

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

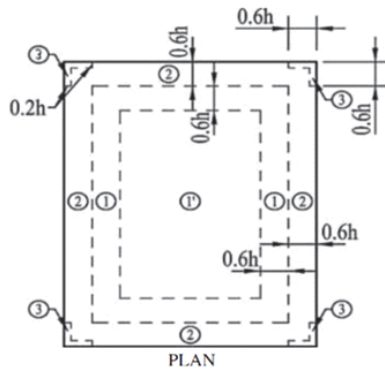
- 0.2-s Spectral Response Acceleration, $S_S \leq 3$
- $S_S = 1.25$ and 3 per criteria shown on individual span tables sheets.
- $S_1 = 0.5$
- Seismic site class D

Array Assumptions

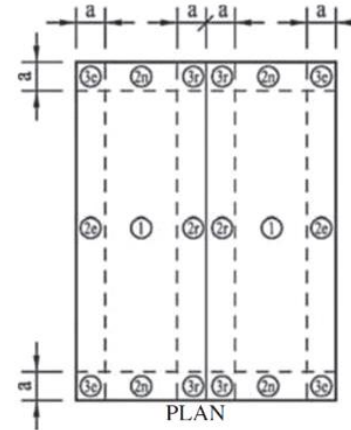
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at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

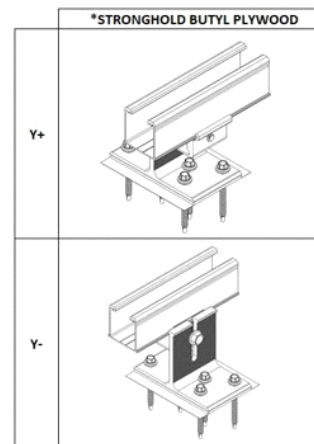


Gable Roofs $7^\circ < \theta \leq 45^\circ$

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.



* 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.

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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			
0	B	0-7	Interior	78	78	71	78	78	59	78	78	53	78	75	48	78	62	43	78	56	39	78	51	36	60	43	30	51	36	26	43	31	22	38	27	19	33	24	17	29	21	15
			Exposed	78	61	43	78	78	55	38	74	49	34	61	44	31	55	40	28	50	36	25	45	33	23	28	19	33	24	17	28	20	14	24	18	12	22	16	11	19	14	15
		7-20	Interior	78	78	58	78	63	52	78	57	46	78	51	42	77	46	38	65	42	34	59	38	31	50	32	26	42	27	22	36	24	19	32	21	17	28	18	15	25	16	13
			Exposed	76	46	37	63	41	33	57	36	30	51	33	27	46	30	24	42	27	22	38	25	20	32	21	17	27	18	15	24	15	13	21	13	11	18	12	15	16	10	13
		20-27	Interior	80	80	80	80	80	63	80	80	53	80	62	46	80	56	41	80	51	36	80	46	32	69	39	26	57	33	22	49	29	19	43	25	17	38	22	15	33	19	13
			Exposed	80	55	40	80	49	35	80	44	30	72	40	27	63	36	24	57	33	22	52	30	20	43	25	17	37	21	15	32	19	13	28	16	11	24	14	10	22	13	9
	C	0-7	Interior	81	81	81	81	81	81	81	81	76	81	81	58	81	81	52	81	63	46	65	58	41	54	49	34	46	41	28	40	36	24	35	31	20	31	27	17	27	24	15
			Exposed	81	81	51	81	62	45	62	55	39	56	50	35	50	45	31	46	41	28	42	37	25	35	32	20	30	27	17	26	23	14	23	20	12	20	18	11	18	16	10
		7-20	Interior	78	68	46	78	59	41	78	52	37	67	47	33	59	43	30	54	39	27	49	35	25	41	30	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	10
			Exposed	59	42	30	52	38	26	47	34	24	42	30	21	38	27	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	10	17	12	13	15	11	12	13	15	10
		20-27	Interior	78	49	40	70	44	36	61	39	32	55	35	29	49	32	26	45	29	24	41	26	22	34	22	18	29	19	16	25	16	14	22	14	12	19	13	10	17	11	14
			Exposed	80	60	44	80	53	38	80	47	33	80	43	29	69	39	26	61	35	24	56	32	22	47	27	18	40	23	16	34	20	14	30	17	12	26	15	10	23	14	9
10	B	0-7	Interior	81	81	56	81	70	49	81	59	43	60	53	38	54	48	34	49																							

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

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[illegible]

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

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

[illegible]

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		Exposed	38	38	37	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	32	37	37	27	19	32	23	16	27	20	14	24	17	12	21	15	11	19	14	14
		Exposed	46	46	39	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	
		Exposed	53	53	50	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
		Exposed	37	37	29	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	29	37	36	25	37	31	22	37	27	19	32	23	16	12	20	15	11	19	14	14
	Exposed	38	31	26	38	38	28	23	38	25	20	34	22	18	31	20	17	28	18	15	26	17	14	22	14	12	15	16	10	13	14	14	11	12	12	12	12	12</							

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