

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

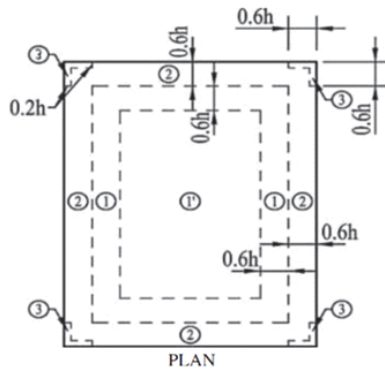
- 0.2-s Spectral Response Acceleration, $SS \leq 3$
- $S_s = 1.25$ and 3 per criteria shown on individual span tables sheets.
- $S_1 = 0.5$
- Seismic site class D

Array Assumptions

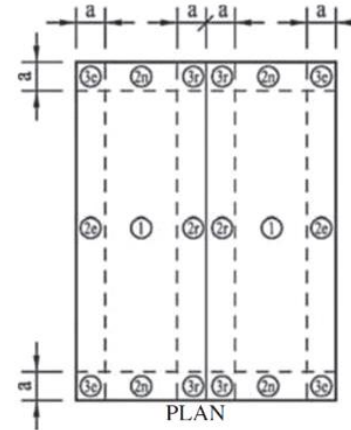
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at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

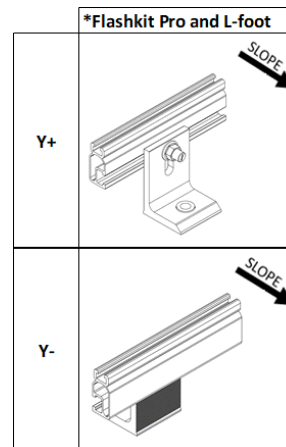


Gable Roofs $7^\circ < \theta \leq 45^\circ$

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.



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	83	83	83	83	83	83	83	83	82	83	83	79	83	76	83	83	72	83	80	68	83	75	61	80	68	56	75	62	51	70	57	47	64	53	44	60	50	40										
			Exposed	83	83	75	83	82	71	83	78	66	83	75	62	82	71	59	79	67	55	77	64	52	70	58	47	64	53	43	58	49	38	54	45	46	50	41	43	47	37	39									
		7-20	Interior	83	83	83	83	83	83	83	83	80	83	82	76	83	79	72	83	76	68	82	72	64	77	65	58	72	59	52	66	54	48	61	49	44	57	46	39	53	42	35									
			Exposed	83	79	72	83	75	67	81	70	62	78	66	58	75	62	55	71	58	52	68	55	49	62	50	44	56	45	39	52	41	34	48	35	43	45	45	39	42	42	35									
		20-27	Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84	80	84	82	77	84	79	74	84	73	66	81	66	60	77	60	54	72	55	50	67	51	46	63	50	43									
			Exposed	84	84	80	84	81	76	84	77	72	84	74	67	84	69	63	81	65	59	78	62	56	73	56	50	67	51	46	61	46	41	57	43	34	53	38	43	50	38	38									
	27-45	Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	81	84	84	78	84	80	72	80	75	65	75	69	60	69	63	55	64	58	51	59	54	47					
		Exposed	84	84	84	84	84	84	84	84	84	84	84	77	84	80	73	83	77	68	80	74	65	77	80	70	63	55	63	58	50	67	53	46	53	49	43	49	45	37	45	42	45								
	C	0-7	Interior	83	83	78	83	83	74	83	81	69	83	77	65	83	75	61	82	70	58	79	67	55	73	60	49	67	55	45	61	51	41	56	47	36	52	44	45	49	39	42									
			Exposed	83	74	61	81	69	57	77	65	53	74	61	50	70	58	47	66	55	45	63	52	42	57	47	36	52	43	44	48	38	40	44	46	35	40	43	41	35	39	29									
		7-20	Interior	83	81	75	83	77	70	83	74	65	80	69	61	77	65	57	74	61	54	70	58	51	64	52	46	59	47	42	54	43	36	50	38	45	47	34	42	44	44	37									
			Exposed	77	65	57	73	60	53	69	56	50	65	53	47	61	49	44	58	47	41	55	44	38	51	38	45	47	46	41	43	43	36	38	38	41	34	29	26	44	39	24									
20-27		Interior	84	84	83	84	83	79	84	80	7																																								

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

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II

30 ft

S_s = 3.00

23 sq.ft
Module Area

LANDSCAPE

CROSS-SLOPE
Rail Direction

SML
Rail Type

UAF
Clamp

Flashkit Pro

SPAN TABLES

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

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