Span Tables

Design Criteria for Span Tables:

Values in the maximum allowable 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: 30ft
- 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, γ_E = 1.5 for 'Exposed' spans (ASCE 7-22, Fig. 29.4-7)

Snow Design Assumptions

- Ground Snow Load = 0-100 psf
- Exposure Factor coefficients of Partially Exposed condition
- Thermal Factor = 1.2
- Results based on uniform snow load

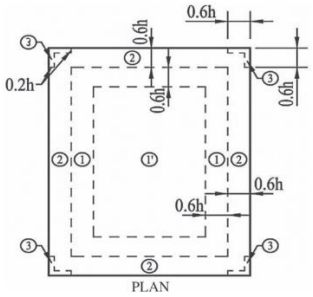
Seismic Design Assumptions

- 0.2-s Spectral Response Acceleration
- S_s = 1.25 and 3 with S_{Ds} = 1, 2.4 respectively per criteria shown on individual span tables sheets.
- S_1 = 0.5, S_{D1} = 0.6
- Seismic site class D

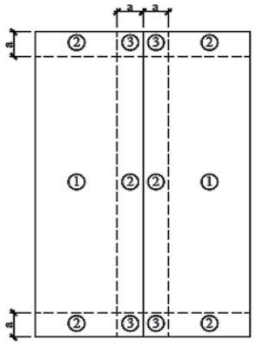
Span Tables

Array Assumptions

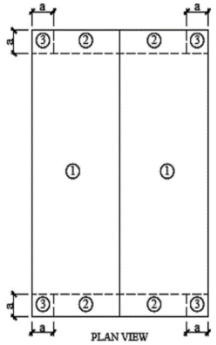
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1” x 67” (~19 sq.ft, 47.65 lbs) and 41” x 80” (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at 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.
- ‘Exposed’ spans as defined in ASCE 7-22 sec. 29.4.4 shall be used when any part of an exposed module or panel is attributed to that span.
- The most restrictive of all roof zone spans shall be used when any part of the module is attributed to that span.
- Zone should be considered as per ASCE 7-22 Fig. 30.3-2A to 30.3-2D



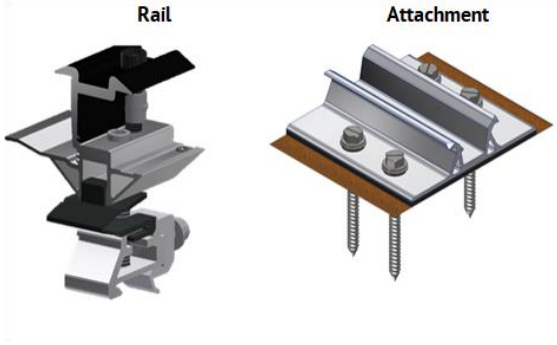
Gable Roofs θ ≤ 7°



Gable Roofs 7°< θ ≤ 27°



Gable Roofs 27°< θ ≤ 45°



Micro Rail - DtD Ply

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	14	9	15	12	8	14	10	7	12	9	6	11	8	5	9	7	5
			Exposed	15	15	14	15	15	12	15	15	11	15	14	10	15	13	9	15	11	8	15	10	7	12	9	6	10	7	5	9	6	4	8	5	4	7	5	3	6	4	3
		7-20	Interior	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	15	11	15	14	10	15	11	8	14	10	7	12	8	6	10	7	5	9	6	5	8	6	4
			Exposed	15	15	12	15	15	11	15	13	9	15	12	9	15	11	8	13	10	7	12	9	6	10	7	5	9	6	4	7	5	4	6	5	3	6	4	3	5	3	2
		20-27	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	12	10	15	11	9	15	9	7	14	8	6	12	7	6	11	6	5
			Exposed	15	15	15	15	15	13	15	14	12	15	13	10	15	11	9	15	10	8	15	9	8	14	8	6	12	7	5	10	6	5	9	5	4	8	4	4	7	4	3
		27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	12	15	13	10	13	11	9	11	10	8	10	9	7	9	8	6
			Exposed	16	16	16	16	16	16	16	16	14	16	16	13	16	14	11	15	13	10	13	12	9	11	10	8	10	9	7	8	7	6	7	6	5	6	6	4	6	5	4
	C	0-7	Interior	15	15	15	15	15	13	15	15	11	15	15	10	15	13	9	15	12	8	15	11	8	13	9	6	11	8	5	9	7	5	8	6	4	7	5	3	6	4	3
			Exposed	15	13	9	15	12	8	15	11	7	13	9	7	12	9	6	11	8	5	10	7	5	8	6	4	7	5	3	6	4	3	5	4	2	5	3	2	4	3	2
		7-20	Interior	15	15	13	15	15	11	15	14	10	15	12	9	15	11	8	14	10	7	13	9	7	11	8	6	9	7	5	8	6	4	7	5	3	6	4	3	5	4	3
			Exposed	15	11	8	14	10	7	12	9	6	11	8	6	10	7	5	9	6	5	8	6	4	7	5	4	6	4	3	5	4	3	4	3	2	4	3	2	3	2	2
		20-27	Interior	15	15	15	15	15	14	15	15	12	15	13	11	15	12	10	15	11	9	15	10	8	15	8	7	13	7	6	11	6	5	9	5	4	8	5	4	7	4	3
			Exposed	15	12	10	15	11	9	15	10	8	15	9	7	14	8	6	12	7	6	11	6	5	9	5	4	8	5	4	7	4	3	6	3	3	5	3	2	5	3	2
		27-45	Interior	16	16	16	16	16	16	16	16	15	16	16	13	16	15	12	16	14	11	14	13	10	12	11	8	10	9	7	9	8	6	8	7	5	7	6	5	6	5	4
			Exposed	16	15	12	15	14	11	14	12	9	12	11	9	11	10	8	10	9	7	9	8	6	8	7	5	6	6	4	6	5	4	5	4	3	4	4	3	4	3	2
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			Exposed	15	10	8	15	9	7	14	8	6	12	7	6	11	6	5	10	6	5	9	5	4	8	4	4	7	4	3	6	3	3	5	3	2	4	2	2	4	2	2
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		7-20	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	6	9	7	5	8	6	4	7	5	3	6	4	3	5	4	3
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		20-27	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	10	8	11	8	7	11	7	6	11	6	5	9	5	4	8	5	4	7	4	3
			Exposed	11	11	10	11	11	9	11	10	8	11	9	7	11	8	6	11	7	6	11	6	5	9	5	4	8	5	4	7	4	3	6	3	3	5	3	2	5	3	2
		27-45	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	11	11	8	10	9	7	9	8	6	8	7	5	6	6	4	5	4	3
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	D	0-7	Interior	9	9	9	9	9	9	9	9	9	9	8	9	9	8	9	9	7	9	9	6	9	8	5	9	6	4	8	6	4	7	5	3	6	4	3	5	4	2	
			Exposed	9	9	8	9	9	7	9	9	6	9	8	5	9	7	5	9	6	4	8	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	3	2	3	2	1
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		20-27	Interior	11	11	11	11	11	11	11	11	10	11	11	9	11	10	8	11	9	7	11	8	7	11	7	6	10	6	5	9	5	4	8	4	4	7	4	3	6	3	3
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UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	6	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	7	5	3	6	4	3
		7-20	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	6	7	7	5	7	6	5	7	6	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3	5	3	2
		20-27	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	7	9	8	6	9	7	6	9	6	5
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	8	9	8	6	9	7	5	9	6	5	9	5	4	8	4	4	7	4	3
		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	10	10	10	10	10	10	9	9	9	8	9	9	7	8	8	6
			Exposed	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	8	7	6	7	6	5	6	6	4	5	5	4
	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	6	7	7	5	7	7	5	7	6	4	7	5	3	6	4	3
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	7	5	7	6	4	7	5	3	6	4	3	5	4	2	5	3	2	4	3	2
		7-20	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	3	6	4	3	5	4	3
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	7	5	7	6	5	7	6	4	7	5	4	6	4	3	5	4	3	4	3	2	4	3	2	3	2	2
		20-27	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	8	7	9	8	6	9	7	5	8	5	4	8	5	4	7	4	3
			Exposed	9	9	9	9	9	9	9	9	8	9	9	7	9	8	6	9	7	6	9	6	5	9	5	4	8	5	4	7	4	3	6	3	3	5	3	2	5	3	2
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	8	8	8	6	7	7	5	7	6	5	6	6	4	6	5	4
			Exposed	10	10	10	10	10	10	10	10	9	10	10	9	10	10	8	10	9	7	9	8	6	8	7	5	6	6	4	6	5	4	5	4	3	4	4	3	4	3	2
	D	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	4	2
			Exposed	7	7	7	7	7	7	7	7	6	7	7	5	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	5	4	6	5	3	6	4	3	5	3	2	4	3	2
			Exposed	7	7	7	7	7	7	7	7	6	7	7	5	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	2	2	3	2	1
		20-27	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	7	9	7	6	9	6	5	8	5	4	8	4	4	7	4	3	6	3	3
			Exposed	9	9	8	9	9	7	9	8	6	9	7	6	9	6	5	9	6	5	9	5	4	8	4	4	7	4	3	6	3	3	5	3	2	4	2	2	4	2	2
		27-45	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	9	10	10	8	9	9	7	8	7	6	7	6	5	6	6	4	5	5	4	5	4	3
			Exposed	11	11	10	11	11	9	11	10	8	10	9	7	9	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
40	B	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2
		20-27	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	6	8	7	6	7	6	5
			Exposed	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	7	5	8	6	5	8	5	4	8	4	4	7	4	3
		27-45	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	8	8	8	8	8	8	7	7	7	7	7	6
			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	8	7	6	7	6	5	6	6	4	5	5	4
	C	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	4	3	2	4	3	2
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	3	6	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	4	3	2	4	3	2	3	2	2
		20-27	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	7	6	7	6	5	7	5	4	6	4	3
			Exposed	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	7	5	8	6	5	8	5	4	8	4	4	7	4	3
		27-45	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	8	8	8	8	8	8	7	7	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	8	9	9	7	8	7	6	7	6	5	6	6	4	5	5	4
	D	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	4	2
			Exposed	7	7	7	7	7	7	7	7	6	7	7	5	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	5	4	6	5	3	6	4	3	5	3	2	4	3	2
			Exposed	7	7	7	7	7	7	7	7	6	7	7	5	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	2	2	3	2	1
		20-27	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	7	8	7	6	8	6	5	7	5	4	7	4	4	7	4	3	6	3	3
			Exposed	8	8	8	8	8	7	8	8	6	8	7	6	8	7	5	8	7	5	8	5	4	7	4	3	6	3	3	5	3	2	4	2	2	4	2	2	4	2	2
		27-45	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	7	7	7	6	7	6	5	6	6	4	5	5	4	5	4	3
			Exposed	9	9	9	9	9	9	9	9	8	9	9	7	9	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
50	B	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2
		27-45	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	7	7	7	7	7	7	6	6	6
			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	7	7	6	7	6	5	6	6	4	5	5	4
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	5	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	5	4	2	5	3	2	4	3	2
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4	5	5	3	5	4	3	5	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	4	3	2	4	3	2	3	2	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	4	6	4	3	6	3	3	5	3	2
		27-45	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	7	7	7	6	6	6	6	6	5	5	5	4
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	7	7	5	6	6	4	5	4	3	4	3	3	4	4	3	4	3	2
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	6	6	4	6	5	3	6	4	3	5	4	2	4	3	2
			Exposed	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	6	4	6	5	3	6	4	3	5	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	3	5	4	3	5	3	2	4	3	2
			Exposed	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	6	4	6	6	4	6	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1
		20-27	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	6	5	6	5	4	6	4	4	6	4	3	6	3	3
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	6	5	7	5	4	7	4	3	6	3	3	5	3	2	4	2	2	4	2	2	4	2	2
		27-45	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	6	6	6	5	6	6	4	5	5	4	5	4	3
			Exposed	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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) | | |

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	3	2	4	3	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	3	4	4	3	4	3	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2	3	2	1
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	3	2	4	2	2	4	2	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	4	4	3	4	3	3	3	3	2	3	3	2
100	B	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2	3	2	1
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	3	2	4	2	2	4	2	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	4	3	3	3	3	2	3	3	2

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	26	19	26	23	16	26	20	14	24	17	12	21	15	10	18	13	9	16	11	8
			Exposed	26	26	23	26	26	21	26	26	18	26	24	17	26	21	15	26	19	14	25	18	12	21	15	10	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5
		7-20	Interior	26	26	26	26	26	26	26	26	25	26	26	23	26	26	20	26	25	19	26	23	17	26	19	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7
			Exposed	26	26	20	26	25	18	26	22	16	26	20	15	25	18	13	23	16	12	21	15	11	17	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	23	26	25	21	26	21	17	26	18	15	26	15	13	23	13	11	20	12	10	18	10	9
			Exposed	26	26	25	26	26	22	26	24	20	26	22	18	26	19	16	26	18	15	26	16	13	24	14	11	20	12	9	17	10	8	15	9	7	13	8	6	12	7	5
		27-45	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	21	25	22	18	22	19	15	19	17	13	17	15	12	15	13	10
			Exposed	26	26	26	26	26	26	26	26	24	26	26	21	26	24	19	25	22	17	23	20	16	19	17	13	16	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	C	0-7	Interior	26	26	25	26	26	22	26	26	20	26	25	18	26	23	16	26	21	14	26	19	13	22	16	11	19	13	9	16	12	8	14	10	7	12	9	6	11	8	5
			Exposed	26	23	16	26	20	14	25	18	13	23	16	11	20	15	10	18	13	9	17	12	8	14	10	7	12	9	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	26	26	22	26	26	19	26	23	17	26	21	15	26	19	14	24	17	13	22	16	12	18	13	10	16	11	8	13	10	7	12	8	6	10	7	5	9	7	5
			Exposed	26	19	14	23	17	12	21	15	11	19	14	10	17	12	9	15	11	8	14	10	7	12	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		20-27	Interior	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	10	18	11	9	16	9	8	14	8	7	12	7	6
			Exposed	26	21	17	26	18	15	26	16	13	26	15	12	23	13	11	21	12	10	19	11	9	16	9	8	14	8	6	12	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	26	26	26	26	26	26	26	26	25	26	26	22	26	26	20	26	24	18	24	21	17	20	18	14	17	15	12	15	13	10	13	12	9	11	10	8	10	9	7
			Exposed	26	26	20	26	23	18	23	21	16	21	18	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	D	0-7	Interior	26	26	20	26	26	18	26	23	16	26	21	15	26	19	13	24	17	12	22	16	11	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5	9	6	4
			Exposed	26	19	13	23	17	12	21	15	10	19	13	9	17	12	8	15	11	8	14	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	26	24	18	26	22	16	26	19	14	24	17	13	22	16	12	20	14	10	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	22	16	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	26	26	22	26	23	19	26	21	17	26	19	15	26	17	14	26	15	13	25	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
			Exposed	26	17	14	26	15	12	24	14	11	21	12	10	19	11	9	17	10	8	16	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	26	26	26	26	26	23	26	26	21	26	24	19	24	21	17	22	19	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	24	21	17	21	19	15	19	17	13	17	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
10	B	0-7	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	20	14	21	17	12	21	15	10	18	13	9	16	11	8
			Exposed	21	21	21	21	21	21	21	21	18	21	21	17	21	21	15	21	19	14	21	18	12	21	15	10	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5
		7-20	Interior	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	10	17	12	9	15	11	8	13	10	7
			Exposed	21	21	20	21	21	18	21	21	16	21	20	15	21	18	13	21	16	12	21	15	11	17	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
		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	24	17	24	18	15	24	15	13	23	13	11	20	12	10	18	10	9
			Exposed	24	24	24	24	24	22	24	24	20	24	22	18	24	19	16	24	18	15	24	16	13	24	14	11	20	12	9	17	10	8	15	9	7	13	8	6	12	7	5
		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	21	25	22	18	22	19	15	19	17	13	17	15	12	15	13	10
			Exposed	25	25	25	25	25	25	25	25	24	25	25	21	25	24	19	25	22	17	23	20	16	19	17	13	16	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	C	0-7	Interior	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	14	21	19	13	21	16	11	19	13	9	16	12	8	14	10	7	12	9	6	11	8	5
			Exposed	21	21	16	21	20	14	21	18	13	21	16	11	20	15	10	18	13	9	17	12	8	14	10	7	12	9	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	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	13	10	7	12	8	6	10	7	5	9	7	5
			Exposed	21	19	14	21	17	12	21	15	11	19	14	10	17	12	9	15	11	8	14	10	7	12	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		20-27	Interior	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
			Exposed	24	21	17	24	18	15	24	16	13	24	15	12	23	13	11	21	12	10	19	11	9	16	9	8	14	8	6	12	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	22	25	25	20	25	24	18	24	21	17	20	18	14	17	15	12	15	13	10	13	12	9	11	10	8	10	9	7
			Exposed	25	25	20	25	23	18	23	21	16	21	18	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	D	0-7	Interior	21	21	20	21	21	18	21	21	16	21	21	15	21	19	13	21	17	12	21	16	11	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5	9	6	4
			Exposed	21	19	13	21	17	12	21	15	10	19	13	9	17	12	8	15	11	8	14	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	21	21	18	21	21	16	21	19	14	21	17	13	21	16	12	20	14	10	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	21	16	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	24	24	22	24	23	19	24	21	17	24	19	15	24	17	14	24	15	13	24	14	12	19	14	11	19	12	9	17	10	8	15	9	7	13	8	6	12	7	5
			Exposed	24	17	14	24	15	12	24	14	11	21	12	10	19	11	9	17	10	8	16	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	26	26	26	26	26	23	26	26	21	26	24	19	24	21	17	22	19	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	24	21	17	21	19	15	19	17	13	17	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
20	B	0-7	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	15	10	15	13	9	15	11	8	13	10	7	12	8	6
			Exposed	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	10	7	12	8	6	10	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	12	15	14	10	15	12	9	15	11	8	13	10	7	10	7	5
			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	7	11	8	6	10	7	5	9	6	4
		20-27	Interior	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	13	11	19	12	10	18	10	9	15	9	7
			Exposed	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	18	15	19	16	13	19	14	11	19	12	9	17	10	8	15	9	7	13	8	6	12	7	5
		27-45	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	19	19	15	18	17	13	17	15	12	15	13	10	13	10	8
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	20	16	19	17	13	16	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	C	0-7	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	12	8	14	10	7	12	9	6	11	8	5
			Exposed	15	15	15	15	15	14	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	10	15	15	7	12	9	6	10	7	5	9	6	4	8	6	4
		7-20	Interior	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	11	8	13	10	7	12	8	6	10	7	5	9	7	5
			Exposed	15	15	14	15	15	12	15	15	11	15	14	10	15	12	9	15	11	8	14	10	7	12	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	17	14	19	14	12	19	12	10	18	11	9	16	9	8	14	8	7	12	7	6
			Exposed	19	19	17	19	18	15	19	16	13	19	15	12	19	13	11	19	12	10	19	11	9	16	9	8	14	8	6	12	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	20	20	17	19	18	14	17	15	12	15	13	10	13	12	9	11	10	8	10	9	7
			Exposed	21	21	20	21	21	18	21	21	16	21	18	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	D	0-7	Interior	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	10	7	12	8	6	10	7	5	9	6	4
			Exposed	15	15	13	15	15	12	15	15	10	15	13	9	15	12	8	15	11	8	14	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	14	10	15	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	15	15	11	15	14	10	15	12	9	15	11	8	14	10	7	13	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	19	19	19	19	19	19	19	19	17	19	19	15	19	17	14	19	15	13	19	14	12	19	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
			Exposed	19	17	14	19	15	12	19	14	11	19	12	10	19	11	9	17	10	8	16	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	22	22	22	22	22	22	22	22	21	22	22	19	21	21	17	20	19	15	19	18	14	17	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	22	21	17	21	19	15	19	17	13	17	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	12	9	12	11	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	12	9	12	11	8	12	10	7	12	8	6	10	7	5
		7-20	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	10	12	12	9	12	11	8	12	10	7	12	9	7
			Exposed	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	8	12	9	7	11	8	6	10	7	5	9	6	4
		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	15	15	15	13	15	13	11	15	12	10	15	10	9	15	12	10
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	14	11	15	12	9	15	10	8	15	9	7	13	8	6	12	7	5
		27-45	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	16	16	15	15	15	13	15	15	12	14	13	10
			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	16	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	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	9	12	12	8	12	10	7	12	9	6	11	8	5
			Exposed	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	10	7	12	9	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	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	11	8	12	10	7	11	8	6	10	7	5	9	7	5
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		20-27	Interior	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	12	10	15	11	9	14	9	8	13	8	7	12	7	6
			Exposed	15	15	15	15	15	15	15	15	13	15	15	12	15	13	11	15	12	10	15	11	9	15	9	8	14	8	6	12	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	16	14	15	15	12	14	13	10	13	12	9	11	10	8	10	9	7
			Exposed	17	17	17	17	17	17	17	17	16	17	17	15	17	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	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	8	12	10	7	12	8	6	10	7	5	9	6	4
			Exposed	12	12	12	12	12	12	12	12	10	12	12	9	12	12	8	12	11	8	12	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	10	12	11	8	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	15	13	16	14	12	16	12	10	15	10	8	14	9	7	13	8	6	12	7	5	10	6	5
			Exposed	16	16	14	16	15	12	16	14	11	16	12	10	16	11	9	16	10	8	16	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	15	17	17	14	15	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	18	18	17	18	18	15	18	17	13	17	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
40	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	10	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	10	7	11	8	6	10	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	10	11	11	9	11	11	8	11	11	9	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	9	11	11	8	11	9	7	11	8	6	10	7	5	9	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	13	13	13	13	13	13	11	13	12	10	13	13	10	13	10	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	12	9	13	10	8	13	9	7	13	8	6	12	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	15	15	15	15	15	15	14	14	14	14	14	13	13	13	12	12	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	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	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	9	11	11	8	11	10	7	11	9	6	11	8	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	7	11	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		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	10	11	11	8	11	11	7	10	8	6	10	7	5	9	7	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	7	11	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		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	12	13	13	10	13	13	9	12	9	8	11	8	7	11	7	6
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	13	10	13	12	9	13	12	9	13	10	8	13	10	8	12	8	6	12	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	15	15	15	15	15	15	15	15	15	14	14	14	14	14	13	13	13	12
			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	14	13	10	12	11	9	11	10	8	10	8	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	8	12	10	7	12	8	6	10	7	5	9	6	4
			Exposed	12	12	12	12	12	12	12	12	10	12	12	9	12	12	8	12	11	8	12	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	10	12	11	8	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	12	10	13	10	8	13	9	7	12	8	6	11	7	5	10	6	5
			Exposed	14	14	14	14	14	12	14	14	11	14	12	10	14	11	9	14	10	8	14	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	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	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	16	16	16	16	16	15	16	16	13	16	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
50	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	8	9	9	7	9	8	6	9	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	10	10	10	10	10	10	10	10	10	8	9	9	7	9	7	5
			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	8	10	9	7	10	8	6	10	7	5	9	6	4
		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	10	11	11	9	11	10	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	9	11	10	8	11	9	7	11	8	6	11	7	5
		27-45	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	12	12	12	11	11	11	11	11	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	11	13	13	10	12	11	9	11	10	8	10	8	7	10	8	7
	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	9	6	9	8	5
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	9	9	9	9	9	9	7	9	9	6	9	7	5	9	6	4	8	6	4	7	5	3
		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	8	9	9	7	9	8	6	9	7	5	8	7	5
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		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	10	11	11	9	10	9	8	10	8	7	10	7	6	10	7	6
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	9	8	11	8	6	11	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	12	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	12	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	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	8	10	10	7	10	8	6	10	7	5	9	6	4	7	5	4
			Exposed	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3	5	3	2
		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	8	10	9	7	10	8	6	9	7	5	8	6	4	7	5	4
			Exposed	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	9	7	10	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		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	10	12	10	8	11	9	7	11	8	6	10	7	5	10	6	5
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	11	9	12	10	8	12	9	7	12	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	12	12	12	11	11	10	11	11	9	10	10	8	9	8	7	8	7	6
			Exposed	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	13	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	8	8	7	8	8	6	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	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	6	8	7	5	8	6	4
		20-27	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	9	10	10	8	10	9	7	10	8	6	10	7	5
		27-45	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	11	11	11	11	11	11	10	10	10	10	10	10
			Exposed	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	11	11	10	11	11	9	10	10	8	10	8	7
	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	6	8	8	5
			Exposed	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	5	8	6	4	8	6	4	7	5	3
		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	6	8	7	5	7	7	5
			Exposed	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	5	8	6	5	8	5	4	7	5	3	6	4	3
		20-27	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	9	9	8	9	8	7	9	7	6	9	7	6	9	7	6
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	9	8	10	8	6	10	7	6	9	6	5	9	5	4	8	5	4
		27-45	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	10	10	10	10	10	10	9	9	9	9	9	8	8	8	7
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	9	10	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	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	8	9	9	7	9	8	6	9	7	5	9	6	4	8	6	4
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	8	9	9	7	9	8	6	9	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		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	7	8	8	6	8	7	5	8	6	4	7	5	4
			Exposed	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	6	9	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		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	10	10	10	8	10	9	7	9	8	6	9	7	5	9	6	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	10	8	11	9	7	11	8	6	10	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	13	13	13	13	13	13	13	13	13	13	13	13	12	12	12	12	12	12	12	12	12	11	11	11	10	10	10	10	10	9	9	9	8	9	8	7	8	7	6
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	12	12	11	12	12	10	12	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
70	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	7	7	7	6	7	7	5
		7-20	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	6	7	7	5	7	6	4	7	6	4
		20-27	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	8	6	9	7	5	9	7	5
		27-45	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	10	10	10	10	10	10	9	9	9	9	9	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	11	10	10	10	10	10	9	9	9	8	9	8	7
	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	6	7	7	5	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3
		7-20	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	6	7	7	5	7	7	5	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	7	5	4	7	5	3	6	4	3
		20-27	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	8	6	9	7	6	8	6	5	8	5	4	8	5	4
			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	8	6	9	7	6	8	6	5	8	5	4	8	5	4
		27-45	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	9	9	9	8	9	9	7	8	7	6	7	7	5	6	6	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	9	9	9	8	9	9	7	8	7	6	7	7	5	6	6	5
	D	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	6	7	7	5	7	6	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	7	5	3	6	4	3
		7-20	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	6	7	7	5	6	6	4	6	5	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	6	7	7	5	7	6	5
			Exposed	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	5	8	6	5	8	5	4	7	4	3	7	4	3
		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	9	9	8	9	8	6	8	7	6	8	6	4	7	5	4
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	9	10	10	9	9	9	8	8	8	7	8	7	6	7	6	5	6	5	4	5	5	4
80	B	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4
		20-27	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	7	7	7	6	7	7	5
		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	10	10	10	9	9	9	9	9	9	9	9	9	8	8	8	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	9	9	9	9	9	9	9	8	8	8	8	7
	C	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4	6	5	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	5	3
		20-27	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	6	7	7	5	7	7	5	7	7	6
			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	6	7	7	5	7	6	4	7	5	4
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	7	7	7	7
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	8	8	8	7	8	7	6	7	7	5	6	6	5	6	6	5
	D	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	6	7	7	5	7	6	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	7	5	3	6	4	3
		7-20	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	6	7	7	5	6	6	4	6	5	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	6	7	7	5	7	6	5
			Exposed	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	5	8	6	5	8	5	4	7	4	3	7	4	3
		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	9	9	9	9	9	7	9	8	6	8	6	4	7	5	4
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
		20-27	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	6	7	7	5	7	7	5
		27-45	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	8	8	8	8	8	8	8	8	8	7
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	
		20-27	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	6
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	5	4	7	5	4	7	5	4
		27-45	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	7	7	7	7	7	7	7	7	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	7	7	6	7	7	5	6	6	5
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	6	7	7	5	7	6	5			
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	7	5	4	7	4	3	7	4	3
		27-45	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	8	8	8	8	8	8	7	7	7	7	7	7	7	7	6
			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	8	8	6	8	7	6	7	6	5	6	5	4	5	5	4
100	B	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		27-45	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	7	7	7	7	7	7	7	7	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	8	7	7	7	7	7	7	7	7	7
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4
		27-45	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	7	7	7	7	7	7	7	7	6	7	7	6	7	7	6
			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	6	7	7	6	7	6	5	6	5	4	5	5	4
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2			
		20-27	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	6	6	6	5	6	6	5						
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	6	4	3	6	4	3			
		27-45	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	7	7	7	7	7	7	6	6	6			
			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	6	7	7	6	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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) | | |

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4			
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2		
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	6	5	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	5	3	2	4	3	2
		20-27	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	6	7	6	5	7	6	5	7	5	4	6	5	4	7	5	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	7	5	4	7	4	3	6	4	3	6	3	2		
		27-45	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	7	7	7	6	7	7	6	7	6	5			
			Exposed	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	7	5	7	6	5	6	5	4	5	5	4	5	4	3		
	C	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4	6	5	3	6	4	3	5	4	2		
			Exposed	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	5	6	6	4	6	6	4	6	5	3	6	4	3	5	3	2	4	3	2	3	2	1		
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	3	5	4	3	5	3	2	4	3	2		
			Exposed	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1		
		20-27	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	7	5	4	7	4	4	6	4	3	6	3	3
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	6	5	7	5	4	7	4	4	7	4	3	6	3	3	5	3	2	4	2	2	4	2	2		
		27-45	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	7	7	6	7	6	5	6	6	4	5	5	4	5	4	3		
			Exposed	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2		
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2		
			Exposed	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2	3	2	2	3	2	1	3	2	1		
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	3	5	3	2	4	3	2	4	2	2					
			Exposed	6	6	6	6	6	6	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2	3	2	2	3	2	1	3	2	1	2	2	1	2	1	1		
		20-27	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	6	8	6	5	7	5	4	7	4	3	6	4	3	6	3	2	5	3	2		
			Exposed	8	8	7	8	7	6	8	7	5	8	6	5	8	6	4	8	5	4	8	4	3	6	4	3	5	3	2	5	3	2	4	2	2	3	2	1	3	2	1		
		27-45	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	7	8	8	7	7	7	6	7	6	5	6	5	4	5	5	4	4	4	3	4	3	3		
			Exposed	9	9	8	9	9	7	9	8	6	8	7	6	8	7	5	7	6	5	6	6	4	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2		
40	B	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2		
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2	4	3	2		
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	3	6	4	3	6	3	2		
		27-45	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	6	6	6	6	6	6	5		
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	6	5	4	5	5	4	5	4	3		
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	5	4	2			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	4	3	2	4	3	2		
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1		
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5		
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	3	6	4	3	6	3	2		
		27-45	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	6		
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	7	6	5	6	5	4	5	5	4	5	4	3		
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1		
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	4	3	2	4	3	2	4	2	2			
			Exposed	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1	3	2	1		
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	4	5	4	3	5	3	2	4	3	2	5	3	2
			Exposed	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	6	4	5	5	3	4	4	3	5	3	2	4	2	2	3	2	1	3	2	1		
		27-45	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	5	5	5	5	5	4	5	5	4	4	4	3	4	3	3		
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	7	5	6	6	5	6	6	4	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2		
50	B	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4			
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2		
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2	4	3	2		
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3		
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	5	5	4	5	4	3	5	4	3		
	C	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4			
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2		
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2	4	3	2		
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3		
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	5	5	4	5	4	3	5	4	3		
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1		
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	4	3	2	4	3	2	4	2	2			
			Exposed	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1	3	2	1		
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	4	5	4	3	5	3	2	4	3	2	5	3	2
			Exposed	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	6	4	5	5	3	4	4	3	5	3	2	4	2	2	3	2	1	3	2	1		
		27-45	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	5	5	5	5	5	4	5	5	4	4	4	3	4	3	3		
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	7	5	6	6	5	6	6	4	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2		

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2			
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	5	3	2			
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	4	5	5	4	5	4	3				
	C	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	2	
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3	4	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	3	3	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	4	2	2	3	2	1	3	2	1
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	4	5	4	3	5	4	3	4	3	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	4	5	4	3	5	3	3	4	3	2	4	2	2	4	2	2
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	4	5	5	4	4	4	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	5	5	4	5	5	4	5	4	3	4	3	2	4	3	2	3	3	2
	D	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	3	2	2	3	2	1	3	2	1
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	4	2	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3	4	3	2	3	2	1	2	2	1	2	1	1	2	1	1	2	1	1
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	4	4	3	4	3	2	4	3	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	3	2	4	2	2	3	2	1	3	2	1	3	2	1			
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	4	3	3	
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2
70	B	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2			
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	3	4	4	3	4	4	3	4	4	3
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1			
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	3	4	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	3	2	4	3	2			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	4	4	3	4	4	3
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	3	3	2	3	3	2	3	2	2			
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3	4	3	2	3	2	1	2	2	1	2	1	1	2	1	1	2	1	1
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	4	5	4	3	5	4	3	4	3	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	4	3	4	3	3	4	3	2	4	3	2	4	3	2			
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	5	5	4	5	5	4	5	4	3	4	4	3	4	4	3	4	4	3
80	B	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	3
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1			
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	3	4	3	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	3	4	4	3	4	3	3	3	3	2	3	3	2	3	2	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1			
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	3	4	3	3	3	3	2	3	3	2			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2			

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
	C	0-7	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	2	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	2	2	1	2	1	1
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	2	3	2	1	3	2	1
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2
100	B	0-7	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3
	C	0-7	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	2	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3
	D	0-7	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	1
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	1	1
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	2	2	1	3	2	1
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	21	25	25	19	25	23	16	25	19	13	23	17	12	20	14	10	18	13	9	16	11	8
			Exposed	25	25	23	25	25	20	25	25	18	25	23	16	25	21	15	25	19	13	24	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	22	25	25	20	25	25	18	25	23	17	25	19	14	22	16	12	19	14	10	17	12	9	15	11	8	13	9	7
			Exposed	25	25	20	25	24	18	25	22	16	25	19	14	24	18	13	22	16	12	20	15	11	17	12	9	14	10	8	12	9	7	11	8	6	9	7	5	8	6	4
		20-27	Interior	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	21	17	25	18	14	25	15	12	23	13	11	20	12	9	18	10	8			
			Exposed	25	25	24	25	25	21	25	23	19	25	21	17	25	19	16	25	17	14	25	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	6	11	7	5
		27-45	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	20	25	22	17	21	19	15	18	17	13	16	14	11	14	13	10
			Exposed	26	26	26	26	26	26	26	26	23	26	26	21	26	24	19	24	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	C	0-7	Interior	25	25	24	25	25	21	25	25	19	25	25	17	25	22	16	25	20	14	25	18	13	21	15	11	18	13	9	16	11	8	14	10	7	12	9	6	11	8	5
			Exposed	25	22	15	25	20	14	25	18	12	22	16	11	20	14	10	18	13	9	16	12	8	14	10	7	12	8	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	25	25	21	25	25	19	25	23	17	25	21	15	25	19	14	23	17	12	21	15	11	18	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	5
			Exposed	25	19	14	23	16	12	20	15	11	18	13	10	17	12	9	15	11	8	14	10	7	12	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	Interior	25	25	25	25	25	23	25	25	20	25	22	18	25	20	17	25	18	15	25	17	14	24	14	12	21	12	10	18	10	8	16	9	7	14	8	6	12	7	6
			Exposed	25	20	16	25	18	15	25	16	13	25	14	12	23	13	11	21	12	10	19	11	9	16	9	7	13	8	6	12	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	26	26	26	26	26	26	26	26	24	26	26	22	26	25	20	26	23	18	23	21	17	20	18	14	17	15	12	15	13	10	13	11	9	11	10	8	10	9	7
			Exposed	26	25	20	25	22	18	22	20	16	20	18	14	18	16	13	17	15	12	15	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	D	0-7	Interior	25	25	20	25	25	18	25	23	16	25	20	14	25	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
			Exposed	25	18	13	23	16	11	20	15	10	18	13	9	16	12	8	15	11	7	14	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	25	24	17	25	21	15	25	19	14	24	17	12	21	15	11	19	14	10	18	13	9	15	11	8	13	9	7	11	8	6	9	7	5	8	6	4	7	5	4
			Exposed	21	15	11	19	14	10	17	12	9	15	11	8	14	10	7	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	25	25	21	25	23	19	25	21	17	25	18	15	25	17	14	25	15	12	24	14	11	20	12	10	17	10	8	15	9	7	13	7	6	11	6	5	10	6	5
			Exposed	25	17	14	25	15	12	23	13	11	21	12	10	19	11	9	17	10	8	15	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	26	26	25	26	26	23	26	26	20	26	23	18	23	21	16	21	19	15	19	17	14	16	15	12	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	23	21	16	21	19	15	19	17	13	17	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
10	B	0-7	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	19	13	20	17	12	20	14	10	18	13	9	16	11	8
			Exposed	20	20	20	20	20	20	20	20	18	20	20	16	20	20	15	20	19	13	20	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	17	20	19	14	20	16	12	19	14	10	17	12	9	15	11	8	13	9	7
			Exposed	20	20	20	20	20	18	20	20	16	20	19	14	20	18	13	20	16	12	20	15	11	17	12	9	14	10	8	12	9	7	11	8	6	9	7	5	8	6	4
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	21	17	23	18	14	23	15	12	23	13	11	20	12	9	18	10	8
			Exposed	23	23	23	23	23	21	23	23	19	23	21	17	23	19	16	23	17	14	23	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	6	11	7	5
		27-45	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	22	17	21	19	15	18	17	13	16	14	11	14	13	10
			Exposed	25	25	25	25	25	25	25	25	23	25	25	21	25	24	19	24	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	C	0-7	Interior	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	20	20	14	20	18	13	20	15	11	18	13	9	16	11	8	14	10	7	12	9	6	11	8	5
			Exposed	20	20	15	20	20	14	20	18	12	20	16	11	20	14	10	18	13	9	16	12	8	14	10	7	12	8	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	20	20	20	20	20	19	20	20	17	20	20	15	20	19	14	20	17	12	20	15	11	18	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	5
			Exposed	20	19	14	20	16	12	20	15	11	18	13	10	17	12	9	15	11	8	14	10	7	12	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	Interior	23	23	23	23	23	23	23	23	20	23	23	18	23	20	17	23	18	14	23	17	13	21	14	11	20	12	9	16	9	7	14	8	6	12	7	6			
			Exposed	23	23	23	23	23	20	23	22	18	23	20	17	23	18	15	23	17	14	23	14	12	21	12	10	18	10	8	16	9	7	14	8	6	12	7	6	11	7	5
		27-45	Interior	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	23	18	24	21	17	20	18	14	17	15	12	15	13	10	13	11	9	11	10	8	10	9	7
			Exposed	25	25	20	25	22	18	22	20	16	20	18	14	18	16	13	17	15	12	15	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	D	0-7	Interior	20	20	20	20	20	18	20	20	16	20	20	14	20	18	13	20	17	12	20	15	11	18	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
			Exposed	20	18	13	20	16	11	20	15	10	18	13	9	16	12	8	15	11	7	14	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	20	20	17	20	20	15	20	19	14	20	17	12	20	15	11	19	14	10	18	13	9	15	11	8	13	9	7	11	8	6	9	7	5	8	6	4	7	5	4
			Exposed	20	15	11	19	14	10	17	12	9	15	11	8	14	10	7	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	24	24	21	24	23	19	24	21	17	24	18	15	24	17	14	24	15	12	24	14	11	20	12	10	17	10	8	15	9	7	13	7	6	11	6	5	10	6	5
			Exposed	24	17	14	24	15	12	23	13	11	21	12	10	19	11	9	17	10	8	15	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	25	25	25	25	25	23	25	25	20	25	23	18	23	21	16	21	19	15	19	17	14	16	15	12	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	23	21	16	21	19	15	19	17	13	17	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
20	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	12	15	15	10	15	13	9	15	11	7	13	9	6	11	8	5
			Exposed	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	12	9	15	11	7	13	9	6	11	8	6	10	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	12	15	15	10	15	14	10	15	12	9	15	11	8	13	9	7			
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	11	15	12	9	14	10	8	12	9	7	11	8	6	9	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	17	18	18	14	18	15	12	18	13	11	18	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	8	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	20	20	20	20	20	17	19	19	15	18	17	13	16	14	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
	C	0-7	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	14	10	7	12	9	6	11	8	5
			Exposed	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	13	9	15	12	8	14	10	7	12	8	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	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	11	8	13	9	7	11	8	6	10	7	5	9	6	5
			Exposed	15	15	14	15	15	12	15	15	11	15	13	10	15	12	9	15	11	8	14	10	7	12	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	17	14	18	14	12	18	12	10	17	10	8	16	9	7	14	8	6	12	7	6
			Exposed	18	18	16	18	18	15	18	16	13	18	14	12	18	13	11	18	12	10	18	11	9	16	9	7	13	8	6	12	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	17	15	12	15	13	10	13	11	9	11	10	8	10	9	7			
			Exposed	20	20	20	20	20	18	20	20	16	20	18	14	18	16	13	17	15	12	15	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	D	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	11	15	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
			Exposed	15	15	13	15	15	11	15	15	10	15	13	9	15	12	8	15	11	7	14	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	13	9	15	11	8	13	9	7	11	8	6	9	7	5	8	6	4	7	5	4
			Exposed	15	15	11	15	14	10	15	12	9	15	11	8	14	10	7	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	19	19	19	19	19	19	19	19	17	19	18	15	19	17	14	19	15	12	19	14	11	19	12	10	17	10	8	15	9	7	13	7	6	11	6	5	10	6	5
			Exposed	19	17	14	19	15	12	19	13	11	19	12	10	19	11	9	17	10	8	15	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	20	19	15	19	17	14	16	15	12	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	21	21	16	21	19	15	19	17	13	17	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	12	9	12	11	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	12	9	12	11	7	12	9	6	11	8	6	10	7	5
		7-20	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	10	12	12	9	12	11	8	11	9	7
			Exposed	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	10	8	12	9	7	11	8	6	9	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	15	15	15	15	15	15	15	15	15	14	15	15	12	15	13	11	15	12	9	14	10	8
			Exposed	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	15	8	7	13	7	6	11	7	5
		27-45	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	16	16	15	15	15	13	14	14	11	13	13	10
			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	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	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	9	12	11	8	12	10	7	12	9	6	11	8	5
			Exposed	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	10	7	12	8	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	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	8	11	9	7	11	8	6	10	7	5	9	6	5
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	Interior	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	12	10	14	10	8	14	9	7	13	8	6	12	7	6
			Exposed	15	15	15	15	15	15	15	15	13	15	14	12	15	13	11	15	12	10	15	11	9	15	9	7	13	8	6	12	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	16	14	14	14	12	13	13	10	12	11	9	11	10	8	10	9	7
			Exposed	17	17	17	17	17	17	17	17	16	17	17	14	17	16	13	17	15	12	15	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	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	8	12	9	7	11	8	6	10	7	5	9	6	4
			Exposed	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	11	7	12	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		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	11	8	11	9	7	11	8	6	9	7	5	8	6	4	7	5	4
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	2	5	3	2
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	15	12	16	14	11	16	12	10	15	10	8	14	9	7	13	7	6	11	6	5	10	6	5
			Exposed	16	16	14	16	15	12	16	13	11	16	12	10	16	11	9	16	10	8	15	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	17	17	15	16	16	14	15	15	12	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	18	18	16	18	18	15	18	17	13	17	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
40	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	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	7	11	9	6	11	8	6	10	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	10	11	11	9	11	11	8	11	9	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	9	11	10	8	11	9	7	11	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	13	13	13	13	13	13	12	13	13	11	13	12	9	12	10	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	8	7	13	7	6	11	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	15	15	15	15	15	15	14	14	14	13	13	13	12	12	11	12	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	14	12	10	12	11	8	11	9	7	9	8	7
	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	9	11	11	8	11	10	7	11	9	6	11	8	5
			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	6	10	7	5	9	6	4	8	6	4	7	5	3
		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	10	8	6	10	7	5	9	6	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		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	12	13	13	10	12	10	8	12	9	7	11	8	6	11	7	6
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	10	13	11	9	13	9	7	13	8	6	12	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	14	13	13	12	12	12	10	11	11	9	10	10	8	10	9	7
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	14	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	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	8	12	9	7	11	8	6	10	7	5	9	6	4
			Exposed	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	11	7	12	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	11	9	7	11	8	6	9	7	5	8	6	4	7	5	4	7	5	4
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	2	5	3	2
		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	11	13	12	9	12	10	8
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	12	10	13	11	9	13	9	7	13	8	6	12	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	14	13	13	12	12	12	10	11	11	9	10	10	8	10	9	7
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	14	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
50	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	7	9	9	6	9	8	6	9	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	9	9	9	9	9	9	9	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	8	6	9	7	5	8	6	4
		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	9	11	10	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	10	8	11	8	7	11	7	6	11	7	5
		27-45	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	12	12	12	12	12	12	11	11	11	11	11	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	11	12	12	10	12	11	8	11	9	7	9	8	7	9	8	7
	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	9	6	9	8	5
			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	6	9	7	5	8	6	4	7	5	4	6	5	3
		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	6	9	7	5	8	6	4
			Exposed	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	5	8	6	4	7	5	4	6	5	3	6	4	3
		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	10	11	11	9	11	10	8	10	9	7	10	8	6	9	7	6
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	9	7	11	8	6	11	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	12	12	11	11	11	11	11	10	10	10	9	9	9	8	9	9	7
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	12	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	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	8	10	9	7	10	8	6	10	7	5	9	6	4	8	6	4
			Exposed	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	10	7	10	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	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	9	8	6	9	7	5	8	6	4	7	5	4
			Exposed	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	10	7	10	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	2	5	3	2
		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	12	10	11	10	8	11	9	7	10	7	6	10	6	5	9	6	5
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	11	9	12	10	8	12	9	7	12	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	14	14	14	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	13	13	12	12	12	11	11	10	10	10	8	10	9	7	9	8	6	8	7	6
			Exposed	14	14	14	14	14	14	14	14	13	14	14	12	13	13	11	13	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	7	8	8	6	8	8	6	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	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	6	8	7	5	8	6	4
		20-27	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	9	9	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	8	7	10	7	6	9	7	5
		27-45	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	10	10	10	10	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	10	11	11	8	10	9	7	9	8	7			
	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	6	8	8	5
			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	6	8	7	5	8	6	4	7	5	3
		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	6	7	7	5	7	6	5
			Exposed	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	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	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	9	8	9	9	7	9	8	6	8	7	6	
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	9	7	10	8	6	9	7	5	9	6	5	9	5	4	8	4	4
		27-45	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	10	10	10	10	10	10	9	9	9	9	9	8	8	8	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	9	10	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	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	8	9	9	7	9	8	6	9	7	5	9	6	4
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	6	9	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		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	7	8	8	6	8	7	5	8	6	4	7	5	4
			Exposed	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	6	9	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	9	7	9	7	6	9	6	5	8	6	5
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	7	6	10	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	11	10	10	10	9	9	8	9	9	7	8	8	6	8	7	6
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	11	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
70	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	6	7	7	6	7	7	5
		7-20	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	6	7	7	5	7	6	4	7	6	4
		20-27	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	8	8	8	7	8	7	6	8	7	5
		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	10	10	10	10	10	10	10	10	10	9	9	9	9	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	10	10	10	10	10	10	8	9	9	7	9	8	7
	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	6	7	7	5	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3
		7-20	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	6	7	7	5	6	6	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3
		20-27	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	6	8	7	6
			Exposed	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	5	8	6	5	8	5	4	8	4	4
		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	10	9	9	9	9	9	9	8	8	8	8	8	8	8	8	7
			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	9	9	8	9	8	7	8	7	6	7	6	5	6	6	4
	D	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	6	7	7	5	7	6	4	7	6	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3
		7-20	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	6	7	7	5	6	6	5	6	6	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3
		20-27	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	8	7	6	8	6	5	8	6	5
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	7	6	9	6	5	9	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	10	9	9	9	9	9	8	8	8	7	8	8	6	7	7	6
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	9	10	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
80	B	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	4
		20-27	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	6	7	7	5	7	7	5
		27-45	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	8	8	8	8	8	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	8	8	8	7	8	8	7
	C	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	3	6	5	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3
		20-27	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	6	7	7	6
			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	5	7	6	5	7	5	4	7	4	4
		27-45	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	8	8	8	8	8	8	8	8	8	7	7	7	7	7	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	8	8	8	8	8	7	8	7	6	7	6	5	6	6	4
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3
		20-27	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	7	6	7	6	5	7	6	5	7	6	5
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7	6	8	6	5	8	5	4	7	4	3	6	4	3	5	3	2
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	8	8	8	8	7	7	7	7	7	6	7	7	6
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		27-45	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	7	7	7	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	8	8	8	8	8	8	7	7	7	7
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	4
		27-45	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	7	7	7	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	7	7	7	7	7	6	7	6	5	6	6	4
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	6	7	6	5	7	6	5	7	6	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	6	5	7	5	4	7	5	4	7	4	3	6	4	3
		27-45	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	7	7	7	7	7	6	6	6	6
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	7	8	8	6	8	7	5	7	6	5	6	5	4	5	5	4
100	B	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	4
		27-45	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	7	7	7	7	7	7	7
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	4
		27-45	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	6	6	6	5	6	6	6	6	6	6	6	6	6
			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	6	6	6	5	6	6	4	6	6	4
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	4	6	4	3	6	4	3	6	4	3
		27-45	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	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	6	7	7	5	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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) | | |

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	6	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	7	5	3	6	4	3
		7-20	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	6	7	7	5	7	6	5	7	6	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3	5	3	2
		20-27	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	7	9	8	6	9	7	6	9	6	5
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	8	9	8	6	9	7	5	9	6	5	9	5	4	8	4	4	7	4	3
		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	10	10	10	10	10	10	9	9	9	8	9	9	7	8	8	6
			Exposed	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	8	7	6	7	6	5	6	6	4	5	5	4
	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	6	7	7	5	7	7	5	7	6	4	7	5	3	6	4	3
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	7	5	7	6	4	7	5	3	6	4	3	5	4	2	5	3	2	4	3	2
		7-20	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	3	6	4	3	5	4	3
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	7	5	7	6	5	7	6	4	7	5	4	6	4	3	5	4	3	4	3	2	4	3	2	3	2	2
		20-27	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	8	7	9	8	6	9	7	5	8	5	4	8	5	4	7	4	3
			Exposed	9	9	9	9	9	9	9	9	8	9	9	7	9	8	6	9	7	6	9	6	5	9	5	4	8	5	4	7	4	3	6	3	3	5	3	2	5	3	2
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	8	8	8	6	7	7	5	7	6	5	6	6	4	6	5	4
			Exposed	10	10	10	10	10	10	10	10	9	10	10	9	10	10	8	10	9	7	9	8	6	8	7	5	6	6	4	6	5	4	5	4	3	4	4	3	4	3	2
	D	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	4	2
			Exposed	7	7	7	7	7	7	7	7	6	7	7	5	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	5	4	6	5	3	6	4	3	5	3	2	4	3	2
			Exposed	7	7	7	7	7	7	7	7	6	7	7	5	7	7	6	7	5	4	7	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	2	2	3	2	1
		20-27	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	7	9	7	6	9	6	5	8	5	4	8	4	4	7	4	3	6	3	3
			Exposed	9	9	8	9	9	7	9	7	6	9	7	6	9	6	5	9	6	5	9	5	4	8	4	4	7	4	3	6	3	3	5	3	2	4	2	2	4	2	2
		27-45	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	9	10	10	8	9	9	7	8	7	6	7	6	5	6	6	4	5	5	4	5	4	3
			Exposed	11	11	10	11	11	9	11	10	8	10	9	7	9	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
40	B	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2
		20-27	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	6	8	7	6	7	6	5
			Exposed	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	7	5	8	6	5	8	5	4	8	4	4	7	4	3
		27-45	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	8	8	8	8	8	8	7	7	7	7	7	6
			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	8	7	6	7	6	5	6	6	4	5	5	4
	C	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	3	6	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	3	6	4	3	5	4	2	5	3	2	4	3	2
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	3	6	4	3	5	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	4	3	2	4	3	2	3	2	2
		20-27	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	7	6	7	6	5	7	5	4	6	4	3
			Exposed	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	8	6	8	7	5	8	6	4	7	4	3	6	3	3	5	3	2	5	3	2	5	3	2
		27-45	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	7	7	7	6	7	7	5	6	6	4	6	5	3	6	4	2
			Exposed	9	9	9	9	9	9	9	9	8	9	9	7	9	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
	D	0-7	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	4	2
			Exposed	7	7	7	7	7	7	7	7	6	7	7	5	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	5	4	6	5	3	6	4	3	5	3	2	4	3	2
			Exposed	7	7	7	7	7	7	7	7	6	7	7	5	7	7	6	7	5	4	7	6	4	7	5	3	6	4	3	5	3	2	4	3	2	4	2	2	3	2	1
		20-27	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	7	8	7	6	8	6	5	7	5	4	7	4	4	7	4	3	6	3	3
			Exposed	8	8	8	8	8	7	8	8	6	8	8	6	8	8	6	8	8	6	8	7	5	8	6	4	7	4	3	6	3	3	5	3	2	5	3	2	4	2	2
		27-45	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	7	7	7	6	7	6	5	6	6	4	5	5	4	5	4	3
			Exposed	9	9	9	9	9	9	9	9	8	9	9	7	9	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
50	B	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	5	5	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	3	6	4	3	5	3	2	5	3	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	4	4	6	4	3
		27-45	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	7	7	7	7	7	7	7	7	6
			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	7	7	6	7	6	5	6	6	4	5	5	4
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	5	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	5	4	2	5	3	2	4	3	2
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4	5	5	3	5	4	3	5	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	4	3	2	4	3	2	3	2	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	5	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	4	3	6	3	3	5	3	2	5	3	2
		27-45	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	7	7	7	7	7	6	6	6	5	6	6	5	5	5	4
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	7	7	5	6	6	4	5	4	3	4	3	3	4	4	3	4	3	2
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	6	6	4	6	5	3	6	4	3	5	4	2	4	3	2
			Exposed	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4	6	5	3	6	4	3	5	4	2	4	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	3	5	4	3	5	3	2	4	3	2
			Exposed	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	3	6	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1	3	2	1
		20-27	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	6	5	6	5	4	6	4	4	6	4	3	6	3	3
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	5	4	7	4	4	7	4	3	6	3	3	5	3	2	4	2	2	4	2	2	4	2	2
		27-45	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	7	7	7	7	7	6	6	6	5	6	6	4	5	5	4
			Exposed	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	4	6	4	3
		27-45	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	6	6	6	6	6	6	6	6	6
			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	6	6	6	5	6	6	4	5	5	4	5	5	4
	C	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3	4	4	2	4	4	2	4	3	2	4	3	2
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	4	4	3	4	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	4	3	2	4	3	2	3	2	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	5	5	5	4	5	4	4	5	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	4	6	4	3	5	3	3	5	3	2	5	3	2
		27-45	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	5	6	6	4	6	5	4	5	4	3	4	4	3	4	3	2
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	4	3	5	4	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	4	3	2	4	3	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	4	3	4	2	4	3	2	3	2	1	3	2	1	
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	5	4	4	5	4	3	5	3	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	4	6	4	3	6	3	3	5	3	2	4	2	2	4	2	2
		27-45	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	5	5	5	4	5	5	4	5	4	3
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
70	B	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	4	5	4	3	5	4	3
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4	5	5	4	5	5	4
	C	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	2	4	4	2	4	3	2	4	3	2
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3	4	4	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	3	2	2	3	2	2
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	4	4	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	4	3	3	4	3	2	4	3	2
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	5	5	5	4	5	5	4	5	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
	D	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3	4	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	4	3	2	3	2	1	3	2	1
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	4	5	4	3	5	3	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	5	3	3	4	3	2	4	2	2	4	2	2
		27-45	Interior	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	4	5	5	4	4	4	4	4	4	3
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	5	5	5	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
80	B	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	5	4
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	2
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	3	2	4	3	2	4	3	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	4	4	3	4	3	2	4	3	2
	D	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3	4	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	4	3	2	3	2	1	3	2	1
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	3	3	4	3	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	5	3	3	4	3	2	4	2	2	4	2	2
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	2
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	3	2	4	3	2	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	3	4	4	3	4	3	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2	3	2	1	
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1			
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3			
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	3	4	3	2	4	2	2			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	3			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	4	4	3	4	3	3	3	3	2			
100	B	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2	3	2	1	
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1			
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3			
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	3	4	3	2	4	2	2			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	3			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	4	3	3	3	3	2			

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	26	19	26	23	16	26	20	14	24	17	12	21	15	10	18	13	9	16	11	8
			Exposed	26	26	23	26	26	21	26	26	18	26	24	17	26	21	15	26	19	14	25	18	12	21	15	10	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5
		7-20	Interior	26	26	26	26	26	26	26	26	25	26	26	23	26	26	20	26	25	19	26	23	17	26	19	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7
			Exposed	26	26	20	26	25	18	26	22	16	26	20	15	25	18	13	23	16	12	21	15	11	17	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	23	26	25	21	26	21	17	26	18	15	26	15	13	23	13	11	20	12	10	18	10	9
			Exposed	26	26	25	26	26	22	26	24	20	26	22	18	26	19	16	26	18	15	26	16	13	24	14	11	20	12	9	17	10	8	15	9	7	13	8	6	12	7	5
		27-45	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	21	25	22	18	22	19	15	19	17	13	17	15	12	15	13	10
			Exposed	26	26	26	26	26	26	26	26	24	26	26	21	26	24	19	25	22	17	23	20	16	19	17	13	16	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	C	0-7	Interior	26	26	25	26	26	22	26	26	20	26	25	18	26	23	16	26	21	14	26	19	13	22	16	11	19	13	9	16	12	8	14	10	7	12	9	6	11	8	5
			Exposed	26	23	16	26	20	14	25	18	13	23	16	11	20	15	10	18	13	9	17	12	8	14	10	7	12	9	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	26	26	22	26	26	19	26	23	17	26	21	15	26	19	14	24	17	13	22	16	12	18	13	10	16	11	8	13	10	7	12	8	6	10	7	5	9	7	5
			Exposed	26	19	14	23	17	12	21	15	11	19	14	10	17	12	9	15	11	8	14	10	7	12	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		20-27	Interior	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	10	18	11	9	16	9	8	14	8	7	12	7	6
			Exposed	26	21	17	26	18	15	26	16	13	26	15	12	23	13	11	21	12	10	19	11	9	16	9	8	14	8	6	12	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	26	26	26	26	26	26	26	26	25	26	26	22	26	26	20	26	24	18	24	21	17	20	18	14	17	15	12	15	13	10	13	12	9	11	10	8	10	9	7
			Exposed	26	26	20	26	23	18	23	21	16	21	18	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	D	0-7	Interior	26	26	20	26	26	18	26	23	16	26	21	15	26	19	13	24	17	12	22	16	11	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5	9	6	4
			Exposed	26	19	13	23	17	12	21	15	10	19	13	9	17	12	8	15	11	8	14	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	26	24	18	26	22	16	26	19	14	24	17	13	22	16	12	20	14	10	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	22	16	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	26	26	22	26	23	19	26	21	17	26	19	15	26	17	14	26	15	13	25	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
			Exposed	26	17	14	26	15	12	24	14	11	21	12	10	19	11	9	17	10	8	16	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	26	26	26	26	26	23	26	26	21	26	24	19	24	21	17	22	19	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	24	21	17	21	19	15	19	17	13	17	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
10	B	0-7	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	20	14	21	17	12	21	15	10	18	13	9	16	11	8
			Exposed	21	21	21	21	21	21	21	21	18	21	21	17	21	21	15	21	19	14	21	18	12	21	15	10	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5
		7-20	Interior	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	10	17	12	9	15	11	8	13	10	7
			Exposed	21	21	20	21	21	18	21	21	16	21	20	15	21	18	13	21	16	12	21	15	11	17	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
		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	17	24	18	15	24	15	13	23	13	11	20	12	10	18	10	9
			Exposed	24	24	24	24	24	22	24	24	20	24	22	18	24	19	16	24	18	15	24	16	13	24	14	11	20	12	9	17	10	8	15	9	7	13	8	6	12	7	5
		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	21	25	22	18	22	19	15	19	17	13	17	15	12	15	13	10
			Exposed	25	25	25	25	25	25	25	25	24	25	25	21	25	24	19	25	22	17	23	20	16	19	17	13	16	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	C	0-7	Interior	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	14	21	19	13	21	16	11	19	13	9	16	12	8	14	10	7	12	9	6	11	8	5
			Exposed	21	21	16	21	20	14	21	18	13	21	16	11	20	15	10	18	13	9	17	12	8	14	10	7	12	9	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	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	13	10	7	12	8	6	10	7	5	9	7	5
			Exposed	21	19	14	21	17	12	21	15	11	19	14	10	17	12	9	15	11	8	14	10	7	12	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		20-27	Interior	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
			Exposed	24	21	17	24	18	15	24	16	13	24	15	12	23	13	11	21	12	10	19	11	9	16	9	8	14	8	6	12	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	25	25	25	25	25	25	25	25	25	25	25	22	25	25	20	25	24	18	24	21	17	20	18	14	17	15	12	15	13	10	13	12	9	11	10	8	10	9	7
			Exposed	25	25	20	25	23	18	23	21	16	21	18	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	D	0-7	Interior	21	21	20	21	21	18	21	21	16	21	21	15	21	19	13	21	17	12	21	16	11	18	13	9	15	11	8	13	10	7	12	8	6	10	7	5	9	6	4
			Exposed	21	19	13	21	17	12	21	15	10	19	13	9	17	12	8	15	11	8	14	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	21	21	18	21	21	16	21	19	14	21	17	13	21	16	12	20	14	10	18	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	21	16	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	24	24	22	24	23	19	24	21	17	24	19	15	24	17	14	24	15	13	24	14	12	21	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
			Exposed	24	17	14	24	15	12	24	14	11	21	12	10	19	11	9	17	10	8	16	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	26	26	26	26	26	23	26	26	21	26	24	19	24	21	17	22	19	15	20	18	14	17	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	24	21	17	21	19	15	19	17	13	17	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
20	B	0-7	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	15	10	15	13	9	15	11	8	13	10	7	12	8	6
			Exposed	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	10	7	12	8	6	10	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	12	15	14	10	15	12	9	15	11	8	13	10	7	10	7	5
			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	7	11	8	6	10	7	5	9	6	4
		20-27	Interior	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	13	11	19	12	10	18	10	9	18	10	9
			Exposed	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	18	15	19	16	13	19	14	11	19	12	9	17	10	8	15	9	7	13	8	6	12	7	5
		27-45	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	19	19	15	18	17	13	17	15	12	15	13	10
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	20	16	19	17	13	16	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	C	0-7	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	12	8	14	10	7	12	9	6	11	8	5
			Exposed	15	15	15	15	15	14	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	12	9	6	10	7	5	9	6	4	8	6	4	7	5	3	6	4	3
		7-20	Interior	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	8	13	10	7	12	8	6	10	7	5	9	7	5
			Exposed	15	15	14	15	15	12	15	15	11	15	14	10	15	12	9	15	11	8	14	10	7	12	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		20-27	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	17	14	19	14	12	19	12	10	18	11	9	16	9	8	14	8	7	12	7	6
			Exposed	19	19	17	19	18	15	19	16	13	19	15	12	19	13	11	19	12	10	19	11	9	16	9	8	14	8	6	12	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	20	20	17	19	18	14	17	15	12	15	13	10	13	12	9	11	10	8	10	9	7
			Exposed	21	21	20	21	21	18	21	21	16	21	18	15	19	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	D	0-7	Interior	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	10	7	12	8	6	10	7	5	9	6	4
			Exposed	15	15	13	15	15	12	15	15	10	15	13	9	15	12	8	15	11	8	14	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	14	10	15	13	10	15	11	8	13	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	15	15	11	15	14	10	15	12	9	15	11	8	14	10	7	13	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	19	19	19	19	19	19	19	19	17	19	19	15	19	17	14	19	15	13	19	14	12	19	12	10	18	10	8	15	9	7	13	8	6	12	7	5	10	6	5
			Exposed	19	17	14	19	15	12	19	14	11	19	12	10	19	11	9	17	10	8	16	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	22	22	22	22	22	22	22	22	21	22	22	19	21	21	17	20	19	15	19	18	14	17	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	22	21	17	21	19	15	19	17	13	17	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	12	9	12	11	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	12	9	12	11	8	12	10	7	12	8	6	10	7	5
		7-20	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	10	12	12	9	12	11	8	12	10	7	12	9	7
			Exposed	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	8	12	9	7	11	8	6	10	7	5	9	6	4
		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	15	15	15	13	15	13	11	15	12	10	15	10	9	15	12	10
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	14	11	15	12	9	15	10	8	15	9	7	13	8	6	12	7	5
		27-45	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	16	16	15	15	15	13	15	15	12	14	13	10
			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	16	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	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	9	12	12	8	12	10	7	12	9	6	11	8	5
			Exposed	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	10	7	12	9	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	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	11	8	12	10	7	11	8	6	10	7	5	9	7	5
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		20-27	Interior	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	12	10	15	11	9	14	9	8	13	8	7	12	7	6
			Exposed	15	15	15	15	15	15	15	15	13	15	15	12	15	13	11	15	12	10	15	11	9	15	9	8	14	8	6	12	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	16	14	15	15	12	14	13	10	13	12	9	11	10	8	10	9	7
			Exposed	17	17	17	17	17	17	17	17	16	17	17	15	17	17	13	17	15	12	16	14	11	13	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	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	8	12	10	7	12	8	6	10	7	5	9	6	4
			Exposed	12	12	12	12	12	12	12	12	10	12	12	9	12	12	8	12	11	8	12	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	10	12	11	8	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	15	13	16	14	12	16	12	10	15	10	8	14	9	7	13	8	6	12	7	5	10	6	5
			Exposed	16	16	14	16	15	12	16	14	11	16	12	10	16	11	9	16	10	8	16	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	15	17	17	14	15	15	12	14	13	10	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	18	18	17	18	18	15	18	17	13	17	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
40	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	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	10	7	11	8	6	10	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	10	11	11	9	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	11	11	11	9	11	11	8	11	9	7	11	8	6	10	7	5	9	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	13	13	13	13	13	13	11	13	12	10	13	10	9	13	10	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	12	9	13	10	8	13	9	7	13	8	6	12	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	15	15	15	15	15	15	14	14	14	14	14	13	13	13	12	12	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	15	11	14	13	10	12	11	9	11	10	8	10	8	7
	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	9	11	11	8	11	10	7	11	9	6	11	8	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	7	11	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		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	10	11	11	8	11	10	7	10	8	6	10	7	5	9	7	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	7	11	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		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	12	13	13	11	13	12	9	12	9	8	11	8	7	11	7	6
			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	12	9	13	11	8	12	10	8	11	8	6	10	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	15	15	15	15	15	15	15	15	13	14	13	12	12	12	10	12	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	13	15	15	11	14	13	10	12	11	9	11	10	8	10	8	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	8	12	10	7	12	8	6	10	7	5	9	6	4
			Exposed	12	12	12	12	12	12	12	12	10	12	12	9	12	12	8	12	11	8	12	10	7	12	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	10	12	11	8	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	9	7	12	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	12	10	13	10	8	13	9	7	12	8	6	11	7	5	10	6	5
			Exposed	14	14	14	14	14	12	14	14	11	14	12	10	14	11	9	14	10	8	14	9	7	13	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	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	12	11	9	11	10	8	9	8	7	8	7	6
			Exposed	16	16	16	16	16	15	16	16	13	16	15	12	16	14	11	14	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
50	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	8	9	9	7	9	8	6	9	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	10	10	10	10	10	10	10	10	10	10	10	10	9	10	9	7
			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	8	10	9	7	10	8	6	10	7	5	9	6	4
		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	10	11	10	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	9	11	10	8	11	9	7	11	8	6	11	7	5
		27-45	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	12	12	12	11	11	11	11	11	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	11	13	13	10	12	11	9	11	10	8	10	8	7	10	8	7
	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	9	6	9	8	5
			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	6	9	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	10	10	10	8	9	9	7	9	8	6	9	7	5	8	7	5
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	9	6	10	7	5	9	6	5	8	5	4	7	5	3	6	4	3
		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	10	11	11	9	10	9	8	10	8	7	10	7	6	10	7	6
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	9	8	11	8	6	11	7	6	10	6	5	9	5	4	8	5	4
		27-45	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	12	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	12	12	9	11	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	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	8	10	10	8	10	10	7	10	8	6	10	7	5	9	6	4
			Exposed	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	8	10	10	7	10	8	6	10	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		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	8	10	9	7	10	8	6	9	7	5	8	6	4	7	5	4
			Exposed	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	10	7	10	10	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		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	10	12	10	8	11	9	7	11	8	6	10	7	5	10	6	5
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	11	9	12	10	8	12	9	7	12	8	6	11	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	12	12	12	11	11	10	11	11	9	10	10	8	9	8	7	8	7	6
			Exposed	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	13	13	10	13	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	8	8	7	8	8	6	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	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	6	8	7	5	8	6	4
		20-27	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	9	10	10	8	10	9	7	10	8	6	10	7	5
		27-45	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	11	11	11	11	11	11	10	10	10	10	10	10
			Exposed	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	11	11	10	11	11	9	10	10	8	10	8	7
	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	6	8	8	5
			Exposed	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	5	8	6	4	8	6	4	7	5	3
		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	6	8	7	5	7	7	5
			Exposed	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	5	8	6	5	8	5	4	7	5	3	6	4	3
		20-27	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	9	9	8	9	8	7	9	7	6	9	7	6
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	9	8	10	8	6	10	7	6	9	6	5	9	5	4	8	5	4
		27-45	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	10	10	10	10	10	10	9	9	9	9	9	8	8	8	7
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	9	10	10	8	10	9	7	8	7	6	7	7	5	6	6	5
	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	8	9	9	7	9	8	6	9	7	5	9	6	4	7	5	4
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	8	9	9	7	9	8	6	9	7	5	9	6	4	7	5	4	7	5	3	6	4	3
		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	7	8	8	6	8	7	5	8	6	4	7	5	4
			Exposed	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	6	9	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		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	10	10	10	8	10	9	7	9	8	6	9	7	5	9	6	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	10	8	11	9	7	11	8	6	10	7	5	10	6	5	8	5	4	7	4	3	7	4	3
		27-45	Interior	13	13	13	13	13	13	13	13	13	13	13	13	12	12	12	12	12	12	12	12	12	11	11	11	10	10	10	10	10	9	9	9	8	9	8	7	8	7	6
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	12	12	11	12	12	10	12	12	9	11	10	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
70	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	7	7	7	6	7	7	5
		7-20	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	6	7	7	5	7	6	4	7	6	4
		20-27	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	8	6	9	7	5	9	7	5
		27-45	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	10	10	10	10	10	10	9	9	9	9	9	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	11	10	10	10	10	10	9	9	9	8	9	8	7
	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	6	7	7	5	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	6	4	7	5	3	6	4	3
		7-20	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	6	7	7	5	7	7	5	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	7	5	4	7	5	3	6	4	3
		20-27	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	8	8	8	8	8	8	7	8	7	6	5
			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	8	6	9	7	6	8	6	5	8	5	4	8	5	4
		27-45	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	9	9	9	8	9	9	7	8	7	6	7	7	5	6	6	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	9	9	9	8	9	9	7	8	7	6	7	7	5	6	6	5
	D	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	6	7	7	5	7	6	4	7	5	4
			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	7	7	7	7	7	7	7
		7-20	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	7	7	7	7	7	7	7
		20-27	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	6	7	7	5	7	6	5
			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	6	8	7	5	7	6	4
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4
80	B	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4
		20-27	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	7	7	7	6	7	7	5
		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	10	10	10	10	9	9	9	9	9	9	9	9	9	8	8	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	10	9	9	9	9	9	9	9	8	8	8	8	7
	C	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4	6	5	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	5	3	6	4	3
		20-27	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	6
			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	6	7	7	6	7	6	5	7	5	4	7	5	4
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	7	7	7	7	7
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	8	8	8	7	8	7	6	7	7	5	6	6	5
	D	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	6	7	7	5	7	6	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	7	5	3	6	4	3
		7-20	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	6	7	7	5	6	6	4	6	5	4	6	5	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	6	7	7	5	7	6	5
			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	5	4	7	4	3	7	4	3
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	8	8	8	8	8	8	8	7	7	7	7	6
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	8	9	8	6	8	7	6	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
		20-27	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	6	7	7	5	7	7	5
		27-45	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	8	8	8	8	8	8	8	8	8	7
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	
		20-27	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	6
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	6	5	7	5	4	7	5	4	7	5	4
		27-45	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	7	7	7	7	7	7	7	7	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	7	7	6	7	7	5	6	6	5
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	6	7	7	5	7	6	5			
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	7	5	4	7	4	3	7	4	3
		27-45	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	8	8	8	8	8	8	7	7	7	7	7	7	7	7	6
			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	8	8	6	8	7	6	7	6	5	6	5	4	5	5	4
100	B	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		27-45	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	7	7	7	7	7	7	7	7	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	8	7	7	7	7	7	7	7	7	7
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4
		27-45	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	7	7	7	7	7	7	6	6	6	6	6	6	6	6	5
			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	6	7	7	6	7	6	5	6	5	4	5	5	4
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3			
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2			
		20-27	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	6	6	6	5	6	6	5						
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	6	4	3	6	4	3			
		27-45	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	7	7	7	7	7	7	7	7	7	6	6	6			
			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	6	7	7	6	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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) | | |

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4			
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	5	6	6	4	6	5	3			
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	5	3	2	4	3	2
		20-27	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	6	7	6	5	7	6	5	7	5	4			
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	7	5	4	7	4	3	6	4	3	6	3	2
		27-45	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	7	7	6	7	7	6	7	6	5
			Exposed	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	7	5	7	6	5	6	5	4	5	5	4	5	4	3
	C	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4	6	5	3	6	4	3	5	4	2
			Exposed	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	5	3	6	4	4	6	4	3	5	3	2	4	3	2	3	2	1
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	3	5	4	3	5	3	2	4	3	2
			Exposed	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1
		20-27	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	6	5	7	5	4	7	4	4	6	4	3	6	3	3
			Exposed	7	7	7	7	7	7	6	7	7	6	7	6	5	7	6	5	7	5	4	7	4	4	7	4	3	6	3	3	5	3	2	4	2	2	4	2	2			
		27-45	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	7	7	6	7	6	5	6	6	4	5	5	4	5	4	3
			Exposed	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	6	8	7	5	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2
			Exposed	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2	3	2	2	3	2	1	3	2	1
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	3	5	4	3	5	3	2	4	3	2	4	2	2
			Exposed	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2	3	2	2	3	2	1	2	2	1	2	1	1			
		20-27	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	7	6	8	6	5	7	5	4	7	4	3	6	4	3	6	3	2	5	3	2
			Exposed	8	8	7	8	7	6	8	7	5	8	6	5	8	6	4	8	5	4	8	4	3	6	4	3	5	3	2	5	3	2	4	2	2	3	2	1	3	2	1
		27-45	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	7	8	8	7	7	7	6	7	6	5	6	5	4	5	5	4	4	4	3	4	3	3
			Exposed	9	9	8	9	9	7	9	8	6	8	7	6	8	7	5	7	6	5	6	6	4	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2
40	B	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2	4	3	2	4	3	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4			
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	3	6	4	3	6	3	2
		27-45	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	6	6	6	6	6	6	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	6	5	4	5	5	4	5	4	3
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	4	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	4	3	5	3	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2	4	3	2	4	3	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4			
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	3	6	4	3	6	3	2
		27-45	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	6	6	6	6	6	6	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	5	6	5	4	5	5	4	5	4	3			
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	4	2	2	3	2	1	3	2	1	3	2	1
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	4	3	2	4	3	2	4	2	2
			Exposed	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	4	3	5	3	2	4	3	2	4	3	2	3	2	1	3	2	1	3	2	1
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	4	5	4	3	5	4	3	5	3	2
			Exposed	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2	3	2	2	3	2	1	3	2	1
		27-45	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	6	6	5	6	6	5	6	6	4	5	5	4	4	4	3	4	3	3
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	7	5	6	6	5	6	6	4	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2
50	B	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4			
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	4	4	3			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2	4	3	2	4	3	2
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5			
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	5	3	2	4	3	2
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	5	5	4	5	4	3			
	C	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4			
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	3	4	4	3	4	3	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	4	4	3	4	3	2	4	3	2	4	3	2	4	3	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5			
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	5	5	4	5	4	3			
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	5	5	4	5	4	3	4	3	3	3	3	2	3	2	2
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	4	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	3	2	4	3	2	4	3	2	3	2	1	3	2	1	3	2	1
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	4	3	2	4	3	2	4	2	2
			Exposed	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3	5	4	3	5	3	2	4	3	2	4	3	2	3	2	1	3	2	1	3	2	1
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	4	5	4	3	5	4	3	5	3	2
			Exposed	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2	4	3	2	3	2	2	3	2	1	3	2	1
		27-45	Interior	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	5	5	5	5	5	4	5	5	4	4	4	3	4	3	3
			Exposed	7	7	7	7	7	7	7	7	6	7	7	6	7	7	5	6	6	5	6	6	4	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2			
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	5	4	3	5	3	2			
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	4	5	5	4	5	4	3				
	C	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	2	
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	4	3	2	3	2	1
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	3	3	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	4	2	2	3	2	1	3	2	1
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	4	3	4	4	3	4	3	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	4	5	4	3	5	3	3	4	3	2	4	2	2	4	2	2
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	4	5	5	4	4	4	4	4	4	4	3
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4	5	5	4	5	4	3	4	3	3	3	3	2	3	3	2
	D	0-7	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	3	2	2	3	2	1	3	2	1
		7-20	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	4	2	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	3	4	3	2	4	3	2	3	2	1	2	2	1	2	1	1			
		20-27	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	3	4	4	3	4	3	2	4	3	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2	4	2	2	3	2	1	3	2	1			
		27-45	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	4	3	3	
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	6	4	5	5	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2
70	B	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2				
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	3			
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1			
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1			
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	3	4	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	3	2	4	2	2	4	2	2			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	4	4	3	4	3	3	4	3	2	4	3	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1	
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1	
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	2	2	4	2	2			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	3	4	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2
80	B	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
	C	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1			
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1			
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	2	2			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	3	3
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	2	3	3	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	1			
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1			
		20-27	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	4	3	2	4	3	2
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	3	2	4	3	2	3	2	2	3	2	1			
		27-45	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	4	3	3	3	3	2	3	3	2
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
	C	0-7	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	1
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	2	2	3	2	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	2
	D	0-7	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	3	2	1
		7-20	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	1	2	2	1	2	1	1
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2	2	3	2	2	3	2	1	3	2	1
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2
100	B	0-7	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3
	C	0-7	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	1
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	2	2	3	2	2
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2
	D	0-7	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	1
		7-20	Interior	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Exposed	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1
		20-27	Interior	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
			Exposed	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	2	1	3	2	1
		27-45	Interior	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
			Exposed	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	2	3	2	2	2	2	2

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	21	25	25	19	25	23	16	25	19	13	23	17	12	20	14	10	18	13	9	16	11	8
			Exposed	25	25	23	25	25	20	25	25	18	25	23	16	25	21	15	25	19	13	24	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	22	25	25	20	25	25	18	25	23	17	25	19	14	22	16	12	19	14	10	17	12	9	15	11	8	13	9	7
			Exposed	25	25	20	25	24	18	25	22	16	25	19	14	24	18	13	22	16	12	20	15	11	17	12	9	14	10	8	12	9	7	11	8	6	9	7	5	8	6	4
		20-27	Interior	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	21	17	25	18	14	25	15	12	23	13	11	20	12	9	18	10	8			
			Exposed	25	25	24	25	25	21	25	23	19	25	21	17	25	19	16	25	17	14	25	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	6	11	7	5
		27-45	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	20	25	22	17	21	19	15	18	17	13	16	14	11	14	13	10
			Exposed	26	26	26	26	26	26	26	26	23	26	26	21	26	24	19	24	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	C	0-7	Interior	25	25	24	25	25	21	25	25	19	25	25	17	25	22	16	25	20	14	25	18	13	21	15	11	18	13	9	16	11	8	14	10	7	12	9	6	11	8	5
			Exposed	25	22	15	25	20	14	25	18	12	22	16	11	20	14	10	18	13	9	16	12	8	14	10	7	12	8	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	25	25	21	25	25	19	25	23	17	25	21	15	25	19	14	23	17	12	21	15	11	18	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	5
			Exposed	25	19	14	23	16	12	20	15	11	18	13	10	17	12	9	15	11	8	14	10	7	12	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	Interior	25	25	25	25	25	23	25	25	20	25	22	18	25	20	17	25	18	15	25	17	14	24	14	12	21	12	10	18	10	8	16	9	7	14	8	6	12	7	6
			Exposed	25	20	16	25	18	15	25	16	13	25	14	12	23	13	11	21	12	10	19	11	9	16	9	7	13	8	6	12	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	26	26	26	26	26	26	26	26	24	26	26	22	26	25	20	26	23	18	23	21	17	20	18	14	17	15	12	15	13	10	13	11	9	11	10	8	10	9	7
			Exposed	26	25	20	25	22	18	22	20	16	20	18	14	18	16	13	17	15	12	15	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	D	0-7	Interior	25	25	20	25	25	18	25	23	16	25	20	14	25	18	13	23	17	12	21	15	11	18	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
			Exposed	25	18	13	23	16	11	20	15	10	18	13	9	16	12	8	15	11	7	14	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	25	24	17	25	21	15	25	19	14	24	17	12	21	15	11	19	14	10	18	13	9	15	11	8	13	9	7	11	8	6	9	7	5	8	6	4	7	5	4
			Exposed	21	15	11	19	14	10	17	12	9	15	11	8	14	10	7	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	25	25	21	25	23	19	25	21	17	25	18	15	25	17	14	25	15	12	24	14	11	20	12	10	17	10	8	15	9	7	13	7	6	11	6	5	10	6	5
			Exposed	25	17	14	25	15	12	23	13	11	21	12	10	19	11	9	17	10	8	15	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	26	26	25	26	26	23	26	26	20	26	23	18	23	21	16	21	19	15	19	17	14	16	15	12	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	23	21	16	21	19	15	19	17	13	17	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
10	B	0-7	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	19	13	20	17	12	20	14	10	18	13	9	16	11	8
			Exposed	20	20	20	20	20	20	20	20	18	20	20	16	20	20	15	20	19	13	20	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	17	20	19	14	20	16	12	19	14	10	17	12	9	15	11	8	13	9	7
			Exposed	20	20	20	20	20	18	20	20	16	20	19	14	20	18	13	20	16	12	20	15	11	17	12	9	14	10	8	12	9	7	11	8	6	9	7	5	8	6	4
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	21	17	23	18	14	23	15	12	23	13	11	20	12	9	18	10	8
			Exposed	23	23	23	23	23	21	23	23	19	23	21	17	23	19	16	23	17	14	23	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	6	11	7	5
		27-45	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	22	17	21	19	15	18	17	13	16	14	11	14	13	10
			Exposed	25	25	25	25	25	25	25	25	23	25	25	21	25	24	19	24	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	C	0-7	Interior	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	20	20	14	20	18	13	20	15	11	18	13	9	16	11	8	14	10	7	12	9	6	11	8	5
			Exposed	20	20	15	20	20	14	20	18	12	20	16	11	20	14	10	18	13	9	16	12	8	14	10	7	12	8	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	20	20	20	20	20	19	20	20	17	20	20	15	20	19	14	20	17	12	20	15	11	18	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	5
			Exposed	20	19	14	20	16	12	20	15	11	18	13	10	17	12	9	15	11	8	14	10	7	12	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	20	23	23	18	23	18	14	23	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	6	11	7	5
			Exposed	23	23	23	23	23	21	23	23	19	23	21	17	23	19	16	23	17	14	23	16	13	23	13	11	20	11	9	17	10	8	15	8	7	13	7	6	11	7	5
		27-45	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	22	17	21	19	15	18	17	13	16	14	11	14	13	10
			Exposed	25	25	25	25	25	25	25	25	23	25	25	21	25	24	19	24	22	17	22	20	16	19	17	13	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	D	0-7	Interior	20	20	20	20	20	18	20	20	16	20	20	14	20	18	13	20	17	12	20	15	11	18	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
			Exposed	20	18	13	20	16	11	20	15	10	18	13	9	16	12	8	15	11	7	14	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	20	20	17	20	20	15	20	19	14	20	17	12	20	15	11	19	14	10	18	13	9	15	11	8	13	9	7	11	8	6	9	7	5	8	6	4	7	5	4
			Exposed	20	15	11	19	14	10	17	12	9	15	11	8	14	10	7	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	24	24	21	24	23	19	24	21	17	24	18	15	24	17	14	24	15	12	24	14	11	20	12	10	17	10	8	15	9	7	13	7	6	11	6	5	10	6	5
			Exposed	24	17	14	24	15	12	23	13	11	21	12	10	19	11	9	17	10	8	15	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	25	25	25	25	25	23	25	25	20	25	23	18	23	21	16	21	19	15	19	17	14	16	15	12	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	23	21	16	21	19	15	19	17	13	17	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
20	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	12	15	15	10	15	13	9	15	11	7	13	9	6	11	8	5
			Exposed	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	12	9	15	11	7	13	9	6	11	8	6	10	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	12	15	15	10	15	14	10	15	12	9	15	11	8	13	9	7	10	7	5
			Exposed	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	11	15	12	9	14	10	8	12	9	7	11	8	6	9	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	17	18	18	14	18	15	12	18	13	11	18	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	8	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	20	20	20	20	20	17	19	19	15	18	17	13	16	14	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
	C	0-7	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	14	10	7	12	9	6	11	8	5
			Exposed	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	13	9	15	12	8	14	10	7	12	8	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	Interior	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	11	8	13	9	7	11	8	6	10	7	5	9	6	5
			Exposed	15	15	14	15	15	12	15	15	11	15	13	10	15	12	9	15	11	8	14	10	7	12	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	17	14	18	14	12	18	12	10	17	10	8	16	9	7	14	8	6	12	7	6
			Exposed	18	18	16	18	18	15	18	16	13	18	14	12	18	13	11	18	12	10	18	11	9	16	9	7	13	8	6	12	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	17	15	12	15	13	10	13	11	9	11	10	8	10	9	7			
			Exposed	20	20	20	20	20	18	20	20	16	20	18	14	18	16	13	17	15	12	15	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	D	0-7	Interior	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	11	15	13	9	15	11	8	13	9	7	11	8	6	10	7	5	9	6	4
			Exposed	15	15	13	15	15	11	15	15	10	15	13	9	15	12	8	15	11	7	14	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	15	15	15	15	15	15	15	15	14	15	15	12	15	15	11	15	14	10	15	13	9	15	11	8	13	9	7	11	8	6	9	7	5	8	6	4	7	5	4
			Exposed	15	15	11	15	14	10	15	12	9	15	11	8	14	10	7	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	19	19	19	19	19	19	19	19	17	19	18	15	19	17	14	19	15	12	19	14	11	19	12	10	17	10	8	15	9	7	13	7	6	11	6	5	10	6	5
			Exposed	19	17	14	19	15	12	19	13	11	19	12	10	19	11	9	17	10	8	15	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	20	19	15	19	17	14	16	15	12	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	21	21	16	21	19	15	19	17	13	17	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	12	9	12	11	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	12	9	12	11	7	12	9	6	11	8	6	10	7	5
		7-20	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	10	12	12	9	12	11	8	11	9	7
			Exposed	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	10	8	12	9	7	11	8	6	9	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	15	15	15	15	15	15	15	15	15	14	15	15	12	15	13	11	15	12	9	14	10	8
			Exposed	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	15	8	7	13	7	6	11	7	5
		27-45	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	16	16	15	15	15	13	14	14	11	13	13	10
			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	16	14	11	14	12	10	12	11	8	11	9	7	9	8	7
	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	9	12	11	8	12	10	7	12	9	6	11	8	5
			Exposed	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	10	7	12	8	6	10	7	5	9	6	4	8	6	4	7	5	3
		7-20	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	8	11	9	7	11	8	6	10	7	5	9	6	5
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	12	10	7	12	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	Interior	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	12	10	14	10	8	14	9	7	13	8	6	12	7	6
			Exposed	15	15	15	15	15	15	15	15	13	15	14	12	15	13	11	15	12	10	15	11	9	15	9	7	13	8	6	12	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	16	14	14	14	12	13	13	10	12	11	9	11	10	8	10	9	7
			Exposed	17	17	17	17	17	17	17	17	16	17	17	14	17	16	13	17	15	12	15	14	11	13	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	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	8	12	9	7	11	8	6	10	7	5	9	6	4
			Exposed	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	11	7	12	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		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	11	8	11	9	7	11	8	6	9	7	5	8	6	4	7	5	4
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	12	9	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	Interior	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	15	12	16	14	11	16	12	10	15	10	8	14	9	7	13	7	6	11	6	5	10	6	5
			Exposed	16	16	14	16	15	12	16	13	11	16	12	10	16	11	9	16	10	8	15	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	17	17	15	16	16	14	15	15	12	14	12	10	12	11	8	10	9	7	9	8	6	8	7	6
			Exposed	18	18	16	18	18	15	18	17	13	17	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
40	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	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	7	11	9	6	11	8	6	10	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	10	11	11	9	11	11	8	11	9	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	9	11	10	8	11	9	7	11	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	13	13	13	13	13	13	12	13	13	11	13	12	9	12	10	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	8	7	13	7	6	11	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	15	15	15	15	15	15	14	14	14	13	13	13	12	12	11	12	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	14	12	10	12	11	8	11	9	7	9	8	7
	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	9	11	11	8	11	10	7	11	9	6	11	8	5
			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	6	10	7	5	9	6	4	8	6	4	7	5	3
		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	10	8	6	10	7	5	9	6	5
			Exposed	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		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	12	13	13	10	12	10	8	12	9	7	11	8	6	11	7	6
			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	12	10	13	10	8	12	8	6	10	7	5	9	6	4
		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	14	14	12	13	13	10	13	13	9
			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	14	12	10	12	11	8	11	9	7	9	8	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	8	12	9	7	11	8	6	10	7	5	9	6	4
			Exposed	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	11	7	12	10	7	11	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	11	8	11	9	7	11	8	6	9	7	5	8	6	4	7	5	4	7	5	4
			Exposed	12	12	11	12	12	10	12	12	9	12	11	8	12	12	9	12	9	7	11	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		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	10	13	13	10	12	10	8	12	9	7	12	7	6	11	6	5
			Exposed	13	13	13	13	13	12	13	13	11	13	12	10	13	13	9	13	10	8	13	9	7	13	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	13	13	12	12	12	10	11	11	8	10	9	7	9	8	6	8	7	6
			Exposed	15	15	15	15	15	15	15	15	13	15	15	12	15	14	11	14	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
50	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	7	9	9	6	9	8	6	9	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	9	9	9	9	9	9	9	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	8	6	9	7	5	8	6	4
		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	10	11	10	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	10	8	11	8	7	11	7	6	11	7	5
		27-45	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	12	12	12	12	12	12	11	11	11	11	11	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	11	12	12	10	12	11	8	11	9	7	9	8	7	9	8	7
	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	9	6	9	8	5
			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	6	9	7	5	8	6	4	8	6	4	7	5	3
		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	6	9	7	5	8	6	4
			Exposed	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	5	8	6	4	7	5	4	6	5	3	6	4	3
		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	10	11	11	9	11	10	8	10	9	7	10	8	6
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	9	7	11	8	6	11	7	5	10	6	5	9	5	4	8	4	4
		27-45	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	12	12	11	11	11	11	11	10	10	10	9	9	9	8	9	9	7
			Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	12	11	9	11	10	8	9	8	7	8	7	6	7	6	5	6	6	4
	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	8	10	9	7	10	8	6	10	7	5	9	6	4	9	6	4
			Exposed	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	10	7	10	8	6	10	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		7-20	Interior	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	9	8	6	9	7	5	8	6	4	7	5	4
			Exposed	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	10	7	10	8	6	10	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		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	12	10	11	10	8	11	9	7	10	7	6	10	6	5	9	6	5
			Exposed	12	12	12	12	12	12	12	12	11	12	12	10	12	11	9	12	10	8	12	9	7	12	7	6	11	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	14	14	14	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	13	13	12	12	12	11	11	10	10	10	8	10	9	7	9	8	6	8	7	6
			Exposed	14	14	14	14	14	14	14	14	13	14	14	12	13	13	11	13	12	10	13	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	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	7	8	8	6	8	8	6	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	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	6	8	7	5	8	6	4
		20-27	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	9	9	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	8	7	10	7	6	9	7	5
		27-45	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	10	10	10	10	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	10	11	11	8	10	9	7	9	8	7			
	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	6	8	8	5
			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	6	8	7	5	8	6	4	7	5	3
		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	6	7	7	5	7	6	5
			Exposed	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	5	8	6	4	7	5	4	6	5	3	6	4	3
		20-27	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	9	8	9	9	7	9	8	6	8	7	6	
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	9	7	10	8	6	9	7	5	9	6	5	9	5	4	8	4	4
		27-45	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	10	10	10	10	10	10	9	9	9	9	8	8	8	7	
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	10	10	8	9	8	7	8	7	6	7	6	5	6	6	4			
	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	8	9	9	7	9	8	6	9	7	5	9	6	4
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	6	9	7	5	8	6	4	7	5	4	6	5	3	6	4	3
		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	7	8	8	6	8	7	5	8	6	4	7	5	4
			Exposed	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	8	6	9	7	5	8	6	4	7	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	9	7	9	7	6	9	6	5	8	6	5
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	7	6	10	6	5	10	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	11	10	10	10	9	9	8	9	9	7	8	8	6	8	7	6
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	11	11	9	11	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
70	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	6	7	7	6	7	7	5
		7-20	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	6	7	7	5	7	6	4	7	5	4
		20-27	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	7	8	7	6	8	7	5	8	6	4
		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	10	10	10	10	10	10	10	10	10	9	9	9	9	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	10	10	10	10	10	10	8	9	9	7	9	8	7
	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	6	7	7	5	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3
		7-20	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	6	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3
		20-27	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	7	8	8	6
			Exposed	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	5	8	6	5	8	5	4	8	4	4
		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	10	9	9	9	9	9	9	8	8	8	8	8	8	8	7	
			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	9	9	8	9	8	7	8	7	6	7	6	5	6	6	4
	D	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	6	7	7	5	7	6	4	7	6	4
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3
		7-20	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	6	7	7	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	6	4	7	5	4	6	5	3	6	4	3	5	3	2
		20-27	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	8	7	6	8	6	5	8	6	5
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	7	6	9	6	5	9	5	4	8	5	4	7	4	3	6	4	3
		27-45	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	10	9	9	9	9	9	8	8	8	7	8	8	6	7	7	6
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	9	10	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4
80	B	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	6	4
		20-27	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	6	7	7	5	7	7	5
		27-45	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	8	8	8	8	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	8	8	8	7	8	8	7
	C	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	3	6	5	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	4	3
		20-27	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	6	7	7	6	7	7	6	7	7	6
			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	5	7	6	5	7	5	4	7	4	4
		27-45	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	8	8	8	8	8	8	8	8	8	7	7	7	7	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	8	8	8	8	8	7	8	7	6	7	6	5	6	6	4
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3	5	3	2
		20-27	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	7	6	7	6	5	7	6	5
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7	6	8	6	5	8	5	4	7	4	3	6	4	3	5	4	3
		27-45	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	8	8	8	8	8	7	7	7	6	7	7	6
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	7	9	8	6	8	7	5	7	6	5	6	5	4	5	5	4

UNIRAC

ASCE 7-22	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Micro Rail	SFM	SFM DtD-Ply
Design Standard	Risk Category	Roof Height	Seismic	Module Area	Orientation	Rail Direction	Rail Type	Clamp	Attachment

SPAN TABLES

Maximum Allowable 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	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		27-45	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	7	7	7	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	8	8	8	8	8	8	7	7	7	7
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	4
		27-45	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	7	7	7	7	7	7	7	7	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	7	7	7	7	7	6	7	6	5	6	6	4
	D	0-7	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	5	3	6	4	3
		7-20	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	4	6	5	4	6	4	3	5	4	3	5	3	2
		20-27	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	6	7	6	5	7	6	5	7	6	5
			Exposed	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	6	5	7	5	4	7	5	4	7	4	3	6	4	3
		27-45	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	7	7	7	7	7	6	6	6	6
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	7	8	8	6	8	7	5	7	6	5	6	5	4	5	5	4
100	B	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	4
		27-45	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	7	7	7	7	7	7	7
	C	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5	6	5	4	6	4	4
		27-45	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	6	7	7	7	6	6	6	6	6	6	6	6	6
			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	6	6	6	5	6	6	4	6	6	4
	D	0-7	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	4	3
		7-20	Interior	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4
			Exposed	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	3	5	4	3	5	3	2	4	3	2
		20-27	Interior	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	5
			Exposed	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	5	4	6	5	4	6	4	3	6	4	3	5	3	2
		27-45	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	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	6	7	7	5	7	6	5	6	5	4	5	5	4