

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

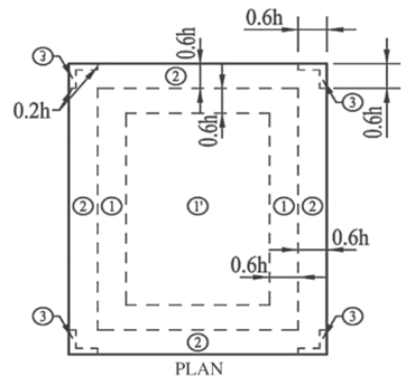
- 0.2-s Spectral Response Acceleration
- $S_s = 1.25$ and 3 with $S_{ds} = 1, 2.4$ respectively per criteria shown on individual span tables sheets.
- $S_1 = 0.5$ & $S_{d1} = 0.6$
- Seismic site class D

Array Assumptions

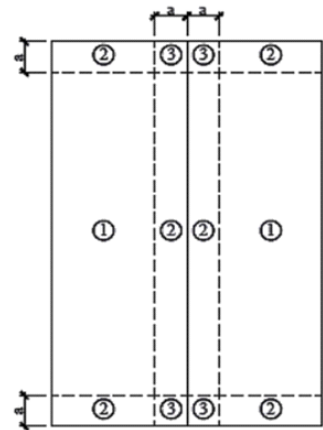
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at 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

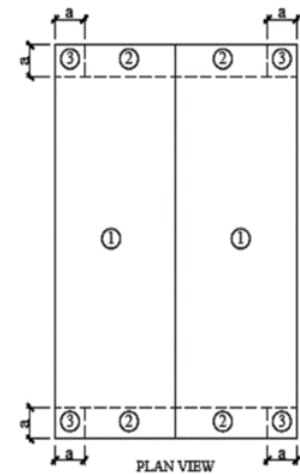
Zone should be considered as per ASCE 7-22, Fig. 30.3-2A to 30.3-2D



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

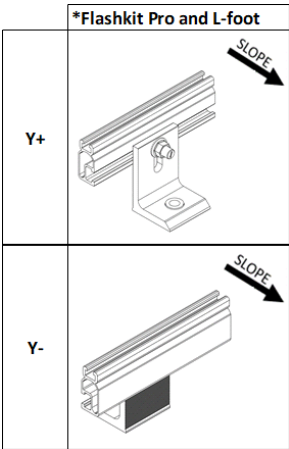


Gable Roofs $7^\circ < \theta \leq 27^\circ$



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

Rails can be installed in these possible orientations.



* 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.

[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)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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10 Highlighted cell indicate 3-rail system span. 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																																													
			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								
60	B	0-7	Interior	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64					
			Exposed	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64			
		7-20	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65		
			Exposed	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65		
		20-27	Interior	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*		
			Exposed	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*		
		27-45	Interior	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*		
			Exposed	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*		
	C	0-7	Interior	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64		
			Exposed	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64		
		7-20	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	
			Exposed	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65		
		20-27	Interior	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*		
			Exposed	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*	73*		
		27-45	Interior	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	
			Exposed	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*		
	D	0-7	Interior	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68		
			Exposed	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68		
		7-20	Interior	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	
			Exposed	68	68	64	68	68	68	68	68	67	57	68	63	54	68	60	52	68	57	49	64	55	58	59	51	54	55	57	50	51	54	46	58	50	41	55	47	36	52	43	42	42	42	42	42		
		20-27	Interior	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	68	74	74	64	74	65	59	74	60	55	72	56	51	70	52	58	64	49	55	60	57	52	57	52	57	52	57	52	
			Exposed	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	64	74	74	57	74	57	50	53	59	64	49	54	59	56	51	55	52	47	52	49	43	49	46	49	46	49			
		27-45	Interior	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	
			Exposed	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*		
70	B	0-7	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60		
			Exposed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60		
		7-20	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
			Exposed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60		
		20-27	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	
			Exposed	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79		
		27-45	Interior	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	
			Exposed	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81		
	C	0-7	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60																	

[illegible]

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

[illegible]

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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.

[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)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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0	B	0-7	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98

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

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.

[illegible]

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

[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)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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0	B	0-7	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	9

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

[illegible]

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

[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.

* 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.

Basic Wind Speed (mph)

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

[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.

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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0	B	0-7	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	9

* 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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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]

* 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 = 1.25
Seismic

19 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

SML
Rail Type

UAF
Clamp

L-Foot
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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				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	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98

[illegible]

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]

* 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.

34 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			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	78	78	78	78	78	78	78	78	77	78	78	73	78	78	69	78	77	65	78	75	61	78	67	55	75	61	50	68	56	46	63	52	37	58	48	32	54	43	29
			Exposed	78	78	69	78	77	64	78	73	60	78	68	56	77	64	53	74	61	50	70	57	47	63	52	38	57	47	32	52	40	27	48	34	24	43	30	32	37	27	28
		7-20	Interior	78	78	78	78	78	78	78	78	75	78	78	70	78	78	66	78	75	62	78	71	58	77	63	52	71	57	47	64	52	38	59	48	32	54	41	29	50	34	25
			Exposed	78	78	65	78	74	61	78	69	56	78	64	53	75	60	49	70	57	47	66	53	41	59	48	33	53	39	28	48	33	24	42	29	32	35	25	28	31	34	25
		20-27	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	75	79	78	70	79	75	66	79	67	59	79	60	53	75	55	48	69	50	42	64	46	34	59	38	31
			Exposed	79	79	75	79	77	69	79	73	64	79	68	60	79	64	56	79	60	53	77	56	50	70	51	43	63	45	34	57	35	29	53	31	26	49	27	34	45	24	30
	27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	
		Exposed	79	79	79	79	79	76	79	79	71	79	76	66	78	71	62	75	67	59	71	64	55	63	57	50	57	52	44	52	48	35	48	41	31	40	34	27	34	30	24	
	C	0-7	Interior	78	78	71	78	78	66	78	75	62	78	71	58	78	66	54	76	63	51	73	59	49	65	54	41	59	49	34	54	43	29	50	36	25	46	32	34	40	28	30
			Exposed	78	78	66	78	75	62	51	71	58	47	66	54	43	62	51	37	59	48	33	56	46	30	50	36	26	46	31	33	37	27	29	32	35	25	28	31	22	25	28
		7-20	Interior	78	78	68	78	76	63	78	71	58	78	67	55	77	62	51	73	59	48	69	55	45	61	50	35	55	43	30	50	35	26	46	30	34	37	27	30	32	24	27
			Exposed	77	77	62	51	72	58	48	67	54	42	62	50	35	58	47	32	55	42	29	52	37	27	46	31	34	36	26	29	31	34	25	27	30	22	24	26	29	32	24
20-27		Interior	79	79	77	79	79	72	79	76	67	79	71	62	79	66	58	79	62	55	78	58	52	72	52	46	65	47	36	60	39	31	55	33	27	51	29	24	47	26	32	
		Exposed	79	79	66	58	79	61	54	77	57	50	73	53	47	69	50	41	65	47	35	61	42	32	55	33	27	50	28	35	46	25	31	37	32	27	32	29	24	25	24	
D	0-7	Interior	79	79	79	79	79	77	79	79	74	79	77	69	79	74	65	77	70	61	74	66	57	66	59	52	59	54	47	54	49	38	49	44	33	44	37	29	36	32	25	
		Exposed	79	74	64	76	69	60	72	64	56	67	60	52	62	56	49	59	53	46	55	50	41	50	45	33	43	36	28	34	31	24	30	27	32	26	36	29	24	32	25	
	7-20	Interior	78	76	63	78	72	59	78	67	55	76	63	52	72	59	49	68	56	46	65	53	40	58	48	33	53	41	28	49	34	24	43	30	32	36	26	28	32	35	25	
		Exposed	72	59	48	67	55	44	63	52	38	59	49	33	56	46	30	53	40	28	50	36	25	44	30	32	35	26	28	31	34	24	27	30	21	36	26	19	32	28	16	
	20-27	Interior	78	73	60	78	68	56	77	63	52	73	59	49	69	55	45	64	52	38	61	49	34	54	41	29	49	33	25	43	29	32	35	25	28	30	34	25	27	30	22	
		Exposed	68	55	45	63	51	37	59	48	33	55	43	29	52	37	27	49	33	24	46	30	34	35	25	29	30	33	24	26	29	21	34	25	19	30	22	16	27	20	15	
10	B	0-7	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77		
			Exposed	77	77	75	77	77	69	77	73	64	77	68	60	77	64	56	77	60	53	77	56	50	70	51	43	63	45	34	57	35	29	53	31	26	49	27	34	45	24	30
		7-20	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
			Exposed	78	78	65	78	74	61	78	69	56	78	64	53	75	60	49	70	57	47	66	53	41	59	48	33	53	39	28	48	33	24	42	29	32	35	25	28	31	34	25
		20-27	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
			Exposed	79	79	75	79	77	69	79	73	64	79	68	60	79	64	56	79	60	53	77	56	50	70	51	43	63	45	34	57	35	29	53	31	26	49	27	34	45	24	30
	C	0-7	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	
			Exposed	78	78	69	78	77	64	78	73	60	78	68	56	77	64	53	74	61	50	70	57	47	63	52	38	57	47	32	52	40	27	48	34	24	43	30	32	37	27	28
		7-20	Interior	78	78	68	78	76	63	78	71	58	78	67	55	77	62	51	73	59	48	69	55	45	61	50	35	55	43	30	50	35	26	46	30	34	37	27	30	32	24	27
			Exposed	77	77	62	51	72	58	48	67	54	42	62	50	35	58	47	32	55	42	29	52	37	27	46	31	34	36	26	29	31	34	25	27	30	22	24	26	29	32	24
		20-27	Interior	79	79	77	79	79	72	79	76	67	79	71	62	79	66	58	79	62	55	77	58	52	72	52	46	65	47	36	60	39	31	55	33	27	51	29	24	47	26	32
			Exposed	79	79	66	58	79	61	54	77	57	50	73	53	47	69	50	41	65	47	35	61	42	32	55	33	27	50	28	35	46	25	31	37	32	27	32	29	24	25	24
D	0-7	Interior	79	79	79	79	79	77	79	79	74	79	77	69	79	74	65	77	70	61	74	66	57	66	59	52	59	54	47	54	49	38	49	44	33	44	37	29	36	32	25	
		Exposed	79	74	64	76	69	60	72	64	56	67	60	52	62	56	49	59	53	46	55	50	41	50	45	33	43	36	28	34	31	24	30	27	32	26	36	29	24	32	25	
	7-20	Interior	78	76	63	78	72	59	78	67	55	76	63	52	72	59	49	68	56	46	65	53	40	58	48	33	53	41	28	49	34	24	43	30	32	36	26	28	32	35	25	
		Exposed	72	59	48	67	55	44	63	52	38	59	49	33	56	46	30	53	40	28	50	36	25	44	30	32	35	26	28	31	34	24	27	30	21	36	26	19	32	28	16	
	20-27	Interior	78	73	60	78	68	56	77	63	52	73	59	49	69	55	45	64	52	38	61	49	34	54	41	29	49	33	25	43	29	32	35	25	28	30	34	25	27	30	22	
		Exposed	68	55	45	63	51	37	59	48	33	55	43	29	52	37	27	49	33	24	46	30	34	35	25	29	30	33	24	26	29	21	34	25	19	30	22	16	27	20	15	
20	B	0-7	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77			
			Exposed	77	77	75	77																																			

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

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.

* 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					
0	B	0-7	Interior	98	98	98	98	98	98	98	98	97	98	98	92	98	98	88	98	97	84	98	93	81	98	87	75	93	81	67	87	76	62	82	70	58	78	64	54	73	60	51		
			Exposed	98	98	88	98	96	83	98	92	79	98	87	76	97	84	71	93	80	66	89	77	63	83	70	58	77	64	54	71	59	50	65	55	47	61	52	54	57	49	51		
		7-20	Interior	98	98	98	98	98	98	98	98	94	98	98	89	98	85	98	94	81	98	90	77	97	82	69	90	76	62	83	69	58	78	63	54	72	59	51	65	56	48			
			Exposed	98	98	84	98	93	80	98	88	76	98	83	70	93	79	65	89	76	62	85	71	59	78	63	54	71	58	50	64	54	47	59	51	42	56	48	51	53	44	48		
		20-27	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	94	98	98	89	98	94	85	98	86	78	98	80	71	94	74	64	88	65	59	83	61	56	79	58	53			
			Exposed	98	98	93	98	97	88	98	92	83	98	87	79	98	83	75	98	79	70	96	76	65	89	66	60	82	61	55	77	57	51	71	53	48	65	50	45	61	47	52		
	27-45	Interior	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	96	99	92	99	93	85	95	87	79	88	81	73	82	76	65	77	71	61	71	65	58				
		Exposed	99	99	99	99	99	95	99	99	99	90	99	95	85	99	90	82	94	86	78	90	83	75	82	77	66	76	70	61	68	63	56	63	59	53	59	56	50	55	52	47		
	C	0-7	Interior	98	98	90	98	98	85	98	94	81	98	90	78	98	86	74	95	82	69	91	79	65	85	73	59	79	66	55	74	61	51	67	57	48	63	53	44	59	50	52		
			Exposed	98	86	74	94	82	68	90	78	63	86	74	60	82	69	57	79	65	55	76	62	52	68	57	48	62	53	43	58	49	51	54	46	48	51	53	44	48	50	39		
		7-20	Interior	98	98	87	98	95	82	98	90	78	98	86	73	96	82	68	92	78	64	87	75	61	80	65	56	74	60	52	66	56	48	61	52	44	57	49	52	54	46	49		
			Exposed	96	81	67	90	77	63	86	72	59	81	66	57	77	63	54	74	60	51	68	57	49	61	53	45	57	49	51	53	45	48	50	52	44	47	49	39	42	46	35		
20-27		Interior	98	98	96	98	98	91	98	94	86	98	89	81	98	85	77	98	81	74	98	78	68	91	69	61	85	63	57	79	58	53	74	54	49	67	51	46	63	48	42			
		Exposed	98	85	77	98	80	72	97	76	65	92	71	62	88	65	59	84	62	56	81	59	54	75	55	50	66	51	46	61	47	53	57	42	49	54	51	46	51	48	42			
27-45	Interior	99	99	99	99	99	98	99	99	92	99	97	88	99	93	84	97	89	80	92	85	77	88	81	73	84	78	68	77	71	61	69	64	57	63	59	56	50	55	52	47	52	49	42
	Exposed	99	92	84	95	88	79	90	83	75	86	80	70	81	76	65	78	72	62	74	67	59	68	63	57	64	61	54	60	57	50	56	53	47	52	49	46	51	46	54	48			
D	0-7	Interior	98	96	83	98	91	79	98	87	75	96	83	69	91	79	65	88	76	62	84	72	59	78	65	54	72	60	50	65	56	47	61	52	54	57	49	50	54	46	48			
		Exposed	91	79	65	87	75	61	83	70	58	79	65	55	76	62	52	71	59	50	67	57	48	61	52	54	57	48	50	53	44	47	49	52	44	46	49	37	53	46	38			
	7-20	Interior	98	92	79	98	87	75	97	82	68	92	78	64	87	75	61	83	69	58	80	64	55	73	59	51	64	55	47	60	51	42	56	48	51	52	44	47	49	52	44			
		Exposed	87	74	61	82	68	57	78	63	54	74	60	52	68	57	49	64	55	47	61	52	44	56	48	51	52	43	47	48	51	42	45	48	37	52	44	39	49	39	29			
	20-27	Interior	98	96	87	98	91	82	96	86	78	96	82	74	96	78	68	94	74	64	90	68	61	84	62	56	78	57	52	72	53	48	65	50	45	61	47	52	57	42	49			
		Exposed	96	78	68	93	72	63	89	66	60	84	62	57	81	59	54	77	57	52	74	54	49	65	50	45	60	46	52	56	53	48	52	49	44	49	46	39	46	42	35			
27-45	Interior	99	99	94	99	98	89	99	93	84	97	89	80	92	85	77	88	81	73	84	78	68	77	71	61	69	64	57	63	59	53	59	56	50	55	52	47	52	49	42				
	Exposed	92	85	77	87	81	71	82	77	65	78	72	62	74	67	59	68	63	57	64	61	54	59	56	50	55	52	46	51	48	53	48	44	49	44	52	46	52	49	42				
10	B	0-7	Interior	91	91	91	91	91	91	91	91	91	91	91	91	88	91	88	91	84	91	91	81	91	87	75	91	81	67	87	76	62	82	70	58	78	64	54	73	60	51			
			Exposed	91	91	88	91	91	83	91	91	79	91	87	76	91	84	71	91	80	66	89	77	63	83	70	58	77	64	54	71	59	50	65	55	47	61	52	54	57	49	51		
		7-20	Interior	91	91	91	91	91	91	91	91	91	91	91	89	91	85	91	91	81	91	90	77	91	82	69	90	76	62	83	69	58	78	63	54	72	59	51	65	56	48			
			Exposed	91	91	84	91	91	80	91	88	76	91	83	70	91	79	65	89	76	62	85	71	59	78	63	54	71	58	50	64	54	47	59	51	42	56	48	51	53	44	48		
		20-27	Interior	95	95	95	95	95	95	95	95	95	95	95	95	95	94	95	95	89	95	94	85	95	86	78	95	80	71	94	74	64	88	65	59	83	61	56	79	58	53			
			Exposed	95	95	93	95	95	88	95	92	83	95	87	79	95	83	75	95	79	70	95	76	65	89	66	60	82	61	55	77	57	51	71	53	48	65	50	45	61	47	52		
	27-45	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	96	98	98	92	98	93	85	95	87	79	88	81	73	82	76	65	77	71	61	71	65	58			
		Exposed	98	98	98	98	98	95	98	98	90	98	98	95	85	98	90	82	94	86	78	90	83	75	82	77	66	76	70	61	68	63	56	63	59	53	59	56	50	55	52	47		
	C	0-7	Interior	91	91	90	91	91	85	91	91	81	91	90	78	91	86	74	91	82	69	91	79	65	85	73	59	79	66	55	74	61	51	67	57	48	63	53	44	59	50	52		
			Exposed	91	86	74	91	82	68	90	78	63	86	74	60	82	69	57	79	65	55	76	62	52	68	57	48	62	53	43	58	49	51	54	46	48	51	53	44	48	50	39		
		7-20	Interior	91	91	87	91	91	82	91	90	78	91	86	73	91	82	68	91	78	64	87	75	61	80	65	56	74	60	52	66	56	48	61	52	44	57	49	52	54	46	49		
			Exposed	91	81	67	90	77	63	86	72	59	81	66	57	77	63	54	74	60	51	68	57	49	61	53	45	57	49	51	53	45	48	50	52	44	47	49	39	42	46	35		
20-27		Interior	95	95	95	95	95	91	95	94	86	95	89	81	95	85	77	95	81	74	95	78	68	91	69	61	85	63	57	79	58	53	74	54	49	67	51	46	63	48	42			
		Exposed	95	85	77	95	80	72	95	76	65	92	71	62	88	65	59	84	62	56	81	59	54	75	55	50	66	51	46	61	47	53	57	42	49	54	51	46	51	48	42			
27-45	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	96	98	98	92	98	93	85	95	87	79	88	81	73	82	76	65	77	71	61	71	65	58				
	Exposed	98	92																																									

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.

* 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	1	2	3																																				
0	B	0-7	Interior	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83																																	
			Exposed	83	83	73	83	80	68	83	77	64	83	73	60	81	69	56	78	65	53	75	62	50	68	56	45	62	51	38	56	47	33	52	41	29	48	36	25	44	32	34	34	34	34	34	34	34	34																																
		7-20	Interior	83	83	83	83	83	81	83	83	78	83	83	75	83	81	70	83	78	66	83	75	62	80	67	55	75	61	50	68	55	46	62	51	39	57	47	34	53	41	30	41	30	41	30	41	30	41	30																															
			Exposed	83	81	70	83	77	64	83	73	60	81	68	56	78	64	53	75	60	50	70	57	47	63	51	39	57	46	34	52	39	29	47	34	25	41	30	34	37	27	30	30	30	30	30	30	30	30																																
		20-27	Interior	84	84	84	84	84	84	84	84	84	84	84	81	84	84	78	84	81	75	84	78	70	84	71	63	83	64	57	78	58	52	74	54	47	68	49	41	63	46	37	47	37	37	37	37	37	37	37																															
			Exposed	84	84	78	84	80	74	84	76	68	84	72	64	84	68	60	83	64	56	80	60	53	75	54	48	67	49	41	62	42	35	57	37	31	52	33	27	49	29	36	44	26	32	32	32	32	32																																
	27-45	Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84																																	
		Exposed	84	84	82	84	84	79	84	82	75	84	79	71	81	76	67	78	72	63	75	68	59	67	61	53	61	56	48	55	51	42	51	47	37	47	41	33	41	36	29	41	36	29	41	36	29																																		
	C	0-7	Interior	83	83	76	83	82	71	83	79	66	83	75	62	82	71	58	79	67	55	77	64	52	73	60	49	69	57	47	63	52	39	57	47	33	52	41	29	48	36	25	43	32	34	38	28	30	34	36																															
			Exposed	82	71	58	79	66	54	75	62	51	71	58	48	67	55	44	63	52	40	60	50	36	54	44	31	49	37	26	45	32	34	39	28	30	34	25	27	30	33	24	34	24	34	24	34																																		
		7-20	Interior	83	83	72	83	79	67	83	75	62	83	71	58	79	66	55	76	63	52	73	59	49	65	53	41	59	48	35	54	41	31	49	36	27	44	32	36	39	28	32	36	39	28	32	36	39	28																																
			Exposed	79	66	55	76	62	51	71	57	47	66	54	42	62	51	38	58	48	35	55	44	32	49	37	27	43	31	35	37	27	30	32	36	27	29	32	34	25	28	24	24	24	24	24	24																																		
20-27		Interior	84	84	79	84	82	76	84	78	71	84	75	66	84	70	62	84	66	58	82	62	55	79	59	52	76	55	49	69	50	42	62	44	36	57	37	31	52	33	27	49	29	36	44	26	32																																		
		Exposed	84	70	62	84	65	57	80	61	54	77	57	50	74	53	47	69	50	42	66	47	39	59	40	33	54	34	28	49	29	24	44	26	32	39	34	28	34	30	25	30	31	25	30	31	25																																		
27-45	Interior	84	84	84	84	84	80	84	84	77	84	80	74	83	77	69	80	74	83	77	69	80	75	65	77	70	61	70	63	55	63	58	50	57	53	46	52	49	39	48	44	34	43	38	31	31	31																																		
	Exposed	83	77	69	79	73	64	75	69	60	71	64	56	66	61	53	62	57	50	59	54	47	53	49	37	53	41	37	29	36	32	26	32	28	24	28	24	28	24	28	24	28	24	28	24	28																																			
D	0-7	Interior	78	80	68	83	76	63	83	72	59	80	68	55	77	64	52	73	60	49	69	57	47	63	52	39	57	47	33	52	41	29	48	36	25	43	32	34	38	28	30	34	36	39	28	32	36	39	28																																
		Exposed	76	64	52	72	59	49	68	56	45	64	52	40	60	50	36	57	47	33	54	43	30	49	36	26	42	31	33	37	27	29	32	35	25	28	31	22	25	28	20	24	24	24	24	24																																			
	7-20	Interior	83	77	64	83	72	59	80	67	55	77	63	52	73	59	49	68	56	46	64	52	41	58	47	35	52	40	38	55	26	41	30	34	36	27	30	32	36	27	30	32	36	27	30	32	36	27																																	
		Exposed	73	59	49	67	55	44	63	51	39	59	48	35	55	44	32	52	39	29	49	36	27	42	31	34	36	26	29	31	34	25	27	30	32	36	26	26	32	24	17	17	17	17	17																																				
	20-27	Interior	84	80	73	84	76	67	84	71	63	84	66	59	82	62	55	79	59	52	76	55	49	69	50	42	62	44	36	57	37	31	52	33	27	49	29	36	44	26	32	32	32	32	32	32	32																																		
		Exposed	81	62	55	78	58	51	74	54	48	70	50	43	65	47	39	62	43	35	58	39	32	53	33	27	48	28	35	42	25	31	36	32	27	32	29	24	29	25	24	24	24	24	24	24																																			
27-45	Interior	84	84	78	84	81	75	83	78	70	80	75	65	77	70	61	73	66	58	69	63	55	62	57	49	56	52	43	51	47	37	47	41	33	40	36	29	36	32	25	30	36	32	25	30	36	32	25																																	
	Exposed	77	70	61	72	65	57	67	61	53	63	57	50	59	54	47	55	51	42	52	48	39	47	41	33	40	35	28	34	31	24	30	27	32	26	36	29	36	32	25	30	36	32	25																																					
10	B	0-7	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78																																	
			Exposed	78	78	73	78	78	68	78	77	64	78	73	60	78	68	56	78	64	53	75	60	50	70	57	47	63	51	39	57	46	34	52	39	29	47	34	25	41	30	34	37	27	30	30	30	30	30																																
		7-20	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78																															
			Exposed	78	78	70	78	77	64	78	73	60	78	68	56	78	64	53	75	60	50	70	57	47	63	51	39	57	46	34	52	39	29	47	34	25	41	30	34	37	27	30	30	30	30	30	30	30	30																																
		20-27	Interior	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81																																	
			Exposed	81	81	78	81	80	74	81	76	68	81	72	64	81	68	60	81	64	56	80	60	53	75	54	48	67	49	41	62	42	35	57	37	31	52	33	27	49	29	36	44	26	32	32	32	32																																	
	27-45	Interior	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83																																	
		Exposed	83	83	82	83	83	79	83	82	75	83	79	71	81	76	67	78	72	63	75	68	59	67	61	53	61	56	48	55	51	42	51	47	37	47	41	33	41	36	29	41	36	29	41	36	29																																		
	C	0-7	Interior	78	78	76	78	78	71	78	78	66	78	75	62	78	71	58	78	67	55	77	64	52	73	60	49	69	57	47	63	52	39	57	47	33	52	41	29	48	36	25	43	32	34	38	28	30	34	36																															
			Exposed	78	71	58	78	66	54	75	62	51	71	58	48	67	55	44	63	52	40	60	50	36	54	44	31	49	37	26	45	32	34	39	28	30	34	25	27	30	33	24	34	24	34	24	34																																		
		7-20	Interior	78	78	72	78	67	78	75	62	78	71	58	78	66	55	76	63	52	73	59	49	65	53	41	59	48	35	54	41	31	49	36	27	44	32	36	39	28	32	36	39	28	32	36	39	28																																	
			Exposed	78	66	55	76	62	51	71	57	47	66	54	42	62	51	38	58	48	35																																																												

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]

* 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.



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

SML
Rail Type

UAF
Clamp

L-Foot
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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
0	B	0-7	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98</

[illegible]

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.

* 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							
0	B	0-7	Interior	78	78	78	78	78	78	78	78	77	78	78	73	78	78	69	78	77	65	78	75	61	78	67	55	75	61	50	68	56	46	63	52	37	58	48	32	54	43	29	
			Exposed	78	78	69	78	77	64	78	73	60	78	68	56	77	64	53	74	61	50	70	57	47	63	52	38	57	47	32	52	40	27	48	34	24	43	30	32	37	27	28	
		7-20	Interior	78	78	78	78	78	78	78	75	78	78	70	78	78	66	78	75	62	78	71	58	77	63	52	71	57	47	64	52	38	59	48	32	54	41	29	50	34	25		
			Exposed	78	78	65	78	74	61	78	69	56	78	64	53	75	60	49	70	57	47	66	53	41	59	48	33	53	39	28	48	33	24	42	29	32	35	25	28	31	34	25	
		20-27	Interior	79	79	79	79	79	79	79	79	79	79	79	78	79	79	75	79	78	70	79	75	66	79	67	59	79	60	53	75	55	48	69	50	42	64	46	34	59	38	31	
			Exposed	79	79	75	79	77	69	79	73	64	79	68	60	79	64	56	79	60	53	77	56	50	70	51	43	63	45	34	57	35	29	53	31	26	49	27	34	45	24	30	
	27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	77	79	73	79	75	65	76	68	59	69	62	54	63	57	50	58	53	46	53	49	38		
		Exposed	79	79	79	79	79	76	79	79	71	79	76	66	78	71	62	75	67	59	71	64	55	63	57	50	57	52	44	52	48	35	48	41	31	40	34	27	34	30	24		
	C	0-7	Interior	78	78	71	78	78	66	78	75	62	78	71	58	78	66	54	76	63	51	73	59	49	65	54	41	59	49	34	54	43	29	50	36	25	46	32	34	40	28	30	
			Exposed	78	66	54	75	62	51	71	58	47	66	54	43	62	51	37	59	48	33	56	46	30	50	36	26	46	31	33	37	27	29	32	35	25	28	31	22	25	28	29	
		7-20	Interior	78	78	68	78	76	63	78	71	58	78	67	55	77	62	51	73	59	48	69	55	45	61	50	35	55	43	30	50	35	26	46	30	34	37	27	30	32	24	27	
			Exposed	77	62	51	72	58	48	67	54	42	62	50	35	58	47	32	55	42	29	52	47	31	34	25	27	30	34	25	27	30	22	24	26	29	32	24	17				
20-27		Interior	79	79	77	79	79	72	79	76	67	79	71	62	79	66	58	79	62	55	78	58	52	72	52	46	65	47	36	60	39	31	55	33	27	51	29	24	47	26	32		
		Exposed	79	66	58	79	61	54	77	57	50	73	53	47	69	50	41	65	47	35	61	42	32	55	33	27	50	28	35	46	25	31	37	32	27	32	29	24	25	24			
27-45	Interior	79	79	79	79	79	77	79	79	74	79	77	69	79	74	65	77	70	61	74	66	57	66	59	52	59	54	47	54	49	38	49	44	33	44	37	29	36	32	25			
	Exposed	79	74	64	76	69	60	72	64	56	67	60	52	62	56	49	59	53	46	55	50	41	56	45	32	43	36	28	34	31	24	30	27	32	26	36	29	24	32	25			
D	0-7	Interior	78	76	63	78	72	59	78	67	55	76	63	52	72	59	49	68	56	46	65	53	40	58	48	33	53	41	28	49	34	24	43	30	32	36	26	28	32	35	25		
		Exposed	72	59	48	67	55	44	63	52	38	59	49	33	56	46	30	53	40	28	50	36	25	44	30	32	35	26	28	31	34	24	27	30	21	36	26	19	32	28	16		
	7-20	Interior	78	73	60	78	68	56	77	63	52	73	59	49	69	55	45	64	52	38	61	49	34	54	41	29	49	33	25	43	29	32	35	25	28	30	34	25	27	30	22		
		Exposed	68	55	45	63	51	37	59	48	33	55	43	29	52	37	27	49	33	24	46	30	34	35	25	29	30	33	24	26	29	34	25	19	30	22	16	27	20	15			
	20-27	Interior	79	77	69	79	72	63	79	67	59	79	62	55	78	58	52	75	55	49	72	52	46	64	47	35	58	36	30	53	31	26	49	27	34	44	24	30	37	32	27		
		Exposed	78	58	51	75	54	48	70	50	43	65	47	36	61	42	32	58	36	29	55	33	27	49	28	34	43	24	30	35	31	26	30	27	22	27	24	26	24	19			
27-45	Interior	79	79	75	79	78	70	79	75	65	77	70	61	74	66	57	69	62	54	65	59	51	58	53	46	52	48	41	31	40	34	27	34	30	24	30	27	32					
	Exposed	74	66	57	68	61	53	63	57	50	59	54	47	55	50	41	52	48	35	49	44	32	41	35	27	33	30	36	29	26	31	25	34	27	33	30	24	30	27	24			
10	B	0-7	Interior	72	72	72	72	72	72	72	72	72	72	72	72	69	72	72	65	72	72	61	72	67	55	72	61	50	68	56	46	63	52	37	58	48	32	54	43	29			
			Exposed	72	72	69	72	72	64	72	72	60	72	68	56	72	64	53	72	61	50	70	57	47	63	52	38	57	47	32	52	40	27	48	34	24	43	30	32	37	27	28	
		7-20	Interior	73	73	73	73	73	73	73	73	73	73	73	73	73	73	66	73	73	62	73	71	58	73	63	52	71	57	47	64	52	38	59	48	32	54	41	29	50	34	25	
			Exposed	73	73	65	73	73	61	73	69	56	73	64	53	73	60	49	70	57	47	66	53	41	59	48	33	53	39	28	48	33	24	42	29	32	35	25	28	31	34	25	
		20-27	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	75	77	77	77	77	67	59	77	60	53	75	55	48	69	50	42	64	46	34	59	38	31
			Exposed	77	77	75	77	77	69	77	73	64	77	68	60	77	64	56	77	60	53	77	56	50	70	51	43	63	45	34	57	35	29	53	31	26	49	27	34	45	24	30	
	27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	77	78	78	73	78	75	65	76	68	59	69	62	54	63	57	50	58	53	46	53	49	38		
		Exposed	78	78	78	78	78	76	78	78	71	78	76	66	78	71	62	75	67	59	71	64	55	63	57	50	57	52	44	52	48	35	48	41	31	40	34	27	34	30	24		
	C	0-7	Interior	72	72	71	72	72	66	72	72	62	72	71	58	72	66	54	72	63	51	72	59	49	65	54	41	59	49	34	54	43	29	50	36	25	46	32	34	40	28	30	
			Exposed	72	66	54	72	62	51	71	58	47	66	54	43	62	51	37	59	48	33	56	46	30	50	36	26	46	31	33	37	27	29	32	35	25	28	31	22	25	28	29	
		7-20	Interior	73	73	68	73	73	63	73	71	58	73	67	55	73	62	51	73	59	48	69	55	45	61	50	35	55	43	30	50	35	26	46	30	34	37	27	30	32	24	27	
			Exposed	73	62	51	72	58	48	67	54	42	62	50	35	58	47	32	55	42	29	52	47	31	34	25	27	30	34	25	27	30	22	24	26	29	32	24	17				
20-27		Interior	77	77	77	77	77	72	77	76	67	77	71	62	77	66	58	77	62	55	77	58	52	72	52	46	65	47	36	60	39	31	55	33	27	51	29	24	47	26	32		
		Exposed	77	66	58	77	61	54	77	57	50	73	53	47	69	50	41	65	47	35	61	42	32	55	33	27	50	28	35	46	25	31	37	32	27	32	29	24	25	24			
27-45	Interior	78	78	78	78	78	77	78	78	74	78	77	69	78	74	65	77	70	61	74	66	57	66	59	52	59	54	47	54	49	38	49	44	33	44	37	29	36	32	25			
	Exposed	78	74	64	76	69	60	72	64	56	67	60	52	62	56	49	59	53	46	55	50	41	56																				

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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						
0	B	0-7	Interior	98	98	98	98	98	98	98	98	98	97	98	98	98	92	98	98	88	98	97	84	98	93	81	98	87	75	93	81	67	87	76	62	82	70	58	78	64	54	73	60	51	
			Exposed	98	98	88	98	96	83	98	92	79	98	87	76	97	84	71	93	80	66	89	77	63	83	70	58	77	64	54	71	59	50	65	55	47	61	52	54	57	49	51			
		7-20	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	89	98	85	98	94	81	98	90	77	97	82	69	90	76	62	83	69	58	78	63	54	72	59	51	65	56	48		
			Exposed	98	98	84	98	93	80	98	88	76	98	83	70	93	79	65	89	76	62	85	71	59	78	63	54	71	58	50	64	54	47	59	51	42	56	48	51	53	44	48			
		20-27	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	94	98	89	98	94	85	98	86	78	98	80	71	94	74	64	88	65	59	83	61	56	79	58	53				
			Exposed	98	98	93	98	97	88	98	92	83	98	87	79	98	83	75	98	79	70	96	76	65	89	66	60	82	61	55	77	57	51	71	53	48	65	50	45	61	47	52			
	C	27-45	Interior	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99				
			Exposed	99	99	99	99	99	95	99	99	99	99	95	85	99	90	82	94	86	78	90	83	75	82	77	66	76	70	61	68	63	56	63	59	53	59	56	50	55	52	47			
		0-7	Interior	98	98	90	98	98	85	98	94	81	98	90	78	98	86	74	95	82	69	91	79	65	85	73	59	79	66	55	74	61	51	67	57	48	63	53	44	59	50	52			
			Exposed	98	86	74	94	82	68	90	78	63	86	74	60	82	69	57	79	65	55	76	62	52	68	57	48	62	53	43	58	49	51	54	46	48	51	53	44	48	50	39			
		7-20	Interior	98	98	87	98	95	82	98	90	78	98	86	73	96	82	68	92	78	64	87	75	61	80	65	56	74	60	52	66	56	48	61	52	44	57	49	52	54	46	49			
			Exposed	96	81	67	90	77	63	86	72	59	81	66	57	77	63	54	74	60	51	68	57	49	61	53	45	57	49	51	53	45	48	50	52	44	47	49	39	42	46	35			
10	B	0-7	Interior	98	98	96	98	98	91	98	94	86	98	89	81	98	85	77	98	81	74	98	78	68	94	74	64	90	68	61	84	62	56	78	57	52	72	53	48	65	50	45	61	47	52
			Exposed	98	85	77	98	80	72	97	76	65	92	71	62	88	65	59	84	62	56	81	59	54	75	55	50	66	51	46	61	47	53	57	42	49	54	51	46	51	48	42			
		7-20	Interior	99	99	94	99	98	89	99	93	84	97	89	80	92	85	77	88	81	73	84	78	68	77	71	61	69	64	57	63	59	53	59	56	50	55	52	47	52	49	42			
			Exposed	92	85	77	87	81	71	82	77	65	78	72	62	74	67	59	68	63	57	64	61	54	59	56	50	55	52	46	51	48	53	48	44	49	44	52	46	52	49	42			
		20-27	Interior	91	91	91	91	91	91	91	91	91	91	91	91	91	91	88	91	91	81	91	91	90	77	91	82	69	90	76	62	83	69	58	78	63	54	72	59	51	65	56	48		
			Exposed	91	91	84	91	91	80	91	88	76	91	83	70	91	79	65	89	76	62	85	71	59	78	63	54	71	58	50	64	54	47	59	51	42	56	48	51	53	44	48			
	C	27-45	Interior	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95				
			Exposed	95	95	93	95	95	88	95	92	83	95	87	79	95	83	75	95	79	70	95	76	65	89	66	60	82	61	55	77	57	51	71	53	48	65	50	45	61	47	52			
		0-7	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98		
			Exposed	98	92	84	95	88	79	90	83	75	86	80	70	81	76	65	78	92	62	74	67	59	68	63	57	64	61	54	59	56	50	55	52	46	51	46	54	48	42				
		D	27-45	Interior	91	91	83	91	91	79	91	87	75	91	83	69	91	79	65	88	76	62	84	72	59	78	65	54	72	60	50	65	56	47	61	52	54	57	49	50	54	46	48		
				Exposed	91	79	65	87	75	61	83	70	58	79	65	55	76	62	52	71	59	50	67	57	48	61	52	54	57	48	50	53	44	47	49	52	44	46	49	37	53	46	33		
0-7	Interior		91	91	79	91	87	75	91	82	68	91	78	64	87	75	61	83	69	58	80	64	55	73	59	51	64	55	47	60	51	42	56	48	51	52	44	47	49	52	44				
	Exposed		87	74	61	82	68	57	78	63	54	74	60	52	68	57	49	64	55	47	61	52	44	56	48	51	52	43	47	48	51	42	45	48	37	52	44	32	49	39	29				
7-20	Interior		96	96	87	96	91	82	96	86	78	96	82	74	96	78	68	94	74	64	90	68	61	84	62	56	78	57	52	72	53	48	65	50	45	61	47	52	57	42	49				
	Exposed		96	78	68	93	72	63	89	66	60	84	62	57	81	59	54	77	57	52	74	54	49	65	50	45	60	46	52	56	53	48	52	49	44	49	46	39	46	42	35				
20	B	27-45	Interior	99	99	94	99	98	89	99	93	84	97	89	80	92	85	77	88	81	73	84	78	68	77	71	61	69	64	57	63	59	53	59	56	50	55	52	47	52	49	42			
			Exposed	92	85	77	87	81	71	82	77	65	78	72	62	74	67	59	68	63	57	64	61	54	59	56	50	55	52	46	51	48	53	48	44	49	44	52	46	52	49	42			
		0-7	Interior	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83			
			Exposed	83	83	83	83	83	83	83	83	79	83	83	76	83	83	71	83	80	66	83	77	63	83	70	58	77	64	54	71	59	50	65	55	47	61	52	54	57	49	51			
		7-20	Interior	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83			
			Exposed	83	83	83	83	83	83	83	83	80	83	83	76	83	83	70	83	79	65	83	76	62	83	71	59	78	63	54	71	58	50	64	54	47	59	51	53	44	48				
	C	20-27	Interior	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88				
			Exposed	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88				
		27-45	Interior	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91			
			Exposed	91	91	84	91	91	88	79	90	83	75	86	80	70	81	76	65	78	92	62	74	67	59	68	63	57	64	61	54	59	56	50	55	52	46	51	46	54	48	42			
		D	27-45	Interior	83	83	83	83	83	79	83	83	75	83	83	69	83	79	65	83	76	62	83	72	59	78	65	54	72	60	50	65	56	47	61	52	54	57	49	50	54	46	48		
				Exposed	83	79	65	83	75	61	83	70	58	79	65	55	76	62	52	71																									

[illegible]

10 Highlighted cell indicate 3-rail system span. 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.

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