

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

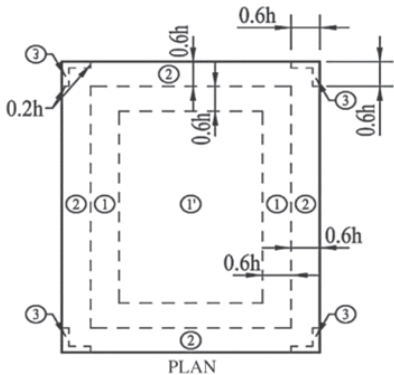
- 0.2-s Spectral Response Acceleration
- $S_S = 1.25$ and 3 with $S_{ds} = 1, 2.4$ respectively per criteria shown on individual span tables sheets.
- $S_1 = 0.5$ & $S_{d1} = 0.6$
- Seismic site class D

Array Assumptions

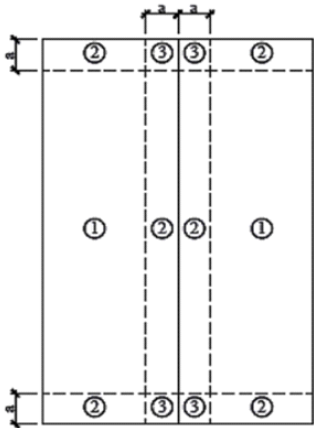
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1” x 67” (~19 sq.ft, 47.65 lbs) and 41” x 80” (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at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

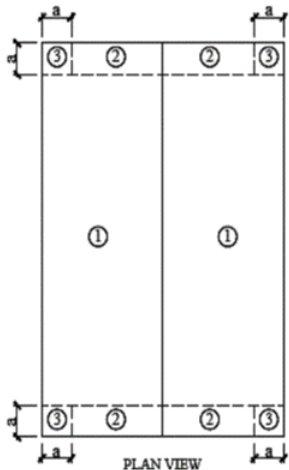
Zone should be considered as per ASCE 7-22, Fig. 30.3-2A to 30.3-2D



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 Comp	
Y+	
Y-	Alternate orientation not allowed

[illegible]

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.

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

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[illegible]

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[illegible]

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																													
				90						95						100						105						110						115						120						130						140						150						160						170						180					
				Roof Wind Zone																																																																													
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3																																				
0	B	0-7	Interior	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120																																		
			Exposed	120	120	97	120	120	79	120	109	66	120	92	56	120	79	48	115	69	42	99	60	37	76	47	31	60	38	26	48	32	23	40	28	20	34	25	26	30	22	23	26	30	22	23																																			
		7-20	Interior	120	120	120	120	120	120	120	120	120	120	120	113	120	120	90	120	120	74	120	115	63	120	80	46	118	60	35	85	46	31	64	37	27	51	32	24	41	28	21	28	21	28	21																																			
			Exposed	120	120	89	120	120	71	120	105	58	120	84	48	120	69	41	114	58	35	93	50	32	66	37	27	49	31	23	38	27	20	32	24	27	29	21	23	25	28	21	23	25	28	21																																			
		20-27	Interior	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	118	121	121	95	121	98	66	121	71	49	121	54	38	100	42	32	80	35	29	65	31	25	29	65	31	25																																				
			Exposed	121	121	121	121	121	111	121	121	86	121	103	69	121	83	57	121	69	48	121	58	41	102	43	33	77	34	28	61	29	24	49	26	21	40	23	28	34	20	25	28	34	20																																				
	27-45	Interior	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121																																			
		Exposed	121	121	121	121	121	121	121	121	113	121	121	92	121	110	76	121	92	65	121	79	55	82	60	42	60	47	34	46	37	29	36	32	25	32	28	22	28	25	20																																								
	C	0-7	Interior	120	120	107	120	120	87	120	120	73	120	101	62	120	86	53	120	75	46	109	65	40	83	51	32	65	41	28	52	34	24	43	30	21	36	26	28	32	23	25	28	32	23																																				
			Exposed	120	120	86	120	120	72	120	109	61	120	86	53	120	75	46	109	65	40	83	51	32	65	41	28	52	34	24	43	30	21	36	26	28	32	23	25	28	32	23	25	28	32																																				
		7-20	Interior	120	120	101	120	120	79	120	119	64	120	94	53	120	77	45	120	65	38	105	55	34	73	41	29	55	33	24	42	29	21	34	25	28	30	22	25	27	20	22	25	27	20																																				
			Exposed	120	120	77	120	120	62	120	109	61	120	86	53	120	75	46	109	65	40	83	51	32	65	41	28	52	34	24	43	30	21	36	26	28	32	23	25	28	32	23	25	28	32																																				
20-27		Interior	121	121	121	121	121	121	121	121	121	121	118	121	118	78	121	94	64	121	77	53	121	64	45	113	47	35	85	36	30	66	31	26	53	27	22	44	24	20	36	21	26																																						
		Exposed	121	121	93	121	121	73	121	59	42	118	49	35	98	41	32	83	35	29	71	32	27	54	27	23	43	23	29	35	20	25	30	27	22	27	24	20	24	21	17																																								
27-45	Interior	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121																																						
	Exposed	121	121	84	121	121	98	121	81	56	98	68	48	79	58	40	65	50	35	55	44	32	40	34	27	33	29	23	28	25	20	25	32	27	22	20	24	19	26	21																																									
D	0-7	Interior	120	120	78	120	106	64	120	89	54	120	76	46	108	65	40	93	57	35	81	50	32	62	39	27	50	33	23	40	28	20	34	25	26	30	22	23	26	29	21	24																																							
		Exposed	108	65	40	89	55	34	75	47	31	65	41	28	56	35	25	49	32	23	43	30	21	34	25	27	29	21	23	25	28	20	22	24	17	29	22	15	26	29	14																																								
	7-20	Interior	120	120	69	120	100	56	120	80	46	120	66	39	105	55	34	85	47	31	71	40	28	52	32	24	39	28	20	33	24	27	29	21	23	25	28	21	22	25	18																																								
		Exposed	104	54	34	81	45	30	65	37	27	54	33	24	45	30	22	39	27	20	34	25	28	29	21	24	25	27	20	21	24	18	28	21	15	25	18	13	22	16	12																																								
	20-27	Interior	121	121	107	121	121	82	121	98	66	121	78	54	121	64	45	121	54	39	109	46	34	81	35	29	62	30	25	50	26	21	40	23	28	34	20	25	30	27	22																																								
		Exposed	121	121	64	121	121	52	121	37	101	43	33	84	36	29	71	32	27	61	29	24	53	27	22	41	23	28	33	20	24	29	26	21	25	22	18	22	20	16	20	17																																							
27-45	Interior	121	121	121	121	121	108	121	121	88	121	104	72	121	87	61	110	74	52	89	64	45	63	49	35	47	38	30	37	32	26	32	28	22	28	25	20	25	22	27																																									
	Exposed	121	121	86	121	121	60	121	50	81	60	42	66	51	35	55	43	32	46	38	29	39	34	27	32	29	23	27	24	29	24	21	25	21	28	22	25	20	25	22	17																																								
10	B	0-7	Interior	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111																																					
			Exposed	111	111	97	111	111	79	111	109	66	111	92	56	111	79	48	111	69	42	99	60	37	76	47	31	60	38	26	48	32	23	40	28	20	34	25	26	30	22	23	26	30	22																																				
		7-20	Interior	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112																																			
			Exposed	112	112	89	112	112	71	112	105	58	112	84	48	112	69	41	112	58	35	93	50	32	66	37	27	49	31	23	38	27	20	32	24	27	29	21	23	25	28	21	23	25	28	21																																			
		20-27	Interior	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117																																			
			Exposed	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117																																				
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		Exposed	122*	122*	84	122*	122*	98	122*	81	56	98	68	48	79	58	40	65	50	35	55	44	32	40	34	27	33	29	23	28	25	20	25	32	27	22	20	24	19	26	21																																								
	C	0-7	Interior	111	111	107	111	111	87	111	111	73	111	101	62	111	86	53	111	75	46	109	65	40	83	51	32	65	41	28	52	34	24	43	30	21	36	26	28	32	23	25	28	32	23																																				
			Exposed	111	111	86	111	111	72	111	109	61	111	86	53	111	75	46	109	65	40	83	51	32	65	41	28	52	34	24	43	30	21	36	26	28	32	23	25	28	32	23	25	28	32																																				
		7-20	Interior	112	112	101	112	112	79	112	112	64	112	94	53	112	77	45	112	65	38	105	55	34	73	41	29	55	33	24	42	29	21	34	25	28	30	22	25	27	20	22	25	27	20																																				
			Exposed	112	112	77	112	112	62	112	109	61	112	86	53	112	75	46	109	65	40	83	51	32	65	41	28	52	34	24	43	30	21	36	26	28	32	23	25	28	32	23	25	28	32																																				
20-27		Interior	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117																																																											

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

[illegible]

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

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

[illegible]

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

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

[illegible]

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

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

[illegible]

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

[illegible]

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.

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																																												
0	B	0-7	Interior	127	127	127	127	127	127	127	127	127	127	127	127	127	125	127	127	89	127	127	77	127	97	58	127	76	46	101	61	38	81	50	34	66	42	30	55	37	26			
			Exposed	127	127	123	127	127	85	127	127	127	127	127	102	60	127	86	52	127	74	45	123	65	40	82	51	34	65	41	29	52	36	25	43	31	22	38	27	19	33	24	17	
		7-20	Interior	127	127	127	127	127	125	127	127	127	127	127	127	127	127	127	127	95	127	127	78	127	127	66	127	85	48	127	63	39	89	49	34	68	40	30	53	35	26	43	31	23
			Exposed	127	127	94	127	127	75	127	127	61	127	89	50	127	73	43	127	61	39	98	52	35	69	40	30	52	35	26	41	30	22	36	26	19	32	23	17	28	20	23		
		20-27	Interior	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	99	128	128	69	128	74	52	128	56	41	126	44	36	86	38	32	70	34	28				
			Exposed	128	128	128	128	128	128	128	128	128	90	128	128	73	128	88	60	128	72	50	128	61	43	127	45	36	83	37	31	65	32	27	52	28	23	43	25	21	38	22	18	
	27-45	Interior	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	112	70	129	79	54	84	63	43	65	51	38	52	42	34					
		Exposed	129	129	129	129	129	129	129	129	129	129	129	129	98	129	129	81	129	100	68	129	85	58	86	44	63	50	37	48	41	32	40	36	28	35	31	25	31	28	22			
	C	0-7	Interior	127	127	127	127	127	94	127	127	78	127	125	66	127	94	56	127	81	49	127	71	42	90	55	36	70	44	31	56	38	27	46	33	23	40	29	20	35	26	18		
			Exposed	127	93	56	127	78	47	125	66	41	93	57	37	80	49	33	69	43	30	60	39	28	47	33	23	39	28	20	34	25	17	29	21	23	26	19	20	23	25	18		
		7-20	Interior	127	127	127	127	127	84	127	127	67	127	126	56	127	82	47	127	68	41	127	58	37	77	43	32	57	37	27	44	32	23	38	28	21	33	24	18	30	22	24		
			Exposed	127	81	46	127	65	40	127	53	36	81	45	32	67	40	29	56	36	27	48	33	24	38	28	21	33	24	18	28	21	23	25	18	20	22	24	18					

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

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

[illegible]

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[illegible]

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

[illegible]

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[illegible]

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[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	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120					
			Exposed	120	120	87	120	120	71	120	100	60	120	84	50	120	72	43	105	62	37	90	54	34	69	42	28	54	34	24	43	30	21	36	26	18	31	23	24	28	20	22		
		7-20	Interior	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120			
			Exposed	120	120	79	120	120	62	120	93	51	120	74	42	120	61	36	101	51	32	82	44	30	58	34	25	43	29	21	34	25	19	30	22	24	26	19	22	23	17	19		
		20-27	Interior	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121				
			Exposed	121	121	121	121	121	97	121	118	75	121	91	61	121	73	50	121	60	42	121	51	36	92	37	30	69	31	26	54	27	22	44	24	20	36	21	17	32	18	23		
	27-45	Interior	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121					
		Exposed	121	121	121	121	121	121	121	121	121	101	121	121	121	82	121	99	68	121	83	57	107	71	49	72	53	37	52	42	31	40	34	27	33	30	24	29	26	21	26	23	18	
	C	0-7	Interior	120	120	97	120	120	79	120	110	65	120	92	55	120	79	47	116	68	41	99	59	35	75	46	30	59	37	26	47	31	22	39	27	19	33	24	17	29	21	23		
			Exposed	120	78	47	111	65	39	92	55	34	78	47	31	67	41	28	58	36	25	50	33	23	39	28	20	33	24	17	28	20	22	25	18	19	22	24	19	21	15			
		7-20	Interior	120	120	89	120	120	70	120	106	56	120	84	47	120	68	39	116	57	34	93	48	31	64	36	26	48	31	23	37	26	20	32	23	17	28	20	23	25	18	20		
			Exposed	120	68	39	109	54	33	84	45	30	68	37	27	56	33	25	47	30	22	40	28	20	32	23	17	27	20	22	24	17	19	21	23	17	18	20	16	24	18	19		
20-27		Interior	121	121	121	121	112	112	121	121	86	121	104	68	121	83	56	121	68	47	121	56	40	102	41	32	76	33	27	59	29	24	48	25	21	39	22	18	33	20	24			
		Exposed	121	82	55	121	64	45	121	52	37	107	43	38	88	36	30	75	33	27	64	30	25	48	25	21	38	22	18	32	19	23	28	25	20	22	18	22	19	16				
27-45	Interior	121	121	121	121	121	121	121	121	115	121	121	121	121	111	76	121	92	63	121	78	54	81	59	40	58	45	33	44	36	28	35	31	25	31	28	22	27	25	19				
	Exposed	121	110	75	121	88	61	110	73	50	86	61	42	69	52	36	57	45	32	48	39	30	35	32	25	30	27	22	26	24	19	23	21	25	20	18	22	18	24	19				
D	0-7	Interior	120	118	70	120	97	58	120	81	48	118	69	41	99	59	35	85	51	32	73	45	29	56	35	25	45	30	21	36	26	18	31	23	24	28	20	22	24	18	19			
		Exposed	98	59	35	81	49	31	68	42	28	58	36	25	50	33	23	44	30	21	38	27	19	32	23	25	27	20	21	23	17	18	20	23	16	18	20	14	24	18	19			
	7-20	Interior	120	116	61	120	89	49	120	71	40	119	58	34	93	48	31	75	41	28	63	35	26	45	30	22	35	25	19	30	22	25	26	19	22	23	17	19	21	23	17			
		Exposed	92	48	31	71	39	28	57	34	25	47	30	22	40	28	20	34	25	19	32	23	17	27	19	22	23	17	19	20	22	16	17	19	14	23	17	12	20	16	11			
	20-27	Interior	121	121	94	121	112	72	121	86	58	121	69	47	121	56	40	118	47	34	99	40	31	73	32	27	56	28	23	44	24	20	36	21	17	31	18	23	28	25	20			
		Exposed	121	56	39	113	45	34	91	37	30	76	33	27	64	30	25	55	27	22	47	25	21	36	21	17	31	18	23	27	24	20	23	21	17	18	16	18	16	19				
27-45	Interior	121	121	121	121	121	97	121	114	78	121	94	64	121	78	54	97	66	46	78	57	39	55	43	32	41	35	27	33	30	24	29	26	21	26	23	18	23	20	25				
	Exposed	121	78	53	91	64	44	71	53	37	58	45	33	48	39	30	44	27	35	31	25	29	26	21	25	23	18	22	20	24	19	17	21	17	23	18	23	20	16					
10	B	0-7	Interior	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	108	111	108	64	111	81	49	108	63	38	84	51	32	68	42	28	55	35	25	46	31	22
			Exposed	111	111	87	111	111	71	111	100	60	111	84	50	111	72	43	105	62	37	90	54	34	69	42	28	54	34	24	43	30	21	36	26	18	31	23	24	28	20	22		
		7-20	Interior	112	112	112	112	112	112	112	112	112	112	112	99	112	80	112	112	66	112	102	55	112	71	40	104	53	33	74	41	28	57	33	25	45	29	22	36	26	19			
			Exposed	112	112	79	112	112	62	112	93	51	112	74	42	112	61	36	101	51	32	82	44	30	58	34	25	43	29	21	34	25	19	30	22	24	26	19	22	23	17	19		
		20-27	Interior	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117			
			Exposed	117	117	117	117	117	97	117	117	75	117	91	61	117	73	50	117	60	42	117	51	36	92	37	30	69	31	26	54	27	22	44	24	20	36	21	17	32	18	23		
	27-45	Interior	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*				
		Exposed	122*	122*	122*	122*	122*	122*	122*	122*	101	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*	122*			
	C	0-7	Interior	111	111	97	111	111	79	111	110	65	111	92	55	111	79	47	111	68	41	99	59	35	75	46	30	59	37	26	47	31	22	39	27	19	33	24	17	29	21	23		
			Exposed	111	78	47	111	65	39	92	55	34	78	47	31	67	41	28	58	36	25	50	33	23	39	28	20	33	24	17	28	20	22	25	18	19	22	24	19	21	15			
		7-20	Interior	112	112	89	112	112	70	112	106	56	112	84	47	112	68	39	112	57	34	93	48	31	64	36	26	48	31	23	37	26	20	32	23	17	28	20	23	25	18	20		
			Exposed	112	68	39	109	54	33	84	45	30	68	37	27	56	33	25	47	30	22	40	28	20	32	23	17	27	20	22	24	17	19	21	23	17	18	20	16	24	18	19		
20-27		Interior	117	117	117	117	112	112	117	117	86	117	104	68	117	83	56	117	68	47	117	56	40	102	41	32	76	33	27	59	29	24	48	25	21	39	22	18	33	20	24			
		Exposed	117	82	55	117	64	45	117	52	37	107	43	38	88	36	30	75	33	27	64	30	25	48	25	21	38	22	18	32	19													

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			
30	B	0-7	Interior	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	64	70	70	49	70	63	38	70	51	32	68	42	28	55	35	25	46	31	22	
			Exposed	70	70	70	70	70	70	70	70	60	70	50	70	43	70	62	37	70	54	34	69	42	28	54	34	24	43	30	21	36	26	18	31	23	24	28	20	22		
		7-20	Interior	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	80*	83*	83*	66	83*	53	55	83*	71	40	83*	53	33	71	41	28	57	33	25	45	29	22	36	26	19		
			Exposed	83*	83*	79*	83*	83*	62	83*	83*	51	83*	71	42	83*	61	36	83*	51	32	82*	44	30	58	34	25	43	29	21	34	25	19	30	22	24	26	19	22	23	17	19
		20-27	Interior	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	89*	86*	58	89*	62	43	89*	47	34	89*	37	30	71*	32	26	58	28	23		
			Exposed	89*	89*	89*	89*	89*	89*	89*	89*	75*	89*	89*	61	89*	73*	50	89*	60	42	89*	51	36	89*	37	30	69*	31	26	54	27	22	44	24	20	36	21	17	32	18	23
	27-45	Interior	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	
		Exposed	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	
	C	0-7	Interior	70	70	70	70	70	70	70	65	70	55	70	47	70	68	41	70	59	35	70	46	30	59	37	26	47	31	22	39	27	19	33	24	17	29	21	23			
			Exposed	70	70	47	70	65	39	70	55	34	70	47	31	67	41	28	58	36	25	50	33	23	39	28	20	33	24	17	28	20	22	25	18	19	21	15				
		7-20	Interior	83*	83*	83*	83*	83*	70	83*	83*	56	83*	83*	47	83*	68	39	83*	57	34	83*	48	31	64	36	26	48	31	23	37	26	20	32	23	17	28	20	23	25	18	20
			Exposed	83*	68	39	83*	83*	54	33	83*	45	30	68	37	27	56	33	25	47	30	22	40	28	20	32	23	17	27	20	22	24	17	19	21	23	17	18	20	16	24	18
20-27		Interior	89*	89*	89*	89*	89*	89*	89*	89*	86*	89*	89*	68*	89*	83*	56	89*	68*	47	89*	56	40	89*	41	32	76*	33	27	59	29	24	48	25	21	39	22	18	33	20	24	
		Exposed	89*	82*	55	89*	64*	45	89*	52	37	89*	43	33	88*	36	30	75*	33	27	64*	30	25	48	25	21	38	22	18	32	19	23	28	25	20	25	22	18	22	19	16	
27-45	Interior	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*		
	Exposed	83*	83*	75*	83*	83*	61*	83*	73*	50	83*	63*	83*	76*	83*	83*	63*	83*	78*	54	81*	59*	40	59*	45	33	44	36	28	35	31	25	31	28	22	27	25	19				
D	0-7	Interior	70	70	70	70	70	58	70	48	70	69	41	70	59	35	70	51	32	70	45	29	56	35	25	45	30	21	36	26	18	31	23	24	28	20	22	24	18	19		
		Exposed	70	59	35	70	49	31	68	42	58	36	25	50	33	23	44	30	21	38	27	19	32	23	25	27	20	21	23	17	18	20	23	16	18	20	14	24	18	13		
	7-20	Interior	88*	88*	61	88*	88*	49	88*	71	40	88*	58	34	88*	48	31	71	41	28	63	35	26	45	30	22	35	25	19	30	22	25	26	19	22	23	17	19	21	23	17	
		Exposed	88*	48	31	71	39	28	57	34	25	47	30	22	40	28	20	34	25	19	32	23	17	27	19	22	23	17	19	20	22	16	17	19	14	23	17	12	20	16	11	
	20-27	Interior	94*	94*	94*	94*	94*	72*	94*	86*	58	94*	69*	47	94*	56	40	94*	47	34	94*	40	31	73*	32	27	56	28	23	44	24	20	36	21	17	31	18	23	28	25	20	
		Exposed	94*	56	39	94*	45	34	91*	37	30	76*	33	27	64	30	25	55	27	22	47	25	21	36	21	17	31	18	23	27	24	20	23	21	17	20	18	16	14	13		
27-45	Interior	90*	90*	90*	90*	90*	90*	90*	90*	78*	90*	90*	65*	90*	78*	54	90*	66*	46	78*	57	39	55	43	32	41	35	27	33	30	24	29	26	21	26	23	18	23	20	25		
	Exposed	90*	78*	53	90*	64*	44	71*	53	37	58	45	33	48	39	40	34	27	35	31	25	29	26	21	25	23	18	22	20	24	19	17	21	17	23	18	23	20	16			
40	B	0-7	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65		
			Exposed	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	
		7-20	Interior	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*
			Exposed	70*	70*	70*	70*	70*	62*	70*	70*	51	70*	70*	42	70*	61*	36	70*	50	32	70*	44	30	58	34	25	43	29	21	34	25	19	30	22	24	26	19	22	23	17	19
		20-27	Interior	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*
			Exposed	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*
	27-45	Interior	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	
		Exposed	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	
	C	0-7	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65		
			Exposed	65	65	47	65	65	39	65	55	34	65	47	31	67	41	28	58	36	25	50	33	23	39	28	20	33	24	17	28	20	22	25	18	19	21	15				
		7-20	Interior	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*
			Exposed	70*	68*	39	70*	54	33	70*	45	30	68*	37	27	56	33	25	47	30	22	40	28	20	32	23	17	27	20	22	24	17	19	21	23	17	18	20	16	24	18	13
20-27		Interior	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	70*	
		Exposed	70*	70*	55*	70*	64*	45	70*	52*	37	70*	43	33	70*	36	30	70*	33	27	64*	30	25	48	25	21	38	22	18	32	19	23	28	25	20	25	22	18	22	19	16	
27-45	Interior	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*		
	Exposed	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*	66*						

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

[illegible]

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

[illegible]

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

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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						
Roof Wind Zone																																										
60	B	0-7	Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94					
			Exposed	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94				
		7-20	Interior	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*			
			Exposed	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*			
		20-27	Interior	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*			
			Exposed	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*				
	27-45	Interior	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*				
		Exposed	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*	92*				
	C	0-7	Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94				
			Exposed	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94				
		7-20	Interior	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*			
			Exposed	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*	105*			
20-27		Interior	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*	95*				
		Exposed	95*	95*	95*	95*	95																																			

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[illegible]

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

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