

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

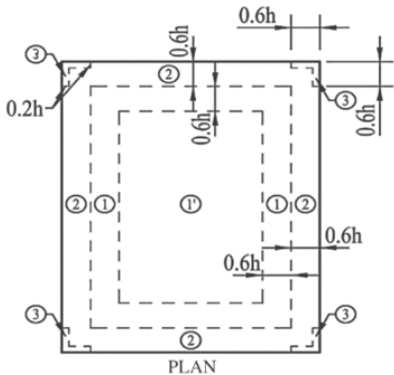
- 0.2-s Spectral Response Acceleration
- $S_s = 1.25$ and 3 with $S_{ds} = 1, 2.4$ respectively per criteria shown on individual span tables sheets.
- $S_1 = 0.5$ & $S_{d1} = 0.6$
- Seismic site class D

Array Assumptions

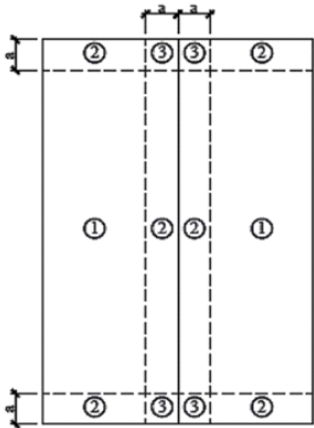
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at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

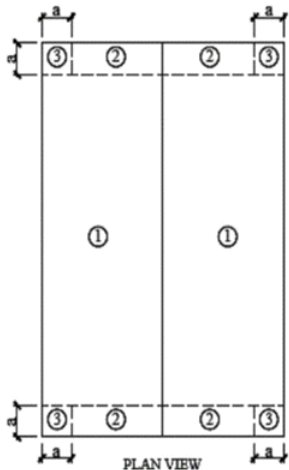
Zone should be considered as per ASCE 7-22, Fig. 30.3-2A to 30.3-2D



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

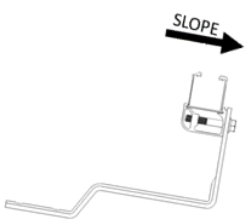


Gable Roofs $7^\circ < \theta \leq 27^\circ$



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

Rails can be installed in these possible orientations.

*AT1	
Y+	Alternate orientation not allowed
Y-	

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																															
				90			95			100			105			110			115			120			130			140			150			160			170			180											
				Roof Wind Zone																																															
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3									
0	B	0-7	Interior	86	86	86	86	86	84	86	86	74	86	86	62	86	84	52	86	77	45	86	67	40	83	51	34	66	41	29	53	36	25	43	31	22	38	27	19	33	24	17									
			Exposed	86	84	52	86	74	84	86	62	39	84	53	35	76	46	31	65	41	29	56	37	26	44	31	22	37	27	19	32	23	16	28	20	14	24	18	19	22	16	17									
		7-20	Interior	86	86	86	86	86	79	86	86	63	86	85	51	86	77	43	86	63	39	86	53	35	72	41	30	53	35	26	41	30	22	36	26	19	32	23	17	28	20	15									
			Exposed	86	76	42	86	60	38	85	49	34	76	41	31	62	38	28	51	34	25	43	31	23	36	26	19	31	23	17	27	20	14	23	17	13	21	15	17	18	13	15									
		20-27	Interior	87	87	87	87	87	87	87	87	85	87	87	76	87	84	62	87	76	51	87	62	43	87	45	36	83	37	31	67	32	27	53	28	23	43	25	21	38	22	18									
			Exposed	87	84	61	87	72	49	87	57	41	87	47	37	86	41	34	83	37	31	72	34	28	54	29	24	42	24	20	36	21	17	32	18	15	28	16	13	25	14	18									
	C	0-7	Interior	87	87	87	87	87	87	87	87	87	87	87	86	87	87	83	87	87	70	87	84	59	84	65	44	64	50	37	48	41	32	40	35	28	35	31	25	31	28	22									
			Exposed	87	87	83	87	86	67	87	87	82	55	85	68	46	76	57	40	62	49	37	52	42	34	40	36	28	34	31	24	30	27	21	26	23	18	23	20	16	20	18	14								
		7-20	Interior	86	86	57	86	82	47	86	68	41	86	58	37	83	50	33	71	43	30	62	39	28	47	33	23	39	28	20	34	24	17	29	21	15	26	19	13	23	17	18									
			Exposed	83	50	33	69	42	30	58	38	26	49	34	24	42	31	22	39	28	20	35	26	18	30	22	15	25	18	13	22	16	17	19	14	15	17	19	13	15	17	12									
		20-27	Interior	86	83	47	86	67	40	86	54	36	83	45	32	69	40	29	57	36	27	48	33	24	38	28	21	33	24	18	28	21	15	25	18	13	22	16	18	19	14	16									
			Exposed	69	40	29	54	35	26	44	32	23	39	29	21	36	26	19	32	24	17	30	22	16	25	18	13	21	16	17	18	13	15	16	18	13	14	16	12	13	14	10									
10	D	0-7	Interior	87	86	69	87	81	54	87	64	44	87	52	39																																				

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.

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

[illegible]

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

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

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

* 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]

* 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.

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.

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

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				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							
60	B	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	21	24	24	18	24	23	16	24	20	14				
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	16	24	19	14	23	17	18	20	15	16	18	13	14
		Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	16	24	24	22	16	24	19	14	23	17	13			
		Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	27	22	29	24	19	28	21	17	27	18	15	
		Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	31	31	27	30	30	23	28	26	21	26	23	18		
		Exposed	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	23	16	24	21	15	24	18	13	21	15	16	18	13	14	16	18	13	14	16	14	10			
	Exposed	24	24	24	24	24	24	22	24	24	19	24	24	18	24	22	16	24	20	14	24	18	13	21	15	17	18	13	15	15	17	13	14	16	18	13	14	16	14	10		

* 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.

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.

* 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 indicate 3-rail system span. Contact Unirac Engineering Services for support.

[illegible]

* Cells with an astrisks 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.

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

[illegible]

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

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

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

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]

10 Highlighted cell indicate 3-rail system span. 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.

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

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

[illegible]

* 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.

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.

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

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

* 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.

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.