Span Tables

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, kzt = 1.0
- γE = 1.0 for 'Interior' spans, γE = 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

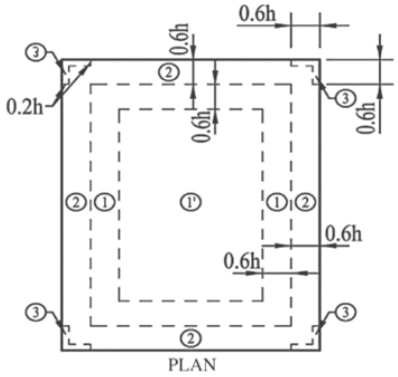
- 0.2-s Spectral Response Acceleration
- S_S = 1.25 and 3 with Sds = 1, 2.4 respectively per criteria shown on individual span tables sheets.
- S_1 = 0.5 & Sd1 = 0.6
- Seismic site class D

Array Assumptions

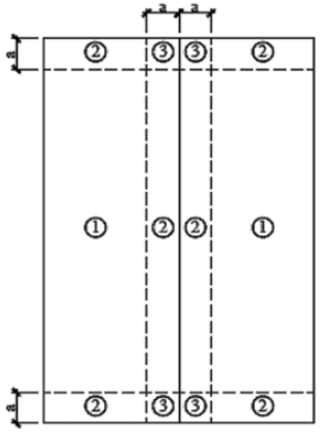
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at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

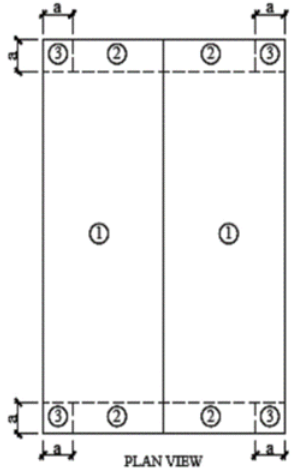
Zone should be considered as per ASCE 7-22, Fig. 30.3-2A to 30.3-2D



Gable Roofs θ ≤ 7°



Gable Roofs 7°< θ ≤ 27°



Gable Roofs 27°< θ ≤ 45°

Rails can be installed in these possible orientations.

#N/A

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ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	47	47	46	47	47	40	47	47	35	47	47	32	47	41	29	47	37	26	47	34	24	40	28	20	34	24	17	29	21	15	25	18	13	22	16	11	19	14	10
			Exposed	47	41	28	47	36	25	47	32	23	41	29	20	37	26	18	33	24	17	30	22	15	25	18	13	22	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	47	47	39	47	47	35	47	43	31	47	38	28	47	34	25	44	31	23	40	28	21	33	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9
			Exposed	47	34	25	42	30	22	38	27	20	34	24	18	31	22	16	28	20	15	25	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	48	48	48	48	48	42	48	48	38	48	41	34	48	37	30	48	34	28	48	31	25	47	26	21	38	22	18	33	19	16	29	16	14	25	14	12	22	13	10
			Exposed	48	37	30	48	33	27	48	29	24	48	26	22	42	24	20	38	22	18	34	20	16	29	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	48	48	48	48	48	48	48	48	47	48	48	40	48	48	36	48	42	33	44	38	30	36	32	25	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13
			Exposed	48	48	36	48	41	32	41	37	29	37	33	26	34	30	24	30	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	47	44	30	47	39	27	47	34	24	44	31	22	39	28	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	39	28	19	34	25	17	31	22	15	28	20	14	25	18	13	23	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	47	36	26	47	32	23	40	29	21	36	26	19	32	23	17	29	21	16	27	19	14	22	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	32	23	17	29	21	15	26	18	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	48	39	32	48	35	29	48	31	25	48	28	23	45	25	21	40	23	19	37	21	17	31	18	14	26	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	45	25	21	39	22	18	35	20	16	31	18	15	28	16	13	26	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	48	48	38	48	44	34	45	39	31	39	35	28	36	32	25	32	29	23	29	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	35	32	25	31	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	47	36	25	46	32	22	40	28	20	36	26	18	32	23	16	29	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	32	23	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	42	30	22	37	27	19	33	24	17	30	21	16	27	19	14	24	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	48	32	27	48	29	24	47	26	21	41	23	19	37	21	17	33	19	16	30	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	36	21	17	32	19	15	29	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	48	41	32	40	36	28	36	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
10	B	0-7	Interior	38	38	38	38	38	38	38	38	35	38	38	32	38	38	29	38	37	26	38	34	24	38	28	20	34	24	17	29	21	15	25	18	13	22	16	11	19	14	10
			Exposed	38	38	28	38	36	25	38	32	23	38	29	20	37	26	18	33	24	17	30	22	15	25	18	13	22	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	38	38	38	38	38	35	38	38	31	38	38	28	38	34	25	38	31	23	38	28	21	33	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9
			Exposed	38	34	25	38	30	22	38	27	20	34	24	18	31	22	16	28	20	15	25	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	44	44	44	44	44	42	44	44	38	44	41	34	44	37	30	44	34	28	44	31	25	44	26	21	38	22	18	33	19	16	29	16	14	25	14	12	22	13	10
			Exposed	44	37	30	44	33	27	44	29	24	44	26	22	42	24	20	38	22	18	34	20	16	29	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	40	47	47	36	47	42	33	44	38	30	36	32	25	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13
			Exposed	47	47	36	47	41	32	41	37	29	37	33	26	34	30	24	30	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	38	38	30	38	38	27	38	34	24	38	31	22	38	28	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	38	28	19	34	25	17	31	22	15	28	20	14	25	18	13	23	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	38	36	26	38	32	23	38	29	21	36	26	19	32	23	17	29	21	16	27	19	14	22	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	32	23	17	29	21	15	26	18	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	44	39	32	44	35	29	44	31	25	44	28	23	44	25	21	40	23	19	37	21	17	31	18	14	26	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	44	25	21	39	22	18	35	20	16	31	18	15	28	16	13	26	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	47	47	38	47	44	34	45	39	31	39	35	28	36	32	25	32	29	23	29	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	35	32	25	31	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	38	36	25	38	32	22	38	28	20	36	26	18	32	23	16	29	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	32	23	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	38	30	22	37	27	19	33	24	17	30	21	16	27	19	14	24	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	45	32	27	45	29	24	45	26	21	41	23	19	37	21	17	33	19	16	30	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	36	21	17	32	19	15	29	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	48	41	32	40	36	28	36	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
20	B	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	24	28	28	20	28	24	17	28	21	15	25	18	13	22	16	11	19	14	10
			Exposed	28	28	28	28	28	25	28	28	23	28	28	20	28	26	18	28	24	17	28	22	15	25	18	13	22	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	28	28	21	28	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9
			Exposed	28	28	25	28	28	22	28	27	20	28	24	18	28	22	16	28	20	15	25	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	30	34	34	28	34	31	25	34	26	21	34	22	18	33	19	16	29	16	14	25	14	12	22	13	10
			Exposed	34	34	30	34	33	27	34	29	24	34	26	22	34	24	20	34	22	18	34	20	16	29	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	36	38	38	33	38	38	30	36	32	25	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13
			Exposed	38	38	36	38	38	32	38	37	29	37	33	26	34	30	24	30	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	28	28	28	28	28	27	28	28	24	28	28	22	28	28	19	28	25	18	28	23	16	27	19	14	23	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	28	28	19	28	25	17	28	22	15	28	20	14	25	18	13	23	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	28	28	26	28	28	23	28	28	21	28	26	19	28	23	17	28	21	16	27	19	14	22	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	28	23	17	28	21	15	26	18	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	34	34	32	34	34	29	34	31	25	34	28	23	34	25	21	34	23	19	34	21	17	31	18	14	26	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	34	25	21	34	22	18	34	20	16	31	18	15	28	16	13	26	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	38	38	38	38	38	34	38	38	31	38	35	28	36	32	25	32	29	23	29	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	35	32	25	31	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	28	28	25	28	28	22	28	28	20	28	26	18	28	23	16	28	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	28	23	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	28	28	22	28	27	19	28	24	17	28	21	16	27	19	14	24	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	36	32	27	36	29	24	36	26	21	36	23	19	36	21	17	33	19	16	30	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	36	21	17	32	19	15	29	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	40	40	32	40	36	28	36	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	15	22	18	13	22	16	11	19	14	10
			Exposed	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	17	22	22	15	22	18	13	22	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	17	22	20	15	22	17	13	21	15	11	18	13	10	16	12	9	
			Exposed	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	20	15	22	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	26	21	28	22	18	28	19	16	28	16	14	25	14	12	22	13	10
			Exposed	28	28	28	28	28	27	28	28	24	28	26	22	28	24	20	28	22	18	28	20	16	28	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	25	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13
			Exposed	32	32	32	32	32	32	32	32	29	32	32	26	32	30	24	30	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	19	22	22	18	22	22	16	22	19	14	22	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	22	22	19	22	22	17	22	22	15	22	20	14	22	18	13	22	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	21	16	22	19	14	22	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	22	22	17	22	21	15	22	18	14	22	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	28	28	28	28	28	28	28	28	25	28	28	23	28	25	21	28	23	19	28	21	17	28	18	14	26	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	28	25	21	28	22	18	28	20	16	28	18	15	28	16	13	26	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	32	32	32	32	32	32	32	32	31	32	32	28	32	32	25	32	29	23	29	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	32	32	25	31	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	22	22	16	22	20	14	22	18	13	22	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	22	22	22	22	22	19	22	22	17	22	21	16	22	19	14	22	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	22	19	14	22	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	30	30	27	30	29	24	30	26	21	30	23	19	30	21	17	30	19	16	30	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	30	21	17	30	19	15	29	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	34	34	32	34	34	28	34	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
40	B	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	15	21	18	13	21	16	11	19	14	10			
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		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	17	21	20	15	21	17	13	21	15	11	18	13	10	16	11	8	14	10	11
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		20-27	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	24	24	24	22	18	24	19	16	24	16	14	24	14	12
			Exposed	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	22	18	24	20	16	24	17	14	24	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	22	26	24	19	23	21	16	20	18	14	18	16	13
			Exposed	28	28	28	28	28	28	28	28	28	28	28	26	28	28	24	28	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	18	21	21	16	21	19	14	21	16	12	20	14	10	17	12	9	15	11	12	13	10	10
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		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	21	19	14	21	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	21	21	17	21	21	15	21	18	14	21	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	23	19	24	21	17	24	18	14	24	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	24	24	21	24	22	18	24	20	16	24	18	15	24	16	13	24	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	27	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	28	28	25	28	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	22	22	16	22	20	14	22	18	13	22	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	22	22	22	22	22	19	22	22	17	22	21	16	22	19	14	22	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	22	19	14	22	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	26	26	26	26	26	24	26	26	21	26	23	19	26	21	17	26	19	16	26	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	26	21	17	26	19	15	26	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	29	29	29	29	29	28	29	29	25	29	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
50	B	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13	18	16	11	18	14	10			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13	18	16	11	18	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	17	13	18	15	11	17	13	10	16	12	9			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	18	13	18	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	16	21	16	14	21	14	12	20	13	10			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	18	21	20	16	21	17	14	21	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	24	22	23	23	19	22	21	16	20	18	14	18	16	13
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	14	18	16	12	18	14	10	17	12	9	15	11	12	13	10	10
			Exposed	18	18	18	18	18	17	18	18	15	18	18	14	18	18	13	18	16	11	18	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	18	14	18	16	12	18	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	18	18	17	18	18	15	18	18	14	18	17	12	18	15	11	18	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	18	14	21	15	12	20	13	11	20	11	9	17	10	12	15	9	11
			Exposed	21	21	21	21	21	18	21	20	16	21	18	15	21	16	13	21	15	12	21	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	24	24	21	23	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	25	25	25	25	25	22	25	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	19	19	16	19	19	14	19	18	13	19	16	11	19	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	19	19	19	19	19	19	19	19	17	19	19	16	19	19	14	19	18	13	19	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	19	19	14	19	17	13	19	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	22	22	22	22	22	22	22	22	21	22	22	19	22	21	17	22	19	16	22	17	14	22	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	22	21	17	22	19	15	22	17	14	22	15	12	22	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	26	26	26	26	26	26	26	26	25	26	26	23	26	26	21	25	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	26	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	11	15	14	10			
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	9	15	12	8	14	10	11	13	9	10
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	9			
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	10	15	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	16	14	18	14	10	18	14	10	18	13	10			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	17	14	18	14	12	18	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	28	30	30	25	29	28	22	27	24	19
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	10	15	12	9	15	11	12	13	10	10
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	11	15	15	10	15	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	10	15	12	9	14	10	12	13	9	10	11	12	9
			Exposed	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	14	18	15	12	18	13	11	17	11	9	17	10	12	15	9	11
			Exposed	18	18	18	18	18	18	18	18	16	18	18	15	18	16	13	18	15	12	18	14	11	18	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	31	31	31	27	29	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	33	33	33	33	33	33	33	33	30	33	33	27	33	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
	D	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	16	11	16	14	10	16	12	9	14	10	11	12	9	10	11	12	9
			Exposed	16	16	16	16	16	14	16	16	13	16	16	11	16	15	10	16	13	9	16	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	12	17	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	17	17	14	17	17	13	17	15	11	17	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	15	12	19	12	10	18	11	9	16	9	12	14	8	10	13	11	9
			Exposed	20	20	17	20	19	15	20	17	14	20	15	12	20	14	11	20	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	22	22	19	22	22	17	20	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	23	23	21	23	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
70	B	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	9	13	12	8	13	10	11	13	9	10
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	9
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	11	8	13	10	11	12	9	10	11	12	9
		20-27	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	24	24	24	24	24	24	24	21	24	22	18	24	19	16
			Exposed	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	22	18	24	19	15	24	16	13	24	14	12	22	13	10
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	28	28	28	25	27	27	22	25	24	19
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	25	30	27	21	26	23	18	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	11	12	13	10	10
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	9	13	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	10	12	13	9	10	11	12	9
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	9	13	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	19	24	20	16	24	17	14	23	15	12	22	13	11
			Exposed	24	24	24	24	24	24	24	24	22	24	24	20	24	22	19	24	21	17	24	17	14	24	15	12	22	13	11	19	11	9	17	10	8	15	9	7			
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	26	27	27	23	26	25	20	24	22	17	21	19	15	19	17	13	
			Exposed	30	30	30	30	30	30	30	30	27	30	30	24	30	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9			
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	11	14	14	10	14	12	8	14	10	11	12	9	10	11	12	9
			Exposed	14	14	14	14	14	14	14	14	13	14	14	11	14	14	10	14	13	9	14	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	13	10	14	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	14	14	14	14	14	13	14	14	11	14	14	10	14	12	9	14	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	26	22	29	22	18	28	19	16	27	16	13	25	14	12	22	13	10	19	11	9
			Exposed	29	29	26	29	28	23	29	25	21	29	23	19	29	21	17	29	19	15	29	17	14	25	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	31	31	28	30	30	26	28	28	22	27	24	19	23	21	16	20	18	14	18	16	12	16	14	11
			Exposed	32	32	31	32	32	28	32	32	25	32	28	22	29	26	20	26	23	19	24	21	17	20	18	14	17	15	12	15	13	11	13	12	9	11	10	8	10	9	7
80	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	10	11	11	9	10
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	13
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	17	13	19	15	11	18	13	10	16	12	9
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	16
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	15	21	16	13	21	14	12	21	13	10			
		27-45	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	26	26	26	25	25	25	24	24	22	24	24	19
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	21	26	23	18	23	20	16	20	18	14	18	16	13			
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	12	11	10	10
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	11	11	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	16	12	19	14	10	17	12	9
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	16	12	19	14	10	16	12	9	14	10	8	12	9	7	11	8	6
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	20	16	21	17	14	21	15	12	21	13	11	15	12	11
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	19	21	21	17	21	17	14	21	15	12	21	13	11	19	11	9	17	10	8	15	9	7
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	23	24	24	20	23	22	17	21	19	15	19	17	13	
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	22	27	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	10	12	12	8	12	10	11	12	9	10	11	12	9
			Exposed	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	12	9	12	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	8	13	10	11	12	9	10	10	12	8	9	10	8
			Exposed	13	13	13	13	13	13	13	13	10	13	13	12	9	13	11	8	13	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5		
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	22	18	24	19	16	23	16	13	22	14	12	21	13	10	19	11	9
			Exposed	24	24	24	24	24	23	24	24	21	24	23	19	24	21	17	24	19	15	24	17	14	24	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	28	28	27	27	26	26	26	22	25	24	19	23	21	16	20	18	14	18	16	12	16	14	11
			Exposed	29	29	29	29	29	28	29	29	25	29	28	22	29	26	20	26	23	19	24	21	17	20	18	14	17	15	12	15	13	11	13	12	9	11	10	8	10	9	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	11	10	9	10
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	11	17	13	10	16	12	9
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	16	13	19	14	12	19	13	10
		27-45	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	26	26	26	26	26	25	25	25	22	24	24	19
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	12	10	10	10
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	11	10	9	10	10	12	9	10	11	8	9	9	7
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	12	17	14	10	17	12	9
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	16	12	17	14	10	16	12	9	14	10	8	12	9	7	11	8	6			
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	17	14	19	15	12	19	13	11						
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	17	14	19	15	12	19	13	11	19	11	9	17	10	8						
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	23	24	24	20	23	22	17	21	19	15	19	17	13
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	22	27	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
	D	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	11	11	9	10	11	12	9			
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	9	11	10	11	11	9	9	11	12	8	9	10	7	12	9	6	11	8	5		
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	17	13	19	15	11	18	13	10	16	12	8	14	10	8	
			Exposed	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	17	13	19	16	12	18	13	10	16	11	8	13	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	16	21	16	13	21	14	12	20	13	10	19	11	9
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	19	15	21	17	14	21	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	25	24	24	22	23	23	19	22	21	16	20	18	14	18	16	12	16	14	11
			Exposed	27	27	27	27	27	27	27	27	25	27	27	22	27	26	20	26	23	19	24	21	17	20	18	14	17	15	12	15	13	11	13	12	9	11	10	8	10	9	7
100	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	11	9	9	10
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	11	14	13	10	14	12	9			
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	16	13	19	14	12	19	13	10
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21	21	20	20	19
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	20	16	20	18	14	18	16	13			
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	9	9	10
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	11	9	9	10	9	12	9	9	11	8	9	9	7
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	10	14	12	9
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	14	10	14	12	9	14	10	8	12	9	7			
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	17	14	19	15	12	19	13	11						
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	17	14	19	15	12	19	13	11	19	11	9	17	10	8						
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	21	21	21	20	20	17	19	19	15	18	17	13
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
	D	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8	10	10	11	10	9	10	10	12	9			
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	9	10	10	11	10	9	9	10	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	11	17	13	10	16	12	8	14	10	8
			Exposed	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	17	13	17	16	12	17	13	10	16	11	8	13	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	16	13	19	14	12	18	13	10	18	11	9
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	15	19	17	14	19	14	12	19	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	23	24	24	19	22	21	16	20	18	14	18	16	12	16	14	11
			Exposed	27	27	27	27	27	27	27	27	25	27	27	23	27	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	12	10	8	10	9	7

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	78	78	78	78	78	70	78	78	60	78	78	53	78	77	48	78	63	44	78	57	40	70	48	34	57	41	29	49	35	25	42	31	22	37	27	19	33	24	17
			Exposed	78	76	48	78	61	43	78	55	38	75	49	34	62	44	31	56	40	28	51	37	26	43	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	78	78	69	78	78	58	78	78	52	78	64	47	78	58	42	78	53	38	77	48	35	56	40	30	47	34	25	41	30	22	36	26	19	31	23	17	28	20	15
			Exposed	78	58	42	78	51	37	64	46	34	57	41	30	52	37	27	47	34	25	43	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	79	79	79	79	79	79	79	79	63	79	79	57	79	63	51	79	57	47	79	52	42	79	44	36	65	37	31	56	32	26	48	28	23	42	25	20	37	22	18
			Exposed	79	62	51	79	55	45	79	50	41	79	45	37	79	40	33	64	37	30	58	33	28	49	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	80	80	80	80	80	80	80	80	80	80	80	80	80	80	61	80	80	56	80	65	51	61	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	80	80	61	80	80	54	80	62	49	63	56	44	57	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	78	78	51	78	65	45	78	58	40	78	52	36	67	47	33	60	43	30	54	39	27	45	33	23	39	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	66	47	33	58	42	29	52	37	26	47	34	24	42	30	21	38	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	78	61	45	78	54	40	78	48	35	61	44	32	55	39	29	50	36	26	45	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	54	39	29	48	35	26	43	31	23	39	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	79	73	54	79	59	48	79	52	43	79	47	39	79	43	35	74	39	32	62	35	29	52	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	79	42	35	68	38	31	59	34	28	53	30	25	48	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	~~12~~
		27-45	Interior	80	80	65	80	80	58	80	67	52	74	59	46	60	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	60	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	78	61	42	78	54	37	70	48	33	60	43	30	54	39	27	49	35	25	45	32	23	38	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	54	39	27	48	34	24	43	31	22	39	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	~~12~~	21	15	~~11~~	19	~~13~~	~~10~~
		7-20	Interior	78	50	37	62	45	33	56	40	29	50	36	27	45	33	24	41	30	22	37	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	~~13~~
			Exposed	45	33	24	40	29	21	36	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	~~12~~	20	15	~~11~~	18	~~13~~	9	16	~~11~~	8
		20-27	Interior	79	55	45	79	49	40	79	43	36	76	39	32	62	35	29	56	32	26	51	29	24	43	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	61	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	~~13~~	16	14	~~11~~	14	~~12~~	~~10~~
		27-45	Interior	80	77	54	80	61	48	61	54	43	55	49	39	50	44	35	45	40	32	41	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	49	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	~~12~~
10	B	0-7	Interior	63	63	63	63	63	63	63	63	60	63	63	53	63	63	48	63	63	44	63	57	40	63	48	34	57	41	29	49	35	25	42	31	22	37	27	19	33	24	17
			Exposed	63	63	48	63	61	43	63	55	38	63	49	34	62	44	31	56	40	28	51	37	26	43	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	64	64	64	64	64	58	64	64	52	64	64	47	64	58	42	64	53	38	64	48	35	56	40	30	47	34	25	41	30	22	36	26	19	31	23	17	28	20	15
			Exposed	64	58	42	64	51	37	64	46	34	57	41	30	52	37	27	47	34	25	43	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	73	73	73	73	73	73	73	73	63	73	73	57	73	63	51	73	57	47	73	52	42	73	44	36	65	37	31	56	32	26	48	28	23	42	25	20	37	22	18
			Exposed	73	62	51	73	55	45	73	50	41	73	45	37	73	40	33	64	37	30	58	33	28	49	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	61	78	78	56	78	65	51	61	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	78	78	61	78	78	54	78	62	49	63	56	44	57	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	63	63	51	63	63	45	63	58	40	63	52	36	63	47	33	60	43	30	54	39	27	45	33	23	39	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	63	47	33	58	42	29	52	37	26	47	34	24	42	30	21	38	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	64	61	45	64	54	40	64	48	35	61	44	32	55	39	29	50	36	26	45	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	54	39	29	48	35	26	43	31	23	39	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	73	73	54	73	59	48	73	52	43	73	47	39	73	43	35	73	39	32	62	35	29	52	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	73	42	35	68	38	31	59	34	28	53	30	25	48	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	~~12~~
		27-45	Interior	78	78	65	78	78	58	78	67	52	74	59	46	60	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	60	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	63	61	42	63	54	37	63	48	33	60	43	30	54	39	27	49	35	25	45	32	23	38	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	54	39	27	48	34	24	43	31	22	39	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	~~12~~	21	15	~~11~~	19	~~13~~	~~10~~
		7-20	Interior	63	63	51	63	63	45	63	58	40	63	52	36	63	47	33	60	43	30	54	39	27	45	33	23	39	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	63	47	33	58	42	29	52	37	26	47	34	24	42	30	21	38	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		20-27	Interior	64	61	45	64	54	40	64	48	35	61	44	32	55	39	29	50	36	26	45	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	54	39	29	48	35	26	43	31	23	39	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		27-45	Interior	73	73	54	73	59	48	73	52	43	73	47	39	73	43	35	73	39	32	62	35	29	52	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	73	42	35	68	38	31	59	34	28	53	30	25	48	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	~~12~~
		27-45	Interior	78	78	65	78	78	58	78	67	52	74	59	46	60	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	60	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
20	B	0-7	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	40	47	47	34	47	41	29	47	35	25	42	31	22	37	27	19	33	24	17
			Exposed	47	47	47	47	47	43	47	47	38	47	47	34	47	44	31	47	40	28	47	37	26	43	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	42	47	47	38	47	47	35	47	40	30	47	34	25	41	30	22	36	26	19	31	23	17	28	20	15
			Exposed	47	47	42	47	47	37	47	46	34	47	41	30	47	37	27	47	34	25	43	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	57	51	57	57	47	57	52	42	57	44	36	57	37	31	56	32	26	48	28	23	42	25	20	37	22	18
			Exposed	57	57	51	57	55	45	57	50	41	57	45	37	57	40	33	57	37	30	57	33	28	49	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	64	64	64	64	64	64	64	64	64	64	64	64	64	64	61	64	64	56	64	64	51	61	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	64	64	61	64	64	54	64	62	49	63	56	44	57	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	47	47	47	47	47	45	47	47	40	47	47	36	47	47	33	47	43	30	47	39	27	45	33	23	39	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	47	47	33	47	42	29	47	37	26	47	34	24	42	30	21	38	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	47	47	45	47	47	40	47	47	35	47	44	32	47	39	29	47	36	26	45	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	47	39	29	47	35	26	43	31	23	39	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	57	57	54	57	57	48	57	52	43	57	47	39	57	43	35	57	39	32	57	35	29	52	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	57	42	35	57	38	31	57	34	28	53	30	25	48	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	~~12~~
		27-45	Interior	64	64	64	64	64	58	64	64	52	64	59	46	60	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	60	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	47	47	42	47	47	37	47	47	33	47	43	30	47	39	27	47	35	25	45	32	23	38	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	47	39	27	47	34	24	43	31	22	39	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	~~12~~	21	15	~~11~~	19	~~13~~	~~10~~
		7-20	Interior	47	47	37	47	45	33	47	40	29	47	36	27	45	33	24	41	30	22	37	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	~~13~~
			Exposed	45	33	24	40	29	21	36	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	~~12~~	20	15	~~11~~	18	~~13~~	9	16	~~11~~	8
		20-27	Interior	60	55	45	60	49	40	60	43	36	60	39	32	60	35	29	56	32	26	51	29	24	43	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	60	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	~~13~~	16	14	~~11~~	14	~~12~~	~~10~~
		27-45	Interior	66	66	54	66	61	48	61	54	43	55	49	39	50	44	35	45	40	32	41	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	49	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	~~12~~

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	29	37	35	25	37	31	22	37	27	19	33	24	17
			Exposed	37	37	37	37	37	37	37	37	37	37	37	34	37	37	31	37	37	28	37	37	26	37	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	30	38	34	25	38	30	22	36	26	19	31	23	17	28	20	15
			Exposed	38	38	38	38	38	37	38	38	34	38	38	30	38	37	27	38	34	25	38	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	42	47	44	36	47	37	31	47	32	26	47	28	23	42	25	20	37	22	18
			Exposed	47	47	47	47	47	45	47	47	41	47	45	37	47	40	33	47	37	30	47	33	28	47	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	51	54	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	54	54	54	54	54	54	54	54	49	54	54	44	54	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	36	37	37	33	37	37	30	37	37	27	37	33	23	37	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	37	37	33	37	37	29	37	37	26	37	34	24	37	30	21	37	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	13	15	16	11
		7-20	Interior	38	38	38	38	38	38	38	38	35	38	38	32	38	38	29	38	36	26	38	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	38	38	29	38	35	26	38	31	23	38	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	13	14	15	11	19	14	10
		20-27	Interior	47	47	47	47	47	47	47	47	43	47	47	39	47	43	35	47	39	32	47	35	29	47	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	47	42	35	47	38	31	47	34	28	47	30	25	47	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	12
		27-45	Interior	54	54	54	54	54	54	54	54	52	54	54	46	54	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	54	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	37	37	37	37	37	37	37	37	33	37	37	30	37	37	27	37	37	25	37	32	23	37	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	37	37	27	37	34	24	37	31	22	37	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	38	38	37	38	38	33	38	38	29	38	36	27	38	33	24	38	30	22	37	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	13
			Exposed	38	33	24	38	29	21	36	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	50	50	45	50	49	40	50	43	36	50	39	32	50	35	29	50	32	26	50	29	24	43	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	50	35	29	50	31	26	49	28	23	44	25	21	40	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	13	16	14	11	14	12	10
		27-45	Interior	57	57	54	57	57	48	57	54	43	55	49	39	50	44	35	45	40	32	41	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	49	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	12
40	B	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	29	35	35	25	35	31	22	35	27	19	33	24	17
			Exposed	35	35	35	35	35	35	35	35	35	35	35	34	35	35	31	35	35	28	35	35	26	35	31	22	35	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	34	25	35	30	22	35	26	19	31	23	17	28	20	15
			Exposed	35	35	35	35	35	35	35	35	34	35	35	30	35	35	27	35	34	25	35	31	23	35	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	36	40	37	31	40	32	26	40	28	23	40	25	20	37	22	18
			Exposed	40	40	40	40	40	40	40	40	40	40	40	37	40	40	33	40	37	30	40	33	28	40	28	23	40	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	43	47	46	37	44	40	32	39	35	28	34	31	24	30	27	22
			Exposed	47	47	47	47	47	47	47	47	47	47	47	44	47	47	40	47	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	35	27	35	33	23	35	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	35	35	33	35	35	29	35	35	26	35	34	24	35	30	21	35	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	13	15	16	11
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	32	35	35	29	35	35	26	35	33	24	35	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	35	35	29	35	35	26	35	31	23	35	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	13	14	15	11	19	14	10
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	39	40	40	35	40	39	32	40	35	29	40	30	25	40	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	40	40	35	40	38	31	40	34	28	40	30	25	40	28	23	40	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	12
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	46	47	47	42	47	47	38	46	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	47	47	42	47	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	37	37	37	37	37	37	37	37	33	37	37	30	37	37	27	37	37	25	37	32	23	37	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	37	37	27	37	34	24	37	31	22	37	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	38	38	37	38	38	33	38	38	29	38	36	27	38	33	24	38	30	22	37	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	13
			Exposed	38	33	24	38	29	21	36	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	43	43	43	43	43	40	43	43	36	43	39	32	43	35	29	43	32	26	43	29	24	43	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	43	35	29	43	31	26	43	28	23	43	25	21	40	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	13	16	14	11	14	12	10
		27-45	Interior	49	49	49	49	49	48	49	49	43	49	49	39	48	44	35	45	40	32	41	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	49	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	12
50	B	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	25	30	30	22	30	27	19	30	24	17			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	30	30	26	30	30	22	30	26	19	30	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	25	30	30	22	30	30	22	30	26	19	30	23	17	28	20	15
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	25	30	30	23	30	26	19	30	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	35	32	26	35	28	23	35	25	20	34	22	18			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	33	28	35	28	23	35	24	20	35	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	37	39	39	32	37	35	28	34	31	24	30	27	22			
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	41	41	36	41	41	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	23	30	28	20	30	24	17	29	21	15	26	18	20
			Exposed	30	30	30	30	30	29	30	30	26	30	30	24	30	30	21	30	28	19	30	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	13	15	16	11
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	30	24	30	28	20	30	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	30	30	29	30	30	26	30	30	23	30	28	21	30	26	19	30	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	13	14	15	11	19	14	10
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	29	35	30	25	35	25	21	34	22	18	33	19	16	29	17	14	26	15	19
			Exposed	35	35	35	35	35	31	35	34	28	35	30	25	35	28	23	35	25	21	35	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	12
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	38	40	40	35	38	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	41	41	41	41	41	37	41	41	33	41	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	32	32	32	32	32	32	32	32	32	32	32	30	32	32	27	32	32	25	32	32	23	32	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	32	32	27	32	32	24	32	31	22	32	28	20	32	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	32	32	32	32	32	32	32	32	29	32	32	27	32	32	24	32	30	22	32	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	13
			Exposed	32	32	24	32	29	21	32	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	38	38	38	38	38	38	38	38	36	38	38	32	38	35	29	38	32	26	38	29	24	38	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	38	35	29	38	31	26	38	28	23	38	25	21	38	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	13	16	14	11	14	12	10
		27-45	Interior	44	44	44	44	44	44	44	44	43	44	44	39	43	43	35	42	40	32	40	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	44	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	12

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ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	19	25	24	17
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	19	25	23	16	25	20	14	24	17	19	21	15	17
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	16	25	25	19	25	23	17	25	20	15
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	19	25	22	16	25	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	26	31	28	23	31	25	20	30	22	18
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	28	31	28	23	31	24	20	31	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	53	48	51	51	42	49	47	37	46	41	33
			Exposed	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	50	55	53	42	51	46	36	44	40	31	39	35	27	34	30	24	30	27	21
	C	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	24	17	25	21	15	25	18	20	23	16	18
			Exposed	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	19	25	25	18	25	21	15	25	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	20	25	24	17	25	20	15	24	18	20	21	16	17	19	14	15
			Exposed	25	25	25	25	25	25	25	25	23	25	25	21	25	25	19	25	23	17	25	21	16	25	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31	30	25	31	25	21	30	22	18	29	19	16	28	17	14	26	15	19
			Exposed	31	31	31	31	31	31	31	31	28	31	30	25	31	28	23	31	25	21	31	23	19	31	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	~~12~~
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	54	53	52	52	45	49	48	38	47	42	33	41	36	29	36	32	25	32	29	23
			Exposed	55	55	55	55	55	55	55	55	51	55	55	46	55	52	41	53	48	38	49	44	35	41	37	29	35	32	25	31	27	22	27	24	19	23	21	17	21	19	15
	D	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	25	28	28	23	28	27	19	28	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	28	28	27	28	28	24	28	28	22	28	28	20	28	25	18	28	23	16	28	21	15	24	18	19	21	15	16	18	20	14	16	17	~~12~~	21	15	~~11~~	19	~~13~~	~~10~~
		7-20	Interior	28	28	28	28	28	28	28	28	28	28	28	27	28	28	24	28	28	22	28	27	20	28	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	~~13~~
			Exposed	28	28	24	28	28	21	28	26	19	28	23	17	28	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	~~12~~	20	15	~~11~~	18	~~13~~	9	16	~~11~~	8
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	32	33	33	29	33	32	26	33	29	24	33	25	20	32	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	33	33	29	33	31	26	33	28	23	33	25	21	33	23	19	33	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	~~13~~	16	14	~~11~~	14	~~12~~	~~10~~
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	38	38	32	37	37	29	34	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	39	39	35	39	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	~~12~~
70	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	17
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	19	22	22	16	22	20	14	22	17	19	21	15	17
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	15
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	19	22	22	16	22	19	14	22	17	19	20	15	17	18	20	15
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	41	41	35	41	41	35	41	37	31
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	35	41	36	30	41	31	26	41	27	23	41	24	20	37	21	18
		27-45	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	48	48	48	46	46	42	44	44	37	43	41	33
			Exposed	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	42	50	46	36	44	39	31	38	34	27	34	30	24	30	27	21
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	15	22	18	20	22	16	18
			Exposed	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	19	22	22	18	22	21	15	22	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	20	15	22	18	20	21	16	17	19	14	15
			Exposed	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	21	16	22	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	37	41	39	32	41	33	27	40	29	24	39	26	21	37	23	19
			Exposed	41	41	41	41	41	41	41	41	41	41	41	38	41	41	34	41	38	31	41	35	29	41	29	24	41	25	21	37	22	18	32	19	16	29	17	14	25	15	~~12~~
		27-45	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	49	49	49	47	47	45	45	45	38	43	42	33	41	36	29	36	32	25	32	28	23
			Exposed	50	50	50	50	50	50	50	50	50	50	50	46	50	50	41	50	48	38	49	44	34	41	37	29	35	32	25	30	27	22	27	24	19	23	21	17	21	19	15
	D	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	19	24	23	16	24	20	14	24	17	19	21	15	16	19	21	15
			Exposed	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	23	16	24	21	15	24	18	19	21	15	16	18	20	14	16	17	~~12~~	21	15	~~11~~	19	~~13~~	~~10~~
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	23	17	24	20	14	23	17	19	20	15	17	18	20	15	16	17	~~13~~
			Exposed	24	24	24	24	24	21	24	24	19	24	23	17	24	21	16	24	19	14	24	18	20	20	15	17	17	19	14	15	17	~~12~~	20	15	~~11~~	18	~~13~~	9	16	~~11~~	8
		20-27	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	44	49	49	40	49	44	37	49	37	31	47	32	26	46	28	23	41	24	20	36	21	18	32	19	16
			Exposed	49	49	44	49	47	39	49	42	35	49	38	32	49	35	29	49	32	26	49	29	24	42	24	20	36	21	17	31	18	15	27	16	~~13~~	24	14	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	51	51	48	50	50	44	47	47	37	45	40	32	39	35	28	34	30	24	30	27	21	26	24	19
			Exposed	53	53	53	53	53	47	53	53	42	53	48	38	49	44	34	44	40	31	40	36	29	34	31	24	29	26	21	25	23	18	22	20	16	20	18	14	17	16	~~12~~
80	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	17	19	19	15	17
		7-20	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	29	32	32	25	32	30	22
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	25	32	29	22	32	25	19	31	22	17	27	20	15
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	31	36	33	27
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	30	36	31	26	36	27	23	36	24	20	36	21	18
		27-45	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	44	44	42	42	42	41	41	37	39	39	33
			Exposed	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	42	45	45	45	45	45	36	44	39	31	38	34	27	34	30	24	30	27	21
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	20	19	16	18
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	26	32	31	23	32	27	20	32	24	17	29	21	15
			Exposed	32	32	32	32	32	32	32	32	32	32	32	31	32	32	28	32	32	26	32	32	24	32	27	20	32	23	17	28	20	15	24	18	~~13~~	21	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	36	36	32	36	33	27	36	29	24	35	26	21	34	23	19
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	31	36	35	29	36	29	24	36	25	21	36	22	18	32	19	16	29	17	14	25	15	~~12~~
		27-45	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	43	43	43	41	41	38	40	40	33	38	36	29	36	32	25	32	28	23
			Exposed	45	45	45	45	45	45	45	45	45	45	45	41	45	45	38	45	44	34	41	37	29	35	32	25	30	27	22	27	24	19	23	21	17	21	19	15			
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	16	21	20	14	21	17	19	21	15	16	19	21	15
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	15	21	18	19	21	15	16	18	20	14	16	17	~~12~~	21	15	~~11~~	19	~~13~~	~~10~~
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	20	14	21	17	19	20	15	17	18	20	15	16	17	~~13~~
			Exposed	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	19	14	21	18	20	20	15	17	17	19	14	15	17	~~12~~	20	15	~~11~~	18	~~13~~	9	16	~~11~~	8
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	37	31	40	32	26	39	28	23	37	24	20	36	21	18	32	19	16
			Exposed	40	40	40	40	40	39	40	40	35	40	38	32	40	35	29	40	32	26	40	29	24	40	24	20	36	21	17	31	18	15	27	16	~~13~~	24	14	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	48	48	48	47	47	47	46	46	44	44	44	37	42	40	32	39	35	28	34	30	24	30	27	21	26	24	19
			Exposed	49	49	49	49	49	47	49	49	42	49	48	38	48	44	34	44	40	31	40	36	29	34	31	24	29	26	21	25	23	18	22	20	16	20	18	14	17	16	~~12~~

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	19	17	15	17
		7-20	Interior	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	29	29	29	29	29	29	29	29	29	29	25	29	29	22
			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	29	25	29	29	22	29	25	19	29	22	17	27	20	15
		20-27	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	32	31	32	32	27
			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	30	32	31	26	32	27	23	32	24	20	32	21	18
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39	39	39	38	38	37	37	37	33
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	36	41	40	31	39	35	27	34	30	24	30	27	21
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	20	17	16	18
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	19	17	16	17	17	21	15	17	18	13	15	16	11
		7-20	Interior	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	29	26	29	29	23	29	27	20	29	24	17	29	21	15
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	26	29	29	24	29	27	20	29	23	17	28	20	15	24	18	13	21	15	11	19	14	10	
		20-27	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	27	32	29	24	32	26	21	32	23	19
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	29	32	29	24	32	25	21	32	22	18	32	19	16	29	17	14	25	15	12	
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	40	40	38	38	38	37	37	33	35	35	29	34	32	26	32	29	23
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	38	41	41	35	40	37	29	35	32	25	31	27	22	27	24	19	24	21	17	21	19	15	
	D	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	17	19	19	15	16	19	21	15
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	18	19	19	19	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	26	32	30	22	32	26	19	31	22	17	27	20	15	24	17	13
			Exposed	32	32	32	32	32	32	32	32	29	32	32	26	32	32	24	32	29	22	32	27	20	31	23	17	26	19	14	23	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	31	36	32	26	36	28	23	34	24	20	33	21	18	32	19	16
			Exposed	36	36	36	36	36	36	36	36	35	36	36	32	36	35	29	36	32	26	36	29	24	36	24	20	36	21	17	31	18	15	27	16	13	24	14	11	21	12	10
		27-45	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	44	44	43	43	43	41	41	37	39	39	32	37	35	28	34	30	24	30	27	21	26	24	19
			Exposed	45	45	45	45	45	45	45	45	42	45	45	38	45	44	34	44	40	31	40	36	29	34	31	24	29	26	21	25	23	18	22	20	16	20	18	14	17	16	12
100	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	19	15	15	17
		7-20	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	24	24	24	24	24	24	24	24	24	24	24	24	24	22
			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	24	24	24	24	22	24	24	19	24	22	17	24	20	15
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	31	33	33	27
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	31	26	33	27	23	33	24	20	33	21	18
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	36	36	35	35	35	34	34	33
			Exposed	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	37	37	31	36	34	27	34	30	24	30	27	21
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	20	15	15	18
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	19	15	15	17	15	21	15	15	18	13	15	16	11
		7-20	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	24	24	24	24	23	24	24	20	24	24	17	24	21	15
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	20	24	23	17	24	20	15	24	18	13	21	15	11	19	14	10
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	33	33	27	33	29	24	33	26	21	32	23	19			
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	31	33	33	29	33	29	24	33	25	21	33	22	18	32	19	16	29	17	14	25	15	12	
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	36	36	36	34	34	33	32	32	25	31	28	23			
			Exposed	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	29	35	32	25	30	27	22	27	24	19	23	21	17	21	19	15
	D	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	19	17	15	16	17	21	15			
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	19	17	15	16	17	20	14	16	17	12	21	15	11	19	13	10	
		7-20	Interior	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	22	29	26	19	29	22	17	27	20	15			
			Exposed	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	29	22	29	27	20	29	23	17	26	19	14	23	17	12	20	15	11	18	13	9	16	11	8	
		20-27	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	26	32	28	23	32	24	20	31	21	18			
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	26	32	29	24	32	24	20	32	21	17	31	18	15	27	16	13	24	14	11	21	12	10	
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	40	40	38	38	37	36	36	32	35	35	28	33	30	24	30	27	21	27	24	19
			Exposed	41	41	41	41	41	41	41	41	41	41	41	38	41	41	35	41	40	32	40	36	29	34	31	24	29	26	21	25	23	18	22	20	16	20	18	14	17	16	12

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	39	39	38	39	39	33	39	39	29	39	39	26	39	35	24	39	31	22	39	28	20	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	12	8
			Exposed	39	34	24	39	30	21	39	27	19	34	24	17	31	22	15	28	20	14	25	18	13	21	15	11	18	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	39	39	33	39	39	29	39	36	26	39	32	23	39	29	21	37	26	19	33	24	17	28	20	15	23	17	12	20	15	11	17	13	9	15	11	8	14	10	11
			Exposed	39	29	21	35	25	18	32	23	17	28	20	15	26	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	40	40	40	40	40	35	40	40	31	40	34	28	40	31	25	40	28	23	40	26	21	39	21	18	32	18	15	28	16	13	24	14	11	21	12	10	18	11	9
			Exposed	40	31	25	40	27	22	40	24	20	40	22	18	35	20	16	32	18	15	29	16	14	24	14	11	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	40	40	40	40	40	40	40	40	39	40	40	34	40	40	30	40	35	28	36	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	40	40	30	40	34	27	34	31	24	31	28	22	28	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	39	37	25	39	32	22	39	29	20	37	26	18	33	23	16	30	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	32	23	16	29	21	14	26	18	13	23	17	12	21	15	10	19	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	39	30	22	39	27	20	33	24	17	30	22	16	27	19	14	25	18	13	22	16	12	19	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	40	33	27	40	29	24	40	26	21	40	23	19	38	21	17	34	19	16	31	17	14	26	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	38	21	17	33	19	15	29	17	14	26	15	12	24	14	11	21	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	40	40	32	40	37	29	37	33	26	33	29	23	30	26	21	27	24	19	25	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	30	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	39	30	21	38	27	18	33	24	16	30	21	15	27	19	13	24	17	12	22	16	11	19	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	27	19	13	24	17	12	21	15	11	19	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	35	25	18	31	22	16	28	20	14	25	18	13	22	16	12	20	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	22	16	12	20	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	40	27	22	40	24	20	39	21	18	34	19	16	31	17	14	28	16	13	25	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	40	34	27	34	30	24	30	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6
10	B	0-7	Interior	32	32	32	32	32	32	32	32	29	32	32	26	32	32	24	32	31	22	32	28	20	32	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	12	8
			Exposed	32	32	24	32	30	21	32	27	19	32	24	17	31	22	15	28	20	14	25	18	13	21	15	11	18	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	32	32	32	32	32	29	32	32	26	32	32	23	32	29	21	32	26	19	32	24	17	28	20	15	23	17	12	20	15	11	17	13	9	15	11	8	14	10	11
			Exposed	32	29	21	32	25	18	32	23	17	28	20	15	26	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	36	36	36	36	36	35	36	36	31	36	34	28	36	31	25	36	28	23	36	26	21	36	21	18	32	18	15	28	16	13	24	14	11	21	12	10	18	11	9
			Exposed	36	31	25	36	27	22	36	24	20	36	22	18	35	20	16	32	18	15	29	16	14	24	14	11	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	34	39	39	30	39	35	28	36	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	39	39	30	39	34	27	34	31	24	31	28	22	28	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	32	32	25	32	32	22	32	29	20	32	26	18	32	23	16	30	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	32	23	16	29	21	14	26	18	13	23	17	12	21	15	10	19	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	32	30	22	32	27	20	32	24	17	30	22	16	27	19	14	25	18	13	22	16	12	19	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	36	33	27	36	29	24	36	26	21	36	23	19	36	21	17	34	19	16	32	17	14	26	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	36	21	17	33	19	15	29	17	14	26	15	12	24	14	11	21	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	39	39	32	39	37	29	37	33	26	33	29	23	30	26	21	27	24	19	25	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	30	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	39	30	21	38	27	18	33	24	16	30	21	15	27	19	13	24	17	12	22	16	11	19	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	27	19	13	24	17	12	21	15	11	19	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	35	25	18	31	22	16	28	20	14	25	18	13	22	16	12	20	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	22	16	12	20	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	30	27	22	30	24	20	30	21	18	30	19	16	30	17	14	28	16	13	25	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	33	33	27	33	30	24	30	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6
20	B	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	17	23	20	14	23	17	12	21	15	11	18	13	9	16	12	8		
			Exposed	23	23	23	23	23	21	23	23	19	23	23	17	23	22	15	23	20	14	23	18	13	21	15	11	18	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	24	19	24	24	17	24	20	15	23	17	12	20	15	11	17	13	9	15	11	8	14	10	11
			Exposed	24	24	21	24	24	18	24	23	17	24	20	15	24	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	28	29	29	25	29	28	23	29	26	21	29	21	18	29	18	15	28	16	13	24	14	11	21	12	10	18	11	9
			Exposed	29	29	25	29	27	22	29	24	20	29	22	18	29	20	16	29	18	15	29	16	14	24	14	11	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	28	32	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	32	32	30	32	32	27	32	31	24	31	28	22	28	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	23	23	23	23	23	22	23	23	20	23	23	18	23	23	16	23	21	15	23	19	13	22	16	11	19	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	23	23	16	23	21	14	23	18	13	23	17	12	21	15	10	19	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	24	24	22	24	24	20	24	24	17	24	22	16	24	19	14	24	18	13	22	16	12	19	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	24	19	14	24	17	13	21	15	11	19	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	29	29	27	29	29	24	29	26	21	29	23	19	29	21	17	29	19	16	29	17	14	26	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	29	21	17	29	19	15	29	17	14	26	15	12	24	14	11	21	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	32	32	32	32	32	29	32	32	26	32	29	23	30	26	21	27	24	19	25	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	30	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	23	23	21	23	23	18	23	23	16	23	21	15	23	19	13	23	17	12	22	16	11	19	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	23	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	24	24	18	24	22	16	24	20	14	24	18	13	22	16	12	20	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	22	16	12	20	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	30	27	22	30	24	20	30	21	18	30	19	16	30	17	14	28	16	13	25	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	33	33	27	33	30	24	30	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6

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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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	14	19	17	12	19	19	15	11	18	13	9	16	12	8
			Exposed	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	18	13	19	15	11	18	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	17	12	19	15	11	17	13	9	15	11	8	14	10	11
			Exposed	19	19	19	19	19	18	19	19	17	19	19	15	19	18	13	19	17	12	19	15	11	18	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	21	18	24	18	15	24	16	13	24	14	11	21	12	10	18	11	9
			Exposed	24	24	24	24	24	22	24	24	20	24	22	18	24	20	16	24	18	15	24	16	14	24	14	11	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	27	27	27	27	27	27	27	27	24	27	27	22	27	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	16	11	19	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	19	19	16	19	19	14	19	18	13	19	17	12	19	15	10	19	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	19	19	19	19	19	19	19	19	17	19	19	16	19	19	14	19	18	13	19	16	12	19	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	19	19	14	19	17	13	19	15	11	19	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	24	24	24	24	24	24	24	24	21	24	23	19	24	21	17	24	19	16	24	17	14	24	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	24	21	17	24	19	15	24	17	14	24	15	12	24	14	11	21	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	27	27	27	27	27	27	27	27	26	27	27	23	27	26	21	27	24	19	25	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	27	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	17	12	19	16	11	19	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	19	19	13	19	17	12	19	15	11	19	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	19	16	12	19	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	25	25	22	25	24	20	25	21	18	25	19	16	25	17	14	25	16	13	25	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	25	17	14	25	15	13	24	14	11	22	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	28	28	27	28	28	24	28	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6
40	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	14	17	17	12	17	15	11	17	13	9	16	12	8			
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	17	13	17	15	11	17	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	12	17	17	12	17	15	11	17	13	9	15	11	8	14	10	11
			Exposed	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	17	12	17	15	11	17	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	18	15	20	16	13	20	14	11	20	12	10	18	11	9
			Exposed	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	18	15	20	16	14	20	14	11	20	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	13	17	16	11	17	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	17	17	16	17	17	14	17	17	13	17	17	12	17	15	10	17	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	12	17	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	17	17	14	17	17	13	17	15	11	17	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	15	12	20	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	20	20	17	20	19	15	20	17	14	20	15	12	20	14	11	20	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	23	23	21	23	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	18	18	18	18	18	18	18	18	16	18	18	15	18	18	13	18	17	12	18	16	11	18	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	18	18	13	18	17	12	18	15	11	18	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	19	16	12	19	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	21	21	21	21	21	20	21	21	18	21	19	16	21	17	14	21	16	13	21	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	21	17	14	21	15	13	21	14	11	21	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	25	25	25	25	25	24	25	25	21	25	24	19	24	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6
50	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	13	9	15	12	8			
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	11	15	13	9	15	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	15	15	12	15	15	11	15	13	9	15	11	8	14	10	11
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	15	11	15	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	27	29	28	23	29	24	20	29	21	17	29	18	15	28	16	13
			Exposed	29	29	29	29	29	29	29	29	29	29	29	27	29	29	25	29	27	22	29	25	21	29	21	17	29	18	15	27	15	13	23	13	11	20	12	10	18	10	9
		27-45	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	27	29	29	24	28	26	21	26	23	18	23	20	16
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	27	31	31	25	30	26	21	25	23	18	22	19	15	19	17	13	17	15	12	15	13	10
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	10	15	12	8	14	10	11	13	9	10	11	12	9
			Exposed	15	15	15	15	15	14	15	15	13	15	15	12	15	15	10	15	14	9	15	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	14	10	15	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	15	15	14	15	15	13	15	15	11	15	14	10	15	13	9	15	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	26	22	29	22	18	29	19	16	28	16	13	25	14	12	22	13	10	19	11	9
			Exposed	29	29	26	29	28	23	29	25	21	29	23	19	29	21	17	29	19	15	29	17	14	25	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	30	30	26	29	28	22	27	24	19	23	21	16	20	18	14	18	16	12	16	14	11
			Exposed	31	31	31	31	31	28	31	31	25	31	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7
	D	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	16	16	12	16	16	11	16	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	16	16	13	16	16	12	16	15	11	16	14	10	16	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	16	16	16	16	16	16	16	16	14	16	16	13	16	16	12	16	15	11	16	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	16	16	12	16	14	10	16	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	19	19	19	19	19	19	19	19	18	19	19	16	19	17	14	19	16	13	19	14	12	19	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	19	17	14	19	15	13	19	14	11	19	12	10	19	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	22	22	22	22	22	22	22	22	21	22	22	19	21	21	17	21	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	22	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6

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ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

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

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				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
60	B	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	9	12	12	8			
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	9	12	11	12	12	10	10	12	8	9	10	11	8
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	16	21	19	14	21	17	12	21	15	11
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	19	21	21	17	21	19	14	21	17	12	20	14	11	17	12	9	15	11	8	13	10	7
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	21	17	23	18	15	23	16	13			
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	21	23	21	17	23	18	15	23	15	13	23	13	11	20	12	10	18	10	9
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	26	26	24	25	25	21	24	23	18	23	20	16
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	25	28	26	21	25	23	18	22	19	15	19	17	13	17	15	12	15	13	10
	C	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	8	12	10	11	12	9	10	11	12	9
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	9	12	12	9	12	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	15	21	18	13	21	15	11	18	13	10	16	12	8	14	10	8
			Exposed	21	21	21	21	21	19	21	21	17	21	21	15	21	19	14	21	17	13	21	16	12	18	13	10	16	11	8	14	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	18	23	19	16	23	16	13	22	14	12	21	13	10	19	11	9
			Exposed	23	23	23	23	23	23	23	23	21	23	23	19	23	21	17	23	19	15	23	17	14	23	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	27	26	26	22	25	24	19	23	21	16	20	18	14	18	16	12	16	14	11		
			Exposed	28	28	28	28	28	28	28	28	25	28	28	23	28	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	13	9	14	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	14	14	13	14	14	12	14	14	11	14	14	10	14	12	9	14	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	13	10	14	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	14	14	12	14	14	10	14	13	9	14	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	24	20	25	22	18	25	18	15	24	16	13	23	14	11	20	12	10	18	10	9	16	9	8
			Exposed	25	25	22	25	23	19	25	21	17	25	19	16	25	17	14	25	16	13	25	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	28	28	24	27	27	22	26	23	18	22	20	16	19	17	14	17	15	12	15	13	10	13	12	9
			Exposed	29	29	26	29	29	23	29	26	21	27	24	19	24	22	17	22	20	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6
70	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8			
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	12	11	10	10	11	8	9	10	11	8
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	14	18	17	12	18	15	11
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	14	18	17	12	18	14	11	17	12	9	15	11	8	13	10	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	18	15	20	16	13
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	18	15	20	15	13	20	13	11	20	12	10	18	10	9
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	24	24	23	23	21	22	22	18	21	20	16
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	23	18	22	19	15	19	17	13	17	15	12	15	13	10
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	11	11	9	10	11	12	9
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	9	11	11	9	11	10	11	11	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	15	11	18	13	10	16	12	8	14	10	8
			Exposed	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	17	13	18	16	12	18	13	10	16	11	8	14	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	16	20	19	16	20	16	13	20	14	12
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		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	23	22	22	22	19	21	21	16	20	18	14	18	16	12	16	14	11
			Exposed	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	9	12	11	12	12	10	10	12	8	9	10	11	8	9	10	7
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	12	12	10	11	12	9	9	10	11	8	10	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	20	15	20	17	13	20	15	11	17	13	9	15	11	8	13	10	7	12	8	6			
			Exposed	20	20	18	20	20	16	20	19	14	20	17	13	20	16	12	20	14	11	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	18	15	22	16	13	21	14	11	20	12	10	18	10	9	16	9	8
			Exposed	22	22	22	22	22	19	22	21	17	22	19	16	22	17	14	22	16	13	22	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	24	25	25	22	24	23	18	22	20	16	19	17	14	17	15	12	15	13	10	13	12	9
			Exposed	27	27	26	27	27	23	27	26	21	27	24	19	24	22	17	22	20	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6
80	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8			
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	9	9	10	9	8	9	9	11	8
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	11	15	12	9	15	11	8	13	10	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	16	13
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	16	13
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9			
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	13	10	15	11	8	14	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	16	13	20	20	16	19	17	13	17	15	11	18	11	9
			Exposed	20	20	20	20	20	20	20	20	19	20	20	16	20	19	13	20	19	14	20	17	14	20	14	12	20	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	22	22	21	21	21	20	20	18	20	20	16
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	18	22	19	16	20	19	15	19	17	13	17	15	12	15	13	10
	D	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	11	9	9	10	9	12	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	10	15	12	8	14	10	8			
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	15	15	10	15	12	9	14	10	7	12	9	6	10	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	16	20	20	16	20	20	16	20	19	14	18	16	12	16	14	11
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	16	20	19	13	20	19	15	19	18	14	18	16	12	16	14	11
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	8	9	10	11	8	9	10	9	10	7
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	12	10	10	11	10	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
	D	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	17	13	18	15	11	17	13	9	15	11	8	13	10	7	12	8	6
			Exposed	18	18	18	18	18	16	18	18	14	18	17	13	18	16	12	18	14	11	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		7-20	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	18	15	20	16	13	19	14	11	19	12	10	18	10	9	16	9	8
			Exposed	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	16	13	20	14	12	20	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	24	25	25	22	24	23	18	22	20	16	19	17	14	17	15	12	15	13	10	13	12	9
			Exposed	27	27	26	27	27	23	27	26	21	27	24	19	24	22	17	22	20	16	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	8	10	8	8	9	8	11	8
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11		
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	9	13	11	8	13	10	7
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	15	13	16	13	11	16	12	10	16	10	9
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	18	18	18	16
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	15	19	17	13	17	15	12	15	13	10
	C	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	11	8	8	10	8	12	9
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	11	8	8	9	8	12	8	8	10	7	8	9	6	11	8	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	8	13	10	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	8	13	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	16	14	12	16	13	10	16	11	9
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	14	12	16	12	10	16	11	9	16	9	8	14	8	7	12	7	6			
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	20	20	20	19	19	19	18	18	16	18	18	14	17	16	12	16	14	11
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7			
	D	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	9	9	10	9	8	9	9	9	11	8	9	10	7		
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	9	9	11	9	9	9	9	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	9	15	11	8	13	10	7	12	8	6
			Exposed	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	14	11	15	13	10	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	18	15	20	16	13	19	14	11	19	12	10	18	10	9	16	9	8
			Exposed	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	16	13	20	14	12	20	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21	20	20	18	19	19	16	18	17	14	17	15	12	15	13	10	13	12	9
			Exposed	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	20	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6
100	B	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	11	7	7	10	7	7	9	7	11	8
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	8	13	10	8
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	11
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	13	11	14	12	10	14	10	9			
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	16	
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	17	13	17	15	12	15	13	10
	C	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	11	7	7	10	7	11	9
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	11	7	7	9	7	11	8	7	10	7	7	9	6	11	8	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	8	13	10	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	8	13	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	13	10	14	14	12	14	13	10	14	11	9
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	12	10	14	11	9	14	9	8	14	8	7	12	7	6
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	16	16	14	16	12	15	14	11	
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7
	D	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	8	10	8	8	9	8	8	11	8	8	10	7		
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	8	11	8	8	9	8	11	8	8	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	9	13	11	8	13	10	7	12	8	6
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	11	8	13	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	14	11	16	12	10	15	10	9	15	9	8
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	16	16	14	16	14	12	16	12	10	16	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	18	18	18	16	17	17	14	16	15	12	15	13	10	13	12	9
			Exposed	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	76	76	76	76	76	66	76	76	58	76	76	52	76	73	47	76	62	43	76	56	39	67	47	33	56	40	28	48	34	24	42	30	21	36	26	19	32	23	16
			Exposed	76	72	47	76	60	42	76	54	37	71	48	34	61	43	30	55	39	28	50	36	25	42	30	21	36	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	76	76	64	76	76	57	76	76	51	76	63	46	76	57	41	76	51	38	66	47	34	55	39	29	46	34	25	40	29	21	35	25	19	30	22	16	27	20	14
			Exposed	76	56	41	76	50	37	62	45	33	56	40	30	50	36	27	46	33	24	42	30	22	35	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	77	77	77	77	77	77	77	77	62	77	77	56	77	61	50	77	56	46	77	51	42	77	43	35	63	36	30	54	31	26	47	27	22	41	24	20	37	21	17
			Exposed	77	61	50	77	54	44	77	48	40	77	44	36	77	39	32	63	36	29	57	33	27	48	28	23	41	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	71	79	79	60	79	79	55	79	63	50	60	53	42	51	45	36	44	39	31	38	34	27	34	30	24	30	27	21
			Exposed	79	79	60	79	75	53	79	61	48	61	55	43	55	49	39	50	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	76	76	50	76	64	44	76	57	40	76	51	36	64	46	32	58	42	29	53	38	27	45	32	23	38	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	64	46	32	57	41	29	51	36	26	46	33	23	41	30	21	37	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	76	60	44	76	53	39	72	47	35	59	43	31	54	39	28	49	35	26	44	32	23	37	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	53	38	28	47	34	25	42	31	22	38	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	77	65	53	77	57	47	77	51	42	77	46	38	77	42	34	69	38	31	60	35	28	51	29	24	43	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	77	42	34	65	37	30	58	33	27	52	30	25	47	27	22	42	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	79	79	63	79	79	56	79	64	50	65	58	45	59	52	41	53	47	37	49	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15
			Exposed	58	52	41	52	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	76	59	41	76	53	37	66	47	33	59	42	29	53	38	27	48	35	24	44	32	22	37	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	53	38	27	47	34	24	42	30	21	38	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	76	49	36	61	44	32	54	39	29	49	35	26	44	32	23	40	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	44	32	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	77	53	44	77	47	39	77	42	35	71	38	31	60	35	28	55	31	26	50	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	60	34	28	53	31	25	48	27	23	43	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	79	71	52	79	59	47	60	53	42	54	48	38	48	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~
10	B	0-7	Interior	62	62	62	62	62	62	62	62	58	62	62	52	62	62	47	62	62	43	62	56	39	62	47	33	56	40	28	48	34	24	42	30	21	36	26	19	32	23	16
			Exposed	62	62	47	62	60	42	62	54	37	62	48	34	61	43	30	55	39	28	50	36	25	42	30	21	36	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	62	62	62	62	62	57	62	62	51	62	62	46	62	57	41	62	51	38	62	47	34	55	39	29	46	34	25	40	29	21	35	25	19	30	22	16	27	20	14
			Exposed	62	56	41	62	50	37	62	45	33	56	40	30	50	36	27	46	33	24	42	30	22	35	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	71	71	71	71	71	71	71	71	62	71	71	56	71	61	50	71	56	46	71	51	42	71	43	35	63	36	30	54	31	26	47	27	22	41	24	20	37	21	17
			Exposed	71	61	50	71	54	44	71	48	40	71	44	36	71	39	32	63	36	29	57	33	27	48	28	23	41	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	76	76	76	76	76	76	76	76	76	76	76	71	76	76	60	76	76	55	76	63	50	60	53	42	51	45	36	44	39	31	38	34	27	34	30	24	30	27	21
			Exposed	76	76	60	76	75	53	76	61	48	61	55	43	55	49	39	50	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	62	62	50	62	62	44	62	57	40	62	51	36	62	46	32	58	42	29	53	38	27	45	32	23	38	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	62	46	32	57	41	29	51	36	26	46	33	23	41	30	21	37	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	62	60	44	62	53	39	62	47	35	59	43	31	54	39	28	49	35	26	44	32	23	37	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	53	38	28	47	34	25	42	31	22	38	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	71	65	53	71	57	47	71	51	42	71	46	38	71	42	34	69	38	31	60	35	28	51	29	24	43	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	71	42	34	65	37	30	58	33	27	52	30	25	47	27	22	42	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	76	76	63	76	76	56	76	64	50	65	58	45	59	52	41	53	47	37	49	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15
			Exposed	58	52	41	52	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	62	59	41	62	53	37	62	47	33	59	42	29	53	38	27	48	35	24	44	32	22	37	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	53	38	27	47	34	24	42	30	21	38	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	62	49	36	61	44	32	54	39	29	49	35	26	44	32	23	40	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	44	32	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	73	53	44	73	47	39	73	42	35	71	38	31	60	35	28	55	31	26	50	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	60	34	28	53	31	25	48	27	23	43	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	78	71	52	78	59	47	60	53	42	54	48	38	48	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~
20	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	43	46	46	39	46	46	33	46	40	28	46	34	24	42	30	21	36	26	19	32	23	16
			Exposed	46	46	46	46	46	42	46	46	37	46	46	34	46	43	30	46	39	28	46	36	25	42	30	21	36	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	41	46	46	38	46	46	34	46	39	29	46	34	25	40	29	21	35	25	19	30	22	16	27	20	14
			Exposed	46	46	41	46	46	37	46	45	33	46	40	30	46	36	27	46	33	24	42	30	22	35	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	50	56	56	46	56	51	42	56	43	35	56	36	30	54	31	26	47	27	22	41	24	20	37	21	17
			Exposed	56	56	50	56	54	44	56	48	40	56	44	36	56	39	32	56	36	29	56	33	27	48	28	23	41	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62	60	62	62	55	62	62	50	60	53	42	51	45	36	44	39	31	38	34	27	34	30	24	30	27	21
			Exposed	62	62	60	62	62	53	62	61	48	61	55	43	55	49	39	50	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	46	46	46	46	46	44	46	46	40	46	46	36	46	46	32	46	42	29	46	38	27	45	32	23	38	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	46	46	32	46	41	29	46	36	26	46	33	23	41	30	21	37	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	46	46	44	46	46	39	46	46	35	46	43	31	46	39	28	46	35	26	44	32	23	37	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	46	38	28	46	34	25	42	31	22	38	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	56	56	53	56	56	47	56	51	42	56	46	38	56	42	34	56	38	31	56	35	28	51	29	24	43	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	56	42	34	56	37	30	56	33	27	52	30	25	47	27	22	42	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	62	62	62	62	62	56	62	62	50	62	58	45	59	52	41	53	47	37	49	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15
			Exposed	58	52	41	52	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	46	46	41	46	46	37	46	46	33	46	42	29	46	38	27	46	35	24	44	32	22	37	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	46	38	27	46	34	24	42	30	21	38	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	46	46	36	46	44	32	46	39	29	46	35	26	44	32	23	40	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	44	32	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	59	53	44	59	47	39	59	42	35	59	38	31	59	35	28	55	31	26	50	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	59	34	28	53	31	25	48	27	23	43	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	65	65	52	65	59	47	60	53	42	54	48	38	48	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	36	36	28	36	34	24	36	30	21	36	26	19	32	23	16
			Exposed	36	36	36	36	36	36	36	36	36	36	36	34	36	36	30	36	36	28	36	36	25	36	30	21	36	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	29	37	34	25	37	29	21	35	25	19	30	22	16	27	20	14
			Exposed	37	37	37	37	37	37	37	37	33	37	37	30	37	36	27	37	33	24	37	30	22	35	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	42	46	43	35	46	36	30	46	31	26	46	27	22	41	24	20	37	21	17
			Exposed	46	46	46	46	46	44	46	46	40	46	44	36	46	39	32	46	36	29	46	33	27	46	28	23	41	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	50	53	53	42	51	45	36	44	39	31	38	34	27	34	30	24	30	27	21
			Exposed	53	53	53	53	53	53	53	53	48	53	53	43	53	49	39	50	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	36	36	29	36	36	27	36	32	23	36	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	36	36	32	36	36	29	36	36	26	36	33	23	36	30	21	36	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	37	37	37	37	37	37	37	37	35	37	37	31	37	37	28	37	35	26	37	32	23	37	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	37	37	28	37	34	25	37	31	22	37	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	46	46	46	46	46	46	46	46	42	46	46	38	46	42	34	46	38	31	46	35	28	46	29	24	43	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	46	42	34	46	37	30	46	33	27	46	30	25	46	27	22	42	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	53	53	53	53	53	53	53	53	50	53	53	45	53	52	41	53	47	37	49	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15
			Exposed	53	52	41	52	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	36	36	36	36	36	36	36	36	33	36	36	29	36	36	27	36	35	24	36	32	22	36	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	36	36	27	36	34	24	36	30	21	36	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	37	37	36	37	37	32	37	37	29	37	35	26	37	32	23	37	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	37	32	23	37	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	49	49	44	49	47	39	49	42	35	49	38	31	49	35	28	49	31	26	49	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	49	34	28	49	31	25	48	27	23	43	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	55	55	52	55	55	47	55	53	42	54	48	38	48	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~
40	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	33	34	34	28	34	34	24	34	30	21	34	26	19	32	23	16
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	30	34	34	28	34	34	25	34	30	21	34	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	29	34	34	25	34	29	21	34	25	19	30	22	16	27	20	14
			Exposed	34	34	34	34	34	34	34	34	33	34	34	30	34	34	27	34	33	24	34	34	30	22	34	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	39	36	30	39	31	26	39	27	22	39	24	20	37	21	17
			Exposed	39	39	39	39	39	39	39	39	39	39	39	36	39	39	32	39	36	29	39	33	27	39	28	23	39	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	42	45	45	36	43	39	31	38	34	27	34	30	24	30	27	21
			Exposed	46	46	46	46	46	46	46	46	46	46	46	43	46	46	39	46	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	32	34	34	29	34	34	27	34	32	23	34	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	34	34	32	34	34	29	34	34	26	34	33	23	34	30	21	34	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	31	34	34	28	34	34	26	34	32	23	34	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	34	34	28	34	34	25	34	31	22	34	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	38	39	39	34	39	38	31	39	34	28	39	29	24	39	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	39	39	34	39	37	30	39	33	27	39	30	25	39	27	22	39	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	46	41	46	46	37	45	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15			
			Exposed	46	46	41	46	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	36	36	36	36	36	36	36	36	33	36	36	29	36	36	27	36	35	24	36	32	22	36	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	36	36	27	36	34	24	36	30	21	36	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	37	37	36	37	37	32	37	37	29	37	35	26	37	32	23	37	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	37	32	23	37	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	42	42	42	42	42	39	42	42	35	42	38	31	42	35	28	42	31	26	42	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	42	34	28	42	31	25	42	27	23	42	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	48	48	48	48	48	47	48	48	42	48	48	38	47	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~
50	B	0-7	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	24	29	29	21	29	26	19	29	23	16			
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	25	29	29	25	29	29	21	29	26	18	29	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	25	30	29	21	30	25	19	30	22	16	27	20	14
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	24	30	30	22	30	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	53	56	55	45	56	47	39	56	41	34	56	36	30	54	32	27
			Exposed	56	56	56	56	56	56	56	56	56	56	56	54	56	56	49	56	54	45	56	49	41	56	42	34	56	36	29	53	31	25	46	27	22	41	24	20	36	21	17
		27-45	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	54	57	57	47	55	52	41	51	45	36	45	40	32
			Exposed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	58	52	41	50	45	35	43	39	31	38	34	27	33	30	24	29	26	21
	C	0-7	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	27	29	29	23	29	27	19	29	24	17	28	21	22	25	18	19	22	16	17
			Exposed	29	29	29	29	29	29	29	29	26	29	29	23	29	29	21	29	27	19	29	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	30	30	26	30	30	23	30	27	20	30	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	30	30	28	30	30	25	30	30	22	30	28	20	30	25	18	30	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	56	56	56	56	56	56	56	56	56	56	56	52	56	56	47	56	52	43	56	44	36	56	38	31	54	33	27	49	28	23	43	25	21	38	22	18			
			Exposed	56	56	52	56	56	46	56	50	41	56	45	37	56	41	34	56	37	31	56	34	28	49	29	24	42	25	20	36	21	18	32	19	15	28	16	~~13~~	25	14	~~12~~
		27-45	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	56	59	59	52	56	55	44	53	47	37	46	41	32	40	36	28	35	31	25	31	28	22
			Exposed	60	60	60	60	60	55	60	60	49	60	56	45	57	51	40	52	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	31	31	31	31	31	31	31	31	31	31	31	29	31	31	27	31	31	24	31	31	22	31	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	31	31	27	31	31	24	31	30	21	31	27	19	31	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	32	32	32	32	32	32	32	32	29	32	32	26	32	32	23	32	29	21	32	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	32	32	23	32	28	21	32	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	37	37	37	37	37	37	37	37	35	37	37	31	37	35	28	37	31	26	37	29	24	37	24	20	35	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	37	34	28	37	31	25	37	27	23	37	25	20	37	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	43	43	43	43	43	43	43	43	42	43	43	38	42	42	34	41	39	31	39	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	43	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~

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UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	19	25	23	16
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	25	18	25	22	16	25	19	21	24	17	18	21	15	16
		7-20	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	37	41	41	32	41	38	28	41	34	25	41	30	22
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	41	41	37	41	41	34	41	39	28	41	33	24	39	28	21	34	25	18	30	22	16	27	19	14
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	39	46	41	34	46	36	30	45	32	27
			Exposed	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	41	46	42	34	46	36	29	46	31	25	46	27	22	41	24	20	36	21	17
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	52	52	47	50	50	41	48	45	36	45	40	32
			Exposed	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	53	54	54	49	54	52	41	50	45	35	43	39	31	38	34	27	33	30	24	29	26	21
	C	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	19	25	24	17	25	21	22	25	18	19	22	16	17
			Exposed	25	25	25	25	25	25	25	25	25	25	25	23	25	25	21	25	25	19	25	25	17	25	21	22	24	18	19	21	15	16	18	20	14	16	18	13	22	16	11
		7-20	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39	41	41	36	41	41	30	41	35	26	41	30	22	36	26	19	32	23	17	28	20	15
			Exposed	41	41	41	41	41	38	41	41	34	41	41	31	41	38	28	41	34	25	41	31	23	36	27	20	31	23	17	27	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	43	46	46	43	46	44	36	46	38	31	45	33	27	43	28	23	42	25	21	38	22	18
			Exposed	46	46	46	46	46	46	46	46	41	46	45	37	46	41	34	46	37	31	46	34	28	46	29	24	42	25	20	36	21	18	32	19	15	28	16	13	25	14	12
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	53	53	52	51	51	44	48	47	37	46	41	32	40	36	28	35	31	25	31	28	22
			Exposed	54	54	54	54	54	54	54	54	49	54	54	45	54	51	40	52	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	22	27	27	19	27	23	16	27	20	21	24	17	18	21	15	16	18	20	14
			Exposed	27	27	27	27	27	24	27	27	21	27	27	19	27	25	17	27	22	16	27	20	22	24	17	18	20	22	16	18	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	27	27	27	27	27	27	27	27	27	27	27	26	27	27	23	27	27	21	27	27	20	27	22	16	26	19	21	23	16	18	20	14	16	17	19	14	15	17	13
			Exposed	27	27	23	27	27	21	27	25	19	27	23	17	27	21	15	26	19	21	24	17	19	20	15	16	17	19	14	15	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	49	49	49	49	49	49	49	49	49	49	49	47	49	49	43	49	48	39	49	43	36	49	37	30	47	31	26	45	27	22	41	24	20	36	21	17	32	18	15
			Exposed	49	49	43	49	46	38	49	42	34	49	37	31	49	34	28	49	31	26	49	28	23	41	24	20	35	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	58	58	58	58	58	58	58	58	58	58	58	57	57	57	52	55	55	47	54	54	43	51	46	36	44	39	31	38	34	27	33	30	24	29	26	21	26	23	18
			Exposed	58	58	51	58	58	46	58	52	41	52	47	37	48	43	34	43	39	31	40	35	28	33	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12
70	B	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	16
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	21	16	21	19	21	21	17	18	21	15	16
		7-20	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	36	36	28	36	34	25	36	30	22
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	28	36	33	24	36	28	21	34	25	18	30	22	16	27	19	14
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	40	40	34	40	36	30	40	32	27
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	34	40	36	29	40	31	25	40	27	22	40	24	20	36	21	17
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	47	47	47	45	45	41	43	43	36	42	40	32
			Exposed	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	41	49	45	35	43	39	31	38	34	27	33	30	24	29	26	21
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	22	21	18	19	21	16	17
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	22	21	18	19	21	15	16	18	20	14	16	18	13	22	16	11
		7-20	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	30	36	35	26	36	30	22	36	26	19	32	23	17	28	20	15
			Exposed	36	36	36	36	36	36	36	36	34	36	36	31	36	36	28	36	34	25	36	31	23	36	27	20	31	23	17	27	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	36	40	38	31	40	33	27	39	28	23	38	25	21	36	22	18
			Exposed	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	40	37	31	40	34	28	40	29	24	40	25	20	36	21	18	32	19	15	28	16	13	25	14	12
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	48	48	48	46	46	44	44	44	37	42	41	32	40	36	28	35	31	25	31	28	22
			Exposed	49	49	49	49	49	49	49	49	49	49	49	45	49	49	40	49	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	23	23	23	19	23	23	16	23	20	21	23	17	18	21	15	16	18	20	14
			Exposed	23	23	23	23	23	23	23	23	21	23	23	19	23	23	17	23	22	16	23	20	22	23	17	18	20	22	16	18	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	40	40	40	40	40	40	40	40	40	40	40	39	40	40	36	40	40	32	40	40	30	40	34	25	40	29	21	34	25	18	30	22	16	26	19	14	23	17	13
			Exposed	40	40	35	40	40	32	40	38	28	40	35	26	40	31	23	39	29	21	36	26	19	30	22	16	26	19	14	22	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	44	44	39	44	43	36	44	37	30	43	31	26	41	27	22	40	24	20	36	21	17	32	18	15
			Exposed	44	44	43	44	44	38	44	42	34	44	37	31	44	34	28	44	31	26	44	28	23	41	24	20	35	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	50	50	47	49	49	43	46	46	36	44	39	31	38	34	27	33	30	24	29	26	21	26	23	18
			Exposed	52	52	51	52	52	46	52	52	41	52	47	37	48	43	34	43	39	31	40	35	28	33	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12
80	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	21	19	17	18	19	15	16
		7-20	Interior	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	29	29	29	29	29	29	29	28	29	29	25	29	29	22
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	24	29	28	21	29	25	18	29	22	16	27	19	14
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	39	34	39	36	30	39	32	27	39	32	27
			Exposed	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	36	29	39	31	25	39	27	22	39	24	20	36	21	17
		27-45	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	43	43	41	41	41	40	40	36	39	39	32
			Exposed	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	35	43	39	31	38	34	27	33	30	24	29	26	24	29	26	21
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	22	19	18	19	19	16	17
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	16	18	13	22	16	11
		7-20	Interior	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	29	29	29	29	22	29	26	19	29	23	17	28	20	15
			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	29	29	29	29	22	29	26	19	29	23	17	28	20	15
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	27	39	28	23	37	25	21	36	22	18
			Exposed	39	39	39	39	39	39	39	39	39	39	39	37	39	39	34	39	37	31	39	34	28	39	29	24	39	25	20	36	21	18	32	19	15	28	16	13	25	14	12
		27-45	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	42	42	42	40	40	37	39	39	32	37	36	28	35	31	25	34	28	22	31	28	22
			Exposed	44	44	44	44	44	44	44	44	44	44	44	44	44	44	40	44	44	37	44	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	16	21	20	21	21	21	17	18	21	15	16	18	20	14	16	14
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	20	22	21	17	18	20	22	16	18	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	30	35	34	25	35	29	21	34	25	18	30	22	16	26	19	14	23	17	13
			Exposed	35	35	35	35	35	32	35	35	28	35	35	26	35	31	23	35	29	21	35	26	19	30	22	16	26	19	14	22	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	37	30	39	31	26	38	27	22	36	24	20	35	21	17	32	18	15
			Exposed	39	39	39	39	39	38	39	39	34	39	37	31	39	34	28	39	31	26	39	28	23	39	24	20	35	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	52	52	52	52	52	52	52	52	52	52	52	52	51	51	51	50	50	47	49	49	43	46	46	36	44	39	31	38	34	27	33	30	24	29	26	21	26	23	18
			Exposed	52	52	52	52	52	46	52	52	41	52	47	37	48	43	34	44	39	31	40	36	28	34	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12

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SPAN TABLES

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

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				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
90	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	21	17	17	18	17	15	16
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	22
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	21	26	25	18	26	22	16	26	19	14
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	27
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31	31	25	31	27	22	31	24	20	31	21	17
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	38	38	37	37	36	36	36	32
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	35	40	39	31	38	34	27	33	30	24	29	26	21
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	22	17	17	19	17	16	17
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	22	17	17	19	17	15	16	17	20	14	16	18	13	22	16	11
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	22	26	26	19	26	23	17	26	20	15
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	23	26	26	20	26	23	17	26	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	27	31	28	23	31	25	21	31	22	18
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	28	31	29	24	31	25	20	31	21	18	31	19	15	28	16	13	25	14	12
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	37	37	37	36	36	32	35	35	28	33	31	25	31	28	22
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	39	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14			
	D	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	21	18	17	18	18	15	16	18	20	14			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	18	22	18	17	18	18	22	16	18	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	25	29	29	21	29	25	18	29	22	16	26	19	14	23	17	13
			Exposed	29	29	29	29	29	29	29	29	28	29	29	26	29	29	23	29	29	21	29	26	19	29	22	16	26	19	14	22	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	37	30	39	31	26	38	27	22	37	24	20	35	21	17	32	18	15
			Exposed	39	39	39	39	39	38	39	39	34	39	37	31	39	34	28	39	31	26	39	28	23	39	24	20	35	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	43	43	42	42	42	40	40	36	38	38	31	36	34	27	33	30	24	29	26	21	26	23	18
			Exposed	44	44	44	44	44	44	44	44	41	44	44	37	44	43	34	43	39	31	40	35	28	33	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12
100	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	21	15	15	18	15	15	16
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	18	25	22	16	25	19	14
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	27	22	28	24	20	28	21	17
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	35	33	33	32			
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	31	36	34	27	33	30	24	29	26	21			
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	22	15	15	19	15	15	17
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	22	15	15	19	15	15	16	15	20	14	15	18	13	22	16	11
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	19	25	23	17	25	20	15
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	23	17	25	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	23	28	25	21	28	22	18
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	24	28	25	20	28	21	18	28	19	15	28	16	13	25	14	12
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	21	17	17	18	17	15	16	17	20	14			
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	22	17	17	18	17	22	16	17	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	21	26	25	18	26	22	16	26	19	14	23	17	13
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	26	19	26	22	16	26	19	14	22	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	26	31	27	22	31	24	20	30	21	17	29	18	15
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	28	31	31	26	31	28	23	31	24	20	31	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	37	37	36	36	36	31	34	34	27	32	30	24	29	26	21	26	23	18
			Exposed	40	40	40	40	40	40	40	40	37	40	40	34	40	39	31	39	35	28	33	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12			

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	47	47	46	47	47	40	47	47	35	47	47	32	47	41	29	47	37	26	47	34	24	40	28	20	34	24	17	29	21	15	25	18	13	22	16	11	19	14	10
			Exposed	47	41	28	47	36	25	47	32	23	41	29	20	37	26	18	33	24	17	30	22	15	25	18	13	22	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	47	47	39	47	47	35	47	43	31	47	38	28	47	34	25	44	31	23	40	28	21	33	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9
			Exposed	47	34	25	42	30	22	38	27	20	34	24	18	31	22	16	28	20	15	25	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	48	48	48	48	48	42	48	48	38	48	41	34	48	37	30	48	34	28	48	31	25	47	26	21	38	22	18	33	19	16	29	16	14	25	14	12	22	13	10
			Exposed	48	37	30	48	33	27	48	29	24	48	26	22	42	24	20	38	22	18	34	20	16	29	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	48	48	48	48	48	48	48	48	47	48	48	40	48	48	36	48	42	33	44	38	30	36	32	25	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13
			Exposed	48	48	36	48	41	32	41	37	29	37	33	26	34	30	24	30	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	47	44	30	47	39	27	47	34	24	44	31	22	39	28	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	39	28	19	34	25	17	31	22	15	28	20	14	25	18	13	23	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	47	36	26	47	32	23	40	29	21	36	26	19	32	23	17	29	21	16	27	19	14	22	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	32	23	17	29	21	15	26	18	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	48	39	32	48	35	29	48	31	25	48	28	23	45	25	21	40	23	19	37	21	17	31	18	14	26	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	45	25	21	39	22	18	35	20	16	31	18	15	28	16	13	26	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	48	48	38	48	44	34	45	39	31	39	35	28	36	32	25	32	29	23	29	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	35	32	25	31	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	47	36	25	46	32	22	40	28	20	36	26	18	32	23	16	29	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	32	23	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	42	30	22	37	27	19	33	24	17	30	21	16	27	19	14	24	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	48	32	27	48	29	24	47	26	21	41	23	19	37	21	17	33	19	16	30	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	36	21	17	32	19	15	29	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	48	41	32	40	36	28	36	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
10	B	0-7	Interior	38	38	38	38	38	38	38	38	35	38	38	32	38	38	29	38	37	26	38	34	24	38	28	20	34	24	17	29	21	15	25	18	13	22	16	11	19	14	10
			Exposed	38	38	28	38	36	25	38	32	23	38	29	20	37	26	18	33	24	17	30	22	15	25	18	13	22	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	38	38	38	38	38	35	38	38	31	38	38	28	38	34	25	38	31	23	38	28	21	33	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9
			Exposed	38	34	25	38	30	22	38	27	20	34	24	18	31	22	16	28	20	15	25	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	44	44	44	44	44	42	44	44	38	44	41	34	44	37	30	44	34	28	44	31	25	44	26	21	38	22	18	33	19	16	29	16	14	25	14	12	22	13	10
			Exposed	44	37	30	44	33	27	44	29	24	44	26	22	42	24	20	38	22	18	34	20	16	29	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	40	47	47	36	47	42	33	44	38	30	36	32	25	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13
			Exposed	47	47	36	47	41	32	41	37	29	37	33	26	34	30	24	30	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	38	38	30	38	38	27	38	34	24	38	31	22	38	28	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	38	28	19	34	25	17	31	22	15	28	20	14	25	18	13	23	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	38	36	26	38	32	23	38	29	21	36	26	19	32	23	17	29	21	16	27	19	14	22	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	32	23	17	29	21	15	26	18	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	44	39	32	44	35	29	44	31	25	44	28	23	44	25	21	40	23	19	37	21	17	31	18	14	26	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	44	25	21	39	22	18	35	20	16	31	18	15	28	16	13	26	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	47	47	38	47	44	34	45	39	31	39	35	28	36	32	25	32	29	23	29	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	35	32	25	31	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	38	36	25	38	32	22	38	28	20	36	26	18	32	23	16	29	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	32	23	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	38	30	22	37	27	19	33	24	17	30	21	16	27	19	14	24	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	45	32	27	45	29	24	45	26	21	41	23	19	37	21	17	33	19	16	30	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	36	21	17	32	19	15	29	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	48	41	32	40	36	28	36	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
20	B	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	24	28	28	20	28	24	17	28	21	15	25	18	13	22	16	11	19	14	10
			Exposed	28	28	28	28	28	25	28	28	23	28	28	20	28	26	18	28	24	17	28	22	15	25	18	13	22	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	28	28	21	28	24	17	28	20	15	24	17	13	21	15	11	18	13	10	16	12	9
			Exposed	28	28	25	28	28	22	28	27	20	28	24	18	28	22	16	28	20	15	25	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	30	34	34	28	34	31	25	34	26	21	34	22	18	33	19	16	29	16	14	25	14	12	22	13	10
			Exposed	34	34	30	34	33	27	34	29	24	34	26	22	34	24	20	34	22	18	34	20	16	29	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	36	38	38	33	38	38	30	36	32	25	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13
			Exposed	38	38	36	38	38	32	38	37	29	37	33	26	34	30	24	30	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	28	28	28	28	28	27	28	28	24	28	28	22	28	28	19	28	25	18	28	23	16	27	19	14	23	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	28	28	19	28	25	17	28	22	15	28	20	14	25	18	13	23	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	28	28	26	28	28	23	28	28	21	28	26	19	28	23	17	28	21	16	27	19	14	22	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	28	23	17	28	21	15	26	18	14	23	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	34	34	32	34	34	29	34	31	25	34	28	23	34	25	21	34	23	19	34	21	17	31	18	14	26	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	34	25	21	34	22	18	34	20	16	31	18	15	28	16	13	26	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	38	38	38	38	38	34	38	38	31	38	35	28	36	32	25	32	29	23	29	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	35	32	25	31	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	28	28	25	28	28	22	28	28	20	28	26	18	28	23	16	28	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	28	23	16	28	20	14	25	18	13	23	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	28	28	22	28	27	19	28	24	17	28	21	16	27	19	14	24	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	36	32	27	36	29	24	36	26	21	36	23	19	36	21	17	33	19	16	30	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	36	21	17	32	19	15	29	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	40	40	32	40	36	28	36	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	15	22	18	13	22	16	11	19	14	10
			Exposed	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	17	22	22	15	22	18	13	22	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	17	22	20	15	22	17	13	21	15	11	18	13	10	16	12	9
			Exposed	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	20	15	22	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	26	21	28	22	18	28	19	16	28	16	14	25	14	12	22	13	10
			Exposed	28	28	28	28	28	27	28	28	24	28	26	22	28	24	20	28	22	18	28	20	16	28	17	14	25	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	25	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13
			Exposed	32	32	32	32	32	32	32	32	29	32	32	26	32	30	24	30	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	19	22	22	18	22	22	16	22	19	14	22	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	22	22	19	22	22	17	22	22	15	22	20	14	22	18	13	22	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	21	16	22	19	14	22	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	22	22	17	22	21	15	22	18	14	22	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	28	28	28	28	28	28	28	28	25	28	28	23	28	25	21	28	23	19	28	21	17	28	18	14	26	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	28	25	21	28	22	18	28	20	16	28	18	15	28	16	13	26	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	32	32	32	32	32	32	32	32	31	32	32	28	32	32	25	32	29	23	29	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	32	32	25	31	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	22	22	16	22	20	14	22	18	13	22	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	22	22	22	22	22	19	22	22	17	22	21	16	22	19	14	22	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	22	19	14	22	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	30	30	27	30	29	24	30	26	21	30	23	19	30	21	17	30	19	16	30	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	30	21	17	30	19	15	29	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	34	34	32	34	34	28	34	32	25	32	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
40	B	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	15	21	18	13	21	16	11	19	14	10			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	17	21	21	15	21	18	13	21	16	11	19	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	17	21	20	15	21	17	13	21	15	11	18	13	10	16	11	8	14	10	12
			Exposed	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	20	15	21	18	13	21	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	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	24	24	24	22	18	24	19	16	24	16	14	24	14	12
			Exposed	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	22	18	24	20	16	24	17	14	24	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	22	26	24	19	23	21	16	20	18	14	18	16	13
			Exposed	28	28	28	28	28	28	28	28	28	28	28	26	28	28	24	28	27	21	28	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	18	21	21	16	21	19	14	21	16	12	20	14	10	17	12	9	15	11	12	13	10	10
			Exposed	21	21	19	21	21	17	21	21	15	21	20	14	21	18	13	21	16	11	21	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	21	19	14	21	16	12	19	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	21	21	17	21	21	15	21	18	14	21	17	12	21	15	11	19	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	23	19	24	21	17	24	18	14	24	15	12	22	13	11	20	11	9	17	10	12	15	9	11
			Exposed	24	24	21	24	22	18	24	20	16	24	18	15	24	16	13	24	15	12	23	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	27	26	21	25	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	28	28	25	28	28	22	28	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	13	22	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	22	22	16	22	20	14	22	18	13	22	16	11	21	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	22	22	22	22	22	19	22	22	17	22	21	16	22	19	14	22	18	13	22	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	22	19	14	22	17	13	21	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	26	26	26	26	26	24	26	26	21	26	23	19	26	21	17	26	19	16	26	17	14	25	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	26	21	17	26	19	15	26	17	14	26	15	12	23	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	29	29	29	29	29	28	29	29	25	29	29	23	29	26	21	27	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	29	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
50	B	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13	18	16	11	18	14	10			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13	18	16	11	18	13	9	16	12	8	14	10	11	13	9	10
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	17	13	18	15	11	17	13	10	16	12	9			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	18	13	18	15	11	18	13	10	16	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	16	21	16	14	21	14	12	20	13	10			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	18	21	20	16	21	17	14	21	14	12	21	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	24	22	23	23	19	22	21	16	20	18	14	18	16	13
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	20	23	21	16	20	18	14	17	15	12	15	13	11	13	12	9	12	10	8
	C	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	14	18	16	12	18	14	10	17	12	9	15	11	12	13	10	10
			Exposed	18	18	18	18	18	17	18	18	15	18	18	14	18	18	13	18	16	11	18	15	10	17	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	18	14	18	16	12	18	14	10	16	12	9	14	10	12	13	9	10	11	12	9
			Exposed	18	18	17	18	18	15	18	18	14	18	17	12	18	15	11	18	14	10	17	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	18	14	21	15	12	20	13	11	20	11	9	17	10	12	15	9	11
			Exposed	21	21	21	21	21	18	21	20	16	21	18	15	21	16	13	21	15	12	21	14	11	20	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	24	24	21	23	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
			Exposed	25	25	25	25	25	22	25	25	20	25	23	18	23	20	16	21	19	15	19	17	13	16	14	11	14	12	10	12	11	8	10	9	11	9	12	10	12	11	9
	D	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	16	11	19	14	10	16	12	8	14	10	11	12	9	10	11	12	9
			Exposed	19	19	16	19	19	14	19	18	13	19	16	11	19	15	10	19	13	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	19	19	19	19	19	19	19	19	17	19	19	16	19	19	14	19	18	13	19	16	12	19	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	19	19	14	19	17	13	19	15	11	19	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	22	22	22	22	22	22	22	22	21	22	22	19	22	21	17	22	19	16	22	17	14	22	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	22	21	17	22	19	15	22	17	14	22	15	12	22	14	11	21	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	26	26	26	26	26	26	26	26	25	26	26	23	26	26	21	25	24	19	24	22	17	21	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	26	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7

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UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	11	15	14	10			
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	9	15	12	8	14	10	11	13	9	10
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	9			
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	10	15	11	8	14	10	11	12	9	10	11	12	9
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	16	14	18	14	10	18	14	10	18	13	10			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	17	14	18	14	12	18	12	10	18	11	9	16	9	12	14	8	10
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	28	30	30	25	29	28	22	27	24	19
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	10	15	12	9	15	11	12	13	10	10
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	11	15	15	10	15	12	9	15	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	10	15	12	9	14	10	12	13	9	10	11	12	9
			Exposed	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	12	9	15	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	14	18	15	12	18	13	11	17	11	9	17	10	12	15	9	11
			Exposed	18	18	18	18	18	18	18	18	16	18	18	15	18	16	13	18	15	12	18	14	11	18	11	9	17	10	12	14	8	11	13	11	9	11	10	8	10	9	7
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	31	31	31	27	29	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	33	33	33	33	33	33	33	33	30	33	33	27	33	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
	D	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	16	11	16	14	10	16	12	9	14	10	11	12	9	10	11	12	9
			Exposed	16	16	16	16	16	14	16	16	13	16	16	11	16	15	10	16	13	9	16	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	12	17	13	10	16	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	17	17	14	17	17	13	17	15	11	17	14	10	17	12	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	15	12	19	12	10	18	11	9	16	9	12	14	8	10	13	11	9
			Exposed	20	20	17	20	19	15	20	17	14	20	15	12	20	14	11	20	12	10	19	11	9	16	9	12	14	12	10	12	11	9	10	9	8	9	8	7	12	7	6
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	22	22	19	22	22	17	20	18	14	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	23	23	21	23	23	18	23	21	16	21	19	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	12	10	9	11	9	12	9	11	10	8	10	9	7
70	B	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	9	13	12	8	13	10	11	13	9	10
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	9
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	11	8	13	10	11	12	9	10	11	12	9
		20-27	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	24	24	24	24	24	24	24	21	24	22	18	24	19	16
			Exposed	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	22	18	24	19	15	24	16	13	24	14	12	22	13	10
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	28	28	28	25	27	27	22	25	24	19
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	25	30	27	21	26	23	18	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	11	12	13	10	10
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	9	13	11	11	13	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	10	12	13	9	10	11	12	9
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	9	13	10	12	12	9	10	11	12	9	9	10	8	8	9	7	11	8	6
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	19	24	20	16	24	17	14	23	15	12	22	13	11
			Exposed	24	24	24	24	24	24	24	24	22	24	24	20	24	22	19	24	21	17	24	17	14	24	15	12	22	13	11	19	11	9	17	10	8	15	9	7			
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	28	28	26	27	27	23	26	25	20	24	22	17	21	19	15	19	17	13			
			Exposed	30	30	30	30	30	30	30	30	27	30	30	24	30	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9			
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	11	14	14	10	14	12	8	14	10	11	12	9	10	11	12	9
			Exposed	14	14	14	14	14	14	14	14	13	14	14	11	14	14	10	14	13	9	14	12	9	14	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	13	10	14	11	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	14	14	14	14	14	13	14	14	11	14	14	10	14	12	9	14	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	26	22	29	22	18	28	19	16	27	16	13	25	14	12	22	13	10	19	11	9
			Exposed	29	29	26	29	28	23	29	25	21	29	23	19	29	21	17	29	19	15	29	17	14	25	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	31	31	28	30	30	26	28	28	22	27	24	19	23	21	16	20	18	14	18	16	12	16	14	11
			Exposed	32	32	31	32	32	28	32	32	25	32	28	22	29	26	20	26	23	19	24	21	17	20	18	14	17	15	12	15	13	11	13	12	9	11	10	8	10	9	7
80	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	10	11	11	9	10
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	13
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	17	13	19	15	11	18	13	10	16	12	9
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	16
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	15	21	16	13	21	14	12	21	13	10			
		27-45	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	26	26	26	25	25	25	24	24	22	24	24	19
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	21	26	23	18	23	20	16	20	18	14	18	16	13			
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	12	11	10	10
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	11	11	9	10	11	12	9	10	11	8	9	9	7
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	16	12	19	14	10
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	16	12	19	14	10	16	12	9	14	10	8	12	9	7	11	8	6
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	20	16	21	17	14	21	15	12	21	13	11			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	19	21	21	17	21	17	14	21	15	12	21	13	11	19	11	9	17	10	8	15	9	7
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	23	24	24	20	23	22	17	21	19	15	19	17	13	
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	22	27	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	8	12	10	11	12	9	10	11	12	9			
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	12	9	12	12	9	12	10	11	12	9	9	11	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	8	13	10	11	12	9	10	10	12	8	9	10	8
			Exposed	13	13	13	13	13	13	13	13	10	13	13	12	9	13	11	8	13	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5		
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	22	18	24	19	16	23	16	13	22	14	12	21	13	10	19	11	9
			Exposed	24	24	24	24	24	23	24	24	21	24	23	19	24	21	17	24	19	15	24	17	14	24	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	28	28	27	27	26	26	26	26	22	25	24	19	23	21	16	20	18	14	18	16	12	16	14	11
			Exposed	29	29	29	29	29	28	29	29	25	29	28	22	29	26	20	26	23	19	24	21	17	20	18	14	17	15	12	15	13	11	13	12	9	11	10	8	10	9	7

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ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
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SPAN TABLES

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				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
90	B	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	11	10	9	10
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	11	17	13	10	16	12	9
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	16	13	19	14	12	19	13	10
		27-45	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	26	26	26	26	26	25	25	25	22	24	24	19
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	12	10	10	10
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	11	10	9	10	10	12	9	10	11	8	9	9	7
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	12	17	14	10	17	12	9
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	16	12	17	14	10	16	12	9	14	10	8	12	9	7	11	8	6
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	17	14	19	15	12	19	13	11	19	14	11
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	17	14	19	15	12	19	13	11	19	11	9	17	10	8	15	9	7
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	23	24	24	20	23	22	17	21	19	15	19	17	13
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	22	27	26	20	24	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
	D	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	11	11	9	10	11	12	9			
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	9	11	10	11	11	9	9	11	12	8	9	10	7	12	9	6	11	8	5			
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	17	13	19	15	11	18	13	10	16	12	8	14	10	8			
			Exposed	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	17	13	19	16	12	18	13	10	16	11	8	13	10	7	12	9	6	10	7	5	9	7	5		
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	16	21	16	13	21	14	12	20	13	10	19	11	9
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	19	15	21	17	14	21	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	25	24	24	22	23	23	19	22	21	16	20	18	14	18	16	12	16	14	11
			Exposed	27	27	27	27	27	27	27	27	25	27	27	22	27	26	20	26	23	19	24	21	17	20	18	14	17	15	12	15	13	11	13	12	9	11	10	8	10	9	7
100	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	11	9	9	10
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	11	14	13	10	14	12	9
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	16	13	19	14	12	19	13	10
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21	20	20	19
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	20	16	20	18	14	18	16	13	18	16	13
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	9	9	10
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	11	9	9	10	9	12	9	9	11	8	9	9	7
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	10	14	12	9
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	14	10	14	12	9	14	10	8	12	9	7	11	8	6
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	17	14	19	15	12	19	13	11
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	17	14	19	14	12	19	12	10	18	13	10	18	11	9	16	11	9	16	12	9
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21	20	20	20	20	20	20	17	19	19	15	18	17	13
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9
	D	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8	10	10	11	10	9	10	10	12	9
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	9	10	10	11	10	9	9	10	12	8	9	10	7	12	9	6	11	8	5
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	11	17	13	10	16	12	8	14	10	8
			Exposed	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	17	13	17	16	12	17	13	10	16	11	8	13	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	16	13	19	14	12	18	13	10	18	11	9
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	15	19	17	14	19	14	12	19	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	23	24	24	19	22	21	16	20	18	14	18	16	12	16	14	11
			Exposed	27	27	27	27	27	27	27	27	25	27	27	23	27	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	12	10	8	10	9	7

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	78	78	78	78	78	70	78	78	60	78	78	53	78	77	48	78	63	44	78	57	40	70	48	34	57	41	29	49	35	25	42	31	22	37	27	19	33	24	17
			Exposed	78	76	48	78	61	43	78	55	38	75	49	34	62	44	31	56	40	28	51	37	26	43	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	78	78	69	78	78	58	78	78	52	78	64	47	78	58	42	78	53	38	77	48	35	56	40	30	47	34	25	41	30	22	36	26	19	31	23	17	28	20	15
			Exposed	78	58	42	78	51	37	64	46	34	57	41	30	52	37	27	47	34	25	43	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	79	79	79	79	79	79	79	79	63	79	79	57	79	63	51	79	57	47	79	52	42	79	44	36	65	37	31	56	32	26	48	28	23	42	25	20	37	22	18
			Exposed	79	62	51	79	55	45	79	50	41	79	45	37	79	40	33	64	37	30	58	33	28	49	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	80	80	80	80	80	80	80	80	80	80	80	80	80	80	61	80	80	56	80	65	51	61	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	80	80	61	80	80	54	80	62	49	63	56	44	57	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	78	78	51	78	65	45	78	58	40	78	52	36	67	47	33	60	43	30	54	39	27	45	33	23	39	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	66	47	33	58	42	29	52	37	26	47	34	24	42	30	21	38	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	78	61	45	78	54	40	78	48	35	61	44	32	55	39	29	50	36	26	45	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	54	39	29	48	35	26	43	31	23	39	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	79	73	54	79	59	48	79	52	43	79	47	39	79	43	35	74	39	32	62	35	29	52	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	79	42	35	68	38	31	59	34	28	53	30	25	48	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	~~12~~
		27-45	Interior	80	80	65	80	80	58	80	67	52	74	59	46	60	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	60	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	78	61	42	78	54	37	70	48	33	60	43	30	54	39	27	49	35	25	45	32	23	38	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	54	39	27	48	34	24	43	31	22	39	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	~~12~~	21	15	~~11~~	19	~~13~~	~~10~~
		7-20	Interior	78	50	37	62	45	33	56	40	29	50	36	27	45	33	24	41	30	22	37	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	~~13~~
			Exposed	45	33	24	40	29	21	36	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	~~12~~	20	15	~~11~~	18	~~13~~	9	16	~~11~~	8
		20-27	Interior	79	55	45	79	49	40	79	43	36	76	39	32	62	35	29	56	32	26	51	29	24	43	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	61	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	~~13~~	16	14	~~11~~	14	~~12~~	~~10~~
		27-45	Interior	80	77	54	80	61	48	61	54	43	55	49	39	50	44	35	45	40	32	41	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	49	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	~~12~~
10	B	0-7	Interior	63	63	63	63	63	63	63	63	60	63	63	53	63	63	48	63	63	44	63	57	40	63	48	34	57	41	29	49	35	25	42	31	22	37	27	19	33	24	17
			Exposed	63	63	48	63	61	43	63	55	38	63	49	34	62	44	31	56	40	28	51	37	26	43	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	64	64	64	64	64	58	64	64	52	64	64	47	64	58	42	64	53	38	64	48	35	56	40	30	47	34	25	41	30	22	36	26	19	31	23	17	28	20	15
			Exposed	64	58	42	64	51	37	64	46	34	57	41	30	52	37	27	47	34	25	43	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	73	73	73	73	73	73	73	73	63	73	73	57	73	63	51	73	57	47	73	52	42	73	44	36	65	37	31	56	32	26	48	28	23	42	25	20	37	22	18
			Exposed	73	62	51	73	55	45	73	50	41	73	45	37	73	40	33	64	37	30	58	33	28	49	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	61	78	78	56	78	65	51	61	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	78	78	61	78	78	54	78	62	49	63	56	44	57	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	63	63	51	63	63	45	63	58	40	63	52	36	63	47	33	60	43	30	54	39	27	45	33	23	39	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	63	47	33	58	42	29	52	37	26	47	34	24	42	30	21	38	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	64	61	45	64	54	40	64	48	35	61	44	32	55	39	29	50	36	26	45	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	54	39	29	48	35	26	43	31	23	39	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	73	73	54	73	59	48	73	52	43	73	47	39	73	43	35	73	39	32	62	35	29	52	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	73	42	35	68	38	31	59	34	28	53	30	25	48	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	~~12~~
		27-45	Interior	78	78	65	78	78	58	78	67	52	74	59	46	60	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	60	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	63	63	63	63	63	63	63	63	60	63	63	53	63	63	48	63	63	44	63	57	40	63	48	34	57	41	29	49	35	25	42	31	22	37	27	19	33	24	17
			Exposed	63	63	48	63	61	43	63	55	38	63	49	34	62	44	31	56	40	28	51	37	26	43	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	64	64	64	64	64	58	64	64	52	64	64	47	64	58	42	64	53	38	64	48	35	56	40	30	47	34	25	41	30	22	36	26	19	31	23	17	28	20	15
			Exposed	64	58	42	64	51	37	64	46	34	57	41	30	52	37	27	47	34	25	43	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	73	73	73	73	73	73	73	73	63	73	73	57	73	63	51	73	57	47	73	52	42	73	44	36	65	37	31	56	32	26	48	28	23	42	25	20	37	22	18
			Exposed	73	62	51	73	55	45	73	50	41	73	45	37	73	40	33	64	37	30	58	33	28	49	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	61	78	78	56	78	65	51	61	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	78	78	61	78	78	54	78	62	49	63	56	44	57	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
20	B	0-7	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	44	47	47	40	47	47	34	47	41	29	47	35	25	42	31	22	37	27	19	33	24	17
			Exposed	47	47	47	47	47	43	47	47	38	47	47	34	47	44	31	47	40	28	47	37	26	43	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	42	47	47	38	47	47	35	47	40	30	47	34	25	41	30	22	36	26	19	31	23	17	28	20	15	
			Exposed	47	47	42	47	47	37	47	46	34	47	41	30	47	37	27	47	34	25	43	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	51	57	57	47	57	52	42	57	44	36	57	37	31	56	32	26	48	28	23	42	25	20	37	22	18	
			Exposed	57	57	51	57	55	45	57	50	41	57	45	37	57	40	33	57	37	30	57	33	28	49	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	64	64	64	64	64	64	64	64	64	64	64	64	64	64	61	64	64	56	64	64	51	61	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	64	64	61	64	64	54	64	62	49	63	56	44	57	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	47	47	47	47	47	45	47	47	40	47	47	36	47	47	33	47	43	30	47	39	27	45	33	23	39	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	47	47	33	47	42	29	47	37	26	47	34	24	42	30	21	38	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	~~13~~	15	16	~~11~~
		7-20	Interior	47	47	45	47	47	40	47	47	35	47	44	32	47	39	29	47	36	26	45	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	47	39	29	47	35	26	43	31	23	39	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	~~13~~	14	15	~~11~~	19	~~14~~	~~10~~
		20-27	Interior	57	57	54	57	57	48	57	52	43	57	47	39	57	43	35	57	39	32	57	35	29	52	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	57	42	35	57	38	31	57	34	28	53	30	25	48	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	~~12~~
		27-45	Interior	64	64	64	64	64	58	64	64	52	64	59	46	60	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	60	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	47	47	42	47	47	37	47	47	33	47	43	30	47	39	27	47	35	25	45	32	23	38	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	47	39	27	47	34	24	43	31	22	39	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	~~12~~	21	15	~~11~~	19	~~13~~	~~10~~
		7-20	Interior	47	47	37	47	45	33	47	40	29	47	36	27	45	33	24	41	30	22	37	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	~~13~~
			Exposed	45	33	24	40	29	21	36	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	~~12~~	20	15	~~11~~	18	~~13~~	9	16	~~11~~	8
		20-27	Interior	60	55	45	60	49	40	60	43	36	60	39	32	60	35	29	56	32	26	51	29	24	43	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	60	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	~~13~~	16	14	~~11~~	14	~~12~~	~~10~~
		27-45	Interior	66	66	54	66	61	48	61	54	43	55	49	39	50	44	35	45	40	32	41	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	49	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	~~12~~

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	29	37	35	25	37	31	22	37	27	19	33	24	17
			Exposed	37	37	37	37	37	37	37	37	37	37	37	34	37	37	31	37	37	28	37	37	26	37	31	22	37	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	30	38	34	25	38	30	22	36	26	19	31	23	17	28	20	15
			Exposed	38	38	38	38	38	37	38	38	34	38	38	30	38	37	27	38	34	25	38	31	23	36	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	42	47	44	36	47	37	31	47	32	26	47	28	23	42	25	20	37	22	18
			Exposed	47	47	47	47	47	45	47	47	41	47	45	37	47	40	33	47	37	30	47	33	28	47	28	23	42	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	51	54	54	43	52	46	37	45	40	32	39	35	28	34	31	24	30	27	22
			Exposed	54	54	54	54	54	54	54	54	49	54	54	44	54	50	40	51	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	36	37	37	33	37	37	30	37	37	27	37	33	23	37	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	37	37	33	37	37	29	37	37	26	37	34	24	37	30	21	37	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	13	15	16	11
		7-20	Interior	38	38	38	38	38	38	38	38	35	38	38	32	38	38	29	38	36	26	38	33	24	38	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	38	38	29	38	35	26	38	31	23	38	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	13	14	15	11	19	14	10
		20-27	Interior	47	47	47	47	47	47	47	47	43	47	47	39	47	43	35	47	39	32	47	35	29	47	30	25	44	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	47	42	35	47	38	31	47	34	28	47	30	25	47	28	23	43	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	12
		27-45	Interior	54	54	54	54	54	54	54	54	52	54	54	46	54	53	42	54	49	38	50	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	54	53	42	53	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	37	37	37	37	37	37	37	37	33	37	37	30	37	37	27	37	37	25	37	32	23	37	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	37	37	27	37	34	24	37	31	22	37	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	38	38	37	38	38	33	38	38	29	38	36	27	38	33	24	38	30	22	37	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	13
			Exposed	38	33	24	38	29	21	36	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	50	50	45	50	49	40	50	43	36	50	39	32	50	35	29	50	32	26	50	29	24	43	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	50	35	29	50	31	26	49	28	23	44	25	21	40	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	13	16	14	11	14	12	10
		27-45	Interior	57	57	54	57	57	48	57	54	43	55	49	39	50	44	35	45	40	32	41	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	49	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	12
40	B	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	29	35	35	25	35	31	22	35	27	19	33	24	17			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	34	35	35	31	35	35	28	35	35	26	35	31	22	35	26	19	32	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	34	25	35	30	22	35	26	19	31	23	17	28	20	15			
			Exposed	35	35	35	35	35	35	35	35	34	35	35	30	35	35	27	35	34	25	35	31	23	35	26	19	31	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	36	40	37	31	40	32	26	40	28	23	40	25	20	37	22	18
			Exposed	40	40	40	40	40	40	40	40	40	40	40	37	40	40	33	40	37	30	40	33	28	40	28	23	40	24	20	36	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	43	47	46	37	44	40	32	39	35	28	34	31	24	30	27	22
			Exposed	47	47	47	47	47	47	47	47	47	47	47	44	47	47	40	47	46	36	47	42	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	35	27	35	33	23	35	28	20	33	24	17	29	21	15	26	18	20	23	16	18
			Exposed	35	35	33	35	35	29	35	35	26	35	34	24	35	30	21	35	28	19	35	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	13	15	16	11
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	32	35	35	29	35	35	26	35	33	24	35	28	20	32	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	35	35	29	35	35	26	35	31	23	35	28	21	35	26	19	32	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	13	14	15	11	19	14	10
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	39	40	40	35	40	39	32	40	35	29	40	30	25	40	25	21	38	22	18	33	19	16	29	17	14	26	15	19
			Exposed	40	40	35	40	38	31	40	34	28	40	30	25	40	28	23	40	25	21	40	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	12
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	46	47	47	42	47	47	38	46	44	35	42	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	47	47	42	47	47	37	47	42	33	43	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	37	37	37	37	37	37	37	37	33	37	37	30	37	37	27	37	37	25	37	32	23	37	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	37	37	27	37	34	24	37	31	22	37	28	20	35	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	38	38	37	38	38	33	38	38	29	38	36	27	38	33	24	38	30	22	37	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	13
			Exposed	38	33	24	38	29	21	36	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	43	43	43	43	43	40	43	43	36	43	39	32	43	35	29	43	32	26	43	29	24	43	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	43	35	29	43	31	26	43	28	23	43	25	21	40	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	13	16	14	11	14	12	10
		27-45	Interior	49	49	49	49	49	48	49	49	43	49	49	39	48	44	35	45	40	32	41	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	49	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	12
50	B	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	25	30	30	22	30	27	19	30	24	17			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	30	30	26	30	30	22	30	26	19	30	23	16	27	20	14	24	17	19	21	15	17
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	25	30	30	22	30	26	19	30	23	17	28	20	15			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	25	30	30	23	30	26	19	30	22	16	26	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	35	32	26	35	28	23	35	25	20	34	22	18			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	33	28	35	28	23	35	24	20	35	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	37	39	39	32	37	35	28	34	31	24	30	27	22			
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	41	41	36	41	41	33	39	35	28	34	30	24	29	26	21	25	23	18	22	20	16	20	18	14
	C	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	23	30	28	20	30	24	17	29	21	15	26	18	20	23	16	18
			Exposed	30	30	30	30	30	29	30	30	26	30	30	24	30	30	21	30	28	19	30	25	18	29	21	15	25	18	19	22	16	17	19	21	15	17	18	13	15	16	11
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	30	24	30	28	20	30	24	17	28	20	15	24	18	20	21	16	17	19	14	15
			Exposed	30	30	29	30	30	26	30	30	23	30	28	21	30	26	19	30	23	17	29	21	16	25	18	20	21	15	17	18	20	15	16	18	13	14	15	11	19	14	10
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	29	35	35	25	21	34	22	18	33	19	16	29	17	14	26	15	19		
			Exposed	35	35	35	35	35	31	35	34	28	35	30	25	35	28	23	35	25	21	35	23	19	33	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	12
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	38	40	40	35	38	37	29	36	32	25	31	28	22	27	24	19	24	21	17	21	19	15
			Exposed	41	41	41	41	41	37	41	41	33	41	38	30	39	35	27	35	32	25	32	29	23	27	24	19	23	21	16	20	18	14	18	16	19	15	14	17	14	19	15
	D	0-7	Interior	32	32	32	32	32	32	32	32	32	32	32	30	32	32	27	32	32	25	32	32	23	32	27	19	32	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	32	32	27	32	32	24	32	31	22	32	28	20	32	25	18	32	23	16	29	21	15	24	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	32	32	32	32	32	32	32	32	29	32	32	27	32	32	24	32	30	22	32	27	20	31	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	13
			Exposed	32	32	24	32	29	21	32	26	19	32	23	17	29	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	38	38	38	38	38	38	38	38	36	38	38	32	38	35	29	38	32	26	38	29	24	38	25	20	36	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	38	35	29	38	31	26	38	28	23	38	25	21	38	23	19	36	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	13	16	14	11	14	12	10
		27-45	Interior	44	44	44	44	44	44	44	44	43	44	44	39	43	43	35	42	40	32	40	37	29	35	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	44	44	35	44	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	12

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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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	19	25	24	17
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	19	25	23	16	25	20	14	24	17	19	21	15	17
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	16	25	25	19	25	23	17	25	20	15
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	19	25	22	16	25	19	14	23	17	19	20	15	17	18	20	15
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	26	31	28	23	31	25	20	30	22	18			
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	28	31	28	23	31	24	20	31	21	17	31	18	15	27	16	20	24	14	18
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	53	48	51	51	42	49	47	37	46	41	33
			Exposed	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	50	55	53	42	51	46	36	44	40	31	39	35	27	34	30	24	30	27	21
	C	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	24	17	25	21	15	25	18	20	23	16	18
			Exposed	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	25	19	25	25	18	25	21	15	25	18	19	22	16	17	19	21	15	17	18	13	15	16	11
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	20	25	24	17	25	20	15	24	18	20	21	16	17	19	14	15
			Exposed	25	25	25	25	25	25	25	25	23	25	25	21	25	25	19	25	23	17	25	21	16	25	18	20	21	15	17	18	20	15	16	18	13	14	15	11	19	14	10
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31	30	25	31	25	21	30	22	18	29	19	16	28	17	14	26	15	19
			Exposed	31	31	31	31	31	31	31	31	28	31	30	25	31	28	23	31	25	21	31	23	19	31	19	16	28	17	21	25	14	18	21	19	16	19	17	14	17	15	12
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	54	53	52	52	45	49	48	38	47	42	33	41	36	29	36	32	25	32	29	23	
			Exposed	55	55	55	55	55	55	55	55	51	55	55	46	55	52	41	53	48	38	49	44	35	41	37	29	35	32	25	31	27	22	27	24	19	23	21	17	21	19	15
	D	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	25	28	28	23	28	27	19	28	23	16	28	20	14	24	17	19	21	15	16	19	21	15
			Exposed	28	28	27	28	28	24	28	28	22	28	28	20	28	25	18	28	23	16	28	21	15	24	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	28	28	28	28	28	28	28	28	28	28	28	27	28	28	24	28	28	22	28	27	20	28	23	17	27	20	14	23	17	19	20	15	17	18	20	15	16	17	13
			Exposed	28	28	24	28	28	21	28	26	19	28	23	17	28	21	16	27	19	14	24	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	32	33	33	29	33	32	26	33	29	24	33	25	20	32	21	17	31	18	15	27	16	20	24	14	18	21	19	16
			Exposed	33	33	29	33	31	26	33	28	23	33	25	21	33	23	19	33	21	17	33	19	16	28	16	20	24	14	17	20	18	15	18	16	13	16	14	11	14	12	10
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	38	38	32	37	37	29	34	31	25	30	27	21	26	23	18	22	20	16	20	18	14	17	16	19
			Exposed	39	39	35	39	39	31	39	35	28	36	32	25	32	29	23	29	26	21	27	24	19	23	20	16	19	17	21	17	15	18	15	20	16	20	18	14	17	16	12
70	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	17
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	19	22	22	16	22	20	14	22	17	19	21	15	17
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	15
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	19	22	22	16	22	19	14	22	17	19	20	15	17
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	41	41	35	41	41	35	41	37	31	41	33	27
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	35	41	36	30	41	31	26	41	27	23	41	24	20	37	21	18
		27-45	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	48	48	48	46	46	42	44	44	37	43	41	33
			Exposed	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	42	50	46	36	44	39	31	38	34	27	34	30	24	30	27	21
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	15	22	18	20	22	16	18
			Exposed	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	19	22	22	18	22	21	15	22	18	19	22	16	17	19	21	15	17	18	13	15	16	11
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	20	15	22	18	20	21	16	17	19	14	15
			Exposed	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	21	16	22	18	20	21	15	17	18	20	15	16	18	13	14	15	11	19	14	10
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	37	41	39	32	41	33	27	40	29	24	39	26	21	37	23	19
			Exposed	41	41	41	41	41	41	41	41	41	41	41	38	41	41	34	41	38	31	41	35	29	41	29	24	41	25	21	37	22	18	32	19	16	29	17	14	25	15	12
		27-45	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	49	49	47	47	45	45	45	38	43	42	33	41	36	29	36	32	25	32	28	23
			Exposed	50	50	50	50	50	50	50	50	50	50	50	46	50	50	41	50	48	38	49	44	34	41	37	29	35	32	25	30	27	22	27	24	19	23	21	17	21	19	15
	D	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	19	24	23	16	24	20	14	24	17	19	21	15	16	19	21	15
			Exposed	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	23	16	24	21	15	24	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	23	17	24	20	14	23	17	19	20	15	17	18	20	15	16	17	13
			Exposed	24	24	24	24	24	21	24	24	19	24	23	17	24	21	16	24	19	14	24	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	44	49	49	40	49	44	37	49	37	31	47	32	26	46	28	23	41	24	20	36	21	18	32	19	16
			Exposed	49	49	44	49	47	39	49	42	35	49	38	32	49	35	29	49	32	26	49	29	24	42	24	20	36	21	17	31	18	15	27	16	13	24	14	11	21	12	10
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	51	51	48	50	50	44	47	47	37	45	40	32	39	35	28	34	30	24	30	27	21	26	24	19
			Exposed	53	53	53	53	53	47	53	53	42	53	48	38	49	44	34	44	40	31	40	36	29	34	31	24	29	26	21	25	23	18	22	20	16	20	18	14	17	16	12
80	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	17	19	19	15	17
		7-20	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	29	32	32	25	32	30	22
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	25	32	29	22	32	25	19	31	22	17	27	20	15
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	31	36	33	27
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	30	36	31	26	36	27	23	36	24	20	36	21	18
		27-45	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	44	44	42	42	42	41	41	37	39	39	33
			Exposed	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	42	45	45	36	44	39	31	38	34	27	34	30	24	30	27	21
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	20	19	16	18
		7-20	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	26	32	31	23	32	27	20	32	24	17	29	21	15
			Exposed	32	32	32	32	32	32	32	32	32	32	32	31	32	32	28	32	32	26	32	32	24	32	27	20	32	23	17	28	20	15	24	18	13	21	15	11	19	14	10
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	36	36	32	36	33	27	36	29	24	35	26	21	34	23	19
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	31	36	35	29	36	29	24	36	25	21	36	22	18	32	19	16	29	17	14	25	15	12
		27-45	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	43	43	43	41	41	38	40	40	33	38	36	29	36	32	25	32	28	23
			Exposed	45	45	45	45	45	45	45	45	45	45	45	41	45	45	38	45	44	34	41	37	29	35	32	25	30	27	22	27	24	19	23	21	17	21	19	15			
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	16	21	20	14	21	17	19	21	15	16	19	21	15			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	15	21	18	19	21	15	16	18	20	14	16	17	12	21	15	11	19	13	10
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	20	14	21	17	19	20	15	17	18	20	15	16	17	13
			Exposed	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	19	14	21	18	20	20	15	17	17	19	14	15	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	37	31	40	32	26	39	28	23	37	24	20	36	21	18	32	19	16
			Exposed	40	40	40	40	40	39	40	40	35	40	38	32	40	35	29	40	32	26	40	29	24	40	24	20	36	21	17	31	18	15	27	16	13	24	14	11	21	12	10
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	48	48	48	47	47	47	46	46	44	44	44	37	42	40	32	39	35	28	34	30	24	30	27	21	26	24	19
			Exposed	49	49	49	49	49	47	49	49	42	49	48	38	48	44	34	44	40	31	40	36	29	34	31	24	29	26	21	25	23	18	22	20	16	20	18	14	17	16	12

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ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	19	17	15	17
		7-20	Interior	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	29	29	29	29	29	29	29	29	29	29	25	29	29	22
			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	29	25	29	29	22	29	25	19	29	22	17	27	20	15
		20-27	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	32	31	32	32	27
			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	30	32	31	26	32	27	23	32	24	20	32	21	18
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39	39	39	38	38	37	37	37	33
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	36	41	40	31	39	35	27	34	30	24	30	27	21
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	20	17	16	18
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	19	17	16	17	17	21	15	17	18	13	16	14	11
		7-20	Interior	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	29	26	29	29	23	29	27	20	29	24	17	29	21	15
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	26	29	29	24	29	27	20	29	23	17	28	20	15	24	18	13	21	15	11	19	14	10	
		20-27	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	27	32	29	24	32	26	21	32	23	19
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	29	32	29	24	32	25	21	32	22	18	32	19	16	29	17	14	25	15	12	
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	40	40	38	38	38	37	37	33	35	35	29	34	32	26	32	29	23
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	38	41	41	35	40	37	29	35	32	25	31	27	22	27	24	19	24	21	17	21	19	15	
	D	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	17	19	19	15	16	19	21	15			
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	18	19	19	15	16	18	20	14	16	17	12	21	15	11	19	13	10	
		7-20	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	26	32	30	22	32	26	19	31	22	17	27	20	15	24	17	13
			Exposed	32	32	32	32	32	32	32	32	29	32	32	26	32	32	24	32	29	22	32	27	20	31	23	17	26	19	14	23	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	31	36	32	26	36	28	23	34	24	20	33	21	18	32	19	16
			Exposed	36	36	36	36	36	36	36	36	35	36	36	32	36	35	29	36	32	26	36	29	24	36	24	20	36	21	17	31	18	15	27	16	13	24	14	11	21	12	10
		27-45	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	44	44	43	43	43	41	41	37	39	39	32	37	35	28	34	30	24	30	27	21	26	24	19
			Exposed	45	45	45	45	45	45	45	45	42	45	45	38	45	44	34	44	40	31	40	36	29	34	31	24	29	26	21	25	23	18	22	20	16	20	18	14	17	16	12
100	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	19	15	15	17
		7-20	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	24	24	24	24	24	24	24	24	24	24	24	24	24	22
			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	24	24	24	24	22	24	24	19	24	22	17	24	20	15
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	31	33	33	27
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	31	26	33	27	23	33	24	20	33	21	18
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	36	36	35	35	35	34	34	33
			Exposed	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	37	37	31	36	34	27	34	30	24	30	27	21			
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	20	15	15	18
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	19	15	15	17	15	21	15	15	18	13	15	16	11
		7-20	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	24	24	24	24	23	24	24	20	24	24	17	24	21	15
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	20	24	23	17	24	20	15	24	18	13	21	15	11	19	14	10
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	33	33	27	33	29	24	33	26	21	32	23	19			
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	31	33	33	29	33	29	24	33	25	21	33	22	18	32	19	16	29	17	14	25	15	12	
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	36	36	34	34	33	32	32	25	31	28	23			
			Exposed	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	29	35	32	25	30	27	22	27	24	19	23	21	17	21	19	15
	D	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	19	17	15	16	17	21	15			
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	19	17	15	16	17	20	14	16	17	12	21	15	11	19	13	10	
		7-20	Interior	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	22	29	26	19	29	22	17	27	20	15	24	17	13
			Exposed	29	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	29	22	29	27	20	29	23	17	26	19	14	23	17	12	20	15	11	18	13	9	16	11	8
		20-27	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	26	32	28	23	32	24	20	31	21	18	30	19	16
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	26	32	29	24	32	24	20	32	21	17	31	18	15	27	16	13	24	14	11	21	12	10
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	40	40	38	38	37	36	36	32	35	35	28	33	30	24	30	27	21	27	24	19
			Exposed	41	41	41	41	41	41	41	41	41	41	41	38	41	41	35	41	40	32	40	36	29	34	31	24	29	26	21	25	23	18	22	20	16	20	18	14	17	16	12

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	39	39	38	39	39	33	39	39	29	39	39	26	39	35	24	39	31	22	39	28	20	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	12	8
			Exposed	39	34	24	39	30	21	39	27	19	34	24	17	31	22	15	28	20	14	25	18	13	21	15	11	18	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	39	39	33	39	39	29	39	36	26	39	32	23	39	29	21	37	26	19	33	24	17	28	20	15	23	17	12	20	15	11	17	13	9	15	11	8	14	10	11
			Exposed	39	29	21	35	25	18	32	23	17	28	20	15	26	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	40	40	40	40	40	35	40	40	31	40	34	28	40	31	25	40	28	23	40	26	21	39	21	18	32	18	15	28	16	13	24	14	11	21	12	10	18	11	9
			Exposed	40	31	25	40	27	22	40	24	20	40	22	18	35	20	16	32	18	15	29	16	14	24	14	11	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	40	40	40	40	40	40	40	40	39	40	40	34	40	40	30	40	35	28	36	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	40	40	30	40	34	27	34	31	24	31	28	22	28	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	39	37	25	39	32	22	39	29	20	37	26	18	33	23	16	30	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	32	23	16	29	21	14	26	18	13	23	17	12	21	15	10	19	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	39	30	22	39	27	20	33	24	17	30	22	16	27	19	14	25	18	13	22	16	12	19	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	40	33	27	40	29	24	40	26	21	40	23	19	38	21	17	34	19	16	31	17	14	26	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	38	21	17	33	19	15	29	17	14	26	15	12	24	14	11	21	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	40	40	32	40	37	29	37	33	26	33	29	23	30	26	21	27	24	19	25	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	30	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	39	30	21	38	27	18	33	24	16	30	21	15	27	19	13	24	17	12	22	16	11	19	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	27	19	13	24	17	12	21	15	11	19	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	35	25	18	31	22	16	28	20	14	25	18	13	22	16	12	20	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	22	16	12	20	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	40	27	22	40	24	20	39	21	18	34	19	16	31	17	14	28	16	13	25	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	40	34	27	34	30	24	30	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6
10	B	0-7	Interior	32	32	32	32	32	32	32	32	29	32	32	26	32	32	24	32	31	22	32	28	20	32	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	12	8
			Exposed	32	32	24	32	30	21	32	27	19	32	24	17	31	22	15	28	20	14	25	18	13	21	15	11	18	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	32	32	32	32	32	29	32	32	26	32	32	23	32	29	21	32	26	19	32	24	17	28	20	15	23	17	12	20	15	11	17	13	9	15	11	8	14	10	11
			Exposed	32	29	21	32	25	18	32	23	17	28	20	15	26	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	36	36	36	36	36	35	36	36	31	36	34	28	36	31	25	36	28	23	36	26	21	36	21	18	32	18	15	28	16	13	24	14	11	21	12	10	18	11	9
			Exposed	36	31	25	36	27	22	36	24	20	36	22	18	35	20	16	32	18	15	29	16	14	24	14	11	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	34	39	39	30	39	35	28	36	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	39	39	30	39	34	27	34	31	24	31	28	22	28	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	32	32	25	32	32	22	32	29	20	32	26	18	32	23	16	30	21	15	27	19	13	22	16	11	19	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	32	23	16	29	21	14	26	18	13	23	17	12	21	15	10	19	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	32	30	22	32	27	20	32	24	17	30	22	16	27	19	14	25	18	13	22	16	12	19	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	27	19	14	24	17	13	21	15	11	19	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	36	33	27	36	29	24	36	26	21	36	23	19	36	21	17	34	19	16	32	17	14	26	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	36	21	17	33	19	15	29	17	14	26	15	12	24	14	11	21	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	39	39	32	39	37	29	37	33	26	33	29	23	30	26	21	27	24	19	25	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	30	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	39	30	21	38	27	18	33	24	16	30	21	15	27	19	13	24	17	12	22	16	11	19	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	27	19	13	24	17	12	21	15	11	19	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	35	25	18	31	22	16	28	20	14	25	18	13	22	16	12	20	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	22	16	12	20	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	30	27	22	30	24	20	30	21	18	30	19	16	30	17	14	28	16	13	25	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	33	33	27	33	30	24	30	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6
20	B	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	17	23	20	14	23	17	12	21	15	11	18	13	9	16	12	8		
			Exposed	23	23	23	23	23	21	23	23	19	23	23	17	23	22	15	23	20	14	23	18	13	21	15	11	18	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	24	19	24	24	17	24	20	15	23	17	12	20	15	11	17	13	9	15	11	8	14	10	11
			Exposed	24	24	21	24	24	18	24	23	17	24	20	15	24	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	28	29	29	25	29	28	23	29	26	21	29	21	18	29	18	15	28	16	13	24	14	11	21	12	10	18	11	9
			Exposed	29	29	25	29	27	22	29	24	20	29	22	18	29	20	16	29	18	15	29	16	14	24	14	11	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	28	32	32	25	30	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	32	32	30	32	32	27	32	31	24	31	28	22	28	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	23	23	23	23	23	22	23	23	20	23	23	18	23	23	16	23	21	15	23	19	13	22	16	11	19	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	23	23	16	23	21	14	23	18	13	23	17	12	21	15	10	19	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	24	24	22	24	24	20	24	24	17	24	22	16	24	19	14	24	18	13	22	16	12	19	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	24	19	14	24	17	13	21	15	11	19	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	29	29	27	29	29	24	29	26	21	29	23	19	29	21	17	29	19	16	29	17	14	26	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	29	21	17	29	19	15	29	17	14	26	15	12	24	14	11	21	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	32	32	32	32	32	29	32	32	26	32	29	23	30	26	21	27	24	19	25	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	30	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	23	23	21	23	23	18	23	23	16	23	21	15	23	19	13	23	17	12	22	16	11	19	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	23	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	24	24	18	24	22	16	24	20	14	24	18	13	22	16	12	20	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	22	16	12	20	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	30	27	22	30	24	20	30	21	18	30	19	16	30	17	14	28	16	13	25	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	33	33	27	33	30	24	30	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	14	19	17	12	19	19	15	11	18	13	9	16	12	8
			Exposed	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	18	13	19	15	11	18	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	17	12	19	15	11	17	13	9	15	11	8	14	10	11
			Exposed	19	19	19	19	19	18	19	19	17	19	19	15	19	18	13	19	17	12	19	15	11	18	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	21	18	24	18	15	24	16	13	24	14	11	21	12	10	18	11	9
			Exposed	24	24	24	24	24	22	24	24	20	24	22	18	24	20	16	24	18	15	24	16	14	24	14	11	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	21	26	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	27	27	27	27	27	27	27	27	24	27	27	22	27	25	20	25	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	16	11	19	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	19	19	16	19	19	14	19	18	13	19	17	12	19	15	10	19	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	19	19	19	19	19	19	19	19	17	19	19	16	19	19	14	19	18	13	19	16	12	19	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	19	19	14	19	17	13	19	15	11	19	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	24	24	24	24	24	24	24	24	21	24	23	19	24	21	17	24	19	16	24	17	14	24	15	12	22	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	24	21	17	24	19	15	24	17	14	24	15	12	24	14	11	21	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	27	27	27	27	27	27	27	27	26	27	27	23	27	26	21	27	24	19	25	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	27	26	21	26	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	17	12	19	16	11	19	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	19	19	13	19	17	12	19	15	11	19	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	19	16	12	19	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	25	25	22	25	24	20	25	21	18	25	19	16	25	17	14	25	16	13	25	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	25	17	14	25	15	13	24	14	11	22	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	28	28	27	28	28	24	28	27	21	27	24	19	25	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6
40	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	14	17	17	12	17	15	11	17	13	9	16	12	8			
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	17	13	17	15	11	17	13	9	16	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	12	17	17	12	17	15	11	17	13	9	15	11	8	14	10	11
			Exposed	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	17	12	17	15	11	17	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	18	15	20	16	13	20	14	11	20	12	10	18	11	9
			Exposed	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	18	15	20	16	14	20	14	11	20	12	10	18	10	8	15	9	11	13	12	10	12	10	9
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	18	22	20	16	19	17	14	17	15	12	15	13	11
			Exposed	23	23	23	23	23	23	23	23	23	23	22	23	23	22	20	23	23	18	23	21	16	20	17	14	17	15	12	14	13	10	12	11	9	11	10	12	10	9	10
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	13	17	16	11	17	14	10	16	12	8	14	10	11	13	9	10	11	12	9
			Exposed	17	17	16	17	17	14	17	17	13	17	17	12	17	15	10	17	14	9	17	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	12	17	14	10	16	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	17	17	14	17	17	13	17	15	11	17	14	10	17	13	9	16	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	19	16	20	20	17	20	19	16	20	17	14	20	15	12	20	12	10	19	11	9	16	9	12	14	8	10	13	11	9
			Exposed	20	20	17	20	19	15	20	17	14	20	15	12	20	14	11	20	12	10	20	11	9	16	9	12	14	8	10	12	11	9	10	9	8	9	8	7	8	7	6
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	22	17	21	18	15	18	16	12	15	14	11	13	12	9	12	10	8	10	9	11
			Exposed	23	23	21	23	23	18	23	21	16	21	19	15	19	17	13	17	16	12	16	14	11	13	12	9	11	10	8	10	9	11	9	12	9	11	10	8	10	9	7
	D	0-7	Interior	18	18	18	18	18	18	18	18	16	18	18	15	18	18	13	18	17	12	18	16	11	18	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	18	18	13	18	17	12	18	15	11	18	14	10	17	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	15	11	18	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	19	16	12	19	14	10	18	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	21	21	21	21	21	20	21	21	18	21	19	16	21	17	14	21	16	13	21	14	12	21	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	21	17	14	21	15	13	21	14	11	21	12	10	20	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	25	25	25	25	25	24	25	25	21	25	24	19	24	22	17	22	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6
50	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	13	9	15	12	8			
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	11	15	13	9	15	11	12	13	10	10	12	8	9	10	11	8
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	15	15	12	15	15	11	15	13	9	15	11	8	14	10	11
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	15	15	11	15	13	9	15	11	8	13	9	11	11	8	9	10	11	8	9	10	7
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	27	29	28	23	29	24	20	29	21	17	29	18	15	28	16	13
			Exposed	29	29	29	29	29	29	29	29	29	29	29	27	29	29	25	29	27	22	29	25	21	29	21	17	29	18	15	27	15	13	23	13	11	20	12	10	18	10	9
		27-45	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	27	29	29	24	28	26	21	26	23	18	23	20	16
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	27	31	31	25	30	26	21	25	23	18	22	19	15	19	17	13	17	15	12	15	13	10
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	10	15	12	8	14	10	11	13	9	10	11	12	9
			Exposed	15	15	15	15	15	14	15	15	13	15	15	12	15	15	10	15	14	9	15	12	9	14	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	14	10	15	12	8	14	10	11	12	9	10	10	12	8	9	10	8
			Exposed	15	15	14	15	15	13	15	15	11	15	14	10	15	13	9	15	11	8	14	10	12	12	9	10	10	11	8	9	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	26	22	28	29	19	28	16	13	25	14	12	22	13	10	19	11	9			
			Exposed	29	29	26	29	28	23	29	25	21	29	23	19	29	21	17	29	19	15	29	17	14	25	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	30	30	26	29	28	22	27	24	19	23	21	16	20	18	14	18	16	12	16	14	11
			Exposed	31	31	31	31	31	28	31	31	25	31	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7
	D	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	16	16	12	16	16	11	16	13	9	16	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	16	16	13	16	16	12	16	15	11	16	14	10	16	12	9	16	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	16	16	16	16	16	16	16	16	14	16	16	13	16	16	12	16	15	11	16	13	10	15	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	16	16	12	16	14	10	16	13	9	16	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	19	19	19	19	19	19	19	19	18	19	19	16	19	17	14	19	16	13	19	14	12	19	12	10	18	10	8	15	9	11	13	12	10	12	10	9	10	9	8
			Exposed	19	17	14	19	15	13	19	14	11	19	12	10	19	11	9	18	10	8	16	9	12	14	12	10	12	10	8	10	9	7	9	8	6	12	7	5	10	6	5
		27-45	Interior	22	22	22	22	22	22	22	22	21	22	22	19	21	21	17	21	20	16	20	18	14	17	15	12	15	13	10	13	11	9	11	10	12	10	9	10	9	12	9
			Exposed	22	22	17	22	19	15	19	17	14	18	16	12	16	14	11	14	13	10	13	12	9	11	10	12	9	8	10	8	11	9	11	10	8	10	9	7	8	8	6

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	9	12	12	8			
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	9	12	11	12	12	10	10	12	8	9	10	11	8
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	16	21	19	14	21	17	12	21	15	11
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	19	21	21	17	21	19	14	21	17	12	20	14	11	17	12	9	15	11	8	13	10	7
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	21	17	23	18	15	23	16	13			
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	21	23	21	17	23	18	15	23	15	13	23	13	11	20	12	10	18	10	9
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	26	26	24	25	25	21	24	23	18	23	20	16
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	25	28	26	21	25	23	18	22	19	15	19	17	13	17	15	12	15	13	10
	C	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	8	12	10	11	12	9	10	11	12	9
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	9	12	12	9	12	10	11	12	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	15	21	18	13	21	15	11	18	13	10	16	12	8	14	10	8
			Exposed	21	21	21	21	21	19	21	21	17	21	21	15	21	19	14	21	17	13	21	16	12	18	13	10	16	11	8	14	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	22	18	23	19	16	23	16	13	22	14	12	21	13	10	19	11	9
			Exposed	23	23	23	23	23	23	23	23	21	23	23	19	23	21	17	23	19	15	23	17	14	23	14	12	21	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	27	27	26	26	26	22	25	24	19	23	21	16	20	18	14	18	16	12	16	14	11
			Exposed	28	28	28	28	28	28	28	28	25	28	28	23	28	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	13	9	14	11	12	14	10	10	12	8	9	10	11	8	9	10	7
			Exposed	14	14	13	14	14	12	14	14	11	14	14	10	14	12	9	14	11	12	14	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	13	10	14	11	8	13	10	11	11	8	9	10	11	8	9	10	7	12	8	6
			Exposed	14	14	12	14	14	10	14	13	9	14	11	8	14	10	12	13	9	11	12	9	10	10	11	8	8	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	24	20	25	22	18	25	18	15	24	16	13	23	14	11	20	12	10	18	10	9	16	9	8
			Exposed	25	25	22	25	23	19	25	21	17	25	19	16	25	17	14	25	16	13	25	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	28	28	24	27	27	22	26	23	18	22	20	16	19	17	14	17	15	12	15	13	10	13	12	9
			Exposed	29	29	26	29	29	23	29	26	21	27	24	19	24	22	17	22	20	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6
70	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	12	11	10	10	11	8	9	10	11	8
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	14	18	17	12	18	15	11
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	14	18	17	12	18	14	11	17	12	9	15	11	8	13	10	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	18	15	20	16	13
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	18	15	20	15	13	20	13	11	20	12	10	18	10	9
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	24	24	23	23	21	22	22	18	21	20	16
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	23	18	22	19	15	19	17	13	17	15	12	15	13	10
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	11	11	9	10	11	12	9
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	9	11	11	9	11	10	11	11	9	9	11	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	15	11	18	13	10	16	12	8	14	10	8
			Exposed	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	17	13	18	16	12	18	13	10	16	11	8	14	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	16	20	20	14	20	18	12	19	11	9
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		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	23	22	22	22	22	19	21	21	16	20	18	14	18	16	12
			Exposed	25	25	25	25	25	25	25	25	23	25	25	20	25	24	19	24	22	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7			
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	9	12	11	12	12	10	10	12	12	8	9	10	11	8	9	10	7		
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	12	12	10	11	12	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	20	15	20	17	13	20	15	11	17	13	9	15	11	8	13	10	7	12	8	6
			Exposed	20	20	18	20	20	16	20	19	14	20	17	13	20	16	12	20	14	11	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	18	15	22	16	13	21	14	11	20	12	10	18	10	9	16	9	8
			Exposed	22	22	22	22	22	19	22	21	17	22	19	16	22	17	14	22	16	13	22	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	24	25	25	22	24	23	18	22	20	16	19	17	14	17	15	12	15	13	10	13	12	9
			Exposed	27	27	26	27	27	23	27	26	21	27	24	19	24	22	17	22	20	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6
80	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	9	9	10	9	8	9	9	11	8
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	11	15	12	9	15	11	8	13	10	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	18	15	20	16	13
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	18	15	20	15	13	20	13	11	20	12	10	18	10	9
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	24	24	23	23	21	22	22	18	21	20	16
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	23	18	22	19	15	19	17	13	17	15	12	15	13	10
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	11	9	9	10	9	12	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	6	11	8	5	
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	11	15	13	10	15	12	8	14	10	8
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	22	22	21	21	21	20	20	18	20	20	16
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	18	22	19	15	19	17	13	17	15	12	15	13	10
	D	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	11	9	9	10	9	12	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	8	9	10	7	8	9	6	11	8	5
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	10	15	12	8	14	10	8
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	13	10	15	11	8	14	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	16	20	20	14	20	18	12	19	11	9
			Exposed	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	19	15	20	17	14	20	14	12	20	12	10	18	11	9	16	9	8	14	8	7	12	7	6
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	22	22	21	21	19	20	20	16	20	18	14	18	16	12
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	18	22	19	15	19	17	13	17	15	12	15	13	10	13	10
	C	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	12	10	10	10	10	8	9	10	11	8	9	10	7
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	12	10	10	11	10	9	9	10	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	17	13	18	15	11	17	13	9	15	11	8	13	10	7	12	8	6
			Exposed	18	18	18	18	18	16	18	18	14	18	17	13	18	16	12	18	14	11	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	18	15	20	16	13	19	14	11	19	12	10	18	10	9	16	9	8
			Exposed	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	16	13	20	14	12	20	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	24	25	25	22	24	23	18	22	20	16	19	17	14	17	15	12	15	13	10	13	12	9
			Exposed	27	27	26	27	27	23	27	26	21	27	24	19	24	22	17	22	20	16	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	8	10	8	8	9	8	11	8
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11		
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	9	13	11	8	13	10	7
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	15	13	16	13	11	16	12	10	16	10	9
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	18	18	18	18	16
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	17	13	17	15	12	15	13	10	14	11	9
	C	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	11	8	8	10	8	12	9
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	11	8	8	9	8	12	8	8	10	7	8	9	6	11	8	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	8	13	10	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	8	13	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	14	12	16	12	10	16	11	9	16	9	8	14	8	7	12	7	6
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	16	14	12	16	13	10	16	11	9
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	18	18	16	18	18	14	17	16	12	16	14	11
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7			
	D	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	9	9	10	9	8	9	9	9	11	8	9	10	7		
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	12	9	9	11	9	9	9	9	11	8	9	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	13	9	15	11	8	13	10	7	12	8	6
			Exposed	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	14	11	15	13	10	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	18	15	20	16	13	19	14	11	19	12	10	18	10	9	16	9	8
			Exposed	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	16	13	20	14	12	20	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21	20	20	18	19	19	16	18	17	14	17	15	12	15	13	10	13	12	9
			Exposed	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	20	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6
100	B	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	11	7	7	10	7	7	9	7	11	8
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	8	13	10	8
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	13	11	14	12	10	14	10	9
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	16
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	17	13	17	15	12	15	13	10
	C	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	11	7	7	10	7	11	9
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	11	7	7	9	7	11	8	7	10	7	7	9	6	11	8	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	8	13	10	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	8	13	10	7	12	9	6	10	7	5	9	7	5
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	13	10	14	11	9
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	12	10	14	11	9	14	9	8	14	8	7	12	7	6
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	16	16	14	16	16	12	15	14	11
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	14	17	16	12	15	13	11	13	12	9	11	10	8	10	9	7
	D	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	8	10	8	8	9	8	11	8	8	10	7			
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12	8	8	11	8	8	9	8	11	8	8	10	7	12	8	6	10	7	5	9	7	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	9	13	11	8	13	10	7	12	8	6
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	13	11	13	13	10	13	11	8	13	9	7	11	8	6	10	7	5	9	6	4	8	5	4
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	14	11	16	12	10	15	10	9	15	9	8
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	16	14	12	16	12	10	16	10	8	15	9	7	13	8	6	12	7	5	10	6	5
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	18	18	18	16	17	17	14	16	15	12	15	13	10	13	12	9
			Exposed	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	10	9	7	8	8	6

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	76	76	76	76	76	66	76	76	58	76	76	52	76	73	47	76	62	43	76	56	39	67	47	33	56	40	28	48	34	24	42	30	21	36	26	19	32	23	16
			Exposed	76	72	47	76	60	42	76	54	37	71	48	34	61	43	30	55	39	28	50	36	25	42	30	21	36	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	76	76	64	76	76	57	76	76	51	76	63	46	76	57	41	76	51	38	66	47	34	55	39	29	46	34	25	40	29	21	35	25	19	30	22	16	27	20	14
			Exposed	76	56	41	76	50	37	62	45	33	56	40	30	50	36	27	46	33	24	42	30	22	35	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	77	77	77	77	77	77	77	77	62	77	77	56	77	61	50	77	56	46	77	51	42	77	43	35	63	36	30	54	31	26	47	27	22	41	24	20	37	21	17
			Exposed	77	61	50	77	54	44	77	48	40	77	44	36	77	39	32	63	36	29	57	33	27	48	28	23	41	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	71	79	79	60	79	79	55	79	63	50	60	53	42	51	45	36	44	39	31	38	34	27	34	30	24	30	27	21
			Exposed	79	79	60	79	75	53	79	61	48	61	55	43	55	49	39	50	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	76	76	50	76	64	44	76	57	40	76	51	36	64	46	32	58	42	29	53	38	27	45	32	23	38	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	64	46	32	57	41	29	51	36	26	46	33	23	41	30	21	37	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	76	60	44	76	53	39	72	47	35	59	43	31	54	39	28	49	35	26	44	32	23	37	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	53	38	28	47	34	25	42	31	22	38	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	77	65	53	77	57	47	77	51	42	77	46	38	77	42	34	69	38	31	60	35	28	51	29	24	43	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	77	42	34	65	37	30	58	33	27	52	30	25	47	27	22	42	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	79	79	63	79	79	56	79	64	50	65	58	45	59	52	41	53	47	37	49	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15
			Exposed	58	52	41	52	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	76	59	41	76	53	37	66	47	33	59	42	29	53	38	27	48	35	24	44	32	22	37	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	53	38	27	47	34	24	42	30	21	38	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	76	49	36	61	44	32	54	39	29	49	35	26	44	32	23	40	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	44	32	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	77	53	44	77	47	39	77	42	35	71	38	31	60	35	28	55	31	26	50	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	60	34	28	53	31	25	48	27	23	43	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	79	71	52	79	59	47	60	53	42	54	48	38	48	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~
10	B	0-7	Interior	62	62	62	62	62	62	62	62	58	62	62	52	62	62	47	62	62	43	62	56	39	62	47	33	56	40	28	48	34	24	42	30	21	36	26	19	32	23	16
			Exposed	62	62	47	62	60	42	62	54	37	62	48	34	61	43	30	55	39	28	50	36	25	42	30	21	36	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	62	62	62	62	62	57	62	62	51	62	62	46	62	57	41	62	51	38	62	47	34	55	39	29	46	34	25	40	29	21	35	25	19	30	22	16	27	20	14
			Exposed	62	56	41	62	50	37	62	45	33	56	40	30	50	36	27	46	33	24	42	30	22	35	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	71	71	71	71	71	71	71	71	62	71	71	56	71	61	50	71	56	46	71	51	42	71	43	35	63	36	30	54	31	26	47	27	22	41	24	20	37	21	17
			Exposed	71	61	50	71	54	44	71	48	40	71	44	36	71	39	32	63	36	29	57	33	27	48	28	23	41	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	76	76	76	76	76	76	76	76	76	76	76	71	76	76	60	76	76	55	76	63	50	60	53	42	51	45	36	44	39	31	38	34	27	34	30	24	30	27	21
			Exposed	76	76	60	76	75	53	76	61	48	61	55	43	55	49	39	50	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	62	62	50	62	62	44	62	57	40	62	51	36	62	46	32	58	42	29	53	38	27	45	32	23	38	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	62	46	32	57	41	29	51	36	26	46	33	23	41	30	21	37	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	62	60	44	62	53	39	62	47	35	59	43	31	54	39	28	49	35	26	44	32	23	37	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	53	38	28	47	34	25	42	31	22	38	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	71	65	53	71	57	47	71	51	42	71	46	38	71	42	34	69	38	31	60	35	28	51	29	24	43	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	71	42	34	65	37	30	58	33	27	52	30	25	47	27	22	42	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	76	76	63	76	76	56	76	64	50	65	58	45	59	52	41	53	47	37	49	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15
			Exposed	58	52	41	52	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	62	59	41	62	53	37	62	47	33	59	42	29	53	38	27	48	35	24	44	32	22	37	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	53	38	27	47	34	24	42	30	21	38	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	62	49	36	61	44	32	54	39	29	49	35	26	44	32	23	40	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	44	32	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	73	53	44	73	47	39	73	42	35	71	38	31	60	35	28	55	31	26	50	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	60	34	28	53	31	25	48	27	23	43	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	78	71	52	78	59	47	60	53	42	54	48	38	48	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~
20	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	43	46	46	39	46	46	33	46	40	28	46	34	24	42	30	21	36	26	19	32	23	16
			Exposed	46	46	46	46	46	42	46	46	37	46	46	34	46	43	30	46	39	28	46	36	25	42	30	21	36	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	41	46	46	38	46	46	34	46	39	29	46	34	25	40	29	21	35	25	19	30	22	16	27	20	14
			Exposed	46	46	41	46	46	37	46	45	33	46	40	30	46	36	27	46	33	24	42	30	22	35	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	50	56	56	46	56	51	42	56	43	35	56	36	30	54	31	26	47	27	22	41	24	20	37	21	17
			Exposed	56	56	50	56	54	44	56	48	40	56	44	36	56	39	32	56	36	29	56	33	27	48	28	23	41	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62	60	62	62	55	62	62	50	60	53	42	51	45	36	44	39	31	38	34	27	34	30	24	30	27	21
			Exposed	62	62	60	62	62	53	62	61	48	61	55	43	55	49	39	50	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	46	46	46	46	46	44	46	46	40	46	46	36	46	46	32	46	42	29	46	38	27	45	32	23	38	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	46	46	32	46	41	29	46	36	26	46	33	23	41	30	21	37	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	46	46	44	46	46	39	46	46	35	46	43	31	46	39	28	46	35	26	44	32	23	37	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	46	38	28	46	34	25	42	31	22	38	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	56	56	53	56	56	47	56	51	42	56	46	38	56	42	34	56	38	31	56	35	28	51	29	24	43	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	56	42	34	56	37	30	56	33	27	52	30	25	47	27	22	42	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	62	62	62	62	62	56	62	62	50	62	58	45	59	52	41	53	47	37	49	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15
			Exposed	58	52	41	52	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	46	46	41	46	46	37	46	46	33	46	42	29	46	38	27	46	35	24	44	32	22	37	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	46	38	27	46	34	24	42	30	21	38	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	46	46	36	46	44	32	46	39	29	46	35	26	44	32	23	40	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	44	32	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	19	20	15	16	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	59	53	44	59	47	39	59	42	35	59	38	31	59	35	28	55	31	26	50	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	59	34	28	53	31	25	48	27	23	43	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	17	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	65	65	52	65	59	47	60	53	42	54	48	38	48	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	36	36	28	36	34	24	36	30	21	36	26	19	32	23	16
			Exposed	36	36	36	36	36	36	36	36	36	36	36	34	36	36	30	36	36	28	36	36	25	36	30	21	36	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	29	37	34	25	37	29	21	35	25	19	30	22	16	27	20	14
			Exposed	37	37	37	37	37	37	37	37	33	37	37	30	37	36	27	37	33	24	37	30	22	35	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	42	46	43	35	46	36	30	46	31	26	46	27	22	41	24	20	37	21	17
			Exposed	46	46	46	46	46	44	46	46	40	46	44	36	46	39	32	46	36	29	46	33	27	46	28	23	41	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	50	53	53	42	51	45	36	44	39	31	38	34	27	34	30	24	30	27	21
			Exposed	53	53	53	53	53	53	53	53	48	53	53	43	53	49	39	50	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	36	36	29	36	36	27	36	32	23	36	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	36	36	32	36	36	29	36	36	26	36	33	23	36	30	21	36	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	37	37	37	37	37	37	37	37	35	37	37	31	37	37	28	37	35	26	37	32	23	37	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	37	37	28	37	34	25	37	31	22	37	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	46	46	46	46	46	46	46	46	42	46	46	38	46	42	34	46	38	31	46	35	28	46	29	24	43	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	46	42	34	46	37	30	46	33	27	46	30	25	46	27	22	42	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	53	53	53	53	53	53	53	53	50	53	53	45	53	52	41	53	47	37	49	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15
			Exposed	53	52	41	52	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	36	36	36	36	36	36	36	36	33	36	36	29	36	36	27	36	35	24	36	32	22	36	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	36	36	27	36	34	24	36	30	21	36	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	37	37	36	37	37	32	37	37	29	37	35	26	37	32	23	37	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	37	32	23	37	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	~~19~~	20	15	~~16~~	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	49	49	44	49	47	39	49	42	35	49	38	31	49	35	28	49	31	26	49	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	49	34	28	49	31	25	48	27	23	43	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	~~17~~	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	55	55	52	55	55	47	55	53	42	54	48	38	48	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~
40	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	33	34	34	28	34	34	24	34	30	21	34	26	19	32	23	16
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	30	34	34	28	34	34	25	34	30	21	34	26	18	31	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	29	34	34	25	34	29	21	34	25	19	30	22	16	27	20	14
			Exposed	34	34	34	34	34	34	34	34	33	34	34	30	34	34	27	34	33	24	34	34	30	22	34	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	39	36	30	39	31	26	39	27	22	39	24	20	37	21	17
			Exposed	39	39	39	39	39	39	39	39	39	39	39	36	39	39	32	39	36	29	39	33	27	39	28	23	39	24	19	35	20	17	30	18	15	27	16	20	24	21	17
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	42	45	45	36	43	39	31	38	34	27	34	30	24	30	27	21
			Exposed	46	46	46	46	46	46	46	46	46	46	46	43	46	46	39	46	45	35	46	41	32	39	35	27	33	30	23	29	26	20	25	22	18	22	20	15	19	17	21
	C	0-7	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	32	34	34	29	34	34	27	34	32	23	34	27	19	33	24	17	28	21	22	25	18	19	22	16	17
			Exposed	34	34	32	34	34	29	34	34	26	34	33	23	34	30	21	34	27	19	34	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	31	34	34	28	34	34	26	34	32	23	34	27	20	32	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	34	34	28	34	34	25	34	31	22	34	28	20	34	25	18	31	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	38	39	39	34	39	38	31	39	34	28	39	29	24	39	25	21	37	21	18	32	19	15	28	16	21	25	15	18
			Exposed	39	39	34	39	37	30	39	33	27	39	30	25	39	27	22	39	25	20	39	22	19	33	19	16	28	16	20	24	21	18	21	19	15	18	16	~~13~~	16	14	~~12~~
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	46	41	46	46	37	45	43	34	41	37	29	35	31	25	30	27	21	26	24	19	23	21	16	21	18	15			
			Exposed	46	46	41	46	46	36	46	41	33	42	37	30	38	34	27	34	31	24	31	28	22	27	24	19	23	20	16	20	18	21	17	15	18	15	21	16	20	18	14
	D	0-7	Interior	36	36	36	36	36	36	36	36	33	36	36	29	36	36	27	36	35	24	36	32	22	36	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	36	36	27	36	34	24	36	30	21	36	27	19	34	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	37	37	36	37	37	32	37	37	29	37	35	26	37	32	23	37	29	21	37	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	37	32	23	37	28	21	35	25	19	32	23	17	29	21	15	26	19	21	24	17	~~19~~	20	15	~~16~~	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	42	42	42	42	42	39	42	42	35	42	38	31	42	35	28	42	31	26	42	29	24	42	24	20	36	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	42	34	28	42	31	25	42	27	23	42	25	20	39	22	18	35	20	17	32	19	15	27	16	20	23	20	~~17~~	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	48	48	48	48	48	47	48	48	42	48	48	38	47	43	34	44	39	31	40	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	48	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~
50	B	0-7	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	24	29	29	21	29	26	19	29	23	16			
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	25	29	29	21	29	26	18	29	22	16	27	19	21	24	17	18	21	15	16
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	25	30	29	21	30	25	19	30	25	19	30	22	16	27	20	14
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	24	30	30	22	30	25	19	30	22	16	26	19	21	23	16	18	20	14	16	18	19	14
		20-27	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	53	56	55	45	56	47	39	56	41	34	56	36	30	54	32	27
			Exposed	56	56	56	56	56	56	56	56	56	56	56	54	56	56	49	56	54	45	56	49	41	56	42	34	56	36	29	53	31	25	46	27	22	41	24	20	36	21	17
		27-45	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	54	57	57	47	55	52	41	51	45	36	45	40	32
			Exposed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	58	52	41	50	45	35	43	39	31	38	34	27	33	30	24	29	26	21
	C	0-7	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	27	29	29	23	29	27	19	29	24	17	28	21	22	25	18	19	22	16	17
			Exposed	29	29	29	29	29	29	29	29	26	29	29	23	29	29	21	29	27	19	29	25	17	29	21	22	24	18	19	21	15	16	18	20	~~14~~	16	18	~~13~~	22	16	~~11~~
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	30	30	26	30	30	23	30	27	20	30	23	17	27	20	15	24	17	19	21	15	17	19	20	15
			Exposed	30	30	28	30	30	25	30	30	22	30	28	20	30	25	18	30	23	17	29	21	15	24	17	20	21	15	17	18	20	14	15	17	~~13~~	21	15	~~11~~	18	~~13~~	~~10~~
		20-27	Interior	56	56	56	56	56	56	56	56	56	56	56	52	56	56	47	56	52	43	56	44	36	56	38	31	54	33	27	49	28	23	43	25	21	38	22	18			
			Exposed	56	56	52	56	56	46	56	50	41	56	45	37	56	41	34	56	37	31	56	34	28	49	29	24	42	25	20	36	21	18	32	19	15	28	16	~~13~~	25	14	~~12~~
		27-45	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	59	59	52	56	55	44	53	47	37	46	41	32	40	36	28	35	31	25	31	28	22	
			Exposed	60	60	60	60	60	55	60	60	49	60	56	45	57	51	40	52	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	31	31	31	31	31	31	31	31	31	31	31	29	31	31	27	31	31	24	31	31	22	31	27	19	31	23	16	27	20	21	24	17	18	21	15	16	18	20	~~14~~
			Exposed	31	31	27	31	31	24	31	30	21	31	27	19	31	25	17	31	22	16	28	20	22	24	17	18	20	22	16	18	19	~~14~~	15	17	~~12~~	20	~~15~~	~~10~~	18	~~13~~	9
		7-20	Interior	32	32	32	32	32	32	32	32	29	32	32	26	32	32	23	32	29	21	32	27	20	31	22	16	26	19	21	23	16	18	20	14	16	17	19	~~14~~	15	17	~~13~~
			Exposed	32	32	23	32	28	21	32	25	19	32	23	17	29	21	15	26	19	21	24	17	~~19~~	20	15	~~16~~	17	19	~~14~~	15	16	~~12~~	20	~~14~~	~~11~~	17	~~13~~	9	15	~~11~~	8
		20-27	Interior	37	37	37	37	37	37	37	37	35	37	37	31	37	35	28	37	31	26	37	29	24	37	24	20	35	21	17	31	18	15	27	16	20	24	21	17	21	18	15
			Exposed	37	34	28	37	31	25	37	27	23	37	25	20	37	22	18	35	20	17	32	19	15	27	16	20	23	20	~~17~~	20	18	15	17	15	~~13~~	15	~~14~~	~~11~~	21	~~12~~	~~10~~
		27-45	Interior	43	43	43	43	43	43	43	43	42	43	43	38	42	42	34	41	39	31	39	36	28	34	30	24	29	26	21	25	22	18	22	20	15	19	17	21	17	15	18
			Exposed	43	43	34	43	38	30	39	34	27	35	31	25	31	28	22	29	26	20	26	23	19	22	20	16	19	17	20	16	15	18	14	19	15	19	17	~~14~~	17	15	~~12~~

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	19	25	23	16
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	25	18	25	22	16	25	19	21	24	17	18	21	15	16
		7-20	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	37	41	41	32	41	38	28	41	34	25	41	30	22
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	41	41	37	41	41	34	41	39	28	41	33	24	39	28	21	34	25	18	30	22	16	27	19	14
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	39	46	41	34	46	36	30	45	32	27
			Exposed	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	41	46	42	34	46	36	29	46	31	25	46	27	22	41	24	20	36	21	17
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	52	52	47	50	50	41	48	45	36	45	40	32
			Exposed	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	53	54	54	49	54	52	41	50	45	35	43	39	31	38	34	27	33	30	24	29	26	21
	C	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	19	25	24	17	25	21	22	25	18	19	22	16	17
			Exposed	25	25	25	25	25	25	25	25	25	25	25	23	25	25	21	25	25	19	25	25	17	25	21	22	24	18	19	21	15	16	18	20	14	16	18	13	22	16	11
		7-20	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39	41	41	36	41	41	30	41	35	26	41	30	22	36	26	19	32	23	17	28	20	15
			Exposed	41	41	41	41	41	38	41	41	34	41	41	31	41	38	28	41	34	25	41	31	23	36	27	20	31	23	17	27	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	43	46	46	43	46	44	36	46	38	31	45	33	27	43	28	23	42	25	21	38	22	18
			Exposed	46	46	46	46	46	46	46	46	41	46	45	37	46	41	34	46	37	31	46	34	28	46	29	24	42	25	20	36	21	18	32	19	15	28	16	13	25	14	12
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	53	53	52	51	51	44	48	47	37	46	41	32	40	36	28	35	31	25	31	28	22
			Exposed	54	54	54	54	54	54	54	54	49	54	54	45	54	51	40	52	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	22	27	27	19	27	23	16	27	20	21	24	17	18	21	15	16	18	20	14
			Exposed	27	27	27	27	27	24	27	27	21	27	27	19	27	25	17	27	22	16	27	20	22	24	17	18	20	22	16	18	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	27	27	27	27	27	27	27	27	27	27	27	26	27	27	23	27	27	21	27	27	20	27	22	16	26	19	21	23	16	18	20	14	16	17	19	14	15	17	13
			Exposed	27	27	23	27	27	21	27	25	19	27	23	17	27	21	15	26	19	21	24	17	19	20	15	16	17	19	14	15	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	49	49	49	49	49	49	49	49	49	49	49	47	49	49	43	49	48	39	49	43	36	49	37	30	47	31	26	45	27	22	41	24	20	36	21	17	32	18	15
			Exposed	49	49	43	49	46	38	49	42	34	49	37	31	49	34	28	49	31	26	49	28	23	41	24	20	35	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	58	58	58	58	58	58	58	58	58	58	58	57	57	57	52	55	55	47	54	54	43	51	46	36	44	39	31	38	34	27	33	30	24	29	26	21	26	23	18
			Exposed	58	58	51	58	58	46	58	52	41	52	47	37	48	43	34	43	39	31	40	35	28	33	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12
70	B	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	16
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	21	16	21	19	21	21	17	18	21	15	16
		7-20	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	36	36	28	36	34	25	36	30	22
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	28	36	33	24	36	28	21	34	25	18	30	22	16	27	19	14
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	40	40	34	40	36	30	40	32	27
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	34	40	36	29	40	31	25	40	27	22	40	24	20	36	21	17
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	47	47	47	45	45	41	43	43	36	42	40	32
			Exposed	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	41	49	45	35	43	39	31	38	34	27	33	30	24	29	26	21
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	22	21	18	19	21	16	17
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	22	21	18	19	21	15	16	18	20	14	16	18	13	22	16	11
		7-20	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	30	36	35	26	36	30	22	36	26	19	32	23	17	28	20	15
			Exposed	36	36	36	36	36	36	36	36	34	36	36	31	36	36	28	36	34	25	36	31	23	36	27	20	31	23	17	27	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	36	40	38	31	40	33	27	39	28	23	38	25	21	36	22	18
			Exposed	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	40	37	31	40	34	28	40	29	24	40	25	20	36	21	18	32	19	15	28	16	13	25	14	12
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	48	48	48	46	46	44	44	44	37	42	41	32	40	36	28	35	31	25	31	28	22
			Exposed	49	49	49	49	49	49	49	49	49	49	49	45	49	49	40	49	47	37	48	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	19	23	23	16	23	20	21	23	17	18	21	15	16	18	20	14
			Exposed	23	23	23	23	23	23	23	23	21	23	23	19	23	23	17	23	22	16	23	20	22	23	17	18	20	22	16	18	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	40	40	40	40	40	40	40	40	40	40	40	39	40	40	36	40	40	32	40	40	30	40	34	25	40	29	21	34	25	18	30	22	16	26	19	14	23	17	13
			Exposed	40	40	35	40	40	32	40	38	28	40	35	26	40	31	23	39	29	21	36	26	19	30	22	16	26	19	14	22	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	44	44	39	44	43	36	44	37	30	43	31	26	41	27	22	40	24	20	36	21	17	32	18	15
			Exposed	44	44	43	44	44	38	44	42	34	44	37	31	44	34	28	44	31	26	44	28	23	41	24	20	35	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	50	50	47	49	49	43	46	46	36	44	39	31	38	34	27	33	30	24	29	26	21	26	23	18
			Exposed	52	52	51	52	52	46	52	52	41	52	47	37	48	43	34	43	39	31	40	35	28	33	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12
80	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	21	19	17	18	19	15	16
		7-20	Interior	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	29	29	29	29	29	29	29	28	29	29	25	29	29	22
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	24	29	28	21	29	25	18	29	22	16	27	19	14
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	36	29	39	39	34	39	36	30	39	32	27
			Exposed	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	36	29	39	31	25	39	27	22	39	24	20	36	21	17
		27-45	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	35	43	39	31	38	34	27	33	30	24	29	26	21
			Exposed	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	35	43	39	31	38	34	27	33	30	24	29	26	21	26	23	18
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	22	19	18	19	19	16	17
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	22	19	18	19	19	16	17
		7-20	Interior	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	29	29	29	29	26	29	29	22	29	26	19	29	23	17
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	25	29	29	23	29	27	20	29	23	17	27	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	38	31	39	33	27	39	28	23	37	25	21	36	22	18
			Exposed	39	39	39	39	39	39	39	39	39	39	39	37	39	39	34	39	37	31	39	34	28	39	29	24	39	25	20	36	21	18	32	19	15	28	16	13	25	14	12
		27-45	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	42	42	42	40	40	37	39	39	32	37	36	28	35	31	25	31	28	22			
			Exposed	44	44	44	44	44	44	44	44	44	44	44	44	44	44	40	44	44	37	44	43	34	40	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	16	21	20	21	21	21	17	18	21	15	16	18	20	14		
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	20	22	21	17	18	20	22	16	18	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	30	35	34	25	35	29	21	34	25	18	30	22	16	26	19	14	23	17	13
			Exposed	35	35	35	35	35	32	35	35	28	35	35	26	35	31	23	35	29	21	35	26	19	30	22	16	26	19	14	22	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	37	30	39	31	26	38	27	22	36	24	20	35	21	17	32	18	15
			Exposed	39	39	39	39	39	38	39	39	34	39	37	31	39	34	28	39	31	26	39	28	23	39	24	20	35	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	52	52	52	52	52	52	52	52	52	52	52	52	51	51	51	50	50	47	49	49	43	46	46	36	44	39	31	38	34	27	33	30	24	29	26	21	26	23	18
			Exposed	52	52	52	52	52	46	52	52	41	52	47	37	48	43	34	44	39	31	40	36	28	34	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	PRO SERIES	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	21	17	17	18	17	15	16
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	25	26	22
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	21	26	25	18	26	22	16	26	19	14
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	27
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31	31	25	31	27	22	31	24	20	31	21	17
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	38	38	37	37	36	36	36	32
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	35	40	39	31	38	34	27	33	30	24	29	26	21
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	22	17	17	19	17	16	17
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	22	17	17	19	17	15	16	17	20	14	16	18	13	22	16	11
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	22	26	26	19	26	23	17	26	20	15
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	23	26	26	20	26	23	17	26	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	27	31	28	23	31	25	21	31	22	18
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	28	31	29	24	31	25	20	31	21	18	31	19	15	28	16	13	25	14	12
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	37	37	37	36	36	32	35	35	28	33	31	25	31	28	22
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	39	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14			
	D	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	21	18	17	18	18	15	16	18	20	14			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	18	22	18	17	18	18	22	16	18	19	14	15	17	12	20	15	10	18	13	9
		7-20	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	25	29	29	21	29	25	18	29	22	16	26	19	14	23	17	13
			Exposed	29	29	29	29	29	29	29	29	28	29	29	26	29	29	23	29	29	21	29	26	19	29	22	16	26	19	14	22	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	37	30	39	31	26	38	27	22	37	24	20	35	21	17	32	18	15
			Exposed	39	39	39	39	39	38	39	39	34	39	37	31	39	34	28	39	31	26	39	28	23	39	24	20	35	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	43	43	42	42	42	40	40	36	38	38	31	36	34	27	33	30	24	29	26	21	26	23	18
			Exposed	44	44	44	44	44	44	44	44	41	44	44	37	44	43	34	43	39	31	40	35	28	33	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12
100	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	21	15	15	18	15	15	16
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	18	25	22	16	25	19	14
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	27	22	28	24	20	28	21	17
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	35	33	33	32
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	31	36	34	27	33	30	24	29	26	21			
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	22	15	15	19	15	15	17
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	22	15	15	19	15	15	16	15	20	14	15	18	13	22	16	11
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	19	25	23	17	25	20	15
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	23	17	25	20	15	24	17	13	21	15	11	18	13	10
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	23	28	25	21	28	22	18						
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	24	28	25	20	28	21	18	28	19	15	28	16	13	25	14	12
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	34	34	32	32	32	28	31	31	25	30	28	22			
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	29	34	31	24	30	27	21	26	23	18	23	21	16	20	18	14
	D	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	21	17	17	18	17	15	16	17	20	14			
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	22	17	17	18	17	22	16	17	19	14	15	17	12	20	15	10	18	13	9			
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	21	26	25	18	26	22	16	26	19	14	23	17	13
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	26	19	26	22	16	26	19	14	22	16	12	20	14	11	17	13	9	15	11	8
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	26	31	27	22	31	24	20	30	21	17	29	18	15
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	28	31	31	26	31	28	23	31	24	20	31	20	17	30	18	15	26	15	13	23	14	11	21	12	10
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	37	37	36	36	36	31	34	34	27	32	30	24	29	26	21	26	23	18
			Exposed	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	40	39	31	39	35	28	33	30	24	29	26	20	25	22	18	22	19	15	19	17	14	17	15	12

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	47	47	41	47	47	36	47	47	32	47	42	29	47	38	26	47	34	24	44	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	47	38	26	47	33	23	42	30	21	37	27	19	34	24	17	31	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	47	47	36	47	45	32	47	39	28	47	35	25	45	31	23	40	29	21	36	26	19	30	22	16	26	19	14	22	16	12	19	14	10	17	12	9	15	11	8
			Exposed	45	31	23	39	28	20	35	25	18	31	22	16	28	20	15	25	18	13	23	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	48	48	44	48	48	39	48	42	34	48	38	31	48	34	28	48	31	25	48	28	23	42	24	19	35	20	17	30	17	14	26	15	12	23	13	11	20	12	10
			Exposed	48	34	28	48	30	25	48	27	22	43	24	20	38	22	18	35	20	16	32	18	15	27	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	48	48	48	48	48	48	48	48	41	48	48	37	48	43	33	44	39	30	40	35	28	33	30	23	28	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	48	43	33	42	38	30	38	34	27	34	30	24	31	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	47	40	28	47	35	25	45	32	22	40	28	20	36	26	18	32	23	16	29	21	15	25	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	36	25	18	32	23	16	28	20	14	25	18	13	23	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	47	33	24	41	29	22	37	26	19	33	24	17	30	21	16	27	19	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	30	21	16	26	19	14	23	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	48	36	29	48	32	26	48	29	23	47	26	21	41	23	19	37	21	17	34	19	16	28	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	40	23	19	36	21	17	32	18	15	29	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	48	47	35	47	40	31	40	36	28	36	32	25	33	29	23	30	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	32	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	47	33	23	41	29	20	36	26	18	33	23	16	29	21	15	27	19	13	24	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	29	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	38	27	20	34	24	18	30	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	24	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	48	30	24	48	26	22	41	24	19	37	21	17	33	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	33	19	16	30	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	42	37	29	37	33	26	33	30	23	30	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
10	B	0-7	Interior	38	38	38	38	38	36	38	38	32	38	38	29	38	38	26	38	34	24	38	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	38	38	26	38	33	23	38	30	21	37	27	19	34	24	17	31	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	38	38	36	38	38	32	38	38	28	38	35	25	38	31	23	38	29	21	36	26	19	30	22	16	26	19	14	22	16	12	19	14	10	17	12	9	15	11	8
			Exposed	38	31	23	38	28	20	35	25	18	31	22	16	28	20	15	25	18	13	23	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	44	44	44	44	44	39	44	42	34	44	38	31	44	34	28	44	31	25	44	28	23	42	24	19	35	20	17	30	17	14	26	15	12	23	13	11	20	12	10
			Exposed	44	34	28	44	30	25	44	27	22	43	24	20	38	22	18	35	20	16	32	18	15	27	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	47	47	47	47	47	47	47	47	41	47	47	37	47	43	33	44	39	30	40	35	28	33	30	23	28	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	47	43	33	42	38	30	38	34	27	34	30	24	31	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	38	38	28	38	35	25	38	32	22	38	28	20	36	26	18	32	23	16	29	21	15	25	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	36	25	18	32	23	16	28	20	14	25	18	13	23	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	38	33	24	38	29	22	37	26	19	33	24	17	30	21	16	27	19	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	30	21	16	26	19	14	23	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	44	36	29	44	32	26	44	29	23	44	26	21	41	23	19	37	21	17	34	19	16	28	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	40	23	19	36	21	17	32	18	15	29	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	47	47	35	47	40	31	40	36	28	36	32	25	33	29	23	30	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	32	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	38	33	23	38	29	20	36	26	18	33	23	16	29	21	15	27	19	13	24	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	29	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	38	27	20	34	24	18	30	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	24	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	45	30	24	45	26	22	41	24	19	37	21	17	33	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	33	19	16	30	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	42	37	29	37	33	26	33	30	23	30	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
20	B	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	24	28	28	22	28	26	18	28	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	28	28	26	28	28	23	28	28	21	28	27	19	28	24	17	28	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	28	28	21	28	26	19	28	22	16	26	19	14	22	16	12	19	14	10	17	12	9	15	11	8
			Exposed	28	28	23	28	28	20	28	25	18	28	22	16	28	20	15	25	18	13	23	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	34	34	34	34	34	34	34	34	34	34	34	31	34	34	28	34	31	25	34	28	23	34	24	19	34	20	17	30	17	14	26	15	12	23	13	11	20	12	10
			Exposed	34	34	28	34	30	25	34	27	22	34	24	20	34	22	18	34	20	16	32	18	15	27	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	37	38	38	33	38	38	30	38	35	28	33	30	23	28	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	38	38	33	38	38	30	38	34	27	34	30	24	31	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	28	28	28	28	28	25	28	28	22	28	28	20	28	26	18	28	23	16	28	21	15	25	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	28	25	18	28	23	16	28	20	14	25	18	13	23	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	28	28	24	28	28	22	28	26	19	28	24	17	28	21	16	27	19	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	28	21	16	26	19	14	23	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	34	34	29	34	32	26	34	29	23	34	26	21	34	23	19	34	21	17	34	19	16	28	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	34	23	19	34	21	17	32	18	15	29	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	38	38	35	38	38	31	38	36	28	36	32	25	33	29	23	30	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	32	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	28	28	23	28	28	20	28	26	18	28	23	16	28	21	15	27	19	13	24	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	28	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	28	27	20	28	24	18	28	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	24	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	36	30	24	36	26	22	36	24	19	36	21	17	33	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	33	19	16	30	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	40	37	29	37	33	26	33	30	23	30	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	18	22	22	16	22	19	13	22	17	12	20	15	10	18	13	9
			Exposed	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	22	15	22	20	14	22	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	16	22	19	14	22	16	12	19	14	10	17	12	9	15	11	8
			Exposed	22	22	22	22	22	20	22	22	18	22	22	16	22	20	15	22	18	13	22	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	28	24	19	28	20	17	28	17	14	26	15	12	23	13	11	20	12	10
			Exposed	28	28	28	28	28	25	28	27	22	28	24	20	28	22	18	28	20	16	28	18	15	27	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	28	32	30	23	28	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	32	32	32	32	32	30	32	32	27	32	30	24	31	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	22	22	18	22	22	16	22	20	14	22	18	13	22	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	22	22	22	22	22	22	22	22	19	22	22	17	22	21	16	22	19	14	22	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	22	21	16	22	19	14	22	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	28	28	28	28	28	26	28	28	23	28	26	21	28	23	19	28	21	17	28	19	16	28	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	28	23	19	28	21	17	28	18	15	28	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	32	32	32	32	32	31	32	32	28	32	32	25	32	29	23	30	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	32	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	13	22	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	22	21	15	22	19	13	22	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	22	22	20	22	22	18	22	22	16	22	20	14	22	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	22	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	30	30	24	30	26	22	30	24	19	30	21	17	30	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	30	19	16	30	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	34	34	29	34	33	26	33	30	23	30	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
40	B	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	16	21	19	13	21	17	12	20	15	10	18	13	9
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	15	21	20	14	21	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	16	21	19	14	21	16	12	19	14	10	17	12	9	15	11	8
			Exposed	21	21	21	21	21	20	21	21	18	21	21	16	21	20	15	21	18	13	21	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	19	24	20	17	24	17	14	24	15	12	23	13	11	20	12	10
			Exposed	24	24	24	24	24	24	24	24	22	24	24	20	24	22	18	24	20	16	24	18	15	24	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	23	27	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	28	28	28	28	28	28	28	28	27	28	28	24	28	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	15	21	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	21	21	18	21	21	16	21	20	14	21	18	13	21	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	19	14	21	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	21	21	16	21	19	14	21	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	24	24	24	24	24	24	24	24	23	24	24	21	24	23	19	24	21	17	24	19	16	24	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	24	23	19	24	21	17	24	18	15	24	17	14	24	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	27	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	28	28	23	28	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	13	22	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	22	21	15	22	19	13	22	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	22	22	20	22	22	18	22	22	16	22	20	14	22	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	22	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	26	26	24	26	26	22	26	24	19	26	21	17	26	19	16	26	17	14	26	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	26	19	16	26	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	29	29	29	29	29	26	29	29	23	29	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
50	B	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	13	18	17	12	18	15	10	18	13	9
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	17	12	18	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	14	18	18	12	18	14	10	17	12	9	15	11	8	12	9	8
			Exposed	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	18	13	18	17	12	18	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	17	21	20	17	21	17	14	21	15	12	21	13	11	20	12	10
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	20	16	21	18	15	21	15	13	21	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	24	24	20	23	22	17	21	19	15	19	17	13	17	15	12
			Exposed	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	18	12	18	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	18	18	18	18	18	16	18	18	14	18	18	13	18	16	12	18	15	10	18	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	18	14	18	18	13	18	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	18	18	16	18	18	14	18	17	12	18	15	11	18	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	19	16	21	16	13	21	14	11	20	12	10	18	10	8	16	9	7	14	8	7
			Exposed	21	21	19	21	21	17	21	18	15	21	17	14	21	15	12	21	14	11	21	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	24	24	21	23	23	19	22	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	25	25	23	25	25	20	25	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	18	12	19	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	19	19	15	19	19	13	19	17	12	19	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	19	19	19	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	19	18	13	19	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	22	22	22	22	22	22	22	22	19	22	21	17	22	19	16	22	17	14	22	16	13	22	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	22	19	16	22	17	14	22	15	13	22	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	26	26	26	26	26	26	26	26	23	26	26	21	25	24	19	24	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	26	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	15	10	15	13	9
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	10	15	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	10	15	12	9	15	11	8
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	14	10	15	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	17	14	18	15	12	18	13	11	18	12	10
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	15	13	18	13	11	18	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	20	20	20	17	20	19	15	19	17	13	17	15	12
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	15	15	11	15	13	9	15	11	8	14	10	7	12	9	9
			Exposed	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	10	15	14	10	15	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	11	15	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	13	9	15	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	16	13	18	14	11	18	12	10	17	10	8	16	9	7	14	8	7
			Exposed	18	18	18	18	18	17	18	18	15	18	17	14	18	15	12	18	14	11	18	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21	19	20	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	22	22	22	22	22	20	22	22	18	22	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	16	12	16	15	10	16	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	16	16	15	16	16	13	16	16	12	16	15	11	16	14	10	16	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	12	17	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	17	17	13	17	16	12	17	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	20	20	20	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	16	13	20	13	11	19	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	20	19	16	20	17	14	20	15	13	20	14	11	20	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	21	22	22	19	22	22	17	21	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	23	23	19	23	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
70	B	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	13	9
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	11	7	13	9	7	12	8	9
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	11	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	15	12	16	13	11	16	12	10
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	15	13	16	13	11	16	11	9	16	10	8	15	9	7	13	8	10
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	19	19	17	18	18	15	17	17	13	16	15	12
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	9	13	11	8	13	10	7	12	9	9
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	13	11	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	9	13	11	8	13	10	7	12	8	9	10	7	8
			Exposed	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	13	9	13	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	15	12	16	13	11	16	12	10
			Exposed	16	16	16	16	16	16	16	16	15	16	16	14	16	15	12	16	14	11	16	12	10	16	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	19	19	17	18	18	15	17	17	13	16	15	12
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	10	14	13	9	14	11	8	13	9	7	11	8	9	10	7	8
			Exposed	14	14	14	14	14	13	14	14	12	14	14	11	14	14	10	14	12	9	14	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	12	9	14	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	14	14	13	14	14	12	14	14	10	14	13	9	14	11	8	13	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	17	14	18	16	13	18	13	11	17	11	9	16	10	8	15	9	7	13	8	9	12	7	8
			Exposed	18	18	16	18	17	14	18	15	13	18	14	11	18	12	10	18	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	21	21	21	21	21	21	21	21	21	21	21	21	20	20	19	20	20	17	19	19	16	18	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	21	21	19	21	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
80	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	7	11	9	7	11	8	9
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	10	8	11	9	7	11	8	9	10	7	8
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	13	11	14	12	10
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	13	11	14	11	9	14	10	8	14	9	7	13	8	10
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	16	16	15	16	16	13	15	15	12
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	10	7	11	9	9
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	11	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	10	7	11	8	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	7	11	8	6
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	13	11	14	12	10
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	13	11	14	11	9	14	10	8	14	9	7	13	8	10
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	16	16	15	16	16	13	15	15	12
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	9	12	11	8	12	9	7	11	8	9	10	7	8
			Exposed	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	9	13	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	13	13	13	13	13	12	13	13	10	13	13	9	13	11	8	13	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	13	16	13	11	15	11	9	15	10	8	14	9	7	13	8	9	12	7	8
			Exposed	16	16	16	16	16	14	16	15	13	16	14	11	16	12	10	16	11	9	16	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	18	17	18	18	16	17	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	19	19	19	19	19	17	19	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	7	10	9	7	10	8	9
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	8	9	10	7	8
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	10
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	11	9	13	10	8	13	9	7	13	8	10
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	13	14	14	12
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	16	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	9	9
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	7	10	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	8	9	10	7	8
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	12	10	13	10	8	12	9	7	12	8	7
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	10	13	10	9	13	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	14	14	14	12	13	13	10	13	11	9	11	10	8
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	9	7	11	8	9	10	7	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	9	7	11	8	9	10	7	8	8	9	7
			Exposed	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	8	11	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	13	11	14	11	9	14	10	8	13	9	7	13	8	9	12	7	8
			Exposed	14	14	14	14	14	14	14	14	13	14	14	11	14	12	10	14	11	9	14	10	8	14	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	17	17	17	16	16	16	16	16	13	15	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	18	18	18	18	18	17	18	18	15	18	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
100	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	7	9	8	9
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	9	9	7	8
		20-27	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	10	8	11	9	7	11	8	10
		27-45	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	13	13	12
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	13	14	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	9	9	9	6
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	9	9	7	8
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	9	9	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	9	7	11	8	7
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	10	9	11	9	7	11	8	10	11	7	8	10	9	7	9	8	7
		27-45	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	13	12	13	13	10	12	11	9	11	10	8
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	8	9	10	7	8
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	8	9	10	7	8	8	9	7
			Exposed	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	8	10	9	7	10	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	11	9	13	10	8	12	9	7	12	8	9	11	7	8
			Exposed	13	13	13	13	13	13	13	13	13	13	11	13	12	10	13	11	9	13	10	8	13	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	13	14	14	11	13	12	10	12	11	9	11	10	7	9	8	7
			Exposed	16	16	16	16	16	16	16	16	15	16	16	14	16	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7

#N/A

*	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.
~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	78	78	78	78	78	61	78	78	55	78	78	49	78	64	44	78	58	40	78	53	37	62	44	31	52	38	26	45	32	23	39	28	20	34	25	17	30	22	15
			Exposed	78	64	44	78	56	39	78	50	35	63	45	32	57	41	29	52	37	26	47	34	24	39	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	78	78	60	78	78	53	78	69	48	78	59	43	78	53	39	78	48	35	61	44	32	51	37	27	44	31	23	37	27	20	33	24	17	29	21	15	25	18	14
			Exposed	78	53	39	67	47	34	58	42	31	52	38	28	47	34	25	43	31	23	39	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	79	79	79	79	79	65	79	79	58	79	64	52	79	58	47	79	52	43	79	48	39	79	40	33	59	34	28	51	29	24	44	26	21	39	23	19	34	20	16
			Exposed	79	57	47	79	51	42	79	45	37	79	41	34	65	37	30	59	34	28	53	31	25	45	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	80	80	80	80	80	80	80	80	80	80	80	62	80	80	56	80	65	51	80	59	47	56	50	39	48	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	80	80	56	80	64	50	64	57	45	57	51	40	52	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	78	71	47	78	60	42	78	53	37	70	48	33	60	43	30	55	39	27	50	36	25	42	30	21	36	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	60	43	30	53	38	27	48	34	24	43	31	22	39	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	78	56	41	78	50	36	62	45	33	56	40	29	50	36	27	46	33	24	41	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	50	36	26	44	32	24	40	29	21	36	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	79	61	50	79	54	44	79	48	40	79	43	36	79	39	32	62	36	29	57	33	27	47	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	79	39	32	61	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	80	80	59	80	75	53	80	60	47	61	54	43	55	49	39	50	45	35	46	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	55	49	38	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	78	55	39	76	49	34	61	44	31	55	40	28	50	36	25	45	32	23	41	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	49	36	25	44	32	22	39	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	64	46	34	57	41	30	51	37	27	46	33	24	41	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	41	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	79	50	41	79	45	37	79	40	33	63	36	30	56	32	27	51	30	24	47	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	56	32	27	50	29	24	45	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	80	63	49	63	56	44	56	50	39	50	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
10	B	0-7	Interior	63	63	63	63	63	61	63	63	55	63	63	49	63	63	44	63	58	40	63	53	37	62	44	31	52	38	26	45	32	23	39	28	20	34	25	17	30	22	15
			Exposed	63	63	44	63	56	39	63	50	35	63	45	32	57	41	29	52	37	26	47	34	24	39	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	64	64	60	64	64	53	64	64	48	64	59	43	64	53	39	64	48	35	61	44	32	51	37	27	44	31	23	37	27	20	33	24	17	29	21	15	25	18	14
			Exposed	64	53	39	64	47	34	58	42	31	52	38	28	47	34	25	43	31	23	39	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	73	73	73	73	73	65	73	73	58	73	64	52	73	58	47	73	52	43	73	48	39	73	40	33	59	34	28	51	29	24	44	26	21	39	23	19	34	20	16
			Exposed	73	57	47	73	51	42	73	45	37	73	41	34	65	37	30	59	34	28	53	31	25	45	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	62	78	78	56	78	65	51	78	59	47	56	50	39	48	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	78	78	56	78	64	50	64	57	45	57	51	40	52	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	63	63	47	63	60	42	63	53	37	63	48	33	60	43	30	55	39	27	50	36	25	42	30	21	36	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	60	43	30	53	38	27	48	34	24	43	31	22	39	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	64	56	41	64	50	36	62	45	33	56	40	29	50	36	27	46	33	24	41	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	50	36	26	44	32	24	40	29	21	36	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	73	61	50	73	54	44	73	48	40	73	43	36	73	39	32	62	36	29	57	33	27	47	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	73	39	32	61	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	78	78	59	78	75	53	78	60	47	61	54	43	55	49	39	50	45	35	46	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	55	49	38	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	63	55	39	63	49	34	61	44	31	55	40	28	50	36	25	45	32	23	41	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	49	36	25	44	32	22	39	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	64	46	34	57	41	30	51	37	27	46	33	24	41	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	41	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	75	50	41	75	45	37	75	40	33	63	36	30	56	32	27	51	30	24	47	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	56	32	27	50	29	24	45	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	80	63	49	63	56	44	56	50	39	50	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
20	B	0-7	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	44	47	40	47	47	37	47	44	31	47	38	26	45	32	23	39	28	20	34	25	17	30	22	15
			Exposed	47	47	44	47	47	39	47	47	35	47	45	32	47	41	29	47	37	26	47	34	24	39	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	47	47	47	47	47	47	47	47	47	47	47	43	47	47	39	47	47	35	47	44	32	47	37	27	44	31	23	37	27	20	33	24	17	29	21	15	25	18	14
			Exposed	47	47	39	47	47	34	47	42	31	47	38	28	47	34	25	43	31	23	39	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	57	57	57	57	57	57	57	57	57	57	57	52	57	57	47	57	52	43	57	48	39	57	40	33	57	34	28	51	29	24	44	26	21	39	23	19	34	20	16
			Exposed	57	57	47	57	51	42	57	45	37	57	41	34	57	37	30	57	34	28	53	31	25	45	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	64	64	64	64	64	64	64	64	64	64	64	62	64	64	56	64	64	51	64	59	47	56	50	39	48	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	64	64	56	64	64	50	64	57	45	57	51	40	52	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	47	47	47	47	47	42	47	47	37	47	47	33	47	43	30	47	39	27	47	36	25	42	30	21	36	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	47	43	30	47	38	27	47	34	24	43	31	22	39	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	47	47	41	47	47	36	47	45	33	47	40	29	47	36	27	46	33	24	41	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	47	36	26	44	32	24	40	29	21	36	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	57	57	50	57	54	44	57	48	40	57	43	36	57	39	32	57	36	29	57	33	27	47	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	57	39	32	57	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	64	64	59	64	64	53	64	60	47	61	54	43	55	49	39	50	45	35	46	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	55	49	38	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	47	47	39	47	47	34	47	44	31	47	40	28	47	36	25	45	32	23	41	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	47	36	25	44	32	22	39	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	47	46	34	47	41	30	47	37	27	46	33	24	41	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	41	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	60	50	41	60	45	37	60	40	33	60	36	30	56	32	27	51	30	24	47	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	56	32	27	50	29	24	45	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	66	63	49	63	56	44	56	50	39	50	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	31	37	37	26	37	32	23	37	28	20	34	25	17	30	22	15
			Exposed	37	37	37	37	37	37	37	37	35	37	37	32	37	37	29	37	37	26	37	34	24	37	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	32	38	37	27	38	31	23	37	27	20	33	24	17	29	21	15	25	18	14
			Exposed	38	38	38	38	38	34	38	38	31	38	38	28	38	34	25	38	31	23	38	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	43	47	47	39	47	40	33	47	34	28	47	29	24	44	26	21	39	23	19	34	20	16
			Exposed	47	47	47	47	47	42	47	45	37	47	41	34	47	37	30	47	34	28	47	31	25	45	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	51	54	54	47	54	50	39	48	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	54	54	54	54	54	50	54	54	45	54	51	40	52	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	33	37	37	30	37	37	27	37	36	25	37	30	21	36	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	37	37	30	37	37	27	37	34	24	37	31	22	37	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	38	38	38	38	38	36	38	38	33	38	38	29	38	36	27	38	33	24	38	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	38	36	26	38	32	24	38	29	21	36	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	47	47	47	47	47	44	47	47	40	47	43	36	47	39	32	47	36	29	47	33	27	47	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	47	39	32	47	35	29	47	31	26	47	28	23	44	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	54	54	54	54	54	53	54	54	47	54	54	43	54	49	39	50	45	35	46	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	54	49	38	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	37	37	37	37	37	34	37	37	31	37	37	28	37	36	25	37	32	23	37	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	37	36	25	37	32	22	37	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	38	38	34	38	38	30	38	37	27	38	33	24	38	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	38	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	10	16	12	9	14	10	8					
		20-27	Interior	50	50	41	50	45	37	50	40	33	50	36	30	50	32	27	50	30	24	47	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	50	32	27	50	29	24	45	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	57	57	49	57	56	44	56	50	39	50	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
40	B	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	35	35	26	35	32	23	35	28	20	34	25	17	30	22	15			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	32	35	35	29	35	35	26	35	34	24	35	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	27	35	31	23	35	27	20	33	24	17	29	21	15	25	18	14
			Exposed	35	35	35	35	35	34	35	35	31	35	35	28	35	34	25	35	31	23	35	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	40	40	33	40	34	28	40	29	24	40	26	21	39	23	19	34	20	16
			Exposed	40	40	40	40	40	40	40	40	37	40	40	34	40	37	30	40	34	28	40	31	25	40	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	39	45	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	47	47	47	47	47	47	47	47	45	47	47	40	47	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	35	27	35	35	25	35	30	21	35	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	35	35	30	35	35	27	35	34	24	35	31	22	35	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	35	35	35	35	35	35	35	35	33	35	35	29	35	35	27	35	33	24	35	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	35	35	26	35	32	24	35	29	21	35	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	36	40	39	32	40	36	29	40	33	27	40	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	40	39	32	40	35	29	40	31	26	40	28	23	40	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	43	47	47	39	46	45	35	44	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	47	47	38	47	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	37	37	37	37	37	34	37	37	31	37	37	28	37	36	25	37	32	23	37	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	37	36	25	37	32	22	37	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	38	38	34	38	38	30	38	37	27	38	33	24	38	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	38	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	10	16	12	9	14	10	8					
		20-27	Interior	43	43	41	43	43	37	43	40	33	43	36	30	43	32	27	43	30	24	43	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	43	32	27	43	29	24	43	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	49	49	49	49	49	44	49	49	39	49	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
50	B	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	26	30	30	23	30	28	20	30	25	17	30	22	15			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	30	24	30	28	20	30	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	23	30	27	20	30	24	17	29	21	15	25	18	14			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	28	30	30	25	30	30	23	30	28	21	30	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	26	35	34	28	35	29	24	35	26	21	34	23	19	33	20	16
			Exposed	35	35	35	35	35	35	35	35	35	35	35	34	35	35	30	35	34	28	35	31	25	35	26	21	35	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39	40	40	34	38	37	29	36	32	25	32	28	22	28	25	20
			Exposed	41	41	41	41	41	41	41	41	41	41	41	40	41	41	37	41	41	33	41	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	25	30	30	21	30	26	18	30	22	16	27	19	14	23	17	12	21	15	16
			Exposed	30	30	30	30	30	27	30	30	24	30	30	22	30	28	20	30	25	18	30	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	29	30	30	27	30	30	24	30	30	22	30	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	30	30	26	30	30	24	30	29	21	30	26	19	30	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	29	35	35	27	35	27	23	35	23	19	33	20	17	30	18	15	27	16	13	24	14	11
			Exposed	35	35	32	35	35	29	35	31	26	35	28	23	35	25	21	35	23	19	35	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39	41	41	35	39	39	32	37	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	41	41	38	41	41	34	41	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	32	32	32	32	32	32	32	32	31	32	32	28	32	32	25	32	32	23	32	30	21	32	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	32	32	25	32	32	22	32	28	20	32	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	32	32	32	32	32	30	32	32	27	32	32	24	32	30	22	32	27	20	32	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	32	30	22	32	27	20	32	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	10	16	12	9	14	10	8					
		20-27	Interior	38	38	38	38	38	37	38	38	33	38	36	30	38	32	27	38	30	24	38	27	22	37	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	38	32	27	38	29	24	38	26	21	38	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	44	44	44	44	44	44	44	44	39	43	43	35	42	41	32	40	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	44	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	25	17	25	22	15
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	20	25	24	17	25	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	23	25	25	20	25	24	17	25	21	15	25	18	14
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	21	25	24	18	25	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	28	31	29	24	31	26	21	31	23	19	30	20	16
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	28	31	31	25	31	26	21	31	22	18	31	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	36	34	34	34	29	33	32	25	31	28	22	28	25	20
			Exposed	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	33	37	37	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	25	18	25	22	16	25	19	14	23	17	12	21	15	16
			Exposed	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	25	18	25	23	16	25	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	19	25	22	16	25	19	14	22	16	12	20	14	16	17	13	14
			Exposed	25	25	25	25	25	24	25	25	21	25	25	19	25	23	17	25	21	16	25	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31	31	27	31	27	23	31	23	19	30	20	17	29	18	15	27	16	13	24	14	11
			Exposed	31	31	31	31	31	29	31	31	26	31	28	23	31	25	21	31	23	19	31	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	36	35	35	35	32	34	34	27	32	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	37	37	37	37	37	34	37	37	31	37	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	28	28	21	28	25	18	28	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	28	28	25	28	28	22	28	28	20	28	26	18	28	23	16	28	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	28	28	28	28	28	28	28	28	27	28	28	24	28	28	22	28	27	20	28	25	18	28	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	28	28	22	28	27	20	28	24	18	28	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	30	33	32	27	33	30	24	33	27	22	33	23	19	32	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	33	32	27	33	29	24	33	26	21	33	23	19	33	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	35	38	38	32	37	37	29	35	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	39	39	32	39	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
70	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	22	15
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	15	22	18	13	22	16	11	20	14	15
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	15	22	18	14
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	20	15	22	18	13	21	15	11	19	14	15	16	12	13
		20-27	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	24	27	26	21	27	23	19	27	20	16
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	26	21	27	22	18	27	19	16	27	17	14	25	15	12	22	13	16
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	31	31	29	30	30	25	29	28	22
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	22	16	22	19	14	22	17	12	21	15	16
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	20	14	22	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	19	22	22	16	22	19	14	22	16	12	20	14	16	17	13	14
			Exposed	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	21	16	22	20	14	22	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	23	27	27	19	27	20	17	26	18	15	25	16	13	24	14	11
			Exposed	27	27	27	27	27	27	27	27	26	27	27	23	27	25	21	27	23	19	27	21	17	27	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	31	31	31	27	29	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	33	33	33	33	33	33	33	33	31	33	33	28	33	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	24	18	24	21	15	24	18	13	22	16	11	19	14	15	17	13	13
			Exposed	24	24	24	24	24	22	24	24	20	24	24	18	24	23	16	24	21	15	24	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	21	15	24	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	24	24	22	24	24	20	24	24	18	24	22	16	24	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	24	30	27	22	30	23	19	29	19	16	27	17	14	25	15	12	22	13	16	20	11	14
			Exposed	30	30	27	30	29	24	30	26	21	30	23	19	30	21	17	30	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	36	36	36	36	36	36	36	36	36	35	35	35	34	34	32	33	33	29	32	32	27	31	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	36	36	32	36	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
80	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	13	19	16	11	19	14	15
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	14
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	15	11	19	14	15	16	12	13
		20-27	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	24	24	24	24	24	24	24	21	24	23	19	24	20	16
			Exposed	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	22	18	24	19	16	24	17	14	24	15	12	22	13	16
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	25	27	27	22	26	25	20
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	26	30	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	14	19	17	12	19	15	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	14	19	17	12	19	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	16	12	19	14	16	17	13	14
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	15	16	12	13	14	10	11	13	9		
		20-27	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	24	24	24	24	24	24	24	21	24	23	19	24	20	16
			Exposed	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	22	18	24	19	16	24	17	14	24	15	12	22	13	16
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	25	27	27	22	26	25	20
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	26	30	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	15	21	18	13	21	16	11	19	14	15	17	13	13
			Exposed	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	15	21	19	14	21	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	15	21	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	21	21	21	21	21	20	21	21	18	21	21	16	21	21	15	21	21	18	21	21	15	21	18	13	21	16	11	19	14	15	16	12	13	14	10	11	12	9	14	10	8
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	22	26	23	19	26	19	16	25	17	14	24	15	12	22	13	16	20	11	14
			Exposed	26	26	26	26	26	24	26	26	21	26	23	19	26	21	17	26	19	16	26	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	31	31	29	30	30	27	28	28	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	33	33	32	33	33	29	33	32	26	32	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	11	17	14	15
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	11	17	14	15	16	12	13
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	20	16			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	16	21	17	14	21	15	12	21	13	16
		27-45	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	26	26	26	26	26	25	25	25	22	24	24	20
			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	22	26	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	12	17	15	16
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	12	17	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	16	12	17	14	16	17	13	14
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	16	12	17	14	16	17	12	14	15	16	12	13	14	10	11	13	9			
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	20	17	21	18	15	21	16	13	20	14	11
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	18	15	21	15	13	21	13	11	20	11	14	17	15	13	15	14	11			
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	23	24	24	20	23	22	18	22	20	15	19	17	14
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	23	27	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	16	11	19	14	15	17	13	13
			Exposed	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	14	19	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	16	11	19	14	15	16	12	13	14	16	12
			Exposed	19	19	19	19	19	19	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	23	19	24	19	16	23	17	14	22	15	12	22	13	16	20	11	14
			Exposed	24	24	24	24	24	24	24	24	21	24	23	19	24	21	17	24	19	16	24	18	14	24	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	28	28	28	27	26	26	23	25	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	30	30	30	30	30	29	30	30	26	30	29	23	29	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
100	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	15			
		7-20	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14			
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	15	11	16	14	15	16	12	13
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16			
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	17	14	19	15	12	19	13	16
		27-45	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	24	24	24	24	24	24	24	24	23	23	22	22	22	20
			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	24	22	24	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	16
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	15	14	15	15	13	14	15	11	12	13	15	11
		7-20	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	12	16	14	16	16	13	14
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	12	16	14	16	16	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	18	15	19	16	13	19	14	11
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	13	19	15	12	19	13	16	19	14	11
		27-45	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	24	24	24	24	24	24	24	24	24	24	24	24	24	24
			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	24	22	24	24	19	23	21	17	21	18	15	18	16	13
	D	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	11	17	14	15	17	13	13
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	14	17	16	11	17	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	11	17	14	15	16	12	13	14	16	12
			Exposed	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	17	12	17	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	19	16	21	17	14	21	15	12	20	13	16	19	11	14
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	17	21	19	14	21	15	12	21	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	26	25	25	23	24	24	19	22	21	17	21	18	15	18	16	13	16	14	11
			Exposed	27	27	27	27	27	27	27	27	26	27	27	23	27	26	21	26	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	39	39	34	39	39	30	39	39	27	39	35	24	39	32	22	39	29	20	37	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	8	15	11	7
			Exposed	39	31	22	39	28	19	35	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	39	39	30	39	37	26	39	33	24	39	29	21	38	26	19	33	24	17	30	22	16	25	18	13	21	15	11	18	13	10	16	12	8	14	10	7	12	9	7
			Exposed	38	26	19	32	23	17	29	21	15	26	19	14	23	17	12	21	15	11	19	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	40	40	37	40	40	32	40	35	29	40	32	26	40	28	23	40	26	21	40	23	19	35	20	16	29	17	14	25	14	12	22	13	10	19	11	9	17	10	8
			Exposed	40	28	23	40	25	21	40	22	18	36	20	17	32	18	15	29	17	14	26	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	40	40	40	40	40	40	40	40	34	40	40	31	40	36	28	37	32	25	33	29	23	28	25	19	24	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	40	36	28	35	32	25	32	28	22	28	25	20	26	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	39	33	23	39	30	20	38	26	18	33	24	16	30	21	15	27	19	14	25	18	12	21	15	10	18	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	30	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	39	28	20	34	25	18	31	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	25	18	13	22	16	12	20	14	10	18	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	40	30	25	40	27	22	40	24	20	39	21	18	34	19	16	31	18	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	34	19	16	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	40	39	29	39	33	26	34	30	23	30	27	21	27	24	19	25	22	17	23	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	39	27	19	34	24	17	30	22	15	27	20	14	25	18	12	22	16	11	20	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	24	18	12	22	16	11	19	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	32	23	17	28	20	15	25	18	13	23	16	12	20	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	20	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	40	25	20	40	22	18	35	20	16	31	18	15	28	16	13	25	15	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	28	16	13	25	14	12	22	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	35	31	24	31	28	22	28	25	19	25	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
10	B	0-7	Interior	32	32	32	32	32	30	32	32	27	32	32	24	32	32	22	32	29	20	32	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	8	15	11	7
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		7-20	Interior	32	32	30	32	32	26	32	32	24	32	29	21	32	26	19	32	24	17	30	22	16	25	18	13	21	15	11	18	13	10	16	12	8	14	10	7	12	9	7
			Exposed	32	26	19	32	23	17	29	21	15	26	19	14	23	17	12	21	15	11	19	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	36	36	36	36	36	32	36	35	29	36	32	26	36	28	23	36	26	21	36	23	19	35	20	16	29	17	14	25	14	12	22	13	10	19	11	9	17	10	8
			Exposed	36	28	23	36	25	21	36	22	18	36	20	17	32	18	15	29	17	14	26	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	39	39	39	39	39	39	39	39	34	39	39	31	39	36	28	37	32	25	33	29	23	28	25	19	24	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	39	36	28	35	32	25	32	28	22	28	25	20	26	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	32	32	23	32	30	20	32	26	18	32	24	16	30	21	15	27	19	14	25	18	12	21	15	10	18	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	30	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	32	28	20	32	25	18	31	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	25	18	13	22	16	12	20	14	10	18	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	36	30	25	36	27	22	36	24	20	36	21	18	34	19	16	31	18	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	34	19	16	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	39	39	29	39	33	26	34	30	23	30	27	21	27	24	19	25	22	17	23	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	32	27	19	32	24	17	30	22	15	27	20	14	25	18	12	22	16	11	20	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	24	18	12	22	16	11	19	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	32	23	17	28	20	15	25	18	13	23	16	12	20	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	20	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	30	25	20	30	22	18	30	20	16	30	18	15	28	16	13	25	15	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	28	16	13	25	14	12	22	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	35	31	24	31	28	22	28	25	19	25	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
20	B	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	18	23	22	15	23	19	13	22	16	11	19	14	10	17	12	8	15	11	7
			Exposed	23	23	22	23	23	19	23	23	17	23	22	16	23	20	14	23	18	13	23	17	12	19	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	21	24	24	19	24	24	17	24	22	16	24	18	13	21	15	11	18	13	10	16	12	8	14	10	7	12	9	7
			Exposed	24	24	19	24	23	17	24	21	15	24	19	14	23	17	12	21	15	11	19	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	26	29	28	23	29	26	21	29	23	19	29	20	16	29	17	14	25	14	12	22	13	10	19	11	9	17	10	8
			Exposed	29	28	23	29	25	21	29	22	18	29	20	17	29	18	15	29	17	14	26	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	31	32	32	28	32	32	25	32	29	23	28	25	19	24	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	32	32	28	32	32	25	32	28	22	28	25	20	26	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	23	23	23	23	23	20	23	23	18	23	23	16	23	21	15	23	19	14	23	18	12	21	15	10	18	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	23	21	15	23	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	24	24	20	24	24	18	24	22	16	24	20	14	24	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	24	18	13	22	16	12	20	14	10	18	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	29	29	25	29	27	22	29	24	20	29	21	18	29	19	16	29	18	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
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		27-45	Interior	32	32	29	32	32	26	32	30	23	30	27	21	27	24	19	25	22	17	23	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	23	23	19	23	23	17	23	22	15	23	20	14	23	18	12	22	16	11	20	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	23	18	12	22	16	11	19	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	24	23	17	24	20	15	24	18	13	23	16	12	20	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	20	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	30	25	20	30	22	18	30	20	16	30	18	15	28	16	13	25	15	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	28	16	13	25	14	12	22	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	33	31	24	31	28	22	28	25	19	25	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	19	13	19	16	11	19	14	10	17	12	8	15	11	7
			Exposed	19	19	19	19	19	19	19	19	17	19	19	16	19	19	14	19	18	13	19	17	12	19	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	16	19	18	13	19	15	11	18	13	10	16	12	8	14	10	7	12	9	7
			Exposed	19	19	19	19	19	17	19	19	15	19	19	14	19	17	12	19	15	11	19	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	23	19	24	20	16	24	17	14	24	14	12	22	13	10	19	11	9	17	10	8
			Exposed	24	24	23	24	24	21	24	22	18	24	20	17	24	18	15	24	17	14	24	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	23	27	25	19	24	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	27	27	27	27	27	25	27	27	22	27	25	20	26	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	14	19	18	12	19	15	10	18	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	19	19	15	19	19	13	19	17	12	19	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	6	5
		7-20	Interior	19	19	19	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	19	18	13	19	16	12	19	14	10	18	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	24	24	24	24	24	22	24	24	20	24	21	18	24	19	16	24	18	14	24	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	24	19	16	24	17	14	24	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	27	27	27	27	27	26	27	27	23	27	27	21	27	24	19	25	22	17	23	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	19	19	19	19	19	17	19	19	15	19	19	14	19	18	12	19	16	11	19	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	19	18	12	19	16	11	19	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	19	19	17	19	19	15	19	18	13	19	16	12	19	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	19	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	25	25	20	25	22	18	25	20	16	25	18	15	25	16	13	25	15	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	25	16	13	25	14	12	22	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	28	28	24	28	28	22	28	25	19	25	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
40	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	11	17	14	10	17	12	8	14	10	7	12	9	7
			Exposed	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	17	12	17	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	13	17	15	11	17	13	10	16	12	8	14	10	7	12	9	7
			Exposed	17	17	17	17	17	17	17	17	15	17	17	14	17	17	12	17	15	11	17	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	16	20	17	14	20	14	12	20	13	10	19	11	9	17	10	8
			Exposed	20	20	20	20	20	20	20	20	18	20	20	17	20	18	15	20	17	14	20	15	12	20	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	19	23	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	23	23	23	23	23	23	23	23	22	23	23	20	23	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	14	17	17	12	17	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	17	17	15	17	17	13	17	17	12	17	15	11	17	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	12	17	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	17	17	13	17	16	12	17	14	10	17	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	18	20	19	16	20	18	14	20	16	13	20	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	20	19	16	20	17	14	20	15	13	20	14	11	20	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	23	23	19	23	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	18	18	18	18	18	17	18	18	15	18	18	14	18	18	12	18	16	11	18	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	18	18	12	18	16	11	18	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	19	19	17	19	19	15	19	18	13	19	16	12	19	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	19	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	21	21	20	21	21	18	21	20	16	21	18	15	21	16	13	21	15	12	21	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	21	16	13	21	14	12	21	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	25	25	24	25	25	22	25	25	19	24	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
50	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	10	15	12	8	14	10	7	12	8	7	11	8	7
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	14	10	15	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	11	15	13	10	15	12	8	14	10	7	12	9	7	12	9	7
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	14	12	17	13	10	16	12	8	14	10	7	12	9	7
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	15	12	17	13	10	17	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	19	18	14	18	16	12	16	14	11	14	12	10
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	10	15	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	15	15	15	15	15	13	15	15	12	15	15	11	15	14	10	15	12	9	15	11	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	7	7	5
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	11	15	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	15	15	13	15	15	12	15	14	10	15	13	9	15	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	16	13	17	13	11	17	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	17	17	16	17	17	14	17	15	13	17	14	11	17	12	10	17	11	9	17	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	18	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	20	20	19	20	20	17	20	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	16	16	16	16	16	16	16	16	15	16	16	14	16	16	12	16	16	11	16	15	10	16	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	16	16	12	16	16	11	16	14	10	16	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	16	16	16	16	16	15	16	16	13	16	16	12	16	15	11	16	13	10	16	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	16	15	11	16	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	19	19	19	19	19	18	19	19	16	19	18	15	19	16	13	19	15	12	19	13	11	18	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	19	16	13	19	14	12	19	13	10	19	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	22	22	22	22	22	22	22	22	19	22	22	17	21	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	8	12	11	7
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	8	12	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	8	13	10	7	12	9	7
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	9	13	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	14	12	15	13	10	15	11	9	15	10	8	13	10	8
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	13	10	15	11	9	15	9	8	14	8	7	12	7	9	11	6	8	9	7	6
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	14	16	16	12	16	14	11	14	12	10
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	7	6	9	8	6
	C	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	9	12	11	8	12	9	7	11	8	9	10	7	8
			Exposed	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5	7
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	9	13	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	13	13	13	13	13	12	13	13	10	13	13	9	13	11	8	13	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	14	13	15	13	11	15	11	9	15	10	8	14	9	7	13	8	6	12	7	8
			Exposed	15	15	15	15	15	14	15	15	13	15	14	11	15	12	10	15	11	9	15	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	17	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	18	18	18	18	18	17	18	18	15	18	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	14	11	14	14	10	14	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	14	14	12	14	14	11	14	14	10	14	13	9	14	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	13	10	14	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	14	14	11	14	13	10	14	12	9	14	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	17	17	17	17	17	17	17	17	16	17	17	15	17	16	13	17	15	12	17	13	11	16	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	17	16	13	17	14	12	17	13	10	17	11	9	17	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	20	20	20	20	20	20	20	20	19	19	19	17	19	19	16	18	18	14	18	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	20	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
70	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	11	7
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	7	11	9	10	11	8	8	10	7	7
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	7	11	9	7
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	10	7	11	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	9	13	10	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	9	13	9	8	13	8	7	12	7	9	11	6	8
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	14	15	15	12	14	14	11	14	12	10
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	9	7	11	8	9	10	7	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	8	11	10	7	11	8	9	10	7	8	8	9	7
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	9	7	11	8	9
			Exposed	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	8	11	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	10	8	13	9	7	12	8	6	12	7	8	9	7	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	11	9	13	10	8	13	9	7	13	8	7	12	7	9
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	15	14	11	15	12	9	12	10	8
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	16	16	16	15	16	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	13	11	15	11	9	14	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	15	15	13	15	14	12	15	13	10	15	11	9	15	10	8	15	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	18	18	18	18	18	18	18	18	18	17	17	17	17	17	16	17	17	14	16	16	13	15	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	18	18	16	18	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
80	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	10	9	8	8	9	7	7
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	6	9	7	8	9	7	7	8	9	7
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	10	8
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	9	8	12	8	7	12	7	9	11	6	8
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	12	13	13	11	13	12	10
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	9	9	7	8
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	6	9	7	8	9	7	7	8	9	7
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	9	9	7	8	8	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	8	9	9	7	9	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	11	9	12	10	8	12	9	7	11	8	6	11	7	8
			Exposed	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	11	9	12	10	8	12	9	7	12	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	13	13	13	11	13	12	10	12	11	9	11	10	7	9	8	7
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	7	10	9	6	10	8	8	9	7	7	8	9	6	8	7	6
			Exposed	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	9	7	10	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	10	8	11	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	11	11	11	11	11	10	11	11	9	11	11	8	11	11	8	11	10	8	11	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	11	9	13	9	8	12	8	7	12	7	9	11	6	8	10	8	7
			Exposed	13	13	13	13	13	12	13	13	10	13	11	9	13	10	8	13	9	8	13	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	14	15	15	13	14	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	16	16	16	16	16	14	16	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	10	8	8	8	8	7	7
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	8	8	7	7	8	9	7
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	16	18	18	16	18	17	14	18	15	12
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	17	14	18	14	12	18	12	10	18	11	9	17	10	8
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	18	18	17	18	18	15
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	16	20	18	14	18	16	12	15	14	11	14	12	10
	C	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	9	8	7	7	8	9	7	7	8	8	7	8	5
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8	8	9	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	17	14	18	15	12	18	13	11	17	12	9	17	10	8
			Exposed	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	17	14	18	16	13	18	13	11	18	11	9	17	10	8	15	9	7	13	7	6	11	7	5
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	19	19	17	18	18	15	17	17	13	16	15	11	14	13	10
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	19	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	D	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	6	9	8	8	9	7	7	8	8	9	8	9	6
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	6	9	8	8	9	7	7	8	9	6	7	8	6
			Exposed	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	6	9	8	9	9	7	7	8	8	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	11	9	12	9	8	11	8	7	11	7	9	11	6	8	10	8	7
			Exposed	12	12	12	12	12	12	12	12	10	12	11	9	12	10	8	12	9	8	12	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14	13	13	13	11	12	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	15	15	15	15	15	14	15	15	13	15	14	11	14	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
100	B	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	10	7	7	8	7	7	7
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	8	8	7	7	8	9	7
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	12	10	14	11	9	14	10	8
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	17	17	15
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	14	17	16	12	15	14	11	14	12	10	14	12	10
	C	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	9	7	7	8
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	9	7	7	7	7	9	7	7	8	6	7	7	5
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8	8	9	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	12	9	14	10	8	14	10	8
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	12	10	14	11	9	14	10	8
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	14	17	16	12	15	14	11	14	12	10
	D	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	8	8	8	7	7	8	9	6
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	7	8	8	8	8	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	8	8	8	8	7	7	8	9	6	7	8	6
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	8	9	8	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	17	14	18	14	12	18	13	10	17	11	9	16	10	8	15	8	7
			Exposed	18	18	18	18	18	18	18	18	16	18	17	14	18	16	13	18	14	12	18	13	11	18	11	9	16	9	8	14	8	7	12	7	6	11	6	5	9	5	4
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	18	18	17	18	18	14	17	16	12	15	14	11	14	12	10	12	11	8
			Exposed	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	20	18	14	18	16	13	16	14	11	13	12	9	11	10	8	10	9	7	9	8	6	8	7	5

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	76	76	75	76	76	60	76	76	53	76	76	48	76	62	43	76	57	39	76	51	36	60	43	30	51	37	26	44	32	22	38	28	19	33	24	17	30	21	15
			Exposed	76	62	43	76	55	38	76	49	34	62	44	31	56	40	28	50	36	25	46	33	23	39	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	76	76	59	76	76	52	76	64	47	76	58	42	76	52	38	70	47	34	60	43	31	50	36	27	43	31	23	37	27	20	32	23	17	28	20	15	25	18	13
			Exposed	76	52	38	64	46	34	57	41	30	51	37	27	46	33	25	42	30	22	38	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	77	77	77	77	77	64	77	77	57	77	62	51	77	56	46	77	51	42	77	46	38	77	39	32	58	33	27	50	29	24	43	25	21	38	22	18	34	20	16
			Exposed	77	56	46	77	50	41	77	44	37	77	40	33	63	36	30	57	33	27	52	30	25	44	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	61	79	79	55	79	64	50	66	58	46	55	49	39	47	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	79	79	55	79	62	49	62	56	44	56	50	39	51	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	76	67	46	76	58	41	76	52	36	66	47	33	59	42	30	53	38	27	49	35	25	41	29	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	59	42	29	52	37	26	47	33	24	42	30	21	38	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	76	55	40	76	49	36	61	44	32	54	39	29	49	35	26	45	32	24	41	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	49	35	26	43	31	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	77	59	49	77	53	43	77	47	39	77	42	35	73	38	32	61	35	29	55	32	26	46	27	22	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	71	38	31	59	34	28	53	30	25	48	27	23	43	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	79	79	58	79	68	52	79	59	46	59	53	42	54	48	38	49	44	34	45	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	54	48	38	48	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	76	54	38	72	48	34	60	43	30	54	39	27	49	35	25	44	32	22	40	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	48	35	24	43	31	22	38	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	63	45	33	56	40	30	50	36	26	45	32	24	41	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	40	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	77	49	40	77	44	36	77	39	32	61	35	29	55	32	26	50	29	24	46	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	55	32	26	49	28	23	44	25	21	39	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	79	61	48	61	55	43	55	49	38	49	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11
10	B	0-7	Interior	62	62	62	62	62	60	62	62	53	62	62	48	62	62	43	62	57	39	62	51	36	60	43	30	51	37	26	44	32	22	38	28	19	33	24	17	30	21	15
			Exposed	62	62	43	62	55	38	62	49	34	62	44	31	56	40	28	50	36	25	46	33	23	39	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	62	62	59	62	62	52	62	62	47	62	58	42	62	52	38	62	47	34	60	43	31	50	36	27	43	31	23	37	27	20	32	23	17	28	20	15	25	18	13
			Exposed	62	52	38	62	46	34	57	41	30	51	37	27	46	33	25	42	30	22	38	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	71	71	71	71	71	64	71	71	57	71	62	51	71	56	46	71	51	42	71	46	38	71	39	32	58	33	27	50	29	24	43	25	21	38	22	18	34	20	16
			Exposed	71	56	46	71	50	41	71	44	37	71	40	33	63	36	30	57	33	27	52	30	25	44	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	76	76	76	76	76	76	76	76	76	76	76	61	76	76	55	76	64	50	66	58	46	55	49	39	47	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	76	76	55	76	62	49	62	56	44	56	50	39	51	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	62	62	46	62	58	41	62	52	36	62	47	33	59	42	30	53	38	27	49	35	25	41	29	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	59	42	29	52	37	26	47	33	24	42	30	21	38	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	62	55	40	62	49	36	61	44	32	54	39	29	49	35	26	45	32	24	41	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	49	35	26	43	31	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	71	59	49	71	53	43	71	47	39	71	42	35	71	38	32	61	35	29	55	32	26	46	27	22	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	71	38	31	59	34	28	53	30	25	48	27	23	43	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	76	76	58	76	68	52	76	59	46	59	53	42	54	48	38	49	44	34	45	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	54	48	38	48	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	62	54	38	62	48	34	60	43	30	54	39	27	49	35	25	44	32	22	40	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	48	35	24	43	31	22	38	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	62	45	33	56	40	30	50	36	26	45	32	24	41	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	40	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	73	49	40	73	44	36	73	39	32	61	35	29	55	32	26	50	29	24	46	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	55	32	26	49	28	23	44	25	21	39	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	78	61	48	61	55	43	55	49	38	49	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11
20	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	43	46	46	39	46	46	36	46	43	30	46	37	26	44	32	22	38	28	19	33	24	17	30	21	15
			Exposed	46	46	43	46	46	38	46	46	34	46	44	31	46	40	28	46	36	25	46	33	23	39	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	46	46	46	46	46	46	46	46	46	46	46	42	46	46	38	46	46	34	46	43	31	46	36	27	43	31	23	37	27	20	32	23	17	28	20	15	25	18	13
			Exposed	46	46	38	46	46	34	46	41	30	46	37	27	46	33	25	42	30	22	38	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	56	56	56	56	56	56	56	56	56	56	56	51	56	56	46	56	51	42	56	46	38	56	39	32	56	33	27	50	29	24	43	25	21	38	22	18	34	20	16
			Exposed	56	56	46	56	50	41	56	44	37	56	40	33	56	36	30	56	33	27	52	30	25	44	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	62	62	62	62	62	62	62	62	62	62	62	61	62	62	55	62	62	50	62	58	46	55	49	39	47	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	62	62	55	62	62	49	62	56	44	56	50	39	51	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	46	46	46	46	46	41	46	46	36	46	46	33	46	42	30	46	38	27	46	35	25	41	29	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	46	42	29	46	37	26	46	33	24	42	30	21	38	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	46	46	40	46	46	36	46	44	32	46	39	29	46	35	26	45	32	24	41	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	46	35	26	43	31	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	56	56	49	56	53	43	56	47	39	56	42	35	56	38	32	56	35	29	55	32	26	46	27	22	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	56	38	31	56	34	28	53	30	25	48	27	23	43	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	62	62	58	62	62	52	62	59	46	59	53	42	54	48	38	49	44	34	45	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	54	48	38	48	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	46	46	38	46	46	34	46	43	30	46	39	27	46	35	25	44	32	22	40	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	46	35	24	43	31	22	38	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	46	45	33	46	40	30	46	36	26	45	32	24	41	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	40	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	59	49	40	59	44	36	59	39	32	59	35	29	55	32	26	50	29	24	46	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	55	32	26	49	28	23	44	25	21	39	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	65	61	48	61	55	43	55	49	38	49	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	30	36	36	26	36	32	22	36	28	19	33	24	17	30	21	15
			Exposed	36	36	36	36	36	36	36	36	34	36	36	31	36	36	28	36	36	25	36	33	23	36	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	31	37	36	27	37	31	23	37	27	20	32	23	17	28	20	15	25	18	13
			Exposed	37	37	37	37	37	34	37	37	30	37	37	27	37	33	25	37	30	22	37	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	42	46	46	38	46	39	32	46	33	27	46	29	24	43	25	21	38	22	18	34	20	16
			Exposed	46	46	46	46	46	41	46	44	37	46	40	33	46	36	30	46	33	27	46	30	25	44	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	50	53	53	46	53	49	39	47	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	53	53	53	53	53	49	53	53	44	53	50	39	51	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	33	36	36	30	36	36	27	36	35	25	36	29	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	36	36	29	36	36	26	36	33	24	36	30	21	36	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	37	37	37	37	37	36	37	37	32	37	37	29	37	35	26	37	32	24	37	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	37	35	26	37	31	23	37	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	~~10~~	11	12	9
		20-27	Interior	46	46	46	46	46	43	46	46	39	46	42	35	46	38	32	46	35	29	46	32	26	46	27	22	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	46	38	31	46	34	28	46	30	25	46	27	23	43	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	~~11~~
		27-45	Interior	53	53	53	53	53	52	53	53	46	53	53	42	53	48	38	49	44	34	45	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	53	48	38	48	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	36	36	36	36	36	34	36	36	30	36	36	27	36	35	25	36	32	22	36	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	36	35	24	36	31	22	36	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	9
		7-20	Interior	37	37	33	37	37	30	37	36	26	37	32	24	37	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	37	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	8	14	~~10~~	8
		20-27	Interior	49	49	40	49	44	36	49	39	32	49	35	29	49	32	26	49	29	24	46	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	49	32	26	49	28	23	44	25	21	39	23	19	36	21	17	39	23	19	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	~~10~~	12	11	9
		27-45	Interior	55	55	48	55	55	43	55	49	38	49	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	~~11~~
40	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	30	34	34	26	34	32	22	34	28	19	33	24	17	30	21	15
			Exposed	34	34	34	34	34	34	34	34	34	34	34	31	34	34	28	34	34	25	34	33	23	34	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	31	34	34	27	34	31	23	34	27	20	32	23	17	28	20	15	25	18	13
			Exposed	34	34	34	34	34	34	34	34	30	34	34	27	34	33	25	34	30	22	34	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	38	39	39	32	39	33	27	39	29	24	39	25	21	38	22	18	34	20	16
			Exposed	39	39	39	39	39	39	39	39	37	39	39	33	39	36	30	39	33	27	39	30	25	39	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	39	44	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	46	46	46	46	46	46	46	46	44	46	46	39	46	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	34	34	34	34	34	34	34	34	34	34	34	33	34	34	30	34	34	27	34	34	25	34	29	21	34	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	34	34	29	34	34	26	34	33	24	34	30	21	34	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	34	34	34	34	34	34	34	34	32	34	34	29	34	34	26	34	32	24	34	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	34	34	26	34	31	23	34	28	21	34	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	~~10~~	11	12	9
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	35	39	38	32	39	35	29	39	32	26	39	27	22	39	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	39	38	31	39	34	28	39	30	25	39	27	23	39	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	~~11~~
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	42	34	46	46	38	45	44	34	43	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	46	46	38	46	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	36	36	36	36	36	34	36	36	30	36	36	27	36	35	25	36	32	22	36	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	36	35	24	36	31	22	36	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	9
		7-20	Interior	37	37	33	37	37	30	37	36	26	37	32	24	37	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	37	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	8	14	~~10~~	8
		20-27	Interior	42	42	40	42	42	36	42	39	32	42	35	29	42	32	26	42	29	24	42	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	42	32	26	42	28	23	42	25	21	39	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	~~10~~	12	11	9
		27-45	Interior	48	48	48	48	48	43	48	48	38	48	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	~~11~~
50	B	0-7	Interior	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	26	29	29	22	29	28	19	29	24	17	29	21	15
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	25	29	29	23	29	28	20	29	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	23	30	30	23	30	27	20	30	23	17	28	20	15	25	18	13
			Exposed	30	30	30	30	30	30	30	30	30	30	30	27	30	30	25	30	30	22	30	28	20	30	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		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	32	34	33	27	34	29	24	34	25	21	34	22	18	33	20	16
			Exposed	34	34	34	34	34	34	34	34	34	34	34	33	34	34	30	34	33	27	34	30	25	34	25	21	34	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	33	37	36	28	35	31	25	31	28	22	27	25	19
			Exposed	40	40	40	40	40	40	40	40	40	40	40	39	40	40	36	40	40	33	40	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	29	29	29	29	29	29	29	29	29	29	29	27	29	29	25	29	29	25	29	29	21	29	25	18	29	22	15	26	19	13	23	17	12	20	15	16			
			Exposed	29	29	29	29	29	26	29	29	24	29	29	21	29	27	19	29	25	17	29	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	30	24	30	29	22	30	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	30	30	26	30	30	23	30	28	21	30	25	19	30	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	~~10~~	11	12	9
		20-27	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	32	34	34	29	34	32	26	34	27	22	34	23	19	33	20	16	30	17	14	26	15	12	23	13	11
			Exposed	34	34	31	34	34	28	34	30	25	34	27	23	34	25	20	34	23	19	34	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	~~11~~
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	40	40	34	39	39	31	36	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	40	40	38	40	40	34	40	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	31	31	31	31	31	31	31	31	30	31	31	27	31	31	25	31	31	22	31	29	20	31	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	31	31	24	31	31	22	31	28	20	31	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	9
		7-20	Interior	32	32	32	32	32	30	32	32	26	32	32	24	32	29	22	32	27	20	32	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	32	29	21	32	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	8	14	~~10~~	8
		20-27	Interior	37	37	37	37	37	36	37	37	32	37	35	29	37	32	26	37	29	24	37	26	22	36	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	37	32	26	37	28	23	37	25	21	37	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	~~10~~	12	11	9
		27-45	Interior	43	43	43	43	43	43	43	43	38	42	42	35	41	40	31	40	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	43	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	~~11~~

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	19	25	24	17	25	21	15
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	24	17	25	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	23	17	25	20	15	25	18	13						
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	20	25	23	17	25	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	29	24	30	25	21	30	22	18						
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	25	30	25	21	30	22	18	30	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	33	34	34	28	32	31	25	31	28	22	27	25	19
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	36	36	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	25	18	25	22	15	25	19	13	23	17	12	20	15	16
			Exposed	25	25	25	25	25	25	25	25	24	25	25	21	25	25	19	25	25	17	25	23	16	25	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	18	25	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	25	25	25	25	25	23	25	25	21	25	25	19	25	23	17	25	21	15	25	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	27	22	30	23	19	29	20	16	28	17	14	26	15	12	23	13	11
			Exposed	30	30	30	30	30	28	30	30	25	30	27	23	30	25	20	30	23	19	30	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	34	35	35	31	33	33	27	31	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	36	36	36	36	36	34	36	36	30	36	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	22	27	27	20	27	24	17	27	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	27	27	24	27	27	22	27	27	20	27	25	18	27	23	16	27	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	27	27	27	27	27	27	27	27	26	27	27	24	27	27	22	27	27	20	27	24	18	27	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	27	27	21	27	26	19	27	23	17	27	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	33	33	33	33	33	33	33	33	32	33	33	29	33	32	26	33	29	24	33	26	22	32	22	18	31	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	33	32	26	33	28	23	33	25	21	33	23	19	33	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	35	37	37	31	36	36	29	35	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	38	38	31	38	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11
70	B	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	15
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	14	21	18	13	21	16	17	19	14	15
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	21	21	21	20	21	21	17	21	21	17	21	20	15
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	20	15	21	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	25	21	26	22	18	26	20	16
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	25	21	26	22	18	26	19	15	26	16	13	25	14	12	22	13	16
		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	31	31	28	29	29	25	28	28	22	27	25	19
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	21	15	21	19	13	21	17	12	20	15	16
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	19	13	21	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	21	16	21	18	13	21	16	12	19	14	16	17	12	14
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	15	21	19	14	21	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	20	16	25	17	14	25	15	12	22	13	11			
			Exposed	26	26	26	26	26	26	26	26	25	26	26	23	26	25	20	26	23	19	26	21	17	26	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	31	31	30	30	27	28	28	23	27	25	20	24	22	17	21	19	15	19	17	13
			Exposed	32	32	32	32	32	32	32	32	30	32	32	27	32	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	17	23	21	15	23	18	13	22	16	17	19	14	15	17	12	13
			Exposed	23	23	23	23	23	22	23	23	20	23	23	18	23	23	16	23	21	14	23	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	24	24	21	24	24	19	24	23	17	24	21	15	24	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	26	22	29	22	18	28	19	16	27	16	14	25	14	12	22	13	16	19	11	14
			Exposed	29	29	26	29	28	23	29	25	21	29	23	19	29	21	17	29	19	15	29	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	35	35	35	35	35	35	35	35	35	34	34	34	34	34	31	33	33	29	32	32	26	30	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	35	35	31	35	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11
80	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	14	19	18	13	19	16	17	19	14	15
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	13
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	17	13	19	15	17	18	13	15	16	12	13
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	22	18	23	20	16
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	22	18	23	19	15	23	16	13	23	14	12	22	13	16
		27-45	Interior	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	29	29	28	28	28	27	27	25	26	26	22	25	25	19
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	25	29	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	19	13	19	17	12	19	15	16			
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	15	19	16	12	19	14	16	17	12	13
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	18	13	19	16	12	19	14	16	17	12	14
			Exposed	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9			
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	19	23	20	16	23	17	14	22	15	12	22	13	11			
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	19	23	20	16	23	17	14	22	15	12	22	13	16	19	11	14
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	27	27	27	26	26	23	25	25	20	24	22	17	21	19	15	19	17	13
			Exposed	29	29	29	29	29	29	29	29	29	29	29	27	29	29	25	29	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	15	21	18	13	21	16	17	19	14	15	17	12	13
			Exposed	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	14	21	19	13	21	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	15	21	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	21	21	21	21	21	19	21	21	17	21	21	15	21	19	14	21	17	13	21	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	22	26	22	18	25	19	16	25	16	14	24	14	12	22	13	16	19	11	14
			Exposed	26	26	26	26	26	23	26	25	21	26	23	19	26	21	17	26	19	15	26	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	31	31	31	30	30	29	29	29	26	28	28	22	26	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	32	32	31	32	32	28	32	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	14	17	17	13	17	16	17	17	14	15
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	13
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	17	17	13	15	16	12	13
		20-27	Interior	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	35	35	35	35	35	31	35	33	28	35	30	24		
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	33	27	35	28	23	35	25	20	35	22	18	33	19	16
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	38	38	38	36	36	33	35	35	29
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	40	40	33	39	36	28	35	31	25	31	27	22	27	24	19
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	17	12	17	15	16
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	13	17	16	11	17	14	15	17	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	13	17	16	12	17	14	16	17	12	14
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	16	12	17	14	15	16	12	13	14	16	12	13	14	~~10~~	11	12	~~9~~			
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	35	29	35	30	25	35	26	22	34	23	19	33	20	17			
			Exposed	35	35	35	35	35	35	35	35	35	34	35	35	31	35	34	28	35	31	26	35	26	22	35	23	19	33	20	16	29	17	14	26	15	12	23	13	~~11~~		
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	38	38	37	37	34	35	35	30	34	33	26	32	29	23	29	26	20	
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	40	39	31	37	33	26	32	28	22	27	25	19	24	21	17	21	19	15	19	17	13
	D	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13	18	16	17	18	14	15	17	12	13
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	14	18	18	13	18	16	17	18	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	~~9~~
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	15	11	18	13	15	16	12	13	14	16	12
			Exposed	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	17	13	19	16	12	18	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	~~8~~	14	~~10~~	~~8~~
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	22	18	23	19	16	23	16	14	22	14	12	21	13	16	19	11	14
			Exposed	23	23	23	23	23	23	23	23	21	23	23	19	23	21	17	23	19	15	23	17	14	23	14	12	21	12	16	18	16	13	16	14	12	14	13	~~10~~	12	11	~~9~~
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	47	47	47	46	46	44	44	44	40	42	42	34	40	36	29	35	31	25	31	27	22	27	24	19	24	21	17
			Exposed	48	48	48	48	48	42	48	48	38	48	44	34	44	39	31	40	36	28	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	12	16	14	~~11~~
100	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	17	15	14	15
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	17	15	13	15	15	12	13
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	24
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	23	28	25	20	28	22	18	28	19	16			
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	35	34	34	33	33	33	29
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	36	36	28	35	31	25	31	27	22	31	27	22	27	24	19
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	15	16
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	15	15	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	14	16	15	12	14
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	15	15	12	13	14	16	12	13	14	~~10~~	11	12	~~9~~
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	22	28	26	22	28	23	19	28	20	17			
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	26	22	28	23	19	28	20	16	28	17	14	26	15	12	23	13	~~11~~
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	34	34	33	33	30	32	32	26	30	29	23	29	26	20
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	31	36	33	26	32	28	22	27	25	19	24	21	17	21	19	15	19	17	13
	D	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	17	17	14	15	17	12	13			
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	17	17	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	~~9~~
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	11	17	13	15	16	12	13	14	16	12
			Exposed	17	17	17	17	17	17	17	17	17	15	17	17	14	17	17	13	17	17	12	17	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	~~8~~	14	~~10~~	~~8~~		
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	34	28	35	29	24	35	25	21	33	22	18	32	19	16	29	17	14
			Exposed	35	35	35	35	35	35	35	35	32	35	34	28	35	31	26	35	28	24	35	26	21	35	22	18	32	19	16	28	16	13	24	14	12	21	13	~~10~~	19	11	~~9~~
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	38	38	38	36	36	33	35	35	29	33	31	25	31	27	22	27	24	19	24	21	17
			Exposed	40	40	40	40	40	40	40	40	38	40	40	34	40	39	31	39	36	28	36	33	26	31	28	22	26	24	19	23	20	16	20	18	14	18	16	12	16	14	~~11~~

#N/A

*	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.
~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	47	47	41	47	47	36	47	47	32	47	42	29	47	38	26	47	34	24	44	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	47	38	26	47	33	23	42	30	21	37	27	19	34	24	17	31	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	47	47	36	47	45	32	47	39	28	47	35	25	45	31	23	40	29	21	36	26	19	30	22	16	26	19	14	22	16	12	19	14	10	17	12	9	15	11	8
			Exposed	45	31	23	39	28	20	35	25	18	31	22	16	28	20	15	25	18	13	23	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	48	48	44	48	48	39	48	42	34	48	38	31	48	34	28	48	31	25	48	28	23	42	24	19	35	20	17	30	17	14	26	15	12	23	13	11	20	12	10
			Exposed	48	34	28	48	30	25	48	27	22	43	24	20	38	22	18	35	20	16	32	18	15	27	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	48	48	48	48	48	48	48	48	41	48	48	37	48	43	33	44	39	30	40	35	28	33	30	23	28	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	48	43	33	42	38	30	38	34	27	34	30	24	31	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	47	40	28	47	35	25	45	32	22	40	28	20	36	26	18	32	23	16	29	21	15	25	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	36	25	18	32	23	16	28	20	14	25	18	13	23	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	47	33	24	41	29	22	37	26	19	33	24	17	30	21	16	27	19	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	30	21	16	26	19	14	23	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	48	36	29	48	32	26	48	29	23	47	26	21	41	23	19	37	21	17	34	19	16	28	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	40	23	19	36	21	17	32	18	15	29	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	48	47	35	47	40	31	40	36	28	36	32	25	33	29	23	30	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	32	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	47	33	23	41	29	20	36	26	18	33	23	16	29	21	15	27	19	13	24	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	29	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	38	27	20	34	24	18	30	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	24	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	48	30	24	48	26	22	41	24	19	37	21	17	33	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	33	19	16	30	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	42	37	29	37	33	26	33	30	23	30	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
10	B	0-7	Interior	38	38	38	38	38	36	38	38	32	38	38	29	38	38	26	38	34	24	38	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	38	38	26	38	33	23	38	30	21	37	27	19	34	24	17	31	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	38	38	36	38	38	32	38	38	28	38	35	25	38	31	23	38	29	21	36	26	19	30	22	16	26	19	14	22	16	12	19	14	10	17	12	9	15	11	8
			Exposed	38	31	23	38	28	20	35	25	18	31	22	16	28	20	15	25	18	13	23	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	44	44	44	44	44	39	44	42	34	44	38	31	44	34	28	44	31	25	44	28	23	42	24	19	35	20	17	30	17	14	26	15	12	23	13	11	20	12	10
			Exposed	44	34	28	44	30	25	44	27	22	43	24	20	38	22	18	35	20	16	32	18	15	27	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	47	47	47	47	47	47	47	47	41	47	47	37	47	43	33	44	39	30	40	35	28	33	30	23	28	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	47	43	33	42	38	30	38	34	27	34	30	24	31	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	38	38	28	38	35	25	38	32	22	38	28	20	36	26	18	32	23	16	29	21	15	25	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	36	25	18	32	23	16	28	20	14	25	18	13	23	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	38	33	24	38	29	22	37	26	19	33	24	17	30	21	16	27	19	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	30	21	16	26	19	14	23	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	44	36	29	44	32	26	44	29	23	44	26	21	41	23	19	37	21	17	34	19	16	28	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	40	23	19	36	21	17	32	18	15	29	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	47	47	35	47	40	31	40	36	28	36	32	25	33	29	23	30	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	32	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	38	33	23	38	29	20	36	26	18	33	23	16	29	21	15	27	19	13	24	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	29	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	38	27	20	34	24	18	30	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	24	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	45	30	24	45	26	22	41	24	19	37	21	17	33	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	33	19	16	30	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	42	37	29	37	33	26	33	30	23	30	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
20	B	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	24	28	28	22	28	26	18	28	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	28	28	26	28	28	23	28	28	21	28	27	19	28	24	17	28	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	28	28	21	28	26	19	28	22	16	26	19	14	22	16	12	19	14	10	17	12	9	15	11	8
			Exposed	28	28	23	28	28	20	28	25	18	28	22	16	28	20	15	25	18	13	23	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	34	34	34	34	34	34	34	34	34	34	34	31	34	34	28	34	31	25	34	28	23	34	24	19	34	20	17	30	17	14	26	15	12	23	13	11	20	12	10
			Exposed	34	34	28	34	30	25	34	27	22	34	24	20	34	22	18	34	20	16	32	18	15	27	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	37	38	38	33	38	38	30	38	35	28	33	30	23	28	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	38	38	33	38	38	30	38	34	27	34	30	24	31	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	28	28	28	28	28	25	28	28	22	28	28	20	28	26	18	28	23	16	28	21	15	25	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	28	25	18	28	23	16	28	20	14	25	18	13	23	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	28	28	24	28	28	22	28	26	19	28	24	17	28	21	16	27	19	14	25	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	28	21	16	26	19	14	23	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	34	34	29	34	32	26	34	29	23	34	26	21	34	23	19	34	21	17	34	19	16	28	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	34	23	19	34	21	17	32	18	15	29	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	38	38	35	38	38	31	38	36	28	36	32	25	33	29	23	30	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	32	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	28	28	23	28	28	20	28	26	18	28	23	16	28	21	15	27	19	13	24	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	28	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	28	27	20	28	24	18	28	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	24	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	36	30	24	36	26	22	36	24	19	36	21	17	33	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	33	19	16	30	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	40	37	29	37	33	26	33	30	23	30	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	18	22	22	16	22	19	13	22	17	12	20	15	10	18	13	9
			Exposed	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	22	15	22	20	14	22	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	16	22	19	14	22	16	12	19	14	10	17	12	9	15	11	8
			Exposed	22	22	22	22	22	20	22	22	18	22	22	16	22	20	15	22	18	13	22	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	28	24	19	28	20	17	28	17	14	26	15	12	23	13	11	20	12	10
			Exposed	28	28	28	28	28	25	28	27	22	28	24	20	28	22	18	28	20	16	28	18	15	27	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	28	32	30	23	28	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	32	32	32	32	32	30	32	32	27	32	30	24	31	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	22	22	18	22	22	16	22	20	14	22	18	13	22	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	22	22	22	22	22	22	22	22	19	22	22	17	22	21	16	22	19	14	22	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	22	21	16	22	19	14	22	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	28	28	28	28	28	26	28	28	23	28	26	21	28	23	19	28	21	17	28	19	16	28	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	28	23	19	28	21	17	28	18	15	28	17	14	26	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	32	32	32	32	32	31	32	32	28	32	32	25	32	29	23	30	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	32	29	23	29	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	13	22	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	22	21	15	22	19	13	22	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	22	22	20	22	22	18	22	22	16	22	20	14	22	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	22	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	30	30	24	30	26	22	30	24	19	30	21	17	30	19	16	30	17	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	30	19	16	30	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	34	34	29	34	33	26	33	30	23	30	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
40	B	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	16	21	19	13	21	17	12	20	15	10	18	13	9
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	15	21	20	14	21	17	12	20	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	16	21	19	14	21	16	12	19	14	10	17	12	9	15	11	8
			Exposed	21	21	21	21	21	20	21	21	18	21	21	16	21	20	15	21	18	13	21	17	12	19	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	19	24	20	17	24	17	14	24	15	12	23	13	11	20	12	10
			Exposed	24	24	24	24	24	24	24	24	22	24	24	20	24	22	18	24	20	16	24	18	15	24	15	13	23	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	23	27	25	20	24	22	17	21	19	15	19	17	13	17	15	12
			Exposed	28	28	28	28	28	28	28	28	27	28	28	24	28	27	22	28	25	20	26	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	15	21	18	12	21	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	21	21	18	21	21	16	21	20	14	21	18	13	21	16	12	21	15	10	19	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	19	14	21	18	13	21	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	21	21	16	21	19	14	21	17	12	21	15	11	19	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	24	24	24	24	24	24	24	24	23	24	24	21	24	23	19	24	21	17	24	19	16	24	16	13	24	14	11	21	12	10	18	10	8	16	9	7	14	8	7
			Exposed	24	23	19	24	21	17	24	18	15	24	17	14	24	15	12	24	14	11	22	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	27	26	21	27	24	19	23	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	28	28	23	28	26	20	26	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	13	22	18	12	20	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	22	21	15	22	19	13	22	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	22	22	20	22	22	18	22	22	16	22	20	14	22	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	22	18	13	22	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	26	26	24	26	26	22	26	24	19	26	21	17	26	19	16	26	17	14	26	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	26	19	16	26	17	14	26	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	29	29	29	29	29	26	29	29	23	29	27	21	27	24	19	25	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
50	B	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	13	18	17	12	18	15	10	18	13	9
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	17	12	18	14	10	17	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	14	18	18	12	18	14	10	17	12	9	15	11	8	11	8	8
			Exposed	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	18	13	18	17	12	18	14	10	17	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	17	21	20	17	21	17	14	21	15	12	21	13	11	20	12	10
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	20	16	21	18	15	21	15	13	21	13	11	19	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	24	24	20	23	22	17	21	19	15	19	17	13	17	15	12
			Exposed	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	23	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	18	12	18	15	11	18	13	9	16	11	8	14	10	7	12	9	9
			Exposed	18	18	18	18	18	16	18	18	14	18	18	13	18	16	12	18	15	10	18	14	10	16	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	18	14	18	18	13	18	15	11	18	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	18	18	16	18	18	14	18	17	12	18	15	11	18	14	10	17	13	9	16	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	19	16	21	16	13	21	14	11	20	12	10	18	10	8	16	9	7	14	8	7
			Exposed	21	21	19	21	21	17	21	18	15	21	17	14	21	15	12	21	14	11	21	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	24	24	21	23	23	19	22	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	25	25	23	25	25	20	25	23	18	23	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	18	12	19	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	19	19	15	19	19	13	19	17	12	19	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	19	19	19	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	19	18	13	19	16	12	19	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	22	22	22	22	22	22	22	22	19	22	21	17	22	19	16	22	17	14	22	16	13	22	13	11	20	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	22	19	16	22	17	14	22	15	13	22	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	26	26	26	26	26	26	26	26	23	26	26	21	25	24	19	24	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	26	24	19	24	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	15	10	15	13	9
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	10	15	12	9	15	11	7	13	9	7	12	8	9
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	10	15	12	9	15	11	8
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	14	10	15	12	9	14	10	8	12	9	7	11	8	9	10	7	8
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	17	14	18	15	12	18	13	11	18	12	10	18	12	10
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	15	13	18	13	11	18	11	9	17	10	8	15	9	7	13	8	10
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	20	20	20	17	20	19	15	19	17	13	17	15	12
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	21	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	15	15	11	15	13	9	15	11	8	14	10	7	12	9	9
			Exposed	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	10	15	14	10	15	11	8	14	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	11	15	13	9	15	11	8	13	10	7	12	8	9	10	7	8
			Exposed	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	13	9	15	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	16	13	18	14	11	18	12	10	17	10	8	16	9	7	14	8	7
			Exposed	18	18	18	18	18	17	18	18	15	18	17	14	18	15	12	18	14	11	18	12	10	18	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21	19	20	20	16	19	17	14	17	15	12	15	13	10	13	11	9	11	10	8
			Exposed	22	22	22	22	22	20	22	22	18	22	21	16	21	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	16	12	16	15	10	16	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	16	16	15	16	16	13	16	16	12	16	15	11	16	14	10	16	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	12	17	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	17	17	13	17	16	12	17	14	10	17	13	9	16	11	8	14	10	8	13	9	7	11	8	9	9	7	8	7	8	6	9	7	5	8	6	4			
		20-27	Interior	20	20	20	20	20	20	20	20	19	20	20	17	20	19	16	20	17	14	20	16	13	20	13	11	19	11	9	17	10	8	15	9	7	13	8	9	12	7	8
			Exposed	20	19	16	20	17	14	20	15	13	20	14	11	20	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	21	22	22	19	22	22	17	21	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	23	23	19	23	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
70	B	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	13	9
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	13	9	13	11	7	13	9	7	12	8	9
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	11	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	10	8	12	9	7	11	8	9
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	15	12	16	13	11	16	12	10
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	15	13	16	13	11	16	11	9	16	10	8	15	9	7	13	8	10
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	19	19	17	18	18	15	17	17	13	16	15	12
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	19	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	9	13	11	8	13	10	7	12	9	9
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	13	11	13	11	8	13	10	7	12	8	9	10	7	8	9	6	7	8	9	6
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	9	13	11	8	13	10	7	12	8	9	10	7	8
			Exposed	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	13	9	13	11	8	13	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	11	16	12	10	15	10	8	15	9	7	14	8	7
			Exposed	16	16	16	16	16	16	16	16	15	16	16	14	16	15	12	16	14	11	16	12	10	16	10	9	15	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	18	19	18	16	17	17	14	16	15	12	15	13	10	13	11	9	11	10	8
			Exposed	20	20	16	20	20	16	20	20	16	20	20	16	20	19	15	19	17	14	18	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	10	14	13	9	14	11	8	13	9	7	11	8	9	10	7	8
			Exposed	14	14	14	14	14	13	14	14	12	14	14	11	14	14	10	14	12	9	14	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	12	9	14	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	14	14	13	14	14	12	14	14	10	14	13	9	14	11	8	13	10	8	13	9	7	11	8	9	9	7	8	7	8	6	9	7	5	8	6	4			
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	17	14	18	16	13	18	13	11	17	11	9	16	10	8	15	9	7	13	8	9	12	7	8
			Exposed	18	18	16	18	17	14	18	15	13	18	14	11	18	12	10	18	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	21	21	21	21	21	21	21	21	21	21	21	21	20	20	19	20	20	17	19	19	16	18	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	21	21	19	21	21	17	21	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
80	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	7	11	9	7	11	8	9
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	9	7	11	8	9	10	7	8
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	13	11	14	12	10
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	13	11	14	11	9	14	10	8	14	9	7	13	8	10
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	16	16	15	16	16	13	15	15	12
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	16	13	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	10	7	11	9	9
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	7	11	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	9	12	11	8	12	9	7	11	8	9	10	7	8
			Exposed	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	9	13	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	13	13	13	13	13	12	13	13	10	13	13	9	13	13	8	13	10	8	13	9	7	11	8	9	9	7	8	7	8	6	9	7	5	8	6	4			
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	13	16	13	11	15	11	9	15	10	8	14	9	7	13	8	9	12	7	8
			Exposed	16	16	16	16	16	14	16	15	13	16	14	11	16	12	10	16	11	9	16	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	18	17	18	18	16	17	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	19	19	19	19	19	17	19	19	15	19	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	7	10	9	7	10	8	9
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	8	9	10	7	8
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	10
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	11	9	13	10	8	13	9	7	13	8	10
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	13	14	14	12
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	16	16	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	9	9
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	7	10	8	8	10	7	7	10	8	6	7	7	6
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	8	9	10	7	8
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	8	9	10	7	8	9	9	7	7	8	6	7	7	5
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	12	10	13	10	8	12	9	7	12	8	7
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	10	13	10	9	13	9	7	13	8	10	12	7	8	10	9	7	9	8	7
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	14	14	14	12	13	13	10	13	11	9	11	10	8
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	16	12	15	13	10	13	11	9	11	10	8	9	8	7	8	7	9	7	7	8
	D	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	9	7	11	8	9	10	7	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	9	7	11	8	9	10	7	8	8	9	7
			Exposed	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	8	11	9	7	11	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	13	11	14	11	9	14	10	8	13	9	7	13	8	9	12	7	8
			Exposed	14	14	14	14	14	14	14	14	13	14	14	11	14	12	10	14	11	9	14	10	8	14	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	17	17	17	16	16	16	16	16	13	15	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	18	18	18	18	18	17	18	18	15	18	17	14	17	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7
100	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	7	9	8	9
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	9	9	7	8
		20-27	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	10	8	11	9	7	11	8	10
		27-45	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	13	13	12
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	13	14	14	11	14	12	10	12	11	9	11	10	8
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	9	9	9	9
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	9	9	7	8	9	9	7	7	8	6	7	7	5
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	9	9	7	8
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8
		20-27	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	10	8	11	9	7	11	8	10
		27-45	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	13	13	12
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	13	14	14	11	14	12	10	12	11	9	11	10	8
	D	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	8	9	10	7	8
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	8	9	10	7	8	8	9	7
			Exposed	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	8	10	9	7	10	8	9	9	7	8	8	9	7	7	8	6	9	7	5	8	6	4
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	11	9	13	10	8	12	9	7	12	8	9	11	7	8
			Exposed	13	13	13	13	13	13	13	13	13	13	11	13	12	10	13	11	9	13	10	8	13	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	13	14	14	11	13	12	10	12	11	9	11	10	7	9	8	7
			Exposed	16	16	16	16	16	16	16	16	15	16	16	14	16	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	10	8	7	8	7	9	7	9	8	7

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	78	78	78	78	78	61	78	78	55	78	78	49	78	64	44	78	58	40	78	53	37	62	44	31	52	38	26	45	32	23	39	28	20	34	25	17	30	22	15
			Exposed	78	64	44	78	56	39	78	50	35	63	45	32	57	41	29	52	37	26	47	34	24	39	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	78	78	60	78	78	53	78	69	48	78	59	43	78	53	39	78	48	35	61	44	32	51	37	27	44	31	23	37	27	20	33	24	17	29	21	15	25	18	14
			Exposed	78	53	39	67	47	34	58	42	31	52	38	28	47	34	25	43	31	23	39	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	79	79	79	79	79	65	79	79	58	79	64	52	79	58	47	79	52	43	79	48	39	79	40	33	59	34	28	51	29	24	44	26	21	39	23	19	34	20	16
			Exposed	79	57	47	79	51	42	79	45	37	79	41	34	65	37	30	59	34	28	53	31	25	45	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	80	80	80	80	80	80	80	80	80	80	80	62	80	80	56	80	65	51	80	59	47	56	50	39	48	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	80	80	56	80	64	50	64	57	45	57	51	40	52	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	78	71	47	78	60	42	78	53	37	70	48	33	60	43	30	55	39	27	50	36	25	42	30	21	36	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	60	43	30	53	38	27	48	34	24	43	31	22	39	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	~~11~~
		7-20	Interior	78	56	41	78	50	36	62	45	33	56	40	29	50	36	27	46	33	24	41	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	50	36	26	44	32	24	40	29	21	36	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	~~10~~	11	13	9
		20-27	Interior	79	61	50	79	54	44	79	48	40	79	43	36	79	39	32	62	36	29	57	33	27	47	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	79	39	32	61	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	80	80	59	80	75	53	80	60	47	61	54	43	55	49	39	50	45	35	46	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	55	49	38	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	78	55	39	76	49	34	61	44	31	55	40	28	50	36	25	45	32	23	41	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	49	36	25	44	32	22	39	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	~~10~~	11	12	9
		7-20	Interior	64	46	34	57	41	30	51	37	27	46	33	24	41	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	41	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	~~10~~	16	12	9	14	~~10~~	8
		20-27	Interior	79	50	41	79	45	37	79	40	33	63	36	30	56	32	27	51	30	24	47	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	56	32	27	50	29	24	45	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	~~11~~	13	11	9
		27-45	Interior	80	63	49	63	56	44	56	50	39	50	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
10	B	0-7	Interior	63	63	63	63	63	61	63	63	55	63	63	49	63	63	44	63	58	40	63	53	37	62	44	31	52	38	26	45	32	23	39	28	20	34	25	17	30	22	15
			Exposed	63	63	44	63	56	39	63	50	35	63	45	32	57	41	29	52	37	26	47	34	24	39	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	64	64	60	64	64	53	64	64	48	64	59	43	64	53	39	64	48	35	61	44	32	51	37	27	44	31	23	37	27	20	33	24	17	29	21	15	25	18	14
			Exposed	64	53	39	64	47	34	58	42	31	52	38	28	47	34	25	43	31	23	39	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	73	73	73	73	73	65	73	73	58	73	64	52	73	58	47	73	52	43	73	48	39	73	40	33	59	34	28	51	29	24	44	26	21	39	23	19	34	20	16
			Exposed	73	57	47	73	51	42	73	45	37	73	41	34	65	37	30	59	34	28	53	31	25	45	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	62	78	78	56	78	65	51	78	59	47	56	50	39	48	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	78	78	56	78	64	50	64	57	45	57	51	40	52	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	63	63	47	63	60	42	63	53	37	63	48	33	60	43	30	55	39	27	50	36	25	42	30	21	36	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	60	43	30	53	38	27	48	34	24	43	31	22	39	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	~~11~~
		7-20	Interior	64	56	41	64	50	36	62	45	33	56	40	29	50	36	27	46	33	24	41	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	50	36	26	44	32	24	40	29	21	36	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	~~10~~	11	13	9
		20-27	Interior	73	61	50	73	54	44	73	48	40	73	43	36	73	39	32	62	36	29	57	33	27	47	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	73	39	32	61	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	78	78	59	78	75	53	78	60	47	61	54	43	55	49	39	50	45	35	46	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	55	49	38	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	63	55	39	63	49	34	61	44	31	55	40	28	50	36	25	45	32	23	41	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	49	36	25	44	32	22	39	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	~~10~~	11	12	9
		7-20	Interior	64	46	34	57	41	30	51	37	27	46	33	24	41	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	41	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	~~10~~	16	12	9	14	~~10~~	8
		20-27	Interior	75	50	41	75	45	37	75	40	33	63	36	30	56	32	27	51	30	24	47	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	56	32	27	50	29	24	45	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	~~11~~	13	11	9
		27-45	Interior	80	63	49	63	56	44	56	50	39	50	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
20	B	0-7	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	40	47	47	37	47	44	31	47	38	26	45	32	23	39	28	20	34	25	17	30	22	15
			Exposed	47	47	44	47	47	39	47	47	35	47	45	32	47	41	29	47	37	26	47	34	24	39	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	47	47	47	47	47	47	47	47	47	47	47	43	47	47	39	47	47	35	47	44	32	47	37	27	44	31	23	37	27	20	33	24	17	29	21	15	25	18	14
			Exposed	47	47	39	47	47	34	47	42	31	47	38	28	47	34	25	43	31	23	39	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	57	57	57	57	57	57	57	57	57	57	57	52	57	57	47	57	52	43	57	48	39	57	40	33	57	34	28	51	29	24	44	26	21	39	23	19	34	20	16
			Exposed	57	57	47	57	51	42	57	45	37	57	41	34	57	37	30	57	34	28	53	31	25	45	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	64	64	64	64	64	64	64	64	64	64	64	62	64	64	56	64	64	51	64	59	47	56	50	39	48	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	64	64	56	64	64	50	64	57	45	57	51	40	52	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	47	47	47	47	47	42	47	47	37	47	47	33	47	43	30	47	39	27	47	36	25	42	30	21	36	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	47	43	30	47	38	27	47	34	24	43	31	22	39	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	~~11~~
		7-20	Interior	47	47	41	47	47	36	47	45	33	47	40	29	47	36	27	46	33	24	41	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	47	36	26	44	32	24	40	29	21	36	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	~~10~~	11	13	9
		20-27	Interior	57	57	50	57	54	44	57	48	40	57	43	36	57	39	32	57	36	29	57	33	27	47	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	57	39	32	57	35	29	54	31	26	49	28	23	44	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	64	64	59	64	64	53	64	60	47	61	54	43	55	49	39	50	45	35	46	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	55	49	38	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	47	47	39	47	47	34	47	44	31	47	40	28	47	36	25	45	32	23	41	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	47	36	25	44	32	22	39	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	~~10~~	11	12	9
		7-20	Interior	47	46	34	47	41	30	47	37	27	46	33	24	41	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	41	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	~~10~~	16	12	9	14	~~10~~	8
		20-27	Interior	60	50	41	60	45	37	60	40	33	60	36	30	56	32	27	51	30	24	47	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	56	32	27	50	29	24	45	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	~~11~~	13	11	9
		27-45	Interior	66	63	49	63	56	44	56	50	39	50	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	31	37	37	26	37	32	23	37	28	20	34	25	17	30	22	15
			Exposed	37	37	37	37	37	37	37	37	35	37	37	32	37	37	29	37	37	26	37	34	24	37	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	32	38	37	27	38	31	23	37	27	20	33	24	17	29	21	15	25	18	14
			Exposed	38	38	38	38	38	34	38	38	31	38	38	28	38	34	25	38	31	23	38	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	43	47	47	39	47	40	33	47	34	28	47	29	24	44	26	21	39	23	19	34	20	16
			Exposed	47	47	47	47	47	42	47	45	37	47	41	34	47	37	30	47	34	28	47	31	25	45	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	51	54	54	47	54	50	39	48	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	54	54	54	54	54	50	54	54	45	54	51	40	52	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	33	37	37	30	37	37	27	37	36	25	37	30	21	36	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	37	37	30	37	37	27	37	34	24	37	31	22	37	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	38	38	38	38	38	36	38	38	33	38	38	29	38	36	27	38	33	24	38	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	38	36	26	38	32	24	38	29	21	36	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	47	47	47	47	47	44	47	47	40	47	43	36	47	39	32	47	36	29	47	33	27	47	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	47	39	32	47	35	29	47	31	26	47	28	23	44	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	54	54	54	54	54	53	54	54	47	54	54	43	54	49	39	50	45	35	46	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	54	49	38	49	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	37	37	37	37	37	34	37	37	31	37	37	28	37	36	25	37	32	23	37	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	37	36	25	37	32	22	37	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	38	38	34	38	38	30	38	37	27	38	33	24	38	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	38	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	10	16	12	12	13	10	16	12	9	14	10	8
		20-27	Interior	50	50	41	50	45	37	50	40	33	50	36	30	50	32	27	50	30	24	47	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	50	32	27	50	29	24	45	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	57	57	49	57	56	44	56	50	39	50	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
40	B	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	35	35	26	35	32	23	35	28	20	34	25	17	30	22	15			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	32	35	35	29	35	35	26	35	34	24	35	28	20	34	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	27	35	31	23	35	27	20	33	24	17	29	21	15	25	18	14
			Exposed	35	35	35	35	35	34	35	35	31	35	35	28	35	34	25	35	31	23	35	28	21	33	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	40	40	33	40	34	28	40	29	24	40	26	21	39	23	19	34	20	16
			Exposed	40	40	40	40	40	40	40	40	37	40	40	34	40	37	30	40	34	28	40	31	25	40	26	21	38	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	39	45	43	34	41	37	29	36	32	25	32	28	22	28	25	20
			Exposed	47	47	47	47	47	47	47	47	45	47	47	40	47	46	37	47	42	33	43	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	35	27	35	35	25	35	30	21	35	26	18	31	22	16	27	19	14	23	17	12	21	15	16
			Exposed	35	35	30	35	35	27	35	34	24	35	31	22	35	28	20	35	25	18	32	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	35	35	35	35	35	35	35	35	33	35	35	29	35	35	27	35	33	24	35	30	22	35	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	35	35	26	35	32	24	35	29	21	35	26	19	32	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	36	40	39	32	40	36	29	40	33	27	40	27	23	40	23	19	35	20	17	30	18	15	27	16	13	24	14	11
			Exposed	40	39	32	40	35	29	40	31	26	40	28	23	40	25	21	40	23	19	36	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	43	47	47	39	46	45	35	44	41	32	38	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	47	47	38	47	44	34	44	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	37	37	37	37	37	34	37	37	31	37	37	28	37	36	25	37	32	23	37	30	21	35	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	37	36	25	37	32	22	37	28	20	35	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	38	38	34	38	38	30	38	37	27	38	33	24	38	30	22	38	27	20	34	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	38	30	22	37	27	20	33	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	10	16	12	12	13	10	16	12	9	14	10	8
		20-27	Interior	43	43	41	43	43	37	43	40	33	43	36	30	43	32	27	43	30	24	43	27	22	39	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	43	32	27	43	29	24	43	26	21	40	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	49	49	49	49	49	44	49	49	39	49	45	35	46	41	32	41	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	45	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
50	B	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	26	30	30	23	30	28	20	30	25	17	30	22	15			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	30	24	30	28	20	30	24	17	29	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	23	30	27	20	30	24	17	29	21	15	25	18	14			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	28	30	30	25	30	30	23	30	28	21	30	24	18	28	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	28	35	34	23	19	33	20									
			Exposed	35	35	35	35	35	35	35	35	35	35	35	34	35	35	30	35	34	28	35	31	25	35	26	21	35	22	18	33	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39	40	40	34	38	37	29	36	32	25	32	28	22	28	25	20
			Exposed	41	41	41	41	41	41	41	41	41	41	41	40	41	41	37	41	41	33	41	38	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	25	30	30	21	30	26	18	30	22	16	27	19	14	23	17	12	21	15	16
			Exposed	30	30	30	30	30	27	30	30	24	30	30	22	30	28	20	30	25	18	30	23	16	27	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	29	30	30	27	30	30	24	30	30	22	30	25	19	30	22	16	26	19	14	22	16	12	20	14	16	17	13	14
			Exposed	30	30	26	30	30	24	30	29	21	30	26	19	30	23	17	29	21	16	27	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	29	35	33	27	35	27	23	35	23	19	33	20	17	30	18	15	27	16	13	24	14	11
			Exposed	35	35	32	35	35	29	35	31	26	35	28	23	35	25	21	35	23	19	35	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	39	41	41	35	39	39	32	37	34	27	33	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	41	41	38	41	41	34	41	39	31	39	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	32	32	32	32	32	32	32	32	31	32	32	28	32	32	25	32	32	23	32	30	21	32	25	18	29	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	32	32	25	32	32	22	32	28	20	32	26	18	32	23	16	29	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	32	32	32	32	32	30	32	32	27	32	32	24	32	30	22	32	27	20	32	25	18	29	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	32	30	22	32	27	20	32	24	18	30	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	10	16	12	12	13	10	16	12	9	14	10	8
		20-27	Interior	38	38	38	38	38	37	38	38	33	38	36	30	38	32	27	38	30	24	38	27	22	37	23	19	33	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	38	32	27	38	29	24	38	26	21	38	23	19	36	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	44	44	44	44	44	44	44	44	39	43	43	35	42	41	32	40	37	29	38	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	44	41	32	40	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	25	17	25	22	15
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	20	25	24	17	25	21	15	25	18	13	22	16	11	20	14	15
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	23	25	25	20	25	24	17	25	21	15	25	18	14
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	21	25	24	18	25	20	15	24	18	13	21	15	11	19	14	15	16	12	13
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	28	31	29	24	31	26	21	31	23	19	30	20	16
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	28	31	31	25	31	26	21	31	22	18	31	19	16	29	17	14	25	15	12	22	13	16
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	36	34	34	34	29	33	32	25	31	28	22	28	25	20
			Exposed	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	33	37	37	30	36	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	25	18	25	22	16	25	19	14	23	17	12	21	15	16
			Exposed	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	25	18	25	23	16	25	20	14	23	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	19	25	22	16	25	19	14	22	16	12	20	14	16	17	13	14
			Exposed	25	25	25	25	25	24	25	25	21	25	25	19	25	23	17	25	21	16	25	20	14	23	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31	31	27	31	27	23	31	23	19	30	20	17	29	18	15	27	16	13	24	14	11
			Exposed	31	31	31	31	31	29	31	31	26	31	28	23	31	25	21	31	23	19	31	21	17	31	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	36	35	35	35	32	34	34	27	32	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	37	37	37	37	37	34	37	37	31	37	35	28	36	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	23	28	28	21	28	25	18	28	21	15	25	18	13	22	16	11	19	14	15	17	13	13
			Exposed	28	28	25	28	28	22	28	28	20	28	26	18	28	23	16	28	21	15	27	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	28	28	28	28	28	28	28	28	27	28	28	24	28	28	22	28	27	20	28	25	18	28	21	15	25	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	28	28	22	28	27	20	28	24	18	28	22	16	27	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	30	33	32	27	33	30	24	33	27	22	33	23	19	32	19	16	29	17	14	25	15	12	22	13	16	20	11	14
			Exposed	33	32	27	33	29	24	33	26	21	33	23	19	33	21	17	33	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	35	38	38	32	37	37	29	35	34	27	32	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	39	39	32	39	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
70	B	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	22	15
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	15	22	18	13	22	16	11	20	14	15
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	15	22	18	14
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	20	15	22	18	13	21	15	11	19	14	15	16	12	13
		20-27	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	24	27	26	21	27	23	19	27	20	16
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	26	21	27	22	18	27	19	16	27	17	14	25	15	12	22	13	16
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	31	31	29	30	30	25	29	28	22	28	25	20
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	32	26	31	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	22	16	22	19	14	22	17	12	21	15	16
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	20	14	22	17	12	20	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	19	22	22	16	22	19	14	22	16	12	20	14	16	17	13	14
			Exposed	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	21	16	22	20	14	22	16	12	19	14	16	17	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	23	27	27	19	27	20	17	26	18	15	25	16	13	24	14	11
			Exposed	27	27	27	27	27	27	27	27	26	27	27	23	27	25	21	27	23	19	27	21	17	27	18	15	26	15	13	23	13	11	20	11	14	17	15	13	15	14	11
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	31	31	27	29	29	23	28	25	20	25	22	18	22	20	15	19	17	14
			Exposed	33	33	33	33	33	33	33	33	31	33	33	28	33	32	25	32	29	23	30	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	24	18	24	21	15	24	18	13	22	16	11	19	14	15	17	13	13
			Exposed	24	24	24	24	24	22	24	24	20	24	24	18	24	23	16	24	21	15	24	19	14	22	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	21	15	24	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	24	24	22	24	24	20	24	24	18	24	22	16	24	19	14	24	18	13	22	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	24	30	27	22	30	23	19	29	19	16	27	17	14	25	15	12	22	13	16	20	11	14
			Exposed	30	30	27	30	29	24	30	26	21	30	23	19	30	21	17	30	19	16	30	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	36	36	36	36	36	36	36	36	36	35	35	35	34	34	32	33	33	29	32	32	27	31	29	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	36	36	32	36	36	29	36	32	26	33	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
80	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	13	19	16	11	19	14	15
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	14
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	15	11	19	14	15	16	12	13
		20-27	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	24	24	24	24	24	24	24	21	24	23	19	24	20	16
			Exposed	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	22	18	24	19	16	24	17	14	24	15	12	22	13	16
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	25	27	27	22	26	25	20
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	26	30	28	22	27	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	14	19	17	12	19	15	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	13	19	16	11	19	14	15
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	14
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	15	11	19	14	15	16	12	13
		20-27	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	24	24	24	24	24	24	24	21	24	23	19	24	20	16
			Exposed	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	22	18	24	19	16	24	17	14	24	15	12	22	13	16
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	25	27	27	22	26	25	20
			Exposed	30	30	30	30	30	30	30	30	30	30	30	28	30	30	25	30	29	23	29	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	21	15	21	18	13	21	16	11	19	14	15	17	13	13
			Exposed	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	15	21	19	14	21	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	15	21	18	13	21	16	11	19	14	15	16	12	13	14	16	12
			Exposed	21	21	21	21	21	20	21	21	18	21	21	16	21	21	15	21	19	14	21	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	22	26	23	19	26	19	16	25	17	14	24	15	12	22	13	16	20	11	14
			Exposed	26	26	26	26	26	24	26	26	21	26	23	19	26	21	17	26	19	16	26	18	14	25	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	31	31	29	30	30	27	28	28	23	27	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	33	33	32	33	33	29	33	32	26	32	29	23	30	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	11	17	14	15
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	11	17	14	15	16	12	13
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	20	16			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	16	21	17	14	21	15	12	21	13	16
		27-45	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	26	26	26	26	26	25	25	25	22	24	24	20
			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	22	26	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	12	17	15	16
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	12	17	14	15	17	13	14	15	11	12	13	15	11
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	16	12	17	14	16	17	13	14
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	16	12	17	14	16	17	12	14	15	16	12	13	14	10	11	13	9			
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	20	17	21	18	15	21	16	13	20	14	11
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	18	15	21	15	13	21	13	11	20	11	14	17	15	13	15	14	11			
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	25	25	23	24	24	20	23	22	18	22	20	15	19	17	14
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	23	27	27	21	25	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	16	11	19	14	15	17	13	13
			Exposed	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	14	19	16	11	19	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	16	11	19	14	15	16	12	13	14	16	12
			Exposed	19	19	19	19	19	19	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	23	19	24	19	16	23	17	14	22	15	12	22	13	16	20	11	14
			Exposed	24	24	24	24	24	24	24	24	21	24	23	19	24	21	17	24	19	16	24	18	14	24	15	12	22	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	28	28	28	27	26	26	23	25	24	19	24	21	17	21	18	15	18	16	13	16	14	11
			Exposed	30	30	30	30	30	29	30	30	26	30	29	23	29	26	21	27	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11
100	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	15
		7-20	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	16	16	16	14
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	15	11	16	14	15	16	12	13
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	17	14	19	15	12	19	13	16
		27-45	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	24	24	24	24	24	24	24	24	23	23	22	22	22	20
			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	24	22	24	24	19	23	21	17	21	18	15	18	16	13
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	16
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	15	14	15	15	13	14	15	11	12	13	15	11
		7-20	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	12	16	14	16	16	13	14
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	12	16	14	16	16	12	14	15	16	12	13	14	10	11	13	9
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	18	15	19	16	13	19	14	11
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	18	15	19	15	13	19	14	11	15	13	15
		27-45	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	24	23	23	23	22	22	20	21	21	18	21	20	15	19
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	22	18	21	19	15	19	17	13	16	14	11	14	13	15	13	11	14
	D	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	11	17	14	15	17	13	13
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	14	17	16	11	17	14	15	17	12	13	14	16	11	13	14	10	11	12	9
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	11	17	14	15	16	12	13	14	16	12
			Exposed	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	17	12	17	14	15	16	12	13	14	15	11	12	13	10	16	12	9	14	10	8
		20-27	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	19	16	21	17	14	21	15	12	20	13	16	19	11	14
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	17	21	21	18	21	21	15	21	13	16	19	11	14	16	15	12	14	13	11	13	11	9
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	26	25	25	23	24	24	19	22	21	17	21	18	15	18	16	13	16	14	11
			Exposed	27	27	27	27	27	27	27	27	26	27	27	23	27	26	21	26	24	19	25	22	17	21	19	15	18	16	13	15	14	11	13	12	14	12	16	13	16	14	11

#N/A

* 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.

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UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	39	39	34	39	39	30	39	39	27	39	35	24	39	32	22	39	29	20	37	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	8	15	11	7
			Exposed	39	31	22	39	28	19	35	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	39	39	30	39	37	26	39	33	24	39	29	21	38	26	19	33	24	17	30	22	16	25	18	13	21	15	11	18	13	10	16	12	8	14	10	7	12	9	7
			Exposed	38	26	19	32	23	17	29	21	15	26	19	14	23	17	12	21	15	11	19	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	40	40	37	40	40	32	40	35	29	40	32	26	40	28	23	40	26	21	40	23	19	35	20	16	29	17	14	25	14	12	22	13	10	19	11	9	17	10	8
			Exposed	40	28	23	40	25	21	40	22	18	36	20	17	32	18	15	29	17	14	26	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	40	40	40	40	40	40	40	40	34	40	40	31	40	36	28	37	32	25	33	29	23	28	25	19	24	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	40	36	28	35	32	25	32	28	22	28	25	20	26	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	39	33	23	39	30	20	38	26	18	33	24	16	30	21	15	27	19	14	25	18	12	21	15	10	18	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	30	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	7	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	39	28	20	34	25	18	31	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	25	18	13	22	16	12	20	14	10	18	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	40	30	25	40	27	22	40	24	20	39	21	18	34	19	16	31	18	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	34	19	16	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	40	39	29	39	33	26	34	30	23	30	27	21	27	24	19	25	22	17	23	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	39	27	19	34	24	17	30	22	15	27	20	14	25	18	12	22	16	11	20	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	24	18	12	22	16	11	19	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	32	23	17	28	20	15	25	18	13	23	16	12	20	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	20	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	40	25	20	40	22	18	35	20	16	31	18	15	28	16	13	25	15	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	28	16	13	25	14	12	22	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	35	31	24	31	28	22	28	25	19	25	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
10	B	0-7	Interior	32	32	32	32	32	30	32	32	27	32	32	24	32	32	22	32	29	20	32	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	8	15	11	7
			Exposed	32	31	22	32	28	19	32	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	32	32	30	32	32	26	32	32	24	32	29	21	32	26	19	32	24	17	30	22	16	25	18	13	21	15	11	18	13	10	16	12	8	14	10	7	12	9	7
			Exposed	32	26	19	32	23	17	29	21	15	26	19	14	23	17	12	21	15	11	19	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	36	36	36	36	36	32	36	35	29	36	32	26	36	28	23	36	26	21	36	23	19	35	20	16	29	17	14	25	14	12	22	13	10	19	11	9	17	10	8
			Exposed	36	28	23	36	25	21	36	22	18	36	20	17	32	18	15	29	17	14	26	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	39	39	39	39	39	39	39	39	34	39	39	31	39	36	28	37	32	25	33	29	23	28	25	19	24	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	39	36	28	35	32	25	32	28	22	28	25	20	26	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	32	32	23	32	30	20	32	26	18	32	24	16	30	21	15	27	19	14	25	18	12	21	15	10	18	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	30	21	15	26	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	32	28	20	32	25	18	31	22	16	27	20	14	25	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	25	18	13	22	16	12	20	14	10	18	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	36	30	25	36	27	22	36	24	20	36	21	18	34	19	16	31	18	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	34	19	16	30	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	39	39	29	39	33	26	34	30	23	30	27	21	27	24	19	25	22	17	23	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	32	27	19	32	24	17	30	22	15	27	20	14	25	18	12	22	16	11	20	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	24	18	12	22	16	11	19	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	32	23	17	28	20	15	25	18	13	23	16	12	20	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	20	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	37	25	20	37	22	18	35	20	16	31	18	15	28	16	13	25	15	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	28	16	13	25	14	12	22	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	35	31	24	31	28	22	28	25	19	25	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
20	B	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	18	23	22	15	23	19	13	22	16	11	19	14	10	17	12	8	15	11	7
			Exposed	23	23	22	23	23	19	23	23	17	23	22	16	23	20	14	23	18	13	23	17	12	19	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	21	24	24	19	24	24	17	24	22	16	24	18	13	21	15	11	18	13	10	16	12	8	14	10	7	12	9	7
			Exposed	24	24	19	24	23	17	24	21	15	24	19	14	23	17	12	21	15	11	19	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	26	29	28	23	29	26	21	29	23	19	29	20	16	29	17	14	25	14	12	22	13	10	19	11	9	17	10	8
			Exposed	29	28	23	29	25	21	29	22	18	29	20	17	29	18	15	29	17	14	26	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	31	32	32	28	32	32	25	32	29	23	28	25	19	24	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	32	32	28	32	32	25	32	28	22	28	25	20	26	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	23	23	23	23	23	20	23	23	18	23	23	16	23	21	15	23	19	14	23	18	12	21	15	10	18	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	23	21	15	23	19	13	23	17	12	21	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	24	24	20	24	24	18	24	22	16	24	20	14	24	18	13	22	16	12	20	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	24	18	13	22	16	12	20	14	10	18	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	29	29	25	29	27	22	29	24	20	29	21	18	29	19	16	29	18	14	28	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	29	19	16	29	17	14	27	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	32	32	29	32	32	26	32	30	23	30	27	21	27	24	19	25	22	17	23	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	23	23	19	23	23	17	23	22	15	23	20	14	23	18	12	22	16	11	20	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	23	18	12	22	16	11	19	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	24	23	17	24	20	15	24	18	13	23	16	12	20	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	20	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	30	25	20	30	22	18	30	20	16	30	18	15	28	16	13	25	15	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	28	16	13	25	14	12	22	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	33	31	24	31	28	22	28	25	19	25	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5

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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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				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
30	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	19	13	19	16	11	19	14	10	17	12	8	15	11	7
			Exposed	19	19	19	19	19	19	19	19	17	19	19	16	19	19	14	19	18	13	19	17	12	19	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	16	19	18	13	19	15	11	18	13	10	16	12	8	14	10	7	12	9	7
			Exposed	19	19	19	19	19	17	19	19	15	19	19	14	19	17	12	19	15	11	19	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	21	24	23	19	24	20	16	24	17	14	24	14	12	22	13	10	19	11	9	17	10	8
			Exposed	24	24	23	24	24	21	24	22	18	24	20	17	24	18	15	24	17	14	24	15	12	22	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	23	27	25	19	24	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	27	27	27	27	27	25	27	27	22	27	25	20	26	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	14	19	18	12	19	15	10	18	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	19	19	15	19	19	13	19	17	12	19	15	11	19	14	10	17	12	9	16	11	8	13	10	7	11	8	6	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	19	19	19	19	19	18	19	19	16	19	19	14	19	18	13	19	16	12	19	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	19	18	13	19	16	12	19	14	10	18	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	24	24	24	24	24	22	24	24	20	24	21	18	24	19	16	24	18	14	24	16	13	23	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	24	19	16	24	17	14	24	15	13	24	14	11	22	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	27	27	27	27	27	26	27	27	23	27	27	21	27	24	19	25	22	17	23	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	27	24	19	24	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	19	19	19	19	19	17	19	19	15	19	19	14	19	18	12	19	16	11	19	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	19	18	12	19	16	11	19	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	19	19	17	19	19	15	19	18	13	19	16	12	19	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	19	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	25	25	20	25	22	18	25	20	16	25	18	15	25	16	13	25	15	12	23	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	25	16	13	25	14	12	22	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	28	28	24	28	28	22	28	25	19	25	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
40	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	11	17	14	10	17	12	8	14	10	7	15	11	7
			Exposed	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	17	12	17	14	10	17	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	13	17	15	11	17	13	10	16	12	8	14	10	7	12	9	7
			Exposed	17	17	17	17	17	17	17	17	15	17	17	14	17	17	12	17	15	11	17	14	10	16	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	16	20	17	14	20	14	12	20	13	10	19	11	9	17	10	8
			Exposed	20	20	20	20	20	20	20	20	18	20	20	17	20	18	15	20	17	14	20	15	12	20	13	10	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	19	23	21	17	20	18	14	18	16	12	16	14	11	14	12	10
			Exposed	23	23	23	23	23	23	23	23	22	23	23	20	23	23	18	23	21	16	21	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	14	17	17	12	17	15	10	17	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	17	17	15	17	17	13	17	17	12	17	15	11	17	14	10	17	12	9	16	11	8	13	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	12	17	15	11	17	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	17	17	13	17	16	12	17	14	10	17	13	9	16	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	18	20	19	16	20	18	14	20	16	13	20	13	11	20	11	9	17	10	8	15	9	7	13	8	6	12	7	8
			Exposed	20	19	16	20	17	14	20	15	13	20	14	11	20	12	10	20	11	9	18	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	23	23	19	23	22	17	22	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	18	18	18	18	18	17	18	18	15	18	18	14	18	18	12	18	16	11	18	15	10	17	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	18	18	12	18	16	11	18	14	10	17	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	19	19	17	19	19	15	19	18	13	19	16	12	19	15	11	19	13	10	17	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	19	15	11	18	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	21	21	20	21	21	18	21	20	16	21	18	15	21	16	13	21	15	12	21	13	11	19	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	21	16	13	21	14	12	21	13	10	20	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	25	25	24	25	25	22	25	25	19	24	22	17	23	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
50	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	10	15	12	8	14	10	7	12	8	7	11	7	7
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	14	10	15	12	8	14	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	11	15	13	10	15	12	8	14	10	7	12	9	7	11	7	7
			Exposed	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	12	9	14	10	7	12	9	6	10	7	8	9	7	7	8	9	7	8	9	7
		20-27	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	14	12	17	13	10	17	11	9	17	10	8	12	8	8
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	15	12	17	13	10	17	11	9	16	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	19	18	14	18	16	12	16	14	11	14	12	10
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	19	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	10	15	13	9	15	11	8	13	9	7	11	8	9	10	7	8
			Exposed	15	15	15	15	15	13	15	15	12	15	15	11	15	14	10	15	12	9	15	11	8	13	10	7	11	8	9	9	7	7	8	9	7	7	8	6	7	7	5
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	11	15	12	9	15	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	15	15	13	15	15	12	15	14	10	15	13	9	15	11	8	14	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	16	13	17	13	11	17	11	9	17	10	8	15	9	7	13	8	6	12	7	8		
			Exposed	17	17	16	17	17	14	17	15	13	17	14	11	17	12	10	17	11	9	17	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	18	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	20	20	19	20	20	17	20	19	15	19	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	16	16	16	16	16	16	16	16	15	16	16	14	16	16	12	16	16	11	16	15	10	16	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	16	16	12	16	16	11	16	14	10	16	13	9	16	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	16	16	16	16	16	15	16	16	13	16	16	12	16	15	11	16	13	10	16	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	16	15	11	16	13	10	16	12	9	15	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	19	19	19	19	19	18	19	19	16	19	18	15	19	16	13	19	15	12	19	13	11	18	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	19	16	13	19	14	12	19	13	10	19	11	9	18	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	22	22	22	22	22	22	22	22	19	22	22	17	21	20	16	20	18	14	19	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	22	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	8	12	11	7
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	8	12	10	7	12	9	10	11	8	8	10	7	7
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	10	13	12	8	13	10	7	12	9	7
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	9	13	10	7	12	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	14	12	15	13	10	15	11	9	13	10	8	11	9	8
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	13	10	15	11	9	15	9	8	14	8	7	12	7	9	11	6	8
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	14	16	16	12	16	14	11	14	12	10
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	15	18	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	9	12	11	8	12	9	7	11	8	9	10	7	8
			Exposed	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	11	8	9	10	7	7	8	9	7	7	8	6	7	7	5	7
		7-20	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	9	13	11	8	13	9	7	11	8	9	10	7	8	8	9	7
			Exposed	13	13	13	13	13	12	13	13	10	13	13	9	13	11	8	13	10	8	13	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	13	11	15	11	9	15	10	8	14	9	7	13	8	6	12	7	8
			Exposed	15	15	15	15	15	14	15	15	13	15	14	11	15	12	10	15	11	9	15	10	8	15	9	7	13	7	9	11	6	8	10	8	7	8	7	6	7	7	5
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	17	17	13	16	14	11	14	12	10	12	11	9	11	10	7	9	8	7
			Exposed	18	18	18	18	18	17	18	18	15	18	17	14	18	16	12	16	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	14	11	14	14	10	14	12	9	14	10	7	12	9	6	11	8	8	9	7	7	8	9	6
			Exposed	14	14	12	14	14	11	14	14	10	14	13	9	14	11	8	14	10	7	13	9	7	11	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	13	10	14	12	9	14	10	8	12	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	14	14	11	14	13	10	14	12	9	14	11	8	13	10	7	12	9	6	11	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	17	17	17	17	17	17	17	17	16	17	17	15	17	16	13	17	15	12	17	13	11	16	11	9	16	9	8	14	8	7	12	7	9	11	6	8	10	8	7
			Exposed	17	16	13	17	14	12	17	13	10	17	11	9	17	10	8	16	9	8	15	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	20	20	20	20	20	20	20	20	19	19	19	17	19	19	16	18	18	14	18	17	13	16	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	20	20	16	20	18	14	18	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
70	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	11	7
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	7	11	9	10	11	8	8	10	7	7
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	7	11	9	7
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	10	7	11	9	6	10	7	8	9	7	7	8	9	7
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	9	13	10	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	11	9	13	9	8	13	8	7	12	7	9	11	6	8
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	14	15	15	12	14	14	11	14	12	10
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	9	7	11	8	9	10	7	8
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	8	11	10	7	11	8	9	10	7	8	8	9	7
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	9	7	11	8	9	10	7	8
			Exposed	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	8	11	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	13	13	9	13	10	8	13	9	7	12	8	6	12	7	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	10	13	11	9	13	9	8	13	8	7	12	7	9	11	6	8
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	14	15	15	12	14	14	11	14	12	10
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	D	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	10	9	8	8	9	7	7
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	6	9	7	8	9	7	7	8	9	7
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	10	8
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	9	8	12	8	7	12	7	9	11	6	8
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	12	13	13	11	13	12	10
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
80	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	7	8	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	10	9	8	8	9	7	7
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	6	9	7	8	9	7	7	8	9	7
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	10	8
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	9	8	12	8	7	12	7	9	11	6	8
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	12	13	13	11	13	12	10
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	14	11	13	12	9	11	10	8	10	9	7	9	8	6
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	7	8	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	10	9	8	8	9	7	7
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	6	9	7	8	9	7	7	8	9	7
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	10	8
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	9	8	12	8	7	12	7	9	11	6	8
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	12	13	13	11	13	12	10
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	11	15	13	10	12	11	9	10	9	7	9	8	6	8	7	8	7	9	7	9	8	7
	D	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	7	10	9	6	10	8	6
			Exposed	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	9	7	10	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	10	8	11	9	6	10	8	8	9	7	7	8	9	6	7	8	6
			Exposed	11	11	11	11	11	10	11	11	9	11	11	8	11	11	8	11	10	8	11	10	7	11	8	9	9	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	11	9	13	9	8	12	8	7	12	7	9	11	6	8	10	8	7
			Exposed	13	13	13	13	13	12	13	13	10	13	11	9	13	10	8	13	9	8	13	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	14	15	15	13	14	14	11	13	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	16	16	16	16	16	14	16	16	13	16	14	11	15	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	10	8	8	8	8	7	7
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	8	8	7	7	8	9	7
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	16	18	18	16	18	17	14	18	15	12
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	17	14	18	14	12	18	12	10	18	11	9	17	10	8
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	18	18	17	18	18	15
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	16	20	18	14	18	16	12	15	14	11	14	12	10
	C	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	9	8	7	7	8	9	7	7	8	8	8	7	5
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8	8	9	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	17	14	18	15	12	18	13	11	17	12	9	17	10	8
			Exposed	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	17	14	18	16	13	18	13	11	18	11	9	17	10	8	15	9	7	13	7	6	11	7	5
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	19	19	17	18	18	15	17	17	13	16	15	11	14	13	10
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	19	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	D	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	6	9	8	8	9	7	7	8	8	9	7	8	6
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	8	9	7	7	8	9	6	7	8	5	9	7	5	8	6	7	8	6
		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	6	9	8	8	9	7	7	8	9	6	7	8	6
			Exposed	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	6	9	8	9	9	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	11	9	12	9	8	11	8	7	11	7	9	11	6	8	10	8	7
			Exposed	12	12	12	12	12	12	12	12	10	12	11	9	12	10	8	12	9	8	12	9	7	12	7	9	11	9	8	9	8	7	8	7	6	7	6	5	9	5	4
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14	13	13	13	11	12	12	9	12	10	8	10	9	7	9	8	6	8	7	8
			Exposed	15	15	15	15	15	14	15	15	13	15	14	11	14	13	10	13	12	9	12	11	8	10	9	7	9	8	9	7	7	8	6	9	7	9	8	6	8	7	5
100	B	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	10	7	7	8	7	7	7
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	8	8	7	7	8	9	7
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	12	10	14	11	9	14	10	8
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	17	17	15
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	14	17	16	12	15	14	11	14	12	10	14	12	10
	C	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	9	7	7	8
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	9	7	7	7	7	9	7	7	8	6	7	7	5	8	6	5
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8	8	9	7
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	9	8	7	8	8	9	7	7	8	6	6	7	5	8	6	4
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	12	10	14	12	9	14	10	8
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	13	11	14	11	9	14	10	8	14	9	7	13	7	6	11	7	5
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	17	17	15	16	16	13	15	15	11	14	13	10
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	16	18	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7	9	8	7
	D	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	8	8	8	8	7	7	8	9	7	8	6
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	7	8	8	8	8	7	7	8	9	6	7	8	5	9	7	5	8	6	4
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	8	8	8	8	7	7	8	9	6
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	8	9	8	7	7	8	9	6	7	7	5	9	6	5	8	6	4	7	5	4
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	17	14	18	14	12	18	13	10	17	11	9	16	10	8	15	8	7
			Exposed	18	18	18	18	18	18	18	18	16	18	17	14	18	16	13	18	14	12	18	13	11	18	11	9	16	9	8	14	8	7	12	7	6	11	6	5	9	5	4
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19	19	18	18	17	18	18	14	17	16	12	15	14	11	14	12	10	12	11	8
			Exposed	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	20	18	14	18	16	13	16	14	11	13	12	9	11	10	8	10	9	7	9	8	6	8	7	5

#N/A

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
0	B	0-7	Interior	76	76	75	76	76	60	76	76	53	76	76	48	76	62	43	76	57	39	76	51	36	60	43	30	51	37	26	44	32	22	38	28	19	33	24	17	30	21	15
			Exposed	76	62	43	76	55	38	76	49	34	62	44	31	56	40	28	50	36	25	46	33	23	39	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	76	76	59	76	76	52	76	64	47	76	58	42	76	52	38	70	47	34	60	43	31	50	36	27	43	31	23	37	27	20	32	23	17	28	20	15	25	18	13
			Exposed	76	52	38	64	46	34	57	41	30	51	37	27	46	33	25	42	30	22	38	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	77	77	77	77	77	64	77	77	57	77	62	51	77	56	46	77	51	42	77	46	38	77	39	32	58	33	27	50	29	24	43	25	21	38	22	18	34	20	16
			Exposed	77	56	46	77	50	41	77	44	37	77	40	33	63	36	30	57	33	27	52	30	25	44	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	61	79	79	55	79	64	50	66	58	46	55	49	39	47	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	79	79	55	79	62	49	62	56	44	56	50	39	51	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	76	67	46	76	58	41	76	52	36	66	47	33	59	42	30	53	38	27	49	35	25	41	29	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	59	42	29	52	37	26	47	33	24	42	30	21	38	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	76	55	40	76	49	36	61	44	32	54	39	29	49	35	26	45	32	24	41	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	49	35	26	43	31	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	77	59	49	77	53	43	77	47	39	77	42	35	73	38	32	61	35	29	55	32	26	46	27	22	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	71	38	31	59	34	28	53	30	25	48	27	23	43	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	79	79	58	79	68	52	79	59	46	59	53	42	54	48	38	49	44	34	45	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	54	48	38	48	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	76	54	38	72	48	34	60	43	30	54	39	27	49	35	25	44	32	22	40	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	48	35	24	43	31	22	38	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	63	45	33	56	40	30	50	36	26	45	32	24	41	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	40	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	77	49	40	77	44	36	77	39	32	61	35	29	55	32	26	50	29	24	46	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	55	32	26	49	28	23	44	25	21	39	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	79	61	48	61	55	43	55	49	38	49	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11
10	B	0-7	Interior	62	62	62	62	62	60	62	62	53	62	62	48	62	62	43	62	57	39	62	51	36	60	43	30	51	37	26	44	32	22	38	28	19	33	24	17	30	21	15
			Exposed	62	62	43	62	55	38	62	49	34	62	44	31	56	40	28	50	36	25	46	33	23	39	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	62	62	59	62	62	52	62	62	47	62	58	42	62	52	38	62	47	34	60	43	31	50	36	27	43	31	23	37	27	20	32	23	17	28	20	15	25	18	13
			Exposed	62	52	38	62	46	34	57	41	30	51	37	27	46	33	25	42	30	22	38	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	71	71	71	71	71	64	71	71	57	71	62	51	71	56	46	71	51	42	71	46	38	71	39	32	58	33	27	50	29	24	43	25	21	38	22	18	34	20	16
			Exposed	71	56	46	71	50	41	71	44	37	71	40	33	63	36	30	57	33	27	52	30	25	44	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	76	76	76	76	76	76	76	76	76	76	76	61	76	76	55	76	64	50	66	58	46	55	49	39	47	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	76	76	55	76	62	49	62	56	44	56	50	39	51	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	62	62	46	62	58	41	62	52	36	62	47	33	59	42	30	53	38	27	49	35	25	41	29	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	59	42	29	52	37	26	47	33	24	42	30	21	38	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	62	55	40	62	49	36	61	44	32	54	39	29	49	35	26	45	32	24	41	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	49	35	26	43	31	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	71	59	49	71	53	43	71	47	39	71	42	35	71	38	32	61	35	29	55	32	26	46	27	22	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	71	38	31	59	34	28	53	30	25	48	27	23	43	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	76	76	58	76	68	52	76	59	46	59	53	42	54	48	38	49	44	34	45	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	54	48	38	48	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	62	54	38	62	48	34	60	43	30	54	39	27	49	35	25	44	32	22	40	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	48	35	24	43	31	22	38	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	62	45	33	56	40	30	50	36	26	45	32	24	41	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	40	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	73	49	40	73	44	36	73	39	32	61	35	29	55	32	26	50	29	24	46	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	55	32	26	49	28	23	44	25	21	39	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	78	61	48	61	55	43	55	49	38	49	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11
20	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	43	46	46	39	46	46	36	46	43	30	46	37	26	44	32	22	38	28	19	33	24	17	30	21	15
			Exposed	46	46	43	46	46	38	46	46	34	46	44	31	46	40	28	46	36	25	46	33	23	39	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	46	46	46	46	46	46	46	46	46	46	46	42	46	46	38	46	46	34	46	43	31	46	36	27	43	31	23	37	27	20	32	23	17	28	20	15	25	18	13
			Exposed	46	46	38	46	46	34	46	41	30	46	37	27	46	33	25	42	30	22	38	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	56	56	56	56	56	56	56	56	56	56	56	51	56	56	46	56	51	42	56	46	38	56	39	32	56	33	27	50	29	24	43	25	21	38	22	18	34	20	16
			Exposed	56	56	46	56	50	41	56	44	37	56	40	33	56	36	30	56	33	27	52	30	25	44	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	62	62	62	62	62	62	62	62	62	62	62	61	62	62	55	62	62	50	62	58	46	55	49	39	47	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	62	62	55	62	62	49	62	56	44	56	50	39	51	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	46	46	46	46	46	41	46	46	36	46	46	33	46	42	30	46	38	27	46	35	25	41	29	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	46	42	29	46	37	26	46	33	24	42	30	21	38	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	46	46	40	46	46	36	46	44	32	46	39	29	46	35	26	45	32	24	41	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	46	35	26	43	31	23	39	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	56	56	49	56	53	43	56	47	39	56	42	35	56	38	32	56	35	29	55	32	26	46	27	22	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	56	38	31	56	34	28	53	30	25	48	27	23	43	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	62	62	58	62	62	52	62	59	46	59	53	42	54	48	38	49	44	34	45	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	54	48	38	48	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	46	46	38	46	46	34	46	43	30	46	39	27	46	35	25	44	32	22	40	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	46	35	24	43	31	22	38	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	46	45	33	46	40	30	46	36	26	45	32	24	41	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	40	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	59	49	40	59	44	36	59	39	32	59	35	29	55	32	26	50	29	24	46	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	55	32	26	49	28	23	44	25	21	39	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	65	61	48	61	55	43	55	49	38	49	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11

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~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
30	B	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	30	36	36	26	36	32	22	36	28	19	33	24	17	30	21	15
			Exposed	36	36	36	36	36	36	36	36	34	36	36	31	36	36	28	36	36	25	36	33	23	36	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	31	37	36	27	37	31	23	37	27	20	32	23	17	28	20	15	25	18	13
			Exposed	37	37	37	37	37	34	37	37	30	37	37	27	37	33	25	37	30	22	37	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	42	46	46	38	46	39	32	46	33	27	46	29	24	43	25	21	38	22	18	34	20	16
			Exposed	46	46	46	46	46	41	46	44	37	46	40	33	46	36	30	46	33	27	46	30	25	44	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	50	53	53	46	53	49	39	47	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	53	53	53	53	53	49	53	53	44	53	50	39	51	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	33	36	36	30	36	36	27	36	35	25	36	29	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	36	36	29	36	36	26	36	33	24	36	30	21	36	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	37	37	37	37	37	36	37	37	32	37	37	29	37	35	26	37	32	24	37	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	37	35	26	37	31	23	37	28	21	35	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	~~10~~	11	12	9
		20-27	Interior	46	46	46	46	46	43	46	46	39	46	42	35	46	38	32	46	35	29	46	32	26	46	27	22	40	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	46	38	31	46	34	28	46	30	25	46	27	23	43	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	~~11~~
		27-45	Interior	53	53	53	53	53	52	53	53	46	53	53	42	53	48	38	49	44	34	45	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	53	48	38	48	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	36	36	36	36	36	34	36	36	30	36	36	27	36	35	25	36	32	22	36	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	36	35	24	36	31	22	36	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	9
		7-20	Interior	37	37	33	37	37	30	37	36	26	37	32	24	37	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	37	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	8	14	~~10~~	8
		20-27	Interior	49	49	40	49	44	36	49	39	32	49	35	29	49	32	26	49	29	24	46	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	49	32	26	49	28	23	44	25	21	39	23	19	36	21	17	39	23	19	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	~~10~~	12	11	9
		27-45	Interior	55	55	48	55	55	43	55	49	38	49	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	~~11~~
40	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	30	34	34	26	34	32	22	34	28	19	33	24	17	30	21	15
			Exposed	34	34	34	34	34	34	34	34	34	34	34	31	34	34	28	34	34	25	34	33	23	34	28	20	33	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	31	34	34	27	34	31	23	34	27	20	32	23	17	28	20	15	25	18	13
			Exposed	34	34	34	34	34	34	34	34	30	34	34	27	34	33	25	34	30	22	34	28	20	32	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	38	39	39	32	39	33	27	39	29	24	39	25	21	38	22	18	34	20	16
			Exposed	39	39	39	39	39	39	39	39	37	39	39	33	39	36	30	39	33	27	39	30	25	39	25	21	37	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	39	44	42	33	40	36	28	35	31	25	31	28	22	27	25	19
			Exposed	46	46	46	46	46	46	46	46	44	46	46	39	46	45	36	46	41	33	42	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	34	34	34	34	34	34	34	34	34	34	34	33	34	34	30	34	34	27	34	34	25	34	29	21	34	25	18	30	22	15	26	19	13	23	17	12	20	15	16
			Exposed	34	34	29	34	34	26	34	33	24	34	30	21	34	27	19	34	25	17	31	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	34	34	34	34	34	34	34	34	32	34	34	29	34	34	26	34	32	24	34	29	22	34	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	34	34	26	34	31	23	34	28	21	34	25	19	32	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	~~10~~	11	12	9
		20-27	Interior	39	39	39	39	39	39	39	39	39	39	39	35	39	38	32	39	35	29	39	32	26	39	27	22	39	23	19	34	20	16	30	17	14	26	15	12	23	13	11
			Exposed	39	38	31	39	34	28	39	30	25	39	27	23	39	25	20	39	23	19	36	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	~~11~~
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	42	34	46	46	38	45	44	34	43	40	31	38	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	46	46	38	46	43	34	43	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	36	36	36	36	36	34	36	36	30	36	36	27	36	35	25	36	32	22	36	29	20	34	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	36	35	24	36	31	22	36	28	20	35	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	9
		7-20	Interior	37	37	33	37	37	30	37	36	26	37	32	24	37	29	22	37	27	20	34	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	37	29	21	36	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	8	14	~~10~~	8
		20-27	Interior	42	42	40	42	42	36	42	39	32	42	35	29	42	32	26	42	29	24	42	26	22	38	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	42	32	26	42	28	23	42	25	21	39	23	19	36	21	17	39	23	19	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	~~10~~	12	11	9
		27-45	Interior	48	48	48	48	48	43	48	48	38	48	44	35	45	40	31	41	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	44	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	~~11~~
50	B	0-7	Interior	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	26	29	29	22	29	28	19	29	24	17	29	21	15
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	25	29	29	23	29	28	20	29	24	17	28	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	23	30	30	23	30	27	20	30	23	17	28	20	15	25	18	13
			Exposed	30	30	30	30	30	30	30	30	30	30	30	27	30	30	25	30	30	22	30	28	20	30	23	17	28	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		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	32	34	33	27	34	29	24	34	25	21	34	22	18	33	20	16
			Exposed	34	34	34	34	34	34	34	34	34	34	34	33	34	34	30	34	33	27	34	30	25	34	25	21	34	22	18	32	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	33	37	36	28	35	31	25	31	28	22	27	25	19
			Exposed	40	40	40	40	40	40	40	40	40	40	40	39	40	40	36	40	40	33	40	38	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	27	29	29	25	29	29	21	29	25	18	29	22	15	26	19	13	23	17	12	20	15	16
			Exposed	29	29	29	29	29	26	29	29	24	29	29	21	29	27	19	29	25	17	29	23	16	26	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	30	24	30	29	22	30	25	18	29	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	30	30	26	30	30	23	30	28	21	30	25	19	30	23	17	29	21	15	26	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	~~10~~	11	12	9
		20-27	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	32	34	34	29	34	32	26	34	27	22	34	23	19	33	20	16	30	17	14	26	15	12	23	13	11
			Exposed	34	34	31	34	34	28	34	30	25	34	27	23	34	25	20	34	23	19	34	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	~~11~~
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	40	40	34	39	39	31	36	34	27	32	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	40	40	38	40	40	34	40	38	30	38	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	31	31	31	31	31	31	31	31	30	31	31	27	31	31	25	31	31	22	31	29	20	31	24	17	29	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	31	31	24	31	31	22	31	28	20	31	25	18	31	23	16	28	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	9
		7-20	Interior	32	32	32	32	32	30	32	32	26	32	32	24	32	29	22	32	27	20	32	24	18	28	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	32	29	21	32	26	19	32	23	17	29	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	8	14	~~10~~	8
		20-27	Interior	37	37	37	37	37	36	37	37	32	37	35	29	37	32	26	37	29	24	37	26	22	36	22	18	33	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	37	32	26	37	28	23	37	25	21	37	23	19	36	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	~~10~~	12	11	9
		27-45	Interior	43	43	43	43	43	43	43	43	38	42	42	35	41	40	31	40	36	29	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	43	40	31	40	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	~~11~~

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
60	B	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	19	25	24	17	25	21	15
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	24	17	25	21	14	25	18	13	22	16	17	19	14	15
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	20	25	23	17	25	20	15	25	18	13	22	16	17	18	13	13
			Exposed	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	22	25	25	20	25	23	17	25	20	15	24	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	29	24	30	25	21	30	22	18	29	20	16			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	30	25	30	25	21	30	22	18	30	19	15	28	16	13	25	14	12	22	13	16
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	33	34	34	28	32	31	25	31	28	22	27	25	19
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	36	36	30	36	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	21	25	25	18	25	22	15	25	19	13	23	17	12	20	15	16
			Exposed	25	25	25	25	25	25	25	25	24	25	25	21	25	25	19	25	25	17	25	23	16	25	19	13	23	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	18	25	21	16	25	18	13	22	16	12	19	14	16	17	12	14
			Exposed	25	25	25	25	25	23	25	25	21	25	25	19	25	23	17	25	21	15	25	19	14	22	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	27	22	30	23	19	29	20	16	28	17	14	26	15	12	23	13	11
			Exposed	30	30	30	30	30	28	30	30	25	30	27	23	30	25	20	30	23	19	30	21	17	30	17	14	26	15	12	22	13	16	19	11	14	17	15	12	15	13	11
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	34	35	35	31	33	33	27	31	29	23	28	25	20	24	22	17	21	19	15	19	17	13
			Exposed	36	36	36	36	36	34	36	36	30	36	34	27	35	31	25	32	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	22	27	27	20	27	24	17	27	21	15	25	18	13	22	16	17	19	14	15	17	12	13
			Exposed	27	27	24	27	27	22	27	27	20	27	25	18	27	23	16	27	21	14	26	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	27	27	27	27	27	27	27	27	26	27	27	24	27	27	22	27	27	20	27	24	18	27	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	27	27	21	27	26	19	27	23	17	27	21	15	26	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	33	33	33	33	33	33	33	33	32	33	33	29	33	32	26	33	29	24	33	26	22	32	22	18	31	19	16	28	16	14	25	14	12	22	13	16	19	11	14
			Exposed	33	32	26	33	28	23	33	25	21	33	23	19	33	21	17	32	19	15	30	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	35	37	37	31	36	36	29	35	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	38	38	31	38	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11
70	B	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	15
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	14	21	18	13	21	16	17	19	14	15
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	21	21	21	20	21	21	17	21	21	17	21	20	15
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	20	15	21	17	13	21	15	17	18	13	15	16	12	13
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	25	21	26	22	18	21	20	16
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	25	21	26	22	18	26	19	15	26	16	13	25	14	12	22	13	16
		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	31	31	28	29	29	25	28	28	22	27	25	19
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	21	15	21	19	13	21	17	12	20	15	16
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	16	21	19	13	21	16	11	19	14	15	17	12	13	15	16	12	13	15	10
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	21	16	21	18	13	21	16	12	19	14	16	17	12	14
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	15	21	19	14	21	16	12	19	14	15	16	12	13	14	16	12	13	14	10	11	12	9
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	25	21	26	22	18	21	20	16
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	25	21	26	22	18	26	19	15	26	16	13	25	14	12	22	13	16
		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	31	31	28	29	29	25	28	28	22	27	25	19
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	30	32	32	25	30	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	D	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	17	23	21	15	23	18	13	22	16	17	19	14	15	17	12	13
			Exposed	23	23	23	23	23	22	23	23	20	23	23	18	23	23	16	23	21	14	23	19	13	22	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	21	15	24	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	24	24	21	24	24	19	24	23	17	24	21	15	24	19	14	24	17	13	22	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	24	29	26	22	29	22	18	28	19	16	27	16	14	25	14	12	22	13	16	19	11	14
			Exposed	29	29	26	29	28	23	29	25	21	29	23	19	29	21	17	29	19	15	29	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	35	35	35	35	35	35	35	35	35	34	34	34	34	34	31	33	33	29	32	32	26	30	28	22	27	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	35	35	31	35	35	28	35	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11
80	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	14	19	18	13	19	16	17	19	14	15
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	17	19	18	13
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	17	13	19	15	17	18	13	15	16	12	13
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	22	18	23	20	16
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	22	18	23	19	15	23	16	13	23	14	12	22	13	16
		27-45	Interior	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	29	29	28	28	28	27	27	25	26	26	22	25	25	19
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	25	29	27	21	26	23	19	23	20	16	20	18	14	18	16	13
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	19	13	19	17	12	19	15	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	15	19	19	13	19	16	12	19	14	15
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	13	19	16	12	19	14	16	17	12	14
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	15	19	19	15	19	18	13	19	16	12	19	14	16	17	12	13
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	22	18	23	19	15	23	16	13	23	14	12	22	13	16
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	22	18	23	19	15	23	16	13	23	14	12	22	13	16
		27-45	Interior	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	29	29	28	28	28	27	27	25	26	26	22	25	25	19
			Exposed	29	29	29	29	29	29	29	29	29	29	29	27	29	29	25	29	28	22	29	26	20	24	22	17	21	19	15	18	16	13	16	14	17	14	12	15	12	17	13
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	15	21	18	13	21	16	17	19	14	15	17	12	13
			Exposed	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	14	21	19	13	21	16	17	19	14	15	16	12	13	14	16	11	12	14	10	17	12	9
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	18	21	21	15	21	21	20	21	21	18	21	21	15	21	18	13	21	15	11	18	13	15	16	12	13	14	16	12
			Exposed	21	21	21	21	21	19	21	21	17	21	21	15	21	19	14	21	17	13	21	16	12	18	13	15	16	11	13	14	15	11	12	13	10	16	12	8	14	10	8
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	22	26	26	22	26	22	18	25	19	16	25	16	14	24	14	12	22	13	16	19	11	14
			Exposed	26	26	26	26	26	23	26	25	21	26	23	19	26	21	17	26	19	15	26	17	14	25	14	12	21	12	16	18	16	13	16	14	12	14	13	10	12	11	9
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	31	31	31	30	30	29	29	29	26	28	28	22	26	24	19	23	21	16	20	18	14	18	16	13	16	14	17
			Exposed	32	32	31	32	32	28	32	32	25	32	29	23	29	26	20	26	24	19	24	22	17	20	18	14	17	16	12	15	13	16	13	12	14	12	16	12	16	14	11

* 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.

~~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.

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	SML	UAF	SM BUTYL Plywood
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	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
90	B	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	14	17	17	13	17	16	17	17	14	15
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	13
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	17	17	13	15	16	12	13
		20-27	Interior	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	35	35	35	35	35	31	35	33	28	35	30	24		
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	33	27	35	28	23	35	25	20	35	22	18	33	19	16
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	38	38	38	36	36	33	35	35	29
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	40	40	33	39	36	28	35	31	25	31	27	22	27	25	19
	C	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	17	12	17	15	16
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	13	17	16	11	17	14	15	17	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	13	17	16	12	17	14	16	17	12	14
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	16	12	17	14	15	16	12	13	14	16	12	13	14	~~10~~	11	12	~~9~~			
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	35	29	35	30	25	35	26	22	34	23	19	33	20	17			
			Exposed	35	35	35	35	35	35	35	35	35	34	35	35	31	35	34	28	35	31	26	35	26	22	35	23	19	33	20	16	29	17	14	26	15	12	23	13	~~11~~		
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	38	38	37	37	34	35	35	30	34	33	26	32	29	23	29	26	20	
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	40	39	31	37	33	26	32	28	22	27	25	19	24	21	17	21	19	15	19	17	13
	D	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13	18	16	17	18	14	15	17	12	13			
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	14	18	18	13	18	16	17	18	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	~~9~~		
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	15	11	18	13	15	16	12	13	14	16	12
			Exposed	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	17	13	19	16	12	18	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	~~8~~	14	~~10~~	~~8~~
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	22	18	23	19	16	23	16	14	22	14	12	21	13	16	19	11	14
			Exposed	23	23	23	23	23	23	23	23	21	23	23	19	23	21	17	23	19	15	23	17	14	23	14	12	21	12	16	18	16	13	16	14	12	14	13	~~10~~	12	11	~~9~~
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	47	47	47	46	46	44	44	44	40	42	42	34	40	36	29	35	31	25	31	27	22	27	24	19	24	21	17
			Exposed	48	48	48	48	48	42	48	48	38	48	44	34	44	39	31	40	36	28	37	33	26	31	28	22	27	24	19	23	21	16	20	18	14	18	16	12	16	14	~~11~~
100	B	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	17	15	14	15
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	17	15	13	15	15	12	13
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	24
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	23	28	25	20	28	22	18	28	19	16			
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	35	34	34	33	33	33	29
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	36	36	28	35	31	25	31	27	22	31	27	22	27	24	19
	C	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	15	16
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	15	15	12	13	15	16	12	13	15	~~10~~
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	14	16	15	12	14
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	14	15	15	12	13	14	16	12	13	14	~~10~~	11	12	~~9~~
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	25	28	28	22	28	26	22	28	23	19	28	20	17			
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	26	22	28	23	19	28	20	16	28	17	14	26	15	12	23	13	~~11~~
		27-45	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	31	36	33	26	32	28	22	27	25	19	24	21	17	21	19	15	19	17	13
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	34	34	33	33	30	32	32	26	30	29	23	29	26	20			
	D	0-7	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	16	17	17	14	15	17	12	13			
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	17	16	17	17	14	15	16	12	13	14	16	~~11~~	12	14	~~10~~	17	12	~~9~~		
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	15	11	17	13	15	16	12	13	14	16	12
			Exposed	17	17	17	17	17	17	17	17	17	17	17	15	17	17	13	17	17	13	17	16	12	17	13	15	16	11	13	14	15	~~11~~	12	13	~~10~~	16	12	~~8~~	14	~~10~~	~~8~~
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	34	28	35	29	24	35	25	21	33	22	18	32	19	16	29	17	14
			Exposed	35	35	35	35	35	35	35	35	32	35	34	28	35	31	26	35	28	24	35	26	21	35	22	18	32	19	16	28	16	13	24	14	12	21	13	~~10~~	19	11	~~9~~
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	38	38	38	36	36	33	35	35	29	33	31	25	31	27	22	27	24	19	24	21	17
			Exposed	40	40	40	40	40	40	40	40	38	40	40	34	40	39	31	39	36	28	36	33	26	31	28	22	26	24	19	23	20	16	20	18	14	18	16	12	16	14	~~11~~

#N/A

*	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.
~~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.