7	5																																				
			Exposed	28	20	14	25	18	12	22	16	11	20	14	10	18	13	9	16	12	8	15	11	7	12	9	6	11	8	5	9	7	4	8	6	6	7	5	5	6	6	7	5																																						
		20-27	Interior	23	17	12	21	15	11	18	13	10	16	12	9	15	11	8	14	10	7	12	9	6	10	7	5	9	6	5	8	5	6	7	5	5	6	6	5	5	6	4	6	5																																					
			Exposed	34	28	23	34	25	20	34	22	18	34	20	16	32	18	15	29	16	13	26	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	6	11	6	5																																							
	D	0-7	Interior	32	18	15	28	16	13	25	14	12	22	13	11	20	12	10	18	11	9	17	10	8	14	8	7	12	7	5	10	6	5	9	5	7	8	4	6	7	6	5	6	5																																					
			Exposed	35	35	28	35	31	25	31	28	22	28	25	20	25	23	18	23	21	16	21	19	15	18	16	12	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6	5																																						
		7-20	Interior	25	23	18	23	20	16	20	18	14	18	16	13	16	15	12	15	13	10	14	12	10	11	10	8	10	9	7	8	8	6	7	5	6	6	4	6	5	6	4	6	5																																					
			Exposed	34	26	18	32	23	16	28	20	14	26	18	13	23	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	6	10	7	5	9	6	7	8	6	6	6																																						
		20-27	Interior	30	21	16	26	19	14	24	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	6	10	7	5	8	6	4	7	5	6	7	5	5	6	5																																					
			Exposed	19	14	10	17	12	9	15	11	8	14	10	7	12	9	6	11	8	6	10	7	5	9	6	4	7	5	6	6	4	5	5	6	4	5	5	4	6	5	3	6	5																																					
10	B	0-7	Interior	34	23	19	34	21	17	32	18	15	29	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	6	12	7	5	10	6	5	9	5	6	5	6																																					
			Exposed	26	15	12	23	13	11	21	12	10	19	11	9	17	10	8	15	9	7	14	8	7	12	7	5	10	6	5	9	5	6	7	7	5	7	6	5	6	5	4	6	5																																					
		7-20	Interior	33	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	5																																					
			Exposed	21	19	15	19	17	13	17	15	12	15	13	11	14	12	10	12	11	9	11	10	8	10	8	7	8	7	6	7	6	5	6	5	7	5	5	6	5	6	5																																							
		20-27	Interior	27	27	27	27	27	27	27	25	27	27	23	27	27	20	27	27	27	24	17	27	20	14	24	17	12	21	15	10	18	13	9	16	11	8	14	10	7	5	6	7	5																																					
			Exposed	27	27	20	27	26	18	27	23	16	27	21	15	26	19	13	24	17	12	22	16	11	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5	9	6	4	6	5																																					
	C	0-7	Interior	28	28	28	28	28	25	28	28	22	28	27	20	28	25	18	28	22	16	28	20	15	24	17	12	20	14	11	17	12	9	15	11	8	13	10	7	12	8	6	10	7																																					
			Exposed	28	24	18	28	22	16	27	19	14	24	17	13	22	16	12	20	14	10	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	6	4	6	5																																				
		7-20	Interior	32	32	32	32	32	30	32	32	27	32	30	24	32	27	22	32	24	20	32	22	18	32	18	15	28	16	13	24	14	11	20	12	10	18	10	8	16	9	7	12	8																																					
			Exposed	32	27	22	32	24	19	32	21	17	32	19	15	30	17	14	27	16	13	25	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5	10	6	5																																				
		20-27	Interior	34	34	34	34	34	34	34	34	32	34	34	29	34	33	26	34	30	24	31	28	22	26	23	18	22	20	16	19	17	13	17	15	12	15	13	10	13	12	9	7	6	5																																				
			Exposed	34	33	26	33	30	23	30	26	21	27	24	19	24	21	17	22	19	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6	5																																						
	D	0-7	Interior	27	27	22	27	27	19	27	25	17	27	22	15	27	20	14	25	18	13	23	16	12	19	14	10	16	11	8	14	10	7	12	9	6	11	8	5	9	7	5																																							
			Exposed	27	20	14	25	18	12	22	16	11	20	14	10	18	13	9	16	12	8	15	11	7	12	9	6	11	8	5	9	7	4	8	6	6	7	5	5	6	7	5																																							
		7-20	Interior	28	26	19	28	23	17	28	21	15	26	18	14	23	17	12	21	15	11	19	14	10	16	12	8	14	10	7	12	8	6	10	7	5	9	6	5	8	6	6	6																																						
			Exposed	23	17	12	21	15	11	18	13	10	16	12	9	15	11	8	14	10	7	12	9	6	10	7	5	9	6	5	8	5	6	7	5	5	6	6	5	5	6	4	6	5																																					
		20-27	Interior	32	28	23	32	25	20	32	22	18	32	20	16	32	18	15	29	16	13	26	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	6	11	6	5																																							
			Exposed	32	18	15	28	16	13	25	14	12	22	13	11	20	12	10	18	11	9	17	10	8	14	8	7	12	7	5	10	6	5	9	5	7	8	4	6	7	6	5																																							
20	B	0-7	Interior	34	34	28	34	34	25	34	30	22	34	27	20	34	25	18	31	22	16	28	20	15	24	17	12	20	14	11	17	12	9	15	11	8	13	10	7	12	8	6	10	7																																					
			Exposed	34	29	20	34	34	26	18	33	23	16	29	21	15	26	19	13	24	17	12	22	16	11	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5	9	6	4	6	5																																				
		7-20	Interior	34	34	28	34	34	25	34	30	22	34	27	20	34	25	18	31	22	16	28	20	15	24	17	12	20	14	11	17	12	9	15	11	8	13	10	7	12	8	6	10	7																																					
			Exposed	34	24	18	30	22	16	27	19	14	24	17	13	22	16	12	20	14	10	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	6	4	6	5																																				
		20-27	Interior	34	34	34	34	34	30	34	33	27	34	30	24	34	27	22	34	24	20	34	22	18	32	18																																																							

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

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* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.



ASCE 7-22
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

19 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

SM
Rail Type

UAF
Clamp

Flashloc DUO OSB
Attachment

SPAN TABLES

Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
				90						95						100						105						110						115						120						130						140						150						160						170						180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.



ASCE 7-22
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

23 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

SM
Rail Type

UAF
Clamp

Flashloc DUO OSB
Attachment

SPAN TABLES

Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
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30	B	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	9	13	11	7	13	9	7	12	8	6				
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	13	9	13	11	8	13	9	6	11	8	6	10	7	5	6					
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	9	14	10	8	12	9	7	11	8	6	10	7	5		
			Exposed	14	14	14	14	14	14	14	14	14	14	12	14	14	11	14	13	10	14	12	9	14	11	8	13	9	7	11	8	6	9	7	5	6	6	4	5				
		20-27	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	15	13	17	13	11	17	11	9	17	10	8	15	9	7	13	8	6			
			Exposed	17	17	17	17	17	17	16	17	17	17	14	17	16	13	17	14	12	17	13	11	17	12	10	17	10	8	15	8	7	13	7	6	11	5	10	5	4	8	5	
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	15	18	19	15	18	16	13	16	14	11	14	12	10	12	11	8
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	15	18	16	13	16	14	11	14	12	10	12	11	8	
		7-20	Interior	13	13	12	13	13	10	13	9	13	12	8	13	11	7	13	10	7	12	9	6	10	7	12	8	13	10	7	5	9	6	4	8	5	6	7	5	5	6	4	5
			Exposed	14	14	14	14	14	14	14	14	14	14	12	14	14	11	14	14	10	14	13	9	14	11	8	13	10	7	11	8	6	10	7	5	8	6	4	7	5	6		
		20-27	Interior	14	14	10	14	12	9	14	11	8	14	10	7	12	9	6	11	8	6	10	7	5	9	6	4	7	5	6	6	4	5	5	6	4	5	5	4	6	5	5	
			Exposed	17	17	17	17	17	17	17	17	17	15	17	17	14	17	15	12	17	14	17	15	12	17	10	17	16	9	16	9	7	13	8	6	12	7	5	10	6	5	9	5
40	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19		
			Exposed	19	19	19	19</																																				

* Cells with an asterisk indicates that the L-foot must be oriented in the Y- direction as indicated in the image.

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[illegible]

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10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

10 Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.

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