

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 7-16 Sec 29.4.4 with Provisions from SEAOC PV2-2017
- 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 7-16, 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

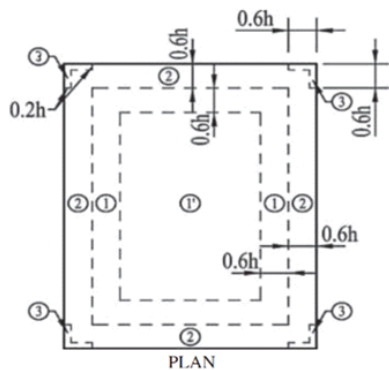
- 0.2-s Spectral Response Acceleration, $S_S \leq 3$
- $S_S = 1.25$ and 3 per criteria shown on individual span tables sheets.
- $S_1 = 0.5$
- Seismic site class D

Array Assumptions

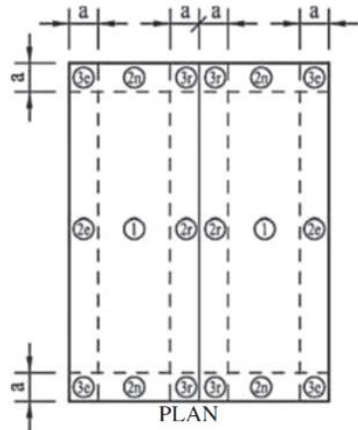
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1” x 67” (~19 sq.ft, 47.65 lbs) and 41” x 80” (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at 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 7-16 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 7-16, Fig. 30.3-2A to 30.3-2D



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

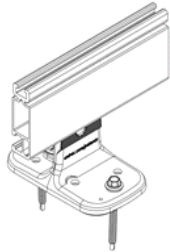


Gable Roofs $7^\circ < \theta \leq 45^\circ$

Grouping of ASCE 7-16 Roof Zones (Gable and Flat)

- **Roof Tilt 0° - 7°**
Roof Zone 1 = 1
Roof Zone 2 = 2
Roof Zone 3 = 3
- **Roof Tilt 7° - 27°**
Roof Zone 1 = 1, 2e
Roof Zone 2 = 2n, 2r, 3e
Roof Zone 3 = 3r
- **Roof Tilt 27° - 45°**
Roof Zone 1 = 1, 2e, 2r
Roof Zone 2 = 2n, 3r
Roof Zone 3 = 3e

Rails can be installed in these possible orientations.

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



ASCE 7-16
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

19 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

SM
Rail Type

PRO SERIES
Clamp

Flashloc DUO Rafter
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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[illegible]

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ASCE 7-16
Design Standard

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Ss = 3.00
Seismic

19 sq.ft
Module Area

LANDSCAPE
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CROSS-SLOPE
Rail Direction

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PRO SERIES
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Flashloc DUO Rafter
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SPAN TABLES

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		7-20	Interior	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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		20-27	Interior	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

Basic Wind Speed (mph)

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

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																																																																																																																																																																																																																																				
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	120	120	120	120																																																																																																																																																																																																																																	
			Exposed	120	120	98	120	120	80	120	110	67	120	93	57	120	80	49	116	69	42	100	61	37	76	48	31	60	38	26	49	32	23	40	28	30	34	25	27	30	22	24	26	21	22	24	26	21	22	24	26	21	22	24	26	21																																																																																																																																																																																																																												
		7-20	Interior	115	115	115	115	115	115	115	115	115	115	115	115	115	114	115	115	92	115	110	75	115	63	115	65	47	91	50	36	64	39	31	54	33	27	46	29	24	20	24	20	26	21	22	24	26	21	22	24	26	21																																																																																																																																																																																																																															
			Exposed	115	115	91	115	104	72	115	83	59	115	68	49	115	57	41	86	48	35	68	42	32	55	33	27	45	28	23	38	24	20	33	21	27	29	28	24	26	25	21	22	24	26	21	22	24	26	21																																																																																																																																																																																																																																		
		20-27	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*	112*	112*	112*	112*	112*	112*																																																																																																																																																																																																																																
			Exposed	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*	112*	112*	112*	112*	112*	112*	112*																																																																																																																																																																																																																															
	27-45	Interior	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*																																																																																																																																																																																																																														
		Exposed	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*																																																																																																																																																																																																																														
	C	0-7	Interior	120	120	111	120	120	91	120	120	75	120	105	64	120	89	55	120	77	47	112	67	41	85	53	33	67	42	28	54	35	25	45	30	21	37	27	29	33	24	25	27	29	33	24	25	27	29	33	24	25																																																																																																																																																																																																																																
			Exposed	120	89	54	120	74	46	105	63	39	89	54	34	76	47	31	66	41	28	58	37	26	45	31	22	36	26	28	31	23	24	27	30	21	24	26	19	21	23	17	21	23	17	21	23	17	21	23	17																																																																																																																																																																																																																																	
		7-20	Interior	115	115	106	115	115	83	115	96	67	115	78	55	115	65	46	115	55	40	79	47	35	60	35	29	49	30	25	41	26	22	35	23	29	31	20	25	27	27	27	27	27	27	27	27	27	27	27	27	27																																																																																																																																																																																																																																
			Exposed	115	64	46	113	53	38	70	44	33	62	37	30	55	33	27	49	30	25	44	27	23	35	23	29	30	30	25	26	26	22	33	23	19	31	29	17	27	14	15	16	15	16	15	16	15	16	15																																																																																																																																																																																																																																		
		20-27	Interior	112*	112*	112*	112*	112*	112*	112*	112*	112*	112*	112*	110*	87	112*	90	70	112*	75	58	112*	64	49	94	48	36	72	37	29	60	32	24	50	28	21	43	24	17	37	22	23	23	23	23	23	23	23	23	23	23	23																																																																																																																																																																																																																															
			Exposed	112*	89	70	112*	72	56	112*	60	46	98	50	38	82	43	33	71	37	29	63	33	26	51	28	21	42	24	17	35	21	22	31	27	19	27	24	17	24	17	24	17	24	17	24	17	24	17																																																																																																																																																																																																																																			
	27-45	Interior	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*																																																																																																																																																																																																																															
		Exposed	109*	109*	84	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*																																																																																																																																																																																																																															
	D	0-7	Interior	120	120	81	120	110	67	120	93	57	120	79	48	114	68	42	97	59	36	84	52	33	65	41	28	52	34	24	42	29	21	35	25	27	31	22	24	27	30	21	22	24	27	30	21	22	24	27	30	21																																																																																																																																																																																																																																
			Exposed	113	68	41	93	57	35	79	49	32	67	42	28	58	37	26	51	33	24	45	30	21	35	26	28	30	22	24	26	29	20	23	25	18	30	22	16	27	14	15	16	15	16	15	16	15																																																																																																																																																																																																																																				
7-20		Interior	115	106	73	115	84	59	115	68	48	115	56	41	81	47	35	66	40	32	59	35	29	48	30	25	40	25	21	34	22	28	29	24	26	21	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23																																																																																																																																																																																																																																
		Exposed	80	47	35	64	39	31	56	34	28	49	30	25	44	28	23	39	25	21	35	23	29	30	29	24	25	25	24	22	22	18	29	19	16	26	17	14	23	15	12	14	15	12	14	15	12	14	15																																																																																																																																																																																																																																			
20-27		Interior	112*	112*	112*	112*	112*	112*	112*	112*	112*	112*	112*	110*	87	112*	90	70	112*	75	58	112*	64	49	94	48	36	72	37	29	60	32	24	50	28	21	43	24	17	37	22	23	23	23	23	23	23	23	23	23	23	23	23																																																																																																																																																																																																																															
		Exposed	112*	89	70	112*	72	56	112*	60	46	98	50	38	82	43	33	71	37	29	63	33	26	51	28	21	42	24	17	35	21	22	31	27	19	27	24	17	24	17	24	17	24	17	24	17	24	17																																																																																																																																																																																																																																				
27-45	Interior	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*																																																																																																																																																																																																																																
	Exposed	109*	109*	84	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*	109*																																																																																																																																																																																																																															
10	B	0-7	Interior	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104

[illegible]

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

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

[illegible]

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

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

[illegible]

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

[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					
30	B	0-7	Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	90	94	94	77	94	94	59	94	77	46	94	62	39	82	50	34	67	42	30	56	37	26				
			Exposed	94	94	94	94	94	86	94	94	72	94	94	61	94	87	52	94	75	45	94	66	40	83	51	34	65	41	29	53	36	25	43	31	22	38	20	34	24	26			
		7-20	Interior	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95			
			Exposed	95	95	95	95	95	76	95	88	62	95	72	51	95	60	43	84	51	39	74	44	36	60	37	30	49	31	26	41	27	22	36	24	20	32	21	26	28	18	23		
		20-27	Interior	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	97*	74	100*	72	54	100*	56	42	88*	44	35	74	38	30	63	34	25
			Exposed	100*	100*	100*	100*	100*	100*	100*	100*	98*	100*	100*	78	100*	84	64	100*	70	53	100*	60	45	89*	45	36	72	38	29	60	33	24	50	29	20	43	25	17	38	22	15		
	27-45	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*	94*	94*	94*	94*			
		Exposed	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	81*	94*	94*	68	94*	86*	59	87*	65	45	64	50	37	48	41	31	40	36	26	35	32	23	31	28	20			
	C	0-7	Interior	94	94	94	94	94	94	94	94	81	94	94	68	94	58	94	84	50	94	73	44	93	57	37	73	45	31	58	38	27	48	34	24	41	30	21	36	26	19			
			Exposed	94	94	58	94	81	49	94	68	42	94	59	38	82	51	34	71	45	31	62	40	28	49	34	24	40	29	21	34	25	18	30	22	24	27	19	21	24	26	18		
		7-20	Interior	95	95	95	95	95	87	95	95	70	95	83	58	95	69	49	95	58	42	82	49	38	66	39	32	54	34	28	45	29	24	39	25	21	34	22	18	30	20	25		
			Exposed	95	68	48	95	55	41	77	46	37	68	40	33	60	36	30	53	33	27	47	30	25	39	26	21	34	22	18	29	19	24	25	25	21	22	22	18	20	20	16		
20-27		Interior	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	91*	100*	96*	74	100*	80	61	100*	68	51	100*	51	39	79	41	32	65	35	26	55	31	22	47	27	19	41	24	16			
		Exposed	100*	95*	73	100*	77	58	100*	63	47	100*	53	40	89*	45	35	78	40	31	69	37	28	56	31	23	46	27	19	39	23	16	34	20	21	30	18	18	27	24	16			
27-45	Interior	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	91*	94*	94*	77	94*	94*	66	94*	94*	73	50	73	56	40	55	45	34	43	38	29	38	34	25	34	30	21			
	Exposed	94*	94*	90*	94*	94*	94*	94*	90*	61	94*	76	52	87*	64	44	71	55	39	60	48	35	44	39	29	37	33	24	32	29	20	28	25	20	23	22	20	20	20					
D	0-7	Interior	95	95	88	95	95	72	95	95	61	95	86	52	95	74	44	95	64	40	92	56	36	70	44	31	56	37	26	45	32	23	39	28	20	34	25	18	30	22	24			
		Exposed	95	73	44	95	62	39	86	53	35	73	45	31	63	40	29	55	37	26	48	34	24	39	28	20	33	24	26	29	21	23	25	18	20	22	25	17	20	22	15			
	7-20	Interior	95	95	77	95	89	62	95	72	51	95	59	43	82	50	39	73	43	35	65	39	32	52	33	27	43	28	23	37	24	20	33	21	18	29	19	24	25	25	21			
		Exposed	82	50	38	71	41	34	61	37	31	54	34	28	48	31	25	43	28	23	39	25	21	32	22	18	28	18	23	24	24	20	21	17	19	19	16	25	17	14				
	20-27	Interior	104*	104*	104*	104*	104*	98*	104*	104*	77	104*	82	63	104*	69	52	104*	58	44	100*	50	39	77	40	31	63	34	25	52	29	21	44	26	18	39	23	15	34	20	21			
		Exposed	104*	68	52	104*	56	42	92	47	36	79	41	32	70	37	28	62	34	25	55	31	22	45	26	18	38	22	15	33	19	20	29	26	17	25	23	16	22	20	14			
27-45	Interior	100*	100*	100*	100*	100*	100*	100*	100*	95*	100*	100*	79	100*	99*	67	100*	84	57	100*	72	49	70	55	39	52	43	32	41	37	27	36	32	23	28	20	28	25	17					
	Exposed	100*	98*	66	100*	80	55	92*	67	46	73	57	40	61	48	36	51	42	32	43	39	29	36	33	23	31	28	19	27	24	16	24	21	21	19	18	18	25	16					
40	B	0-7	Interior	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85			
			Exposed	85	85	85	85	85	85	85	85	72	85	85	61	85	85	52	85	75	45	85	66	40	83	51	34	65	41	29	53	36	25	43	31	22	38	20	34	24	26			
		7-20	Interior	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	94*	80	94*	94*	67	94*	69	49	85*	52	40	70	41	34	59	36	30	50	32	26	43	28	23			
			Exposed	94*	94*	94*	94*	94*	94*	94*	88*	62*	94*	72	51	94*	60	43	84*	51	39	74	44	36	60	37	30	49	31	26	41	27	22	36	24	20	32	21	26	28	18	23		
		20-27	Interior	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	74*	79*	72*	54	79*	56	42	79*	44	35	74*	38	30	63	34	25		
			Exposed	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	70*	53	79*	60	45	36	72*	38	29	60	33	24	50	29	20	43	25	17	38	22	15				
	27-45	Interior	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*			
		Exposed	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	68*	75*	59	75*	65*	45	64*	50	37	48	41	31	40	36	26	35	32	23	31	28	20				
	C	0-7	Interior	85	85	85	85	85	85	85	85	81	85	85	68	85	85	58	85	84	50	85	73	44	85	57	37	73	45	31	58	38	27	48	34	24	41	30	21	36	26	19		
			Exposed	85	85	58	85	81	49	85	68	42	85	59	38	82	51	34	71	45	31	62	40	28	49	34	24	40	29	21	34	25	18	30	22	24	27	19	21	24	26	18		
		7-20	Interior	94*	94*	94*	94*	94*	87*	94*	94*	70	94*	83*	58	94*	69	49	94*	58	42	82	49	38	66	39	32	54	34	28	45	29	24	39	25	21	34	22	18	30	20	25		
			Exposed	94*	68	48	94*	55	41	77	46	37	68	40	33	60	36	30	53	33	27	47	30	25	39	26	21	34	22	18	29	19	24	25	25	21	22	22	18	20	20	16		
20-27		Interior	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	79*	74*	79*	72*	54	79*	56	42	79*	44	35	74*	38	30	63	34	25		
		Exposed	79*	79*	73*	79*	77*	58	79*	63	47	79*	53	40	79*	45	35	78	40	31	69	37	28	56	31	23	46	27	19	39	23	16	34	20	21	30	18	18	27	24	16			
27-45	Interior	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*	75*				
	Exposed	75*	75*	75*	75*																																							

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

[illegible]

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

[illegible]

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

[illegible]

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

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.

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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	120	120	120

[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.

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[illegible]

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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																	
				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															
30	B	0-7	Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	90	94	94	77	94	94	59	94	77	46	94	62	39	82	50	34	67	42	30	56	37	26																					
			Exposed	94	94	94	94	94	94	94	94	94	72	94	94	61	94	94	87	52	94	75	45	94	66	40	83	51	34	65	41	29	53	36	25	43	31	22	38	28	20	34	24	26																			
		Exposed	96*	96*	96*	96*	96*	96*	96*	96*	96*	88*	62	96*	72	51	96*	60	43	84	51	39	74	44	36	60	37	30	49	31	26	41	27	22	36	24	20	32	21	26	28	18	23																				
		Exposed	87*	87*	87*	87*	87*	87*	87*	87*	87*	87*	87*	78*	87*	84*	64	87*	70	53	87*	60	45	87*	45	36	72	38	29	60	33	24	50	29	20	43	25	17	38	22	15																						
		Exposed	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	83*	80*	83*	68	83*	83*	59	83*	65	45	63*	50	37	48	41	31	40	36	26	35	32	23	31	28	20																				
		Exposed	94	94	58	94	81	49	94	68	42	94	59	38	82	51	34	71	45	31	62	40	28	49	34	24	40	29	21	34	25	18	30	22	24	27	19	21	24	26	18																						
		Exposed	96*	68	48	96*	55	41	77	46	37	68	40	33	60	36	30	53	33	27	47	30	25	39	26	21	34	22	18	29	19	24	25	25	21	22	22	18	20	20	16																						

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[illegible]

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[illegible]

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[illegible]

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