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 7-16 Sec 29.4.4 with Provisions from SEAOC PV2-2017
- Exposure Category B, C, or D
- Basic Wind Speed = 90 – 180 mph
- Level terrain. Topographic factor, kzt = 1.0
- γE = 1.0 for 'Interior' spans, γ_E = 1.5 for 'Exposed' spans (ASCE 7-16, Fig. 29.4-7)

Snow Design Assumptions

- Ground Snow Load = 0-100 psf
- Exposure Factor coefficients of Partially Exposed condition
- Thermal Factor = 1.0
- Results based on uniform snow load

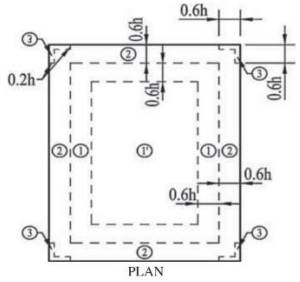
Seismic Design Assumptions

- 0.2-s Spectral Response Acceleration, SS ≤ 3
- S_S = 1.25, 3 per criteria shown on individual span tables sheets.
- S_1 = 0.5
- Seismic site class D-Default

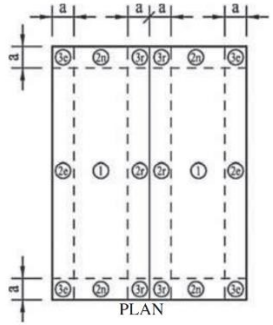
Span Tables

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 7-16 sec. 29.4.4 shall be used when any part of an exposed module or panel as 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 7-16, Fig. 30.3-2A to 30.3-2D



Gable Roofs θ ≤ 7°



Gable Roofs 7°< θ ≤ 45°

Grouping of ASCE 7-16 Roof Zones (Gable and Flat)

Roof Tilt 0°-7°

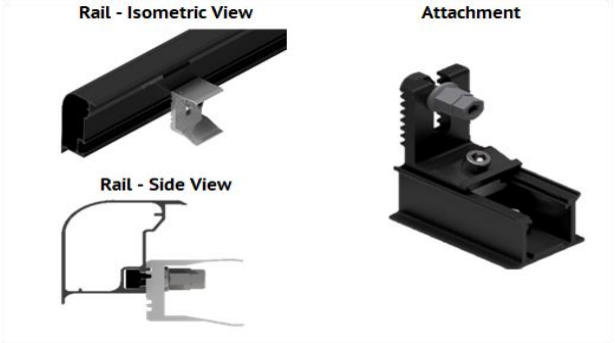
Roof Zone 1 = 1
Roof Zone 2 = 2
Roof Zone 3 = 3

Roof Tilt 7°-27°

Roof Zone 1 = 1, 2e
Roof Zone 2 = 2n, 2r, 3e
Roof Zone 3 = 3r

Roof Tilt 27°-45°

Roof Zone 1 = 1, 2e, 2r
Roof Zone 2 = 2n, 3r
Roof Zone 3 = 3e



Trim Rail - SFM Slider

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	113	113	92	113	113	76	113	113	63	113	90	54	113	77	46	113	67	41	96	58	37	74	46	31	58	38	27	47	33	23	40	29	20	35	25	18	31	22	16
			Exposed	113	77	46	113	64	40	90	55	36	76	47	32	66	42	29	57	38	27	50	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	112	112	81	112	94	65	112	75	53	112	62	45	85	52	40	75	45	36	67	40	33	54	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	85	52	39	73	43	35	64	38	31	56	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	110	110	110	110	110	110	110	110	81	110	86	66	110	72	54	110	61	46	110	52	40	79	41	32	65	35	26	54	30	21	46	26	18	40	23	16	35	20	14
			Exposed	110	71	54	110	58	44	97	49	38	82	42	33	72	38	29	64	34	26	57	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	107	107	107	107	107	107	107	107	97	107	107	81	107	105	69	107	86	59	107	74	51	72	56	40	54	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	107	102	68	107	82	57	94	69	48	76	58	41	63	50	36	53	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	113	86	51	113	72	43	102	61	38	85	52	35	73	46	31	63	41	28	55	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	73	45	31	61	40	28	52	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	112	59	42	80	48	38	70	41	34	61	37	30	54	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	54	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	110	81	62	110	66	50	110	55	41	91	46	36	79	41	32	70	37	28	62	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	78	40	31	68	36	27	59	32	24	52	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	107	107	77	107	93	63	107	77	53	88	65	45	72	56	40	60	48	35	51	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	71	55	39	57	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	113	65	40	90	55	36	76	47	32	65	41	29	56	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	56	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	74	43	35	64	38	31	56	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	110	59	45	97	49	38	81	42	33	71	37	29	63	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	62	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	107	83	57	94	69	48	75	58	41	62	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
10	B	0-7	Interior	83	83	83	83	83	76	83	83	63	83	83	54	83	77	46	83	67	41	83	58	37	74	46	31	58	38	27	47	33	23	40	29	20	35	25	18	31	22	16
			Exposed	83	77	46	83	64	40	83	55	36	76	47	32	66	42	29	57	38	27	50	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	83	83	81	83	83	65	83	75	53	83	62	45	83	52	40	75	45	36	67	40	33	54	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	83	52	39	73	43	35	64	38	31	56	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	109	109	109	109	109	109	109	109	81	109	86	66	109	72	54	109	61	46	109	52	40	79	41	32	65	35	26	54	30	21	46	26	18	40	23	16	35	20	14
			Exposed	109	71	54	109	58	44	97	49	38	82	42	33	72	38	29	64	34	26	57	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	107	107	107	107	107	107	107	107	97	107	107	81	107	105	69	107	86	59	107	74	51	72	56	40	54	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	107	102	68	107	82	57	94	69	48	76	58	41	63	50	36	53	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	83	83	51	83	72	43	83	61	38	83	52	35	73	46	31	63	41	28	55	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	73	45	31	61	40	28	52	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	83	59	42	80	48	38	70	41	34	61	37	30	54	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	54	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	109	81	62	109	66	50	109	55	41	91	46	36	79	41	32	70	37	28	62	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	78	40	31	68	36	27	59	32	24	52	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	107	107	77	107	93	63	107	77	53	88	65	45	72	56	40	60	48	35	51	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	71	55	39	57	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	83	65	40	83	55	36	76	47	32	65	41	29	56	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	56	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	74	43	35	64	38	31	56	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	110	59	45	97	49	38	81	42	33	71	37	29	63	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	62	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	107	83	57	94	69	48	75	58	41	62	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
20	B	0-7	Interior	57	57	57	57	57	57	57	57	57	57	57	54	57	57	46	57	57	41	57	57	37	57	46	31	57	38	27	47	33	23	40	29	20	35	25	18	31	22	16
			Exposed	57	57	46	57	57	40	57	55	36	57	47	32	57	42	29	57	38	27	50	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	58	58	58	58	58	58	58	58	53	58	58	45	58	52	40	58	45	36	58	40	33	54	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	58	52	39	58	43	35	58	38	31	56	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	86	86	86	86	86	86	86	86	81	86	86	66	86	72	54	86	61	46	86	52	40	79	41	32	65	35	26	54	30	21	46	26	18	40	23	16	35	20	14
			Exposed	86	71	54	86	58	44	86	49	38	82	42	33	72	38	29	64	34	26	57	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	84	84	84	84	84	84	84	84	84	84	84	81	84	84	69	84	84	59	84	74	51	72	56	40	54	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	84	84	68	84	82	57	84	69	48	76	58	41	63	50	36	53	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	57	57	51	57	57	43	57	57	38	57	52	35	57	46	31	57	41	28	55	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	57	45	31	57	40	28	52	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	58	58	42	58	48	38	58	41	34	58	37	30	54	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	54	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	86	81	62	86	66	50	86	55	41	86	46	36	79	41	32	70	37	28	62	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	78	40	31	68	36	27	59	32	24	52	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	84	84	77	84	84	63	84	77	53	84	65	45	72	56	40	60	48	35	51	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	71	55	39	57	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	57	57	40	57	55	36	57	47	32	57	41	29	56	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	56	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	58	43	35	58	38	31	56	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	90	59	45	90	49	38	81	42	33	71	37	29	63	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	62	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	90	83	57	90	69	48	75	58	41	62	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	56	56	56	56	56	56	56	56	56	56	56	54	56	56	46	56	56	41	56	56	37	56	46	31	56	38	27	47	33	23	40	29	20	35	25	18	31	22	16
			Exposed	56	56	46	56	56	40	56	55	36	56	47	32	56	42	29	56	38	27	50	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	58	58	58	58	58	58	58	58	53	58	58	45	58	52	40	58	45	36	58	40	33	54	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	58	52	39	58	43	35	58	38	31	56	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	66	66	66	66	66	66	66	66	66	66	66	66	66	66	54	66	61	46	66	52	40	66	41	32	65	35	26	54	30	21	46	26	18	40	23	16	35	20	14
			Exposed	66	66	54	66	58	44	66	49	38	66	42	33	66	38	29	64	34	26	57	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	59	61	61	51	61	56	40	54	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	61	61	61	61	61	57	61	61	48	61	58	41	61	50	36	53	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	56	56	51	56	56	43	56	56	38	56	52	35	56	46	31	56	41	28	55	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	56	45	31	56	40	28	52	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	58	58	42	58	48	38	58	41	34	58	37	30	54	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	54	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	66	66	62	66	66	50	66	55	41	66	46	36	66	41	32	66	37	28	62	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	66	40	31	66	36	27	59	32	24	52	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	61	61	61	61	61	61	61	61	53	61	61	45	61	56	40	60	48	35	51	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	61	55	39	57	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	57	57	40	57	55	36	57	47	32	57	41	29	56	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	56	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	58	43	35	58	38	31	56	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	72	59	45	72	49	38	72	42	33	71	37	29	63	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	62	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	67	67	57	67	67	48	67	58	41	62	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
40	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	41	46	46	37	46	46	31	46	38	27	46	33	23	40	29	20	35	25	18	31	22	16
			Exposed	46	46	46	46	46	40	46	46	36	46	46	32	46	42	29	46	38	27	46	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	49	49	49	49	49	49	49	49	49	49	49	45	49	49	40	49	45	36	49	40	33	49	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	49	49	39	49	43	35	49	38	31	49	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	46	51	51	40	51	41	32	51	35	26	51	30	21	46	26	18	40	23	16	35	20	14
			Exposed	51	51	51	51	51	44	51	49	38	51	42	33	51	38	29	51	34	26	51	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	40	48	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	48	48	48	48	48	48	48	48	48	48	48	41	48	48	36	48	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	46	46	46	46	46	43	46	46	38	46	46	35	46	46	31	46	41	28	46	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	46	45	31	46	40	28	46	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	49	49	42	49	48	38	49	41	34	49	37	30	49	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	49	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	51	51	51	51	51	50	51	51	41	51	46	36	51	41	32	51	37	28	51	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	51	40	31	51	36	27	51	32	24	51	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	45	48	48	40	48	48	35	48	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	48	48	39	48	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	50	50	40	50	50	36	50	47	32	50	41	29	50	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	50	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	53	43	35	53	38	31	53	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	56	56	45	56	49	38	56	42	33	56	37	29	56	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	56	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	53	53	53	53	53	48	53	53	41	53	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
50	B	0-7	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	37	38	38	31	38	38	27	38	33	23	38	29	20	35	25	18	31	22	16
			Exposed	38	38	38	38	38	38	38	38	36	38	38	32	38	38	29	38	38	27	38	34	24	38	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	41	41	36	41	40	33	41	34	28	41	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	41	41	39	41	41	35	41	38	31	41	34	28	41	31	26	41	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40	42	41	32	42	35	26	42	30	21	42	26	18	40	23	16	35	20	14
			Exposed	42	42	42	42	42	42	42	42	38	42	42	33	42	38	29	42	34	26	42	31	23	42	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	33	40	38	28	37	33	23	32	29	20	29	26	17
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	36	40	40	32	40	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	38	38	38	38	38	38	38	38	38	38	38	35	38	38	31	38	38	28	38	37	26	38	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	38	38	31	38	38	28	38	35	25	38	32	22	38	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	41	41	41	41	41	38	41	41	34	41	37	30	41	33	28	41	30	25	41	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	41	33	27	41	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	42	42	42	42	42	42	42	42	41	42	42	42	42	41	32	42	42	37	42	34	24	42	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	42	40	31	42	36	27	42	32	24	42	29	21	42	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	35	40	40	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	40	40	39	40	40	34	40	40	30	40	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	42	42	40	42	42	36	42	42	32	42	41	29	42	37	26	42	34	24	42	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	42	37	26	42	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	45	43	35	45	38	31	45	34	28	45	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	46	46	45	46	46	38	46	42	33	46	37	29	46	34	25	46	31	22	46	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	46	34	25	46	30	22	46	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	43	43	43	43	43	43	43	43	41	43	43	36	43	42	32	43	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	43	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	27	32	32	23	32	29	20	32	25	18	31	22	16
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	27	32	32	24	32	29	20	32	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	28	34	29	24	34	25	20	33	22	18	29	19	16	26	17	14
			Exposed	34	34	34	34	34	34	34	34	31	34	34	28	34	31	26	34	28	23	34	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	26	35	30	21	35	26	18	35	23	16	35	20	14	23	16	11
			Exposed	35	35	35	35	35	35	35	35	35	35	35	33	35	35	29	35	34	26	35	31	23	35	26	18	35	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	28	34	33	23	32	29	20	29	26	17
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	32	34	34	29	34	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	28	32	32	26	32	31	22	32	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	32	32	31	32	32	28	32	32	25	32	32	22	32	29	20	32	26	19	32	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	30	34	33	28	34	30	25	34	28	23	34	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	34	33	27	34	30	24	34	27	22	34	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	28	35	34	25	35	28	20	35	24	17	35	21	14	31	18	12	28	16	11	24	14	10
			Exposed	35	35	31	35	35	27	35	32	24	35	29	21	35	26	18	35	24	16	35	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	32	34	34	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	34	34	34	34	34	34	34	34	30	34	34	27	34	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	35	35	35	35	35	35	35	35	32	35	35	29	35	35	26	35	34	24	35	31	22	35	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	35	35	26	35	33	23	35	30	21	35	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	38	38	35	38	38	31	38	34	28	38	31	25	38	28	23	38	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	38	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	39	39	39	39	39	38	39	39	33	39	37	29	39	34	25	39	31	22	39	28	20	39	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	39	34	25	39	30	22	39	27	19	39	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	36	37	37	32	37	37	29	37	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	37	37	32	37	37	28	37	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
70	B	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	23	27	27	20	27	25	18	27	22	16
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	20	27	25	17	27	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	30	29	24	30	25	20	30	22	18	29	19	16	26	17	14
			Exposed	30	30	30	30	30	30	30	30	30	30	30	28	30	30	26	30	28	23	30	26	21	30	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	26	31	30	21	31	26	18	31	23	16	31	20	14	20	14	
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31	31	26	31	31	23	31	26	18	31	23	15	31	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	23	29	29	20	29	26	17
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	24	29	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	22	27	27	19	27	23	16	27	20	14	24	18	12	22	16	11
			Exposed	27	27	27	27	27	27	27	27	25	27	27	22	27	27	20	27	26	19	27	24	17	27	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	30	30	25	30	28	23	30	23	19	30	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	30	30	27	30	30	24	30	27	22	30	24	20	30	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	28	31	31	25	31	28	20	31	24	17	31	21	14	31	18	12	28	16	11	24	14	10
			Exposed	31	31	31	31	31	27	31	31	24	31	29	21	31	26	18	31	24	16	31	22	15	31	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	29	29	29	29	29	29	29	29	29	29	29	27	29	29	24	29	29	21	29	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	29	30	30	26	30	30	24	30	30	22	30	26	18	30	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	30	30	26	30	30	23	30	30	21	30	27	19	30	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	33	33	33	33	33	31	33	33	28	33	31	25	33	28	23	33	25	21	33	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	33	28	23	33	25	20	33	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	34	34	34	34	34	34	34	34	33	34	34	29	34	34	25	34	31	22	34	28	20	34	24	16	34	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	34	34	25	34	30	22	34	27	19	34	24	17	34	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	26	32	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	32	32	32	32	32	28	32	32	24	32	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
80	B	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	20	24	24	18	24	22	16
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	20	24	24	17	24	21	15	24	19	13	23	16	12	20	15	10
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	24	26	25	20	26	22	18	26	19	16	26	17	14
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	22	18	26	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	26	27	27	21	27	26	18	27	23	16	27	20	14
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	23	27	26	18	27	23	15	27	20	13	27	17	12	26	15	10	23	13	9
		27-45	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	20	26	26	17
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	20	26	25	17	24	21	14	21	19	12	19	17	11			
	C	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	19	24	23	16	24	20	14	24	18	12	22	16	11
			Exposed	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	19	24	24	17	24	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	23	26	23	19	26	20	17	26	17	14	23	15	12	20	13	11	18	12	10
			Exposed	26	26	26	26	26	24	26	26	22	26	24	20	26	22	18	26	20	16	26	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	20	27	24	17	27	21	14	27	18	12	27	16	11	24	14	10			
			Exposed	27	27	27	27	27	27	27	27	24	27	27	21	27	26	18	27	24	16	27	22	15	27	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	21	26	26	18	26	23	15	23	20	13	20	18	11			
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	21	26	26	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	22	27	26	18	27	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	27	27	26	27	27	23	27	27	21	27	27	19	27	24	17	27	22	15	27	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	29	29	29	29	29	29	29	29	28	29	29	25	29	28	23	29	25	21	29	23	19	29	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	29	28	23	29	25	20	29	22	18	29	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	29	30	30	25	30	30	22	30	28	20	30	24	16	30	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	30	30	25	30	30	22	30	27	19	30	24	17	30	22	15	30	20	14	30	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	28	28	28	28	28	28	28	28	24	28	28	22	28	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	19 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	15	21	19	13	21	16	12	20	15	10
		7-20	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	22	18	23	19	16	23	17	14			
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	22	18	23	19	15	23	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	21	24	24	18	24	23	16	24	20	14			
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	18	24	23	15	24	20	13	24	17	12	24	15	10	23	13	9
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	23	17
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	23	17	23	21	14	21	19	12	19	17	11			
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	16	21	20	14	21	18	12	21	16	11
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	19	21	21	17	21	20	14	21	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	19	23	20	17	23	17	14	23	15	12	20	13	11	18	12	10
			Exposed	23	23	23	23	23	23	23	23	22	23	23	20	23	22	18	23	20	16	23	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	20	24	24	17	24	21	14	24	18	12	24	16	11	24	14	10
			Exposed	24	24	24	24	24	24	24	24	24	24	24	21	24	24	18	24	24	16	24	22	15	24	18	13	24	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	18	23	23	15	23	20	13	20	18	11			
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	18	24	22	16	24	19	14	23	17	12	20	15	10	18	13	9
			Exposed	24	24	24	24	24	23	24	24	21	24	24	19	24	24	17	24	22	15	24	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	25	26	26	23	26	25	21	26	23	19	26	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	26	26	23	26	25	20	26	22	18	26	20	17	26	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	22	27	27	20	27	24	16	27	20	14	27	18	12	26	15	10	23	13	9	20	12	8
			Exposed	27	27	25	27	27	22	27	27	19	27	24	17	27	22	15	27	20	14	27	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	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	25	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	25	25	25	25	25	25	25	25	24	25	25	22	25	25	19	25	25	17	25	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
100	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	19	13	19	16	12	19	15	10
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	19	16	21	17	14			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	15	21	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	22	16	22	20	14
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	18	22	22	15	22	20	13	22	17	12	22	15	10	22	13	9
		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	21	21	21	21	21	21	20	21	21	17			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	14	21	19	12	19	17	11			
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	18	12	19	16	11
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	14	19	17	12	19	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	20	17	21	17	14	21	15	12	20	13	11	18	12	10
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	20	16	21	18	15	21	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	14	22	18	12	22	16	11	22	14	10
			Exposed	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	22	16	22	22	15	22	18	13	22	16	11	22	14	9	20	12	8	18	10	7	16	9	6
		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	21	21	21	18	21	21	15	21	20	13	20	18	11
			Exposed	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	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	16	21	19	14	21	17	12	20	15	10	18	13	9			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	15	21	20	14	21	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	20	16	23	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	23	23	23	23	23	20	23	22	18	23	20	17	23	18	15	23	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	16	24	20	14	24	18	12	24	15	10	23	13	9	20	12	8
			Exposed	24	24	24	24	24	22	24	24	19	24	24	17	24	22	15	24	20	14	24	18	12	24	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	17	23	22	15	22	19	12	19	17	11	17	15	9
			Exposed	23	23	23	23	23	23	23	23	23	23	23	22	23	23	19	23	23	17	23	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	188	188	188	188	188	188	188	188	188	188	188	188	188	188	105	188	188	76	188	155	63	188	91	53	158	64	45	96	55	39	69	48	34	59	43	30	52	38	27
			Exposed	188	188	103	188	188	70	188	131	60	188	96	54	188	76	49	149	63	45	109	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	187	187	187	187	187	187	187	187	187	187	187	187	187	187	71	187	187	60	187	74	55	187	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	187	187	70	187	187	59	187	64	53	187	58	48	90	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	170	185	79	53	185	58	44	121	50	36	82	44	31	67	39	26	59	34	24
			Exposed	185	185	185	185	185	185	185	185	65	185	89	55	185	63	48	185	58	43	185	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	74	179	97	55	179	63	46	62	55	40	54	49	34	48	43	30
			Exposed	179	179	179	179	179	179	179	179	179	179	179	80	179	179	61	179	92	55	179	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	188	188	159	188	188	88	188	177	65	188	118	58	188	90	53	188	72	48	139	62	44	83	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	188	89	52	188	68	47	119	60	42	88	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	187	187	187	187	187	63	187	87	57	187	62	51	187	56	46	87	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	187	56	46	84	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	185	185	185	185	185	185	185	185	180	185	185	61	185	78	53	185	62	47	185	57	42	93	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	185	76	53	185	60	46	185	54	40	103	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	179	179	179	179	179	179	179	179	179	179	179	114	179	179	73	179	144	59	179	86	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	179	179	72	179	116	58	179	74	51	179	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	188	188	72	188	132	60	188	96	54	188	74	49	142	63	44	104	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	140	62	44	97	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	187	187	59	187	64	53	187	58	48	89	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	185	185	185	185	185	66	185	87	55	185	63	48	185	57	42	150	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	185	57	42	122	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	179	179	179	179	179	179	179	179	79	179	179	61	179	88	54	179	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	179	86	53	179	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
10	B	0-7	Interior	139	139	139	139	139	139	139	139	139	139	139	139	139	139	105	139	139	76	139	139	63	139	91	53	139	64	45	96	55	39	69	48	34	59	43	30	52	38	27
			Exposed	139	139	103	139	139	70	139	131	60	139	96	54	139	76	49	139	63	45	109	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	140	140	140	140	140	140	140	140	140	140	140	140	140	140	71	140	140	60	140	74	55	140	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	140	140	70	140	140	59	140	64	53	140	58	48	90	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	170	183	79	53	183	58	44	121	50	36	82	44	31	67	39	26	59	34	24
			Exposed	183	183	183	183	183	183	183	183	65	183	89	55	183	63	48	183	58	43	183	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	179	74	179	97	55	179	63	46	62	55	40	54	49	34	48	43	30
			Exposed	179	179	179	179	179	179	179	179	179	179	179	80	179	179	61	179	92	55	179	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	139	139	139	139	139	88	139	139	65	139	118	58	139	90	53	139	72	48	139	62	44	83	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	139	89	52	139	68	47	119	60	42	88	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	140	140	140	140	140	63	140	87	57	140	62	51	140	56	46	87	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	140	56	46	84	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	183	183	183	183	183	183	183	183	180	183	183	61	183	78	53	183	62	47	183	57	42	93	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	183	76	53	183	60	46	183	54	40	103	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	179	179	179	179	179	179	179	179	179	179	179	114	179	179	73	179	144	59	179	86	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	179	179	72	179	116	58	179	74	51	179	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	139	139	72	139	132	60	139	96	54	139	74	49	139	63	44	104	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	139	62	44	97	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	140	140	59	140	64	53	140	58	48	89	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	185	185	185	185	185	66	185	87	55	185	63	48	185	57	42	150	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	185	57	42	122	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	179	179	179	179	179	179	179	179	79	179	179	61	179	88	54	179	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	179	86	53	179	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
20	B	0-7	Interior	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	76	96	96	63	96	91	53	96	64	45	96	55	39	69	48	34	59	43	30	52	38	27
			Exposed	96	96	96	96	96	70	96	96	60	96	96	54	96	76	49	96	63	45	96	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	97	97	97	97	97	97	97	97	97	97	97	97	97	97	71	97	97	60	97	74	55	97	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	97	97	70	97	97	59	97	64	53	97	58	48	90	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	79	53	144	58	44	121	50	36	82	44	31	67	39	26	59	34	24
			Exposed	144	144	144	144	144	144	144	144	65	144	89	55	144	63	48	144	58	43	144	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	74	141	97	55	141	63	46	62	55	40	54	49	34	48	43	30
			Exposed	141	141	141	141	141	141	141	141	141	141	141	80	141	141	61	141	92	55	141	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	96	96	96	96	96	88	96	96	65	96	96	58	96	90	53	96	72	48	96	62	44	83	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	96	89	52	96	68	47	96	60	42	88	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	97	97	97	97	97	63	97	87	57	97	62	51	97	56	46	87	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	97	56	46	84	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	144	144	144	144	144	144	144	144	144	144	144	61	144	78	53	144	62	47	144	57	42	93	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	144	76	53	144	60	46	144	54	40	103	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	141	141	141	141	141	141	141	141	141	141	141	114	141	141	73	141	141	59	141	86	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	141	141	72	141	116	58	141	74	51	141	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	96	96	72	96	96	60	96	96	54	96	74	49	96	63	44	96	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	96	62	44	96	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	97	97	59	97	64	53	97	58	48	89	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	150	150	150	150	150	66	150	87	55	150	63	48	150	57	42	150	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	150	57	42	122	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	150	150	150	150	150	150	150	150	79	150	150	61	150	88	54	150	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	150	86	53	150	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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)

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				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
30	B	0-7	Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	76	94	94	63	94	91	53	94	64	45	94	55	39	69	48	34	59	43	30	52	38	27
			Exposed	94	94	94	94	94	70	94	94	60	94	94	54	94	76	49	94	63	45	94	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	97	97	97	97	97	97	97	97	97	97	97	97	97	97	71	97	97	60	97	74	55	97	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	97	97	70	97	97	59	97	64	53	97	58	48	90	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	79	53	110	58	44	110	50	36	82	44	31	67	39	26	59	34	24
			Exposed	110	110	110	110	110	110	110	110	65	110	89	55	110	63	48	110	58	43	110	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	74	103	97	55	103	63	46	62	55	40	54	49	34	48	43	30
			Exposed	103	103	103	103	103	103	103	103	103	103	103	80	103	103	61	103	92	55	103	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	94	94	94	94	94	88	94	94	65	94	94	58	94	90	53	94	72	48	94	62	44	83	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	94	89	52	94	68	47	94	60	42	88	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	97	97	97	97	97	63	97	87	57	97	62	51	97	56	46	87	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	97	56	46	84	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	110	110	110	110	110	110	110	110	110	110	110	61	110	78	53	110	62	47	110	57	42	93	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	110	76	53	110	60	46	110	54	40	103	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	103	103	103	103	103	103	103	103	103	103	103	103	103	103	73	103	103	59	103	86	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	103	103	72	103	103	58	103	74	51	103	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	96	96	72	96	96	60	96	96	54	96	74	49	96	63	44	96	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	96	62	44	96	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	97	97	59	97	64	53	97	58	48	89	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	120	120	120	120	120	66	120	87	55	120	63	48	120	57	42	120	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	120	57	42	120	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	112	112	112	112	112	112	112	112	79	112	112	61	112	88	54	112	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	112	86	53	112	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
40	B	0-7	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	76	77	77	63	77	77	53	77	64	45	77	55	39	69	48	34	59	43	30	52	38	27
			Exposed	77	77	77	77	77	70	77	77	60	77	77	54	77	76	49	77	63	45	77	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	82	82	82	82	82	82	82	82	82	82	82	82	82	82	71	82	82	60	82	74	55	82	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	82	82	70	82	82	59	82	64	53	82	58	48	82	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	79	53	86	58	44	86	50	36	82	44	31	67	39	26	59	34	24
			Exposed	86	86	86	86	86	86	86	86	65	86	86	55	86	63	48	86	58	43	86	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	74	81	81	55	81	63	46	62	55	40	54	49	34	48	43	30
			Exposed	81	81	81	81	81	81	81	81	81	81	80	81	81	81	61	81	81	55	81	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	77	77	77	77	77	77	77	77	65	77	77	58	77	77	53	77	72	48	77	62	44	77	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	77	77	52	77	68	47	77	60	42	77	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	82	82	82	82	82	63	82	82	57	82	62	51	82	56	46	82	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	82	56	46	82	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	86	86	86	86	86	86	86	86	86	86	86	61	86	78	53	86	62	47	86	57	42	86	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	86	76	53	86	60	46	86	54	40	86	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	81	81	81	81	81	81	81	81	81	81	81	81	81	81	73	81	81	59	81	81	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	81	81	72	81	81	58	81	74	51	81	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	83	83	72	83	83	60	83	83	54	83	74	49	83	63	44	83	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	83	62	44	83	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	88	88	59	88	64	53	88	58	48	88	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	94	94	94	94	94	66	94	87	55	94	63	48	94	57	42	94	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	94	57	42	94	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	88	88	88	88	88	88	88	88	79	88	88	61	88	88	54	88	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	88	86	53	88	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
50	B	0-7	Interior	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	53	63	63	45	63	55	39	63	48	34	59	43	30	52	38	27	46	34	24
			Exposed	63	63	63	63	63	63	63	63	60	63	63	54	63	63	49	63	63	45	63	58	41	63	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	60	69	69	55	69	57	47	69	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	69	69	69	69	69	59	69	64	53	69	58	48	69	52	43	69	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	53	70	58	44	70	50	36	70	44	31	67	39	26	59	34	24
			Exposed	70	70	70	70	70	70	70	70	65	70	70	55	70	63	48	70	58	43	70	53	38	70	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	55	66	63	46	62	55	40	54	49	34	48	43	30
			Exposed	66	66	66	66	66	66	66	66	66	66	66	66	66	66	61	66	66	55	66	66	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	63	63	63	63	63	63	63	63	63	63	63	58	63	63	53	63	63	48	63	62	44	63	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	63	63	52	63	63	47	63	60	42	63	54	38	63	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	69	69	69	69	69	63	69	69	57	69	62	51	69	56	46	69	51	42	69	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	69	56	46	69	50	41	69	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	70	70	70	70	70	70	70	70	70	70	70	61	70	70	53	70	62	47	70	57	42	70	48	34	70	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	70	70	53	70	60	46	70	54	40	70	49	35	70	44	31	70	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	59	66	66	53	66	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	66	66	66	66	66	58	66	66	51	66	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	70	70	70	70	70	60	70	70	54	70	70	49	70	63	44	70	57	40	70	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	70	62	44	70	56	39	70	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	76	76	59	76	64	53	76	58	48	76	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	77	77	77	77	77	66	77	77	55	77	63	48	77	57	42	77	52	37	77	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	77	57	42	77	51	36	77	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	73	73	73	73	73	73	73	73	73	73	73	61	73	73	54	73	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	73	73	53	73	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	45	53	53	39	53	48	34	53	43	30	52	38	27
			Exposed	53	53	53	53	53	53	53	53	53	53	53	53	53	53	49	53	53	45	53	53	41	53	49	34	53	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	55	58	57	47	58	48	40	58	42	34	56	36	30	49	32	27	44	28	24
			Exposed	58	58	58	58	58	58	58	58	53	58	58	48	58	52	43	58	48	39	58	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	53	59	58	44	59	50	36	59	44	31	59	39	26	59	34	24
			Exposed	59	59	59	59	59	59	59	59	59	59	59	55	59	59	48	59	58	43	59	53	38	59	45	31	59	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	55	56	56	46	56	55	40	54	49	34	48	43	30
			Exposed	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	55	56	56	49	56	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	48	53	53	44	53	52	37	53	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	53	53	52	53	53	47	53	53	42	53	53	38	53	49	34	53	44	31	53	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	58	58	58	58	58	58	58	58	57	58	58	51	58	56	46	58	51	42	58	47	39	58	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	58	56	46	58	50	41	58	45	37	58	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	59	59	59	59	59	59	59	59	59	59	59	59	59	59	53	59	59	47	59	57	42	59	48	34	59	41	28	59	35	24	53	31	21	47	27	19	41	24	17
			Exposed	59	59	53	59	59	46	59	54	40	59	49	35	59	44	31	59	40	28	59	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	53	56	56	44	56	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	56	56	56	56	56	56	56	56	51	56	56	45	56	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	59	59	59	59	59	59	59	59	54	59	59	49	59	59	44	59	57	40	59	52	37	59	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	59	59	44	59	56	39	59	50	35	59	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	64	64	59	64	64	53	64	58	48	64	52	43	64	47	39	64	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	64	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	65	65	65	65	65	65	65	65	55	65	63	48	65	57	42	65	52	37	65	47	33	65	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	65	57	42	65	51	36	65	45	32	65	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	62	62	62	62	62	62	62	62	62	62	62	61	62	62	54	62	62	48	62	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	62	62	53	62	62	47	62	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
70	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	34	46	46	45	46	46	39	46	46	34	46	43	30	46	38	27
			Exposed	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	41	46	46	34	46	42	30	46	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	47	50	48	40	50	42	34	50	36	30	49	32	27	44	28	24			
			Exposed	50	50	50	50	50	50	50	50	50	50	50	48	50	50	43	50	48	39	50	44	36	50	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	44	51	50	36	51	44	31	51	39	26	51	34	24			
			Exposed	51	51	51	51	51	51	51	51	51	51	51	51	51	51	48	51	51	43	51	51	38	51	45	31	51	38	26	51	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	46	49	49	40	49	49	34	48	43	30
			Exposed	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	40	49	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	44	46	46	37	46	45	32	46	39	27	46	34	24	41	30	21	36	26	19
			Exposed	46	46	46	46	46	46	46	46	42	46	46	38	46	46	34	46	44	31	46	40	29	46	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	46	50	50	42	50	47	39	50	40	33	50	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	50	50	46	50	50	41	50	45	37	50	40	33	50	37	30	50	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	47	51	51	42	51	48	34	51	41	28	51	35	24	51	31	21	47	27	19	41	24	17
			Exposed	51	51	51	51	51	46	51	51	40	51	49	35	51	44	31	51	40	28	51	37	25	51	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	44	49	49	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	49	49	49	49	49	49	49	49	49	49	49	45	49	49	40	49	49	36	49	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	51	51	51	51	51	51	51	51	51	51	51	49	51	51	44	51	51	40	51	51	37	51	44	31	51	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	51	51	44	51	51	39	51	50	35	51	45	32	51	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	55	55	55	55	55	53	55	55	48	55	52	43	55	47	39	55	43	35	55	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	55	47	39	55	42	35	55	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	57	57	57	57	57	57	57	57	55	57	57	48	57	57	42	57	52	37	57	47	33	57	40	27	57	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	57	57	42	57	51	36	57	45	32	57	41	28	57	37	25	57	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	48	54	54	43	54	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	54	54	53	54	54	47	54	54	41	54	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
80	B	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	40	40	34	40	40	30	40	38	27
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	34	40	40	30	40	36	26	40	32	22	38	28	20	34	25	17
		7-20	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	40	44	42	34	44	42	34	44	36	30	44	32	27	44	28	24
			Exposed	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	44	44	39	44	44	36	44	37	30	44	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	45	45	36	45	44	31	45	39	26	45	34	24			
			Exposed	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	43	45	45	38	45	45	31	45	38	26	45	33	23	45	29	20	43	25	17	38	23	15
		27-45	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	40	43	43	34	43	43	30
			Exposed	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	40	43	43	33	43	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	32	40	39	27	40	34	24	40	30	21	36	26	19
			Exposed	40	40	40	40	40	40	40	40	40	40	40	38	40	40	34	40	40	31	40	40	29	40	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	42	44	44	39	44	40	33	44	34	28	44	29	24	39	26	21	34	23	19	31	20	17
			Exposed	44	44	44	44	44	41	44	44	37	44	40	33	44	37	30	44	33	28	44	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	42	45	45	34	45	41	28	45	35	24	45	31	21	45	27	19	41	24	17
			Exposed	45	45	45	45	45	45	45	45	40	45	45	35	45	44	31	45	40	28	45	37	25	45	31	21	45	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	36	43	43	31	43	39	26	38	34	22	34	30	20			
			Exposed	43	43	43	43	43	43	43	43	43	43	43	40	43	43	36	43	43	32	43	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12			
	D	0-7	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	45	45	40	45	45	37	45	44	31	45	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	45	45	44	45	45	39	45	45	35	45	45	32	45	41	29	45	37	26	45	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	49	49	49	49	49	49	49	49	48	49	49	43	49	47	39	49	43	35	49	39	32	49	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	49	47	39	49	42	35	49	38	31	49	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	50	50	50	50	50	50	50	50	50	50	50	48	50	50	42	50	50	37	50	47	33	50	40	27	50	34	23	50	30	20	44	26	18	39	23	16	35	20	14
			Exposed	50	50	42	50	50	36	50	45	32	50	41	28	50	37	25	50	34	23	50	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	43	48	48	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	48	48	48	48	48	47	48	48	41	48	48	36	48	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	30	36	36	27			
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	30	36	36	26	36	32	22	36	28	20	34	25	17
		7-20	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	36	30	39	32	27	39	28	24			
			Exposed	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	37	30	39	32	26	39	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	36	41	41	31	41	39	26	41	34	24			
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	38	41	41	31	41	38	26	41	33	23	41	29	20	41	25	17	38	23	15
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	39	30			
			Exposed	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	32	39	36	24	36	32	21	32	28	18			
	C	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	36	36	27	36	34	24	36	30	21	36	26	19
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	31	36	36	29	36	34	24	36	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	33	39	34	28	39	29	24	39	26	21	34	23	19	31	20	17
			Exposed	39	39	39	39	39	39	39	39	37	39	39	33	39	37	30	39	33	28	39	31	25	39	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	34	41	41	28	41	35	24	41	31	21	41	27	19	41	24	17
			Exposed	41	41	41	41	41	41	41	41	40	41	41	35	41	41	31	41	40	28	41	37	25	41	31	21	41	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	31	39	39	26	38	34	22	34	30	20			
			Exposed	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	39	32	39	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12			
	D	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	31	40	38	27	40	32	23	39	28	20	34	25	18	30	22	16
			Exposed	40	40	40	40	40	39	40	40	35	40	40	32	40	40	29	40	37	26	40	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	39	43	43	35	43	39	32	43	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	43	43	39	43	42	35	43	38	31	43	34	28	43	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	42	45	45	37	45	45	33	45	40	27	45	34	23	45	30	20	44	26	18	39	23	16	35	20	14
			Exposed	45	45	42	45	45	36	45	45	32	45	41	28	45	37	25	45	34	23	45	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	35	43	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	43	43	43	43	43	43	43	43	41	43	43	36	43	43	32	43	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
100	B	0-7	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	33	27			
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	33	26	33	32	22	33	28	20	33	25	17
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	30	35	32	27	35	28	24			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	32	26	35	27	23	35	24	20	32	21	17	28	19	15
		20-27	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	37	37	31	37	37	26	37	34	24			
			Exposed	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	31	37	37	26	37	33	23	37	29	20	37	25	17	37	23	15
		27-45	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	30			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	28	35	35	24	35	32	21	32	28	18						
	C	0-7	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	33	33	27	33	33	24	33	30	21	33	26	19			
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	31	33	33	29	33	33	24	33	29	21	33	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	34	28	35	29	24	35	26	21	34	23	19	31	20	17
			Exposed	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	33	28	35	31	25	35	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	28	37	35	24	37	31	21	37	27	19	37	24	17
			Exposed	37	37	37	37	37	37	37	37	37	37	37	35	37	37	31	37	37	28	37	37	25	37	31	21	37	27	18	37	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	35	35	26	35	34	22	34	30	20			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	26	35	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	31	36	36	27	36	32	23	36	28	20	34	25	18	30	22	16
			Exposed	36	36	36	36	36	36	36	36	35	36	36	32	36	36	29	36	36	26	36	34	24	36	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	39	39	32	39	33	27	39	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	39	39	39	39	39	35	39	38	31	39	34	28	39	31	25	39	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	37	41	41	33	41	40	27	41	34	23	41	30	20	41	26	18	39	23	16	35	20	14
			Exposed	41	41	41	41	41	36	41	41	32	41	41	28	41	37	25	41	34	23	41	31	21	41	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	39	39	29	39	37	25	36	33	21	32	29	18	28	25	16
			Exposed	39	39	39	39	39	39	39	39	39	39	39	36	39	39	32	39	39	29	39	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	94	94	77	94	94	64	94	89	53	94	75	45	94	65	39	94	56	34	81	49	31	62	38	26	49	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	94	64	39	90	54	33	75	46	30	64	40	27	55	35	24	48	32	22	42	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	94	94	68	94	79	54	94	63	45	94	52	37	72	44	33	63	37	30	56	33	27	45	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	71	43	33	61	36	29	53	32	26	47	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	93	93	93	93	93	88	93	89	68	93	72	55	93	60	46	93	51	38	88	44	33	66	34	27	54	29	22	45	25	18	38	22	15	33	19	13	29	17	12
			Exposed	93	60	45	93	49	37	81	41	31	68	35	27	60	32	24	53	29	21	48	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	89	89	89	89	89	89	89	89	82	89	89	68	89	85	57	89	72	49	87	62	43	61	47	33	45	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	89	84	57	89	69	47	79	58	40	63	49	34	52	42	30	44	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	94	72	43	94	60	36	85	51	32	72	44	29	61	38	26	53	34	24	46	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	61	38	26	51	33	23	44	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	94	49	35	67	40	32	58	34	28	51	31	25	45	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	45	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	93	68	52	93	55	42	92	46	35	77	39	30	66	34	26	59	31	23	52	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	66	34	26	57	30	23	49	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	89	89	64	89	78	53	89	65	45	74	55	38	60	47	33	50	40	30	43	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	60	46	33	48	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	91	55	34	76	46	30	64	39	27	54	34	24	47	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	47	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	62	36	30	53	32	26	47	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	93	50	37	81	41	32	68	35	27	60	31	24	53	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	52	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	89	70	48	79	58	40	63	48	34	52	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
10	B	0-7	Interior	69	69	69	69	69	64	69	69	53	69	69	45	69	65	39	69	56	34	69	49	31	62	38	26	49	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	69	64	39	69	54	33	69	46	30	64	40	27	55	35	24	48	32	22	42	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	70	70	68	70	70	54	70	63	45	70	52	37	70	44	33	63	37	30	56	33	27	45	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	70	43	33	61	36	29	53	32	26	47	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	91	91	91	91	91	88	91	89	68	91	72	55	91	60	46	91	51	38	88	44	33	66	34	27	54	29	22	45	25	18	38	22	15	33	19	13	29	17	12
			Exposed	91	60	45	91	49	37	81	41	31	68	35	27	60	32	24	53	29	21	48	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	89	89	89	89	89	89	89	89	82	89	89	68	89	85	57	89	72	49	87	62	43	61	47	33	45	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	89	84	57	89	69	47	79	58	40	63	49	34	52	42	30	44	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	69	69	43	69	60	36	69	51	32	69	44	29	61	38	26	53	34	24	46	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	61	38	26	51	33	23	44	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	70	49	35	67	40	32	58	34	28	51	31	25	45	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	45	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	91	68	52	91	55	42	91	46	35	77	39	30	66	34	26	59	31	23	52	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	66	34	26	57	30	23	49	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	89	89	64	89	78	53	89	65	45	74	55	38	60	47	33	50	40	30	43	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	60	46	33	48	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	69	55	34	69	46	30	64	39	27	54	34	24	47	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	47	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	62	36	30	53	32	26	47	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	93	50	37	81	41	32	68	35	27	60	31	24	53	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	52	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	89	70	48	79	58	40	63	48	34	52	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
20	B	0-7	Interior	48	48	48	48	48	48	48	48	48	48	48	45	48	48	39	48	48	34	48	48	31	48	38	26	48	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	48	48	39	48	48	33	48	46	30	48	40	27	48	35	24	48	32	22	42	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	49	49	49	49	49	49	49	49	45	49	49	37	49	44	33	49	37	30	49	33	27	45	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	49	43	33	49	36	29	49	32	26	47	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	72	72	72	72	72	72	72	72	68	72	72	55	72	60	46	72	51	38	72	44	33	66	34	27	54	29	22	45	25	18	38	22	15	33	19	13	29	17	12
			Exposed	72	60	45	72	49	37	72	41	31	68	35	27	60	32	24	53	29	21	48	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	70	70	70	70	70	70	70	70	70	70	70	68	70	70	57	70	70	49	70	62	43	61	47	33	45	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	70	70	57	70	69	47	70	58	40	63	49	34	52	42	30	44	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	48	48	43	48	48	36	48	48	32	48	44	29	48	38	26	48	34	24	46	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	48	38	26	48	33	23	44	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	49	49	35	49	40	32	49	34	28	49	31	25	45	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	45	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	72	68	52	72	55	42	72	46	35	72	39	30	66	34	26	59	31	23	52	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	66	34	26	57	30	23	49	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	70	70	64	70	70	53	70	65	45	70	55	38	60	47	33	50	40	30	43	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	60	46	33	48	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	48	48	34	48	46	30	48	39	27	48	34	24	47	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	47	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	49	36	30	49	32	26	47	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	75	50	37	75	41	32	68	35	27	60	31	24	53	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	52	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	75	70	48	75	58	40	63	48	34	52	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	47	47	47	47	47	47	47	47	47	47	47	45	47	47	39	47	47	34	47	47	31	47	38	26	47	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	47	47	39	47	47	33	47	46	30	47	40	27	47	35	24	47	32	22	42	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	49	49	49	49	49	49	49	49	45	49	49	37	49	44	33	49	37	30	49	33	27	45	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	49	43	33	49	36	29	49	32	26	47	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	46	55	51	38	55	44	33	55	34	27	54	29	22	45	25	18	38	22	15	33	19	13	29	17	12
			Exposed	55	55	45	55	49	37	55	41	31	55	35	27	55	32	24	53	29	21	48	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	49	51	51	43	51	47	33	45	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	51	51	51	51	51	47	51	51	40	51	49	34	51	42	30	44	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	47	47	43	47	47	36	47	47	32	47	44	29	47	38	26	47	34	24	46	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	47	38	26	47	33	23	44	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	49	49	35	49	40	32	49	34	28	49	31	25	45	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	45	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	55	55	52	55	55	42	55	46	35	55	39	30	55	34	26	55	31	23	52	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	55	34	26	55	30	23	49	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	51	51	51	51	51	51	51	51	45	51	51	38	51	47	33	50	40	30	43	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	51	46	33	48	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	48	48	34	48	46	30	48	39	27	48	34	24	47	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	47	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	49	36	30	49	32	26	47	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	60	50	37	60	41	32	60	35	27	60	31	24	53	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	52	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	56	56	48	56	56	40	56	48	34	52	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
40	B	0-7	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	39	31	39	38	26	39	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	39	39	39	39	39	33	39	39	30	39	39	27	39	35	24	39	32	22	39	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	41	41	41	41	41	41	41	41	41	41	41	37	41	41	33	41	37	30	41	33	27	41	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	41	41	33	41	36	29	41	32	26	41	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	38	43	43	33	43	34	27	43	29	22	43	25	18	38	22	15	33	19	13	29	17	12
			Exposed	43	43	43	43	43	37	43	41	31	43	35	27	43	32	24	43	29	21	43	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	33	40	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	40	40	40	40	40	40	40	40	40	40	40	34	40	40	30	40	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	39	39	39	39	39	36	39	39	32	39	39	29	39	38	26	39	34	24	39	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	39	38	26	39	33	23	39	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	41	41	35	41	40	32	41	34	28	41	31	25	41	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	41	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	43	43	43	43	43	42	43	43	35	43	39	30	43	34	26	43	31	23	43	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	43	34	26	43	30	23	43	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	38	40	40	30	40	40	30	40	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	40	40	33	40	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	41	41	34	41	41	30	41	39	27	41	34	24	41	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	41	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	44	36	30	44	32	26	44	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	47	47	37	47	41	32	47	35	27	47	31	24	47	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	47	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	44	44	44	44	44	40	44	44	34	44	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
50	B	0-7	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	26	31	31	22	31	28	19	31	24	17	29	21	15	26	19	13
			Exposed	31	31	31	31	31	31	31	31	30	31	31	27	31	31	24	31	31	22	31	29	20	31	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	30	34	33	27	34	28	23	34	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	34	34	33	34	34	29	34	32	26	34	29	24	34	26	21	34	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	34	27	35	29	22	35	25	18	35	22	15	33	19	13	29	17	12
			Exposed	35	35	35	35	35	35	35	35	31	35	35	27	35	32	24	35	29	21	35	26	19	35	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	28	33	31	23	31	27	20	27	24	17	24	21	15
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	33	27	33	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	31	31	31	31	31	31	31	31	31	31	31	29	31	31	26	31	31	24	31	31	22	31	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	31	31	26	31	31	23	31	30	21	31	27	19	31	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	34	34	34	34	34	32	34	34	28	34	31	25	34	28	23	34	25	21	34	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	34	28	23	34	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	30	35	34	26	35	31	23	35	28	21	35	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	35	34	26	35	30	23	35	27	20	35	24	17	35	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	33	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	33	33	33	33	33	29	33	33	25	33	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	35	35	34	35	35	30	35	35	27	35	34	24	35	31	22	35	28	20	35	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	35	31	22	35	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	38	36	30	38	32	26	38	29	24	38	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	6	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	38	38	37	38	38	32	38	35	27	38	31	24	38	28	21	38	26	19	38	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	38	28	21	38	25	18	38	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	36	36	36	36	36	36	36	36	34	36	36	30	36	35	27	36	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	36	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	22	26	26	19	26	24	17	26	21	15	26	19	13
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	22	26	26	20	26	24	17	26	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	27	29	28	23	29	24	20	29	21	17	28	18	15	24	16	13	22	14	12
			Exposed	29	29	29	29	29	29	29	29	26	29	29	24	29	26	21	29	24	19	29	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	29	22	30	25	18	30	22	15	30	19	13	29	17	12
			Exposed	30	30	30	30	30	30	30	30	30	30	30	27	30	30	24	30	29	21	30	26	19	30	22	15	30	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	23	28	27	20	27	24	17	24	21	15
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	24	28	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	22	26	26	18	26	22	16	26	19	13	23	17	12	20	15	10	18	13	9
			Exposed	26	26	26	26	26	23	26	26	21	26	26	19	26	24	17	26	22	15	26	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	29	29	29	29	29	29	29	29	28	29	29	25	29	28	23	29	25	21	29	23	19	29	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	29	28	23	29	25	20	29	22	18	29	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	26	30	30	23	30	28	21	30	24	17	30	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	30	30	26	30	30	23	30	27	20	30	24	17	30	22	15	30	20	14	30	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	28	28	28	28	28	28	28	28	25	28	28	22	28	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	29	29	29	29	29	29	29	29	27	29	29	24	29	29	22	29	28	20	29	26	18	29	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	29	29	22	29	28	19	29	25	17	29	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	32	32	30	32	32	26	32	29	24	32	26	21	32	23	19	32	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	32	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	33	33	33	33	33	32	33	33	27	33	31	24	33	28	21	33	26	19	33	24	17	33	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	33	28	21	33	25	18	33	23	16	33	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	31	31	31	31	31	31	31	31	31	31	31	30	31	31	27	31	31	24	31	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	31	31	27	31	31	23	31	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
70	B	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	17	23	21	15	23	18	13	21	16	11	19	14	10	17	12	8
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	17	23	21	15	23	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	24	20	25	21	17	25	18	15	24	16	13	22	14	12
			Exposed	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	24	19	25	22	18	25	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	22	26	25	18	26	22	15	26	19	13	26	17	12	26	17	12
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	21	26	26	19	26	22	15	26	19	13	26	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	20	24	24	17	24	21	15
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	20	24	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	18	23	22	16	23	19	13	23	17	12	20	15	10	18	13	9
			Exposed	23	23	23	23	23	21	23	23	19	23	23	17	23	22	15	23	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6	12	8	6
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	21	25	23	19	25	20	16	25	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	25	25	23	25	25	20	25	22	18	25	20	16	25	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	24	17	26	20	14	26	17	12	26	15	10	23	13	9	20	12	8
			Exposed	26	26	26	26	26	23	26	26	20	26	24	17	26	22	15	26	20	14	26	18	12	26	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	18	24	22	15	21	19	13	19	17	11	17	15	10	17	15	10
			Exposed	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	25	18	25	22	15	25	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	25	25	22	25	25	19	25	25	17	25	22	16	25	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	27	27	27	27	27	26	27	27	24	27	26	21	27	23	19	27	21	17	27	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	27	23	19	27	21	17	27	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	28	28	28	28	28	28	28	28	27	28	28	24	28	28	21	28	26	19	28	24	17	28	20	13	28	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	28	28	21	28	25	18	28	23	16	28	20	14	28	18	12	28	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	21	27	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	27	27	27	27	27	23	27	27	20	27	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
80	B	0-7	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	20	15	20	18	13	20	16	11	19	14	10	17	12	8
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	20	15	20	18	13	20	16	11	19	14	10	17	12	8
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	20	22	21	17	22	18	15	22	16	13	22	14	12
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	18	22	18	15	22	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	18	22	22	15	22	19	13	22	17	12
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	15	22	19	13	22	16	11	22	14	10	21	12	8	19	11	7
		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	21	21	21	21	21	21	20	21	21	17	21	21	15
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	16	21	20	14	20	18	12	18	16	10	16	14	9	14	13	9
	C	0-7	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	19	13	20	17	12	20	15	10	18	13	9
			Exposed	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	15	20	20	14	20	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	20	16	22	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	22	22	22	22	22	20	22	22	18	22	20	16	22	18	15	22	17	14	22	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	17	22	22	14	22	17	12	22	15	10	22	13	9	20	12	8
			Exposed	22	22	22	22	22	22	22	22	20	22	22	17	22	22	15	22	20	14	22	18	12	22	15	10	22	13	9	20	11	8	17	10	7	15	9	6	13	8	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	21	21	15	21	19	13	19	17	11	16	14	9	14	12	8
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	19	13	19	17	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
	D	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	15	22	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	22	22	22	22	22	19	22	22	17	22	22	16	22	20	14	22	18	13	22	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	21	24	23	19	24	21	17	24	19	16	24	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	24	23	19	24	21	17	24	19	15	24	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	19	25	24	17	25	20	13	25	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	25	25	21	25	25	18	25	23	16	25	20	14	25	18	12	25	17	11	25	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	21	24	24	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	24	24	24	24	24	23	24	24	20	24	24	18	24	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	23 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13	18	16	11	18	14	10	17	12	8
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	18	15	19	16	13	19	14	12
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	18	15	19	16	13	19	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	15	20	19	13	20	17	12
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	15	20	19	13	20	16	11	20	14	10	20	12	8	19	11	7
		27-45	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15			
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	18	12	18	16	10	16	14	9
	C	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	13	18	17	12	18	15	10	18	13	9
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	17	12	18	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	17	14	19	14	12	19	13	10	17	11	9	15	10	8
			Exposed	19	19	19	19	19	19	19	19	18	19	19	16	19	18	15	19	17	14	19	15	12	19	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	20	14	20	17	12	20	15	10	20	13	9	20	12	8
			Exposed	20	20	20	20	20	20	20	20	20	20	20	17	20	20	15	20	20	14	20	18	12	20	15	10	20	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	19	13	19	17	11	17	15	10
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6			
	D	0-7	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	15	20	19	13	20	16	11	19	14	10	17	12	9	15	11	8
			Exposed	20	20	20	20	20	19	20	20	17	20	20	16	20	20	14	20	18	13	20	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	21	17	22	19	16	22	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	22	22	19	22	21	17	22	19	15	22	17	14	22	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	20	13	22	17	11	22	15	10	22	13	9	19	11	8	17	10	7
			Exposed	22	22	21	22	22	18	22	22	16	22	20	14	22	18	12	22	17	11	22	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		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	17	21	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
100	B	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	16	11	16	14	10	16	12	8
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	16	13	17	14	12
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	16	13	17	13	11	17	12	10	16	10	8	14	9	7
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	17	12
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	16	11	18	14	10	18	12	8	18	11	7
		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	17	17	17	17	17	17	17	17	17	17	17	15
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	12	17	16	10	16	14	9			
	C	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	16	16	12	16	15	10	16	13	9
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	16	12	16	14	10	16	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	14	12	17	13	10	17	11	9	15	10	8
			Exposed	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	14	17	15	12	17	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	14	18	17	12	18	15	10	18	13	9	18	12	8
			Exposed	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	18	12	18	15	10	18	13	9	18	11	8	17	10	7	15	9	6	13	8	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	17	17	15	17	17	13	17	17	11	17	15	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	17	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	16	11	18	14	10	17	12	9	15	11	8
			Exposed	18	18	18	18	18	18	18	18	17	18	18	16	18	18	14	18	18	13	18	17	12	18	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	16	19	16	13	19	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	19	19	19	19	19	17	19	19	15	19	17	14	19	15	12	19	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	13	20	17	11	20	15	10	20	13	9	19	11	8	17	10	7
			Exposed	20	20	20	20	20	18	20	20	16	20	20	14	20	18	12	20	17	11	20	15	10	20	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	12	18	16	10	16	14	9	14	13	8
			Exposed	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	14	19	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	185	185	185	185	185	185	185	185	185	185	185	185	185	185	97	185	185	71	185	143	61	185	86	52	145	63	44	91	54	38	65	47	33	57	42	29	51	37	26
			Exposed	185	185	95	185	185	66	185	123	59	185	91	53	185	72	48	138	62	44	102	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	183	183	183	183	183	183	183	183	183	183	183	183	183	183	65	183	183	59	183	67	54	183	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	183	183	65	183	105	58	183	63	52	183	57	47	87	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	181	181	181	181	181	181	181	181	181	181	181	181	181	181	181	181	181	181	181	181	76	181	72	52	181	57	43	108	49	35	79	43	30	65	38	26	58	34	23
			Exposed	181	181	181	181	181	181	181	181	62	181	80	54	181	62	47	181	56	42	145	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	69	175	89	54	175	62	45	60	54	39	53	48	33	47	42	29
			Exposed	175	175	175	175	175	175	175	175	126	175	175	74	175	149	60	175	85	53	175	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	185	185	134	185	185	82	185	161	63	185	111	57	185	85	52	185	69	47	129	61	43	79	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	185	84	51	171	65	46	112	58	41	84	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	183	183	183	183	183	62	183	77	56	183	61	50	183	55	45	84	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	183	55	45	81	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	181	181	181	181	181	181	181	181	173	181	181	59	181	71	52	181	61	46	181	55	41	90	47	33	70	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	181	70	52	181	59	45	181	53	39	94	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	175	175	175	175	175	175	175	175	175	175	175	100	175	175	68	175	119	58	175	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	175	175	67	175	103	56	175	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	185	185	68	185	124	59	185	91	53	185	71	48	132	61	43	98	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	130	61	43	91	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	183	183	58	183	63	52	183	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	181	181	181	181	181	63	181	78	54	181	62	47	181	56	41	126	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	181	55	41	109	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	175	175	175	175	175	128	175	175	73	175	134	59	175	81	53	175	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	175	80	52	175	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
10	B	0-7	Interior	135	135	135	135	135	135	135	135	135	135	135	135	135	135	97	135	135	71	135	135	61	135	86	52	135	63	44	91	54	38	65	47	33	57	42	29	51	37	26
			Exposed	135	135	95	135	135	66	135	123	59	135	91	53	135	72	48	135	62	44	102	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	136	136	136	136	136	136	136	136	136	136	136	136	136	136	65	136	136	59	136	67	54	136	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	136	136	65	136	105	58	136	63	52	136	57	47	87	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	76	178	72	52	178	57	43	108	49	35	79	43	30	65	38	26	58	34	23
			Exposed	178	178	178	178	178	178	178	178	62	178	80	54	178	62	47	178	56	42	145	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	69	175	89	54	175	62	45	60	54	39	53	48	33	47	42	29
			Exposed	175	175	175	175	175	175	175	175	126	175	175	74	175	149	60	175	85	53	175	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	135	135	134	135	135	82	135	135	63	135	111	57	135	85	52	135	69	47	129	61	43	79	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	135	84	51	135	65	46	112	58	41	84	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	136	136	136	136	136	62	136	77	56	136	61	50	136	55	45	84	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	136	55	45	81	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	178	178	178	178	178	178	178	178	173	178	178	59	178	71	52	178	61	46	178	55	41	90	47	33	70	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	178	70	52	178	59	45	178	53	39	94	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	175	175	175	175	175	175	175	175	175	175	175	100	175	175	68	175	119	58	175	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	175	175	67	175	103	56	175	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	135	135	68	135	124	59	135	91	53	135	71	48	132	61	43	98	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	130	61	43	91	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	136	136	58	136	63	52	136	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	181	181	181	181	181	63	181	78	54	181	62	47	181	56	41	126	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	181	55	41	109	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	175	175	175	175	175	128	175	175	73	175	134	59	175	81	53	175	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	175	80	52	175	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
20	B	0-7	Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	71	94	94	61	94	86	52	94	63	44	91	54	38	65	47	33	57	42	29	51	37	26
			Exposed	94	94	94	94	94	66	94	94	59	94	91	53	94	72	48	94	62	44	94	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	95	95	95	95	95	95	95	95	95	95	95	95	95	95	65	95	95	59	95	67	54	95	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	95	95	65	95	95	58	95	63	52	95	57	47	87	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	76	140	72	52	140	57	43	108	49	35	79	43	30	65	38	26	58	34	23
			Exposed	140	140	140	140	140	140	140	140	62	140	80	54	140	62	47	140	56	42	140	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	69	137	89	54	137	62	45	60	54	39	53	48	33	47	42	29
			Exposed	137	137	137	137	137	137	137	137	126	137	137	74	137	137	60	137	85	53	137	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	94	94	94	94	94	82	94	94	63	94	94	57	94	85	52	94	69	47	94	61	43	79	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	94	84	51	94	65	46	94	58	41	84	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	95	95	95	95	95	62	95	77	56	95	61	50	95	55	45	84	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	95	55	45	81	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	76	140	72	52	140	57	43	108	49	35	79	43	30	65	38	26	58	34	23
			Exposed	140	70	52	140	59	45	140	53	39	94	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	137	137	137	137	137	137	137	137	137	137	137	100	137	137	68	137	119	58	137	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	137	137	67	137	103	56	137	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	94	94	68	94	94	59	94	91	53	94	71	48	94	61	43	94	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	94	61	43	91	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	95	95	58	95	63	52	95	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	147	147	147	147	147	63	147	78	54	147	62	47	147	56	41	126	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	147	55	41	109	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	146	146	146	146	146	128	146	146	73	146	134	59	146	81	53	146	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	146	80	52	146	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	71	91	91	61	91	86	52	91	63	44	91	54	38	65	47	33	57	42	29	51	37	26
			Exposed	91	91	91	91	91	66	91	91	59	91	91	53	91	72	48	91	62	44	91	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	95	95	95	95	95	95	95	95	95	95	95	95	95	95	65	95	95	59	95	67	54	95	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	95	95	65	95	95	58	95	63	52	95	57	47	87	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	76	108	72	52	108	57	43	108	49	35	79	43	30	65	38	26	58	34	23
			Exposed	108	108	108	108	108	108	108	108	62	108	80	54	108	62	47	108	56	42	108	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	69	100	89	54	100	62	45	60	54	39	53	48	33	47	42	29
			Exposed	100	100	100	100	100	100	100	100	100	100	100	74	100	100	60	100	85	53	100	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	91	91	91	91	91	82	91	91	63	91	91	57	91	85	52	91	69	47	91	61	43	79	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	91	84	51	91	65	46	91	58	41	84	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	95	95	95	95	95	62	95	77	56	95	61	50	95	55	45	84	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	95	55	45	81	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	108	108	108	108	108	108	108	108	108	108	108	59	108	71	52	108	61	46	108	55	41	90	47	33	70	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	108	70	52	108	59	45	108	53	39	94	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	100	100	100	100	100	100	100	100	100	100	100	100	100	100	68	100	100	58	100	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	100	100	67	100	100	56	100	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	94	94	68	94	94	59	94	91	53	94	71	48	94	61	43	94	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	94	61	43	91	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	95	95	58	95	63	52	95	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	117	117	117	117	117	63	117	78	54	117	62	47	117	56	41	117	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	117	55	41	109	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	109	109	109	109	109	109	109	109	73	109	109	59	109	81	53	109	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	109	80	52	109	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
40	B	0-7	Interior	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	71	76	76	61	76	76	52	76	63	44	76	54	38	65	47	33	57	42	29	51	37	26
			Exposed	76	76	76	76	76	66	76	76	59	76	76	53	76	72	48	76	62	44	76	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	80	80	80	80	80	80	80	80	80	80	80	80	80	80	65	80	80	59	80	67	54	80	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	80	80	65	80	80	58	80	63	52	80	57	47	80	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	76	84	72	52	84	57	43	84	49	35	79	43	30	65	38	26	58	34	23
			Exposed	84	84	84	84	84	84	84	84	62	84	80	54	84	62	47	84	56	42	84	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	69	79	79	54	79	62	45	60	54	39	53	48	33	47	42	29
			Exposed	79	79	79	79	79	79	79	79	79	79	79	74	79	79	60	79	79	53	79	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	76	76	76	76	76	76	76	76	63	76	76	57	76	76	52	76	69	47	76	61	43	76	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	76	76	51	76	65	46	76	58	41	76	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	80	80	80	80	80	62	80	77	56	80	61	50	80	55	45	80	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	80	55	45	80	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	76	84	72	52	84	57	43	84	49	35	79	43	30	65	38	26	58	34	23
			Exposed	84	70	52	84	59	45	84	53	39	84	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	68	79	79	58	79	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	79	79	67	79	79	56	79	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	81	81	68	81	81	59	81	81	53	81	71	48	81	61	43	81	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	81	61	43	81	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	86	86	58	86	63	52	86	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	92	92	92	92	92	63	92	78	54	92	62	47	92	56	41	92	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	92	55	41	92	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	86	86	86	86	86	86	86	86	73	86	86	59	86	81	53	86	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	86	80	52	86	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
50	B	0-7	Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	52	62	62	44	62	54	38	62	47	33	57	42	29	51	37	26			
			Exposed	62	62	62	62	62	62	62	62	59	62	62	53	62	62	48	62	62	44	62	57	40	62	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	67	67	67	67	67	67	67	67	67	67	67	67	67	67	65	67	67	59	67	67	54	67	55	46	67	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	67	67	65	67	67	58	67	63	52	67	57	47	67	51	42	67	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	52	69	57	43	69	49	35	69	43	30	65	38	26	58	34	23
			Exposed	69	69	69	69	69	69	69	69	62	69	69	54	69	62	47	69	56	42	69	52	37	69	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	54	65	62	45	60	54	39	53	48	33	47	42	29
			Exposed	65	65	65	65	65	65	65	65	65	65	65	65	65	65	60	65	65	53	65	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	62	62	62	62	62	62	62	62	62	62	62	57	62	62	52	62	62	47	62	61	43	62	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	62	62	51	62	62	46	62	58	41	62	53	37	62	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	67	67	67	67	67	62	67	67	56	67	61	50	67	55	45	67	50	41	67	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	67	55	45	67	49	40	67	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	69	69	69	69	69	69	69	69	69	69	69	59	69	69	52	69	61	46	69	55	41	69	47	33	69	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	69	69	52	69	59	45	69	53	39	69	48	34	69	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	58	65	65	52	65	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	65	65	65	65	65	56	65	65	50	65	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	68	68	68	68	68	59	68	68	53	68	68	48	68	61	43	68	56	39	68	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	68	61	43	68	54	38	68	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	74	74	58	74	63	52	74	56	46	74	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	75	75	75	75	75	63	75	75	54	75	62	47	75	56	41	75	51	37	75	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	75	55	41	75	49	36	75	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	71	71	71	71	71	71	71	71	71	71	71	59	71	71	53	71	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	71	71	52	71	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	44	52	52	38	52	47	33	52	42	29	51	37	26
			Exposed	52	52	52	52	52	52	52	52	52	52	52	52	52	52	48	52	52	44	52	52	40	52	48	34	52	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	54	57	55	46	57	47	39	57	41	34	55	36	29	48	31	26	43	28	23
			Exposed	57	57	57	57	57	57	57	57	52	57	57	47	57	51	42	57	47	38	57	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	52	58	57	43	58	49	35	58	43	30	58	38	26	58	34	23
			Exposed	58	58	58	58	58	58	58	58	58	58	58	54	58	58	47	58	56	42	58	52	37	58	44	30	58	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	55	55	45	55	54	39	53	48	33	47	42	29
			Exposed	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	55	55	48	55	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	47	52	52	43	52	51	36	52	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	52	52	51	52	52	46	52	52	41	52	52	37	52	48	34	52	43	31	52	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	57	57	57	57	57	57	57	57	56	57	57	50	57	55	45	57	50	41	57	46	38	57	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	57	55	45	57	49	40	57	44	36	57	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58	52	58	58	46	58	55	41	58	47	33	58	40	27	58	35	24	52	30	21	45	27	18	40	24	16
			Exposed	58	58	52	58	58	45	58	53	39	58	48	34	58	43	30	58	39	27	58	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	43	55	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	55	55	55	55	55	55	55	55	50	55	55	44	55	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	58	58	58	58	58	58	58	58	53	58	58	48	58	58	43	58	56	39	58	51	36	58	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	58	58	43	58	54	38	58	49	34	58	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	62	62	58	62	62	52	62	56	46	62	51	42	62	46	38	62	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	62	46	38	62	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	64	64	64	64	64	63	64	64	54	64	62	47	64	56	41	64	51	37	64	46	33	64	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	64	55	41	64	49	36	64	44	31	64	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	61	61	61	61	61	61	61	61	61	61	61	59	61	61	53	61	61	47	61	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	61	61	52	61	61	46	61	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
70	B	0-7	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	45	45	38	45	45	33	45	42	29	45	37	26
			Exposed	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	45	45	40	45	45	34	45	41	29	45	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	46	49	47	39	49	41	34	49	36	29	48	31	26	43	28	23	40	28	23
			Exposed	49	49	49	49	49	49	49	49	49	49	49	47	49	49	42	49	47	38	49	43	35	49	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	43	50	49	35	50	43	30	50	38	26	50	34	23	40	30	20
			Exposed	50	50	50	50	50	50	50	50	50	50	50	50	50	50	47	50	50	42	50	50	37	50	44	30	50	37	25	50	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	45	48	48	39	48	48	33	47	42	29
			Exposed	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	39	48	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	43	45	45	36	45	44	31	45	38	27	45	33	23	40	29	21	36	26	18
			Exposed	45	45	45	45	45	45	45	45	41	45	45	37	45	45	34	45	43	31	45	40	28	45	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	45	49	49	41	49	46	38	49	39	32	49	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	49	49	45	49	49	40	49	44	36	49	40	33	49	36	30	49	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	46	50	50	41	50	47	33	50	40	27	50	35	24	50	30	21	45	27	18	40	24	16
			Exposed	50	50	50	50	50	45	50	50	39	50	48	34	50	43	30	50	39	27	50	36	25	50	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	43	48	48	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	48	48	48	48	48	48	48	48	48	48	48	44	48	48	39	48	48	35	48	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	50	50	50	50	50	50	50	50	50	50	50	48	50	50	43	50	50	39	50	50	36	50	43	30	50	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	50	50	43	50	50	38	50	49	34	50	44	31	50	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	54	54	54	54	54	52	54	54	46	54	51	42	54	46	38	54	42	35	54	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	54	46	38	54	41	34	54	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	55	55	55	55	55	55	55	55	54	55	55	47	55	55	41	55	51	37	55	46	33	55	39	27	55	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	55	55	41	55	49	36	55	44	31	55	40	27	55	36	25	55	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	47	53	53	42	53	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	53	53	52	53	53	46	53	53	40	53	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
80	B	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	40	40	33	40	40	29	40	37	26
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	34	40	40	29	40	35	25	40	31	22	37	27	19	33	24	17
		7-20	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	39	43	41	34	43	36	29	43	31	26	43	28	23	40	28	23
			Exposed	43	43	43	43	43	43	43	43	43	43	43	43	43	43	42	43	43	38	43	43	35	43	36	30	43	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	35	44	44	30	44	44	26	44	34	23
			Exposed	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	42	44	44	37	44	44	30	44	37	25	44	32	22	44	28	19	42	25	17	38	22	15
		27-45	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	39	42	42	33	42	42	29
			Exposed	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40	42	42	33	42	42	30	42	28	18
	C	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	36	40	40	31	40	38	27	40	33	23	40	29	21	36	26	18
			Exposed	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	40	40	31	40	40	28	40	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	41	43	43	38	43	39	32	43	33	27	43	29	24	38	25	21	34	22	18	30	20	16
			Exposed	43	43	43	43	43	40	43	43	36	43	40	33	43	36	30	43	33	27	43	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	41	44	44	33	44	40	27	44	35	24	44	30	21	44	27	18	40	24	16
			Exposed	44	44	44	44	44	44	44	44	39	44	44	34	44	43	30	44	39	27	44	36	25	44	31	21	44	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	35	42	42	30	42	38	25	37	33	22	33	30	19
			Exposed	42	42	42	42	42	42	42	42	42	42	42	42	42	42	39	42	42	35	42	42	31	42	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	44	44	39	44	44	36	44	43	30	44	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	44	44	43	44	44	38	44	44	34	44	44	31	44	40	28	44	36	26	44	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	48	48	48	48	48	48	48	48	46	48	48	42	48	46	38	48	42	35	48	38	32	48	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	48	46	38	48	41	34	48	37	30	48	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	49	49	49	49	49	49	49	49	49	49	49	47	49	49	41	49	49	37	49	46	33	49	39	27	49	34	23	49	29	20	43	25	17	38	22	15	34	20	14
			Exposed	49	49	41	49	49	36	49	44	31	49	40	27	49	36	25	49	33	23	49	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	42	47	47	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	47	47	47	47	47	46	47	47	40	47	47	35	47	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 1.25	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	35	29	35	35	26
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	29	35	35	25	35	31	22	35	27	19	33	24	17
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	34	38	36	29	38	31	26	38	28	23
			Exposed	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	36	30	38	31	25	38	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	35	40	40	30	40	38	26	40	34	23
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	30	40	37	25	40	32	22	40	28	19	40	25	17	38	22	15
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	33	38	38	29
			Exposed	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	27	38	35	23	35	31	20	31	28	18
	C	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	35	35	27	35	33	23	35	29	21	35	26	18
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	31	35	35	28	35	33	24	35	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	32	38	33	27	38	29	24	38	25	21	34	22	18	30	20	16
			Exposed	38	38	38	38	38	38	38	38	36	38	38	33	38	36	30	38	33	27	38	30	25	38	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	33	40	40	27	40	35	24	40	30	21	40	27	18	40	24	16
			Exposed	40	40	40	40	40	40	40	40	39	40	40	34	40	40	30	40	39	27	40	36	25	40	31	21	40	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	30	38	38	25	37	33	22	33	30	19
			Exposed	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	31	38	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12			
	D	0-7	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	39	30	39	37	26	39	32	22	38	28	20	34	24	17	30	22	15
			Exposed	39	39	39	39	39	38	39	39	34	39	39	31	39	39	28	39	36	26	39	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	38	42	42	35	42	38	32	42	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	42	42	38	42	41	34	42	37	30	42	33	27	42	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	41	44	44	37	44	44	33	44	39	27	44	34	23	44	29	20	43	25	17	38	22	15	34	20	14
			Exposed	44	44	41	44	44	36	44	44	31	44	40	27	44	36	25	44	33	23	44	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	35	42	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	42	42	42	42	42	42	42	42	40	42	42	35	42	42	32	42	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
100	B	0-7	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	26
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	25	32	31	22	32	27	19	32	24	17
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	29	35	31	26	35	28	23
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	31	25	35	27	22	35	23	19	31	21	17	28	18	15
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	30	36	36	26	36	34	23
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	30	36	36	25	36	32	22	36	28	19	36	25	17	36	22	15
		27-45	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	29
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	27	34	34	23	34	31	20	31	28	18
	C	0-7	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	27	32	32	23	32	29	21	32	26	18
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	28	32	32	24	32	29	20	32	25	18	30	22	15	26	19	13	23	17	12			
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	33	27	35	29	24	35	25	21	34	22	18	30	20	16
			Exposed	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	33	27	35	30	25	35	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	36	36	27	36	35	24	36	30	21	36	27	18	36	24	16
			Exposed	36	36	36	36	36	36	36	36	36	36	36	34	36	36	30	36	36	27	36	36	25	36	31	21	36	26	18	36	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	30	34	34	25	34	33	22	33	30	19
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	31	34	34	26	34	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	35	26	35	32	22	35	28	20	34	24	17	30	22	15
			Exposed	35	35	35	35	35	35	35	35	34	35	35	31	35	35	28	35	35	26	35	33	23	35	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	32	38	32	27	38	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	38	38	38	38	38	34	38	37	30	38	33	27	38	30	25	38	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	33	40	39	27	40	34	23	40	29	20	40	25	17	38	22	15	34	20	14
			Exposed	40	40	40	40	40	36	40	40	31	40	40	27	40	36	25	40	33	23	40	30	21	40	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	29	38	36	24	36	32	21	31	28	18	28	25	16
			Exposed	38	38	38	38	38	38	38	38	38	38	38	35	38	38	32	38	38	28	38	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	113	113	92	113	113	76	113	113	63	113	90	54	113	77	46	113	67	41	96	58	37	74	46	31	58	38	27	47	33	23	40	29	20	35	25	18	31	22	16
			Exposed	113	77	46	113	64	40	90	55	36	76	47	32	66	42	29	57	38	27	50	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	112	112	81	112	94	65	112	75	53	112	62	45	85	52	40	75	45	36	67	40	33	54	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	85	52	39	73	43	35	64	38	31	56	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	106	106	106	106	106	106	106	106	81	106	86	66	106	72	54	106	61	46	106	52	40	79	41	32	65	35	26	54	30	21	46	26	18	40	23	16	35	20	14
			Exposed	106	71	54	106	58	44	97	49	38	82	42	33	72	38	29	64	34	26	57	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	101	101	101	101	101	101	101	101	97	101	101	81	101	101	69	101	86	59	101	74	51	72	56	40	54	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	101	101	68	101	82	57	94	69	48	76	58	41	63	50	36	53	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	113	86	51	113	72	43	102	61	38	85	52	35	73	46	31	63	41	28	55	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	73	45	31	61	40	28	52	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	112	59	42	80	48	38	70	41	34	61	37	30	54	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	54	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	106	81	62	106	66	50	106	55	41	91	46	36	79	41	32	70	37	28	62	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	78	40	31	68	36	27	59	32	24	52	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	101	101	77	101	93	63	101	77	53	88	65	45	72	56	40	60	48	35	51	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	71	55	39	57	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	113	65	40	90	55	36	76	47	32	65	41	29	56	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	56	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	74	43	35	64	38	31	56	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	106	59	45	97	49	38	81	42	33	71	37	29	63	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	62	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	101	83	57	94	69	48	75	58	41	62	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
10	B	0-7	Interior	83	83	83	83	83	76	83	83	63	83	83	54	83	77	46	83	67	41	83	58	37	74	46	31	58	38	27	47	33	23	40	29	20	35	25	18	31	22	16
			Exposed	83	77	46	83	64	40	83	55	36	76	47	32	66	42	29	57	38	27	50	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	83	83	81	83	83	65	83	75	53	83	62	45	83	52	40	75	45	36	67	40	33	54	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	83	52	39	73	43	35	64	38	31	56	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	92	92	92	92	92	92	92	92	81	92	86	66	92	72	54	92	61	46	92	52	40	79	41	32	65	35	26	54	30	21	46	26	18	40	23	16	35	20	14
			Exposed	92	71	54	92	58	44	92	49	38	82	42	33	72	38	29	64	34	26	57	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	87	87	87	87	87	87	87	87	87	87	87	81	87	87	69	87	86	59	87	74	51	72	56	40	54	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	87	87	68	87	82	57	87	69	48	76	58	41	63	50	36	53	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	83	83	51	83	72	43	83	61	38	83	52	35	73	46	31	63	41	28	55	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	73	45	31	61	40	28	52	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	83	59	42	80	48	38	70	41	34	61	37	30	54	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	54	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	92	81	62	92	66	50	92	55	41	91	46	36	79	41	32	70	37	28	62	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	78	40	31	68	36	27	59	32	24	52	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	87	87	77	87	87	63	87	77	53	87	65	45	72	56	40	60	48	35	51	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	71	55	39	57	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	83	65	40	83	55	36	76	47	32	65	41	29	56	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	56	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	74	43	35	64	38	31	56	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	95	59	45	95	49	38	81	42	33	71	37	29	63	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	62	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	90	83	57	90	69	48	75	58	41	62	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
20	B	0-7	Interior	57	57	57	57	57	57	57	57	57	57	57	54	57	57	46	57	57	41	57	57	37	57	46	31	57	38	27	47	33	23	40	29	20	35	25	18	31	22	16
			Exposed	57	57	46	57	57	40	57	55	36	57	47	32	57	42	29	57	38	27	50	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	58	58	58	58	58	58	58	58	53	58	58	45	58	52	40	58	45	36	58	40	33	54	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	58	52	39	58	43	35	58	38	31	56	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	71	71	71	71	71	71	71	71	71	71	71	66	71	71	54	71	61	46	71	52	40	71	41	32	65	35	26	54	30	21	46	26	18	40	23	16	35	20	14
			Exposed	71	71	54	71	58	44	71	49	38	71	42	33	71	38	29	64	34	26	57	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	59	68	68	51	68	56	40	54	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	68	68	68	68	68	57	68	68	48	68	58	41	63	50	36	53	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	57	57	51	57	57	43	57	57	38	57	52	35	57	46	31	57	41	28	55	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	57	45	31	57	40	28	52	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	58	58	42	58	48	38	58	41	34	58	37	30	54	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	54	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	71	71	62	71	66	50	71	55	41	71	46	36	71	41	32	70	37	28	62	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	71	40	31	68	36	27	59	32	24	52	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	68	68	68	68	68	63	68	68	53	68	65	45	68	56	40	60	48	35	51	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	68	55	39	57	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	57	57	40	57	55	36	57	47	32	57	41	29	56	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	56	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	58	43	35	58	38	31	56	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	74	59	45	74	49	38	74	42	33	71	37	29	63	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	62	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	71	71	57	71	69	48	71	58	41	62	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	56	56	56	56	56	56	56	56	56	56	56	54	56	56	46	56	56	41	56	56	37	56	46	31	56	38	27	47	33	23	40	29	20	35	25	18	31	22	16
			Exposed	56	56	46	56	56	40	56	55	36	56	47	32	56	42	29	56	38	27	50	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	58	58	58	58	58	58	58	58	53	58	58	45	58	52	40	58	45	36	58	40	33	54	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	58	52	39	58	43	35	58	38	31	56	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	58	58	58	58	58	58	58	58	58	58	58	54	58	58	46	58	52	40	58	41	32	58	35	26	54	30	21	46	26	18	40	23	16	35	20	14	30	20	14
			Exposed	58	58	54	58	58	44	58	49	38	58	42	33	58	38	29	58	34	26	57	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	51	55	55	40	54	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	55	55	55	55	55	55	55	55	48	55	55	41	55	50	36	53	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	56	56	51	56	56	43	56	56	38	56	52	35	56	46	31	56	41	28	55	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	56	45	31	56	40	28	52	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	58	58	42	58	48	38	58	41	34	58	37	30	54	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	54	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	58	58	58	58	58	50	58	55	41	58	46	36	58	41	32	58	37	28	58	34	25	50	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	58	40	31	58	36	27	58	32	24	52	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	55	55	55	55	55	55	55	55	53	55	55	45	55	55	40	55	48	35	51	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	55	55	39	55	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	57	57	40	57	55	36	57	47	32	57	41	29	56	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	56	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	58	43	35	58	38	31	56	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	61	59	45	61	49	38	61	42	33	61	37	29	61	34	25	56	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	61	34	25	54	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	59	59	57	59	59	48	59	58	41	59	49	36	52	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	51	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
40	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	41	46	46	37	46	46	31	46	38	27	46	33	23	40	29	20	35	25	18	31	22	16
			Exposed	46	46	46	46	46	40	46	46	36	46	46	32	46	42	29	46	38	27	46	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	49	49	49	49	49	49	49	49	49	49	49	45	49	49	40	49	45	36	49	40	33	49	34	28	45	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	49	49	39	49	43	35	49	38	31	49	34	28	49	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	46	49	49	40	49	41	32	49	35	26	49	30	21	46	26	18	40	23	16	35	20	14
			Exposed	49	49	49	49	49	44	49	49	38	49	42	33	49	38	29	49	34	26	49	31	23	46	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	40	47	44	33	42	38	28	37	33	23	32	29	20	29	26	17
			Exposed	47	47	47	47	47	47	47	47	47	47	47	41	47	47	36	47	43	32	45	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	46	46	46	46	46	43	46	46	38	46	46	35	46	46	31	46	41	28	46	37	26	43	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	46	45	31	46	40	28	46	35	25	45	32	22	40	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	49	49	42	49	48	38	49	41	34	49	37	30	49	33	28	48	30	25	43	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	49	33	27	47	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	49	49	49	49	49	49	49	49	41	49	46	36	49	41	32	49	37	28	49	34	25	49	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	49	40	31	49	36	27	49	32	24	49	29	21	46	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	45	47	47	40	47	47	35	47	42	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	47	47	39	47	46	34	47	40	30	41	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	50	50	40	50	50	36	50	47	32	50	41	29	50	37	26	49	34	24	43	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	50	37	26	47	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	53	43	35	53	38	31	53	34	28	49	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	52	52	45	52	49	38	52	42	33	52	37	29	52	34	25	52	31	22	50	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	52	34	25	52	30	22	47	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	50	50	50	50	50	48	50	50	41	50	49	36	50	42	32	44	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	50	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
50	B	0-7	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	37	38	38	31	38	38	27	38	33	23	38	29	20	35	25	18	31	22	16
			Exposed	38	38	38	38	38	38	38	38	36	38	38	32	38	38	29	38	38	27	38	34	24	38	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	41	41	36	41	40	33	41	34	28	41	29	24	38	25	20	33	22	18	29	19	16	26	17	14
			Exposed	41	41	39	41	41	35	41	38	31	41	34	28	41	31	26	41	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	40	42	41	32	42	35	26	42	30	21	42	26	18	40	23	16	35	20	14
			Exposed	42	42	42	42	42	42	42	42	38	42	42	33	42	38	29	42	34	26	42	31	23	42	26	18	39	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	33	40	38	28	37	33	23	32	29	20	29	26	17
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	36	40	40	32	40	39	29	37	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	38	38	38	38	38	38	38	38	38	38	38	35	38	38	31	38	38	28	38	37	26	38	31	22	37	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	38	38	31	38	38	28	38	35	25	38	32	22	38	29	20	36	26	19	33	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	41	41	41	41	41	38	41	41	34	41	37	30	41	33	28	41	30	25	41	28	23	36	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	41	33	27	41	30	24	41	27	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	42	42	42	42	42	42	42	42	41	42	42	36	42	41	32	42	37	28	42	34	25	42	28	20	42	24	17	36	21	14	31	18	12	28	16	11	24	14	10
			Exposed	42	40	31	42	36	27	42	32	24	42	29	21	42	26	18	41	24	16	38	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	35	40	40	32	40	36	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	40	40	39	40	40	34	40	40	30	40	36	27	37	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	42	42	40	42	42	36	42	42	32	42	41	29	42	37	26	42	34	24	42	31	22	36	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	42	37	26	42	33	23	41	30	21	37	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	45	43	35	45	38	31	45	34	28	45	31	25	43	28	23	39	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	45	45	45	45	45	38	45	42	33	45	37	29	45	34	25	45	31	22	45	28	20	41	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	45	34	25	45	30	22	45	27	19	42	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	43	43	43	43	43	43	43	43	41	43	43	36	43	42	32	43	39	29	39	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	43	42	32	42	38	28	38	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	27	32	32	23	32	29	20	32	25	18	31	22	16
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	27	32	32	24	32	29	20	32	25	17	30	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	28	34	29	24	34	25	20	33	22	18	29	19	16	26	17	14
			Exposed	34	34	34	34	34	34	34	34	31	34	34	28	34	31	26	34	28	23	34	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	26	35	30	21	35	26	18	35	23	16	35	20	14
			Exposed	35	35	35	35	35	35	35	35	35	35	35	33	35	35	29	35	34	26	35	31	23	35	26	18	35	23	15	34	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	28	34	33	23	32	29	20	29	26	17
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	32	34	34	29	34	33	24	32	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	28	32	32	26	32	31	22	32	27	19	32	23	16	28	20	14	24	18	12	22	16	11
			Exposed	32	32	31	32	32	28	32	32	25	32	32	22	32	29	20	32	26	19	32	24	17	28	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	30	34	33	28	34	30	25	34	28	23	34	23	19	31	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	34	33	27	34	30	24	34	27	22	34	24	20	33	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	28	35	34	25	35	28	20	35	24	17	35	21	14	31	18	12	28	16	11	24	14	10
			Exposed	35	35	31	35	35	27	35	32	24	35	29	21	35	26	18	35	24	16	35	22	15	32	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	26	34	30	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	34	34	34	34	34	34	34	34	30	34	34	27	34	33	24	34	30	21	31	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	35	35	35	35	35	35	35	35	32	35	35	29	35	35	26	35	34	24	35	31	22	35	26	18	31	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	35	35	26	35	33	23	35	30	21	35	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	38	38	35	38	38	31	38	34	28	38	31	25	38	28	23	38	25	21	36	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	38	28	23	38	25	20	34	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	39	39	39	39	39	38	39	39	33	39	37	29	39	34	25	39	31	22	39	28	20	39	24	16	35	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	39	34	25	39	30	22	39	27	19	39	24	17	38	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	37	37	37	37	37	37	37	37	37	37	37	36	37	37	32	37	37	29	37	35	26	33	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	37	37	32	37	37	28	37	34	24	34	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
70	B	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	23	27	27	20	27	25	18	27	22	16
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	20	27	25	17	27	21	15	26	19	13	23	16	12	20	15	10
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	30	29	24	30	25	20	30	22	18	29	19	16	26	17	14
			Exposed	30	30	30	30	30	30	30	30	30	30	30	28	30	30	26	30	28	23	30	26	21	30	22	18	29	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	26	31	30	21	31	26	18	31	23	16	31	20	14
			Exposed	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	31	31	26	31	31	23	31	26	18	31	23	15	31	20	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	23	29	29	20	29	26	17
			Exposed	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	24	29	28	20	27	25	17	24	21	14	21	19	12	19	17	11
	C	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	22	27	27	19	27	23	16	27	20	14	24	18	12	22	16	11
			Exposed	27	27	27	27	27	27	27	27	25	27	27	22	27	27	20	27	26	19	27	24	17	27	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	30	30	25	30	28	23	30	23	19	30	20	17	27	17	14	23	15	12	20	13	11	18	12	10
			Exposed	30	30	27	30	30	24	30	27	22	30	24	20	30	22	18	30	20	16	28	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	28	31	31	25	31	28	20	31	24	17	31	21	14	31	18	12	28	16	11	24	14	10
			Exposed	31	31	31	31	31	27	31	31	24	31	29	21	31	26	18	31	24	16	31	22	15	31	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	26	29	29	21	29	26	18	26	23	15	23	20	13	20	18	11
			Exposed	29	29	29	29	29	29	29	29	29	29	29	27	29	29	24	29	29	21	29	27	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	30	30	30	30	30	30	30	30	30	30	30	26	30	30	24	30	30	22	30	26	18	30	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	30	30	26	30	30	23	30	30	21	30	27	19	30	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	33	33	33	33	33	31	33	33	28	33	31	25	33	28	23	33	25	21	33	23	19	30	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	33	28	23	33	25	20	33	22	18	31	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	34	34	34	34	34	34	34	34	33	34	34	29	34	34	25	34	31	22	34	28	20	34	24	16	34	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	34	34	25	34	30	22	34	27	19	34	24	17	34	22	15	34	20	14	31	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	26	32	30	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	32	32	32	32	32	28	32	32	24	32	31	22	31	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
80	B	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	20	24	24	18	24	22	16
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	20	24	24	17	24	21	15	24	19	13	23	16	12	20	15	10
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	24	26	25	20	26	22	18	26	19	16	26	17	14
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	22	18	26	19	15	25	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	26	27	27	21	27	26	18	27	23	16	27	20	14
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	23	27	26	18	27	23	15	27	20	13	27	17	12	26	15	10	23	13	9
		27-45	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	20	26	26	17
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	20	26	25	17	24	21	14	21	19	12	19	17	11	17	15	11
	C	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	19	24	23	16	24	20	14	24	18	12	22	16	11
			Exposed	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	19	24	24	17	24	20	14	24	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	26	26	23	26	23	19	26	20	17	26	17	14	23	15	12	20	13	11	18	12	10
			Exposed	26	26	26	26	26	24	26	26	22	26	24	20	26	22	18	26	20	16	26	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	20	27	24	17	27	21	14	27	18	12	27	16	11	24	14	10	24	14	10
			Exposed	27	27	27	27	27	27	27	27	24	27	27	21	27	26	18	27	24	16	27	22	15	27	18	13	27	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	21	26	26	18	26	23	15	23	20	13	20	18	11	20	18	11
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	21	26	26	19	26	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	22	27	26	18	27	22	16	27	19	14	23	17	12	20	15	10	18	13	9
			Exposed	27	27	26	27	27	23	27	27	21	27	27	19	27	24	17	27	22	15	27	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	29	29	29	29	29	29	29	29	28	29	29	25	29	28	23	29	25	21	29	23	19	29	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	29	28	23	29	25	20	29	22	18	29	20	17	28	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	29	30	30	25	30	30	22	30	28	20	30	24	16	30	20	14	30	18	12	26	15	10	23	13	9	20	12	8
			Exposed	30	30	25	30	30	22	30	27	19	30	24	17	30	22	15	30	20	14	30	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	21	28	26	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	28	28	28	28	28	28	28	28	24	28	28	22	28	28	19	28	25	17	26	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	19 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	15	21	19	13	21	16	12	20	15	10
		7-20	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	22	18	23	19	16	23	17	14
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	22	18	23	19	15	23	16	13	22	14	12	19	12	10	17	11	9
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	21	24	24	18	24	23	16	24	20	14
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	18	24	23	15	24	20	13	24	17	12	24	15	10	23	13	9
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	23	17
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	23	17	23	21	14	21	19	12	19	17	11			
	C	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	21	16	21	20	14	21	18	12	21	16	11
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	19	21	21	17	21	20	14	21	17	12	21	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	19	23	20	17	23	17	14	23	15	12	20	13	11	18	12	10
			Exposed	23	23	23	23	23	23	23	23	22	23	23	20	23	22	18	23	20	16	23	18	15	23	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	20	24	24	17	24	21	14	24	18	12	24	16	11	24	14	10
			Exposed	24	24	24	24	24	24	24	24	24	24	24	21	24	24	18	24	24	16	24	22	15	24	18	13	24	16	11	23	14	9	20	12	8	18	10	7	16	9	6
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	18	23	23	15	23	20	13	20	18	11
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	23	16	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	18	24	22	16	24	19	14	23	17	12	20	15	10	18	13	9
			Exposed	24	24	24	24	24	23	24	24	21	24	24	19	24	24	17	24	22	15	24	20	14	23	17	12	20	14	10	17	13	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	26	26	26	26	26	26	26	26	26	26	26	25	26	26	23	26	25	21	26	23	19	26	20	16	26	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	26	26	23	26	25	20	26	22	18	26	20	17	26	18	15	25	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	22	27	27	20	27	24	16	27	20	14	27	18	12	26	15	10	23	13	9	20	12	8
			Exposed	27	27	25	27	27	22	27	27	19	27	24	17	27	22	15	27	20	14	27	18	12	27	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	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	25	17	25	22	15	22	19	12	19	17	11	17	15	9
			Exposed	25	25	25	25	25	25	25	25	24	25	25	22	25	25	19	25	25	17	25	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6
100	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	19	13	19	16	12	19	15	10
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	19	16	21	17	14
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	18	21	19	15	21	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	22	16	22	20	14
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	18	22	22	15	22	20	13	22	17	12	22	15	10	22	13	9
		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	21	21	21	21	21	21	21	21	21	20	21	21	17
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	17	21	21	14	21	19	12	19	17	11			
	C	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	18	12	19	16	11
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	14	19	17	12	19	15	11	18	13	9	16	11	8	14	10	7
		7-20	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	19	21	20	17	21	17	14	21	15	12	20	13	11	18	12	10
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	20	16	21	18	15	21	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	17	22	21	14	22	18	12	22	16	11	22	14	10
			Exposed	22	22	22	22	22	22	22	22	22	22	22	21	22	22	18	22	22	16	22	22	15	22	18	13	22	16	11	22	14	9	20	12	8	18	10	7	16	9	6
		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	21	21	21	18	21	21	15	21	20	13	20	18	11
			Exposed	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	13	19	17	11	17	15	9	15	13	8	13	12	7
	D	0-7	Interior	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	16	21	19	14	21	17	12	20	15	10	18	13	9			
			Exposed	21	21	21	21	21	21	21	21	21	21	21	19	21	21	17	21	21	15	21	20	14	21	17	10	17	13	9	15	11	8	13	10	7	12	8	6			
		7-20	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	20	16	23	17	14	22	15	12	19	13	10	17	11	9	15	10	8
			Exposed	23	23	23	23	23	20	23	22	18	23	20	17	23	18	15	23	17	14	23	15	12	20	13	11	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	16	24	20	14	24	18	12	24	15	10	23	13	9	20	12	8
			Exposed	24	24	24	24	24	22	24	24	19	24	24	17	24	22	15	24	20	14	24	18	12	24	15	11	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	17	23	22	15	22	19	12	19	17	11	17	15	9
			Exposed	23	23	23	23	23	23	23	23	23	23	23	22	23	23	19	23	23	17	23	23	15	22	19	13	19	17	11	16	14	9	14	13	8	12	11	7	11	10	6

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	188	188	188	188	188	188	188	188	188	188	188	188	188	188	105	188	188	76	188	155	63	188	91	53	158	64	45	96	55	39	69	48	34	59	43	30	52	38	27
			Exposed	188	188	103	188	188	70	188	131	60	188	96	54	188	76	49	149	63	45	109	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	187	187	187	187	187	187	187	187	187	187	187	187	187	187	71	187	187	60	187	74	55	187	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	187	187	70	187	187	59	187	64	53	187	58	48	90	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	170	178	79	53	178	58	44	121	50	36	82	44	31	67	39	26	59	34	24
			Exposed	178	178	178	178	178	178	178	178	65	178	89	55	178	63	48	178	58	43	178	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	74	169	97	55	169	63	46	62	55	40	54	49	34	48	43	30
			Exposed	169	169	169	169	169	169	169	169	169	169	169	80	169	169	61	169	92	55	169	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	188	188	159	188	188	88	188	177	65	188	118	58	188	90	53	188	72	48	139	62	44	83	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	188	89	52	188	68	47	119	60	42	88	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	187	187	187	187	187	63	187	87	57	187	62	51	187	56	46	87	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	187	56	46	84	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	178	178	178	178	178	178	178	178	178	178	178	61	178	78	53	178	62	47	178	57	42	93	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	178	76	53	178	60	46	178	54	40	103	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	169	169	169	169	169	169	169	169	169	169	169	114	169	169	73	169	144	59	169	86	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	169	169	72	169	116	58	169	74	51	169	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	188	188	72	188	132	60	188	96	54	188	74	49	142	63	44	104	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	140	62	44	97	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	187	187	59	187	64	53	187	58	48	89	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	178	178	178	178	178	66	178	87	55	178	63	48	178	57	42	150	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	178	57	42	122	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	169	169	169	169	169	169	169	169	79	169	169	61	169	88	54	169	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	169	86	53	169	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
10	B	0-7	Interior	139	139	139	139	139	139	139	139	139	139	139	139	139	139	105	139	139	76	139	139	63	139	91	53	139	64	45	96	55	39	69	48	34	59	43	30	52	38	27
			Exposed	139	139	103	139	139	70	139	131	60	139	96	54	139	76	49	139	63	45	109	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	140	140	140	140	140	140	140	140	140	140	140	140	140	140	71	140	140	60	140	74	55	140	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	140	140	70	140	140	59	140	64	53	140	58	48	90	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	79	53	154	58	44	121	50	36	82	44	31	67	39	26	59	34	24
			Exposed	154	154	154	154	154	154	154	154	65	154	89	55	154	63	48	154	58	43	154	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	74	146	97	55	146	63	46	62	55	40	54	49	34	48	43	30
			Exposed	146	146	146	146	146	146	146	146	146	146	146	80	146	146	61	146	92	55	146	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	139	139	139	139	139	88	139	139	65	139	118	58	139	90	53	139	72	48	139	62	44	83	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	139	89	52	139	68	47	119	60	42	88	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	140	140	140	140	140	63	140	87	57	140	62	51	140	56	46	87	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	140	56	46	84	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	154	154	154	154	154	154	154	154	154	154	154	61	154	78	53	154	62	47	154	57	42	93	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	154	76	53	154	60	46	154	54	40	103	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	146	146	146	146	146	146	146	146	146	146	146	114	146	146	73	146	144	59	146	86	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	146	146	72	146	116	58	146	74	51	146	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	139	139	72	139	132	60	139	96	54	139	74	49	139	63	44	104	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	139	62	44	97	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	140	140	59	140	64	53	140	58	48	89	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	159	159	159	159	159	66	159	87	55	159	63	48	159	57	42	150	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	159	57	42	122	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	151	151	151	151	151	151	151	151	79	151	151	61	151	88	54	151	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	151	86	53	151	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
20	B	0-7	Interior	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	76	96	96	63	96	91	53	96	64	45	96	55	39	69	48	34	59	43	30	52	38	27
			Exposed	96	96	96	96	96	70	96	96	60	96	96	54	96	76	49	96	63	45	96	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	97	97	97	97	97	97	97	97	97	97	97	97	97	97	71	97	97	60	97	74	55	97	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	97	97	70	97	97	59	97	64	53	97	58	48	90	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	79	53	119	58	44	119	50	36	82	44	31	67	39	26	59	34	24
			Exposed	119	119	119	119	119	119	119	119	65	119	89	55	119	63	48	119	58	43	119	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	74	114	97	55	114	63	46	62	55	40	54	49	34	48	43	30
			Exposed	114	114	114	114	114	114	114	114	114	114	114	80	114	114	61	114	92	55	114	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	96	96	96	96	96	88	96	96	65	96	96	58	96	90	53	96	72	48	96	62	44	83	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	96	89	52	96	68	47	96	60	42	88	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	97	97	97	97	97	63	97	87	57	97	62	51	97	56	46	87	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	97	56	46	84	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	119	119	119	119	119	119	119	119	119	119	119	61	119	78	53	119	62	47	119	57	42	93	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	119	76	53	119	60	46	119	54	40	103	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	114	114	114	114	114	114	114	114	114	114	114	114	114	114	73	114	114	59	114	86	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	114	114	72	114	114	58	114	74	51	114	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	96	96	72	96	96	60	96	96	54	96	74	49	96	63	44	96	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	96	62	44	96	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	97	97	59	97	64	53	97	58	48	89	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	125	125	125	125	125	66	125	87	55	125	63	48	125	57	42	125	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	125	57	42	122	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	119	119	119	119	119	119	119	119	79	119	119	61	119	88	54	119	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	119	86	53	119	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	76	94	94	63	94	91	53	94	64	45	94	55	39	69	48	34	59	43	30	52	38	27
			Exposed	94	94	94	94	94	70	94	94	60	94	94	54	94	76	49	94	63	45	94	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	97	97	97	97	97	97	97	97	97	97	97	97	97	97	71	97	97	60	97	74	55	97	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	97	97	70	97	97	59	97	64	53	97	58	48	90	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	79	53	97	58	44	97	50	36	82	44	31	67	39	26	59	34	24
			Exposed	97	97	97	97	97	97	97	97	65	97	89	55	97	63	48	97	58	43	97	53	38	83	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	74	93	93	55	93	63	46	62	55	40	54	49	34	48	43	30
			Exposed	93	93	93	93	93	93	93	93	93	93	93	80	93	93	61	93	92	55	93	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	94	94	94	94	94	88	94	94	65	94	94	58	94	90	53	94	72	48	94	62	44	83	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	94	89	52	94	68	47	94	60	42	88	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	97	97	97	97	97	63	97	87	57	97	62	51	97	56	46	87	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	97	56	46	84	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	97	97	97	97	97	97	97	97	97	97	97	61	97	78	53	97	62	47	97	57	42	93	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	97	76	53	97	60	46	97	54	40	97	49	35	82	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	93	93	93	93	93	93	93	93	93	93	93	93	93	93	73	93	93	59	93	86	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	93	93	72	93	93	58	93	74	51	93	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	96	96	72	96	96	60	96	96	54	96	74	49	96	63	44	96	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	96	62	44	96	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	97	97	59	97	64	53	97	58	48	89	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	102	102	102	102	102	66	102	87	55	102	63	48	102	57	42	102	52	37	92	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	102	57	42	102	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	98	98	98	98	98	98	98	98	79	98	98	61	98	88	54	98	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	98	86	53	98	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
40	B	0-7	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	76	77	77	63	77	77	53	77	64	45	77	55	39	69	48	34	59	43	30	52	38	27
			Exposed	77	77	77	77	77	70	77	77	60	77	77	54	77	76	49	77	63	45	77	58	41	70	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	82	82	82	82	82	82	82	82	82	82	82	82	82	82	71	82	82	60	82	74	55	82	57	47	79	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	82	82	70	82	82	59	82	64	53	82	58	48	82	52	43	78	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	79	53	81	58	44	81	50	36	81	44	31	67	39	26	59	34	24
			Exposed	81	81	81	81	81	81	81	81	65	81	81	55	81	63	48	81	58	43	81	53	38	81	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	74	78	78	55	78	63	46	62	55	40	54	49	34	48	43	30
			Exposed	78	78	78	78	78	78	78	78	78	78	78	78	78	78	61	78	78	55	78	67	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	77	77	77	77	77	77	77	77	65	77	77	58	77	77	53	77	72	48	77	62	44	77	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	77	77	52	77	68	47	77	60	42	77	54	38	70	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	82	82	82	82	82	63	82	82	57	82	62	51	82	56	46	82	51	42	76	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	82	56	46	82	50	41	71	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	81	81	81	81	81	81	81	81	81	81	81	61	81	78	53	81	62	47	81	57	42	81	48	34	73	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	81	76	53	81	60	46	81	54	40	81	49	35	81	44	31	71	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	73	78	78	59	78	78	53	77	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	78	78	72	78	78	58	78	74	51	78	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	83	83	72	83	83	60	83	83	54	83	74	49	83	63	44	83	57	40	82	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	83	62	44	83	56	39	73	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	88	88	59	88	64	53	88	58	48	88	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	87	87	87	87	87	66	87	87	55	87	63	48	87	57	42	87	52	37	87	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	87	57	42	87	51	36	86	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	83	83	83	83	83	83	83	83	79	83	83	61	83	83	54	83	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	83	83	53	83	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
50	B	0-7	Interior	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	53	63	63	45	63	55	39	63	48	34	59	43	30	52	38	27	46	34	24
			Exposed	63	63	63	63	63	63	63	63	60	63	63	54	63	63	49	63	63	45	63	58	41	63	49	34	58	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	60	69	69	55	69	57	47	69	48	40	64	42	34	56	36	30	49	32	27	44	28	24
			Exposed	69	69	69	69	69	59	69	64	53	69	58	48	69	52	43	69	48	39	68	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	53	70	58	44	70	50	36	70	44	31	67	39	26	59	34	24
			Exposed	70	70	70	70	70	70	70	70	65	70	70	55	70	63	48	70	58	43	70	53	38	70	45	31	65	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	55	66	63	46	62	55	40	54	49	34	48	43	30
			Exposed	66	66	66	66	66	66	66	66	66	66	66	66	66	66	61	66	66	55	66	66	49	62	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	63	63	63	63	63	63	63	63	63	63	63	58	63	63	53	63	63	48	63	62	44	63	52	37	62	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	63	63	52	63	63	47	63	60	42	63	54	38	63	49	34	61	44	31	56	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	69	69	69	69	69	63	69	69	57	69	62	51	69	56	46	69	51	42	69	47	39	61	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	69	56	46	69	50	41	69	45	37	62	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	70	70	70	70	70	70	70	70	70	70	70	61	70	70	53	70	62	47	70	57	42	70	48	34	70	41	28	61	35	24	53	31	21	47	27	19	41	24	17
			Exposed	70	70	53	70	60	46	70	54	40	70	49	35	70	44	31	70	40	28	63	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	59	66	66	53	66	60	44	57	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	66	66	66	66	66	58	66	66	51	66	61	45	62	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	70	70	70	70	70	60	70	70	54	70	70	49	70	63	44	70	57	40	70	52	37	61	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	70	62	44	70	56	39	70	50	35	62	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	76	76	59	76	64	53	76	58	48	76	52	43	76	47	39	66	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	76	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	76	76	76	76	76	66	76	76	55	76	63	48	76	57	42	76	52	37	76	47	33	70	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	76	57	42	76	51	36	76	45	32	73	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	73	73	73	73	73	73	73	73	73	73	73	61	73	73	54	73	65	48	72	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	73	73	53	73	63	47	63	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	45	53	53	39	53	48	34	53	43	30	52	38	27
			Exposed	53	53	53	53	53	53	53	53	53	53	53	53	53	53	49	53	53	45	53	53	41	53	49	34	53	42	30	50	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	55	58	57	47	58	48	40	58	42	34	56	36	30	49	32	27	44	28	24
			Exposed	58	58	58	58	58	58	58	58	53	58	58	48	58	52	43	58	48	39	58	44	36	57	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	53	59	58	44	59	50	36	59	44	31	59	39	26	59	34	24
			Exposed	59	59	59	59	59	59	59	59	59	59	59	55	59	59	48	59	58	43	59	53	38	59	45	31	59	38	26	56	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	55	56	56	46	56	55	40	54	49	34	48	43	30
			Exposed	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	55	56	56	49	56	56	40	53	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	48	53	53	44	53	52	37	53	45	32	53	39	27	47	34	24	41	30	21	36	26	19
			Exposed	53	53	52	53	53	47	53	53	42	53	53	38	53	49	34	53	44	31	53	40	29	47	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	58	58	58	58	58	58	58	58	57	58	58	51	58	56	46	58	51	42	58	47	39	58	40	33	52	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	58	56	46	58	50	41	58	45	37	58	40	33	56	37	30	51	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	59	59	59	59	59	59	59	59	59	59	59	59	59	59	53	59	59	47	59	57	42	59	48	34	59	41	28	59	35	24	53	31	21	47	27	19	41	24	17
			Exposed	59	59	53	59	59	46	59	54	40	59	49	35	59	44	31	59	40	28	59	37	25	53	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	53	56	56	44	56	51	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	56	56	56	56	56	56	56	56	51	56	56	45	56	56	40	56	51	36	52	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	59	59	59	59	59	59	59	59	54	59	59	49	59	59	44	59	57	40	59	52	37	59	44	31	52	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	59	59	44	59	56	39	59	50	35	59	45	32	56	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	64	64	59	64	64	53	64	58	48	64	52	43	64	47	39	64	43	35	60	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	64	47	39	64	42	35	58	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	65	65	65	65	65	65	65	65	55	65	63	48	65	57	42	65	52	37	65	47	33	65	40	27	59	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	65	57	42	65	51	36	65	45	32	65	41	28	64	37	25	58	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	62	62	62	62	62	62	62	62	62	62	62	61	62	62	54	62	62	48	62	59	43	56	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	62	62	53	62	62	47	62	57	41	57	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
70	B	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	34	46	46	45	46	46	39	46	46	34	46	43	30	46	38	27
			Exposed	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	41	46	46	34	46	42	30	46	36	26	43	32	22	38	28	20	34	25	17
		7-20	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	47	50	48	40	50	42	34	50	36	30	49	32	27	44	28	24			
			Exposed	50	50	50	50	50	50	50	50	50	50	50	48	50	50	43	50	48	39	50	44	36	50	37	30	48	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	44	51	50	36	51	44	31	51	39	26	51	34	24			
			Exposed	51	51	51	51	51	51	51	51	51	51	51	51	51	51	48	51	51	43	51	51	38	51	45	31	51	38	26	51	33	23	49	29	20	43	25	17	38	23	15
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	46	49	49	40	49	49	34	48	43	30
			Exposed	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	40	49	48	33	46	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	44	46	46	37	46	45	32	46	39	27	46	34	24	41	30	21	36	26	19
			Exposed	46	46	46	46	46	46	46	46	42	46	46	38	46	46	34	46	44	31	46	40	29	46	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	46	50	50	42	50	47	39	50	40	33	50	34	28	45	29	24	39	26	21	34	23	19	31	20	17
			Exposed	50	50	46	50	50	41	50	45	37	50	40	33	50	37	30	50	33	28	47	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	47	51	51	42	51	48	34	51	41	28	51	35	24	51	31	21	47	27	19	41	24	17
			Exposed	51	51	51	51	51	46	51	51	40	51	49	35	51	44	31	51	40	28	51	37	25	51	31	21	46	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	44	49	49	36	49	44	31	43	39	26	38	34	22	34	30	20
			Exposed	49	49	49	49	49	49	49	49	49	49	49	45	49	49	40	49	49	36	49	46	32	44	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	51	51	51	51	51	51	51	51	51	51	51	49	51	51	44	51	51	40	51	51	37	51	44	31	51	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	51	51	44	51	51	39	51	50	35	51	45	32	51	41	29	51	37	26	47	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	55	55	55	55	55	53	55	55	48	55	52	43	55	47	39	55	43	35	55	39	32	51	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	55	47	39	55	42	35	55	38	31	52	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	57	57	57	57	57	57	57	57	55	57	57	48	57	57	42	57	52	37	57	47	33	57	40	27	57	34	23	51	30	20	44	26	18	39	23	16	35	20	14
			Exposed	57	57	42	57	51	36	57	45	32	57	41	28	57	37	25	57	34	23	53	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	48	54	54	43	54	50	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	54	54	53	54	54	47	54	54	41	54	51	36	52	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
80	B	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	40	40	34	40	40	30	40	38	27
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	34	40	40	30	40	36	26	40	32	22	38	28	20	34	25	17
		7-20	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	40	44	42	34	44	42	34	44	36	30	44	32	27	44	28	24
			Exposed	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	44	44	39	44	44	36	44	37	30	44	32	26	42	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	45	45	36	45	44	31	45	39	26	45	34	24			
			Exposed	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	43	45	45	38	45	45	31	45	38	26	45	33	23	45	29	20	43	25	17	38	23	15
		27-45	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	40	43	43	34	43	43	30
			Exposed	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	40	43	43	33	43	41	28	40	36	24	36	32	21	32	28	18
	C	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	32	40	39	27	40	34	24	40	30	21	36	26	19
			Exposed	40	40	40	40	40	40	40	40	40	40	40	38	40	40	34	40	40	31	40	40	29	40	34	24	40	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	42	44	44	39	44	40	33	44	34	28	44	29	24	39	26	21	34	23	19	31	20	17
			Exposed	44	44	44	44	44	41	44	44	37	44	40	33	44	37	30	44	33	28	44	31	25	40	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	42	45	45	34	45	41	28	45	35	24	45	31	21	45	27	19	41	24	17
			Exposed	45	45	45	45	45	45	45	45	40	45	45	35	45	44	31	45	40	28	45	37	25	45	31	21	45	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	36	43	43	31	43	39	26	38	34	22	34	30	20			
			Exposed	43	43	43	43	43	43	43	43	43	43	43	40	43	43	36	43	43	32	43	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12			
	D	0-7	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	45	45	40	45	45	37	45	44	31	45	38	27	45	32	23	39	28	20	34	25	18	30	22	16
			Exposed	45	45	44	45	45	39	45	45	35	45	45	32	45	41	29	45	37	26	45	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	49	49	49	49	49	49	49	49	48	49	49	43	49	47	39	49	43	35	49	39	32	49	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	49	47	39	49	42	35	49	38	31	49	34	28	47	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	50	50	50	50	50	50	50	50	50	50	50	48	50	50	42	50	50	37	50	47	33	50	40	27	50	34	23	50	30	20	44	26	18	39	23	16	35	20	14
			Exposed	50	50	42	50	50	36	50	45	32	50	41	28	50	37	25	50	34	23	50	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	43	48	48	35	48	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	48	48	48	48	48	47	48	48	41	48	48	36	48	47	32	47	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	19 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	30	36	36	27			
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	30	36	36	26	36	32	22	36	28	20	34	25	17
		7-20	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	36	30	39	32	27	39	28	24			
			Exposed	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	37	30	39	32	26	39	27	23	36	24	20	32	21	17	28	19	15
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	36	41	41	31	41	39	26	41	34	24			
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	38	41	41	31	41	38	26	41	33	23	41	29	20	41	25	17	38	23	15
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	39	30			
			Exposed	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	32	39	36	24	36	32	21	32	28	18			
	C	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	32	36	36	27	36	34	24	36	30	21	36	26	19
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	36	31	36	36	29	36	34	24	36	29	21	35	25	18	30	22	16	27	20	14	24	17	12
		7-20	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	33	39	34	28	39	29	24	39	26	21	34	23	19	31	20	17
			Exposed	39	39	39	39	39	39	39	39	37	39	39	33	39	37	30	39	33	28	39	31	25	39	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	34	41	41	28	41	35	24	41	31	21	41	27	19	41	24	17
			Exposed	41	41	41	41	41	41	41	41	40	41	41	35	41	41	31	41	40	28	41	37	25	41	31	21	41	27	18	40	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	31	39	39	26	38	34	22	34	30	20						
			Exposed	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	39	32	39	39	26	37	34	22	32	29	19	28	25	16	25	22	14	22	20	12			
	D	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	31	40	38	27	40	32	23	39	28	20	34	25	18	30	22	16
			Exposed	40	40	40	40	40	39	40	40	35	40	40	32	40	40	29	40	37	26	40	34	24	39	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	39	43	43	35	43	39	32	43	33	27	43	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	43	43	39	43	42	35	43	38	31	43	34	28	43	31	25	43	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	42	45	45	37	45	45	33	45	40	27	45	34	23	45	30	20	44	26	18	39	23	16	35	20	14
			Exposed	45	45	42	45	45	36	45	45	32	45	41	28	45	37	25	45	34	23	45	31	21	45	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	35	43	43	29	42	37	25	36	33	21	32	29	18	28	25	16
			Exposed	43	43	43	43	43	43	43	43	41	43	43	36	43	43	32	43	42	29	43	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10
100	B	0-7	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	33	27			
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	33	26	33	32	22	33	28	20	33	25	17
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	32	26	35	27	23	35	24	20	32	21	17
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	32	26	35	27	23	35	24	20	32	21	17	28	19	15
		20-27	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	31	37	37	26	37	36	24	37	26	17	37	24	14
			Exposed	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	31	37	37	26	37	33	23	37	29	20	37	25	17	37	23	15
		27-45	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	30			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	28	35	35	24	35	32	21	32	28	18			
	C	0-7	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	33	33	27	33	33	24	33	30	21	33	26	19
			Exposed	33	33	33	33	33	33	33	33	33	33	33	33	33	33	31	33	33	29	33	33	24	33	29	21	33	25	18	30	22	16	27	20	14	24	17	12			
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	34	28	35	29	24	35	26	21	34	23	19	31	20	17
			Exposed	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	33	28	35	31	25	35	26	21	34	22	18	29	19	16	26	17	14	23	15	12	20	13	11
		20-27	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	34	37	37	28	37	35	24	37	31	21	37	27	19	37	24	17
			Exposed	37	37	37	37	37	37	37	37	37	37	37	35	37	37	31	37	37	28	37	37	25	37	31	21	37	27	18	37	23	16	35	20	14	30	18	12	27	16	11
		27-45	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	35	35	26	35	34	22	34	30	20			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	35	26	35	34	22	32	29	19	28	25	16	25	22	14	22	20	12
	D	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	31	36	36	27	36	32	23	36	28	20	34	25	18	30	22	16
			Exposed	36	36	36	36	36	36	36	36	35	36	36	32	36	36	29	36	36	26	36	34	24	36	29	20	34	25	17	29	21	15	25	19	13	22	16	12	20	15	10
		7-20	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	39	39	32	39	33	27	39	28	23	38	25	20	33	21	18	29	19	16	26	17	14
			Exposed	39	39	39	39	39	35	39	38	31	39	34	28	39	31	25	39	28	23	39	26	21	33	22	18	28	19	15	25	16	13	21	14	12	19	12	10	17	11	9
		20-27	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	37	41	41	33	41	40	27	41	34	23	41	30	20	41	26	18	39	23	16	35	20	14
			Exposed	41	41	41	41	41	36	41	41	32	41	41	28	41	37	25	41	34	23	41	31	21	41	26	18	38	22	15	33	19	13	29	17	12	26	15	10	23	13	9
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	39	39	29	39	37	25	36	33	21	32	29	18	28	25	16
			Exposed	39	39	39	39	39	39	39	39	39	39	39	36	39	39	32	39	39	29	39	39	26	37	33	21	31	28	18	27	24	15	24	21	13	21	19	12	19	17	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	94	94	77	94	94	64	94	89	53	94	75	45	94	65	39	94	56	34	81	49	31	62	38	26	49	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	94	64	39	90	54	33	75	46	30	64	40	27	55	35	24	48	32	22	42	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	94	94	68	94	79	54	94	63	45	94	52	37	72	44	33	63	37	30	56	33	27	45	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	71	43	33	61	36	29	53	32	26	47	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	88	88	88	88	88	88	88	88	68	88	72	55	88	60	46	88	51	38	88	44	33	66	34	27	54	29	22	45	25	18	38	22	15	33	19	13	29	17	12
			Exposed	88	60	45	88	49	37	81	41	31	68	35	27	60	32	24	53	29	21	48	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	84	84	84	84	84	84	84	84	82	84	84	68	84	84	57	84	72	49	84	62	43	61	47	33	45	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	84	84	57	84	69	47	79	58	40	63	49	34	52	42	30	44	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	94	72	43	94	60	36	85	51	32	72	44	29	61	38	26	53	34	24	46	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	61	38	26	51	33	23	44	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	94	49	35	67	40	32	58	34	28	51	31	25	45	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	45	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	88	68	52	88	55	42	88	46	35	77	39	30	66	34	26	59	31	23	52	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	66	34	26	57	30	23	49	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	84	84	64	84	78	53	84	65	45	74	55	38	60	47	33	50	40	30	43	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	60	46	33	48	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	91	55	34	76	46	30	64	39	27	54	34	24	47	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	47	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	62	36	30	53	32	26	47	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	88	50	37	81	41	32	68	35	27	60	31	24	53	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	52	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	84	70	48	79	58	40	63	48	34	52	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
10	B	0-7	Interior	69	69	69	69	69	64	69	69	53	69	69	45	69	65	39	69	56	34	69	49	31	62	38	26	49	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	69	64	39	69	54	33	69	46	30	64	40	27	55	35	24	48	32	22	42	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	70	70	68	70	70	54	70	63	45	70	52	37	70	44	33	63	37	30	56	33	27	45	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	70	43	33	61	36	29	53	32	26	47	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	77	77	77	77	77	77	77	77	68	77	72	55	77	60	46	77	51	38	77	44	33	66	34	27	54	29	22	45	25	18	38	22	15	33	19	13	29	17	12
			Exposed	77	60	45	77	49	37	77	41	31	68	35	27	60	32	24	53	29	21	48	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	73	73	73	73	73	73	73	73	73	73	73	68	73	73	57	73	72	49	73	62	43	61	47	33	45	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	73	73	57	73	69	47	73	58	40	63	49	34	52	42	30	44	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	69	69	43	69	60	36	69	51	32	69	44	29	61	38	26	53	34	24	46	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	61	38	26	51	33	23	44	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	70	49	35	67	40	32	58	34	28	51	31	25	45	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	45	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	77	68	52	77	55	42	77	46	35	77	39	30	66	34	26	59	31	23	52	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	66	34	26	57	30	23	49	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	73	73	64	73	73	53	73	65	45	73	55	38	60	47	33	50	40	30	43	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	60	46	33	48	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	69	55	34	69	46	30	64	39	27	54	34	24	47	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	47	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	62	36	30	53	32	26	47	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	79	50	37	79	41	32	68	35	27	60	31	24	53	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	52	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	75	70	48	75	58	40	63	48	34	52	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
20	B	0-7	Interior	48	48	48	48	48	48	48	48	48	48	48	45	48	48	39	48	48	34	48	48	31	48	38	26	48	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	48	48	39	48	48	33	48	46	30	48	40	27	48	35	24	48	32	22	42	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	49	49	49	49	49	49	49	49	45	49	49	37	49	44	33	49	37	30	49	33	27	45	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	49	43	33	49	36	29	49	32	26	47	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	59	59	59	59	59	59	59	59	59	59	59	55	59	59	46	59	51	38	59	44	33	59	34	27	54	29	22	45	25	18	38	22	15	33	19	13	29	17	12
			Exposed	59	59	45	59	49	37	59	41	31	59	35	27	59	32	24	53	29	21	48	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	49	56	56	43	56	47	33	45	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	56	56	56	56	56	47	56	56	40	56	49	34	52	42	30	44	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	48	48	43	48	48	36	48	48	32	48	44	29	48	38	26	48	34	24	46	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	48	38	26	48	33	23	44	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	49	49	35	49	40	32	49	34	28	49	31	25	45	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	45	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	59	59	52	59	55	42	59	46	35	59	39	30	59	34	26	59	31	23	52	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	59	34	26	57	30	23	49	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	56	56	56	56	56	53	56	56	45	56	55	38	56	47	33	50	40	30	43	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	56	46	33	48	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	48	48	34	48	46	30	48	39	27	48	34	24	47	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	47	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	49	36	30	49	32	26	47	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	62	50	37	62	41	32	62	35	27	60	31	24	53	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	52	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	59	59	48	59	58	40	59	48	34	52	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	47	47	47	47	47	47	47	47	47	47	47	45	47	47	39	47	47	34	47	47	31	47	38	26	47	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	47	47	39	47	47	33	47	46	30	47	40	27	47	35	24	47	32	22	42	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	49	49	49	49	49	49	49	49	45	49	49	37	49	44	33	49	37	30	49	33	27	45	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	49	43	33	49	36	29	49	32	26	47	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	48	48	48	48	48	48	48	48	48	48	48	48	48	48	46	48	48	38	48	44	33	48	34	27	48	29	22	45	25	18	38	22	15	33	19	13	29	17	12
			Exposed	48	48	45	48	48	37	48	41	31	48	35	27	48	32	24	48	29	21	48	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	43	46	46	33	45	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	46	46	46	46	46	46	46	46	40	46	46	34	46	42	30	44	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	47	47	43	47	47	36	47	47	32	47	44	29	47	38	26	47	34	24	46	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	47	38	26	47	33	23	44	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	49	49	35	49	40	32	49	34	28	49	31	25	45	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	45	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	48	48	48	48	48	42	48	46	35	48	39	30	48	34	26	48	31	23	48	28	21	42	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	48	34	26	48	30	23	48	27	20	43	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	46	46	46	46	46	46	46	46	45	46	46	38	46	46	33	46	40	30	43	35	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	46	46	33	46	39	29	40	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	48	48	34	48	46	30	48	39	27	48	34	24	47	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	47	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	49	36	30	49	32	26	47	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	51	50	37	51	41	32	51	35	27	51	31	24	51	28	21	47	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	51	28	21	45	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	49	49	48	49	49	40	49	48	34	49	41	30	43	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	43	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
40	B	0-7	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	39	31	39	38	26	39	32	22	39	28	19	33	24	17	29	21	15	26	19	13
			Exposed	39	39	39	39	39	33	39	39	30	39	39	27	39	35	24	39	32	22	39	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	41	41	41	41	41	41	41	41	41	41	41	37	41	41	33	41	37	30	41	33	27	41	28	23	37	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	41	41	33	41	36	29	41	32	26	41	29	24	41	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	40	40	33	40	34	27	40	29	22	40	25	18	38	22	15	33	19	13	29	17	12
			Exposed	40	40	40	40	40	37	40	40	31	40	35	27	40	32	24	40	29	21	40	26	19	39	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	33	39	37	28	35	31	23	31	27	20	27	24	17	24	21	15
			Exposed	39	39	39	39	39	39	39	39	39	39	39	34	39	39	30	39	36	27	38	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	39	39	39	39	39	36	39	39	32	39	39	29	39	38	26	39	34	24	39	31	22	36	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	39	38	26	39	33	23	39	30	21	38	27	19	33	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	41	41	35	41	40	32	41	34	28	41	31	25	41	28	23	40	25	21	36	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	41	28	23	39	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	40	40	40	40	40	40	40	40	35	40	39	30	40	34	26	40	31	23	40	28	21	40	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	40	34	26	40	30	23	40	27	20	40	24	17	39	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	39	39	39	39	39	39	39	39	39	39	39	38	39	39	33	39	39	30	39	36	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	39	39	33	39	39	29	39	34	25	34	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	41	41	34	41	41	30	41	39	27	41	34	24	41	31	22	41	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	41	31	22	39	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	44	36	30	44	32	26	44	29	24	41	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	43	43	37	43	41	32	43	35	27	43	31	24	43	28	21	43	26	19	42	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	43	28	21	43	25	18	40	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	41	41	41	41	41	40	41	41	34	41	41	30	41	35	27	37	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	41	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
50	B	0-7	Interior	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	26	31	31	22	31	28	19	31	24	17	29	21	15	26	19	13
			Exposed	31	31	31	31	31	31	31	31	30	31	31	27	31	31	24	31	31	22	31	29	20	31	24	17	29	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	30	34	33	27	34	28	23	34	24	20	32	21	17	28	18	15	24	16	13	22	14	12
			Exposed	34	34	33	34	34	29	34	32	26	34	29	24	34	26	21	34	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	34	27	35	29	22	35	25	18	35	22	15	33	19	13	29	17	12
			Exposed	35	35	35	35	35	35	35	35	31	35	35	27	35	32	24	35	29	21	35	26	19	35	22	15	33	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	28	33	31	23	31	27	20	27	24	17	24	21	15
			Exposed	33	33	33	33	33	33	33	33	33	33	33	30	33	33	27	33	33	24	31	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9	14	13	8
	C	0-7	Interior	31	31	31	31	31	31	31	31	31	31	31	29	31	31	26	31	31	24	31	31	22	31	26	18	31	22	16	27	19	13	23	17	12	20	15	10	18	13	9
			Exposed	31	31	26	31	31	23	31	30	21	31	27	19	31	24	17	30	22	15	28	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	34	34	34	34	34	32	34	34	28	34	31	25	34	28	23	34	25	21	34	23	19	30	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	34	28	23	34	25	20	34	22	18	31	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	35	35	35	35	35	35	35	35	35	35	35	30	35	34	26	35	31	23	35	28	21	35	24	17	35	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	35	34	26	35	30	23	35	27	20	35	24	17	35	22	15	35	20	14	31	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	30	33	33	26	33	30	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	33	33	33	33	33	29	33	33	25	33	30	22	31	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	35	35	34	35	35	30	35	35	27	35	34	24	35	31	22	35	28	20	35	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	35	31	22	35	28	19	34	25	17	31	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	38	36	30	38	32	26	38	29	24	38	26	21	36	23	19	33	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	36	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	6	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	37	37	37	37	37	32	37	35	27	37	31	24	37	28	21	37	26	19	37	24	17	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	37	28	21	37	25	18	37	23	16	35	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	36	36	36	36	36	36	36	36	34	36	36	30	36	35	27	36	32	24	33	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	36	35	27	35	31	23	32	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	22	26	26	19	26	24	17	26	21	15	26	19	13
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	22	26	26	20	26	24	17	26	21	15	25	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	27	29	28	23	29	24	20	29	21	17	28	18	15	24	16	13	22	14	12	
			Exposed	29	29	29	29	29	29	29	29	26	29	29	24	29	26	21	29	24	19	29	22	18	28	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	30	29	22	30	25	18	30	22	15	30	19	13	29	17	12			
			Exposed	30	30	30	30	30	30	30	30	30	30	30	27	30	30	24	30	29	21	30	26	19	30	22	15	30	19	13	28	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	23	28	27	20	27	24	17	24	21	15
			Exposed	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	28	28	24	28	28	20	26	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	22	26	26	18	26	22	16	26	19	13	23	17	12	20	15	10	18	13	9
			Exposed	26	26	26	26	26	23	26	26	21	26	26	19	26	24	17	26	22	15	26	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	29	29	29	29	29	29	29	29	28	29	29	25	29	28	23	29	25	21	29	23	19	29	20	16	26	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	29	28	23	29	25	20	29	22	18	29	20	16	28	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	30	30	30	30	30	30	30	30	30	30	30	30	30	30	26	30	30	23	30	28	21	30	24	17	30	20	14	30	17	12	26	15	10	23	13	9	20	12	8
			Exposed	30	30	26	30	30	23	30	27	20	30	24	17	30	22	15	30	20	14	30	18	12	27	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	22	28	25	18	25	22	15	21	19	13	19	17	11	17	15	10
			Exposed	28	28	28	28	28	28	28	28	25	28	28	22	28	28	20	28	25	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	29	29	29	29	29	29	29	29	27	29	29	24	29	29	22	29	28	20	29	26	18	29	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	29	29	22	29	28	19	29	25	17	29	22	16	28	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	32	32	30	32	32	26	32	29	24	32	26	21	32	23	19	32	21	17	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	32	23	19	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	33	33	33	33	33	32	33	33	27	33	31	24	33	28	21	33	26	19	33	24	17	33	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	33	28	21	33	25	18	33	23	16	33	20	14	32	18	12	29	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	31	31	31	31	31	31	31	31	31	31	31	30	31	31	27	31	31	24	31	29	21	28	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	31	31	27	31	31	23	31	28	20	28	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
70	B	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	17	23	21	15	23	18	13	21	16	11	19	14	10	17	12	8
			Exposed	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	17	23	21	15	23	18	13	21	16	11	19	14	10	17	12	8
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	18	25	24	20	25	21	17	25	18	15	24	16	13	22	14	12
			Exposed	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	24	19	25	22	18	25	18	15	24	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	22	26	25	18	26	22	15	26	19	13	26	17	12			
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	24	26	26	21	26	26	19	26	22	15	26	19	13	26	16	11	24	14	10	21	12	8	19	11	7
		27-45	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	20	24	24	17	24	21	15
			Exposed	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	20	24	24	16	23	20	14	20	18	12	18	16	10	16	14	9
	C	0-7	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	18	23	22	16	23	19	13	23	17	12	20	15	10	18	13	9
			Exposed	23	23	23	23	23	23	23	23	21	23	23	19	23	23	17	23	22	15	23	20	14	23	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	25	25	25	25	25	25	25	25	25	25	25	25	25	25	23	25	25	21	25	23	19	25	20	16	25	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	25	25	23	25	25	20	25	22	18	25	20	16	25	18	15	25	17	14	23	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	24	17	26	20	14	26	17	12	26	15	10	23	13	9	20	12	8
			Exposed	26	26	26	26	26	23	26	26	20	26	24	17	26	22	15	26	20	14	26	18	12	26	15	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	22	24	24	18	24	22	15	21	19	13	19	17	11	17	15	10
			Exposed	24	24	24	24	24	24	24	24	24	24	24	22	24	24	20	24	24	18	24	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	25	25	25	25	25	25	25	25	25	25	25	24	25	25	22	25	25	20	25	25	18	25	22	15	25	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	25	25	22	25	25	19	25	25	17	25	22	16	25	20	14	25	18	13	23	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	27	27	27	27	27	26	27	27	24	27	26	21	27	23	19	27	21	17	27	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	27	23	19	27	21	17	27	19	15	26	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	28	28	28	28	28	28	28	28	27	28	28	24	28	28	21	28	26	19	28	24	17	28	20	13	28	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	28	28	21	28	25	18	28	23	16	28	20	14	28	18	12	28	17	11	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	21	27	25	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	27	27	27	27	27	23	27	27	20	27	25	18	26	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
80	B	0-7	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	15	20	18	13	20	16	11	19	14	10
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	20	15	20	18	13	20	16	11	19	14	10	17	12	8
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	21	17	22	18	15	22	16	13	21	13	11	18	12	10
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	18	22	18	15	22	16	13	21	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	18	22	22	15	22	19	13	22	17	12			
			Exposed	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	15	22	19	13	22	16	11	22	14	10	21	12	8	19	11	7
		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	21	21	21	21	21	21	20	21	21	17	21	21	15
			Exposed	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20	21	21	16	21	20	14	20	18	12	18	16	10	16	14	9	14	13	9
	C	0-7	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	19	13	20	17	12	20	15	10	18	13	9
			Exposed	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	15	20	20	14	20	17	12	20	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	20	16	22	17	14	22	14	12	19	13	10	17	11	9	15	10	8
			Exposed	22	22	22	22	22	20	22	22	18	22	20	16	22	18	15	22	17	14	22	15	12	20	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	17	22	20	14	22	17	12	22	15	10	22	13	9	20	12	8
			Exposed	22	22	22	22	22	22	22	22	20	22	22	17	22	22	15	22	20	14	22	18	12	22	15	10	22	13	9	20	11	8	17	10	7	15	9	6	13	8	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	21	21	15	21	19	13	19	17	11	16	14	9	14	12	8
			Exposed	21	21	21	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	19	13	19	17	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
	D	0-7	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	15	22	19	13	22	16	11	19	14	10	17	12	9	15	11	8
			Exposed	22	22	22	22	22	19	22	22	17	22	22	16	22	20	14	22	18	13	22	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	24	24	24	24	24	24	24	24	24	24	24	21	24	23	19	24	21	17	24	19	16	24	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	24	23	19	24	21	17	24	19	15	24	17	14	23	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	25	25	25	25	25	25	25	25	25	25	25	24	25	25	21	25	25	19	25	24	17	25	20	13	25	17	11	25	15	10	22	13	9	19	11	8	17	10	7
			Exposed	25	25	21	25	25	18	25	23	16	25	20	14	25	18	12	25	17	11	25	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	21	24	24	17	24	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	24	24	24	24	24	23	24	24	20	24	24	18	24	23	16	23	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	23 sq.ft	PORTRAIT	CROSS-SLOPE	Trim	SFM	SFM Slider
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	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	13	18	16	11	18	14	10	17	12	8
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	18	15	19	16	13	19	14	12
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	18	15	19	16	13	19	13	11	18	12	10	16	10	8	14	9	7
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	15	20	19	13	20	17	12
			Exposed	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	15	20	19	13	20	16	11	20	14	10	20	12	8	19	11	7
		27-45	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15			
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	19	14	19	18	12	18	16	10	16	14	9
	C	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	16	18	18	13	18	17	12	18	15	10	18	13	9
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	17	12	18	14	10	17	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	16	19	17	14	19	14	12	19	13	10	17	11	9	15	10	8
			Exposed	19	19	19	19	19	19	19	19	18	19	19	16	19	18	15	19	17	14	19	15	12	19	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	17	20	20	14	20	17	12	20	15	10	20	13	9	20	12	8
			Exposed	20	20	20	20	20	20	20	20	20	20	20	17	20	20	15	20	20	14	20	18	12	20	15	10	20	13	9	20	11	8	17	10	7	15	9	6	13	8	5
		27-45	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	19	13	19	17	11	17	15	10
			Exposed	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6			
	D	0-7	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	15	20	19	13	20	16	11	19	14	10	17	12	9	15	11	8
			Exposed	20	20	20	20	20	19	20	20	17	20	20	16	20	20	14	20	18	13	20	17	12	19	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	21	17	22	19	16	22	16	13	22	14	12	19	12	10	16	11	9	14	9	8	13	8	7
			Exposed	22	22	19	22	21	17	22	19	15	22	17	14	22	15	12	21	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	20	13	22	17	11	22	15	10	22	13	9	19	11	8	17	10	7
			Exposed	22	22	21	22	22	18	22	22	16	22	20	14	22	18	12	22	17	11	22	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		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	17	21	21	15	21	18	12	18	16	10	16	14	9	14	13	8
			Exposed	21	21	21	21	21	21	21	21	20	21	21	18	21	21	16	21	21	14	21	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5
100	B	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	16	11	16	14	10	16	12	8
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	16	13	17	14	12
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	16	13	17	13	11	17	12	10	16	10	8	14	9	7
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	17	12
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	16	11	18	14	10	18	12	8	18	11	7
		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	17	17	17	17	17	17	17	17	17	17	17	15
			Exposed	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	17	12	17	16	10	16	14	9			
	C	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	13	16	16	12	16	15	10	16	13	9
			Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	14	16	16	12	16	14	10	16	12	9	15	11	8	13	10	7	12	8	6
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	14	17	14	12	17	13	10	17	11	9	15	10	8
			Exposed	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	17	14	17	15	12	17	13	10	17	11	9	14	9	8	13	8	7	11	7	6	10	6	5
		20-27	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	14	18	17	12	18	15	10	18	13	9	18	12	8
			Exposed	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	18	12	18	15	10	18	13	9	18	11	8	17	10	7	15	9	6	13	8	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	17	17	15	17	17	13	17	17	11	17	15	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	17	17	11	16	14	9	14	12	8	12	11	7	11	10	6
	D	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	15	18	18	13	18	16	11	18	14	10	17	12	9	15	11	8
			Exposed	18	18	18	18	18	18	18	18	17	18	18	16	18	18	14	18	18	13	18	17	12	18	14	10	17	12	8	14	10	7	13	9	6	11	8	6	10	7	5
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	16	19	16	13	19	14	12	19	12	10	16	11	9	14	9	8	13	8	7			
			Exposed	19	19	19	19	19	17	19	19	15	19	17	14	19	15	12	19	14	11	19	13	10	16	11	9	14	9	7	12	8	6	11	7	6	9	6	5	8	5	4
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	13	20	17	11	20	15	10	20	13	9	19	11	8	17	10	7			
			Exposed	20	20	20	20	20	18	20	20	16	20	20	14	20	18	12	20	17	11	20	15	10	20	13	9	19	11	7	16	9	6	14	8	6	13	7	5	11	6	4
		27-45	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	18	12	18	16	10	16	14	9	14	13	8
			Exposed	19	19	19	19	19	19	19	19	19	19	19	18	19	19	16	19	19	14	19	19	13	18	16	11	16	14	9	13	12	7	12	10	6	10	9	6	9	8	5

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	185	185	185	185	185	185	185	185	185	185	185	185	185	185	97	185	185	71	185	143	61	185	86	52	145	63	44	91	54	38	65	47	33	57	42	29	51	37	26
			Exposed	185	185	95	185	185	66	185	123	59	185	91	53	185	72	48	138	62	44	102	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	183	183	183	183	183	183	183	183	183	183	183	183	183	183	65	183	183	59	183	67	54	183	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	183	183	65	183	105	58	183	63	52	183	57	47	87	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	173	173	173	173	173	173	173	173	173	173	173	173	173	173	173	173	173	173	173	173	76	173	72	52	173	57	43	108	49	35	79	43	30	65	38	26	58	34	23
			Exposed	173	173	173	173	173	173	173	173	62	173	80	54	173	62	47	173	56	42	145	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	69	164	89	54	164	62	45	60	54	39	53	48	33	47	42	29
			Exposed	164	164	164	164	164	164	164	164	126	164	164	74	164	149	60	164	85	53	164	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	185	185	134	185	185	82	185	161	63	185	111	57	185	85	52	185	69	47	129	61	43	79	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	185	84	51	171	65	46	112	58	41	84	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	183	183	183	183	183	62	183	77	56	183	61	50	183	55	45	84	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	183	55	45	81	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	173	173	173	173	173	173	173	173	173	173	173	59	173	71	52	173	61	46	173	55	41	90	47	33	70	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	173	70	52	173	59	45	173	53	39	94	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	164	164	164	164	164	164	164	164	164	164	164	100	164	164	68	164	119	58	164	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	164	164	67	164	103	56	164	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	185	185	68	185	124	59	185	91	53	185	71	48	132	61	43	98	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	130	61	43	91	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	183	183	58	183	63	52	183	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	173	173	173	173	173	63	173	78	54	173	62	47	173	56	41	126	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	173	55	41	109	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	164	164	164	164	164	128	164	164	73	164	134	59	164	81	53	164	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	164	80	52	164	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
10	B	0-7	Interior	135	135	135	135	135	135	135	135	135	135	135	135	135	135	97	135	135	71	135	135	61	135	86	52	135	63	44	91	54	38	65	47	33	57	42	29	51	37	26
			Exposed	135	135	95	135	135	66	135	123	59	135	91	53	135	72	48	135	62	44	102	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	136	136	136	136	136	136	136	136	136	136	136	136	136	136	65	136	136	59	136	67	54	136	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	136	136	65	136	105	58	136	63	52	136	57	47	87	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	76	150	72	52	150	57	43	108	49	35	79	43	30	65	38	26	58	34	23
			Exposed	150	150	150	150	150	150	150	150	62	150	80	54	150	62	47	150	56	42	145	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	69	142	89	54	142	62	45	60	54	39	53	48	33	47	42	29
			Exposed	142	142	142	142	142	142	142	142	126	142	142	74	142	142	60	142	85	53	142	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	135	135	134	135	135	82	135	135	63	135	111	57	135	85	52	135	69	47	129	61	43	79	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	135	84	51	135	65	46	112	58	41	84	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	136	136	136	136	136	62	136	77	56	136	61	50	136	55	45	84	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	136	55	45	81	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	150	150	150	150	150	150	150	150	150	150	150	59	150	71	52	150	61	46	150	55	41	90	47	33	70	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	150	70	52	150	59	45	150	53	39	94	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	142	142	142	142	142	142	142	142	142	142	142	100	142	142	68	142	119	58	142	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	142	142	67	142	103	56	142	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	135	135	68	135	124	59	135	91	53	135	71	48	132	61	43	98	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	130	61	43	91	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	136	136	58	136	63	52	136	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	155	155	155	155	155	63	155	78	54	155	62	47	155	56	41	126	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	155	55	41	109	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	146	146	146	146	146	128	146	146	73	146	134	59	146	81	53	146	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	146	80	52	146	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
20	B	0-7	Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	71	94	94	61	94	86	52	94	63	44	91	54	38	65	47	33	57	42	29	51	37	26
			Exposed	94	94	94	94	94	66	94	94	59	94	91	53	94	72	48	94	62	44	94	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	95	95	95	95	95	95	95	95	95	95	95	95	95	95	65	95	95	59	95	67	54	95	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	95	95	65	95	95	58	95	63	52	95	57	47	87	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	76	116	72	52	116	57	43	108	49	35	79	43	30	65	38	26	58	34	23
			Exposed	116	116	116	116	116	116	116	116	62	116	80	54	116	62	47	116	56	42	116	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	69	111	89	54	111	62	45	60	54	39	53	48	33	47	42	29
			Exposed	111	111	111	111	111	111	111	111	111	111	111	74	111	111	60	111	85	53	111	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	94	94	94	94	94	82	94	94	63	94	94	57	94	85	52	94	69	47	94	61	43	79	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	94	84	51	94	65	46	94	58	41	84	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	95	95	95	95	95	62	95	77	56	95	61	50	95	55	45	84	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	95	55	45	81	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	116	116	116	116	116	116	116	116	116	116	116	59	116	71	52	116	61	46	116	55	41	90	47	33	70	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	116	70	52	116	59	45	116	53	39	94	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	111	111	111	111	111	111	111	111	111	111	111	100	111	111	68	111	111	58	111	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	111	111	67	111	103	56	111	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	94	94	68	94	94	59	94	91	53	94	71	48	94	61	43	94	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	94	61	43	91	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	95	95	58	95	63	52	95	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	121	121	121	121	121	63	121	78	54	121	62	47	121	56	41	121	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	121	55	41	109	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	116	116	116	116	116	116	116	116	73	116	116	59	116	81	53	116	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	116	80	52	116	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	71	91	91	61	91	86	52	91	63	44	91	54	38	65	47	33	57	42	29	51	37	26
			Exposed	91	91	91	91	91	66	91	91	59	91	91	53	91	72	48	91	62	44	91	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	95	95	95	95	95	95	95	95	95	95	95	95	95	95	65	95	95	59	95	67	54	95	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	95	95	65	95	95	58	95	63	52	95	57	47	87	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	76	94	72	52	94	57	43	94	49	35	79	43	30	65	38	26	58	34	23
			Exposed	94	94	94	94	94	94	94	94	62	94	80	54	94	62	47	94	56	42	94	52	37	80	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	69	90	89	54	90	62	45	60	54	39	53	48	33	47	42	29
			Exposed	90	90	90	90	90	90	90	90	90	90	90	74	90	90	60	90	85	53	90	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	91	91	91	91	91	82	91	91	63	91	91	57	91	85	52	91	69	47	91	61	43	79	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	91	84	51	91	65	46	91	58	41	84	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	95	95	95	95	95	62	95	77	56	95	61	50	95	55	45	84	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	95	55	45	81	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	94	94	94	94	94	94	94	94	94	94	94	59	94	71	52	94	61	46	94	55	41	90	47	33	70	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	94	70	52	94	59	45	94	53	39	94	48	34	80	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	90	90	90	90	90	90	90	90	90	90	90	90	90	90	68	90	90	58	90	79	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	90	90	67	90	90	56	90	69	50	78	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	94	94	68	94	94	59	94	91	53	94	71	48	94	61	43	94	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	94	61	43	91	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	95	95	58	95	63	52	95	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	100	100	100	100	100	63	100	78	54	100	62	47	100	56	41	100	51	37	89	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	100	55	41	100	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	96	96	96	96	96	96	96	96	73	96	96	59	96	81	53	96	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	96	80	52	96	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
40	B	0-7	Interior	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	71	76	76	61	76	76	52	76	63	44	76	54	38	65	47	33	57	42	29	51	37	26
			Exposed	76	76	76	76	76	66	76	76	59	76	76	53	76	72	48	76	62	44	76	57	40	67	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	80	80	80	80	80	80	80	80	80	80	80	80	80	80	65	80	80	59	80	67	54	80	55	46	77	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	80	80	65	80	80	58	80	63	52	80	57	47	80	51	42	75	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	76	79	72	52	79	57	43	79	49	35	79	43	30	65	38	26	58	34	23
			Exposed	79	79	79	79	79	79	79	79	62	79	79	54	79	62	47	79	56	42	79	52	37	79	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	69	76	76	54	76	62	45	60	54	39	53	48	33	47	42	29
			Exposed	76	76	76	76	76	76	76	76	76	76	76	74	76	76	60	76	76	53	76	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	76	76	76	76	76	76	76	76	63	76	76	57	76	76	52	76	69	47	76	61	43	76	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	76	76	51	76	65	46	76	58	41	76	53	37	66	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	80	80	80	80	80	62	80	77	56	80	61	50	80	55	45	80	50	41	73	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	80	55	45	80	49	40	69	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	71	79	79	61	79	79	55	41	79	47	33	70	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	79	70	52	79	59	45	79	53	39	79	48	34	79	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	76	76	76	76	76	76	76	76	76	76	76	76	76	76	68	76	76	58	76	76	52	66	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	76	76	67	76	76	56	76	69	50	76	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	81	81	68	81	81	59	81	81	53	81	71	48	81	61	43	81	56	39	77	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	81	61	43	81	54	38	70	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	86	86	58	86	63	52	86	56	46	86	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	85	85	85	85	85	63	85	78	54	85	62	47	85	56	41	85	51	37	85	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	85	55	41	85	49	36	83	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	81	81	81	81	81	81	81	81	73	81	81	59	81	81	53	81	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	81	80	52	81	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
50	B	0-7	Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	61	62	62	52	62	62	44	62	54	38	62	47	33	57	42	29	51	37	26
			Exposed	62	62	62	62	62	62	62	62	59	62	62	53	62	62	48	62	62	44	62	57	40	62	48	34	56	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	67	67	67	67	67	67	67	67	67	67	67	67	67	67	65	67	67	59	67	67	54	67	55	46	67	47	39	63	41	34	55	36	29	48	31	26	43	28	23
			Exposed	67	67	65	67	67	58	67	63	52	67	57	47	67	51	42	67	47	38	66	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	52	69	57	43	69	49	35	69	43	30	65	38	26	58	34	23
			Exposed	69	69	69	69	69	69	69	69	62	69	69	54	69	62	47	69	56	42	69	52	37	69	44	30	64	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	54	65	62	45	60	54	39	53	48	33	47	42	29
			Exposed	65	65	65	65	65	65	65	65	65	65	65	65	65	65	60	65	65	53	65	65	48	61	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	62	62	62	62	62	62	62	62	62	62	62	57	62	62	52	62	62	47	62	61	43	62	51	36	61	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	62	62	51	62	62	46	62	58	41	62	53	37	62	48	34	60	43	31	55	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	67	67	67	67	67	62	67	67	56	67	61	50	67	55	45	67	50	41	67	46	38	59	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	67	55	45	67	49	40	67	44	36	61	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	69	69	69	69	69	69	69	69	69	69	69	59	69	69	52	69	61	46	69	55	41	69	47	33	69	40	27	59	35	24	52	30	21	45	27	18	40	24	16
			Exposed	69	69	52	69	59	45	69	53	39	69	48	34	69	43	30	69	39	27	62	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	58	65	65	52	65	59	43	56	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	65	65	65	65	65	56	65	65	50	65	60	44	61	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	68	68	68	68	68	59	68	68	53	68	68	48	68	61	43	68	56	39	68	51	36	59	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	68	61	43	68	54	38	68	49	34	61	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	74	74	58	74	63	52	74	56	46	74	51	42	74	46	38	65	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	73	46	38	63	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	74	74	74	74	74	63	74	74	54	74	62	47	74	56	41	74	51	37	74	46	33	68	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	74	55	41	74	49	36	74	44	31	71	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	71	71	71	71	71	71	71	71	71	71	71	59	71	71	53	71	63	47	65	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	71	71	52	71	62	46	62	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	44	52	52	38	52	47	33	52	42	29	51	37	26
			Exposed	52	52	52	52	52	52	52	52	52	52	52	52	52	52	48	52	52	44	52	52	40	52	48	34	52	41	29	49	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	54	57	55	46	57	47	39	57	41	34	55	36	29	48	31	26	43	28	23
			Exposed	57	57	57	57	57	57	57	57	52	57	57	47	57	51	42	57	47	38	57	43	35	55	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	52	58	57	43	58	49	35	58	43	30	58	38	26	58	34	23
			Exposed	58	58	58	58	58	58	58	58	58	58	58	54	58	58	47	58	56	42	58	52	37	58	44	30	58	37	25	55	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	55	55	45	55	54	39	53	48	33	47	42	29
			Exposed	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	55	55	48	55	55	39	52	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	47	52	52	43	52	51	36	52	44	31	52	38	27	46	33	23	40	29	21	36	26	18
			Exposed	52	52	51	52	52	46	52	52	41	52	52	37	52	48	34	52	43	31	52	40	28	46	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	57	57	57	57	57	57	57	57	56	57	57	50	57	55	45	57	50	41	57	46	38	57	39	32	51	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	57	55	45	57	49	40	57	44	36	57	40	33	55	36	30	50	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	58	58	58	58	58	58	58	58	58	58	58	58	58	58	52	58	58	46	58	55	41	58	47	33	58	40	27	58	35	24	52	30	21	45	27	18	40	24	16
			Exposed	58	58	52	58	58	45	58	53	39	58	48	34	58	43	30	58	39	27	58	36	25	52	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	43	55	50	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	55	55	55	55	55	55	55	55	50	55	55	44	55	54	39	55	49	35	51	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	58	58	58	58	58	58	58	58	53	58	58	48	58	58	43	58	56	39	58	51	36	58	43	30	51	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	58	58	43	58	54	38	58	49	34	58	44	31	55	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	62	62	58	62	62	52	62	56	46	62	51	42	62	46	38	62	42	35	59	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	62	46	38	62	41	34	56	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	64	64	64	64	64	63	64	64	54	64	62	47	64	56	41	64	51	37	64	46	33	64	39	27	57	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	64	55	41	64	49	36	64	44	31	64	40	27	62	36	25	57	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	61	61	61	61	61	61	61	61	61	61	61	59	61	61	53	61	61	47	61	58	42	55	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	61	61	52	61	61	46	61	56	40	56	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
70	B	0-7	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	45	45	38	45	45	33	45	42	29	45	37	26
			Exposed	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	45	45	40	45	45	34	45	41	29	45	35	25	42	31	22	37	27	19	33	24	17
		7-20	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	46	49	47	39	49	41	34	49	36	29	48	31	26	43	28	23	40	28	23
			Exposed	49	49	49	49	49	49	49	49	49	49	49	47	49	49	42	49	47	38	49	43	35	49	36	30	47	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	43	50	49	35	50	43	30	50	38	26	50	34	23	40	30	20
			Exposed	50	50	50	50	50	50	50	50	50	50	50	50	50	50	47	50	50	42	50	50	37	50	44	30	50	37	25	50	32	22	48	28	19	42	25	17	38	22	15
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	45	48	48	39	48	48	33	47	42	29
			Exposed	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	39	48	47	33	45	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	43	45	45	36	45	44	31	45	38	27	45	33	23	40	29	21	36	26	18
			Exposed	45	45	45	45	45	45	45	45	41	45	45	37	45	45	34	45	43	31	45	40	28	45	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	49	49	49	49	49	49	49	49	49	49	49	49	49	49	45	49	49	41	49	46	38	49	39	32	49	33	27	44	29	24	38	25	21	34	22	18	30	20	16
			Exposed	49	49	45	49	49	40	49	44	36	49	40	33	49	36	30	49	33	27	46	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	46	50	50	41	50	47	33	50	40	27	50	35	24	50	30	21	45	27	18	40	24	16
			Exposed	50	50	50	50	50	45	50	50	39	50	48	34	50	43	30	50	39	27	50	36	25	50	31	21	45	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	43	48	48	35	48	43	30	42	38	25	37	33	22	33	30	19
			Exposed	48	48	48	48	48	48	48	48	48	48	48	44	48	48	39	48	48	35	48	45	31	43	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	50	50	50	50	50	50	50	50	50	50	50	48	50	50	43	50	50	39	50	50	36	50	43	30	50	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	50	50	43	50	50	38	50	49	34	50	44	31	50	40	28	50	36	26	46	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	54	54	54	54	54	52	54	54	46	54	51	42	54	46	38	54	42	35	54	38	32	50	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	54	46	38	54	41	34	54	37	30	51	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	55	55	55	55	55	55	55	55	54	55	55	47	55	55	41	55	51	37	55	46	33	55	39	27	55	34	23	50	29	20	43	25	17	38	22	15	34	20	14
			Exposed	55	55	41	55	49	36	55	44	31	55	40	27	55	36	25	55	33	23	52	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	47	53	53	42	53	49	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	53	53	52	53	53	46	53	53	40	53	50	35	51	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
80	B	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	38	40	40	33	40	40	29	40	37	26
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	34	40	40	29	40	35	25	40	31	22	37	27	19	33	24	17
		7-20	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	39	43	41	34	43	36	29	43	31	26	43	28	23	40	28	23
			Exposed	43	43	43	43	43	43	43	43	43	43	43	43	43	43	42	43	43	38	43	43	35	43	36	30	43	31	25	41	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	35	44	44	30	44	44	26	44	34	23
			Exposed	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	42	44	44	37	44	44	30	44	37	25	44	32	22	44	28	19	42	25	17	38	22	15
		27-45	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	39	42	42	33	42	42	29
			Exposed	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	33	42	40	27	39	35	23	35	31	20	31	28	18
	C	0-7	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	31	40	38	27	40	33	23	40	29	21
			Exposed	40	40	40	40	40	40	40	40	40	40	40	37	40	40	34	40	40	31	40	40	28	40	33	24	39	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	41	43	43	38	43	39	32	43	33	27	43	29	24	38	25	21	34	22	18	30	20	16
			Exposed	43	43	43	43	43	40	43	43	36	43	40	33	43	36	30	43	33	27	43	30	25	39	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	41	44	44	33	44	40	27	44	35	24	44	30	21	44	27	18	40	24	16
			Exposed	44	44	44	44	44	44	44	44	39	44	44	34	44	43	30	44	39	27	44	36	25	44	31	21	44	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	35	42	42	32	42	42	30	42	42	33	42	42	30
			Exposed	42	42	42	42	42	42	42	42	42	42	42	42	42	42	39	42	42	35	42	42	31	42	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	44	44	39	44	44	36	44	43	30	44	37	26	44	32	22	38	28	20	34	24	17	30	22	15
			Exposed	44	44	43	44	44	38	44	44	34	44	44	31	44	40	28	44	36	26	44	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	48	48	48	48	48	48	48	48	46	48	48	42	48	46	38	48	42	35	48	38	32	48	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	48	46	38	48	41	34	48	37	30	48	33	27	46	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	49	49	49	49	49	49	49	49	49	49	49	47	49	49	41	49	49	37	49	46	33	49	39	27	49	34	23	49	29	20	43	25	17	38	22	15	34	20	14
			Exposed	49	49	41	49	49	36	49	44	31	49	40	27	49	36	25	49	33	23	49	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	42	47	47	35	47	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	47	47	47	47	47	46	47	47	40	47	47	35	47	46	32	46	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10

UNIRAC

ASCE 7-16	II	30 ft	Ss = 3.00	23 sq.ft	LANDSCAPE	CROSS-SLOPE	Trim	SFM	SFM Slider
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	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	35	35	29	35	35	26			
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	29	35	35	25	35	31	22	35	27	19	33	24	17
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	34	38	36	29	38	31	26	38	28	23			
			Exposed	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	36	30	38	31	25	38	27	22	36	23	19	31	21	17	28	18	15
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	35	40	40	30	40	38	26	40	34	23			
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	30	40	37	25	40	32	22	40	28	19	40	25	17	38	22	15
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	33	38	38	29			
			Exposed	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	27	38	35	23	35	31	20	31	28	18			
	C	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	31	35	35	27	35	33	23	35	29	21	35	26	18
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	31	35	35	28	35	33	24	35	29	20	34	25	18	30	22	15	26	19	13	23	17	12
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	32	38	33	27	38	29	24	38	25	21	34	22	18	30	20	16
			Exposed	38	38	38	38	38	38	38	38	36	38	38	33	38	36	30	38	33	27	38	30	25	38	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	33	40	40	27	40	35	24	40	30	21	40	27	18	40	24	16
			Exposed	40	40	40	40	40	40	40	40	39	40	40	34	40	40	30	40	39	27	40	36	25	40	31	21	40	26	18	39	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	30	38	38	25	37	33	22	33	30	19			
			Exposed	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	31	38	38	26	37	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	36	39	39	30	39	37	26	39	32	22	38	28	20	34	24	17	30	22	15
			Exposed	39	39	39	39	39	38	39	39	34	39	39	31	39	39	28	39	36	26	39	33	23	39	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	38	42	42	35	42	38	32	42	32	27	42	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	42	42	38	42	41	34	42	37	30	42	33	27	42	30	25	42	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	44	44	44	44	44	44	44	44	44	44	44	44	44	44	41	44	44	37	44	44	33	44	39	27	44	34	23	44	29	20	43	25	17	38	22	15	34	20	14
			Exposed	44	44	41	44	44	36	44	44	31	44	40	27	44	36	25	44	33	23	44	30	21	44	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	35	42	42	29	41	36	24	36	32	21	31	28	18	28	25	16
			Exposed	42	42	42	42	42	42	42	42	40	42	42	35	42	42	32	42	41	28	42	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10
100	B	0-7	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	26			
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	29	32	32	25	32	31	22	32	27	19	32	24	17
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	35	35	29	35	31	26	35	28	23						
			Exposed	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	31	25	35	27	22	35	23	19	31	21	17	28	18	15
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	30	36	36	26	36	34	23						
			Exposed	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	30	36	36	25	36	32	22	36	28	19	36	25	17	36	22	15
		27-45	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	29						
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	34	34	27	34	34	23	34	31	20	31	28	18			
	C	0-7	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	27	32	32	23	32	29	21	32	26	18
			Exposed	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	32	28	32	32	24	32	29	20	32	25	18	30	22	15	26	19	13	23	17	12			
		7-20	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	32	35	33	27	35	29	24	35	25	21	34	22	18	30	20	16
			Exposed	35	35	35	35	35	35	35	35	35	35	35	33	35	35	30	35	33	27	35	30	25	35	25	21	33	22	18	29	19	15	25	16	14	22	14	12	20	13	11
		20-27	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	36	36	27	36	35	24	36	30	21	36	27	18	36	24	16
			Exposed	36	36	36	36	36	36	36	36	36	36	36	34	36	36	30	36	36	27	36	36	25	36	31	21	36	26	18	36	23	15	34	20	14	30	17	12	26	15	11
		27-45	Interior	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	30	34	34	25	34	33	22	33	30	19			
			Exposed	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	31	34	34	26	34	33	22	32	28	18	28	25	16	24	22	13	22	19	12
	D	0-7	Interior	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	30	35	35	26	35	32	22	35	28	20	34	24	17	30	22	15			
			Exposed	35	35	35	35	35	35	35	35	34	35	35	31	35	35	28	35	35	26	35	33	23	35	28	20	33	24	17	29	21	15	25	18	13	22	16	11	19	14	10
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	32	38	32	27	38	28	23	37	24	20	32	21	17	28	18	15	25	16	14
			Exposed	38	38	38	38	38	34	38	37	30	38	33	27	38	30	25	38	27	23	38	25	21	32	21	18	28	18	15	24	16	13	21	14	11	18	12	10	16	11	9
		20-27	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	37	40	40	33	40	39	27	40	34	23	40	29	20	40	25	17	38	22	15	34	20	14
			Exposed	40	40	40	40	40	36	40	40	31	40	40	27	40	36	25	40	33	23	40	30	21	40	26	18	37	22	15	32	19	13	28	17	11	25	15	10	22	13	9
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	35	38	38	29	38	36	24	36	32	21	31	28	18	28	25	16
			Exposed	38	38	38	38	38	38	38	38	38	38	38	35	38	38	32	38	38	28	38	38	26	36	32	21	31	28	18	27	24	15	23	21	13	21	18	11	18	16	10