

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

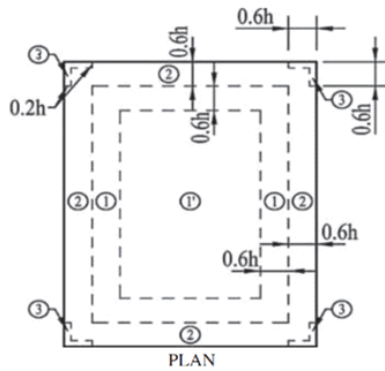
- 0.2-s Spectral Response Acceleration, $SS \leq 3$
- $S_s = 1.25$ and 3 per criteria shown on individual span tables sheets.
- $S_1 = 0.5$
- Seismic site class D

Array Assumptions

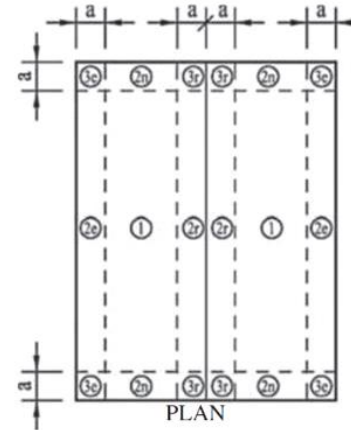
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at 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 $\theta \leq 7^\circ$

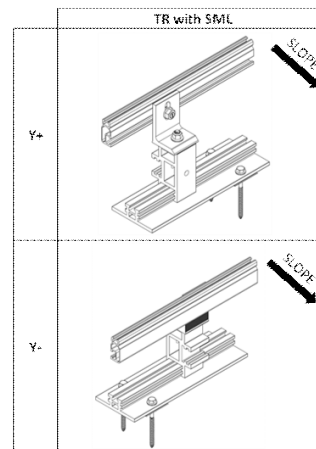


Gable Roofs $7^\circ < \theta \leq 45^\circ$

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.



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

[illegible]

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

Basic Wind Speed (mph)

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

[illegible]

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



ASCE 7-16
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

19 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

SML
Rail Type

PRO SERIES
Clamp

Tile Replacement
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)																																							
				Roof Wind Zone																																							
				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							
0	B	0-7	Interior	98	98	98	98	98	98	98	98	96	98	98	91	98	98	87	98	96	83	98	92	80	98	86	73	92	80	65	86	75	61	81	68	57	77	63	53	72	59	50	
			Exposed	98	98	87	98	95	82	98	91	78	98	86	75	96	83	69	92	79	65	88	76	62	82	69	57	76	63	53	70	58	49	64	54	56	60	51	53	56	59	50	
		7-20	Interior	98	98	98	98	98	98	98	98	98	92	98	97	88	98	92	83	98	87	80	97	83	76	89	77	67	83	69	61	78	63	57	74	58	53	69	55	50	64	52	58
			Exposed	98	91	83	98	86	79	94	82	74	89	78	68	86	74	64	83	68	61	80	64	58	75	59	53	68	54	49	63	51	57	58	58	53	55	55	50	52	51	46	
		20-27	Interior	99	99	99	99	99	99	99	99	99	99	99	99	99	99	94	99	96	89	99	91	85	99	84	78	94	78	70	88	71	62	84	64	57	80	60	53	76	57	50	
			Exposed	99	99	94	99	94	88	99	89	83	99	85	79	98	81	75	94	77	69	90	74	64	84	65	58	79	60	53	75	56	49	69	52	57	64	49	52	60	56	48	
	27-45	Interior	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	94	99	99	92	83	93	86	77	86	80	71	81	75	64	76	69	59	69	64	55				
		Exposed	99	99	98	99	99	93	99	98	88	99	93	84	97	89	80	93	85	77	88	82	73	81	76	64	75	68	59	66	62	54	61	58	50	58	55	45	54	52	55		
	C	0-7	Interior	98	98	90	98	98	85	98	94	81	98	89	77	98	85	73	95	82	68	91	79	64	84	72	59	79	65	55	73	60	51	66	56	58	62	53	55	58	50	52	
			Exposed	98	85	73	94	81	67	89	77	63	85	74	60	81	68	57	78	64	54	75	62	52	67	57	59	61	52	54	57	49	50	53	56	46	50	53	46	58	50	36	
		7-20	Interior	98	95	86	98	89	81	98	85	77	92	80	72	88	77	66	85	72	63	82	67	60	77	61	55	71	56	51	65	52	59	61	49	55	57	57	51	54	53	48	
			Exposed	88	77	66	84	71	62	81	65	59	77	62	56	75	59	53	70	56	51	66	54	49	61	49	55	56	56	51	52	52	46	49	49	41	57	49	36	53	38	32	
20-27		Interior	99	99	97	99	98	91	99	93	86	99	88	82	99	84	78	97	80	74	93	77	68	86	68	60	81	62	55	77	58	51	72	54	45	66	51	55	62	58	51		
		Exposed	99	84	78	96	79	72	91	75	65	87	69	61	84	64	58	81	62	55	78	59	52	72	54	46	65	50	54	61	57	49	57	54	41	53	50	36	50	46	32		
27-45	Interior	99	99	99	99	99	96	99	99	91	99	97	87	99	92	83	96	88	79	92	85	76	84	78	68	78	72	61	70	64	56	64	60	52	60	57	49	56	53	57			
	Exposed	99	92	83	95	87	78	90	83	75	85	79	69	81	76	64	77	71	61	73	66	58	64	61	53	59	56	48	55	52	56	52	49	51	48	56	46	56	53	39			
D	0-7	Interior	98	96	82	98	91	78	98	86	74	95	82	69	91	79	64	87	76	61	84	72	59	78	64	54	72	59	50	65	55	57	60	52	53	57	59	50	53	56	46		
		Exposed	91	79	64	86	75	61	82	70	57	79	65	55	75	62	52	71	59	50	66	56	58	61	52	54	56	59	50	52	55	44	49	51	59	56	48	34	53	42	30		
	7-20	Interior	98	87	79	94	82	75	89	78	68	86	73	63	82	67	60	79	63	58	77	61	55	70	56	51	64	52	58	59	59	54	55	55	50	52	52	46	49	49	44		
		Exposed	82	67	60	79	63	57	75	59	54	71	56	51	67	54	49	69	63	51	57	61	49	55	56	55	50	52	51	48	59	47	39	55	41	34	52	36	30	49	32	27	
	20-27	Interior	99	95	88	99	89	83	99	85	79	98	81	75	93	77	68	89	73	63	86	68	60	81	61	54	76	57	50	70	53	43	64	49	53	60	57	49	57	54	41		
		Exposed	99	77	68	88	71	62	85	65	58	81	62	55	78	59	52	75	56	50	72	54	45	65	50	53	60	56	48	56	53	39	52	49	34	49	44	36	57	39	27		
27-45	Interior	99	99	93	99	98	88	99	93	84	97	89	80	92	85	76	88	81	72	84	78	67	77	70	60	68	63	55	62	59	51	58	55	46	55	52	55	52	49	51			
	Exposed	92	85	76	86	80	71	82	76	65	78	72	61	74	66	58	68	63	55	64	60	52	59	56	47	54	51	55	51	59	50	58	55	43	55	52	37	51	49	32			
10	B	0-7	Interior	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88			
			Exposed	88	88	87	88	88	82	88	78	88	86	75	88	83	69	88	79	65	88	76	62	82	69	57	76	63	53	70	58	49	64	54	56	60	51	53	56	59	50		
		7-20	Interior	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	
			Exposed	88	88	88	88	86	79	88	82	74	88	78	68	86	74	64	83	68	61	80	64	58	75	59	53	68	54	49	63	51	57	58	53	55	55	50	52	51	46		
		20-27	Interior	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96		
			Exposed	96	96	94	96	94	88	96	89	83	96	85	79	96	81	75	94	77	69	90	74	64	84	65	58	79	60	53	75	56	49	69	52	57	64	49	52	60	56	48	
	27-45	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	94	98	99	92	83	93	86	77	86	80	71	81	75	64	76	69	59	69	64	55			
		Exposed	98	98	98	98	98	93	98	88	98	98	93	84	97	89	80	93	85	77	88	82	73	81	76	64	75	68	59	66	62	54	61	58	50	58	55	45	54	52	55		
	C	0-7	Interior	88	88	88	88	88	85	88	88	81	88	88	77	88	85	73	88	82	68	88	79	64	84	72	59	79	65	55	73	60	51	66	56	58	62	53	55	58	50	52	
			Exposed	88	85	73	88	81	67	88	77	63	85	74	60	81	68	57	78	64	54	75	62	52	67	57	59	61	52	54	57	49	50	53	56	46	50	53	46	58	50	36	
		7-20	Interior	88	88	86	88	88	81	88	85	77	88	80	72	88	77	66	85	72	63	82	67	60	77	61	55	71	56	51	65	52	59	61	49	55	57	57	51	54	53	48	
			Exposed	88	77	66	84	71	62	81	65	59	77	62	56	75	59	53	70	56	51	66	54	49	61	49	55	56	56	51	52	52	46	49	49	41	57	49	36	53	38	32	
20-27		Interior	96	96	96	96	96	91	96	93	86	96	88	82	96	84	78	96	80	74	93	77	68	86	68	60	81	62	55	77	58	51	72	54	45	66	51	55	62	58	51		
		Exposed	96	84	78	96	79	72	91	75	65	87	69	61	84	64	58	81	62	55	78	59	52	72	54	46	65	50	54	61	57	49	57	54	41	53	50	36	50	46	32		
27-45	Interior	98	98	98	98	98	96	98	98	91	98	97	87	98	92	83	96	88	79	92	85	76	84	78	68	78	72	61	70	64	56	64	60	52	60	57	49	56	53	57			
	Exposed	98	92	83	95	87	78	90	83	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.

* 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 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.

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 7-16
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

23 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

SML
Rail Type

PRO SERIES
Clamp

Tile Replacement
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)																																									
				Roof Wind Zone																																									
				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									
0	B	0-7	Interior	97	97	97	97	97	97	97	97	95	97	97	90	97	97	86	97	95	82	97	91	79	97	85	72	91	79	64	85	74	60	67	56	76	62	53	71	59	61				
			Exposed	97	97	86	97	94	81	97	90	77	97	86	73	95	82	68	91	79	64	87	76	61	81	68	56	76	62	52	68	58	59	63	54	56	59	50	52	56	58	49			
		7-20	Interior	98	98	98	98	98	97	98	98	91	98	95	87	98	91	82	98	86	79	95	83	75	88	76	65	82	67	80	78	62	56	73	58	53	68	54	49	63	51	57			
			Exposed	98	90	82	98	85	78	92	81	73	89	77	67	85	72	63	82	67	60	79	63	57	74	58	53	67	54	60	62	50	56	58	57	52	54	54	49	63	51	44			
		20-27	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	93	98	94	88	98	80	84	98	83	77	93	77	69	88	70	61	83	64	57	79	60	53	75	56	49
			Exposed	98	98	92	98	93	87	98	88	82	98	84	78	97	80	74	93	77	68	89	72	63	83	64	57	78	59	52	74	55	48	68	51	56	63	59	52	59	56	46			
	27-45	Interior	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	91	82	92	85	76	85	79	69	80	75	63	75	68	59	67	63	55				
		Exposed	99	99	97	99	99	92	99	97	87	99	92	83	96	88	79	92	84	76	87	81	72	80	75	63	74	67	58	65	62	54	61	58	50	57	54	58	54	51	54				
	C	0-7	Interior	97	97	89	97	97	84	97	93	80	97	88	76	97	85	72	94	81	67	90	78	63	83	71	58	78	64	54	72	60	50	65	56	58	61	52	54	58	60	51			
			Exposed	97	84	72	93	80	66	88	77	62	84	72	59	81	67	56	77	64	54	74	61	51	66	56	58	61	52	54	56	59	50	53	55	45	61	52	46	57	49	35			
		7-20	Interior	98	94	85	98	88	80	97	84	76	91	80	71	88	76	65	84	71	62	81	66	59	76	60	55	70	56	51	64	52	58	60	59	54	56	56	51	53	53	47			
			Exposed	87	76	65	84	69	61	80	64	58	77	61	55	73	58	53	69	55	50	66	53	59	60	60	54	56	55	50	52	52	45	59	46	40	56	42	35	53	36	31			
20-27		Interior	98	98	96	98	97	90	98	92	85	98	87	81	98	83	77	96	79	72	92	76	67	86	67	60	81	61	55	76	57	50	71	53	44	65	50	54	61	58	50				
		Exposed	98	83	77	95	78	71	90	74	64	87	68	60	83	64	57	80	61	54	77	58	51	71	54	45	65	50	53	60	57	48	56	53	40	53	50	36	61	45	34				
27-45	Interior	99	99	99	99	99	95	99	99	90	99	96	86	99	91	82	95	87	79	91	84	75	83	77	66	77	70	60	69	64	56	63	60	52	59	56	48	56	53	56					
	Exposed	99	91	82	94	86	78	89	82	73	84	78	68	80	75	63	76	70	60	72	65	57	63	60	52	59	55	47	55	52	55	51	59	51	59	56	45	55	53	38					
D	0-7	Interior	97	95	82	97	90	77	97	85	73	95	82	68	90	78	64	87	75	61	83	71	58	77	63	53	70	59	61	64	55	56	60	51	53	56	59	60	53	55	45				
		Exposed	90	78	63	86	74	60	82	69	57	78	64	54	75	61	51	70	58	60	65	56	58	60	51	53	56	58	49	52	54	43	59	51	38	56	47	33	53	42	30				
	7-20	Interior	98	86	78	93	81	73	88	77	66	85	72	63	82	66	60	79	63	57	76	60	54	69	55	50	63	51	57	59	58	53	55	50	51	51	46	60	48	40					
		Exposed	81	66	60	78	62	56	75	59	53	70	56	51	66	53	59	63	51	57	60	60	54	55	55	50	63	51	44	58	46	38	55	40	33	44	26	48	32	26					
	20-27	Interior	98	94	87	98	88	82	98	84	78	97	80	73	92	76	67	89	71	63	85	66	59	80	61	54	75	56	49	69	52	57	64	60	52	60	56	47	56	53	40				
		Exposed	92	76	67	88	70	62	84	64	58	81	61	55	78	58	52	75	56	49	71	53	44	64	60	53	59	56	46	55	52	38	52	48	33	59	43	29	56	38	26				
27-45	Interior	99	99	92	99	97	87	99	92	83	96	88	79	91	84	76	87	80	71	83	77	66	76	69	60	67	63	55	62	58	51	58	55	59	54	51	54	51	59	51	59	51			
	Exposed	91	84	75	85	79	69	81	76	64	77	71	60	72	65	57	66	62	54	63	60	52	58	55	59	54	51	54	50	58	50	57	54	42	54	51	36	51	48	31					
10	B	0-7	Interior	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87				
			Exposed	87	87	86	87	87	81	87	87	77	87	86	73	87	82	68	87	79	64	87	76	61	81	68	56	76	62	52	68	58	59	63	54	56	59	50	52	56	58	49			
		7-20	Interior	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87		
			Exposed	87	87	82	87	85	78	87	81	73	87	77	67	85	72	63	82	67	60	79	63	57	74	58	53	67	54	60	62	50	56	58	57	52	54	54	49	63	51	44			
		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	95	95	95			
			Exposed	95	95	92	95	93	87	95	88	82	95	84	78	95	80	74	93	77	68	89	72	63	83	64	57	78	59	52	74	55	48	68	51	56	63	59	52	59	56	46			
	27-45	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98			
		Exposed	98	98	97	98	98	92	98	98	97	87	98	92	83	96	88	79	92	84	76	87	81	72	80	75	63	74	67	58	65	62	54	61	58	50	57	54	58	54	51	54			
	C	0-7	Interior	87	87	87	87	87	84	87	87	80	87	87	76	87	85	72	87	81	67	87	78	63	83	71	58	78	64	54	72	60	50	65	56	58	61	52	54	58	60	51			
			Exposed	87	84	72	87	80	66	87	77	62	84	72	59	81	67	56	77	64	54	74	61	51	66	56	58	61	52	54	56	59	50	53	55	45	61	52	46	57	49	35			
		7-20	Interior	87	87	85	87	87	80	87	84	76	87	80	71	87	76	65	84	71	62	81	66	59	76	60	55	70	56	51	64	52	58	60	59	54	56	56	51	53	53	47			
			Exposed	87	76	65	84	69	61	80	64	58	77	61	55	73	58	53	69	55	50	66	53	59	60	60	54	56	55	50	52	52	45	59	46	40	56	42	35	53	36	31			
20-27		Interior	95	95	95	95	95	90	95	92	85	95	87	81	95	83	77	95	79	72	92	76	67	86	67	60	81	61	55	76	57	50	71	53	44	65	50	54	61	58	50				
		Exposed	95	83	77	95	78	71	90	74	64	87	68	60	83	64	57	80	61	54	77	58	51	71	54	45	65	50	53	60	57	48	56	53	40	53	50	36	61	45	34				
27-45	Interior	98	98	98	98	98	95	98	98	90	98	96	86	98	91	82	95	87	79	91	84	75	83	77	66	77	70	60	69	64	56	63	60	52	59	56	48	56	53						

* 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-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.

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.

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

[illegible]

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

* 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.

* 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 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.

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]

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



ASCE 7-16
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

Tile Replacement
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									
0	B	0-7	Interior	97	97	97	97	97	97	97	97	95	97	97	90	97	97	86	97	95	82	97	91	79	97	85	72	91	79	64	85	74	60	67	56	76	62	53	71	59	61				
			Exposed	97	97	86	97	94	81	97	90	77	97	86	73	95	82	68	91	79	64	87	76	61	81	68	56	76	62	52	68	58	59	63	54	56	59	50	52	56	58	49			
		7-20	Interior	98	98	98	98	98	97	98	98	91	98	95	87	98	91	82	98	86	79	95	83	75	88	76	65	82	67	60	78	62	56	73	58	53	68	54	49	63	51	57			
			Exposed	98	90	82	98	85	78	92	81	73	89	77	67	85	72	63	82	67	60	79	63	57	74	58	53	67	54	60	62	50	56	58	57	52	54	54	49	63	51	44			
		20-27	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	93	98	94	88	98	80	84	98	83	77	93	77	69	88	70	61	83	64	57	79	60	53	75	56	49
			Exposed	98	98	92	98	93	87	98	88	82	98	84	78	97	80	74	93	77	68	89	72	63	83	64	57	78	59	52	74	55	48	68	51	56	63	59	52	59	56	46			
	27-45	Interior	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	91	82	92	85	76	85	79	69	80	75	63	75	68	59	67	63	55	
		Exposed	99	99	97	99	99	92	99	97	87	99	92	83	96	88	79	92	84	76	87	81	72	80	75	63	74	67	58	65	62	54	61	58	50	57	54	58	54	51	54				
	C	0-7	Interior	97	97	89	97	97	84	97	93	80	97	88	76	97	85	72	94	81	67	90	78	63	83	71	58	78	64	54	72	60	50	65	56	58	61	52	54	58	60	51			
			Exposed	97	84	72	93	80	66	88	77	62	84	72	59	81	67	56	77	64	54	74	61	51	66	56	58	61	52	54	56	59	50	53	55	45	61	52	46	57	49	35			
		7-20	Interior	98	94	85	98	88	80	97	84	76	91	80	71	88	76	65	84	71	62	81	66	59	76	60	55	70	56	51	64	52	58	60	59	54	56	56	51	53	53	47			
			Exposed	87	76	65	84	69	61	80	64	58	77	61	55	73	58	53	69	55	50	66	53	59	60	60	54	56	55	50	52	52	45	59	46	40	56	42	35	53	36	31			
20-27		Interior	98	98	96	98	97	90	98	92	85	98	87	81	98	83	77	96	79	72	92	76	67	86	67	60	81	61	55	76	57	50	71	53	44	65	50	54	61	58	50				
		Exposed	98	83	77	95	78	71	90	74	64	87	68	60	83	64	57	80	61	54	77	58	51	71	54	45	65	50	53	60	57	48	56	53	40	53	50	36	61	45	34				
27-45	Interior	99	99	99	99	99	95	99	99	90	99	96	86	99	91	82	95	87	79	91	84	75	83	77	66	77	70	60	69	64	56	63	60	52	59	56	48	56	53	56					
	Exposed	99	91	82	94	86	78	89	82	73	84	78	68	80	75	63	76	70	60	72	65	57	63	60	52	59	55	47	55	52	55	51	59	51	59	56	45	55	53	38					
D	0-7	Interior	97	95	82	97	90	77	97	85	73	95	82	68	90	78	64	87	75	61	83	71	58	77	63	53	70	59	61	64	55	56	60	51	53	56	59	60	53	55	45				
		Exposed	90	78	63	86	74	60	82	69	57	78	64	54	75	61	51	70	58	60	65	56	58	60	51	53	56	58	49	52	54	43	59	51	38	56	47	33	53	42	30				
	7-20	Interior	98	86	78	93	81	73	88	77	66	85	72	63	82	66	60	79	63	57	76	60	54	69	55	50	63	51	57	59	58	53	55	50	51	51	46	60	48	40					
		Exposed	81	66	60	78	62	56	75	59	53	70	56	51	66	53	59	63	51	57	60	60	54	55	55	50	63	51	44	58	46	38	55	40	33	51	26	29	48	32	26				
	20-27	Interior	98	94	87	98	88	82	98	84	78	97	80	73	92	76	67	89	71	63	85	66	59	80	61	54	75	56	49	69	52	57	64	60	52	60	56	47	56	53	40				
		Exposed	92	76	67	88	70	62	84	64	58	81	61	55	78	58	52	75	56	49	71	53	44	64	60	53	59	56	46	55	52	38	52	48	33	59	43	29	56	38	26				
27-45	Interior	99	99	92	99	97	87	99	92	83	96	88	79	91	84	76	87	80	71	83	77	66	76	69	60	67	63	55	62	58	51	58	55	59	54	51	54	51	59	51	59	51			
	Exposed	91	84	75	85	79	69	81	76	64	77	71	60	72	65	57	66	62	54	63	60	52	58	55	59	54	51	54	50	58	50	57	54	42	54	51	36	51	48	34					
10	B	0-7	Interior	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87				
			Exposed	87	87	86	87	87	81	87	87	77	87	86	73	87	82	68	87	79	64	87	76	61	81	68	56	76	62	52	68	58	59	63	54	56	59	50	52	56	58	49			
		7-20	Interior	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87		
			Exposed	87	87	82	87	85	78	87	81	73	87	77	67	85	72	63	82	67	60	79	63	57	74	58	53	67	54	60	62	50	56	58	57	52	54	54	49	63	51	44			
		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	95	95	95			
			Exposed	95	95	92	95	93	87	95	88	82	95	84	78	95	80	74	93	77	68	89	72	63	83	64	57	78	59	52	74	55	48	68	51	56	63	59	52	59	56	46			
	C	0-7	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98			
			Exposed	98	98	97	98	98	92	98	98	97	87	98	92	83	96	88	79	92	84	76	87	80	71	83	77	66	77	70	60	69	64	56	63	60	52	59	56	48	56	53	56		
		7-20	Interior	87	87	87	87	87	84	87	87	80	87	87	76	87	85	72	87	81	67	87	78	63	83	71	58	78	64	54	72	60	50	65	56	58	61	52	54	58	60	51			
			Exposed	87	84	72	87	80	66	87	77	62	84	72	59	81	67	56	77	64	54	74	61	51	66	56	58	61	52	54	56	59	50	53	55	45	61	52	46	57	49	35			
	D	0-7	Interior	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87			
			Exposed	87	87	82	87	85	78	87	81	73	87	77	67	85	72	63	82	67	60	79	63	57	74	58	53	67	54	60	62	50	56	58	57	52	54	54	49	63	51	44			
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	95				
		Exposed	95	95	92	95	93	87	95	88	82	95	84	78	95	80	74	93	77	68	89	72	63	83	64	57	78	59	52	74	55	48	68	51	56	63	59	52	59	56	46				
20-27	Interior	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98				
	Exposed	98	98	97	98	98																																							

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

* 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.

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.

* 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.

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 astrisks 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.

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

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

[illegible]

* Cells with an astrisks 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.

[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.

[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)																																									
				Roof Wind Zone																																									
				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						
0	B	0-7	Interior	83	83	83	83	83	80	83	83	77	83	83	73	83	81	68	83	78	64	83	75	61	80	67	55	75	61	50	68	56	41	63	52	36	58	46	32	54	40	28			
			Exposed	83	80	68	83	77	63	83	73	59	80	68	56	77	64	52	74	61	49	70	57	44	63	52	37	57	45	31	52	38	27	48	33	24	40	30	32	36	26	28			
		7-20	Interior	83	83	82	83	83	78	83	80	74	83	77	69	83	73	64	80	69	61	77	65	57	71	58	51	65	52	42	60	46	37	55	39	32	51	34	28	47	30	25			
			Exposed	83	73	64	79	68	60	76	63	55	72	59	52	68	55	49	64	52	42	61	49	38	56	39	32	51	33	28	45	29	24	39	25	32	34	28	30	30	25				
		20-27	Interior	83	83	83	83	83	83	83	83	82	83	83	78	83	79	75	83	76	70	83	73	66	81	65	59	76	59	53	71	54	47	66	49	38	61	41	33	57	37	28			
			Exposed	83	79	75	83	76	69	83	71	64	82	66	60	79	62	56	76	58	53	73	55	50	66	50	39	60	40	32	56	35	26	51	31	22	47	27	29	41	24	25			
	C	0-7	Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	80	75	64	80	72	80	75	64	75	67	58	68	61	53	62	56	49	57	52	41	52	48	35	
			Exposed	84	84	78	84	82	75	84	78	70	81	75	65	77	71	61	74	67	58	70	63	55	62	57	49	56	52	40	51	45	33	43	38	28	38	34	25	34	30	21			
		7-20	Interior	83	83	72	83	79	66	83	76	62	83	71	58	79	67	55	76	63	52	73	60	49	66	54	39	60	49	34	55	41	29	50	36	25	44	32	34	39	28	30			
			Exposed	79	67	54	76	62	51	71	58	46	67	55	40	63	52	36	59	49	33	56	43	30	51	36	26	43	31	33	37	27	29	32	24	25	28	31	22	25	28	29			
		20-27	Interior	83	76	67	81	71	62	78	66	58	75	62	54	71	58	51	67	54	47	64	51	41	58	42	35	53	36	30	49	31	26	42	27	34	37	24	30	32	32	27			
			Exposed	71	58	51	66	53	45	62	50	39	59	43	35	55	39	32	53	35	29	50	32	27	42	27	34	36	24	29	31	31	26	27	27	22	24	24	20	32	24	19			
	D	0-7	Interior	84	84	81	84	84	77	84	81	73	83	77	68	80	74	64	77	70	61	73	66	57	65	59	51	59	54	44	53	49	36	49	41	31	40	36	27	36	32	23			
			Exposed	79	74	64	76	69	60	71	64	56	66	60	52	62	57	49	58	53	43	55	51	38	49	42	31	40	36	26	34	31	22	30	27	28	24	24	24	32	21				
		7-20	Interior	83	77	64	83	73	59	80	68	55	77	64	52	74	60	49	69	57	43	66	54	39	59	49	33	54	40	28	49	35	24	41	30	32	36	27	28	32	24	25			
			Exposed	73	60	49	68	56	42	64	52	37	60	49	34	56	44	31	53	39	28	50	36	26	42	30	33	36	26	28	31	34	24	27	30	24	26	19	32	23	17				
		20-27	Interior	83	76	70	83	71	64	82	66	60	79	62	56	76	58	52	72	55	49	68	52	42	62	43	34	57	36	28	52	32	23	48	28	29	41	24	25	37	33	22			
			Exposed	76	58	52	71	54	48	67	50	40	63	44	35	59	39	31	56	36	27	54	33	24	49	28	20	41	24	25	35	31	21	31	27	19	27	24	17	24	21	15			
10	B	0-7	Interior	84	84	81	84	84	77	84	81	73	83	77	68	80	74	64	77	70	61	73	66	57	65	59	51	59	54	44	53	49	36	49	41	31	40	36	27	36	32	23			
			Exposed	79	74	64	76	69	60	71	64	56	66	60	52	62	57	49	58	53	43	55	51	38	49	42	31	40	36	26	34	31	22	30	27	28	24	24	24	32	21				
		7-20	Interior	83	77	64	83	73	59	80	68	55	77	64	52	74	60	49	69	57	43	66	54	39	59	49	33	54	40	28	49	35	24	41	30	32	36	27	28	32	24	25			
			Exposed	73	60	49	68	56	42	64	52	37	60	49	34	56	44	31	53	39	28	50	36	26	42	30	33	36	26	28	31	34	24	27	30	24	26	19	32	23	17				
		20-27	Interior	83	76	70	83	71	64	82	66	60	79	62	56	76	58	52	72	55	49	68	52	42	62	43	34	57	36	28	52	32	23	48	28	29	41	24	25	37	33	22			
			Exposed	76	58	52	71	54	48	67	50	40	63	44	35	59	39	31	56	36	27	54	33	24	49	28	20	41	24	25	35	31	21	31	27	19	27	24	17	24	21	15			
	C	0-7	Interior	84	84	81	84	84	77	84	81	73	83	77	68	80	74	64	77	70	61	73	66	57	65	59	51	59	54	44	53	49	36	49	41	31	40	36	27	36	32	23			
			Exposed	79	74	64	76	69	60	71	64	56	66	60	52	62	57	49	58	53	43	55	51	38	49	42	31	40	36	26	34	31	22	30	27	28	24	24	24	32	21				
		7-20	Interior	83	77	64	83	73	59	74	68	55	74	64	52	74	60	49	69	57	43	66	54	39	59	49	33	54	40	28	49	35	24	41	30	32	36	27	28	32	24	25			
			Exposed	73	60	49	68	56	42	64	52	37	60	49	34	56	44	31	53	39	28	50	36	26	42	30	33	36	26	28	31	34	24	27	30	24	26	19	32	23	17				
		20-27	Interior	82	76	70	82	71	64	82	66	60	79	62	56	76	58	52	72	55	49	68	52	42	62	43	34	57	36	28	52	32	23	48	28	29	41	24	25	37	33	22			
			Exposed	76	58	52	71	54	48	67	50	40	63	44	35	59	39	31	56	36	27	54	33	24	49	28	20	41	24	25	35	31	21	31	27	19	27	24	17	24	21	15			
	D	0-7	Interior	84*	83*	75	84*	79	70	80	75	65	77	71	61	73	66	57	69	62	54	65	59	51	58	53	42	52	48	35	45	40	30	39	35	25	34	30	22	30	27	28			
			Exposed	73	66	57	68	62	53	63	58	50	59	54	44	55	51	39	52	47	35	49	41	31	39	35	25	33	30	21	29	26	27	25	34	34	30	20	30	27	17				
		7-20	Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	50	61	56	41	61	52	36	58	46	32	54	40	28				
			Exposed	61	61	61	61	61	61	61	61	61	59	61	61	56	61	61	52	61	61	49	61	57	44	61	52	37	57	45	31	52	38	27	48	33	24	40	30	32	36	26	28		
		20-27	Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	60	46	37	55	39	32	51	34	28	47	30	25				
			Exposed	62	62	62	62	62	62	62	62	62	55	62	59	52	62	55	49	62	52	42	61	49	38	56	39	32	51	33	28	45	29	24	39	25	32	34	34	28	30	30	25		
20	B	0-7	Interior	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	74*	70*	74*	73*	66	74*	65	59	74*	59	53	71*	54	47	66	49	38	61	41	33	57	37	28				
			Exposed	74*	74*	74*	74*	74*	74*	74*	71*	64	74*	66	60	74*	62	56	74*	58	53	73*	55	50	66	50	39	60	40	32	56	35	26	51	31	22	47	27	29	41	24	25			
		7-20	Interior	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	65*	71*	67*	58	68*	61	53	62	56	49	57	52	41	52	48	35
			Exposed	71*	71*	71*	71*	71*	71*	71*	71*	71*	65*	71*	65*	71*	61*	65*	71*	61*	64*	55	62	57	49	56	52	40	51	45	33	43	38	28	38	34	25	34	30	21					
		20-27	Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61																											

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 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.

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



ASCE 7-16
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

19 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

SML
Rail Type

UAF
Clamp

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

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

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

[illegible]

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

* 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.

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)																																		
				Roof Wind Zone																																		
				90			95			100			105			110			115			120			130			140			150			160			170	
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	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	
		7-20	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*	
			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*	
		20-27	Interior	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	
			Exposed	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	
	27-45	Interior	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*		
		Exposed	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*	32*		
	C	0-7	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	
		7-20	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*	
			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*	
20-27		Interior	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	
		Exposed	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	34*	
27-45	Interior	32*	32*																																			

* 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.

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	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	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				
		7-20	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77			
			Exposed	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77				
		20-27	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				
			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				
	27-45	Interior	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*					
		Exposed	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*	86*					
	C	0-7	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				
			Exposed	76	76	68	76	76	63	76	76	60	76	69	57	76	64	54	75	61	52	71	59	49	63	54	42	58	50	52	54	44	48	51	53	42	46	39				
		7-20	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77				
			Exposed	77	72	63	77	65	59	77	62	56	75	59	53	70	56	51	66	53	48	63	51	44	58	45	52	54	48	50	42	45	44	47	54	39	38	51				
20-27		Interior	83	83	83	83	83	83	83	83	82	83	83	78	83	80	74	83	77	68	83	72	63	83	64	57	78	59	52	74	55	48	68	51	40	63	48					
		Exposed	83	80	74	83	76	66	83	70	61	83	64	58	81	61	55	78	59	52	75	56	49	68	52	41	62	47	33	58	41											

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.

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