

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

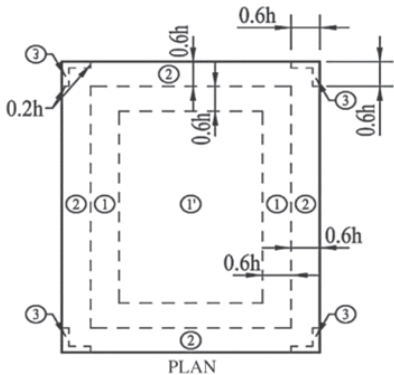
- 0.2-s Spectral Response Acceleration
- $S_s = 1.25$ and 3 with $S_{ds} = 1, 2.4$ respectively per criteria shown on individual span tables sheets.
- $S_1 = 0.5$ & $S_{d1} = 0.6$
- Seismic site class D

Array Assumptions

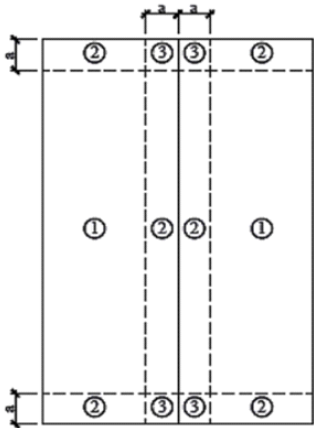
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at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

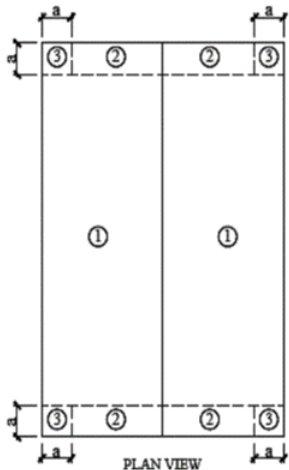
Zone should be considered as per ASCE 7-22, Fig. 30.3-2A to 30.3-2D



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

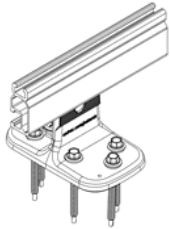


Gable Roofs $7^\circ < \theta \leq 27^\circ$



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

Rails can be installed in these possible orientations.

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

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	47	47	45	47	47	39	47	47	35	47	47	31	47	41	28	47	37	26	47	34	23	39	28	20	33	24	17	29	21	14	25	18	13	22	16	11	19	14	10	12	9	10	12	9	10																																																																																																															
			Exposed	47	41	28	47	36	25	46	32	22	40	29	20	36	26	18	33	24	16	30	21	15	25	18	13	21	15	11	18	13	9	16	12	12	14	10	11	12	9	10	12	9	10																																																																																																																		
		7-20	Interior	47	47	39	47	47	34	47	42	30	47	38	27	47	34	25	43	31	22	39	28	20	33	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9	10	12	9	10																																																																																																																	
			Exposed	47	34	25	42	30	22	37	27	20	33	24	18	30	22	16	27	20	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	11	12	8	10	10	12	8	10	12	8	10																																																																																																																	
		20-27	Interior	48	48	48	48	48	42	48	48	37	48	41	33	48	37	30	48	33	27	48	30	25	46	25	21	38	22	18	33	19	15	28	16	13	25	14	12	22	13	10	12	9	10	12	9	10																																																																																																															
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		7-20	Interior	38	38	38	38	38	34	38	38	30	38	38	27	38	34	25	38	31	22	38	28	20	33	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9	10																																																																																																																				
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	27-45	Interior	47	47	47	47	47	47	47	47	46	47	47	40	47	47	36	47	42	33	43	38	30	36	32	25	30	27	21	26	23	18	23	20	16	20	18	14	18	16	13	10	12	9	10																																																																																																																		
		Exposed	47	47	36	47	41	32	41	36	29	37	33	26	33	30	23	30	27	21	27	25	19	23	21	16	20	18	14	17	15	12	15	13	10	13	12	9	12	10	12	11	9	10																																																																																																																			
	C	0-7	Interior	38	38	30	38	38	26	38	34	24	38	31	21	38	28	19	35	25	17	32	23	16	27	19	13	23	16	11	19	14	10	17	12	9	15	11	11	13	9	10	12	9	10																																																																																																																		
			Exposed	38	27	19	34	24	17	30	22	15	27	20	14	25	18	12	22	16	11	20	15	10	17	12	9	15	11	11	13	9	10	11	12	8	10	11	7	8	9	10	12	9	10																																																																																																																		
		7-20	Interior	38	36	26	38	32	23	38	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	10	16	12	9	14	10	12	12	9	10	11	12	9	10																																																																																																																				
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20-27		Interior	44	39	32	44	34	28	44	31	25	44	28	23	44	25	20	40	23	19	36	21	17	30	17	14	26	15	12	22	13	11	19	11	9	17	10	12	15	9	11	12	9	10																																																																																																																			
		Exposed	44	25	20	39	22	18	35	20	16	31	18	15	28	16	13	25	15	12	23	13	11	19	11	9	17	10	12	14	8	10	12	11	9	11	10	8	10	9	7	6	9	11																																																																																																																			
27-45	Interior	47	47	38	47	43	34	44	38	30	39	35	27	35	31	25	32	28	22	29	26																																																																																																																																										

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.

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		
																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			
				Roof Wind Zone																																																		
90	B	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10													
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10													
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17											
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17											
		20-27	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	19	19	19										
			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	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19											
	C	27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27											
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27											
		0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10											
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10											
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17											
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17											
	D	20-27	Interior	19	19	19	19	1																																														

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	1	2	3												
0	B	0-7	Interior	78	78	78	78	78	68	78	78	59	78	78	53	78	74	48	78	62	43	78	57	39	68	47	33	56	40	28	48	35	24	42	30	21	37	27	19	33	24	17									
			Exposed	78	73	47	78	78	61	42	78	54	38	72	49	34	61	44	31	56	40	28	51	36	26	42	31	22	36	26	18	31	23	16	27	20	14	24	17	18	21	15	16								
		7-20	Interior	78	78	65	78	78	58	78	51	78	63	46	78	57	42	78	52	38	69	47	35	55	40	29	47	34	25	40	29	21	35	25	19	31	22	16	27	20	15										
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			20-27	Interior	79	79	79	79	79	79	79	79	63	79	79	56	79	62	51	79	56	46	79	51	42	79	43	35	64	37	30	55	32	26	48	28	23	42	24	20	37	21	18								
				Exposed	79	62	50	79	55	45	79	49	40	79	44	36	79	40	33	63	36	30	57	33	27	48	28	23	41	24	20	35	21	17	31	18	15	27	16	20	24	14	18								
	C	0-7	Interior	80	80	80	80	80	80	80	80	80	80	75	80	80	61	80	80	55	80	64	50	60	54	42	51	46	36	44	40	31	39	35	27	34	30	24	30	27	21										
			Exposed	80	80	60	80	78	54	80	61	48	62	55	43	56	50	39	51	45	36	46	41	33	39	35	28	33	30	24	29	26	20	25	23	18	22	20	16	20	18	14									
		7-20	Interior	78	78	50	78	64	45	78	57	40	78	52	36	65	47	33	59	42	30	54	38	27	45	32	23	38	28	19	33	24	17	29	21	15	25	18	20	22	16	17									
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10	B	0-7	Interior	78	78	65	78	78	58	78	51	78	63	46	78	57	42	78	52	3																															

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

[illegible]

Highlighted cell indicate 3-rail system span. 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.



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

SML
Rail Type

PRO SERIES
Clamp

Flashloc DUO Plywood
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																																							
0	B	0-7	Interior	39	39	38	39	39	33	39	39	29	39	39	26	39	34	24	39	31	21	39	28	19	33	23	16	28	20	14	24	17	12	21	15	10	18	13	9	16	12	8																																							
			Exposed	39	34	23	39	30	21	39	27	19	34	24	17	30	22	15	27	20	14	25	18	13	21	15	11	18	13	9	15	11	12	13	10	10	12	8	9	10	11	6																																							
		7-20	Interior	39	39	32	39	39	28	39	35	25	39	31	23	39	28	21	36	26	19	33	23	17	27	20	14	23	17	12	20	14	11	17	12	9	15	11	8	13	10	11																																							
			Exposed	39	28	21	35	25	18	31	22	16	28	20	15	25	18	13	23	16	12	21	15	11	17	13	9	15	11	12	13	9	10	11	8	9	10	11	8	9	10	7																																							
		20-27	Interior	40	40	40	40	40	35	40	40	31	40	34	28	40	31	25	40	28	23	40	25	21	38	21	17	32	18	15	27	16	13	24	14	11	21	12	10	18	10	9																																							
			Exposed	40	31	25	40	27	22	40	24	20	40	22	18	35	20	16	31	18	15	28	16	13	24	14	11	20	12	10	17	10	8	15	9	11	13	12	10	12	10	9																																							
	C	0-7	Interior	40	40	40	40	40	40	40	40	38	40	40	33	40	40	30	40	35	27	36	32	25	30	27	21	25	23	18	22	20	15	19	17	13	17	15	12	15	13	10																																							
			Exposed	40	40	30	40	34	27	34	30	24	31	27	21	28	25	19	25	22	18	23	20	16	19	17	14	16	15	12	14	13	10	12	11	9	11	10	12	10	9	10																																							
		7-20	Interior	39	36	25	39	32	22	39	28	20	36	25	18	32	23	16	29	21	15	26	19	13	22	16	11	19	14	9	16	12	8	14	10	11	12	9	10	11	12	8																																							
			Exposed	32	23	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	10	12	8	9	10	7	12	9	6	11	8	5																																								
		20-27	Interior	39	30	22	38	27	19	33	24	17	30	21	16	27	19	14	24	17	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	11	8	9	10	7																																							
			Exposed	27	19	14	24	17	12	21	15	11	19	14	10	17	12	9	16	11	8	14	10	11	12	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5																																								
D	0-7	Interior	40	32	26	40	29	23	40	26	21	40	23	19	37	21	17	33	19	15	30	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10	12	11	9																																								
		Exposed	37	21	17	32	18	15	29	16	14	26	15	12	23	13	11	21	12	10	19	11	9	16	9	10	12	10	18	11	9	10	9	8	9	8	7	8	7	6																																									
	7-20	Interior	40	40	32	40	36	28	37	32	25	32	29	23	29	26	21	27	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	11																																								
		Exposed	29	26	20	26	23	18	23	21	16	21	19	15	19	17	13	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	10	8	12	9	11	10	8	10	9	7																																						
	20-27	Interior	39	30	21	37	26	18	33	23	16	29	21	15	26	19	13	24	17	12	22	16	11	18	13	9	16	11	12	13	9	10	11	8	9	10	11	8	9	10	7																																								
		Exposed	26	19	13	23	17	12	21	15	10	19	13	9	17	12	9	15	11	12	14	10	11	12	8	9	10	11	8	9	10	7	11	8	6	10	7	5	9	6	4																																								
10	B	0-7	Interior	32	32	32	32	32	32	32	29	32	32	26	32	32	24	32	31	21	32	28	19	32	23	16	28	20	14	24	17	12	21	15	10	18	13	9	16	12	8																																								
			Exposed	32	32	32	32	30	21	32	27	19	32	24	17	30	22	15	27	20	14	25	18	13	21	15	11	18	13	9	15	11	12	13	10	10	12	8	9	10	11	6																																							
		7-20	Interior	32	32	32	32	32	28	32	32	25	32	31	23	32	28	21	32	26	19	32	23	17	27	20	14	23	17	12	20	14	11	17	12	9	15	11	8	13	10	11																																							
			Exposed	32	28	21	32	25	18	31	22	16	28	20	15	25	18	13	23	16	12	21	15	11	17	13	9	15	11	12	13	9	10	11	8	9	10	11	8	9	10	7																																							
		20-27	Interior	37	37	37	37	35	37	37	31	37	34	28	37	31	25	37	28	23	37	25	21	37	21	17	32	18	15	27	16	13	24	14	11	21	12	10	18	10	9																																								
			Exposed	37	31	25	37	27	22	37	24	20	37	22	18	35	20	16	31	18	15	28	16	13	24	14	11	20	12	10	17	10	8	15	9	11	13	12	10	12	10	9																																							
	C	0-7	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	27	36	32	25	30	27	21	25	23	18	22	20	15	19	17	13	17	15	12	15	13	10																																							
			Exposed	39	39	30	39	34	27	34	30	24	31	27	21	28	25	19	25	22	18	23	20	16	19	17	14	16	15	12	14	13	10	12	11	9	11	10	12	10	9	10																																							
		7-20	Interior	32	32	25	32	32	22	32	28	20	32	25	18	32	23	16	29	21	15	26	19	13	22	16	11	19	14	9	16	12	8	14	10	11	12	9	10	11	12	8																																							
			Exposed	32	23	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	10	12	8	9	10	7	12	9	6	11	8	5																																								
		20-27	Interior	32	30	22	32	27	19	32	24	17	30	21	16	27	19	14	24	17	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	11	8	9	10	7																																							
			Exposed	27	19	14	24	17	12	21	15	11	19	14	10	17	12	9	16	11	8	14	10	11	12	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5																																								
D	0-7	Interior	37	32	26	37	29	23	37	26	21	37	23	19	37	21	17	33	19	15	30	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10	12	11	9																																								
		Exposed	37	21	17	32	18	15	29	16	14	26	15	12	23	13	11	21	12	10	19	11	9	16	9	10	12	10	18	11	9	10	9	8	9	8	7	8	7	6																																									
	7-20	Interior	39	39	32	39	36	28	37	32	25	32	29	23	29	26	21	27	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	11																																								
		Exposed	29	26	20	26	23	18	23	21	16	21	19	15	19	17	13	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	10	8	12	9	11	10	8	10	9	7																																						
	20-27	Interior	32	30	21	32	26	18	32	23	16	29	21	15	26	19	13	24	17	12	22	16	11	18	13	9	16	11	12	13	9	10	11	8	9	10	11	8	9	10	7																																								
		Exposed	26	19	13	23	17	12	21	15	10	19	13	9	17	12	9	15	11	12	14	10	11	12	8	9	10	11	8	9	10	7	11	8	6	10	7	5	9	6	4																																								
20	B	0-7	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	23	23	23																																									
			Exposed	23	23	23	23	23	21	23	23	19	23	23	17	23	22	15	23	20	14	23	18	13	21	15	11	18	13	9	15	11	12	13	10	12	8	9	10	11	6																																								
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24																																								
			Exposed	24	24	21	24	24	18	24	22	16	24	20	15	24	18	13	23	16	12	21	15	11	17	13	9	15	11	12	13	9	10	11	8	9	10	11	8	9	10	7																																							
		20-27	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	29	29	29																																								
			Exposed	29	29	25	29	27	22	29	24	20	29	22	18	29	20	16	29	18	15	28	16	13																																																									

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.

[illegible]

* 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	76	76	76	76	76	65	76	76	58	76	76	52	76	70	47	76	61	42	76	55	39	65	46	32	55	40	28	47	34	24	41	30	21	36	26	18	32	23	16	
			Exposed	76	70	46	76	59	41	76	53	37	69	48	33	60	43	30	54	39	27	49	36	25	41	30	21	35	26	18	30	22	16	27	19	21	23	17	18	21	23	16	
		7-20	Interior	76	76	64	76	76	56	76	76	50	76	62	45	76	56	41	76	51	37	64	46	34	54	39	29	46	33	24	39	29	21	34	25	18	30	22	16	27	19	14	
			Exposed	76	56	41	76	49	36	62	44	32	55	40	29	50	36	26	45	33	24	41	30	22	35	25	19	30	21	16	26	19	21	22	16	18	20	22	16	17	19	14	
		20-27	Interior	77	77	77	77	77	77	77	77	77	61	77	77	55	77	61	50	77	55	45	77	50	41	77	42	35	63	36	29	54	31	25	47	27	22	41	24	20	36	21	17
			Exposed	77	60	49	77	54	44	77	48	39	77	43	35	76	39	32	62	35	29	56	32	27	47	27	22	40	23	19	35	20	17	30	18	14	26	15	19	23	21	17	
	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	59	79	71	53	79	60	47	60	54	42	55	49	38	50	44	35	45	40	32	38	34	27	33	29	23	28	25	20	25	22	17	22	19	15	19	17	21		
	C	0-7	Interior	76	76	49	76	63	44	76	56	39	76	50	35	64	46	32	58	41	29	52	38	26	44	32	22	37	27	19	32	23	16	28	20	22	25	18	19	22	16	17	
			Exposed	63	45	32	56	40	28	50	36	25	45	32	23	41	29	21	37	27	19	34	24	17	28	21	22	24	18	19	21	15	16	18	20	14	16	18	14	22	16	14	
		7-20	Interior	76	59	43	76	52	38	66	47	34	59	42	31	53	38	28	48	35	25	44	32	23	37	27	20	31	23	17	27	20	14	24	17	19	21	15	17	18	20	15	
			Exposed	53	38	28	47	34	25	42	30	22	38	27	20	34	25	18	31	22	17	28	20	15	26	19	21	23	17	19	20	15	17	18	19	14	15	17	18	14	9		
20-27		Interior	77	64	52	77	57	46	77	51	42	77	46	37	77	41	34	66	37	31	60	34	28	50	29	24	43	25	20	37	21	18	32	19	15	28	16	20	25	14	18		
		Exposed	77	41	34	64	37	30	57	33	27	51	29	24	46	27	22	42	24	20	38	22	18	32	19	15	28	16	20	24	21	17	21	18	15	18	16	14	12	14			
27-45	Interior	79	79	63	79	79	56	79	63	50	64	57	45	58	52	41	53	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	20	16	20	18	14			
	Exposed	58	51	40	51	46	36	46	41	32	41	37	29	37	26	34	30	24	31	28	22	26	24	19	22	20	16	19	17	21	17	15	18	15	20	16	20	18	14				
D	0-7	Interior	76	58	41	76	52	36	65	46	32	58	42	29	52	38	26	47	34	24	43	31	22	36	26	18	31	22	16	27	19	21	23	17	18	20	13	16	18	20	14		
		Exposed	52	37	26	46	33	23	41	30	21	37	27	19	34	24	17	31	22	16	28	20	15	26	19	21	23	17	19	20	15	17	18	19	14	15	17	18	14	9			
	7-20	Interior	76	49	36	60	43	32	54	39	28	48	35	26	44	32	23	40	29	21	36	26	19	30	22	16	26	19	21	22	16	18	20	22	16	17	19	14	15	17	12		
		Exposed	43	31	23	39	28	21	35	25	18	31	23	17	28	20	15	26	19	21	23	17	19	20	14	16	17	19	14	15	16	12	19	14	10	17	12	9	15	11	8		
	20-27	Interior	77	53	43	77	47	38	77	42	34	68	38	31	60	34	28	54	31	26	49	28	23	41	24	20	35	20	17	30	18	15	26	15	19	23	21	17	21	18	15		
		Exposed	59	34	28	53	30	25	47	27	22	42	24	20	38	22	18	35	20	17	32	18	15	27	16	19	23	20	17	20	17	14	17	15	14	15	19	23	21	17			
27-45	Interior	79	68	52	70	59	46	59	52	41	53	47	37	48	43	34	44	39	31	40	36	28	34	30	24	29	26	20	25	22	18	22	19	15	19	17	20	17	15	18			
	Exposed	48	43	34	42	38	30	38	34	27	34	31	24	31	28	22	28	25	20	26	23	18	22	20	15	19	17	20	16	22	17	14	19	15	19	17	18	17	15	12			
10	B	0-7	Interior	62	62	62	62	62	62	62	58	62	62	52	62	62	47	62	61	42	62	55	39	62	46	32	55	40	28	47	34	24	41	30	21	36	26	18	32	23	16		
			Exposed	62	62	46	62	59	41	62	53	37	62	48	33	60	43	30	54	39	27	49	36	25	41	30	21	35	26	18	30	22	16	27	19	21	23	17	18	21	23	16	
		7-20	Interior	62	62	62	62	62	56	62	62	50	62	62	45	62	56	41	62	51	37	62	46	34	54	39	29	46	33	24	39	29	21	34	25	18	30	22	16	27	19	14	
			Exposed	62	56	41	62	49	36	62	44	32	55	40	29	50	36	26	45	33	24	41	30	22	35	25	19	30	21	16	26	19	21	22	16	18	20	22	16	17	19	14	
		20-27	Interior	71	71	71	71	71	71	71	71	71	61	71	71	55	71	61	50	71	55	45	71	50	41	71	42	35	63	36	29	54	31	25	47	27	22	41	24	20	36	21	17
			Exposed	71	60	49	71	54	44	71	48	39	71	43	35	71	39	32	62	35	29	56	32	27	47	27	22	40	23	19	35	20	17	30	18	14	26	15	19	23	21	17	
	27-45	Interior	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76		
		Exposed	76	76	59	76	71	53	76	60	47	60	54	42	55	49	38	50	44	35	45	40	32	38	34	27	33	29	23	28	25	20	25	22	17	22	19	15	19	17	21		
	C	0-7	Interior	62	62	49	62	62	44	62	56	39	62	50	35	62	46	32	58	41	29	52	38	26	44	32	22	37	27	19	32	23	16	28	20	22	25	18	19	22	16	17	
			Exposed	62	45	32	56	40	28	50	36	25	45	32	23	41	29	21	37	27	19	34	24	17	28	21	22	24	18	19	21	15	16	18	20	14	16	18	14	22	16	14	
		7-20	Interior	62	59	43	62	52	38	62	47	34	59	42	31	53	38	28	48	35	25	44	32	23	37	27	20	31	23	17	27	20	14	24	17	19	21	15	17	18	20	15	
			Exposed	53	38	28	47	34	25	42	30	22	38	27	20	34	25	18	31	22	17	28	20	15	26	19	21	23	17	19	20	15	17	18	19	14	15	17	18	14	9		
20-27		Interior	71	64	52	71	57	46	71	51	42	71	46	37	71	41	34	66	37	31	60	34	28	50	29	24	43	25	20	37	21	18	32	19	15	28	16	20	25	14	18		
		Exposed	71	41	34	64	37	30	57	33	27	51	29	24	46	27	22	42	24	20	38	22	18	32	19	15	28	16	20	24	21	17	21	18	15	18	16	14	12	14			
27-45	Interior	76	76	63	76	76	56	76	63	50	64	57	45	58	52	41	53	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	20	16	20	18	14			
	Exposed	58	51	40	51	46	36	46	41	32	41	37	29	37	26																												

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	1	2	3	1	2	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
30	B	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37

[illegible]

* Cells with an asterisk indicates that the L-root 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.

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	47	47	45	47	47	39	47	47	35	47	47	31	47	41	28	47	37	26	47	34	23	39	28	20	33	24	17	29	21	14	25	18	13	22	16	11	19	14	10	12	9	10																																				
			Exposed	47	41	28	47	36	25	46	32	22	40	29	20	36	26	18	33	24	16	30	21	15	25	18	13	21	15	11	18	13	9	16	12	12	14	10	11	12	9	10																																							
		7-20	Interior	47	47	39	47	47	34	47	42	30	47	38	27	47	34	25	43	31	22	39	28	20	33	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9	10																																						
			Exposed	47	34	25	42	30	22	37	27	20	33	24	18	30	22	16	27	20	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	11	12	8	10	10	12	8																																							
		20-27	Interior	48	48	48	48	48	42	48	48	37	48	41	33	48	37	30	48	33	27	48	30	25	46	25	21	38	22	18	33	19	15	28	16	13	25	14	12	22	13	10																																							
			Exposed	48	37	30	48	32	27	48	29	24	48	26	21	41	24	19	37	21	18	34	20	16	29	16	14	24	14	12	21	12	10	18	11	9	16	9	12	14	8	10																																							
	27-45	Interior	48	48	48	48	48	48	48	48	48	46	48	48	40	48	48	36	48	42	33	43	38	30	36	32	25	30	27	21	26	23	18	23	20	16	20	18	14	18	16	13																																							
		Exposed	48	48	36	48	41	32	41	36	29	37	33	26	33	30	23	30	27	21	27	25	19	23	21	16	20	18	14	17	15	12	15	13	10	13	12	9	12	10	12	11	9																																						
	C	0-7	Interior	47	43	30	47	38	26	47	34	24	43	31	21	39	28	19	35	25	17	32	23	16	27	19	13	23	16	11	19	14	10	17	12	9	15	11	11	13	9	10																																							
			Exposed	38	27	19	34	24	17	30	22	15	27	20	14	25	18	12	22	16	11	20	15	10	17	12	9	15	11	11	13	9	10	11	12	8	10	11	7	8	9	7																																							
		7-20	Interior	47	36	26	46	32	23	40	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	10	16	12	9	14	10	12	12	9	10	11	12	9	10																																						
			Exposed	32	23	17	28	20	15	25	18	13	23	16	12	21	15	11	19	14	10	17	12	9	14	10	11	12	9	10	11	12	9	9	10	7	12	9	7	11	8	6																																							
20-27		Interior	48	39	32	48	34	28	48	31	25	48	28	23	45	25	20	40	23	19	36	21	17	30	17	14	26	15	12	22	13	11	19	11	9	17	10	12	15	9	11																																								
		Exposed	44	25	20	39	22	18	35	20	16	31	18	15	28	16	13	25	15	12	23	13	11	19	11	9	17	10	12	14	8	10	12	11	9	11	10	8	10	9	7																																								
27-45	Interior	48	48	38	48	43	34	44	38	30	39	35	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9																																									
	Exposed	35	31	24	31	28	22	28	25	20	25	22	18	23	20	16	21	18	15	19	17	13	16	14	11	14	12	10	12	10	8	10	9	11	9	12	10	12	11	9																																									
D	0-7	Interior	47	35	25	45	31	22	39	28	20	35	25	18	32	23	16	29	21	14	26	19	13	22	16	11	19	13	9	16	12	8	14	10	11	12	9	10	11	12	8																																								
		Exposed	32	23	16	28	20	14	25	18	13	23	16	11	20	15	10	18	13	9	17	12	9	14	10	11	12	9	10	11	8	13	10	11	12	8	10	10	11	8	9	10	7																																						
	7-20	Interior	41	30	22	37	26	19	33	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	10	16	11	8	13	10	11	12	8	10	10	11	8	9	10	7																																								
		Exposed	26	19	14	23	17	12	21	15	11	19	14	10	17	12	9	15	11	8	14	10	11	12	9	10	10	11	8	9	10	7	12	8	6	10	7	6	9	7	5																																								
	20-27	Interior	48	32	26	48	28	23	46	25	21	40	23	19	36	21	17	33	19	15	30	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	12	10	12	11	9																																								
		Exposed	36	21	17	32	18	15	28	16	13	26	15	12	23	13	11	21	12	10	19	11	9	16	9	12	14	12	10	12	10	9	8	9	8	7	12	7	6																																										
27-45	Interior	47	40	31	40	36	28	36	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	15	12	15	13	11	13	12	9	11	10	12	10	9	11																																									
	Exposed	29	26	20	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	10	8	12	9	11	10	8	10	9	7																																									
10	B	0-7	Interior	38	38	38	38	38	38	38	38	35	38	38	31	38	38	28	38	37	26	38	34	23	38	28	20	33	24	17	29	21	14	25	18	13	22	16	11	19	14	10	12	9	10																																				
			Exposed	38	38	28	38	36	25	38	32	22	38	29	20	36	26	18	33	24	16	30	21	15	25	18	13	21	15	11	18	13	9	16	12	12	14	10	11	12	9	10																																							
		7-20	Interior	38	38	38	38	38	34	38	38	30	38	38	27	38	34	25	38	31	22	38	28	20	33	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9	10																																						
			Exposed	38	34	25	38	30	22	37	27	20	33	24	18	30	22	16	27	20	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	11	12	8	10	10	12	8																																							
		20-27	Interior	44	44	44	44	44	42	44	44	37	44	41	33	44	37	30	44	33	27	44	30	25	44	25	21	38	22	18	33	19	15	28	16	13	25	14	12	22	13	10																																							
			Exposed	44	37	30	44	32	27	44	29	24	44	26	21	41	24	19	37	21	18	34	20	16	29	16	14	24	14	12	21	12	10	18	11	9	16	9	12	14	8	10																																							
	27-45	Interior	47	47	47	47	47	47	47	47	46	47	47	40	47	47	36	47	42	33	43	38	30	36	32	25	30	27	21	26	23	18	23	20	16	20	18	14	18	16	13																																								
		Exposed	47	47	36	47	41	32	41	36	29	37	33	26	33	30	23	30	27	21	27	25	19	23	21	16	20	18	14	17	15	12	15	13	10	13	12	9	12	10	12	11	9																																						
	C	0-7	Interior	38	38	30	38	38	26	38	34	24	38	31	21	38	28	19	35	25	17	32	23	16	27	19	13	23	16	11	19	14	10	17	12	9	15	11	11	13	9	10																																							
			Exposed	38	27	19	34	24	17	30	22	15	27	20	14	25	18	12	22	16	11	20	15	10	17	12	9	15	11	11	13	9	10	11	12	8	10	11	7	8	9	7																																							
		7-20	Interior	38	36	26	38	32	23	38	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	10	16	12	9	14	10	12	12	9	10	11	12	9	10																																						
			Exposed	32	23	17	28	20	15	25	18	13	23	16	12	21	15	11	19	14	10	17	12	9	14	10	11	12	9	10	11	12	9	9	10	7	12	9	7	11	8	6																																							
20-27		Interior	44	39	32	44	34	28	44	31	25	44	28	23	44	25	20	40	23	19	36	21	17	30	17	14	26	15	12	22	13	11	19	11	9	17	10	12	15	9	11																																								
		Exposed	44	25	20	39	22	18	35	20	16	31	18	15	28	16	13	25	15	12	23	13	11	19	11	9	17	10	12	14	8	10	12	11	9	11	10	8	10	9	7																																								

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]

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.

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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* Cells with an asterisks 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.

[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 = 3.00
Seismic

23 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

SML
Rail Type

PRO SERIES
Clamp

Flashloc DUO Plywood
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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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-root 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.



ASCE 7-22
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

23 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

SML
Rail Type

PRO SERIES
Clamp

Flashloc DUO Plywood
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	76	76	76	76	76	65	76	76	58	76	76	52	76	70	47	76	61	42	76	55	39	65	46	32	55	40	28	47	34	24	41	30	21	36	26	18	32	23	16		
			Exposed	76	70	46	76	59	41	76	53	37	69	48	33	60	43	30	54	39	27	49	36	25	41	30	21	35	26	18	30	22	16	27	19	21	23	17	18	21	23	16		
		7-20	Interior	76	76	64	76	76	56	76	76	50	76	62	45	76	56	41	76	51	37	64	46	34	54	39	29	46	33	24	39	29	21	34	25	18	30	22	16	27	19	14		
			Exposed	76	56	41	76	49	36	62	44	32	55	40	29	50	36	26	45	33	24	41	30	22	35	25	19	30	21	16	26	19	21	22	16	18	20	22	16	17	19	14		
		20-27	Interior	77	77	77	77	77	77	77	77	77	77	61	77	77	55	77	61	50	77	55	45	77	50	41	77	42	35	63	36	29	54	31	25	47	27	22	41	24	20	36	21	17
			Exposed	77	60	49	77	54	44	77	48	39	77	43	35	76	39	32	62	35	29	56	32	27	47	27	22	40	23	19	35	20	17	30	18	14	26	15	19	23	21	17		
	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	79		
		Exposed	79	79	59	79	71	53	79	60	47	60	54	42	55	49	38	50	44	35	45	40	32	38	34	27	33	29	23	28	25	20	25	22	17	22	19	15	19	17	21			
	C	0-7	Interior	76	76	49	76	63	44	76	56	39	76	50	35	64	46	32	58	41	29	52	38	26	44	32	22	37	27	19	32	23	16	28	20	22	25	18	19	22	16	17		
			Exposed	63	45	32	56	40	28	50	36	25	45	32	23	41	29	21	37	27	19	34	24	17	28	21	22	24	18	19	21	15	16	18	20	14	16	18	18	18	18			
		7-20	Interior	76	59	43	76	52	38	66	47	34	59	42	31	53	38	28	48	35	25	44	32	23	37	27	20	31	23	17	27	20	14	24	17	19	21	15	17	18	20	15		
			Exposed	53	38	28	47	34	25	42	30	22	38	27	20	34	25	18	31	22	17	28	20	15	24	17	19	20	15	17	18	19	14	15	17	18	20	15	17	18	18	18		
		20-27	Interior	77	64	52	77	57	46	77	51	42	77	46	37	77	41	34	66	37	31	60	34	28	50	29	24	43	25	20	37	21	18	32	19	15	28	16	20	25	14	18		
			Exposed	77	41	34	64	37	30	57	33	27	51	29	24	46	27	22	42	24	20	38	22	18	32	19	15	28	16	20	24	21	17	21	18	15	18	16	16	14	12			
	27-45	Interior	79	79	63	79	79	56	79	63	50	64	57	45	58	52	41	53	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	20	16	20	18	14			
		Exposed	58	51	40	51	46	36	46	41	32	41	37	29	37	33	26	34	30	24	31	28	22	26	24	19	22	20	16	19	17	21	17	15	18	15	20	16	20	18	14			
D	0-7	Interior	76	58	41	76	52	36	65	46	32	58	42	29	52	38	26	47	34	24	43	31	22	36	26	18	31	22	16	27	19	21	23	17	18	20	23	16	18	20	14			
		Exposed	52	37	26	46	33	23	41	30	21	37	27	19	34	24	17	31	22	16	28	20	15	26	19	21	23	17	18	20	22	16	17	19	14	15	17	18	20	14				
	7-20	Interior	76	49	36	60	43	32	54	39	28	48	35	26	44	32	23	40	29	21	36	26	19	30	22	16	26	19	21	22	16	18	20	22	16	17	19	14	15	17	12			
		Exposed	43	31	23	39	28	21	35	25	18	31	23	17	28	20	15	26	19	21	23	17	19	20	14	16	17	19	14	15	16	12	19	14	10	17	12	9	15	11	8			
	20-27	Interior	77	53	43	77	47	38	77	42	34	68	38	31	60	34	28	54	31	26	49	28	23	41	24	20	35	20	17	30	18	15	26	15	19	23	21	17	21	18	15			
		Exposed	59	34	28	53	30	25	47	27	22	42	24	20	38	22	18	35	20	17	32	18	15	27	16	19	23	20	17	20	17	14	17	15	13	15	13	11	10	12				
27-45	Interior	79	68	52	70	59	46	59	52	41	53	47	37	48	43	34	44	39	31	40	36	28	34	30	24	29	26	20	25	22	18	22	19	15	19	17	20	17	15	18				
	Exposed	48	43	34	42	38	30	38	34	27	34	31	24	31	28	22	28	25	20	26	23	18	22	20	15	19	17	20	16	22	17	14	19	15	19	17	13	17	15	12				
10	B	0-7	Interior	62	62	62	62	62	62	62	62	58	62	52	62	62	47	62	61	42	62	55	39	62	46	32	55	40	28	47	34	24	41	30	21	36	26	18	32	23	16			
			Exposed	62	62	46	62	59	41	62	53	37	62	48	33	60	43	30	54	39	27	49	36	25	41	30	21	35	26	18	30	22	16	27	19	21	23	17	18	21	23	16		
		7-20	Interior	62	62	62	62	62	56	62	62	50	62	62	45	62	56	41	62	51	37	62	46	34	54	39	29	46	33	24	39	29	21	34	25	18	30	22	16	27	19	14		
			Exposed	62	56	41	62	49	36	62	44	32	55	40	29	50	36	26	45	33	24	41	30	22	35	25	19	30	21	16	26	19	21	22	16	18	20	22	16	17	19	14		
		20-27	Interior	71	71	71	71	71	71	71	71	61	71	71	55	71	61	50	71	55	45	71	50	41	71	42	35	63	36	29	54	31	25	47	27	22	41	24	20	36	21	17		
			Exposed	71	60	49	71	54	44	71	48	39	71	43	35	71	39	32	62	35	29	56	32	27	47	27	22	40	23	19	35	20	17	30	18	14	26	15	19	23	21	17		
	27-45	Interior	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76			
		Exposed	76	76	59	76	71	53	76	60	47	60	54	42	55	49	38	50	44	35	45	40	32	38	34	27	33	29	23	28	25	20	25	22	17	22	19	15	19	17	21			
	C	0-7	Interior	62	62	49	62	62	44	62	56	39	62	50	35	62	46	32	58	41	29	52	38	26	44	32	22	37	27	19	32	23	16	28	20	22	25	18	19	22	16	17		
			Exposed	62	45	32	56	40	28	50	36	25	45	32	23	41	29	21	37	27	19	34	24	17	28	21	22	24	18	19	21	15	16	18	20	14	16	18	18	18				
		7-20	Interior	62	59	43	62	52	38	62	47	34	59	42	31	53	38	28	48	35	25	44	32	23	37	27	20	31	23	17	27	20	14	24	17	19	21	15	17	18	20	15		
			Exposed	53	38	28	47	34	25	42	30	22	38	27	20	34	25	18	31	22	17	28	20	15	24	17	19	20	15	17	18	19	14	15	17	18	20	15	17	18	18			
		20-27	Interior	71	64	52	71	57	46	71	51	42	71	46	37	71	41	34	66	37	31	60	34	28	50	29	24	43	25	20	37	21	18	32	19	15	28	16	20	25	14	18		
			Exposed	71	41	34	64	37	30	57	33	27	51	29	24	46	27	22	42	24	20	38	22	18	32	19	15	28	16	20	24	21	17	21	18	15	18	16	16	14	12			
	27-45	Interior	76	76	63	76	76	56	76	63	50	64	57	45	58	52	41	53	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	20	16	20	18	14			
		Exposed	58	51	40	51	46	36	46	41	322																																	

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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[illegible]

* Cells with an asterisks 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)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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0	B	0-7	Interior	47	47	40	47	47	36	47	47	32	47	42	29	47	37	26	47	34	24	44	31	21	36	26	18	31	22	15	27	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	6	11	8	9	6	11	8	9	47	37	26	47	33	23	41	29	21	37	26	18	33	24	17	30	22	15	27	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	6	11	8	9	6	11	8	9	44	31	23	38	28	20	34	25	18	31	22	16	28	20	15	25	18	13	23	17	12	19	14	10	16	12	9	14	10	7	12	9	7	11	8	9	10	7	11	8	9	10	7	11	8	9	48	48	43	48	48	38	48	42	34	48	37	31	48	34	28	48	31	25	48	28	23	41	23	19	35	20	16	30	17	14	26	15	12	23	13	11	20	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	15	12	10	18	13	16	

10 Highlighted cell indicate 3-rail system span. 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

19 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

SML
Rail Type

UAF
Clamp

Flashloc DUO Plywood
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									
				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							
90	B	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9					
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9			
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8		
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8		
		20-27	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	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12			
			Exposed	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	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12			
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15			
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15			
	C	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9			
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9			
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8		
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8			
		20-27	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	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12			
			Exposed	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	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12			
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15			
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15			
	D	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10			
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10			
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10		
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10			
		20-27	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	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13			
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13			
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17			
100	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9					
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9						
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9						
		20-27	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10				
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10					
		27-45	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	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13				
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13					
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9					
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9						
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9					
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9						
		20-27	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10				
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10						
		27-45	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	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13					
			Exposed	14	14	14	14																																										

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	61	78	78	54	78	78	48	78	63	44	78	57	40	78	52	36	61	44	31	52	37	26	44	32	22	39	28	20	34	24	17	30	22	15				
			Exposed	78	63	44	78	56	39	78	50	35	62	45	31	56	40	28	51	37	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	15				
		Exposed	78	52	38	65	46	34	58	42	30	52	37	27	47	34	25	42	31	23	39	28	21	33	24	17	28	20	15	24	17	13	21	15	11	18	13	15	16	12	13					
		Exposed	79	57	46	79	50	41	79	45	37	79	40	33	64	37	30	58	33	27	53	30	25	44	26	21	38	22	18	33	19	16	28	17	14	25	15	12	22	13	16					
		Exposed	80	80	56	80	63	49	63	56	44	57	51	40	51	46	36	47	42	33	43	38	30	36	32	25	31	27	22	27	24	19	23	21	16	20	18	14	18	16	15					
		Exposed	59	43	30	53	38	27	47	34	24	42	30	21	38	28	19	35	25	18	32	33	16	27	19	14	23	17	12	20	14	15	17	12	13	15	11	12	13	15	14					
	Exposed	49	36	26	44	32	23	39	28	21	35	26	19	32	23	17	29	21	16	27	19	14	22	16	12	19	14	16	17	12	14	14	16	12	13	14	14	11	12	9						

* 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.

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.

[illegible]

* 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)

[illegible]

* Cells with an astrisks 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.

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	1	2	3	1	2	3																																				
0	B	0-7	Interior	39	39	34	39	39	30	39	39	27	39	35	24	39	31	22	39	28	20	36	26	18	30	22	15	26	18	13	22	16	11	19	14	10	16	12	8	14	10	7	12	9	9	11	7	7																																	
			Exposed	39	31	22	39	28	19	34	25	17	31	22	15	28	20	14	25	18	13	23	16	11	19	14	10	16	12	8	14	10	7	12	9	9	11	8	8	9	7	12	9	6	6																																				
		7-20	Interior	39	39	29	39	36	26	39	32	23	39	29	21	37	26	19	33	24	17	30	21	16	25	18	13	21	15	11	18	13	10	16	11	8	14	10	7	12	9	7	12	9	6	6																																			
			Exposed	37	26	19	32	23	17	29	21	15	26	18	13	23	17	12	21	15	11	19	14	10	16	12	8	14	10	7	12	8	6	10	7	8	9	6	7	8	9	6	7	8	9	6																																			
		20-27	Interior	40	40	36	40	40	32	40	35	28	40	31	25	40	28	23	40	26	21	40	23	19	34	20	16	29	17	14	25	14	12	22	12	10	19	11	9	17	10	8	7	10	8	8																																			
			Exposed	40	28	23	40	25	20	40	22	18	35	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	9	11	6	8	8	7	8																																				
	27-45	Interior	40	40	40	40	40	40	40	40	34	40	40	31	40	35	28	36	32	25	33	29	23	27	24	19	23	21	16	20	18	14	18	16	12	15	14	11	14	12	10	11	14	12	10	8																																			
		Exposed	40	35	27	35	31	24	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	7	9	8	8	6	6																																				
	C	0-7	Interior	39	33	23	39	29	20	37	26	18	33	23	16	29	21	15	27	19	13	24	17	12	20	15	10	17	12	8	14	9	15	11	7	13	9	6	11	8	9	10	7	8	7	8																																			
			Exposed	29	21	15	26	19	13	23	17	12	21	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	9	10	7	7	8	9	6	7	8	6	6	7	5	8	7	5																																				
		7-20	Interior	39	27	20	34	24	18	30	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	14	10	8	12	9	7	11	8	9	9	7	11	8	8	9	7	7	7																																				
			Exposed	24	18	13	22	16	11	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	7	8	9	7	7	8	6	9	7	5	8	6	4	7	5	8	6	4																																		
		20-27	Interior	40	30	24	40	26	22	40	24	19	38	21	17	34	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	9	11	7	13	9	11	7	8																																			
			Exposed	33	19	16	30	17	14	26	15	12	24	14	11	21	12	10	19	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5	8	7	5																																				
	27-45	Interior	40	38	29	38	33	26	33	30	23	30	27	21	27	24	19	24	22	17	22	20	16	20	18	14	18	16	13	16	14	11	13	12	9	11	10	8	10	9	7	9	8	7	8	7	8																																		
		Exposed	27	24	19	24	21	17	21	19	15	19	17	13	17	16	12	16	14	11	14	13	10	12	11	8	10	9	7	9	8	6	8	9	7	7	8	6	9	7	9	8	6	7	5																																				
	D	0-7	Interior	39	27	19	34	24	17	30	21	15	27	19	13	24	17	12	22	16	11	20	14	10	17	12	8	14	10	7	12	9	10	11	8	8	9	7	7	12	9	10	7	8	9	6	6																																		
			Exposed	24	17	12	21	15	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	6	11	8	9	9	7	7	8	9	6	7	7	8	6	9	7	5	8	6	4	7	5	8	6	4																																	
		7-20	Interior	32	23	17	28	20	15	25	18	13	22	16	12	20	15	11	18	13	10	17	12	9	14	10	7	12	9	6	10	7	8	9	6	7	8	9	6	7	8	9	6	7	8	6	6																																		
			Exposed	20	15	11	18	13	9	16	12	8	14	10	8	13	9	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	6	9	6	6	8	6	4	7	5	8	6	4	7	5	8	6	4																																
		20-27	Interior	40	24	20	40	22	18	34	19	16	31	17	14	28	16	13	25	14	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	9	11	6	8	9	8	7																																			
			Exposed	28	16	13	24	14	11	22	13	10	20	11	9	18	10	8	16	9	8	15	8	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	8	6	4	7	5	8	6	4																																
	27-45	Interior	34	31	24	31	27	21	27	24	19	25	22	17	22	20	16	20	18	14	18	16	13	16	14	11	13	12	9	11	10	8	10	9	7	9	8	9	8	7	9	8	7	8	7	8																																			
		Exposed	22	20	16	20	18	14	18	16	12	16	14	11	14	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	6	8	7	5	8	6	7	5																																		
10	B	0-7	Interior	32	32	32	32	32	30	32	32	27	32	32	24	32	31	22	32	28	20	32	26	18	30	22	15	26	18	13	22	16	11	19	14	10	17	12	8	14	10	7	12	9	11	7	7																																		
			Exposed	32	31	22	32	28	19	32	25	17	31	22	15	28	20	14	25	18	13	23	16	11	19	14	10	16	12	8	14	10	7	12	9	9	11	8	8	9	7	12	9	6	6																																				
		7-20	Interior	32	32	29	32	32	26	32	32	23	32	29	21	32	26	19	32	24	17	30	21	16	25	18	13	21	15	11	18	13	10	16	11	8	14	10	7	12	9	7	12	9	6	6																																			
			Exposed	32	26	19	32	23	17	29	21	15	26	18	13	23	17	12	21	15	11	19	14	10	16	12	8	14	10	7	12	8	6	10	7	8	9	6	7	8	9	6	7	8	9	6	6																																		
		20-27	Interior	37	37	36	37	37	32	37	35	28	37	31	25	37	28	23	37	26	21	37	23	19	34	20	16	29	17	14	25	14	12	22	12	10	19	11	9	17	10	8	7	10	8	8																																			
			Exposed	37	28	23	37	25	20	37	22	18	35	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	9	11	6	8	8	7	10	8	8																																		
	27-45	Interior	39	39	39	39	39	39	39	39	39	34	39	39	31	39	35	28	36	32	25	33	29	23	27	24	19	23	21	16	20	18	14	18	16	12	15	14	11	14	12	10	11	14	12	10	8																																		
		Exposed	39	35	27	35	31	24	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	7	9	8	8	6	6																																				
	C	0-7	Interior	32	32	23	32	29	20	32	26	18	32	23	16	29	21	15	27	19	13	24	17	12	20	15	10	17	12	8	14	9	15	11	7	13	9	6	11	8	9	10	7	8	7	8																																			
			Exposed	29	21	15	26	19	13	23	17	12	21	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	9	10	7	7	8	9	6	7	7	8	6	6	7	5	8	6	7	5																																		
		7-20	Interior	32	27	20	32	24	18	30	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	14	10	8	12	9	7	11	8	9	9	7	11	8	8	9	7	7	7																																				
			Exposed	24	18	13	22	16	11	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	7	8	9	7	7	8	6	9	7	5	8	6	4	7	5	8	6	4																																		
		20-27	Interior	37	30	24	37	26	22	37	24	19	37	21	17	34	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	9	11	7	13	9	11	7	8																																			
			Exposed	33	19	16	30	17	14	26	15	12	24	14	11	21	12	10	19	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5	8	7	5																																				
	27-45	Interior	39	38	29	38	33	26	33	30	23	30	27	21	27	24	19	24	22	17	22	20	16	19	17	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.

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[illegible]

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10 Highlighted cell indicate 3-rail system span. 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.



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

SML
Rail Type

UAF
Clamp

Flashloc DUO Plywood
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	47	47	40	47	47	36	47	47	32	47	42	29	47	37	26	47	34	24	44	31	21	36	26	18	31	22	15	27	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	6	11	8	9																														
			Exposed	47	37	26	47	33	23	41	29	21	37	26	18	33	24	17	30	22	15	27	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	6	11	8	9	6	11	8	9	6	11	8	9																															
		7-20	Interior	47	47	35	47	44	31	47	38	28	47	34	25	44	31	23	39	28	21	36	26	19	30	22	16	25	18	13	22	16	12	19	14	10	17	12	9	15	11	7	13	9	6	11	8	9	6	11	8	9																													
			Exposed	44	31	23	38	28	20	34	25	18	31	22	16	28	20	15	25	18	13	23	17	12	19	14	10	16	12	9	14	10	7	12	9	7	11	8	9	10	7	11	8	9	10	7	11	8	9																																
		20-27	Interior	48	48	43	48	48	38	48	42	34	48	37	31	48	34	28	48	31	25	48	28	23	41	23	19	35	20	16	30	17	14	26	15	12	23	13	11	20	12	10	18	13	16	15	12	10																																	
			Exposed	48	34	27	48	30	24	48	27	22	42	24	20	38	22	18	34	20	16	31	18	15	26	15	12	22	13	11	19	11	9	17	10	8	15	8	7	13	7	13	7	9	10	7	13	7	9																																
	27-45	Interior	48	48	48	48	48	48	48	48	41	48	48	37	48	42	33	43	30	30	39	35	27	33	29	23	28	25	20	24	22	17	21	19	15	18	17	13	16	15	12	10	18	13	16	15	12	10																																	
		Exposed	48	42	33	42	37	29	37	33	26	34	30	24	30	24	21	28	25	19	25	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	8	11	9	7	10	8	11	9	7	10																																		
	C	0-7	Interior	47	39	27	47	35	24	44	31	22	39	28	20	35	25	18	32	23	16	29	21	15	24	18	12	21	15	10	18	13	9	16	11	8	14	10	7	12	9	6	11	8	9	6	11	8	9																																
			Exposed	35	25	18	31	22	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	16	11	8	13	10	7	12	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10	7	8																																	
		7-20	Interior	47	33	24	41	29	21	36	26	19	33	23	17	29	21	16	27	19	14	24	18	13	20	15	11	17	13	9	15	11	8	13	9	7	11	8	9	10	7	11	8	9	10	7	11	8	9																																
			Exposed	29	21	15	26	19	14	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10	7	8																																
		20-27	Interior	48	36	29	48	32	26	48	28	23	46	25	21	40	23	19	36	21	17	33	19	16	28	16	13	24	14	11	20	12	10	18	10	8	16	9	7	14	8	6	10	7	14	8	6	10																																	
			Exposed	40	23	19	35	20	17	32	18	15	28	16	13	26	15	12	23	13	11	21	12	10	18	10	8	15	9	7	13	8	10	11	7	8	10	9	7	9	8	6	10	7	9	8	6	10																																	
	27-45	Interior	48	46	35	46	40	31	40	35	28	36	32	25	32	29	23	29	26	21	27	24	19	22	20	16	19	17	14	17	15	12	14	13	10	13	11	9	11	10	8	11	10	8	11	10	8																																		
		Exposed	32	29	23	29	25	20	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	15	13	10	12	11	9	11	10	8	9	8	7	8	7	9	7	9	7	9	7	9	7	9																																			
	D	0-7	Interior	47	32	23	40	29	20	36	26	18	32	23	16	29	21	15	26	19	13	24	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	9	10	7	12	9	6	11	8	9	6	11	8	9																														
			Exposed	29	21	15	26	19	13	23	17	12	21	15	10	19	13	9	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10	7	8																																
		7-20	Interior	38	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	20	15	11	17	12	9	14	10	8	12	9	7	11	8	9	9	7	11	8	8	9	9	7	11	8	8	9	9	7																															
			Exposed	24	17	13	21	16	11	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	7	11	8	9	7	7	8	9	7	7	8	6	9	7	7	8	6	9	7	7																																		
		20-27	Interior	48	29	24	48	26	21	41	23	19	37	21	17	33	19	16	30	17	14	27	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	13	7	9	11	7	13	7	9	11	7	13																																
			Exposed	33	19	16	29	17	14	26	15	12	24	14	11	21	12	10	19	11	9	18	10	8	15	9	7	13	7	9	11	10	8	9	8	7	8	7	6	7	6	7	7	6	7	7	6	7																																	
	27-45	Interior	41	37	29	37	33	26	33	29	23	30	26	21	27	24	19	24	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	7	9	7	9	7	9	7	9	7	9																																
		Exposed	27	24	19	24	21	17	21	19	15	19	17	13	17	15	12	16	14	11	14	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	7	9	7	9	7	9	7	9																																		
10	B	0-7	Interior	38	38	38	38	36	38	38	32	38	38	29	38	37	26	38	34	24	38	31	21	36	26	18	31	22	15	26	19	13	23	16	12	20	14	10	18	13	9	15	11	7	13	9	6	11	8	9	6	11	8	9																											
			Exposed	38	37	26	38	33	23	38	29	21	37	26	18	33	24	17	30	22	15	27	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	6	11	8	9	6	11	8	9	6	11	8	9																															
		7-20	Interior	38	38	35	38	38	31	38	28	38	34	25	38	31	23	38	28	21	36	26	19	30	22	16	25	18	13	22	16	12	19	14	10	17	12	9	15	11	7	13	9	6	11	8	9	6	11	8	9																														
			Exposed	38	31	23	38	28	20	34	25	18	31	22	16	28	20	15	25	18	13	23	17	12	19	14	10	16	12	9	14	10	7	12	9	7	11	8	9	10	7	11	8	9	10	7	11	8	9																																
		20-27	Interior	44	44	43	44	44	38	44	42	34	44	37	31	44	34	28	44	31	25	44	28	23	41	23	19	35	20	16	30	17	14	26	15	12	23	13	11	20	12	10	18	13	16	15	12	10																																	
			Exposed	44	34	27	44	30	24	44	27	22	42	24	20	38	22	18	34	20	16	31	18	15	26	15	12	22	13	11	19	11	9	17	10	8	15	8	7	13	7	13	7	9	10	7	13	7	9																																
	27-45	Interior	47	47	47	47	47	47	47	47	41	47	47	37	47	42	33	43	30	30	39	35	27	33	29	23	28	25	20	24	22	17	21	19	15	18	17	13	16	15	12	10	18	13	16	15	12	10																																	
		Exposed	47	42	33	42	37	29	37	33	26	34	30	24	30	24	21	28	25	19	25	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	8	11	9	7	10	8	11	9	7	10																																		
	C	0-7	Interior	38	38	27	38	35	24	38	31	22	38	28	20	35	25	18	32	23	16	29	21	15	24	18	12	21	15	10	18	13	9	16	11	8	14	10	7	12	9	6	11	8	9	6	11	8	9																																
			Exposed	35	25	18	31	22	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	16	11	8	13	10	7	12	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10	7	8																																	
		7-20	Interior	38	33	24	38	29	21	36	26	19	33	23	17	29	21	16	27	19	14	24	18	13	20	15	11	17	13	9	15	11	8	13	9	7	11	8	9	10	7	11	8	9	10	7	11	8	9																																
			Exposed	29	21	15	26	19	14	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10	7	8	9	10	7	8																																
		20-27	Interior	44	36	29	44	32</																																																																									

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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				90			95			100			105			110			115			120			130			140			150			160			170			180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
				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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
30	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	

[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.

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	78	78	78	78	78	61	78	78	54	78	78	48	78	63	44	78	57	40	78	52	36	61	44	31	52	37	26	44	32	22	39	28	20	34	24	17	30	22	15	15	15	15	15	15	15	15	15	15																														
		Exposed	78	63	44	78	56	39	78	50	35	62	45	31	56	40	28	51	37	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	15	15	15	15	15	15	15	15	15																																
		7-20	Interior	78	78	60	78	78	53	78	65	47	78	58	42	78	53	38	78	48	35	60	43	32	51	37	27	43	31	23	37	27	20	32	23	17	28	21	15	25	18	13	22	16	11	19	14	13																																	
		Exposed	78	52	38	65	46	34	58	42	30	52	37	27	47	34	25	42	31	23	39	28	21	33	24	17	28	20	15	24	17	13	21	15	11	18	13	15	16	12	13	13	13	13	13	13	13	13																																	
		20-27	Interior	79	79	79	79	79	64	79	79	57	79	63	52	79	57	47	79	52	42	79	47	39	79	40	32	59	34	28	50	29	24	44	25	21	38	22	18	34	20	16	16	16	16	16	16	16	16																																
		Exposed	79	57	46	79	50	41	79	45	37	79	40	33	64	37	30	58	33	27	53	30	25	44	26	21	38	22	18	33	19	16	28	17	14	25	15	12	22	13	16	16	16	16	16	16	16	16																																	
	27-45	Interior	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	65	51	80	59	46	55	49	39	47	42	33	41	36	29	36	32	25	31	28	22	28	25	20	20	20	20	20	20	20	20																																		
	Exposed	80	80	56	80	63	49	63	56	44	57	51	40	51	46	36	47	42	33	43	38	30	36	32	25	31	27	22	27	24	19	23	21	16	20	18	14	18	16	13	16	13	16	13	16	13																																			
	C	0-7	Interior	78	69	46	78	59	41	78	53	37	68	47	33	60	43	30	54	39	27	49	35	25	41	30	21	35	25	18	30	22	15	26	19	13	23	17	12	21	15	16	16	16	16	16	16	16	16	16																															
		Exposed	59	43	30	53	38	27	47	34	24	42	30	21	38	28	19	35	25	18	32	23	16	27	19	14	23	17	12	20	14	15	17	12	13	15	11	12	13	15	14	15	14	15	14	15	14	15																																	
		7-20	Interior	78	55	40	78	49	36	61	44	32	55	40	29	50	36	26	45	33	24	41	30	22	35	25	18	29	21	16	25	18	14	22	16	12	19	14	16	17	13	14	16	17	13	14	16	17	13																																
		Exposed	49	36	26	44	32	23	39	28	21	35	26	19	32	23	17	29	21	16	27	19	14	22	16	12	19	14	16	17	12	14	14	16	12	13	14	14	16	11	12	9	11	12	9	11	12	9																																	
20-27		Interior	79	60	49	79	53	44	79	48	39	79	43	35	76	39	32	61	35	29	56	32	26	47	27	22	40	23	19	34	20	16	30	17	14	26	15	13	23	14	11	11	11	11	11	11	11																																		
Exposed		75	39	32	60	34	28	53	31	25	48	28	23	43	25	21	39	23	19	36	21	17	33	19	16	30	17	14	25	15	12	22	13	16	19	11	14	16	13	11	9	11	9	11	9	11	9																																		
27-45	Interior	80	80	59	80	71	52	80	60	47	60	54	42	54	49	38	49	44	35	45	40	32	41	37	29	37	33	26	32	28	22	27	24	19	23	21	17	20	18	14	18	16	13	16	14	11																																			
Exposed	54	48	38	48	43	34	43	39	30	39	35	27	35	32	25	32	29	23	29	26	21	25	22	18	21	19	15	18	16	13	16	14	11	14	13	15	12	11	13	15	12	11	13	15	12	11																																			
D	0-7	Interior	78	55	38	74	49	34	61	43	30	54	39	27	49	35	25	45	32	23	41	29	21	34	25	17	29	21	15	25	18	13	22	16	11	19	14	15	17	12	13	15	17	12	13	15	17	12	13																																
	Exposed	49	35	25	43	31	22	39	28	20	35	25	18	32	23	16	29	21	15	26	19	13	22	16	11	19	14	15	16	12	13	14	16	11	13	14	14	16	11	12	9	11	12	9	11	12	9																																		
	7-20	Interior	64	46	34	56	41	30	50	36	27	45	33	24	41	30	22	37	27	20	34	25	18	29	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12	13	14	16	12	13	14	16																																	
	Exposed	41	30	22	36	26	19	33	24	17	29	21	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	14	15	11	18	13	14	16	12	13	14	16	12	13																																			
	20-27	Interior	79	50	41	79	44	36	79	39	32	62	35	29	56	32	26	51	29	24	46	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	19	11	14	16	19	11	14	16	19																																		
	Exposed	56	32	26	49	28	23	44	26	21	40	23	19	36	21	17	33	19	16	30	17	14	25	15	12	22	13	16	19	11	14	16	14	12	14	13	16	13	11	9	11	9	11	9	11	9																																			
27-45	Interior	80	62	49	62	55	43	55	49	39	50	44	35	45	40	32	41	37	29	37	33	26	32	28	22	27	24	19	23	21	17	20	18	14	18	16	13	16	14	11	11	11	11	11	11	11																																			
Exposed	45	40	32	40	36	28	36	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	15	18	16	12	15	14	11	13	12	14	12	16	13	16	14	11	11	11	11	11	11	11																																				
10	B	0-7	Interior	63	63	63	63	63	61	63	63	54	63	63	48	63	63	44	63	57	40	63	52	36	61	44	31	52	37	26	44	32	22	39	28	20	34	24	17	30	22	15	15	15	15	15	15	15	15	15	15																														
		Exposed	63	63	44	63	56	39	63	50	35	62	45	31	56	40	28	51	37	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	15	15	15	15	15	15	15	15																																	
		7-20	Interior	64	64	60	64	64	53	64	64	47	64	58	42	64	53	38	64	48	35	60	43	32	51	37	27	43	31	23	37	27	20	32	23	17	28	21	15	25	18	13	22	16	11	19	14	13																																	
		Exposed	64	52	38	64	46	34	58	42	30	52	37	27	47	34	25	42	31	23	39	28	21	33	24	17	28	20	15	24	17	13	21	15	11	18	13	15	16	12	13	13	13	13	13	13	13																																		
		20-27	Interior	73	73	73	73	73	64	73	73	57	73	63	52	73	57	47	73	52	42	73	47	39	73	40	32	59	34	28	50	29	24	44	25	21	38	22	18	34	20	16	16	16	16	16	16	16																																	
		Exposed	73	57	46	73	50	41	73	45	37	73	40	33	64	37	30	58	33	27	53	30	25	44	26	21	38	22	18	33	19	16	28	17	14	25	15	12	22	13	16	16	16	16	16	16	16																																		
	27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	62	78	56	78	65	51	78	59	46	55	49	39	47	42	33	41	36	29	36	32	25	31	28	22	28	25	20	20	20	20																																		
	Exposed	78	78	56	78	63	49	63	56	44	57	51	40	51	46	36	47	42	33	43	38	30	36	32	25	31	27	22	27	24	19	23	21	16	20	18	14	18	16	13	16	13	16	13	16																																				
	C	0-7	Interior	63	63	63	63	63	59	61	63	63	53	63	63	47	63	60	43	60	54	39	27	49	35	25	41	30	21	35	25	18	30	22	15	26	19	13	23	17	12	21	15	16	16	16	16	16	16																																
		Exposed	59	43	30	53	38	27	47	34	24	42	30	21	38	28	19	35	25	18	32	23	16	27	19	14	23	17	12	20	14	15	17	12	13	15	11	12	13	15	14	15	14	15	14	15	14	15																																	
		7-20	Interior	64	55	40	64	49	36	61	44	32	55	40	29	50	36	26	45	33	24	41	30	22	35	25	18	29	21	16	25	18	14	22	16	12	19	14	16	17	13	14	16	17	13	14	16	17																																	
		Exposed	49	36	26	44	32	23	39	28	21	35	26	19	32	23	17	29	21	16																																																													

* 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	1	2	3																																				
0	B	0-7	Interior	39	39	34	39	39	30	39	39	27	39	35	24	39	31	22	39	28	20	36	26	18	30	22	15	26	18	13	22	16	11	19	14	10	16	12	8	14	10	7	12	9	9	7	7	7																																	
			Exposed	39	31	22	39	28	19	34	25	17	31	22	15	28	20	14	25	18	13	23	16	11	19	14	10	16	12	8	14	10	7	12	9	9	7	7	7	7	7	7	7	7	7	7	7	7																																	
		7-20	Interior	39	39	29	39	36	26	39	32	23	39	29	21	37	26	19	33	24	17	30	21	16	25	18	13	21	15	11	18	13	10	16	11	8	14	10	7	12	9	7	12	9	7	6	6																																		
			Exposed	37	26	19	32	23	17	29	21	15	26	18	13	23	17	12	21	15	11	19	14	10	16	12	8	14	10	7	12	8	6	10	7	8	9	6	7	8	9	6	7	8	9	6	6																																		
		20-27	Interior	40	40	36	40	40	32	40	35	28	40	31	25	40	28	23	40	26	21	40	23	19	34	20	16	29	17	14	25	14	12	22	12	10	19	11	9	17	10	8	7	10	8	8																																			
			Exposed	40	28	23	40	25	20	40	22	18	35	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	9	11	6	8	7	8	8	8																																			
	C	0-7	Interior	40	40	40	40	40	40	40	40	34	40	40	31	40	35	28	36	32	25	33	29	23	27	24	19	23	21	16	20	18	14	18	16	12	15	14	11	14	12	10	11	14	12	10	8	8																																	
			Exposed	40	35	27	35	31	24	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	7	9	8	6	6																																				
		7-20	Interior	39	33	23	39	29	20	37	26	18	33	23	16	29	21	15	27	19	13	24	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	9	10	7	8	9	7	8	8																																			
			Exposed	29	21	15	26	19	13	23	17	12	21	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	9	10	7	7	8	6	7	8	5	9	6	7	5	8	6	7	5																																			
		20-27	Interior	39	27	20	34	24	18	30	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	14	10	7	12	9	7	11	8	9	9	7	7	8	8	9	7	7	7	7																																			
			Exposed	24	18	13	22	16	11	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	7	7	11	8	9	7	7	8	6	9	7	5	8	6	4	4	4	4																																				
D	0-7	Interior	40	30	24	40	26	22	40	24	19	38	21	17	34	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	9	11	7	8	7	8	7	8																																				
		Exposed	33	19	16	30	17	14	26	15	12	24	14	11	21	12	10	19	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	6	7	7	5																																					
	7-20	Interior	40	38	29	38	33	26	33	30	23	30	27	21	27	24	19	24	22	17	22	20	16	20	18	14	18	16	13	16	14	11	13	12	9	11	10	8	10	9	7	9	8	7	8	7	8																																		
		Exposed	27	24	19	24	21	17	21	19	15	19	17	13	17	16	12	14	11	14	13	10	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	7	8	6	8	7	5	5																																					
	20-27	Interior	39	27	19	34	24	17	30	21	15	27	19	13	24	17	12	22	16	11	20	14	10	17	12	8	14	10	7	12	9	7	11	8	9	9	7	7	8	9	7	7	8	8	9	6																																			
		Exposed	24	17	12	21	15	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	6	11	8	9	7	7	11	8	9	7	7	8	6	7	7	8	5	9	6	7	5	8	6	4																																			
10	B	0-7	Interior	32	32	32	32	30	32	32	27	32	32	24	32	31	22	32	28	20	32	26	18	30	22	15	26	18	13	22	16	11	19	14	10	17	12	8	15	11	7	7	7	7	7	7	7	7																																	
			Exposed	32	31	22	32	28	19	32	25	17	31	22	15	28	20	14	25	18	13	23	16	11	19	14	10	16	12	8	14	10	7	12	9	9	11	8	9	7	8	8	9	7	7	7	7																																		
		7-20	Interior	32	32	29	32	32	26	32	32	29	32	29	21	32	26	19	32	24	17	30	21	16	25	18	13	21	15	11	18	13	10	16	11	8	14	10	7	12	9	7	12	9	6	6																																			
			Exposed	32	26	19	32	23	17	29	21	15	26	18	13	23	17	12	21	15	11	19	14	10	16	12	8	14	10	7	12	8	6	10	7	8	9	6	7	8	9	6	7	8	9	6	6																																		
		20-27	Interior	37	37	36	37	37	32	37	35	28	37	31	25	37	28	23	37	26	21	37	23	19	34	20	16	29	17	14	25	14	12	22	12	10	19	11	9	17	10	8	7	10	8	8																																			
			Exposed	37	28	23	37	25	20	37	22	18	35	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	9	11	6	8	7	8	7	8																																			
	C	0-7	Interior	39	39	39	39	39	39	39	39	34	39	39	31	39	35	28	36	32	25	33	29	23	27	24	19	23	21	16	20	18	14	18	16	12	15	14	11	14	12	10	11	14	12	10	8	8																																	
			Exposed	39	35	27	35	31	24	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	7	9	8	6	6																																				
		7-20	Interior	32	32	23	32	29	20	32	26	18	32	23	16	29	21	15	27	19	13	24	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	9	10	7	8	9	7	7	7																																			
			Exposed	29	21	15	26	19	13	23	17	12	21	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	9	10	7	7	8	6	7	7	8	5	9	6	7	5	8	6	4																																			
		20-27	Interior	32	27	20	32	24	18	30	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	14	10	7	12	9	7	11	8	9	9	7	7	8	8	9	7	7	7	7																																			
			Exposed	24	18	13	22	16	11	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	7	7	11	8	9	7	7	8	6	9	7	5	8	6	4	4	4																																					
D	0-7	Interior	37	30	24	37	26	22	37	24	19	37	21	17	34	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	9	11	7	8	7	8	7	8																																				
		Exposed	33	19	16	30	17	14	26	15	12	24	14	11	21	12	10	19	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	6	7	5																																						
	7-20	Interior	39	38	29	38	33	26	33	30	23	30	27	21	27	24	19	24	22	17	22	20	16	20	18	14	18	16	13	16	14	11	13	12	9	11	10	8	10	9	7	9	8	7	8	7	8																																		
		Exposed	27	24	19	24	21	17	21	19	15	19	17	13	17	16	12	14	11	14	13	10	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	7	8	6	8	7	5	5																																					
	20-27	Interior	32	27	19	32	24	17	30	21	15	27	19	13	24	17	12	22	16	11	20	14	10	17	12	8	14	10	7	12	9	7	11	8	9	9	7	7	8	9	7	7	8	8	9	6																																			
		Exposed	24	17	12	21	15	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	6	11	8	9	7	7	11	8	9	7	7	8	6	7	7	8	5	9	6	7	5	8	6	4																																			
20	B	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	18	23	22	15	23	18	13	22	16	11	19	14	10	17	12	8	15	11	7	7	7	7	7	7	7	7																																		
			Exposed	23	23	22	23	23	19	23	23	17	23	22	15	23	20	14	23	18	13	23	16	11	19	14	10	16	12	8	14	10	7	12	9	9	11	8	9	7	8	8	9	7	7	7																																			
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24																																																					

10 Highlighted cell indicate 3-rail system span. 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]

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[illegible]

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