



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell
Module Type

Landscape
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL OSB
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				Roof Wind Zone																																							
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3				
0	B	0-7	All	56	56	41	56	56	36	56	52	32	56	47	29	56	42	26	56	38	24	56	35	22	56	29	18	48	25	16	41	22	13	35	19	12	31	16	10	27	15	9	
		7-27	All	56	56	44	56	56	39	56	55	35	56	50	31	56	45	28	56	41	26	56	37	23	56	31	20	53	26	17	45	23	14	39	20	13	35	17	11	31	15	10	
		27-45	All	58	58	58	58	58	58	58	58	58	58	58	58	56	56	56	52	52	52	49	49	49	43	43	43	38	38	38	33	33	33	30	28	28	27	25	25	24	22	22	
	C	0-7	All	56	45	28	56	40	25	56	36	22	56	32	20	56	29	18	51	27	17	46	24	15	39	20	13	33	17	11	28	15	9	25	13	8	22	11	X	19	10	X	
		7-20	All	56	48	30	56	43	27	56	38	24	56	34	22	56	31	20	56	28	18	51	26	16	43	22	14	36	18	12	31	16	10	27	14	9	24	12	X	21	11	X	
		20-27	All	58	58	58	54	54	54	50	50	50	46	46	46	43	43	43	39	39	39	37	37	37	32	31	31	28	26	26	24	23	23	22	20	19	17	17	17	15	15		
	D	0-7	All	56	38	23	56	34	21	56	30	19	52	27	17	46	24	15	42	22	14	38	20	13	32	17	11	27	15	9	24	13	X	20	11	X	18	10	X	16	8	X	
		7-20	All	56	40	25	56	35	22	56	32	20	56	28	18	52	26	16	47	23	15	43	21	14	36	18	11	30	15	10	26	13	8	23	12	X	20	10	X	18	9	X	
		20-27	All	52	52	52	47	47	47	43	43	43	40	40	40	37	37	37	34	34	34	32	31	31	27	26	26	24	22	22	21	19	19	19	17	17	16	15	15	15	13	13	
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		7-27	All	40	40	40	40	40	39	40	40	35	40	40	31	40	40	28	40	40	26	40	37	23	40	31	20	40	26	17	39	23	14	37	20	13	35	17	11	31	15	10	
		27-45	All	56	56	56	56	56	56	56	56	56	56	56	56	55	55	55	52	52	52	49	49	49	43	43	43	38	38	38	33	33	33	30	28	28	27	25	25	24	22	22	
	C	0-7	All	40	40	28	40	40	25	40	36	22	40	32	20	40	29	18	40	27	17	40	24	15	39	20	13	33	17	11	28	15	9	25	13	8	22	11	X	19	10	X	
		7-20	All	40	40	30	40	40	27	40	38	24	40	34	22	40	31	20	40	28	18	40	26	16	38	22	14	36	18	12	31	16	10	27	14	9	24	12	X	21	11	X	
		20-27	All	56	56	56	54	54	54	50	50	50	46	46	46	43	43	43	39	39	39	37	37	37	32	31	31	28	26	26	24	23	23	22	20	19	17	17	17	15	15		
	D	0-7	All	40	38	23	40	34	21	40	30	19	40	27	17	40	24	15	40	22	14	38	20	13	32	17	11	27	15	9	24	13	X	20	11	X	18	10	X	16	8	X	
		7-20	All	40	40	25	40	35	22	40	32	20	40	28	18	40	26	16	39	23	15	38	21	14	35	18	11	30	15	10	26	13	8	23	12	X	20	10	X	18	9	X	
		20-27	All	52	52	52	47	47	47	43	43	43	40	40	40	37	37	37	34	34	34	32	31	31	27	26	26	24	22	22	21	19	19	17	17	16	15	15	15	13	13		
20	B	0-7	All	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	24	28	28	22	28	28	18	28	25	16	28	22	13	28	19	12	28	16	10	27	15	9	
		7-27	All	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	23	28	28	20	28	26	17	27	23	14	26	20	13	25	17	11	24	15	10		
		27-45	All	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	45	45	43	43	43	41	41	41	38	38	38	35	35	35	32	32	29	28	28	27	25	25	24	22
	C	0-7	All	28	28	28	28	28	25	28	28	22	28	28	20	28	28	18	28	27	17	28	24	15	28	20	13	28	17	11	28	15	9	25	13	8	22	11	X	19	10	X	
		7-20	All	28	28	28	28	28	27	28	28	24	28	28	22	28	28	20	28	28	18	28	26	16	27	22	14	26	18	12	24	16	10	23	14	9	22	12	X	21	11	X	
		20-27	All	46	46	46	44	44	44	42	42	42	40	40	40	38	38	38	36	36	36	34	34	34	31	31	31	28	26	26	24	23	23	22	20	19	17	17	17	15	15		
	D	0-7	All	28	28	23	28	28	21	28	28	19	28	27	17	28	24	15	28	22	14	28	20	13	28	17	11	27	15	9	24	13	X	20	11	X	18	10	X	16	8	X	
		7-20	All	28	28	25	28	28	22	28	28	20	28	28	18	28	26	16	28	23	15	27	21	14	26	18	11	24	15	10	23	13	8	22	12	X	20	10	X	18	9	X	
		20-27	All	44	44	44	42	42	42	40	40	40	37	37	37	35	35	35	33	33	33	31	31	31	27	26	26	24	22	22	21	19	19	17	17	16	15	15	15	13	13		
30	B	0-7	All	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	24	27	27	22	27	27	18	27	25	16	27	22	13	27	19	12	27	16	10	27	15	9		
		7-27	All	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	26	28	28	23	28	28	20	28	26	17	27	23	14	26	20	13	25	17	11	24	15	10		
		27-45	All	39	39	39	39	39	39	39	39	39	39	39	39	39	39	38	38	38	37	37	37	36	36	36	33	33	33	30	30	30	28	28	28	26	26	24	24	24	23	22	22
	C	0-7	All	27	27	27	27	27	25	27	27	22	27	27	20	27	27	18	27	27	17	27	24	15	27	20	13	27	17	11	27	15	9	25	13	8	22	11	X	19	10	X	
		7-20	All	28	28	28	28	28	27	28	28	24	28	28	22	28	28	20	28	28	18	28	26	16	27	22	14	26	18	12	24	16	10	23	14	9	22	12	X	21	11	X	
		20-27	All	39	39	39	38	38	38	36	36	36	34	34	34	33	33	33	31	31	31	30	30	30	27	27	27	25	25	25	23	23	23	21	20	19	17	17	17	15	15		
	D	0-7	All	28	28	23	28	28	21	28	28	19	28	27	17	28	24	15	28	22	14	28	20	13	28	17	11	27	15	9	24	13	X	20	11	X	18	10	X	16	8	X	
		7-20	All	28	28	25	28	28	22	28	28	20	28	28	18	28	26	16	28	23	15	27	21	14	26	18	11	24	15	10	23	13	8	22	12	X	20	10	X	18	9	X	
		20-27	All	38	38	38	36	36	36	35	35	35	33	33	33	31	31	31	30	30	30	28	28	28	26	26	26	23	22	22	21	19</											



Risk Category

Roof Height

Seismic

Module Type

Orientation

Rail Direction

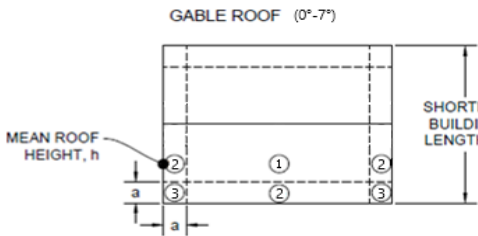
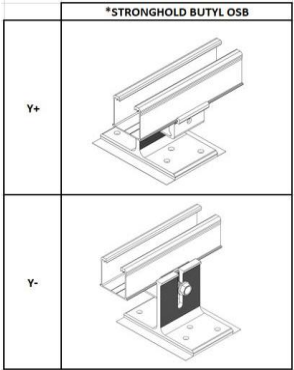
Rail Type

Attachment

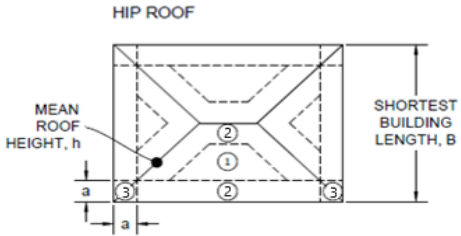
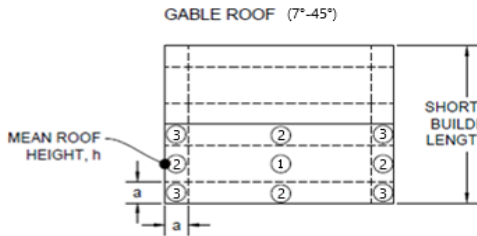
Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

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

X Cells with an "X" indicates that the module clamp's allowable capacity is exceeded and a 3-rail system may be required. Contact Unirac Engineering Services for support.



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$

**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

72 Cell
Module Type

Landscape
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL OSB
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3							
0	B	0-7	All	55	55	40	55	55	35	55	51	31	55	46	28	55	41	26	55	38	23	55	34	21	55	29	18	47	24	15	40	21	13	35	18	11	30	16	10	27	14	9
		7-27	All	55	55	43	55	55	38	55	54	34	55	48	30	55	44	27	55	40	25	55	36	23	55	30	19	52	26	16	44	22	14	39	19	12	34	17	11	30	15	10
		27-45	All	57	57	57	57	57	57	57	57	57	57	57	57	55	55	55	51	51	51	48	48	48	42	42	42	37	37	37	33	32	32	29	28	28	26	24	24	23	22	22
	C	0-7	All	55	44	27	55	39	24	55	35	22	55	32	20	55	29	18	50	26	16	45	24	15	38	20	12	32	17	11	28	15	9	24	13	X	21	11	X	19	10	X
		7-20	All	55	47	29	55	42	26	55	37	23	55	33	21	55	30	19	55	27	17	50	25	16	42	21	13	36	18	11	31	16	10	27	14	X	23	12	X	21	11	X
		20-27	All	57	57	57	53	53	53	49	49	49	45	45	45	42	42	42	39	39	39	36	36	36	31	30	30	27	26	26	24	22	22	21	19	19	17	17	17	15	15	
	D	0-7	All	55	37	23	55	33	20	55	29	18	50	26	16	45	24	15	41	22	13	37	20	12	31	17	10	27	14	9	23	12	X	20	11	X	18	9	X	16	X	X
		7-20	All	55	39	25	55	35	22	55	31	20	55	28	18	50	25	16	46	23	15	42	21	13	35	18	11	30	15	10	26	13	X	22	11	X	20	10	X	17	X	X
		20-27	All	51	51	51	46	46	46	42	42	42	39	39	39	36	36	36	33	33	33	31	30	30	27	25	25	23	22	22	20	19	19	18	16	16	16	14	14	14	13	13
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		7-27	All	39	39	39	39	39	38	39	39	34	39	39	30	39	39	27	39	39	25	39	36	23	39	30	19	39	26	16	38	22	14	36	19	12	34	17	11	30	15	10
		27-45	All	55	55	55	55	55	55	55	55	55	55	55	55	54	54	54	51	51	51	48	48	48	42	42	42	37	37	37	33	32	32	29	28	28	26	24	24	23	22	22
	C	0-7	All	39	39	27	39	39	24	39	35	22	39	32	20	39	29	18	39	26	16	39	24	15	38	20	12	32	17	11	28	15	9	24	13	X	21	11	X	19	10	X
		7-20	All	39	39	29	39	39	26	39	37	23	39	33	21	39	30	19	39	27	17	39	25	16	37	21	13	35	18	11	31	16	10	27	14	X	23	12	X	21	11	X
		20-27	All	55	55	55	52	52	52	49	49	45	45	45	42	42	42	39	39	39	36	36	36	31	30	30	27	26	26	24	22	22	21	19	19	17	17	17	15	15		
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		7-20	All	39	39	25	39	35	22	39	31	20	39	28	18	39	25	16	38	23	15	37	21	13	34	18	11	30	15	10	26	13	X	22	11	X	20	10	X	17	X	X
		20-27	All	51	51	51	46	46	46	42	42	42	39	39	39	36	36	36	33	33	33	31	30	30	27	25	25	23	22	22	20	19	19	18	16	16	16	14	14	14	13	13
20	B	0-7	All	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	23	27	27	21	27	27	18	27	24	15	27	21	13	27	18	11	27	16	10	27	14	9
		7-27	All	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	23	27	27	19	27	26	16	27	22	14	26	19	12	25	17	11	24	15	10	
		27-45	All	45	45	45	45	45	45	45	45	45	45	45	45	44	44	44	42	42	42	40	40	40	37	37	37	34	34	34	31	31	31	29	28	28	26	24	24	23	22	22
	C	0-7	All	27	27	27	27	27	24	27	27	22	27	27	20	27	27	18	27	26	16	27	24	15	27	20	12	27	17	11	27	15	9	24	13	X	21	11	X	19	10	X
		7-20	All	27	27	27	27	27	26	27	27	23	27	27	21	27	27	19	27	27	17	27	25	16	26	21	13	25	18	11	24	16	10	23	14	X	22	12	X	20	11	X
		20-27	All	45	45	45	43	43	43	41	41	41	39	39	39	37	37	37	35	35	35	33	33	33	30	30	30	27	26	26	24	22	22	21	19	19	17	17	17	15	15	
	D	0-7	All	27	27	23	27	27	20	27	27	18	27	26	16	27	24	15	27	22	13	27	20	12	27	17	10	27	14	9	23	12	X	20	11	X	18	9	X	16	X	X
		7-20	All	27	27	25	27	27	22	27	27	20	27	27	18	27	25	16	27	23	15	26	21	13	25	18	11	24	15	10	22	13	X	21	11	X	20	10	X	17	X	X
		20-27	All	43	43	43	41	41	41	39	39	39	36	36	36	34	34	34	33	33	33	31	30	30	27	25	25	23	22	22	20	19	19	18	16	16	16	14	14	14	13	13
30	B	0-7	All	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	23	26	26	21	26	26	18	26	24	15	26	21	13	26	18	11	26	16	10	26	14	9	
		7-27	All	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	25	27	27	23	27	27	19	27	26	16	27	22	14	26	19	12	25	17	11	24	15	10	
		27-45	All	38	38	38	38	38	38	38	38	38	38	38	38	37	37	37	36	36	36	35	35	35	32	32	32	30	30	30	28	28	28	26	26	26	24	24	24	22	22	22
	C	0-7	All	26	26	26	26	26	24	26	26	22	26	26	20	26	26	18	26	26	16	26	24	15	26	20	12	26	17	11	26	15	9	24	13	X	21	11	X	19	10	X
		7-20	All	27	27	27	27	27	26	27	27	23	27	27	21	27	27	19	27	27	17	27	25	16	26	21	13	25	18	11	24	16	10	23	14	X	22	12	X	20	11	X
		20-27	All	38	38	38	37	37	37	35	35	35	34	34	34	32	32	32	31	31	31	29	29	29	27	27	27	25	25	25	22	22	22	21	19	19	17	17	17	15	15	
	D	0-7	All	27	27	23	27	27	20	27	27	18	27	26	16	27	24	15	27	22	13	27	20	12	27	17	10	27	14	9	23	12	X	20	11	X	18	9	X	16	X	X
		7-20	All	27	27	25	27	27	22	27	27	20	27	27	18	27	25	16	27	23	15	26	21	13	25	18	11	24	15	10	22	13	X	21	11	X	20	10	X	17	X	X
		20-27	All	37	37	37	36	36	36	34	34	34	32	32	32	31	31	31	29	29	28	28	28	25	25	25	23	22	22	20	19	19	18	16	16							



Risk Category

Roof Height

Seismic

Module Type

Orientation

Rail Direction

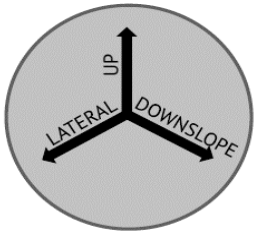
Rail Type

Attachment

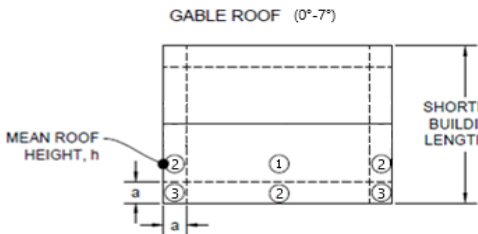
Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

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

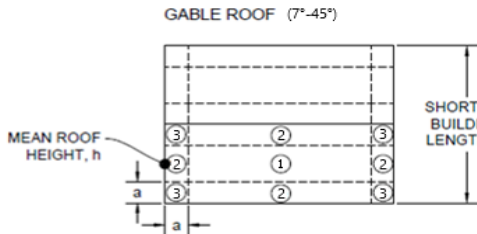
X Cells with an "X" indicates that the module clamp's allowable capacity is exceeded and a 3-rail system may be required. Contact Unirac Engineering Services for support.



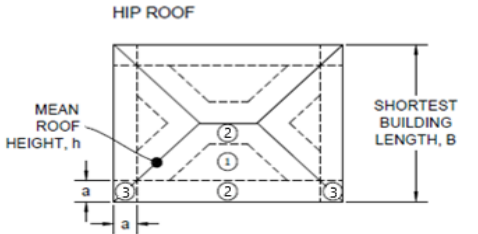
		*STRONGHOLD BUTYL OSB
Y+		
Y-		



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell
Module Type

Landscape
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL Plywood
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				Roof Wind Zone																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	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	All	77	77	50	77	77	44	77	65	40	77	58	36	77	52	32	77	47	29	77	43	27	70	36	23	59	31	19	50	27	17	44	23	14	38	20	13	34	18	11
		7-27	All	77	77	54	77	77	48	77	69	43	77	61	38	77	55	35	77	50	32	77	45	29	77	38	24	65	33	21	56	28	18	49	25	16	43	22	14	38	19	12
		27-45	All	80	80	80	80	80	80	80	80	80	80	80	80	79	79	79	73	73	73	67	65	65	59	55	55	52	47	47	46	40	40	41	35	35	37	31	33	27	27	
	C	0-7	All	77	56	35	77	50	31	77	44	28	77	40	25	70	36	22	63	33	20	57	30	19	48	25	16	40	21	13	35	19	12	30	16	10	27	14	X	24	13	X
		7-20	All	77	59	37	77	52	33	77	47	30	77	42	27	77	38	24	70	35	22	63	32	20	53	27	17	45	23	14	39	20	13	34	17	11	30	15	X	26	13	X
		20-27	All	80	80	80	76	76	76	69	68	68	63	60	60	59	55	55	54	50	50	50	45	45	44	38	38	38	33	33	34	28	28	30	25	25	26	22	22	23	19	19
	D	0-7	All	77	47	29	77	41	26	72	37	23	63	33	21	57	30	19	52	27	17	47	25	16	40	21	13	34	18	11	29	16	X	25	14	X	22	12	X	23	11	X
		7-20	All	77	49	31	77	44	28	77	39	25	71	35	22	64	32	20	58	29	18	52	26	17	44	22	14	37	19	12	32	16	10	28	14	X	25	13	X	22	11	X
		20-27	All	72	71	71	65	63	63	60	56	56	55	50	50	51	46	46	47	41	41	43	38	38	38	32	32	33	27	27	29	24	24	25	21	21	22	18	18	19	16	16
10	B	0-7	All	55	55	50	55	55	44	55	55	40	55	55	36	55	52	32	55	47	29	55	43	27	55	36	23	55	31	19	50	27	17	44	23	14	38	20	13	34	18	11
		7-27	All	55	55	54	55	55	48	55	55	43	55	55	38	55	55	35	55	50	32	55	45	29	55	38	24	55	33	21	54	28	18	49	25	16	43	22	14	38	19	12
		27-45	All	77	77	77	77	77	77	77	77	77	77	77	77	76	76	76	72	72	72	67	65	65	59	55	55	52	47	47	46	40	40	41	35	35	37	31	31	33	27	27
	C	0-7	All	55	55	35	55	50	31	55	44	28	55	40	25	55	36	22	55	33	20	55	30	19	48	25	16	40	21	13	35	19	12	30	16	10	27	14	X	24	13	X
		7-20	All	55	55	37	55	52	33	55	47	30	55	42	27	55	38	24	55	35	22	55	32	20	52	27	17	45	23	14	39	20	13	34	17	11	30	15	X	26	13	X
		20-27	All	77	77	77	74	74	74	69	68	68	63	60	60	59	55	55	54	50	50	50	45	45	44	38	38	38	33	33	34	28	28	30	25	25	26	22	22	23	19	19
	D	0-7	All	55	47	29	55	41	26	55	37	23	55	33	21	55	30	19	52	27	17	47	25	16	40	21	13	34	18	11	29	16	X	25	14	X	22	12	X	20	11	X
		7-20	All	55	49	31	55	44	28	55	39	25	55	35	22	55	32	20	54	29	18	52	26	17	44	22	14	37	19	12	32	16	10	28	14	X	25	13	X	22	11	X
		20-27	All	72	71	71	65	63	63	60	56	56	55	50	50	51	46	46	47	41	41	43	38	38	38	32	32	33	27	27	29	24	24	25	21	21	22	18	18	19	16	16
20	B	0-7	All	38	38	38	38	38	38	38	38	38	38	38	36	38	38	32	38	38	29	38	38	27	38	36	23	38	31	19	38	27	17	38	23	14	38	20	13	34	18	11
		7-27	All	39	39	39	39	39	39	39	39	39	39	39	38	39	39	35	39	39	32	39	39	29	39	38	24	39	33	21	38	28	18	36	25	16	35	22	14	33	19	12
		27-45	All	63	63	63	63	63	63	63	63	63	63	63	63	62	62	62	59	59	59	57	57	57	52	52	52	48	47	47	44	40	40	40	35	35	37	31	31	33	27	27
	C	0-7	All	38	38	35	38	38	31	38	38	28	38	38	25	38	36	22	38	33	20	38	30	19	38	25	16	38	21	13	35	19	12	30	16	10	27	14	X	24	13	X
		7-20	All	39	39	37	39	39	33	39	39	30	39	39	27	39	38	24	39	35	22	39	32	20	37	27	17	35	23	14	34	20	13	32	17	11	30	15	X	26	13	X
		20-27	All	63	63	63	61	61	61	58	58	55	55	55	52	52	52	49	49	49	47	47	45	45	45	42	38	38	33	33	34	28	28	30	25	25	26	22	22	23	19	19
	D	0-7	All	38	38	29	38	38	26	38	37	23	38	33	21	38	30	19	38	27	17	38	25	16	38	21	13	34	18	11	29	16	X	25	14	X	22	12	X	23	11	X
		7-20	All	39	39	31	39	39	28	39	39	25	39	35	22	39	32	20	38	29	18	37	26	17	35	22	14	33	19	12	31	16	10	28	14	X	25	13	X	22	11	X
		20-27	All	61	61	61	58	58	58	54	54	54	51	50	50	48	46	46	46	41	41	43	38	38	38	32	32	33	27	27	29	24	24	25	21	21	22	18	18	19	16	16
30	B	0-7	All	37	37	37	37	37	37	37	37	37	37	37	36	37	37	32	37	37	29	37	37	27	37	36	23	37	31	19	37	27	17	37	23	14	37	20	13	34	18	11
		7-27	All	39	39	39	39	39	39	39	39	39	39	39	39	39	39	35	39	39	32	39	39	29	39	38	24	39	33	21	38	28	18	36	25	16	35	22	14	33	19	12
		27-45	All	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	51	51	51	49	49	49	45	45	45	42	42	42	39	39	39	36	35	35	34	31	31	31	27	27
	C	0-7	All	37	37	35	37	37	31	37	37	28	37	37	25	37	36	22	37	33	20	37	30	19	37	25	16	37	21	13	35	19	12	30	16	10	27	14	X	24	13	X
		7-20	All	39	39	37	39	39	33	39	39	30	39	39	27	39	38	24	39	35	22	39	32	20	37	27	17	35	23	14	34	20	13	32	17	11	30	15	X	26	13	X
		20-27	All	53	53	53	52	52	52	49	49	49	47	47	47	45	45	45	43	43	43	41	41	41	38	38	38	35	33	33	32	28	28	29	25	25	26	22	22	23	19	19
	D	0-7	All	38	38	29	38	38	26	38	37	23	38	33	21	38	30	19	38	27	17	38	25	16	38	21	13	34	18	11	29	16	X	25	14	X	22	12	X	20		



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell
Module Type

Landscape
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL Plywood
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
				90			95			100			105			110			115			120			130			140			150			160			170			180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
				Roof Wind Zone																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
50	B	0-7	All	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	2



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

72 Cell
Module Type

Landscape
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL Plywood
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				Roof Wind Zone																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	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	All	75	75	49	75	75	43	75	63	39	75	57	35	75	51	32	75	46	29	75	42	26	68	35	22	57	30	19	49	26	16	43	23	14	37	20	12	33	18	11
		7-27	All	76	76	52	76	76	47	76	67	42	76	60	37	76	54	34	76	49	31	76	44	28	76	37	24	64	32	20	55	28	18	48	24	15	42	21	13	37	19	12
		27-45	All	78	78	78	78	78	78	78	78	78	78	78	77	77	77	71	71	71	66	64	64	57	54	54	51	46	46	45	39	39	40	34	34	36	30	32	27	27	27	27
	C	0-7	All	75	55	34	75	49	30	75	43	27	75	39	24	68	35	22	61	32	20	56	29	18	47	25	15	40	21	13	34	18	11	30	16	X	26	14	X	23	12	X
		7-20	All	76	58	36	76	51	32	76	46	29	76	41	26	76	37	24	68	34	21	62	31	20	52	26	17	44	22	14	38	19	12	33	17	X	29	15	X	26	13	X
		20-27	All	78	78	78	74	74	74	67	66	66	62	59	59	57	53	53	53	48	48	49	44	44	43	37	37	37	32	32	33	28	28	29	24	24	26	21	21	23	19	19
	D	0-7	All	75	45	28	75	40	25	70	36	22	62	33	20	56	29	18	51	27	17	46	24	15	39	21	13	33	18	11	28	15	X	25	13	X	22	12	X	19	X	X
		7-20	All	76	48	30	76	43	27	76	38	24	69	34	22	62	31	20	56	28	18	51	26	16	43	22	14	37	19	12	32	16	X	28	14	X	24	12	X	21	X	X
		20-27	All	70	70	70	64	61	61	58	55	55	54	49	49	50	45	45	46	40	40	42	37	37	37	31	31	32	27	27	28	23	23	24	20	20	21	18	18	19	16	16
10	B	0-7	All	53	53	49	53	53	43	53	53	39	53	53	35	53	51	32	53	46	29	53	42	26	53	35	22	53	30	19	49	26	16	43	23	14	37	20	12	33	18	11
		7-27	All	54	54	52	54	54	47	54	54	42	54	54	37	54	54	34	54	49	31	54	44	28	54	37	24	54	32	20	52	28	18	48	24	15	42	21	13	37	19	12
		27-45	All	76	76	76	76	76	76	76	76	76	76	76	76	75	75	75	71	71	71	66	64	64	57	54	54	51	46	46	45	39	39	40	34	34	36	30	30	32	27	27
	C	0-7	All	53	53	34	53	49	30	53	43	27	53	39	24	53	35	22	53	32	20	53	29	18	47	25	15	40	21	13	34	18	11	30	16	X	26	14	X	23	12	X
		7-20	All	54	54	36	54	51	32	54	46	29	54	41	26	54	37	24	54	34	21	54	31	20	51	26	17	44	22	14	38	19	12	33	17	X	29	15	X	26	13	X
		20-27	All	76	76	76	73	73	73	67	66	66	62	59	59	57	53	53	53	48	48	49	44	44	43	37	37	37	32	32	33	28	28	29	24	24	26	21	21	23	19	19
	D	0-7	All	53	45	28	53	40	25	53	36	22	53	33	20	53	29	18	51	27	17	46	24	15	39	21	13	33	18	11	28	15	X	25	13	X	22	12	X	19	X	X
		7-20	All	54	48	30	54	43	27	54	38	24	54	34	22	54	31	20	53	28	18	51	26	16	43	22	14	37	19	12	32	16	X	28	14	X	24	12	X	21	X	X
		20-27	All	70	70	70	64	61	61	58	55	55	54	49	49	50	45	45	46	40	40	42	37	37	37	31	31	32	27	27	28	23	23	24	20	20	21	18	18	19	16	16
20	B	0-7	All	37	37	37	37	37	37	37	37	37	37	37	35	37	37	32	37	37	29	37	37	26	37	35	22	37	30	19	37	26	16	37	23	14	37	20	12	33	18	11
		7-27	All	38	38	38	38	38	38	38	38	38	38	38	37	38	38	34	38	38	31	38	38	28	38	37	24	38	32	20	37	28	18	36	24	15	34	21	13	33	19	12
		27-45	All	62	62	62	62	62	62	62	62	62	62	62	61	61	61	58	58	58	56	56	56	51	51	51	47	46	46	43	39	39	34	34	36	30	30	32	27	27		
	C	0-7	All	37	37	34	37	37	30	37	37	27	37	37	24	37	35	22	37	32	20	37	29	18	37	25	15	37	21	13	34	18	11	30	16	X	26	14	X	23	12	X
		7-20	All	38	38	36	38	38	32	38	38	29	38	38	26	38	37	24	38	34	21	38	31	20	36	26	17	35	22	14	33	19	12	31	17	X	29	15	X	26	13	X
		20-27	All	62	62	62	59	59	56	56	56	54	54	54	51	51	51	48	48	48	46	46	44	42	37	37	37	32	32	33	28	28	29	24	24	26	21	21	23	19	19	
	D	0-7	All	37	37	28	37	37	25	37	36	22	37	33	20	37	29	18	37	27	17	37	24	15	37	21	13	33	18	11	28	15	X	25	13	X	22	12	X	19	X	X
		7-20	All	38	38	30	38	38	27	38	38	24	38	34	22	38	31	20	37	28	18	36	26	16	34	22	14	33	19	12	31	16	X	28	14	X	24	12	X	21	X	X
		20-27	All	60	60	60	56	56	56	53	53	53	50	49	49	47	45	45	45	40	40	42	37	37	37	31	31	32	27	27	28	23	23	24	20	20	21	18	18	19	16	16
30	B	0-7	All	36	36	36	36	36	36	36	36	36	36	36	35	36	36	32	36	36	29	36	36	26	36	35	22	36	30	19	36	26	16	36	23	14	36	20	12	33	18	11
		7-27	All	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	31	38	38	28	38	37	24	38	32	20	37	28	18	36	24	15	34	21	13	33	19	12
		27-45	All	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	50	50	50	48	48	48	44	44	44	41	41	41	38	38	38	35	34	34	33	30	30	30	27	27
	C	0-7	All	36	36	34	36	36	30	36	36	27	36	36	24	36	35	22	36	32	20	36	29	18	36	25	15	36	21	13	34	18	11	30	16	X	26	14	X	23	12	X
		7-20	All	38	38	36	38	38	32	38	38	29	38	38	26	38	37	24	38	34	21	38	31	20	36	26	17	35	22	14	33	19	12	31	17	X	29	15	X	26	13	X
		20-27	All	52	52	52	51	51	51	48	48	48	46	46	46	44	44	44	42	42	42	40	40	40	37	37	37	34	32	32	31	28	28	28	24	24	26	21	21	23	19	19
	D	0-7	All	37	37	28	37	37	25	37	36	22	37	33	20	37	29	18	37	27	17	37	24	15	37	21	13	33	18	11	28	15	X	25	13	X	22	12	X	19		



II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

72 Cell

Landscape
Orientation

Cross-Slope
Rail Direction

NXT

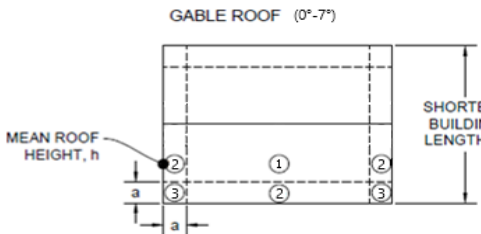
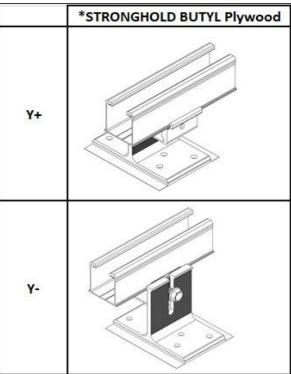
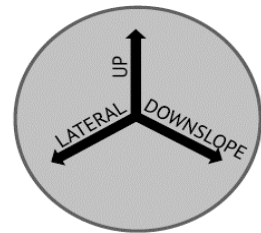
STRONGHOLD BUTYL Plywood

Attachment

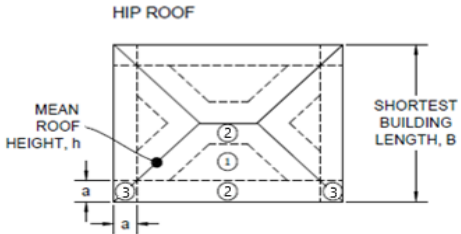
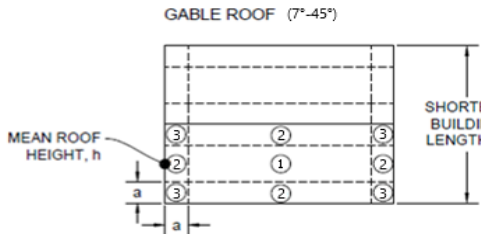
Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

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

X Cells with an "X" indicates that the module clamp's allowable capacity is exceeded and a 3-rail system may be required. Contact Unirac Engineering Services for support.



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$

***Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				Roof Wind Zone																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	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	All	102	102	97	102	102	92	102	102	87	102	99	83	102	95	80	102	91	77	102	88	74	101	82	69	95	77	63	90	73	55	86	69	48	82	66	42	78	59	37
		7-27	All	102	102	93	102	102	90	102	102	86	102	99	83	102	95	80	102	92	77	102	89	75	102	83	70	99	78	67	93	74	59	89	71	51	85	67	45	81	63	40
		27-45	All	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	101	101	101	98	98	98	94	93	93	90	88	88	86	84	84	81	80	80	76	76	76	72	72	72
	C	0-7	All	102	97	82	102	93	78	102	89	75	102	85	72	100	82	69	97	79	66	94	76	61	88	72	52	83	67	44	79	61	38	76	53	34	72	47	X	69	42	X
		7-20	All	102	98	82	102	93	78	102	90	75	102	86	73	102	83	70	101	80	68	97	78	66	92	73	56	87	69	48	82	64	41	78	56	36	75	50	X	72	44	X
		20-27	All	103	103	103	102	102	102	99	99	99	96	96	96	94	93	93	91	90	90	89	87	87	84	82	82	78	78	78	73	73	73	69	69	69	65	65	65	62	62	62
	D	0-7	All	102	91	76	102	86	73	101	83	70	97	80	67	94	77	62	91	74	56	88	71	51	83	67	43	78	59	37	75	51	X	71	45	X	68	39	X	65	35	X
		7-20	All	102	91	77	102	87	74	102	84	71	101	81	68	98	78	66	94	75	60	91	73	55	86	68	47	81	62	40	77	54	35	74	47	X	71	42	X	68	37	X
		20-27	All	100	100	100	97	97	97	94	94	94	92	91	91	89	87	87	87	85	85	84	82	82	78	77	77	72	72	72	68	68	68	64	64	64	60	59	59	57	53	53
10	B	0-7	All	91	91	91	91	91	91	91	91	87	91	91	83	91	91	80	91	91	77	91	88	74	91	82	69	91	77	63	90	73	55	86	69	48	82	66	42	78	59	37
		7-27	All	91	91	91	91	91	90	91	91	86	91	91	83	91	91	80	91	91	77	91	89	75	91	83	70	91	78	67	91	74	59	89	71	51	85	67	45	81	63	40
		27-45	All	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	100	100	100	98	98	98	94	93	93	90	88	88	86	84	84	81	80	80	76	76	76	72	72	72
	C	0-7	All	91	91	82	91	91	78	91	89	75	91	85	72	91	82	69	91	79	66	91	76	61	88	72	52	83	67	44	79	61	38	76	53	34	72	47	X	69	42	X
		7-20	All	91	91	82	91	91	78	91	90	75	91	86	73	91	83	70	91	80	68	91	78	66	91	73	56	87	69	48	82	64	41	78	56	36	75	50	X	72	44	X
		20-27	All	102	102	102	101	101	101	99	99	99	96	96	96	94	93	93	91	90	90	89	87	87	84	82	82	78	78	78	73	73	73	69	69	69	65	65	65	62	62	62
	D	0-7	All	91	91	76	91	86	73	91	83	70	91	80	67	91	77	62	91	74	56	88	71	51	83	67	43	78	59	37	75	51	X	71	45	X	68	39	X	65	35	X
		7-20	All	91	91	77	91	87	74	91	84	71	91	81	68	91	78	66	91	75	60	91	73	55	86	68	47	81	62	40	77	54	35	74	47	X	71	42	X	68	37	X
		20-27	All	100	100	100	97	97	97	94	94	94	92	91	91	89	87	87	85	85	84	82	82	78	77	77	72	72	72	68	68	68	64	64	64	60	59	59	57	53	53	53
20	B	0-7	All	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	77	78	78	74	78	78	69	78	77	63	78	73	55	78	69	48	78	66	42	78	59	37	
		7-27	All	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	77	78	78	75	78	78	70	78	78	67	78	74	59	76	71	51	75	67	45	73	63	40	
		27-45	All	95	95	95	95	95	95	95	95	95	95	95	95	95	95	94	94	94	93	93	93	90	90	87	87	87	84	84	84	80	80	80	76	76	76	72	72	72	72	
	C	0-7	All	78	78	78	78	78	78	78	78	75	78	78	72	78	78	69	78	78	66	78	76	61	78	72	52	78	67	44	78	61	38	76	53	34	72	47	X	69	42	X
		7-20	All	78	78	78	78	78	78	78	75	78	78	73	78	78	70	78	78	68	78	78	66	77	73	56	75	69	48	73	64	41	72	56	36	70	50	X	68	44	X	
		20-27	All	95	95	95	95	95	93	93	93	91	91	91	90	90	88	88	88	87	87	87	87	82	82	82	78	78	78	73	73	73	69	69	69	65	65	65	62	62	62	62
	D	0-7	All	78	78	76	78	78	73	78	78	70	78	78	67	78	77	62	78	74	56	78	71	51	78	67	43	78	59	37	75	51	X	71	45	X	68	39	X	65	35	X
		7-20	All	78	78	77	78	78	74	78	78	71	78	78	68	78	78	66	78	75	60	77	73	55	75	68	47	73	62	40	71	54	35	69	47	X	67	42	X	65	37	X
		20-27	All	95	95	95	93	93	93	91	91	91	89	89	89	88	87	87	86	85	85	83	82	82	78	77	77	72	72	72	68	68	68	64	64	64	60	59	59	57	53	53
30	B	0-7	All	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	74	76	76	69	76	76	63	76	73	55	76	69	48	76	66	42	76	59	37	
		7-27	All	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	77	78	78	75	78	78	70	78	78	67	78	74	59	76	71	51	75	67	45	73	63	40	
		27-45	All	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	89	89	89	88	88	88	85	85	85	82	82	82	79	79	79	76	76	76	73	73	73	70	70	70
	C	0-7	All	76	76	76	76	76	76	76	75	76	76	72	76	76	69	76	76	66	76	76	61	76	72	52	76	67	44	76	61	38	76	53	34	72	47	X	69	42	X	
		7-20	All	78	78	78	78	78	78	78	75	78	78	73	78	78	70	78	78	68	78	78	66	77	73	56	75	69	48	73	64	41	72	56	36	70	50	X	68	44	X	
		20-27	All	90	90	90	89	89	89	88	88	88	87	87	87	85	85	85	83	83	83	81	81	81	78	78	78	74	74	74	71	71	71	68	68	68	65	65	65	62	62	62
	D	0-7	All	78	78	76	78	78	73	78	78	70	78	78	67																											



II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell

Landscape
Orientation

Cross-Slope
Rail Direction

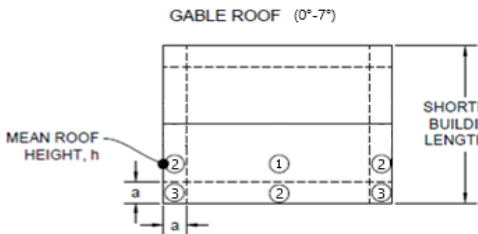
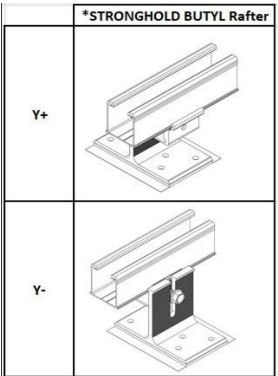
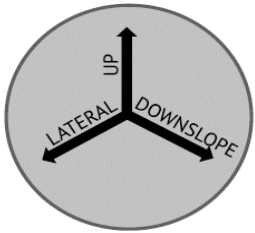
NXT
Rail Type

STRONGHOLD BUTYL Rafter

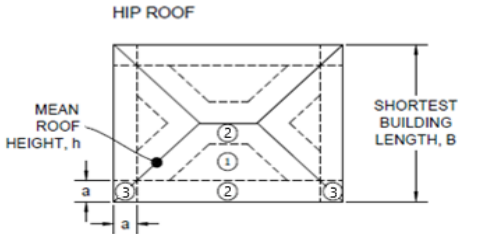
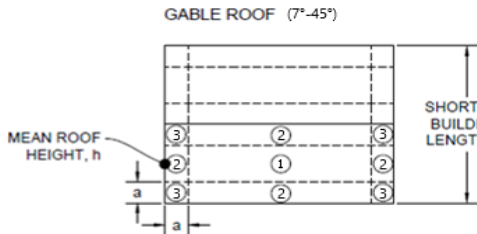
Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

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

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				Roof Wind Zone																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	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	All	101	101	96	101	101	91	101	101	87	101	98	83	101	94	79	101	90	76	101	87	73	100	81	68	94	77	62	89	72	53	85	69	47	81	65	41	78	58	37	
		7-27	All	101	101	93	101	101	89	101	101	85	101	98	82	101	94	79	101	91	77	101	88	74	101	82	70	98	78	66	93	74	58	88	70	50	84	67	44	81	61	39	
		27-45	All	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	100	100	100	98	98	98	93	93	93	89	88	88	85	83	83	80	79	76	76	76	72	72	72	72	
	C	0-7	All	101	97	82	101	92	78	101	88	74	101	85	71	100	81	68	96	78	66	93	76	60	88	71	51	83	67	43	79	60	38	75	52	X	72	46	X	69	41	X	
		7-20	All	101	97	81	101	93	78	101	89	75	101	85	72	101	82	70	100	79	67	97	77	64	91	72	55	86	68	47	82	63	41	78	55	X	74	49	X	71	43	X	
		20-27	All	102	102	102	101	101	101	98	98	98	96	96	96	93	92	92	91	89	89	88	87	87	83	82	82	77	77	77	72	72	68	68	68	64	64	64	61	61	61	61	
	D	0-7	All	101	90	76	101	86	72	100	82	69	97	79	66	93	76	60	90	73	55	87	71	50	82	66	43	78	58	36	74	50	X	71	44	X	68	39	X	63	X	X	
		7-20	All	101	90	76	101	87	73	101	83	70	100	80	68	97	77	65	94	74	59	91	72	54	85	68	46	81	61	39	77	53	X	73	46	X	70	41	X	67	X	X	
		20-27	All	99	99	99	96	96	96	94	93	93	91	90	90	89	87	87	86	84	84	83	81	81	77	77	77	71	71	71	67	67	67	63	63	63	59	58	58	56	52	52	
10	B	0-7	All	90	90	90	90	90	90	90	87	90	90	83	90	90	79	90	90	76	90	87	73	90	81	68	90	77	62	89	72	53	85	69	47	81	65	41	78	58	37		
		7-27	All	90	90	90	90	90	89	90	90	85	90	90	82	90	90	79	90	90	77	90	88	74	90	82	70	90	78	66	90	74	58	88	70	50	84	67	44	81	61	39	
		27-45	All	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	99	99	99	98	98	98	93	93	93	89	88	88	85	83	83	80	79	79	76	76	76	72	72	72	
	C	0-7	All	90	90	82	90	90	78	90	88	74	90	85	71	90	81	68	90	78	66	90	76	60	88	71	51	83	67	43	79	60	38	75	52	X	72	46	X	69	41	X	
		7-20	All	90	90	81	90	90	78	90	89	75	90	85	72	90	82	70	90	79	67	90	77	64	90	72	55	86	68	47	82	63	41	78	55	X	74	49	X	71	43	X	
		20-27	All	101	101	101	100	100	100	98	98	98	96	96	96	93	92	92	91	89	89	88	87	87	83	82	82	77	77	77	72	72	68	68	68	64	64	64	61	61	61	61	
	D	0-7	All	90	90	76	90	86	72	90	82	69	90	79	66	90	76	60	90	73	55	87	71	50	82	66	43	78	58	36	74	50	X	71	44	X	68	39	X	63	X	X	
		7-20	All	90	90	76	90	87	73	90	83	70	90	80	68	90	77	65	90	74	59	90	72	54	85	68	46	81	61	39	77	53	X	73	46	X	70	41	X	67	X	X	
		20-27	All	99	99	99	96	96	96	94	93	93	91	90	90	89	87	87	86	84	84	83	81	81	77	77	77	71	71	71	67	67	67	63	63	63	59	58	58	56	52	52	
20	B	0-7	All	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	76	77	77	73	77	77	68	77	77	62	77	72	53	77	69	47	77	65	41	77	58	37		
		7-27	All	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	74	77	77	70	77	77	66	77	74	58	75	70	50	74	67	44	72	61	39		
		27-45	All	95	95	95	95	95	95	95	95	95	95	95	95	95	95	93	93	93	92	92	92	89	89	89	86	86	86	83	83	83	79	79	79	76	76	76	72	72	72		
	C	0-7	All	77	77	77	77	77	77	77	77	74	77	77	71	77	77	68	77	77	66	77	76	60	77	71	51	77	67	43	77	60	38	75	52	X	72	46	X	69	41	X	
		7-20	All	77	77	77	77	77	77	77	75	77	77	77	72	77	77	70	77	77	67	77	77	64	76	72	55	75	68	47	73	63	41	71	55	X	69	49	X	67	43	X	
		20-27	All	95	95	95	94	94	94	92	92	92	91	91	91	89	89	88	88	88	86	86	86	81	81	81	77	77	77	72	72	68	68	68	64	64	64	61	61	61	61		
	D	0-7	All	77	77	76	77	77	77	72	77	77	69	77	77	66	77	76	60	77	73	55	77	71	50	77	66	43	77	58	36	74	50	X	71	44	X	68	39	X	63	X	X
		7-20	All	77	77	76	77	77	77	73	77	77	70	77	77	68	77	77	65	77	74	59	76	72	54	74	68	46	72	61	39	70	53	X	68	46	X	66	41	X	64	X	X
		20-27	All	94	94	94	92	92	92	90	90	90	89	89	89	87	87	87	85	84	84	84	82	81	81	77	77	77	71	71	71	67	67	67	63	63	63	59	58	58	56	52	52
30	B	0-7	All	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	73	76	76	68	76	76	62	76	72	53	76	69	47	76	65	41	76	58	37		
		7-27	All	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	74	77	77	70	77	77	66	77	74	58	75	70	50	74	67	44	72	61	39		
		27-45	All	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	88	88	88	87	87	87	84	84	84	81	81	81	78	78	78	75	75	75	72	72	72	69	69	69	
	C	0-7	All	76	76	76	76	76	76	76	76	74	76	76	71	76	76	68	76	76	66	76	76	60	76	71	51	76	67	43	76	60	38	75	52	X	72	46	X	69	41	X	
		7-20	All	77	77	77	77	77	77	77	77	75	77	77	77	72	77	77	70	77	77	67	77	77	64	76	72	55	75	68	47	73	63	41	71	55	X	69	49	X	67	43	X
		20-27	All	89	89	89	89	89	89	88	88	88	86	86	86	84	84	84	82	82	82	80	80	80	77	77	77	73	73	73	70	70	70	67	67	67	64	64	64	61	61	61	
	D	0-7	All	77	77	76	77	77	77	72	77	77	69	77	77	66	77	76	60	77	73	55	77	71																			



II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

72 Cell

Landscape
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

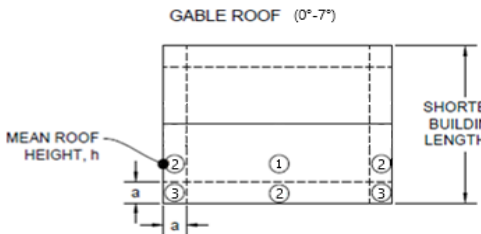
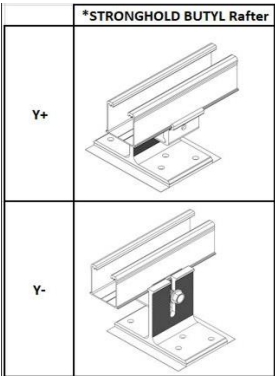
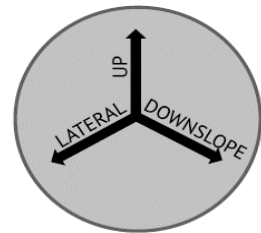
STRONGHOLD BUTYL Rafter

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

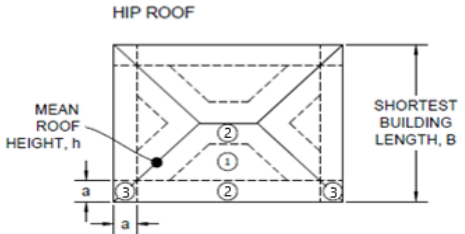
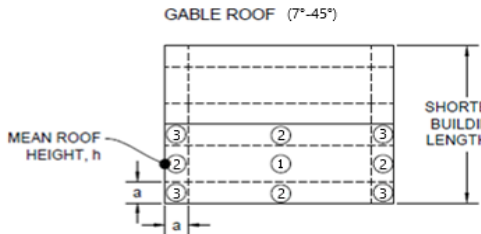
[illegible]

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

X Cells with an "X" indicates that the module clamp's allowable capacity is exceeded and a 3-rail system may be required. Contact Unirac Engineering Services for support.



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$

**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2



II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell

Portrait
Orientation

Cross-Slope
Rail Direction

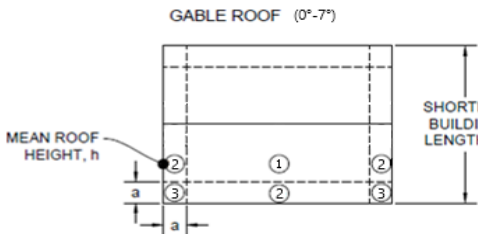
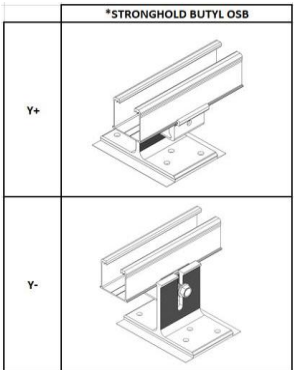
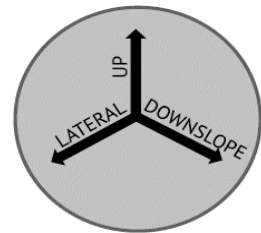
NXT

Attachment

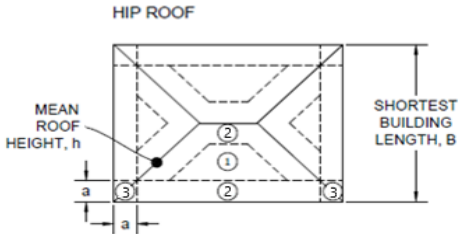
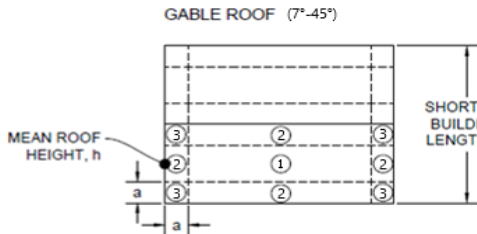
Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

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

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**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2



II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell

Portrait
Orientation

Cross-Slope
Rail Direction

NXT

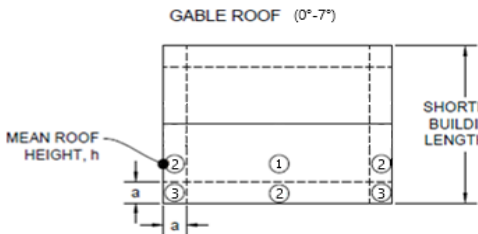
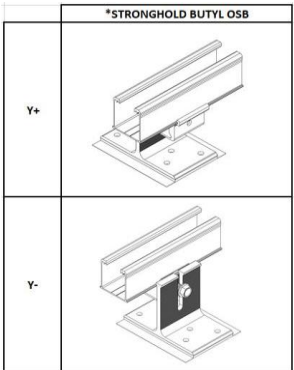
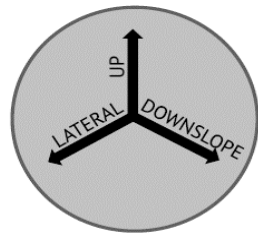
Attachment

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

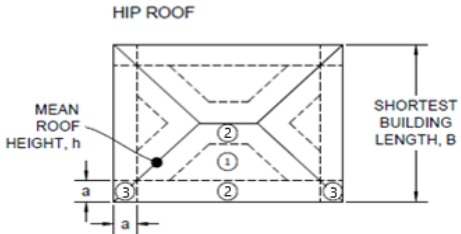
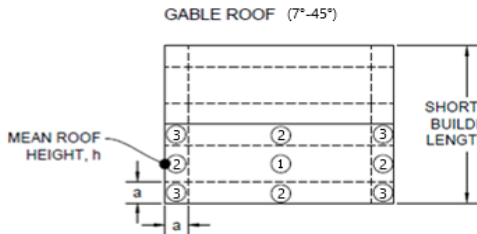
[illegible]

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$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$

**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				Roof Wind Zone																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	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	All	28	28	20	28	28	18	28	26	16	28	23	14	28	21	13	28	19	12	28	17	11	28	14	9	24	12	8	20	11	6	18	9	6	15	8	5	13	7	X
		7-27	All	28	28	22	28	28	19	28	27	17	28	25	15	28	22	14	28	20	13	28	18	11	28	15	10	26	13	8	23	11	7	20	10	6	17	8	5	15	7	X
		27-45	All	29	29	29	29	29	29	29	29	29	29	29	29	28	28	28	26	26	26	24	24	24	21	21	19	19	16	16	16	15	14	14	13	12	12	12	11	11	11	
	C	0-7	All	28	23	14	28	20	12	28	18	11	28	16	10	28	14	9	25	13	8	23	12	7	19	10	6	16	8	5	14	7	X	12	6	X	11	6	X	9	5	X
		7-20	All	28	24	15	28	21	13	28	19	12	28	17	11	28	15	10	28	14	9	25	13	8	21	11	7	18	9	6	15	8	5	13	7	X	12	6	X	10	5	X
		20-27	All	29	29	29	27	27	27	25	25	25	23	23	23	21	21	21	20	20	20	18	18	18	16	15	15	14	13	13	12	11	11	11	10	10	9	9	9	8	8	8
	D	0-7	All	28	19	11	28	17	10	28	15	9	26	13	8	23	12	7	21	11	7	19	10	6	16	8	5	13	7	X	12	6	X	10	5	X	9	X	X	8	X	X
		7-20	All	28	20	12	28	17	11	28	16	10	28	14	9	26	13	8	23	11	7	21	10	7	18	9	5	15	7	X	13	6	X	11	6	X	10	5	X	9	X	X
		20-27	All	26	26	26	23	23	23	22	22	22	20	20	20	18	18	18	17	17	17	16	15	15	13	13	13	12	11	11	10	9	9	9	8	8	8	7	7	7	6	6
10	B	0-7	All	20	20	20	20	20	18	20	20	16	20	20	14	20	20	13	20	19	12	20	17	11	20	14	9	20	12	8	20	11	6	18	9	6	15	8	5	13	7	X
		7-27	All	20	20	20	20	20	19	20	20	17	20	20	15	20	20	14	20	20	13	20	18	11	20	15	10	20	13	8	19	11	7	18	10	6	17	8	5	15	7	X
		27-45	All	28	28	28	28	28	28	28	28	28	28	28	28	27	27	27	26	26	26	24	24	24	21	21	19	19	19	16	16	16	15	14	14	13	12	12	12	11	11	11
	C	0-7	All	20	20	14	20	20	12	20	18	11	20	16	10	20	14	9	20	13	8	20	12	7	19	10	6	16	8	5	14	7	X	12	6	X	11	6	X	9	5	X
		7-20	All	20	20	15	20	20	13	20	19	12	20	17	11	20	15	10	20	14	9	20	13	8	19	11	7	18	9	6	15	8	5	13	7	X	12	6	X	10	5	X
		20-27	All	28	28	28	27	27	27	25	25	25	23	23	23	21	21	21	20	20	20	18	18	18	16	15	15	14	13	13	12	11	11	11	10	10	9	9	9	8	8	8
	D	0-7	All	20	19	11	20	17	10	20	15	9	20	13	8	20	12	7	20	11	7	19	10	6	16	8	5	13	7	X	12	6	X	10	5	X	9	X	X	8	X	X
		7-20	All	20	20	12	20	17	11	20	16	10	20	14	9	20	13	8	19	11	7	19	10	7	17	9	5	15	7	X	13	6	X	11	6	X	10	5	X	9	X	X
		20-27	All	26	26	26	23	23	23	22	22	22	20	20	20	18	18	18	17	17	17	16	15	15	13	13	13	12	11	11	10	9	9	9	8	8	8	7	7	7	6	6
20	B	0-7	All	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	14	9	14	12	8	14	11	6	14	9	6	14	8	5	13	7	X
		7-27	All	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	11	14	14	10	14	13	8	14	11	7	13	10	6	12	8	5	12	7	X	
		27-45	All	23	23	23	23	23	23	23	23	23	23	23	22	22	22	21	21	21	20	20	20	19	19	19	17	17	16	16	16	14	14	13	12	12	12	11	11	11		
	C	0-7	All	14	14	14	14	14	12	14	14	11	14	14	10	14	14	9	14	13	8	14	12	7	14	10	6	14	8	5	14	7	X	12	6	X	11	6	X	9	5	X
		7-20	All	14	14	14	14	14	13	14	14	12	14	14	11	14	14	10	14	14	9	14	13	8	13	11	7	13	9	6	12	8	5	11	7	X	11	6	X	10	5	X
		20-27	All	23	23	23	22	22	22	21	21	21	20	20	20	19	19	19	18	18	18	17	17	17	15	15	15	14	13	13	12	11	11	11	10	10	9	9	9	8	8	8
	D	0-7	All	14	14	11	14	14	10	14	14	9	14	13	8	14	12	7	14	11	7	14	10	6	14	8	5	13	7	X	12	6	X	10	5	X	9	X	X	8	X	X
		7-20	All	14	14	12	14	14	11	14	14	10	14	14	9	14	13	8	14	11	7	13	10	7	13	9	5	12	7	X	11	6	X	11	6	X	10	5	X	9	X	X
		20-27	All	22	22	22	21	21	21	20	20	20	18	18	18	17	17	17	16	16	16	16	15	15	13	13	13	12	11	11	10	9	9	9	8	8	8	7	7	7	6	6
30	B	0-7	All	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	9	13	12	8	13	11	6	13	9	6	13	8	5	13	7	X	
		7-27	All	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	14	14	11	14	14	10	14	13	8	14	11	7	13	10	6	12	8	5	12	7	X	
		27-45	All	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	18	18	18	18	18	18	16	16	16	15	15	15	14	14	13	13	12	12	12	11	11	11	
	C	0-7	All	13	13	13	13	13	12	13	13	11	13	13	10	13	13	9	13	13	8	13	12	7	13	10	6	13	8	5	13	7	X	12	6	X	11	6	X	9	5	X
		7-20	All	14	14	14	14	14	13	14	14	12	14	14	11	14	14	10	14	14	9	14	13	8	13	11	7	13	9	6	12	8	5	11	7	X	11	6	X	10	5	X
		20-27	All	19	19	19	19	19	19	18	18	18	17	17	17	16	16	16	15	15	15	15	15	15	13	13	13	12	12	12	11	11	11	10	10	10	9	9	9	8	8	8
	D	0-7	All	14	14	11	14	14	10	14	14	9	14	13	8	14	12	7	14	11	7	14	10	6	14	8	5	13	7	X	12	6	X	10	5	X	9	X	X	8	X	X
		7-20	All	14	14	12	14	14	11	14	14	10	14	14	9	14	13	8	14	11	7	13	10	7	13	9	5	12	7	X	11	6	X	11	6	X	10	5	X	9	X	X
		20-27	All																																							



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

72 Cell
Module Type

Portrait
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL OSB
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				Roof Wind Zone																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3				
50	B	0-7	All	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	6	9	9	6	9	8	5	9	7	X			
		7-27	All	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8	10	10	7	9	9	6	9	8	5	9	7	X			
		27-45	All	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14	14	13	13	13	12	12	11	11	11	11	10	10	10	9	9	9				
	C	0-7	All	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	6	9	8	5	9	7	X	9	6	X	9	6	X	9	5	X		
		7-20	All	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	9	9	6	9	8	5	9	7	X	8	6	X	8	5	X		
		20-27	All	15	15	15	14	14	14	14	14	14	14	14	13	13	13	13	13	12	12	12	12	12	12	11	11	10	10	10	9	9	9	9	8	8	8	8	8	8			
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		7-20	All	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	8	11	11	7	10	10	7	10	9	5	9	7	X	9	6	X	9	6	X	8	5	X	8	X	X
		20-27	All	15	15	15	14	14	14	14	14	14	14	13	13	13	13	13	13	12	12	12	12	12	12	11	11	11	10	10	10	9	9	9	8	8	7	7	7	6	6		
60	B	0-7	All	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	7	5	7	7	X			
		7-27	All	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	8	5	8	7	X	
		27-45	All	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	12	12	12	12	12	11	11	11	10	10	10	10	9	9	9	9	9	9		
	C	0-7	All	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	5	7	7	X	7	6	X	7	6	X	7	5	X		
		7-20	All	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	6	8	5	8	7	X	7	6	X	7	6	X	7	5	X		
		20-27	All	13	13	13	13	13	13	12	12	12	12	12	12	12	12	12	11	11	11	11	11	10	10	10	9	9	9	9	9	9	8	8	8	8	8	8	7	7	7		
	D	0-7	All	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	7	8	8	6	8	8	5	8	7	X	8	6	X	8	6	X	8	X	X	8	X	X		
		7-20	All	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	9	7	9	9	5	8	7	X	8	6	X	8	6	X	7	5	X	7	X	X	
		20-27	All	13	13	13	13	13	13	12	12	12	12	12	12	11	11	11	11	11	11	11	10	10	10	9	9	9	9	8	8	8	8	8	8	7	7	7	7	6	6		
70	B	0-7	All	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	X			
		7-27	All	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	7	7	X			
		27-45	All	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	11	10	10	10	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8		
	C	0-7	All	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	X	6	6	X	6	6	X	6	5	X				
		7-20	All	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	5	7	7	X	7	6	X	7	6	X	6	5	X		
		20-27	All	12	12	12	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	10	9	9	9	9	9	8	8	8	8	8	8	7	7	7	7	6	6			
	D	0-7	All	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	5	7	7	X	7	6	X	7	5	X	7	X	X	7	X	X	
		7-20	All	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	7	8	8	5	8	7	X	7	6	X	7	6	X	7	5	X	6	X	X		
		20-27	All	12	12	12	12	12	12	11	11	11	11	11	11	11	10	10	10	10	10	10	10	10	9	9	9	8	8	8	8	8	8	7	7	7	7	6	6	6			
80	B	0-7	All	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	X				
		7-27	All	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	X			
		27-45	All	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	8	8	8	8	8	8	7	7	7		
	C	0-7	All	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	X	6	6	X	6	6	X	6	5	X				
		7-20	All	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	X	6	6	X	6	6	X	6	5	X			
		20-27	All	11	11	11	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	8	8	8	8	7	7	7	7	7	7	6	6	6				
	D	0-7	All	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	X	6	6	X	6	5	X	6	X	X	6	X	X				
		7-20	All	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5	7	5	7	7	X	7	6	X	6	6	X	6	5	X	6	X	X		
		20-27	All	11	11	11	11	11	11	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	8	8	8	8	7	7	7	7	7	6	6	6	6	6	6				
90	B	0-7	All	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	X				
		7-27	All	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	X				
		27-45	All	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	7	7	7	7	7	7				
	C	0																																									



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell
Module Type

Portrait
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL Plywood
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				Roof Wind Zone																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	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	All	46	46	30	46	43	26	46	38	24	46	34	21	46	31	19	46	28	17	46	26	16	41	21	13	35	18	11	30	16	10	26	14	8	23	12	7	20	11	7
		7-27	All	46	46	32	46	46	28	46	41	25	46	36	23	46	33	21	46	30	19	46	27	17	46	23	14	39	19	12	33	17	11	29	14	9	25	13	8	22	11	7
		27-45	All	47	47	47	47	47	47	47	47	47	47	47	46	46	43	43	43	40	39	39	35	33	33	31	28	28	27	24	24	21	22	18	18	20	16	16	16	16	16	16
	C	0-7	All	46	33	20	46	30	18	46	26	16	46	24	15	41	21	13	37	19	12	34	18	11	28	15	9	24	13	8	21	11	7	18	9	X	16	8	X	14	7	X
		7-20	All	46	35	22	46	31	20	46	28	18	46	25	16	46	23	14	41	21	13	38	19	12	31	16	10	27	13	8	23	12	7	20	10	6	18	9	X	15	8	X
		20-27	All	47	47	47	45	45	45	41	40	40	38	36	36	35	32	32	32	29	29	30	27	27	26	23	23	23	19	19	20	17	17	18	15	15	13	13	14	11	11	11
	D	0-7	All	46	28	17	46	25	15	42	22	14	38	20	12	34	18	11	31	16	10	28	15	9	23	12	8	20	11	7	17	9	X	15	8	X	13	7	X	12	6	X
		7-20	All	46	29	18	46	26	16	46	23	15	42	21	13	38	19	12	34	17	11	31	16	10	26	13	8	22	11	7	19	10	6	17	8	X	15	7	X	13	6	X
		20-27	All	42	42	42	39	37	37	36	33	33	33	30	30	30	27	27	28	25	25	26	22	22	22	19	19	19	16	16	17	14	14	15	12	12	13	11	11	11	9	9
10	B	0-7	All	33	33	30	33	33	26	33	33	24	33	33	21	33	31	19	33	28	17	33	26	16	33	21	13	33	18	11	30	16	10	26	14	8	23	12	7	20	11	7
		7-27	All	33	33	32	33	33	28	33	33	25	33	33	23	33	33	21	33	30	19	33	27	17	33	23	14	33	19	12	32	17	11	29	14	9	25	13	8	22	11	7
		27-45	All	46	46	46	46	46	46	46	46	46	46	46	46	45	45	45	43	43	43	40	39	39	35	33	33	31	28	28	27	24	24	21	21	22	18	18	20	16	16	16
	C	0-7	All	33	33	20	33	30	18	33	26	16	33	24	15	33	21	13	33	19	12	33	18	11	28	15	9	24	13	8	21	11	7	18	9	X	16	8	X	14	7	X
		7-20	All	33	33	22	33	31	20	33	28	18	33	25	16	33	23	14	33	21	13	33	19	12	31	16	10	27	13	8	23	12	7	20	10	6	18	9	X	15	8	X
		20-27	All	46	46	46	44	44	44	41	40	40	38	36	36	35	32	32	32	29	29	30	27	27	26	23	23	23	19	19	20	17	17	18	15	15	13	13	14	11	11	11
	D	0-7	All	33	28	17	33	25	15	33	22	14	33	20	12	33	18	11	31	16	10	28	15	9	23	12	8	20	11	7	17	9	X	15	8	X	13	7	X	12	6	X
		7-20	All	33	29	18	33	26	16	33	23	15	33	21	13	33	19	12	32	17	11	31	16	10	26	13	8	22	11	7	19	10	6	17	8	X	15	7	X	13	6	X
		20-27	All	42	42	42	39	37	37	36	33	33	33	30	30	30	27	27	28	25	25	26	22	22	22	19	19	19	16	16	17	14	14	15	12	12	13	11	11	11	9	9
20	B	0-7	All	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	23	17	23	23	16	23	21	13	23	18	11	23	16	10	23	14	8	23	12	7	20	11	7
		7-27	All	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	23	17	23	23	14	23	19	12	22	17	11	22	14	9	21	13	8	20	11	7
		27-45	All	38	38	38	38	38	38	38	38	38	38	38	38	37	37	37	35	35	34	34	34	31	31	31	28	28	28	26	24	24	21	21	22	18	18	20	16	16	16	
	C	0-7	All	23	23	20	23	23	18	23	23	16	23	23	15	23	21	13	23	19	12	23	18	11	23	15	9	23	13	8	21	11	7	18	9	X	16	8	X	14	7	X
		7-20	All	23	23	22	23	23	20	23	23	18	23	23	16	23	23	14	23	21	13	23	19	12	22	16	10	21	13	8	20	12	7	19	10	6	18	9	X	15	8	X
		20-27	All	38	38	38	36	36	36	34	34	34	33	33	33	31	31	31	29	29	28	27	27	25	23	23	23	19	19	20	17	17	18	15	15	13	13	14	11	11	11	
	D	0-7	All	23	23	17	23	23	15	23	22	14	23	20	12	23	18	11	23	16	10	23	15	9	23	12	8	20	11	7	17	9	X	15	8	X	13	7	X	12	6	X
		7-20	All	23	23	18	23	23	16	23	23	15	23	21	13	23	19	12	23	17	11	22	16	10	21	13	8	20	11	7	19	10	6	17	8	X	15	7	X	13	6	X
		20-27	All	36	36	36	34	34	34	32	32	32	31	30	30	29	27	27	27	25	25	26	22	22	22	19	19	19	16	16	17	14	14	15	12	12	13	11	11	11	9	9
30	B	0-7	All	22	22	22	22	22	22	22	22	22	22	22	21	22	22	19	22	22	17	22	22	16	22	21	13	22	18	11	22	16	10	22	14	8	22	12	7	20	11	7
		7-27	All	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	23	17	23	23	14	23	19	12	22	17	11	22	14	9	21	13	8	20	11	7
		27-45	All	32	32	32	32	32	32	32	32	32	32	32	32	31	31	31	30	30	30	29	29	29	27	27	27	25	25	25	23	23	23	21	21	21	20	18	18	18	16	16
	C	0-7	All	22	22	20	22	22	18	22	22	16	22	22	15	22	21	13	22	19	12	22	18	11	22	15	9	22	13	8	21	11	7	18	9	X	16	8	X	14	7	X
		7-20	All	23	23	22	23	23	20	23	23	18	23	23	16	23	23	14	23	21	13	23	19	12	22	16	10	21	13	8	20	12	7	19	10	6	18	9	X	15	8	X
		20-27	All	32	32	32	31	31	31	29	29	29	28	28	28	27	27	27	26	26	26	25	25	25	22	22	22	20	19	19	19	17	17	17	15	15	15	13	13	14	11	11
	D	0-7	All	23	23	17	23	23	15	23	22	14	23	20	12	23	18	11	23	16	10	23	15	9	23	12	8	20	11	7	17	9	X	15	8	X	13	7	X	12	6	X
		7-20	All	23	23	18	23	23	16	23	23	15	23	2																												



II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell

Portrait
Orientation

Cross-Slope
Rail Direction

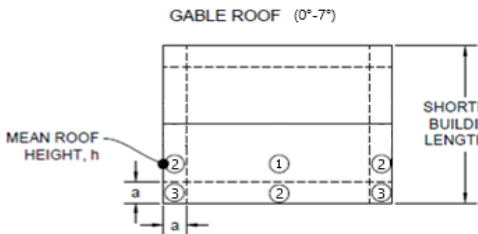
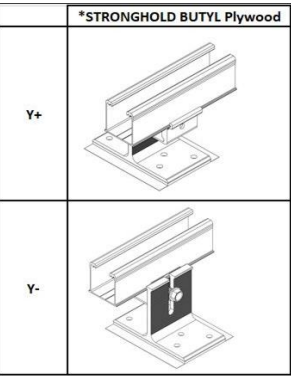
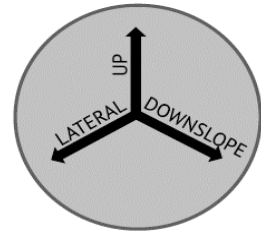
NXT

STRONGHOLD BUTYL Plywood
Attachment

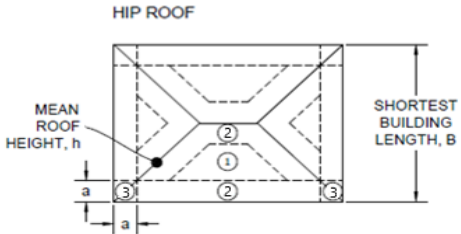
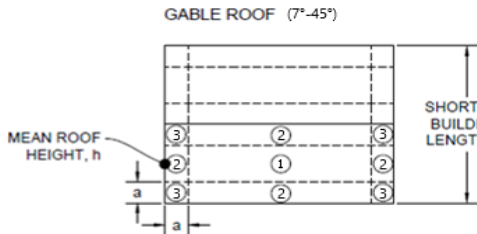
Maximum Allowable Rail Spans for Rooftop Solar Panels Parallel to the Roof Surface (inches)

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

X Cells with an "X" indicates that the module clamp's allowable capacity is exceeded and a 3-rail system may be required. Contact Unirac Engineering Services for support.



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$



$$a = \text{MAX}(0.04B, 3\text{FT.}, \text{MIN}(0.10B, 0.4h))$$

**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2



II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

72 Cell

Portrait
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

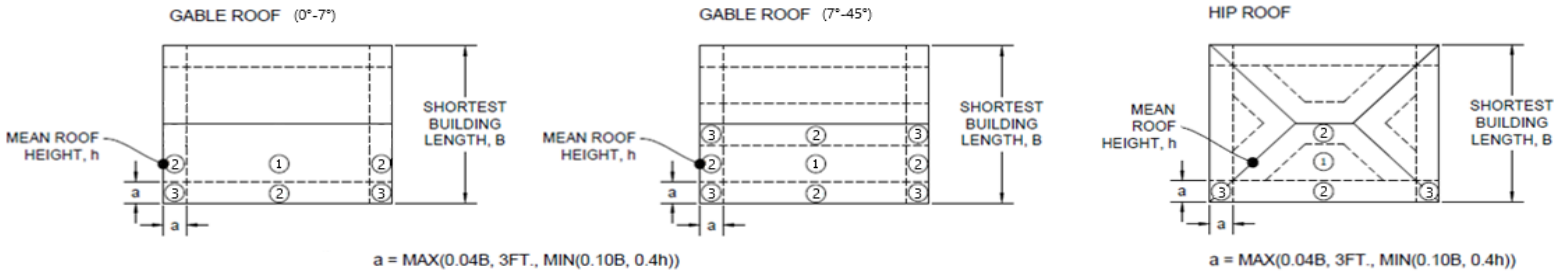
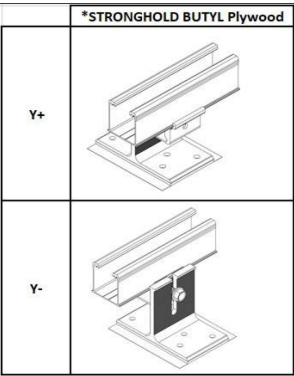
STRONGHOLD BUTYL Plywood
Attachment

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

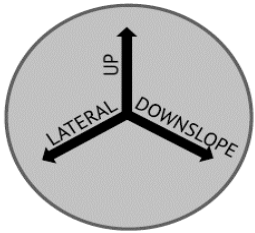
[illegible]

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

X Cells with an "X" indicates that the module clamp's allowable capacity is exceeded and a 3-rail system may be required. Contact Unirac Engineering Services for support.



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-10, Section 30.4.2





ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell
Module Type

Portrait
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL Rafter
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3						
0	B	0-7	All	85	85	80	85	85	76	85	85	73	85	82	70	85	79	68	85	76	64	85	74	56	84	69	44	80	65	38	76	54	33	72	46	28	69	40	25	66	35	22
		7-27	All	85	85	78	85	85	75	85	85	72	85	83	70	85	80	67	85	77	64	85	74	58	85	70	48	83	66	40	79	57	35	75	49	31	72	42	27	69	37	24
		27-45	All	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	83	83	83	80	80	80	75	75	75	70	70	70	66	66	66	62	62	62	59	59	59	56	54	54
	C	0-7	All	85	81	69	85	78	67	85	75	59	85	72	51	84	69	44	81	67	40	79	62	36	74	51	31	70	42	26	67	36	23	60	32	X	52	28	X	46	25	X
		7-20	All	85	82	69	85	78	66	85	75	60	85	72	53	85	70	48	84	68	43	82	65	39	77	53	33	73	45	28	69	38	25	66	34	22	59	30	X	52	26	X
		20-27	All	86	86	86	85	85	85	81	81	81	78	78	78	75	75	75	72	72	72	69	69	69	65	65	65	60	60	60	57	56	56	53	48	48	50	42	42	46	37	37
	D	0-7	All	85	76	63	85	73	53	85	70	46	82	67	40	79	63	37	76	56	33	74	50	31	70	41	26	66	35	22	57	30	X	50	27	X	43	23	X	38	21	X
		7-20	All	85	76	63	85	73	55	85	71	49	85	68	44	82	66	39	79	59	36	77	53	33	72	44	28	69	37	24	64	32	21	56	28	X	49	25	X	43	22	X
		20-27	All	83	83	83	79	79	79	76	76	76	73	73	73	70	70	70	67	67	67	64	64	64	60	60	60	56	54	54	52	46	46	49	40	40	43	35	35	38	31	31
10	B	0-7	All	72	72	72	72	72	72	72	72	72	72	72	70	72	72	68	72	72	64	72	72	56	72	69	44	72	65	38	72	54	33	72	46	28	69	40	25	66	35	22
		7-27	All	72	72	72	72	72	72	72	72	72	72	72	70	72	72	67	72	72	64	72	72	58	72	70	48	72	66	40	72	57	35	70	49	31	68	42	27	66	37	24
		27-45	All	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	83	83	83	80	80	80	75	75	75	70	70	70	66	66	66	62	62	62	59	59	59	56	54	54
	C	0-7	All	72	72	69	72	72	67	72	72	59	72	72	51	72	69	44	72	67	40	72	62	36	72	51	31	70	42	26	67	36	23	60	32	X	52	28	X	46	25	X
		7-20	All	72	72	69	72	72	66	72	72	60	72	72	53	72	70	48	72	68	43	72	65	39	72	53	33	69	45	28	67	38	25	65	34	22	59	30	X	52	26	X
		20-27	All	85	85	85	84	84	84	81	81	81	78	78	78	75	75	75	72	72	72	69	69	69	65	65	65	60	60	60	57	56	56	53	48	48	50	42	42	46	37	37
	D	0-7	All	72	72	63	72	72	53	72	70	46	72	67	40	72	63	37	72	56	33	72	50	31	70	41	26	66	35	22	57	30	X	50	27	X	43	23	X	38	21	X
		7-20	All	72	72	63	72	72	55	72	71	49	72	68	44	72	66	39	72	59	36	71	53	33	69	44	28	66	37	24	64	32	21	56	28	X	49	25	X	43	22	X
		20-27	All	83	83	83	79	79	79	76	76	76	73	73	73	70	70	70	67	67	67	64	64	64	60	60	60	56	54	54	52	46	46	49	40	40	43	35	35	38	31	31
20	B	0-7	All	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	56	60	60	44	60	60	38	60	54	33	60	46	28	60	40	25	60	35	22	
		7-27	All	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	58	60	60	48	60	60	40	60	57	35	59	49	31	58	42	27	57	37	24	
		27-45	All	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	75	75	75	74	74	74	70	70	70	67	67	67	65	65	65	62	62	62	59	59	59	56	54	54
	C	0-7	All	60	60	60	60	60	60	60	60	59	60	60	51	60	60	44	60	60	40	60	60	36	60	51	31	60	42	26	60	36	23	60	32	X	52	28	X	46	25	X
		7-20	All	60	60	60	60	60	60	60	60	60	60	60	53	60	60	48	60	60	43	60	60	39	60	53	33	58	45	28	57	38	25	55	34	22	54	30	X	52	26	X
		20-27	All	77	77	77	76	76	76	74	74	74	72	72	72	70	70	70	69	69	69	67	67	67	64	64	64	60	60	60	57	56	56	53	48	48	50	42	42	46	37	37
	D	0-7	All	60	60	60	60	60	53	60	60	46	60	60	40	60	60	37	60	56	33	60	50	31	60	41	26	60	35	22	57	30	X	50	27	X	43	23	X	38	21	X
		7-20	All	60	60	60	60	60	55	60	60	49	60	60	44	60	60	39	60	59	36	60	53	33	58	44	28	56	37	24	55	32	21	53	28	X	49	25	X	43	22	X
		20-27	All	76	76	76	74	74	74	72	72	72	70	70	70	68	68	68	66	66	66	64	64	64	60	60	60	56	54	54	52	46	46	49	40	40	43	35	35	38	31	31
30	B	0-7	All	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	56	59	59	44	59	59	38	59	54	33	59	46	28	59	40	25	59	35	22	
		7-27	All	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	58	60	60	48	60	60	40	60	57	35	59	49	31	58	42	27	57	37	24	
		27-45	All	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	69	69	69	68	68	68	66	66	66	63	63	63	61	61	61	58	58	58	56	56	56	54	54	54
	C	0-7	All	59	59	59	59	59	59	59	59	59	59	59	51	59	59	44	59	59	40	59	59	36	59	51	31	59	42	26	59	36	23	59	32	X	52	28	X	46	25	X
		7-20	All	60	60	60	60	60	60	60	60	60	60	60	53	60	60	48	60	60	43	60	60	39	60	53	33	58	45	28	57	38	25	55	34	22	54	30	X	52	26	X
		20-27	All	71	71	71	70	70	70	68	68	68	67	67	67	65	65	65	64	64	64	63	63	63	60	60	60	57	57	57	55	55	55	52	48	48	50	42	42	46	37	37
	D	0-7	All	60	60	60	60	60	53	60	60	46	60	60	40	60	60	37	60	56	33	60	50	31	60	41	26	60	35	22	57	30	X	50	27	X	43	23	X	38	21	X
		7-20	All	60	60	60	60	60	55	60	60	49	60	60	44	60	60	39	60	59	36	60	53	33	58	44	28	56	37	24	55	32	21	53	28	X	49	25	X	43	22	X
		20-27	All	71	71	71	69	69	69	67	67	66	66	66	64	64	64	62	62	62	61	61	61	58	58	58	55															



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

60 Cell
Module Type

Portrait
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL Rafter
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
				Roof Wind Zone																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
				90			95			100			105			110			115			120			130			140			150			160			170			180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
50	B	0-7	All	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	49	49	49	49	49	49	49	49	49	49	49	49</



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

72 Cell
Module Type

Portrait
Orientation

Cross-Slope
Rail Direction

NXT
Rail Type

STRONGHOLD BUTYL Rafter
Attachment

SPAN TABLES

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3							
0	B	0-7	All	78	78	77	78	78	73	78	78	70	78	78	67	78	75	62	78	73	54	78	70	47	78	66	37	75	54	31	71	45	27	68	38	24	64	33	21	56	29	X
		7-27	All	78	78	74	78	78	71	78	78	68	78	78	66	78	75	60	78	73	54	78	71	48	78	66	40	78	57	34	74	48	29	71	41	26	68	35	22	63	31	X
		27-45	All	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	76	76	76	74	74	74	69	69	69	65	65	65	61	61	61	57	57	57	54	52	52	51	45	45
	C	0-7	All	78	77	66	78	74	58	78	71	49	78	68	42	78	66	37	77	58	33	74	52	30	70	42	26	66	35	22	58	30	X	50	26	X	44	23	X	38	21	X
		7-20	All	78	77	64	78	74	56	78	71	50	78	69	44	78	66	40	78	61	36	77	54	33	73	45	28	69	37	24	65	32	21	56	28	X	49	25	X	43	22	X
		20-27	All	79	79	79	78	78	78	74	74	74	71	71	71	69	69	69	66	66	66	64	64	64	59	59	59	55	55	55	52	47	47	49	40	40	43	35	35	38	31	31
	D	0-7	All	78	72	53	78	69	45	78	66	38	77	60	34	75	53	31	72	47	28	70	42	25	66	34	22	56	29	X	48	25	X	41	22	X	36	X	X	32	X	X
		7-20	All	78	72	53	78	70	46	78	67	41	78	62	36	77	55	33	75	49	30	72	44	27	68	36	23	63	31	X	54	27	X	46	23	X	41	21	X	36	X	X
		20-27	All	76	76	76	72	72	72	69	69	69	66	66	66	64	64	64	61	61	61	59	59	59	55	53	53	51	45	45	48	39	39	41	34	34	36	30	30	32	26	26
10	B	0-7	All	65	65	65	65	65	65	65	65	65	65	65	65	65	65	62	65	65	54	65	65	47	65	65	37	65	54	31	65	45	27	65	38	24	64	33	21	56	29	X
		7-27	All	66	66	66	66	66	66	66	66	66	66	66	66	66	66	60	66	66	54	66	66	48	66	66	40	66	57	34	66	48	29	65	41	26	63	35	22	61	31	X
		27-45	All	78	78	78	78	78	78	78	78	78	78	78	78	78	78	76	76	76	74	74	74	69	69	69	65	65	65	61	61	61	57	57	57	54	52	52	51	45	45	
	C	0-7	All	65	65	65	65	65	58	65	65	49	65	65	42	65	65	37	65	58	33	65	52	30	65	42	26	65	35	22	58	30	X	50	26	X	44	23	X	38	21	X
		7-20	All	66	66	64	66	66	56	66	66	50	66	66	44	66	66	40	66	61	36	66	54	33	66	45	28	63	37	24	61	32	21	56	28	X	49	25	X	43	22	X
		20-27	All	78	78	78	77	77	77	74	74	74	71	71	71	69	69	69	66	66	66	64	64	64	59	59	59	55	55	55	52	47	47	49	40	40	43	35	35	38	31	31
	D	0-7	All	65	65	53	65	65	45	65	65	38	65	60	34	65	53	31	65	47	28	65	42	25	65	34	22	56	29	X	48	25	X	41	22	X	36	X	X	32	X	X
		7-20	All	66	66	53	66	66	46	66	66	41	66	62	36	66	55	33	66	49	30	66	44	27	63	36	23	61	31	X	54	27	X	46	23	X	41	21	X	36	X	X
		20-27	All	76	76	76	72	72	72	69	69	69	66	66	66	64	64	64	61	61	61	59	59	59	55	53	53	51	45	45	48	39	39	41	34	34	36	30	30	32	26	26
20	B	0-7	All	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	55	55	47	55	55	37	55	54	31	55	45	27	55	38	24	55	33	21	55	29	X		
		7-27	All	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	55	55	48	55	55	40	55	55	34	55	48	29	54	41	26	53	35	22	52	31	X	
		27-45	All	70	70	70	70	70	70	70	70	70	70	70	70	70	69	69	69	67	67	67	64	64	64	62	62	62	59	59	59	57	57	57	54	52	52	51	45	45		
	C	0-7	All	55	55	55	55	55	55	55	55	49	55	55	42	55	55	37	55	55	33	55	52	30	55	42	26	55	35	22	55	30	X	50	26	X	44	23	X	38	21	X
		7-20	All	55	55	55	55	55	55	55	55	50	55	55	44	55	55	40	55	55	36	55	54	33	55	45	28	53	37	24	52	32	21	51	28	X	49	25	X	43	22	X
		20-27	All	70	70	70	70	70	68	68	68	66	66	66	64	64	64	63	63	63	61	61	61	58	58	58	55	55	55	52	47	47	49	40	40	43	35	35	38	31	31	
	D	0-7	All	55	55	53	55	55	45	55	55	38	55	55	34	55	53	31	55	47	28	55	42	25	55	34	22	55	29	X	48	25	X	41	22	X	36	X	X	32	X	X
		7-20	All	55	55	53	55	55	46	55	55	41	55	55	36	55	55	33	55	49	30	55	44	27	53	36	23	52	31	X	50	27	X	46	23	X	41	21	X	36	X	X
		20-27	All	70	70	70	68	68	68	66	66	66	64	64	64	62	62	62	60	60	60	59	59	59	55	53	53	51	45	45	48	39	39	41	34	34	36	30	30	32	26	26
30	B	0-7	All	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	47	54	54	37	54	54	31	54	45	27	54	38	24	54	33	21	54	29	X	
		7-27	All	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	55	55	48	55	55	40	55	55	34	55	48	29	54	41	26	53	35	22	52	31	X	
		27-45	All	65	65	65	65	65	65	65	65	65	65	65	65	65	65	63	63	63	62	62	62	60	60	60	58	58	58	56	56	56	54	54	54	52	52	52	50	45	45	
	C	0-7	All	54	54	54	54	54	54	54	54	49	54	54	42	54	54	37	54	54	33	54	52	30	54	42	26	54	35	22	54	30	X	50	26	X	44	23	X	38	21	X
		7-20	All	55	55	55	55	55	55	55	55	50	55	55	44	55	55	40	55	55	36	55	54	33	55	45	28	53	37	24	52	32	21	51	28	X	49	25	X	43	22	X
		20-27	All	65	65	65	64	64	64	63	63	63	61	61	61	60	60	60	59	59	59	57	57	57	55	55	55	52	52	52	50	47	47	48	40	40	43	35	35	38	31	31
	D	0-7	All	55	55	53	55	55	45	55	55	38	55	55	34	55	53	31	55	47	28	55	42	25	55	34	22	55	29	X	48	25	X	41	22	X	36	X	X	32	X	X
		7-20	All	55	55	53	55	55	46	55	55	41	55	55	36	55	55	33	55	49	30	55	44	27	53	36	23	52	31	X	50	27	X	46	23	X	41	21	X	36	X	X
		20-27	All	65	65	65	63	63	63	62	62	62	60	60	60	58	58	58	57	57	57	56	56	56	53	53	53	50	45	45	48	39	39	41	34	34	36	30	30	32	26	2



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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
0	B	0-7	Interior	56	56	55	56	56	48	56	56	43	56	56	39	56	50	35	56	46	32	56	41	29	49	35	24	41	30	21	35	25	18	31	22	16	27	19	14	24	17	12
			Exposed	56	50	35	56	44	31	56	40	28	50	36	25	45	32	22	41	29	20	37	27	19	31	22	16	26	19	13	23	16	12	20	14	10	17	13	9	15	11	X
		7-20	Interior	56	56	47	56	52	42	56	46	38	56	41	34	56	37	31	53	34	28	48	31	25	40	26	21	34	22	18	29	19	16	26	17	14	22	15	12	20	13	11
			Exposed	56	37	30	52	33	27	46	29	24	41	27	22	37	24	20	34	22	18	31	20	16	26	17	14	22	14	12	19	12	10	17	11	9	15	9	X	13	8	X
		20-27	Interior	57	57	55	57	57	47	57	56	41	57	50	35	57	45	31	57	41	28	57	37	25	55	31	21	47	27	18	40	23	16	35	20	14	31	18	12	27	16	11
			Exposed	57	45	31	57	40	27	57	36	24	57	32	22	51	29	20	46	26	18	42	24	16	35	20	14	30	17	12	26	15	10	23	13	9	20	11	8	18	10	7
	27-45	Interior	58	58	58	58	58	58	58	58	58	52	58	58	45	58	57	40	58	51	36	53	47	32	44	39	26	38	34	22	32	29	18	28	25	16	25	22	13	22	20	12
		Exposed	58	56	40	56	50	35	50	45	30	45	40	27	41	36	24	37	33	21	34	30	19	29	26	16	24	22	13	21	19	11	18	16	10	16	14	9	14	13	8	
	C	0-7	Interior	56	54	37	56	48	33	56	43	30	54	38	27	48	35	24	44	31	22	40	29	20	33	24	17	28	20	14	24	18	12	21	15	11	19	14	9	17	12	8
			Exposed	48	34	24	43	31	21	38	27	19	34	25	17	31	22	16	28	20	14	26	18	13	22	16	11	18	13	9	16	11	X	14	10	X	12	9	X	11	X	X
		7-20	Interior	56	40	33	56	35	29	50	32	26	44	29	23	40	26	21	36	23	19	33	21	18	28	18	15	24	15	13	20	13	11	18	12	10	16	10	8	14	9	X
			Exposed	40	26	21	35	23	19	32	20	17	29	18	15	26	17	14	23	15	12	21	14	11	18	12	10	15	10	8	13	9	X	12	X	X	10	X	X	9	X	X
20-27		Interior	57	49	34	57	43	29	57	39	26	57	35	23	55	31	21	50	28	19	45	26	18	38	22	15	32	19	13	28	16	11	24	14	9	21	12	8	19	11	7	
		Exposed	55	31	21	48	28	19	43	25	17	39	22	15	35	20	14	32	18	12	29	17	11	24	14	10	21	12	8	18	10	7	16	9	X	14	X	X	12	X	X	
27-45	Interior	58	58	44	58	54	38	54	48	33	49	43	29	44	39	26	40	36	23	36	33	21	31	27	17	26	23	14	23	20	12	20	18	11	17	16	9	15	14	8		
	Exposed	44	39	26	39	35	23	35	31	20	31	28	18	28	25	16	26	23	14	24	21	13	20	18	11	17	15	9	15	13	8	13	11	7	11	10	X	10	9	X		
D	0-7	Interior	56	45	31	56	40	28	50	35	25	44	32	22	40	29	20	36	26	18	33	24	17	28	20	14	24	17	12	20	15	10	18	13	9	16	11	X	14	10	X	
		Exposed	40	29	20	35	25	18	32	23	16	28	21	14	26	19	13	23	17	12	21	15	11	18	13	9	15	11	X	13	10	X	12	8	X	10	X	9	X	X		
	7-20	Interior	52	33	27	46	30	24	41	26	22	37	24	20	33	22	18	30	20	16	28	18	15	23	15	12	20	13	11	17	11	9	15	10	X	13	8	X	12	X	X	
		Exposed	33	21	18	30	19	16	26	17	14	24	15	13	22	14	11	20	13	10	18	12	10	15	10	8	13	8	X	11	X	X	10	X	X	8	X	X	X	X		
	20-27	Interior	57	40	27	57	36	24	56	32	22	50	29	20	46	26	18	41	24	16	38	22	15	32	18	12	27	16	11	23	13	9	20	12	8	18	10	7	16	9	X	
		Exposed	45	26	18	40	23	16	36	21	14	32	19	13	29	17	11	27	15	10	24	14	10	20	12	8	17	10	7	15	9	X	13	X	X	12	X	X	10	X	X	
27-45	Interior	57	51	35	50	45	31	45	40	27	41	36	24	37	33	21	33	30	19	30	27	17	26	23	14	22	20	12	19	17	10	17	15	9	15	13	8	13	12	7		
	Exposed	36	33	21	32	29	18	29	26	16	26	23	14	24	21	13	22	19	12	20	18	11	17	15	9	14	13	8	12	11	7	11	10	X	9	8	X	8	X	X		
10	B	0-7	Interior	40	40	40	40	40	40	40	40	40	40	39	40	40	35	40	40	32	40	40	29	40	35	24	40	30	21	35	25	18	31	22	16	27	19	14	24	17	12	
			Exposed	40	40	35	40	40	31	40	40	28	40	36	25	40	32	22	40	29	20	37	27	19	31	22	16	26	19	13	23	16	12	20	14	10	17	13	9	15	11	X
		7-20	Interior	40	40	40	40	40	40	40	40	38	40	40	34	40	37	31	40	34	28	40	31	25	40	26	21	34	22	18	29	19	16	26	17	14	22	15	12	20	13	11
			Exposed	40	37	30	40	33	27	40	29	24	40	27	22	37	24	20	34	22	18	31	20	16	26	17	14	22	14	12	19	12	10	17	11	9	15	9	X	13	8	X
		20-27	Interior	52	52	52	52	52	47	52	52	41	52	50	35	52	45	31	52	41	28	52	37	25	52	31	21	47	27	18	40	23	16	35	20	14	31	18	12	27	16	11
			Exposed	52	45	31	52	40	27	52	36	24	52	32	22	51	29	20	46	26	18	42	24	16	35	20	14	30	17	12	26	15	10	23	13	9	20	11	8	18	10	7
	27-45	Interior	56	56	56	56	56	56	56	56	52	56	56	45	56	56	40	56	51	36	53	47	32	44	39	26	38	34	22	32	29	18	28	25	16	25	22	13	22	20	12	
		Exposed	56	56	40	56	50	35	50	45	30	45	40	27	41	36	24	37	33	21	34	30	19	29	26	16	24	22	13	21	19	11	18	16	10	16	14	9	14	13	8	
	C	0-7	Interior	40	40	37	40	40	33	40	40	30	40	38	27	40	35	24	40	31	22	40	29	20	33	24	17	28	20	14	24	18	12	21	15	11	19	14	9	17	12	8
			Exposed	40	34	24	40	31	21	38	27	19	34	25	17	31	22	16	28	20	14	26	18	13	22	16	11	18	13	9	16	11	X	14	10	X	12	9	X	11	X	X
		7-20	Interior	40	40	33	40	35	29	40	32	26	40	29	23	40	26	21	36	23	19	33	21	18	28	18	15	24	15	13	20	13	11	18	12	10	16	10	8	14	9	X
			Exposed	40	26	21	35	23	19	32	20	17	29	18	15	26	17	14	23	15	12	21	14	11	18	12	10	15	10	8	13	9	X	12	X	X	10	X	X	9	X	X
20-27		Interior	52	49	34	52	43	29	52	39	26	52	35	23	52	31	21	50	28	19	45	26	18	38	22	15	32	19	13	28	16	11	24	14	9	21	12	8	19	11	7	
		Exposed	52</																																							

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				Roof Wind Zone																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
20	B	0-7	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	24	28	28	21	28	25	18	28	22	16	27	19	14	24	17	12	
			Exposed	28	28	28	28	28	28	28	28	28	28	25	28	28	22	28	28	20	28	27	19	28	22	16	26	19	13	23	16	12	20	14	10	17	13	9	15	11	X	
		Exposed	28	28	28	28	28	27	28	28	24	28	27	22	28	24	20	28	22	18	28	20	16	26	17	14	22	14	12	19	12	10	17	11	9	15	9	X	13	8	X	
		Exposed	41	41	31	41	40	27	41	36	24	41	32	22	41	29	20	41	26	18	41	24	16	35	20	14	30	17	12	26	15	10	23	13	9	20	11	8	18	10	7	
		Exposed	46	46	40	46	46	35	46	45	30	45	40	27	41	36	24	37	33	21	34	30	19	29	26	16	24	22	13	21	19	11	18	16	10	16	14	9	14	13	8	
		Exposed	28	28	24	28	28	21	28	27	19	28	25	17	28	22	16	28	20	14	26	18	13	22	16	11	18	13	9	16	11	X	14	10	X	12	9	X	11	X	X	
		Exposed	28	26	21	28	23	19	28	20	17	28	18	15	26	17	14	23	15	12	21	14	11	18	12	10	15	10	8	13	9	X	12	X	X	10	X	X	9	X	X	
		Exposed	41	31	21	41	28	19	41	25	17	39	22	15	35	20	14	32	18	12	29	17	11	24	14	10	21	12	8	18	10	7	16	9	X	14	X	X	12	X	X	
	Exposed	44	39	26	39	35	23	35	31	20	31	28	18	28	25	16	26	23	14	24	21	13	20	18	11	17	15	9	15	13	8	13	11	7	11	10	X	10	9	X		
	Exposed	28	28	20	28	25	18	28	23	16	28	21	14	26	19	13	23	17	12	21	15	11	18	13	9	15	11	X	13	10	X	12	8	X	10	X	9	X	X			
	Exposed	28	21	18	28	19	16	26	17	14	24	15	13	22	14	11	20	13	10	18	12	10	15	10	8	13	8	X	11	X	X	10	X	X	8	X	X	X	X			
	Exposed	43	26	18	40	23	16	36	21	14	32	19	13	29	17	11	27	15	10	24	14	10	20	12	8	17	10	7	15	9	X	13	X	X	12	X	X	10	X	X		
	Exposed	36	33	21	32	29	18	29	26	16	26	23	14	24	21	13	22	19	12	20	18	11	17	15	9	14	13	8	12	11	7	11	10	X	9	8	X	8	X	X		
	30	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	24	27	27	21	27	25	18	27	22	16	27	19	14	24	17	12	
				Exposed	27	27	27	27	27	27	27	27	27	27	25	27	27	22	27	27	20	27	27	19	27	22	16	26	19	13	23	16	12	20	14	10	17	13	9	15	11	X
			Exposed	28	28	28	28	28	27	28	28	24	28	27	22	28	24	20	28	22	18	28	20	16	26	17	14	22	14	12	19	12	10	17	11	9	15	9	X	13	8	X
			Exposed	34	34	31	34	34	27	34	34	24	34	32	22	34	29	20	34	26	18	34	24	16	34	20	14	30	17	12	26	15	10	23	13	9	20	11	8	18	10	7
			Exposed	39	39	39	39	39	35	39	39	30	39	39	27	39	36	24	37	33	21	34	30	19	29	26	16	24	22	13	21	19	11	18	16	10	16	14	9	14	13	8
			Exposed	27	27	24	27	27	21	27	27	19	27	25	17	27	22	16	27	20	14	26	18	13	22	16	11	18	13	9	16	11	X	14	10	X	12	9	X	11	X	X
			Exposed	28	26	21	28	23	19	28	20	17	28	18	15	26	17	14	23	15	12	21	14	11	18	12	10	15	10	8	13	9	X	12	X	X	10	X	X	9	X	X
			Exposed	34	31	21	34	28	19	34	25	17	34	22	15	34	20	14	32	18	12	29	17	11	24	14																



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3							
0	B	0-7	Interior	55	55	53	55	55	47	55	55	42	55	55	38	55	49	34	55	45	31	55	40	28	47	34	24	40	29	20	35	25	17	30	22	15	26	19	13	23	17	12
			Exposed	55	49	34	55	43	30	54	39	27	49	35	24	44	31	22	40	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	X
		7-20	Interior	55	55	46	55	50	41	55	45	37	55	40	33	55	36	30	52	33	27	47	30	25	39	25	21	33	22	18	29	19	15	25	16	13	22	14	12	19	13	10
			Exposed	55	36	30	50	32	26	45	29	24	40	26	21	36	23	19	33	21	18	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	X	13	X	X
		20-27	Interior	56	56	54	56	56	46	56	55	40	56	49	35	56	44	30	56	40	27	56	37	25	54	31	21	46	26	18	39	23	15	34	20	13	30	17	12	26	15	10
			Exposed	56	44	30	56	39	26	56	35	24	55	31	21	50	28	19	45	26	17	41	24	16	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
		27-45	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	55	39	56	50	35	51	46	31	43	39	26	37	33	21	32	28	18	28	25	15	24	22	13	21	19	12
			Exposed	57	55	39	55	49	34	49	44	30	44	39	26	40	36	23	36	32	21	33	30	19	28	25	15	24	21	13	21	18	11	18	16	10	16	14	9	14	13	8
	C	0-7	Interior	55	53	37	55	47	32	55	42	29	52	37	26	47	34	24	43	31	21	39	28	20	33	23	16	28	20	14	24	17	12	21	15	11	18	13	9	16	12	X
			Exposed	47	34	23	42	30	21	37	27	19	33	24	17	30	22	15	27	20	14	25	18	13	21	15	11	18	13	9	15	11	X	13	10	X	12	X	X	10	X	X
		7-20	Interior	55	39	32	54	35	28	48	31	25	43	28	23	39	25	21	36	23	19	32	21	17	27	18	14	23	15	12	20	13	11	17	11	9	15	10	X	14	9	X
			Exposed	39	25	21	35	22	18	31	20	16	28	18	15	25	16	13	23	15	12	21	14	11	18	11	9	15	10	X	13	8	X	11	X	X	10	X	X	X	X	X
		20-27	Interior	56	48	33	56	42	29	56	38	25	56	34	23	54	31	21	49	28	19	44	25	17	37	21	14	32	18	12	27	16	11	24	14	9	21	12	8	18	11	7
			Exposed	53	30	21	47	27	18	42	24	16	38	22	15	34	20	13	31	18	12	28	16	11	24	14	9	20	12	8	18	10	7	15	9	X	13	X	X	12	X	X
		27-45	Interior	57	57	43	57	53	37	53	47	32	48	42	29	43	38	25	39	35	23	36	32	20	30	27	17	26	23	14	22	20	12	19	17	10	17	15	9	15	13	8
			Exposed	43	38	25	38	34	22	34	30	19	31	27	17	28	25	15	25	23	14	23	21	13	19	17	11	17	15	9	14	13	8	13	11	7	11	10	X	10	9	X
	D	0-7	Interior	55	44	30	54	39	27	48	35	24	43	31	22	39	28	20	35	26	18	32	23	16	27	20	14	23	17	12	20	14	10	17	13	9	15	11	X	13	10	X
			Exposed	39	28	20	35	25	17	31	22	16	28	20	14	25	18	13	23	17	12	21	15	11	18	13	9	15	11	X	13	9	X	11	X	X	10	X	X	9	X	X
		7-20	Interior	51	32	27	45	29	24	40	26	21	36	23	19	33	21	17	30	19	16	27	17	14	23	15	12	19	13	10	17	11	9	15	9	X	13	X	X	11	X	X
			Exposed	32	21	17	29	19	15	26	17	14	23	15	12	21	14	11	19	12	10	17	11	9	15	10	X	13	X	X	11	X	X	9	X	X	X	X	X	X	X	
		20-27	Interior	56	39	27	56	35	24	55	31	21	49	28	19	45	26	17	40	23	16	37	21	14	31	18	12	26	15	10	23	13	9	20	11	8	17	10	7	15	9	X
			Exposed	44	25	17	39	23	15	35	20	14	32	18	12	29	17	11	26	15	10	24	14	9	20	12	8	17	10	7	15	9	X	13	X	X	11	X	X	10	X	X
		27-45	Interior	55	49	34	49	44	30	44	39	26	40	35	23	36	32	21	33	29	18	30	27	17	25	22	14	21	19	12	19	17	10	16	14	9	14	13	8	13	11	7
			Exposed	36	32	21	32	28	18	28	25	16	26	23	14	23	21	13	21	19	11	19	17	10	16	15	9	14	12	8	12	11	6	10	9	X	9	X	X	X	X	X
10	B	0-7	Interior	39	39	39	39	39	39	39	39	39	39	39	38	39	39	34	39	39	31	39	39	28	39	34	24	39	29	20	35	25	17	30	22	15	26	19	13	23	17	12
			Exposed	39	39	34	39	39	30	39	39	27	39	35	24	39	31	22	39	28	20	36	26	18	30	22	15	26	19	13	22	16	11	19	14	10	17	12	9	15	11	X
		7-20	Interior	39	39	39	39	39	39	39	39	37	39	39	33	39	36	30	39	33	27	39	30	25	39	25	21	33	22	18	29	19	15	25	16	13	22	14	12	19	13	10
			Exposed	39	36	30	39	32	26	39	29	24	39	26	21	36	23	19	33	21	18	30	19	16	25	16	13	22	14	12	19	12	10	16	11	9	14	9	X	13	X	X
		20-27	Interior	51	51	51	51	51	46	51	51	40	51	49	35	51	44	30	51	40	27	51	37	25	51	31	21	46	26	18	39	23	15	34	20	13	30	17	12	26	15	10
			Exposed	51	44	30	51	39	26	51	35	24	51	31	21	50	28	19	45	26	17	41	24	16	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7
		27-45	Interior	55	55	55	55	55	55	55	55	50	55	55	44	55	55	39	55	50	35	51	46	31	43	39	26	37	33	21	32	28	18	28	25	15	24	22	13	21	19	12
			Exposed	55	55	39	55	49	34	49	44	30	44	39	26	40	36	23	36	32	21	33	30	19	28	25	15	24	21	13	21	18	11	18	16	10	16	14	9	14	13	8
	C	0-7	Interior	39	39	37	39	39	32	39	39	29	39	37	26	39	34	24	39	31	21	39	28	20	33	23	16	28	20	14	24	17	12	21	15	11	18	13	9	16	12	X
			Exposed	39	34	23	39	30	21	37	27	19	33	24	17	30	22	15	27	20	14	25	18	13	21	15	11	18	13	9	15	11	X	13	10	X	12	X	X	10	X	X
		7-20	Interior	39	39	32	39	35	28	39	31	25	39	28	23	39	25	21	36	23	19	32	21	17	27	18	14	23	15	12	20	13	11	17	11	9	15	10	X	14	9	X
			Exposed	39	25	21	35	22	18	31	20	16	28	18	15	25	16	13	23	15	12	21	14	11	18	11	9	15	10	X	13	8	X	11	X	X	10	X	X	X	X	X
		20-27	Interior	51	48	33	51	42	29	51	38	25	51	34	23	51	31	21	49	28	19	44	25	17	37	21	14	32	18	12	27	16	11	24	14	9	21	12	8	18	11	7
			Exposed	51	30	21	47	27</																																		

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				Roof Wind Zone																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3				
20	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	25	17	27	22	15	26	19	13	23	17	12			
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	X			
		7-20	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	X	
		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	40	40	40	40	40	40	40	40	40	40	40
			Exposed	40	40	30	40	39	26	40	35	24	40	31	21	40	28	19	40	26	17	40	24	16	34	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7	
	27-45	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
		Exposed	45	45	39	45	45	34	45	44	30	44	39	26	40	36	23	36	32	21	33	30	19	28	25	15	24	21	13	21	18	11	18	16	10	16	14	9	14	13	8		
	C	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	27	27	27	27	27	27	27	27	27	27	27	X
			Exposed	27	27	23	27	27	21	27	27	19	27	24	17	27	22	15	27	20	14	25	18	13	21	15	11	18	13	9	15	11	X	13	10	X	12	X	X	10	X	X	
		7-20	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	X
			Exposed	27	25	21	27	22	18	27	20	16	27	18	15	25	16	13	23	15	12	21	14	11	18	11	9	15	10	X	13	8	X	11	X	X	10	X	X	X	X	X	
20-27		Interior	40	40	33	40	40	29	40	38	25	40	34	23	40	31	21	40	28	19	40	25	17	37	21	14	32	18	12	27	16	11	24	14	9	21	12	8	18	11	7		
		Exposed	40	30	21	40	27	18	40	24	16	38	22	15	34	20	13	31	18	12	28	16	11	24	14	9	20	12	8	18	10	7	15	9	X	13	X	X	12	X	X		
27-45	Interior	45	45	43	45	45	37	45	45	32	45	42	29	43	38	25	39	35	23	36	32	20	30	27	17	26	23	14	22	20	12	19	17	10	17	15	9	15	13	8			
	Exposed	43	38	25	38	34	22	34	30	19	31	27	17	28	25	15	25	23	14	23	21	13	19	17	11	17	15	9	14	13	8	13	11	7	11	10	X	10	9	X			
D	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	27	27	27	27	27	27	27	27	27	27	X		
		Exposed	27	27	20	27	27	25	17	27	22	16	27	20	14	25	18	13	23	17	12	21	15	11	18	13	9	15	11	X	13	9	X	11	X	X	10	X	X	9	X	X	
	7-20	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	X	
		Exposed	27	21	17	27	19	15	26	17	14	23	15	12	21	14	11	19	12	10	17	11	9	15	10	X	13	X	X	11	X	X	9	X	X	X	X	X	X	X	X		
	20-27	Interior	42	39	27	42	35	24	42	31	21	42	28	19	42	26	17	40	23	16	37	21	14	31	18	12	26	15	10	23	13	9	20	11	8	17	10	7	15	9	X		
		Exposed	42	25	17	39	23	15	35	20	14	32	18	12	29	17	11	26	15	10	24	14	9	20	12	8	17	10	7	15	9	X	13	X	X	11	X	X	10	X	X		
27-45	Interior	47	47	34	47	44	30	44	39	26	40	35	23	36	32	21	33	29	18	30	27	17	25	22	14	21	19	12	19	17	10	16	14	9	14	13	8	13	11	7			
	Exposed	36	32	21	32	28	18	28	25	16	26	23	14	23	21	13	21	19	11	19	17	10	16	15	9	14	12	8	12	11	6	10	9	X	9	X	X	X	X	X			
30	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	25	17	26	22	15	26	19	13	23	17	12			
			Exposed	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	X		
		7-20	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
			Exposed	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
		20-27	Interior	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
			Exposed	33	33	30	33	33	26	33	33	24	33	31	21	33	28	19	33	26	17	33	24	16	33	20	13	29	17	11	25	15	10	22	13	9	19	11	8	17	10	7	
	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	38	38	38	38	38	38
		Exposed	38	38	38	38	38	34	38	38	30	38	38	26	38	36	23	36	32	21	33	30	19	28	25	15	24	21	13	21	18	11	18	16	10	16	14	9	14	13	8		
	C	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	26	26	26	26	26	26	26	26	26	26	26	26	X	
			Exposed	26	26	23	26	26	21	26	26	19	26	24	17	26	22	15	26	20	14	25	18	13	21	15	11	18	13	9	15	11	X	13	10	X	12	X	X	10	X	X	
		7-20	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	X
			Exposed	27	25	21	27	22	18	27	20	16	27	18	15	25	16	13	23	15	12	21	14	11	18	11	9	15	10	X	13	8	X	11	X	X	10	X	X	X	X	X	
20-27		Interior	33	33	33	33	33	29	33	33	25	33	33	23	33	31	21	33	28	19	33	25	17	33	21	14	32	18	12	27	16	11	24	14	9	21	12	8	18	11	7</		



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
0	B	0-7	Interior	77	77	73	77	77	59	77	77	53	77	76	48	77	62	43	77	56	39	77	51	36	60	43	30	51	36	26	44	31	22	38	27	19	33	24	17	29	21	15
			Exposed	77	62	43	77	55	38	75	49	34	61	44	31	55	40	28	50	36	25	46	33	23	38	28	19	33	24	17	28	20	14	24	18	12	21	16	11	19	14	X
		7-20	Interior	77	77	58	77	64	52	77	57	46	77	51	42	77	46	38	65	42	34	59	38	31	50	32	26	42	27	22	36	24	19	32	21	17	28	18	15	25	16	13
			Exposed	77	46	37	64	41	33	57	36	30	51	33	27	46	30	24	42	27	22	38	25	20	32	21	17	27	18	15	24	15	13	21	13	11	18	12	X	16	10	X
		20-27	Interior	78	78	78	78	78	63	78	78	53	78	62	46	78	56	41	78	51	36	78	46	32	70	39	26	58	33	22	49	29	19	43	25	17	38	22	15	33	19	13
			Exposed	78	56	40	78	49	35	78	44	30	73	40	27	63	36	24	57	33	22	52	30	20	43	25	17	37	21	15	32	19	13	28	16	11	24	14	10	22	13	9
		27-45	Interior	80	80	80	80	80	80	80	80	77	80	80	59	80	80	52	80	63	46	65	58	41	54	49	34	46	41	28	40	36	23	35	31	20	31	27	17	27	24	15
			Exposed	80	80	51	80	62	45	62	55	39	56	50	35	50	45	31	46	41	27	42	37	25	35	31	20	30	27	17	26	23	14	23	20	12	20	18	11	18	16	10
	C	0-7	Interior	77	69	46	77	59	41	77	53	37	68	47	33	60	43	30	54	39	27	49	35	25	41	30	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	10
			Exposed	59	42	30	53	38	26	47	34	24	42	30	21	38	27	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	X	17	12	X	15	11	X	13	X	X
		7-20	Interior	77	49	40	71	44	36	61	39	32	55	35	29	49	32	26	45	29	24	41	26	22	34	22	18	29	19	16	25	16	14	22	14	12	19	13	10	17	11	X
			Exposed	49	32	26	44	28	23	39	25	21	35	23	19	32	21	17	29	19	15	26	17	14	22	14	12	19	12	10	16	11	X	14	X	X	13	X	X	11	X	X
		20-27	Interior	78	60	44	78	53	38	78	47	33	78	43	29	69	39	26	61	35	24	56	32	22	47	27	18	40	23	16	34	20	14	30	17	12	26	15	10	23	14	9
			Exposed	69	38	26	60	34	23	53	31	21	48	28	19	43	25	17	39	23	15	36	21	14	30	18	12	26	15	10	22	13	9	19	11	X	17	X	X	15	X	X
		27-45	Interior	80	80	56	80	70	49	80	59	43	60	53	38	54	48	33	49	44	30	45	40	27	38	34	22	32	29	18	28	25	15	24	22	13	21	19	12	19	17	10
			Exposed	54	48	33	48	43	29	43	38	26	39	35	23	35	31	20	32	29	18	29	26	16	25	22	13	21	19	11	18	16	10	16	14	9	14	13	X	12	11	X
	D	0-7	Interior	77	55	38	75	49	34	61	44	31	55	39	27	49	35	25	45	32	23	41	29	21	34	25	17	29	21	15	25	18	13	22	16	11	19	14	X	17	12	X
			Exposed	49	35	25	44	31	22	39	28	20	35	25	18	32	23	16	29	21	15	26	19	13	22	16	11	19	14	X	16	12	X	14	10	X	13	X	11	X	X	
		7-20	Interior	64	41	34	57	36	30	51	33	27	46	29	24	41	27	22	37	24	20	34	22	18	29	19	15	24	16	13	21	14	11	18	12	X	16	11	X	14	X	X
			Exposed	41	26	22	36	24	19	33	21	17	29	19	16	27	17	14	24	16	13	22	14	12	19	12	10	16	10	X	14	X	X	12	X	X	11	X	X			
		20-27	Interior	78	50	35	78	44	30	72	40	27	62	36	24	56	32	22	51	29	20	46	27	18	39	23	15	33	19	13	29	17	11	25	15	10	22	13	9	19	11	X
			Exposed	56	32	22	50	29	19	44	26	17	40	23	16	36	21	14	33	19	13	30	17	12	25	15	10	22	13	8	19	11	X	16	X	X	14	X	X	13	X	X
		27-45	Interior	80	62	45	62	55	39	55	50	34	50	45	30	45	40	27	41	37	24	38	34	22	32	28	18	27	24	15	23	21	13	20	18	11	18	16	10	16	14	9
			Exposed	45	40	27	40	36	24	36	32	21	32	29	18	29	26	16	27	24	15	24	22	13	21	18	11	18	16	10	15	14	8	13	12	X	12	10	X	10	X	X
10	B	0-7	Interior	55	55	55	55	55	55	55	55	53	55	55	48	55	55	43	55	55	39	55	51	36	55	43	30	51	36	26	44	31	22	38	27	19	33	24	17	29	21	15
			Exposed	55	55	43	55	55	38	55	49	34	55	44	31	55	40	28	50	36	25	46	33	23	38	28	19	33	24	17	28	20	14	24	18	12	21	16	11	19	14	X
		7-20	Interior	55	55	55	55	55	52	55	55	46	55	51	42	55	46	38	55	42	34	55	38	31	50	32	26	42	27	22	36	24	19	32	21	17	28	18	15	25	16	13
			Exposed	55	46	37	55	41	33	55	36	30	51	33	27	46	30	24	42	27	22	38	25	20	32	21	17	27	18	15	24	15	13	21	13	11	18	12	X	16	10	X
		20-27	Interior	72	72	72	72	72	63	72	72	53	72	62	46	72	56	41	72	51	36	72	46	32	70	39	26	58	33	22	49	29	19	43	25	17	38	22	15	33	19	13
			Exposed	72	56	40	72	49	35	72	44	30	72	40	27	63	36	24	57	33	22	52	30	20	43	25	17	37	21	15	32	19	13	28	16	11	24	14	10	22	13	9
		27-45	Interior	77	77	77	77	77	77	77	77	77	77	59	77	77	52	77	63	46	65	58	41	54	49	34	46	41	28	40	36	23	35	31	20	31	27	17	27	24	15	
			Exposed	77	77	51	77	62	45	62	55	39	56	50	35	50	45	31	46	41	27	42	37	25	35	31	20	30	27	17	26	23	14	23	20	12	20	18	11	18	16	10
	C	0-7	Interior	55	55	46	55	55	41	55	53	37	55	47	33	55	43	30	54	39	27	49	35	25	41	30	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	10
			Exposed	55	42	30	53	38	26	47	34	24	42	30	21	38	27	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	X	17	12	X	15	11	X	13	X	X
		7-20	Interior	55	49	40	55	44	36	55	39	32	55	35	29	49	32	26	45	29	24	41	26	22	34	22	18	29	19	16	25	16	14	22	14	12	19	13	10	17	11	X
			Exposed	49	32	26	44	28	23	39	25	21	35	23	19	32	21	17	29	19	15	26	17	14	22	14	12	19	12	10	16	11	X	14	X	X	13	X	X	11	X	X
		20-27	Interior	72	60	44	72	53	38	72	47	33	72	43	29	69	39	26	61	35	24	56	32	22	47	27	18	40	23	16	34	20	14	30	17	12	26	15				

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
20	B	0-7	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	36	38	38	30	38	36	26	38	31	22	38	27	19	33	24	17	29	21	15
			Exposed	38	38	38	38	38	38	38	38	34	38	38	31	38	38	28	38	36	25	38	33	23	38	28	19	33	24	17	28	20	14	24	18	12	21	16	11	19	14	X
		7-20	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	34	39	38	31	39	32	26	39	27	22	36	24	19	32	21	17	28	18	15	25	16	13
			Exposed	39	39	37	39	39	33	39	36	30	39	33	27	39	30	24	39	27	22	38	25	20	32	21	17	27	18	15	24	15	13	21	13	11	18	12	X	16	10	X
		20-27	Interior	57	57	57	57	57	57	57	57	53	57	57	46	57	56	41	57	51	36	57	46	32	57	39	26	57	33	22	49	29	19	43	25	17	38	22	15	33	19	13
			Exposed	57	56	40	57	49	35	57	44	30	57	40	27	57	36	24	57	33	22	52	30	20	43	25	17	37	21	15	32	19	13	28	16	11	24	14	10	22	13	9
		27-45	Interior	63	63	63	63	63	63	63	63	63	63	59	63	63	52	63	46	63	38	41	54	49	34	46	41	28	40	36	23	35	31	20	31	27	17	27	24	15		
			Exposed	63	63	51	63	62	45	62	55	39	56	50	35	50	45	31	46	41	27	42	37	25	35	31	20	30	27	17	26	23	14	23	20	12	20	18	11	18	16	10
	C	0-7	Interior	38	38	38	38	38	38	38	38	37	38	38	33	38	38	30	38	38	27	38	35	25	38	30	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	10
			Exposed	38	38	30	38	38	26	38	34	24	38	30	21	38	27	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	X	17	12	X	15	11	X	13	X	X
		7-20	Interior	39	39	39	39	39	36	39	39	32	39	35	29	39	32	26	39	29	24	39	26	22	34	22	18	29	19	16	25	16	14	22	14	12	19	13	10	17	11	X
			Exposed	39	32	26	39	28	23	39	25	21	35	23	19	32	21	17	29	19	15	26	17	14	22	14	12	19	12	10	16	11	X	14	X	X	13	X	X	11	X	X
		20-27	Interior	57	57	44	57	53	38	57	47	33	57	43	29	57	39	26	57	35	24	56	32	22	47	27	18	40	23	16	34	20	14	30	17	12	26	15	10	23	14	9
			Exposed	57	38	26	57	34	23	53	31	21	48	28	19	43	25	17	39	23	15	36	21	14	30	18	12	26	15	10	22	13	9	19	11	X	17	X	X	15	X	X
		27-45	Interior	63	63	56	63	63	49	63	59	43	60	53	38	54	48	33	49	44	30	45	40	27	38	34	22	32	29	18	28	25	15	24	22	13	21	19	12	19	17	10
			Exposed	54	48	33	48	43	29	43	38	26	39	35	23	35	31	20	32	29	18	29	26	16	25	22	13	21	19	11	18	16	10	16	14	9	14	13	X	12	11	X
	D	0-7	Interior	38	38	38	38	38	34	38	38	31	38	38	27	38	35	25	38	32	23	38	29	21	34	25	17	29	21	15	25	18	13	22	16	11	19	14	X	17	12	X
			Exposed	38	35	25	38	31	22	38	28	20	35	25	18	32	23	16	29	21	15	26	19	13	22	16	11	19	14	X	16	12	X	14	10	X	13	X	11	X	X	
		7-20	Interior	39	39	34	39	36	30	39	33	27	39	29	24	39	27	22	37	24	20	34	22	18	29	19	15	24	16	13	21	14	11	18	12	X	16	11	X	14	X	X
			Exposed	39	26	22	36	24	19	33	21	17	29	19	16	27	17	14	24	16	13	22	14	12	19	12	10	16	10	X	14	X	X	12	X	X	11	X	X	X		
		20-27	Interior	59	50	35	59	44	30	59	40	27	59	36	24	56	32	22	51	29	20	46	27	18	39	23	15	33	19	13	29	17	11	25	15	10	22	13	9	19	11	X
			Exposed	56	32	22	50	29	19	44	26	17	40	23	16	36	21	14	33	19	13	30	17	12	25	15	10	22	13	8	19	11	X	16	X	X	14	X	X	13	X	X
		27-45	Interior	66	62	45	62	55	39	55	50	34	50	45	30	45	40	27	41	37	24	38	34	22	32	28	18	27	24	15	23	21	13	20	18	11	18	16	10	16	14	9
			Exposed	45	40	27	40	36	24	36	32	21	32	29	18	29	26	16	27	24	15	24	22	13	21	18	11	18	16	10	15	14	8	13	12	X	12	10	X	10	X	X
30	B	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36	37	37	30	37	36	26	37	31	22	37	27	19	33	24	17	29	21	15	
			Exposed	37	37	37	37	37	37	37	37	34	37	37	31	37	37	28	37	36	25	37	33	23	37	28	19	33	24	17	28	20	14	24	18	12	21	16	11	19	14	X
		7-20	Interior	39	39	39	39	39	39	39	39	39	39	39	39	39	39	38	39	39	34	39	38	31	39	32	26	39	27	22	36	24	19	32	21	17	28	18	15	25	16	13
			Exposed	39	39	37	39	39	33	39	36	30	39	33	27	39	30	24	39	27	22	38	25	20	32	21	17	27	18	15	24	15	13	21	13	11	18	12	X	16	10	X
		20-27	Interior	47	47	47	47	47	47	47	47	47	47	47	46	47	47	41	47	47	36	47	46	32	47	39	26	47	33	22	47	29	19	43	25	17	38	22	15	33	19	13
			Exposed	47	47	40	47	47	35	47	44	30	47	40	27	47	36	24	47	33	22	47	30	20	43	25	17	37	21	15	32	19	13	28	16	11	24	14	10	22	13	9
		27-45	Interior	53	53	53	53	53	53	53	53	53	53	53	53	53	52	53	46	53	53	41	53	49	34	46	41	28	40	36	23	35	31	20	31	27	17	27	24	15		
			Exposed	53	53	51	53	53	45	53	53	39	53	50	35	50	45	31	46	41	27	42	37	25	35	31	20	30	27	17	26	23	14	23	20	12	20	18	11	18	16	10
	C	0-7	Interior	37	37	37	37	37	37	37	37	37	37	33	37	37	30	37	37	27	37	35	25	37	30	21	35	25	18	30	22	15	26	19	13	23	17	12	20	15	10	
			Exposed	37	37	30	37	37	26	37	34	24	37	30	21	37	27	19	35	25	18	32	23	16	27	19	14	23	16	12	20	14	X	17	12	X	15	11	X	13	X	X
		7-20	Interior	39	39	39	39	39	36	39	39	32	39	35	29	39	32	26	39	29	24	39	26	22	34	22	18	29	19	16	25	16	14	22	14	12	19	13	10	17	11	X
			Exposed	39	32	26	39	28	23	39	25	21	35	23	19	32	21	17	29	19	15	26	17	14	22	14	12	19	12	10	16	11	X	14	X	X	13	X	X	11	X	X
		20-27	Interior	47	47	44	47	47	38	47	47	33	47	43	29	47	39	26	47	35	24	47	32	22	47	27	18	40	23	16	34	20	14	30	17	12	26	15	10	23	14	9</



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				Roof Wind Zone																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				1	2	3	1	2	3	1	2	3	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	75	75	67	75	75	58	75	75	52	75	71	47	75	61	42	75	55	38	75	50	35	58	42	29	50	36	25	43	31	22	37	27	19	32	23	16	29	21	15
			Exposed	75	60	42	75	53	37	70	48	33	60	43	30	54	39	27	49	35	25	45	32	22	37	27	19	32	23	16	27	20	14	24	17	12	21	15	11	19	13	X
		7-20	Interior	76	76	57	76	62	51	76	55	45	76	50	41	74	45	37	64	41	33	58	37	31	49	31	26	41	27	22	36	23	19	31	20	17	27	18	15	24	16	13
			Exposed	74	45	37	62	40	33	55	36	29	50	32	26	45	29	24	41	26	22	37	24	20	31	20	17	27	17	14	23	15	12	20	13	11	18	11	X	16	X	X
		20-27	Interior	77	77	77	77	77	61	77	77	52	77	61	45	77	55	40	77	49	35	77	45	31	67	38	26	56	32	22	48	28	19	42	24	16	37	21	15	33	19	13
			Exposed	77	54	39	77	48	34	77	43	30	70	39	26	61	35	24	56	32	22	51	29	20	42	25	17	36	21	14	31	18	12	27	16	11	24	14	9	21	12	8
		27-45	Interior	78	78	78	78	78	78	78	78	69	78	78	57	78	51	78	62	45	63	56	40	53	47	33	45	40	27	39	35	23	34	30	20	30	27	17	27	24	15	
			Exposed	78	78	50	78	60	44	61	54	38	54	49	34	49	44	30	45	40	27	41	36	24	34	31	20	29	26	16	25	23	14	22	20	12	20	17	11	17	15	9
	C	0-7	Interior	75	65	45	75	58	40	75	51	36	65	46	32	58	42	29	53	38	26	48	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	14	X
			Exposed	58	41	29	51	37	26	46	33	23	41	30	21	37	27	19	34	24	17	31	22	16	26	19	13	22	16	11	19	14	X	17	12	X	15	X	X	13	X	X
		7-20	Interior	76	48	39	68	43	35	60	38	31	54	34	28	48	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	X	17	11	X
			Exposed	48	31	25	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	26	17	14	22	14	12	19	12	X	16	10	X	14	X	X	12	X	X	X	X	X
		20-27	Interior	77	59	43	77	52	37	77	46	32	77	42	28	67	38	26	60	34	23	55	31	21	46	26	18	39	23	15	34	19	13	29	17	12	26	15	10	23	13	9
			Exposed	66	38	25	58	33	23	52	30	20	47	27	18	42	24	17	38	22	15	35	20	14	30	17	12	25	15	10	22	13	9	19	11	X	17	X	X	15	X	X
		27-45	Interior	78	78	55	78	65	48	65	58	42	59	52	37	53	47	33	48	43	29	44	39	26	37	33	22	32	28	18	27	24	15	24	21	13	21	19	11	19	17	10
			Exposed	53	47	33	47	42	28	42	38	25	38	34	22	34	31	20	31	28	18	29	26	16	24	22	13	21	18	11	18	16	10	16	14	8	14	12	X	12	11	X
D	0-7	Interior	75	54	37	70	48	33	60	43	30	54	38	27	48	35	24	44	32	22	40	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	X	17	12	X	
		Exposed	48	35	24	43	31	22	38	28	19	34	25	17	31	22	16	28	20	14	26	19	13	22	16	11	19	13	X	16	12	X	14	X	X	12	X	X	11	X	X	
	7-20	Interior	63	40	33	56	36	29	50	32	26	45	29	24	40	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	X	16	X	X	14	X	X	
		Exposed	40	26	21	36	23	19	32	21	17	29	19	15	26	17	14	24	15	13	22	14	12	18	12	X	16	X	X	13	X	X	12	X	X	X	X	X	X			
	20-27	Interior	77	49	34	77	43	30	70	39	26	61	35	24	55	31	21	50	29	19	45	26	18	38	22	15	32	19	13	28	16	11	24	14	10	21	12	8	19	11	X	
		Exposed	55	31	21	48	28	19	43	25	17	39	23	15	35	20	14	32	19	13	29	17	12	25	14	10	21	12	8	18	11	X	16	X	X	14	X	X	12	X	X	
	27-45	Interior	78	61	44	61	54	38	54	48	34	49	44	30	44	39	26	40	36	24	37	33	21	31	28	17	26	24	15	23	20	12	20	18	11	18	16	10	16	14	8	
		Exposed	44	39	26	39	35	23	35	31	20	32	28	18	29	26	16	26	23	14	24	21	13	20	18	11	17	15	9	15	13	8	13	12	X	11	X	X	X	X	X	
10	B	0-7	Interior	53	53	53	53	53	53	53	53	52	53	53	47	53	53	42	53	53	38	53	50	35	53	42	29	50	36	25	43	31	22	37	27	19	32	23	16	29	21	15
			Exposed	53	53	42	53	53	37	53	48	33	53	43	30	53	39	27	49	35	25	45	32	22	37	27	19	32	23	16	27	20	14	24	17	12	21	15	11	19	13	X
		7-20	Interior	54	54	54	54	54	51	54	54	45	54	50	41	54	45	37	54	41	33	54	37	31	49	31	26	41	27	22	36	23	19	31	20	17	27	18	15	24	16	13
			Exposed	54	45	37	54	40	33	54	36	29	50	32	26	45	29	24	41	26	22	37	24	20	31	20	17	27	17	14	23	15	12	20	13	11	18	11	X	16	X	X
		20-27	Interior	70	70	70	70	70	61	70	70	52	70	61	45	70	55	40	70	49	35	70	45	31	67	38	26	56	32	22	48	28	19	42	24	16	37	21	15	33	19	13
			Exposed	70	54	39	70	48	34	70	43	30	70	39	26	61	35	24	56	32	22	51	29	20	42	25	17	36	21	14	31	18	12	27	16	11	24	14	9	21	12	8
		27-45	Interior	76	76	76	76	76	76	76	69	76	76	57	76	51	76	42	45	63	56	40	53	47	33	45	40	27	39	35	23	34	30	20	30	27	17	27	24	15		
			Exposed	76	76	50	76	60	44	61	54	38	54	49	34	49	44	30	45	40	27	41	36	24	34	31	20	29	26	16	25	23	14	22	20	12	20	17	11	17	15	9
	C	0-7	Interior	53	53	45	53	53	40	53	51	36	53	46	32	53	42	29	53	38	26	48	34	24	40	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	14	X
			Exposed	53	41	29	51	37	26	46	33	23	41	30	21	37	27	19	34	24	17	31	22	16	26	19	13	22	16	11	19	14	X	17	12	X	15	X	X	13	X	X
		7-20	Interior	54	48	39	54	43	35	54	38	31	54	34	28	48	31	26	44	28	23	40	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	X	17	11	X
			Exposed	48	31	25	43	28	23	38	25	20	34	22	18	31	20	17	28	18	15	26	17	14	22	14	12	19	12	X	16	10	X	14	X	X	12	X	X	X	X	X
		20-27	Interior	70	59	43	70	52	37	70	46	32	70	42	28	67	38	26	60	34	23	55	31	21	46	26	18	39	23	15	34	19	13	29	17	12	26	15	10	23	13	9
			Exposed	66	38	25	58	33	23	52	30	20	47																													

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
20	B	0-7	Interior	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	35	37	37	29	37	36	25	37	31	22	37	27	19	32	23	16	29	21	15
			Exposed	37	37	37	37	37	37	37	37	33	37	37	30	37	37	27	37	35	25	37	32	22	37	27	19	32	23	16	27	20	14	24	17	12	21	15	11	19	13	X
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	31	38	31	26	38	27	22	36	23	19	31	20	17	27	18	15	24	16	13
			Exposed	38	38	37	38	38	33	38	36	29	38	32	26	38	29	24	38	26	22	37	24	20	31	20	17	27	17	14	23	15	12	20	13	11	18	11	X	16	X	X
		20-27	Interior	56	56	56	56	56	56	56	56	52	56	56	45	56	55	40	56	49	35	56	45	31	56	38	26	56	32	22	48	28	19	42	24	16	37	21	15	33	19	13
			Exposed	56	54	39	56	48	34	56	43	30	56	39	26	56	35	24	56	32	22	51	29	20	42	25	17	36	21	14	31	18	12	27	16	11	24	14	9	21	12	8
	27-45	Interior	62	62	62	62	62	62	62	62	62	62	57	62	62	51	62	45	62	45	62	56	40	53	47	33	45	40	27	39	35	23	34	30	20	30	27	17	27	24	15	
		Exposed	62	62	50	62	60	44	61	54	38	54	49	34	49	44	30	45	40	27	41	36	24	34	31	20	29	26	16	25	23	14	22	20	12	20	17	11	17	15	9	
	C	0-7	Interior	37	37	37	37	37	37	37	37	36	37	37	32	37	37	29	37	26	37	34	24	37	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	14	X	
			Exposed	37	37	29	37	37	26	37	33	23	37	30	21	37	27	19	34	24	17	31	22	16	26	19	13	22	16	11	19	14	X	17	12	X	15	X	X	13	X	X
		7-20	Interior	38	38	38	38	38	35	38	38	31	38	34	28	38	31	26	38	28	23	38	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	X	17	11	X
			Exposed	38	31	25	38	28	23	38	25	20	34	22	18	31	20	17	28	18	15	26	17	14	22	14	12	19	12	X	16	10	X	14	X	X	12	X	X	X	X	X
20-27		Interior	56	56	43	56	52	37	56	46	32	56	42	28	56	38	26	56	34	23	55	31	21	46	26	18	39	23	15	34	19	13	29	17	12	26	15	10	23	13	9	
		Exposed	56	38	25	56	33	23	52	30	20	47	27	18	42	24	17	38	22	15	35	20	14	30	17	12	25	15	10	22	13	9	19	11	X	17	X	X	15	X	X	
27-45	Interior	62	62	55	62	62	48	62	58	42	59	52	37	53	47	33	48	43	29	44	39	26	37	33	22	32	28	18	27	24	15	24	21	13	21	19	11	19	17	10		
	Exposed	53	47	33	47	42	28	42	38	25	38	34	22	34	31	20	31	28	18	29	26	16	24	22	13	21	18	11	18	16	10	16	14	8	14	12	X	12	11	X		
D	0-7	Interior	37	37	37	37	37	33	37	37	30	37	37	27	37	35	24	37	32	22	37	29	20	34	24	17	29	21	15	25	18	13	21	16	11	19	14	X	17	12	X	
		Exposed	37	35	24	37	31	22	37	28	19	34	25	17	31	22	16	28	20	14	26	19	13	22	16	11	19	13	X	16	12	X	14	X	X	12	X	X	11	X	X	
	7-20	Interior	38	38	33	38	36	29	38	32	26	38	29	24	38	26	21	37	24	19	33	22	18	28	18	15	24	16	13	21	13	11	18	12	X	16	X	X	14	X	X	
		Exposed	38	26	21	36	23	19	32	21	17	29	19	15	26	17	14	24	15	13	22	14	12	18	12	X	16	X	X	13	X	X	12	X	X	X	X	X	X	X		
	20-27	Interior	58	49	34	58	43	30	58	39	26	58	35	24	55	31	21	50	29	19	45	26	18	38	22	15	32	19	13	28	16	11	24	14	10	21	12	8	19	11	X	
		Exposed	55	31	21	48	28	19	43	25	17	39	23	15	35	20	14	32	19	13	29	17	12	25	14	10	21	12	8	18	11	X	16	X	X	14	X	X	12	X	X	
27-45	Interior	64	61	44	61	54	38	54	48	34	49	44	30	44	39	26	40	36	24	37	33	21	31	28	17	26	24	15	23	20	12	20	18	11	18	16	10	16	14	8		
	Exposed	44	39	26	39	35	23	35	31	20	32	28	18	29	26	16	26	23	14	24	21	13	20	18	11	17	15	9	15	13	8	13	12	X	11	X	X	X	X	X		
30	B	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	29	36	36	25	36	31	22	36	27	19	32	23	16	29	21	15	
			Exposed	36	36	36	36	36	36	36	36	33	36	36	30	36	36	27	36	35	25	36	32	22	36	27	19	32	23	16	27	20	14	24	17	12	21	15	11	19	13	X
		7-20	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	37	38	33	38	37	31	38	31	26	38	27	22	36	23	19	31	20	17	27	18	15	24	16	13	
			Exposed	38	38	37	38	38	33	38	36	29	38	32	26	38	29	24	38	26	22	37	24	20	31	20	17	27	17	14	23	15	12	20	13	11	18	11	X	16	X	X
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	46	46	46	46	45	46	46	38	26	46	32	22	46	28	19	42	24	16	37	21	15	33	19	13
			Exposed	46	46	39	46	46	34	46	43	30	46	39	26	46	35	24	46	32	22	46	29	20	42	25	17	36	21	14	31	18	12	27	16	11	24	14	9	21	12	8
	27-45	Interior	52	52	52	52	52	52	52	52	52	52	52	52	52	52	51	52	45	52	52	40	52	47	33	45	40	27	39	35	23	34	30	20	30	27	17	27	24	15		
		Exposed	52	52	50	52	52	44	52	52	38	52	49	34	49	44	30	45	40	27	41	36	24	34	31	20	29	26	16	25	23	14	22	20	12	20	17	11	17	15	9	
	C	0-7	Interior	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	36	29	36	29	20	34	25	17	30	21	15	26	19	13	23	16	12	20	14	X
			Exposed	36	36	29	36	36	26	36	33	23	36	30	21	36	27	19	34	24	17	31	22	16	26	19	13	22	16	11	19	14	X	17	12	X	15	X	X	13	X	X
		7-20	Interior	38	38	38	38	38	35	38	38	31	38	34	28	38	31	26	38	28	23	38	26	21	34	22	18	29	19	15	25	16	13	22	14	12	19	12	X	17	11	X
			Exposed	38	31	25	38	28	23	38	25	20	34	22	18	31	20	17	28	18	15	26	17	14	22	14	12	19	12	X	16	10	X	14	X	X	12	X	X	X	X	X
20-27		Interior	46	46	43	46	46	37	46	46	32	46	42	28	46	38	26	46	34	23	46	31	21	46	26	18	39	23	15	34	19	13	29	17	12	26	15	10	23	13	9	
		Exposed	46	38	25</																																					



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**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
0	B	0-7	Interior	102	102	102	102	102	102	102	102	101	102	102	96	102	102	92	102	102	88	102	98	84	102	90	78	98	84	73	91	79	68	86	75	63	81	71	55	77	67	49
			Exposed	102	102	92	102	101	87	102	96	83	102	91	79	101	87	76	97	84	73	93	81	70	86	75	64	80	70	54	76	66	47	71	58	41	68	51	36	62	46	X
		7-20	Interior	102	102	102	102	102	102	102	102	99	102	102	93	102	98	89	102	93	85	102	89	81	93	82	75	87	76	69	82	71	64	78	67	56	74	59	49	71	53	44
			Exposed	102	97	88	102	92	84	102	87	79	95	83	75	90	79	72	87	75	69	84	72	66	78	67	56	74	58	48	70	50	42	66	44	37	59	39	X	53	35	X
		20-27	Interior	102	102	102	102	102	102	102	102	102	102	102	102	102	102	100	102	102	95	102	97	91	102	89	83	100	83	77	93	77	72	88	72	67	84	68	57	80	63	49
			Exposed	102	102	100	102	100	94	102	95	89	102	90	84	102	86	80	99	82	76	95	79	73	88	73	67	83	68	56	78	61	46	74	53	39	71	47	33	68	42	29
		27-45	Interior	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	95	103	98	88	100	91	82	92	85	77	86	80	72	81	75	68	76	72	62
			Exposed	103	103	103	103	103	98	103	103	93	103	99	89	103	94	85	99	90	81	94	87	78	86	80	72	80	75	68	74	70	58	70	66	50	66	59	43	58	52	37
	C	0-7	Interior	102	102	95	102	102	90	102	99	85	102	94	82	102	90	78	100	86	75	96	83	72	89	77	67	83	72	58	78	68	51	74	62	44	70	55	39	66	49	35
			Exposed	102	90	78	99	86	74	94	82	71	90	78	68	86	75	63	83	72	58	79	69	53	74	63	45	69	54	38	64	47	X	56	41	X	49	36	X	44	X	X
		7-20	Interior	102	101	92	102	95	87	102	90	82	100	85	78	93	81	74	89	78	71	86	75	68	81	69	60	76	62	52	72	54	45	68	47	39	64	42	35	56	37	X
			Exposed	93	81	74	89	77	70	85	73	67	81	70	62	78	67	56	76	62	51	73	56	47	68	48	40	62	41	34	54	36	X	47	X	X	42	X	X	37	X	X
		20-27	Interior	102	102	102	102	102	98	102	98	92	102	93	87	102	89	83	102	85	79	98	81	76	91	75	70	85	70	62	81	65	51	76	57	43	73	50	36	70	45	31
			Exposed	102	89	83	102	84	78	96	80	74	92	76	70	88	73	67	85	70	60	82	67	54	77	58	43	72	49	36	68	43	30	64	37	X	56	X	X	50	X	X
		27-45	Interior	103	103	103	103	103	102	103	103	97	103	103	92	103	98	88	103	93	84	98	90	81	89	83	75	83	77	70	77	72	65	72	68	54	68	63	47	62	56	40
			Exposed	103	98	88	101	92	83	96	88	79	91	84	76	86	80	72	82	77	69	79	74	67	73	69	55	67	62	46	60	54	38	52	47	33	46	41	X	41	37	X
	D	0-7	Interior	102	101	87	102	96	83	102	91	79	101	87	75	96	83	72	92	80	69	89	77	67	82	72	57	77	67	49	72	60	43	68	52	37	63	46	X	56	41	X
			Exposed	96	83	72	91	79	69	87	76	65	83	72	59	80	70	53	76	67	48	74	63	44	69	53	38	62	45	X	54	39	X	47	34	X	42	X	X	37	X	X
		7-20	Interior	102	92	84	102	87	79	95	82	75	90	78	72	86	75	69	83	72	66	80	69	60	75	61	51	71	52	43	67	45	38	61	40	X	53	35	X	47	X	X
			Exposed	86	75	68	82	71	64	79	67	57	76	63	52	73	57	47	71	52	43	68	47	39	61	40	33	52	34	X	45	X	X	40	X	X	35	X	X	37	X	X
		20-27	Interior	102	101	94	102	95	89	102	90	84	102	86	80	99	82	76	94	78	72	91	75	69	85	69	59	80	63	49	75	55	40	71	48	34	68	42	29	64	38	X
			Exposed	98	81	76	93	77	72	89	73	68	85	70	62	82	67	54	79	62	48	76	57	43	72	48	35	68	42	29	61	36	X	53	X	X	47	X	X	42	X	X
		27-45	Interior	103	103	99	103	103	93	103	99	89	103	94	85	98	90	81	93	86	78	89	83	74	82	77	69	76	71	62	71	67	52	66	60	44	59	53	38	52	47	33
			Exposed	98	90	81	92	85	77	87	81	73	83	77	70	79	74	67	75	71	61	72	68	54	67	61	44	58	52	37	50	45	31	44	40	X	39	35	X	35	X	X
10	B	0-7	Interior	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	88	91	91	84	91	90	78	91	84	73	91	81	70	86	75	64	80	70	54	76	66	47	
			Exposed	91	91	91	91	91	87	91	91	83	91	91	79	91	87	76	91	84	73	91	81	70	86	75	64	80	70	54	76	66	47	71	58	41	68	51	36	62	46	X
		7-20	Interior	91	91	91	91	91	91	91	91	91	91	91	91	91	91	89	91	85	91	89	81	91	82	75	87	76	69	82	71	64	78	67	56	74	59	49	71	53	44	
			Exposed	91	91	88	91	91	84	91	87	79	91	83	75	90	79	72	87	75	69	84	72	66	78	67	56	74	58	48	70	50	42	66	44	37	59	39	X	53	35	X
		20-27	Interior	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	95	99	97	91	99	89	83	99	83	77	93	77	72	88	72	67	84	68	57	80	63	49	
			Exposed	99	99	99	99	99	94	99	95	89	99	90	84	99	86	80	99	82	76	95	79	73	88	73	67	83	68	56	78	61	46	74	53	39	71	47	33	68	42	29
		27-45	Interior	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	100	102	102	95	102	102	98	88	100	91	82	92	85	77	86	80	72	81	75	68	76	72	62
			Exposed	102	102	102	102	102	98	102	102	93	102	99	89	102	94	85	99	90	81	94	87	78	86	80	72	80	75	68	74	70	58	70	66	50	66	59	43	58	52	37
	C	0-7	Interior	91	91	91	91	91	90	91	85	91	91	82	91	86	75	91	83	72	89	77	67	82	72	57	77	67	49	72	60	43	68	52	37	63	46	X	56	41	X	
			Exposed	91	90	78	91	86	74	91	82	71	90	78	68	86	75	63	83	72	58	79	69	53	74	63	45	69	54	38	64	47	X	56	41	X	49	36	X	44	X	X
		7-20	Interior	91	91	91	91	91	87	91	90	82	91	85	78	91	81	74	89	78	71	86	75	68	81	69	60	76	62	52	72	54	45	68	47	39	64	42	35	56	37	X
			Exposed	91	81	74	89	77	70	85	73	67	81	70	62	78	67	56	76	62	51	73	56	47	68	48	40	62	41	34	54	36	X	47	X	X	42	X	X	37	X	X
		20-27	Interior	99	99	99	99	99	98	99	98	99	98	92	99	93	87	99	89	83	99	85	79	98	81	76	91	75	70	85	70											

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**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
0	B	0-7	Interior	101	101	101	101	101	101	101	101	100	101	101	95	101	101	91	101	101	87	101	97	84	101	89	77	97	83	72	90	78	68	85	74	62	80	70	54	76	67	48
			Exposed	101	101	91	101	100	86	101	95	82	101	90	78	100	87	75	96	83	72	92	80	69	85	74	62	80	70	53	75	65	46	71	57	40	67	50	36	61	45	X
		7-20	Interior	101	101	101	101	101	101	101	101	98	101	101	92	101	97	88	101	92	84	101	88	80	92	81	74	87	75	69	82	70	62	77	66	54	74	58	48	70	51	43
			Exposed	101	96	88	101	91	83	101	86	78	94	82	75	89	78	71	86	75	68	83	71	65	78	66	55	73	57	47	69	49	41	66	43	36	58	38	X	51	X	X
		20-27	Interior	102	102	102	102	102	102	102	102	102	102	102	102	102	102	99	102	101	94	102	96	90	102	88	82	99	82	76	92	76	71	87	72	66	83	68	56	79	62	48
			Exposed	102	102	99	102	99	93	102	94	88	102	89	83	102	85	79	98	81	75	94	78	72	88	72	67	82	67	55	78	59	45	74	52	38	70	46	33	67	41	28
		27-45	Interior	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	99	102	102	94	102	97	87	98	90	81	91	84	76	85	79	71	80	75	68	75	71	60
			Exposed	102	102	102	102	102	97	102	102	92	102	98	88	102	93	84	98	89	81	93	86	77	85	79	72	79	74	67	74	70	57	69	65	49	64	57	42	57	51	36
	C	0-7	Interior	101	101	94	101	101	89	101	98	85	101	93	81	101	89	77	99	86	74	95	82	71	88	77	66	82	72	57	77	68	50	73	61	43	69	54	38	66	48	X
			Exposed	101	89	77	98	85	73	93	81	70	89	77	67	85	74	62	82	71	56	79	69	52	73	62	44	69	53	38	63	46	X	55	40	X	48	X	X	43	X	X
		7-20	Interior	101	100	91	101	94	86	101	89	81	98	85	77	92	81	74	89	77	71	85	74	68	80	68	59	75	61	51	71	53	44	68	46	38	62	41	X	55	36	X
			Exposed	92	80	74	88	76	70	84	72	66	81	69	60	78	66	55	75	60	50	72	55	46	68	47	39	61	40	X	53	35	X	46	X	X	41	X	X	X	X	X
		20-27	Interior	102	102	102	102	102	97	102	97	91	102	92	86	102	88	82	102	84	78	97	81	75	90	74	69	85	69	60	80	64	50	76	56	42	72	49	36	69	44	31
			Exposed	102	88	82	100	83	77	95	79	73	91	75	70	87	72	67	84	69	59	81	66	52	76	56	42	72	48	35	68	42	29	62	37	X	55	X	X	49	X	X
		27-45	Interior	102	102	102	102	102	101	102	102	96	102	101	91	102	97	87	102	92	83	97	89	80	88	82	74	82	76	69	76	72	63	71	68	53	67	62	46	61	55	40
			Exposed	102	97	87	100	91	82	95	87	78	90	83	75	85	79	72	81	76	69	78	73	66	72	68	54	67	61	45	59	52	38	51	46	32	45	41	X	40	36	X
	D	0-7	Interior	101	100	86	101	95	82	101	90	78	100	86	75	95	83	71	91	79	69	88	76	66	81	71	56	76	67	48	72	59	42	68	51	36	62	45	X	55	40	X
			Exposed	95	82	71	90	78	68	86	75	63	82	72	57	79	69	52	76	66	47	73	61	43	68	52	37	61	44	X	53	38	X	46	X	X	41	X	X	36	X	X
		7-20	Interior	101	91	83	101	86	78	93	82	74	89	78	71	86	74	68	83	71	64	80	68	58	75	60	49	70	51	42	67	44	37	59	39	X	52	X	X	46	X	X
			Exposed	86	74	68	82	70	62	78	67	56	75	61	51	72	56	46	70	51	42	68	46	38	60	39	X	51	X	X	44	X	X	39	X	X	X	X	X	X	X	X
		20-27	Interior	102	100	93	102	94	88	102	89	83	102	85	79	98	81	75	93	77	72	90	74	69	84	69	58	79	62	48	75	54	40	71	47	33	67	41	29	62	37	X
			Exposed	97	81	75	92	76	71	88	73	67	85	69	60	81	66	53	79	61	47	76	56	42	71	47	34	67	41	28	60	35	X	52	X	X	46	X	X	41	X	X
		27-45	Interior	102	102	98	102	102	92	102	98	88	102	93	84	97	89	80	92	85	77	88	82	74	81	76	68	75	71	60	70	66	50	66	59	43	58	52	37	51	46	32
			Exposed	97	89	80	91	84	76	86	80	72	82	77	69	78	73	66	75	70	59	71	68	53	66	59	44	57	51	36	49	44	31	43	39	X	38	X	X	X	X	X
10	B	0-7	Interior	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	87	90	90	84	90	89	77	90	83	72	90	78	68	85	74	62	80	70	54	76	67	48
			Exposed	90	90	90	90	90	86	90	90	82	90	90	78	90	87	75	90	83	72	90	80	69	85	74	62	80	70	53	75	65	46	71	57	40	67	50	36	61	45	X
		7-20	Interior	90	90	90	90	90	90	90	90	90	90	90	90	90	90	88	90	84	90	88	80	90	81	74	87	75	69	82	70	62	77	66	54	74	58	48	70	51	43	
			Exposed	90	90	88	90	90	83	90	86	78	90	82	75	89	78	71	86	75	68	83	71	65	78	66	55	73	57	47	69	49	41	66	43	36	58	38	X	51	X	X
		20-27	Interior	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	94	99	96	90	99	88	82	99	82	76	92	76	71	87	72	66	83	68	56	79	62	48
			Exposed	99	99	99	99	99	93	99	94	88	99	89	83	99	85	79	98	81	75	94	78	72	88	72	67	82	67	55	78	59	45	74	52	38	70	46	33	67	41	28
		27-45	Interior	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	99	101	101	94	101	97	87	98	90	81	91	84	76	85	79	71	80	75	68	75	71	60	
			Exposed	101	101	101	101	101	97	101	101	92	101	98	88	101	93	84	98	89	81	93	86	77	85	79	72	79	74	67	74	70	57	69	65	49	64	57	42	57	51	36
	C	0-7	Interior	90	90	90	90	90	89	90	90	85	90	90	81	90	89	77	90	86	74	90	82	71	88	77	66	82	72	57	77	68	50	73	61	43	69	54	38			

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																								
				Roof Wind Zone																																								
				90			95			100			105			110			115			120			130			140			150			160			170			180				
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3					
20	B	0-7	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	72	77	77	68	77	74	62	77	70	54	76	67	48				
			Exposed	77	77	77	77	77	77	77	77	77	77	77	77	75	77	77	72	77	77	69	77	74	62	77	70	53	75	65	46	71	57	40	67	50	36	61	45	X				
		7-20	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	75	69	77	70	62	77	66	54	74	58	48	70	51	43				
			Exposed	77	77	77	77	77	77	77	77	77	77	77	75	77	77	71	77	75	68	77	71	65	77	66	55	73	57	47	69	49	41	66	43	36	58	38	X	51	X	X		
		20-27	Interior	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	90	91	88	82	91	82	76	91	76	71	87	72	66	83	68	56	79	62	48	
			Exposed	91	91	91	91	91	91	91	88	91	89	83	91	85	79	91	81	75	91	78	72	88	72	67	82	67	55	78	59	45	74	52	38	70	46	33	67	41	28			
		27-45	Interior	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	94	95	95	87	95	90	81	91	84	76	85	79	71	80	75	68	75	71	60		
			Exposed	95	95	95	95	95	95	95	95	92	95	95	88	95	93	84	95	89	81	93	86	77	85	79	72	79	74	67	74	70	57	69	65	49	64	57	42	57	51	36		
	C	0-7	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	74	77	77	71	77	77	66	77	72	57	77	68	50	73	61	43	69	54	38	66	48	X	
			Exposed	77	77	77	77	77	73	77	77	70	77	77	67	77	74	62	77	71	56	77	69	52	73	62	44	69	53	38	63	46	X	55	40	X	48	X	X	43	X	X		
		7-20	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	74	77	77	71	77	74	68	77	68	59	75	61	51	71	53	44	68	46	38	62	41	X	55	36	X		
			Exposed	77	77	74	77	76	70	77	72	66	77	69	60	77	66	55	75	60	50	72	55	46	68	47	39	61	40	X	53	35	X	46	X	X	41	X	X	X	X	X		
		20-27	Interior	91	91	91	91	91	91	91	91	91	91	91	86	91	88	82	91	84	78	91	81	75	90	74	69	85	69	60	80	64	50	76	56	42	72	49	36	69	44	31		
			Exposed	91	88	82	91	83	77	91	79	73	91	75	70	87	72	67	84	69	59	81	66	52	76	56	42	72	48	35	68	42	29	62	37	X	55	X	X	49	X	X		
		27-45	Interior	95	95	95	95	95	95	95	95	95	95	95	91	95	95	87	95	92	83	95	89	80	88	82	74	82	76	69	76	72	63	71	68	53	67	62	46	61	55	40		
			Exposed	95	95	87	95	91	82	95	87	78	90	83	75	85	79	72	81	76	69	78	73	66	72	68	54	67	61	45	59	52	38	51	46	32	45	41	X	40	36	X		
	D	0-7	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	76	66	77	71	56	76	67	48	72	59	42	68	51	36	62	45	X	55	40	X		
			Exposed	77	77	71	77	77	68	77	75	63	77	72	57	77	69	52	76	66	47	73	61	43	68	52	37	61	44	X	53	38	X	46	X	X	41	X	X	36	X	X		
		7-20	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	74	68	77	71	64	77	68	58	75	60	49	70	51	42	67	44	37	59	39	X	52	X	X	46	X	X	
			Exposed	77	74	68	77	70	62	77	67	56	75	61	51	72	56	46	70	51	42	68	46	38	60	39	X	51	X	X	44	X	X	39	X	X	X	X	X	X	X	X		
		20-27	Interior	93	93	93	93	93	88	93	89	83	93	85	79	93	81	75	93	77	72	90	74	69	84	69	58	79	62	48	75	54	40	71	47	33	67	41	29	62	37	X		
			Exposed	93	81	75	92	76	71	88	73	67	85	69	60	81	66	53	79	61	47	76	56	42	71	47	34	67	41	28	60	35	X	52	X	X	46	X	X	41	X	X		
		27-45	Interior	96	96	96	96	96	92	96	96	88	96	93	84	96	89	80	92	85	77	88	82	74	81	76	68	75	71	60	70	66	50	66	59	43	58	52	37	51	46	32		
			Exposed	96	89	80	91	84	76	86	80	72	82	77	69	78	73	66	75	70	59	71	68	53	66	59	44	57	51	36	49	44	31	43	39	X	38	X	X	X	X	X		
30	B	0-7	Interior	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	72	76	76	68	76	74	62	76	70	54	76	67	48			
			Exposed	76	76	76	76	76	76	76	76	76	76	76	76	76	76	75	76	76	72	76	76	69	76	74	62	76	70	53	75	65	46	71	57	40	67	50	36	61	45	X		
		7-20	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	75	69	77	70	62	77	66	54	74	58	48	70	51	43	
			Exposed	77	77	77	77	77	77	77	77	77	77	77	77	75	77	77	71	77	75	68	77	71	65	77	66	55	73	57	47	69	49	41	66	43	36	58	38	X	50	X	X	
		20-27	Interior	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	82	85	82	76	85	76	71	85	72	66	83	68	56	79	62	48
			Exposed	85	85	85	85	85	85	85	85	85	85	85	83	85	85	79	85	81	75	85	78	72	85	72	67	82	67	55	78	59	45	74	52	38	70	46	33	67	41	28		
		27-45	Interior	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	
			Exposed	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	
	C	0-7	Interior	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	74	76	76	71	76	76	66	76	72	57	76	68	50	73	61	43	69	54	38	66	48	X		
			Exposed	76	76	76	76	76	73	76	76	70	76	76	67	76	74	62	76	71	56	76	69	52	73	62	44	69	53	38	63	46	X	55	40	X								



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				Roof Wind Zone																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				1	2	3	1	2	3	1	2	3	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	33	33	32	33	33	29	33	33	26	33	33	23	33	30	21	33	27	19	33	25	17	29	21	14	24	17	12	21	15	10	18	13	9	16	11	8	14	10	7
			Exposed	33	30	21	33	26	18	33	23	16	30	21	15	27	19	13	24	17	12	22	16	11	18	13	9	16	11	8	13	10	7	12	8	6	10	7	5	9	6	X
		7-20	Interior	33	33	28	33	31	25	33	27	22	33	24	20	33	22	18	31	20	16	29	18	15	24	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
			Exposed	33	22	18	31	20	16	27	17	14	24	16	13	22	14	12	20	13	11	18	12	10	15	10	8	13	8	7	11	7	6	10	6	5	9	5	X	8	5	X
		20-27	Interior	34	34	33	34	34	28	34	33	24	34	30	21	34	27	18	34	24	16	34	22	15	33	19	13	28	16	11	24	14	9	21	12	8	18	10	7	16	9	6
			Exposed	34	27	18	34	24	16	34	21	14	34	19	13	30	17	12	27	16	11	25	14	10	21	12	8	18	10	7	15	9	6	13	8	5	12	7	4	10	6	4
	27-45	Interior	34	34	34	34	34	34	34	34	34	31	34	34	27	34	34	24	34	31	21	31	28	19	26	23	15	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7
		Exposed	34	34	24	33	30	21	30	27	18	27	24	16	24	22	14	22	20	13	20	18	11	17	15	9	14	13	8	12	11	7	11	10	6	9	8	5	8	7	4	
	C	0-7	Interior	33	32	22	33	28	20	33	25	18	32	23	16	29	20	14	26	19	13	24	17	12	20	14	10	17	12	8	14	10	7	13	9	6	11	8	5	10	7	5
			Exposed	29	20	14	25	18	13	23	16	11	20	15	10	18	13	9	17	12	8	15	11	8	13	9	6	11	8	5	9	7	X	8	6	X	7	5	X	6	X	X
		7-20	Interior	33	24	19	33	21	17	29	19	15	26	17	14	24	15	12	22	14	11	20	13	10	16	11	9	14	9	7	12	8	6	10	7	5	9	6	5	8	5	X
			Exposed	24	15	12	21	13	11	19	12	10	17	11	9	15	10	8	14	9	7	13	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X	5	X	X
		20-27	Interior	34	29	20	34	26	17	34	23	15	34	21	14	33	19	12	30	17	11	27	15	10	23	13	9	19	11	7	16	9	6	14	8	5	13	7	5	11	6	4
			Exposed	33	18	12	29	16	11	26	15	10	23	13	9	21	12	8	19	11	7	17	10	7	14	8	6	12	7	5	11	6	4	9	5	X	8	X	X	7	X	X
	27-45	Interior	34	34	26	34	32	22	32	29	20	29	26	17	26	23	15	24	21	14	22	19	12	18	16	10	15	14	8	13	12	7	12	10	6	10	9	5	9	8	5	
		Exposed	26	23	15	23	21	13	21	18	12	19	17	10	17	15	9	15	14	8	14	12	7	12	10	6	10	9	5	9	8	5	7	7	4	7	6	X	6	5	X	
	D	0-7	Interior	33	27	18	33	24	16	29	21	15	26	19	13	24	17	12	22	15	11	20	14	10	16	12	8	14	10	7	12	9	6	10	7	5	9	7	X	8	6	X
			Exposed	24	17	12	21	15	10	19	13	9	17	12	8	15	11	8	14	10	7	13	9	6	11	8	5	9	6	X	8	6	X	7	5	X	6	X	5	X	X	
		7-20	Interior	31	20	16	27	17	14	24	16	13	22	14	12	20	13	10	18	12	9	16	10	9	14	9	7	12	7	6	10	6	5	9	6	X	8	5	X	7	X	X
			Exposed	20	13	10	17	11	9	16	10	8	14	9	7	13	8	7	12	7	6	10	7	5	9	6	X	7	5	X	6	X	X	6	X	X	5	X	X	X		
		20-27	Interior	34	24	16	34	21	14	34	19	13	30	17	11	27	15	10	25	14	9	22	13	9	19	11	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X
			Exposed	27	15	10	24	14	9	21	12	8	19	11	7	17	10	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X	8	X	X	7	X	X	6	X	X
27-45	Interior	34	30	21	30	27	18	27	24	16	24	21	14	22	19	12	20	18	11	18	16	10	15	14	8	13	12	7	11	10	6	10	9	5	8	8	5	7	7	4		
	Exposed	22	19	12	19	17	11	17	15	9	16	14	8	14	13	8	13	11	7	12	10	6	10	9	5	8	7	4	7	6	4	6	6	X	5	5	X	5	X	X		
10	B	0-7	Interior	24	24	24	24	24	24	24	24	24	24	23	24	24	21	24	24	19	24	24	17	24	21	14	24	17	12	21	15	10	18	13	9	16	11	8	14	10	7	
			Exposed	24	24	21	24	24	18	24	23	16	24	21	15	24	19	13	24	17	12	22	16	11	18	13	9	16	11	8	13	10	7	12	8	6	10	7	5	9	6	X
		7-20	Interior	24	24	24	24	24	24	24	24	22	24	24	20	24	22	18	24	20	16	24	18	15	24	15	13	20	13	11	17	11	9	15	10	8	13	9	7	12	8	6
			Exposed	24	22	18	24	20	16	24	17	14	24	16	13	22	14	12	20	13	11	18	12	10	15	10	8	13	8	7	11	7	6	10	6	5	9	5	X	8	5	X
		20-27	Interior	31	31	31	31	31	28	31	31	24	31	30	21	31	27	18	31	24	16	31	22	15	31	19	13	28	16	11	24	14	9	21	12	8	18	10	7	16	9	6
			Exposed	31	27	18	31	24	16	31	21	14	31	19	13	30	17	12	27	16	11	25	14	10	21	12	8	18	10	7	15	9	6	13	8	5	12	7	4	10	6	4
	27-45	Interior	33	33	33	33	33	33	33	33	31	33	33	27	33	33	24	33	31	21	31	28	19	26	23	15	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7	
		Exposed	33	33	24	33	30	21	30	27	18	27	24	16	24	22	14	22	20	13	20	18	11	17	15	9	14	13	8	12	11	7	11	10	6	9	8	5	8	7	4	
	C	0-7	Interior	24	24	22	24	24	20	24	24	18	24	23	16	24	20	14	24	19	13	24	17	12	20	14	10	17	12	8	14	10	7	13	9	6	11	8	5	10	7	5
			Exposed	24	20	14	24	18	13	23	16	11	20	15	10	18	13	9	17	12	8	15	11	8	13	9	6	11	8	5	9	7	X	8	6	X	7	5	X	6	X	X
		7-20	Interior	24	24	19	24	21	17	24	19	15	24	17	14	24	15	12	22	14	11	20	13	10	16	11	9	14	9	7	12	8	6	10	7	5	9	6	5	8	5	X
			Exposed	24	15	12	21	13	11	19	12	10	17	11	9	15	10	8	14	9	7	13	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X	5	X	X
		20-27	Interior	31	29	20	31	26	17	31	23	15	31	21	14	31	19	12	30	17	11	27	15	10	23	13	9	19	11	7	16	9	6	14	8	5	13	7	5	11	6	4
			Exposed	31	18	12	29	16	11	26	15	10	23	13	9	21	12	8	19	11	7	17	10	7	14	8	6	12	7	5	11	6	4	9	5	X	8	X	X	7	X	X
	27-45	Interior	33	33	26	33	32	22	32	29	20	2																														

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																								
				90			95			100			105			110			115			120			130			140			150			160			170			180				
				Roof Wind Zone																																								
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3					
20	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	14	16	16	12	16	15	10	16	13	9	16	11	8	14	10	7			
			Exposed	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	16	12	16	16	11	16	13	9	16	11	8	13	10	7	12	8	6	10	7	5	9	6	X		
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	15	13	17	13	11	17	11	9	15	10	8	13	9	7	12	8	6		
			Exposed	17	17	17	17	17	17	16	17	17	14	17	16	13	17	14	12	17	13	11	17	12	10	15	10	8	13	8	7	11	7	6	10	6	5	9	5	X	8	5	X	
		20-27	Interior	25	25	25	25	25	25	25	25	24	25	25	21	25	25	18	25	24	16	25	22	15	25	19	13	25	16	11	24	14	9	21	12	8	18	10	7	16	9	6		
			Exposed	25	25	18	25	24	16	25	21	14	25	19	13	25	17	12	25	16	11	25	14	10	21	12	8	18	10	7	15	9	6	13	8	5	12	7	4	10	6	4		
		27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	27	24	27	27	21	27	27	19	26	23	15	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7		
			Exposed	27	27	24	27	27	21	27	27	18	27	24	16	24	22	14	22	20	13	20	18	11	17	15	9	14	13	8	12	11	7	11	10	6	9	8	5	8	7	4		
	C	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	13	16	16	12	16	16	12	16	14	10	16	12	8	14	10	7	13	9	6	11	8	5	10	7	5
			Exposed	16	16	14	16	16	13	16	16	11	16	15	10	16	13	9	16	12	8	15	11	8	13	9	6	11	8	5	9	7	X	8	6	X	7	5	X	6	X	X		
		7-20	Interior	17	17	17	17	17	17	17	17	17	15	17	17	14	17	15	12	17	14	11	17	13	10	16	11	9	14	9	7	12	8	6	10	7	5	9	6	5	8	5	X	
			Exposed	17	15	12	17	13	11	17	12	10	17	11	9	15	10	8	14	9	7	13	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X	5	X	X		
		20-27	Interior	25	25	20	25	25	17	25	23	15	25	21	14	25	19	12	25	17	11	25	15	10	23	13	9	19	11	7	16	9	6	14	8	5	13	7	5	11	6	4		
			Exposed	25	18	12	25	16	11	25	15	10	23	13	9	21	12	8	19	11	7	17	10	7	14	8	6	12	7	5	11	6	4	9	5	X	8	X	X	7	X	X		
		27-45	Interior	27	27	26	27	27	22	27	27	20	27	26	17	26	23	15	24	21	14	22	19	12	18	16	10	15	14	8	13	12	7	12	10	6	10	9	5	9	8	5		
			Exposed	26	23	15	23	21	13	21	18	12	19	17	10	17	15	9	15	14	8	14	12	7	12	10	6	10	9	5	9	8	5	7	7	4	7	6	X	6	5	X		
	D	0-7	Interior	16	16	16	16	16	16	16	16	15	16	16	13	16	16	12	16	15	11	16	14	10	16	12	8	14	10	7	12	9	6	10	7	5	9	7	X	8	6	X		
			Exposed	16	16	12	16	15	10	16	13	9	16	12	8	15	11	8	14	10	7	13	9	6	11	8	5	9	6	X	8	6	X	7	5	X	6	X	X	5	X	X		
		7-20	Interior	17	17	16	17	17	14	17	16	13	17	14	12	17	13	10	17	12	9	16	10	9	14	9	7	12	7	6	10	6	5	9	6	X	8	5	X	7	X	X		
			Exposed	17	13	10	17	11	9	16	10	8	14	9	7	13	8	7	12	7	6	10	7	5	9	6	X	7	5	X	6	X	X	6	X	X	5	X	X					
		20-27	Interior	26	24	16	26	21	14	26	19	13	26	17	11	26	15	10	25	14	9	22	13	9	19	11	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X		
			Exposed	26	15	10	24	14	9	21	12	8	19	11	7	17	10	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X	8	X	X	7	X	X	6	X	X		
		27-45	Interior	28	28	21	28	27	18	27	24	16	24	21	14	22	19	12	20	18	11	18	16	10	15	14	8	13	12	7	11	10	6	10	9	5	8	8	5	7	7	4		
			Exposed	22	19	12	19	17	11	17	15	9	16	14	8	14	13	8	13	11	7	12	10	6	10	9	5	8	7	4	7	6	4	6	6	X	5	5	X	5	X	X		
30	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	14	16	16	12	16	15	10	16	13	9	16	11	8	14	10	7			
			Exposed	16	16	16	16	16	16	16	16	16	16	16	15	16	16	13	16	16	12	16	16	11	16	13	9	16	11	8	13	10	7	12	8	6	10	7	5	9	6	X		
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	15	17	15	13	17	13	11	17	11	9	15	10	8	13	9	7	12	8	6			
			Exposed	17	17	17	17	17	16	17	17	14	17	16	13	17	14	12	17	13	11	17	12	10	15	10	8	13	8	7	11	7	6	10	6	5	9	5	X	8	5	X		
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	20	20	16	20	20	15	20	19	13	20	16	11	20	14	9	20	12	8	18	10	7	16	9	6		
			Exposed	20	20	18	20	20	16	20	20	14	20	19	13	20	17	12	20	16	11	20	14	10	20	12	8	18	10	7	15	9	6	13	8	5	12	7	4	10	6	4		
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	21	23	23	19	23	23	15	22	20	13	19	17	11	17	15	9	15	13	8	13	12	7			
			Exposed	23	23	23	23	23	21	23	23	18	23	23	16	23	22	14	22	20	13	20	18	11	17	15	9	14	13	8	12	11	7	11	10	6	9	8	5	8	7	4		
	C	0-7	Interior	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	13	16	16	12	16	16	12	16	14	10	16	12	8	14	10	7	13	9	6	11	8	5	10	7	5	
			Exposed	16	16	14	16	16	13	16	16	11	16	15	10	16	13	9	16	12	8	15	11	8	13	9	6	11	8	5	9	7	X	8	6	X	7	5	X	6	X	X		
		7-20	Interior	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	15	12	17	14	11	17	13	10	16	11	9	14	9	7	12	8	6	10	7	5	9	6	5	8	5	X
			Exposed	17	15	12	17	13	11	17	12	10	17	11	9	15	10	8	14	9	7	13	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X	5	X	X		
		20-27	Interior	20	20	20	20	20	17	20	20	15	20	20	14	20	19	12	20	17	11	20	15	10	20	13	9	19	11	7	16	9	6	14	8	5	13	7	5	11	6	4		
			Exposed	20	18	12	20	20	16	11	20	15	10	20	13	9	20	12	8	19	11	7	17	10	7	14	8	6	12	7	5	11	6	4	9	5	X	8	X	X	7	X	X	
		27-45	Interior	23	23	23	23																																					



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																								
				Roof Wind Zone																																								
				90			95			100			105			110			115			120			130			140			150			160			170			180				
				1	2	3	1	2	3	1	2	3	1	2	3	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	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7						
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	6	9	7	5	9	6	X				
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	7	10	8	6				
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8	10	8	7	10	7	6	10	6	5	9	5	X	8	5	X		
	20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	8	13	10	7	12	9	6					
		Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	8	13	10	7	13	9	6	13	8	5	12	7	4	10	6	4			
	27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	15	13	14	14	11	14	14	9	13	13	8	13	12	7			
		Exposed	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	16	16	13	16	16	11	16	15	9	14	13	8	12	11	7	11	10	6	9	8	5	8	7	4			
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7	9	8	5	9	7	5
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	8	9	6	9	8	5	9	7	X	8	6	X	7	5	X	6	X	X				
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	7	10	8	5	8	5	X		
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	9	7	10	8	7	6	9	6	5	8	5	X	7	X	X	6	X	X	5	X	X	
20-27	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	8	13	10	7	12	9	6					
	Exposed	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	8	13	11	7	13	9	6	13	8	5	12	7	4	10	6	4				
27-45	Interior	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	15	15	14	15	15	12	14	14	10	13	13	8	13	12	7	12	10	6	10	9	5	8	7	4		
	Exposed	16	16	15	16	16	13	16	16	12	16	16	10	16	15	9	15	14	8	14	12	7	12	10	6	10	9	5	9	8	5	7	7	4	7	6	X	6	5	X				
D	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	7	10	8	6	9	7	X			
		Exposed	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	8	10	10	7	10	9	6	10	8	5	9	6	X	8	6	X	7	5	X	6	X	X			
	7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
		Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	11	7	11	11	7	10	7	5	9	6	10	7	5	X	8	6	X	7	5	X	6	X	X			
20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14		
	Exposed	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14		
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	17	17	17		
	Exposed	17	17	12	17	17	11	17	15	9	16	14	8	14	13	8	13	11	7	12	10	6	10	9	5	8	7	4	7	6	4	6	6	6	X	5	5	X	5	X	X			
70	B	0-7	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7			
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6		
		7-20	Interior	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6
			Exposed	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	5	
	20-27	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	6	
		Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11																								

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

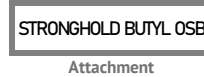
Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				Roof Wind Zone																																							
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3								
0	B	0-7	Interior	28	28	27	28	28	24	28	28	21	28	28	19	28	25	17	28	23	16	28	21	14	24	17	12	20	15	10	17	12	9	15	11	8	13	9	7	12	8	6	
			Exposed	28	25	17	28	22	15	28	20	14	25	18	12	22	16	11	20	14	10	18	13	9	15	11	8	13	9	6	11	8	6	10	7	5	8	6	X	7	5	X	
		7-20	Interior	28	28	24	28	26	21	28	23	19	28	20	17	28	18	15	26	17	14	24	15	12	20	13	10	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5	
			Exposed	28	18	15	26	16	13	23	15	12	20	13	11	18	12	10	17	11	9	15	10	8	13	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X	
		20-27	Interior	28	28	27	28	28	23	28	28	20	28	25	17	28	22	15	28	20	14	28	19	12	27	16	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5	
			Exposed	28	22	15	28	20	13	28	18	12	28	16	11	25	14	10	23	13	9	21	12	8	17	10	7	15	8	6	13	7	5	11	6	4	10	5	4	9	5	X	
		27-45	Interior	29	29	29	29	29	29	29	29	29	26	29	29	22	29	28	20	29	26	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6
			Exposed	29	28	20	28	25	17	25	22	15	22	20	13	20	18	12	18	16	10	17	15	9	14	13	8	12	11	6	10	9	5	9	8	5	8	7	4	7	6	4	
		C	0-7	Interior	28	27	18	28	24	16	28	21	15	27	19	13	24	17	12	22	15	11	20	14	10	16	12	8	14	10	7	12	9	6	10	7	5	9	7	X	8	6	X
				Exposed	24	17	12	21	15	10	19	13	9	17	12	8	15	11	8	14	10	7	13	9	6	11	8	5	9	6	X	8	5	X	7	5	X	6	X	X	5	X	X
	7-20		Interior	28	20	16	28	18	14	25	16	13	22	14	11	20	13	10	18	12	9	16	10	9	14	9	7	12	7	6	10	6	5	9	6	5	8	5	X	7	X	X	
			Exposed	20	13	10	18	11	9	16	10	8	14	9	7	13	8	7	12	7	6	10	7	5	9	6	5	7	5	X	6	X	X	6	X	X	5	X	X	X	X	X	
	20-27		Interior	28	24	17	28	21	14	28	19	13	28	17	11	27	15	10	25	14	9	22	13	9	19	11	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X	
			Exposed	27	15	10	24	14	9	21	12	8	19	11	7	17	10	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X	8	X	X	7	X	X	6	X	X	
	27-45		Interior	29	29	22	29	27	19	27	24	16	24	21	14	22	19	13	20	18	11	18	16	10	15	13	8	13	11	7	11	10	6	10	9	5	8	8	4	7	7	4	
			Exposed	22	19	13	19	17	11	17	15	10	15	14	9	14	12	8	13	11	7	12	10	6	10	9	5	8	7	4	7	6	4	6	6	X	5	5	X	5	X	X	
	D		0-7	Interior	28	22	15	28	20	14	25	17	12	22	16	11	20	14	10	18	13	9	16	12	8	14	10	7	12	8	6	10	7	5	9	6	X	8	5	X	7	5	X
				Exposed	20	14	10	17	13	9	16	11	8	14	10	7	13	9	6	11	8	6	10	7	5	9	6	X	7	5	X	6	X	X	6	X	X	5	X	X	X	X	X
		7-20	Interior	26	16	13	23	15	12	20	13	11	18	12	10	16	11	9	15	10	8	14	9	7	11	7	6	10	6	5	8	5	X	7	5	X	6	X	X	6	X	X	
			Exposed	16	10	9	15	9	8	13	8	7	12	7	6	11	7	6	10	6	5	9	6	5	7	5	X	6	X	X	5	X	X	X	X	X	X	X	X	X	X		
		20-27	Interior	28	20	13	28	18	12	28	16	11	25	14	10	23	13	9	20	12	8	19	11	7	16	9	6	13	8	5	11	6	4	10	6	4	9	5	X	X	8	X	X
			Exposed	22	13	9	20	11	8	18	10	7	16	9	6	14	8	5	13	7	5	12	7	5	10	6	4	8	5	X	7	X	X	6	X	X	6	X	X	5	X	X	
		27-45	Interior	28	25	17	25	22	15	22	20	13	20	18	12	18	16	10	16	15	9	15	13	8	13	11	7	11	10	6	9	8	5	8	7	4	7	6	4	6	6	X	
			Exposed	18	16	10	16	14	9	14	13	8	13	12	7	12	10	6	11	9	6	10	9	5	8	7	4	7	6	4	6	5	X	5	5	X	X	X	X	X	X	X	
10	B	0-7	Interior	20	20	20	20	20	20	20	20	20	20	19	20	20	17	20	20	16	20	20	14	20	17	12	20	15	10	17	12	9	15	11	8	13	9	7	12	8	6		
			Exposed	20	20	17	20	20	15	20	20	14	20	18	12	20	16	11	20	14	10	18	13	9	15	11	8	13	9	6	11	8	6	10	7	5	8	6	X	7	5	X	
		7-20	Interior	20	20	20	20	20	20	20	20	19	20	20	17	20	18	15	20	17	14	20	15	12	20	13	10	17	11	9	15	9	8	13	8	7	11	7	6	10	6	5	
			Exposed	20	18	15	20	16	13	20	15	12	20	13	11	18	12	10	17	11	9	15	10	8	13	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X	
		20-27	Interior	26	26	26	26	26	23	26	26	20	26	25	17	26	22	15	26	20	14	26	19	12	26	16	10	23	13	9	20	11	8	17	10	7	15	9	6	13	8	5	
			Exposed	26	22	15	26	20	13	26	18	12	26	16	11	25	14	10	23	13	9	21	12	8	17	10	7	15	8	6	13	7	5	11	6	4	10	5	4	9	5	X	
		27-45	Interior	28	28	28	28	28	28	28	26	28	28	26	28	28	26	28	28	26	18	26	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6	
			Exposed	28	28	20	28	25	17	25	22	15	22	20	13	20	18	12	18	16	10	17	15	9	14	13	8	12	11	6	10	9	5	9	8	5	8	7	4	7	6	4	
		C	0-7	Interior	20	20	18	20	20	16	20	20	15	20	19	13	20	17	12	20	15	11	20	14	10	16	12	8	14	10	7	12	9	6	10	7	5	9	7	X	8	6	X
				Exposed	20	17	12	20	15	10	19	13	9	17	12	8	15	11	8	14	10	7	13	9	6	11	8	5	9	6	X	8	5	X	7	5	X	6	X	X	5	X	X
	7-20		Interior	20	20	16	20	18	14	20	16	13	20	14	11	20	13	10	18	12	9	16	10	9	14	9	7	12	7	6	10	6	5	9	6	5	8	5	X	7	5	X	
			Exposed	20	13	10	18	11	9	16	10	8	14	9	7	13	8	7	12	7	6	10	7	5	9	6	5	7	5	X	6	X	X	6	X	X	5	X	X	X	X	X	
	20-27		Interior	26	24	17	26	21	14	26	19	13	26	17	11	26	15	10	25	14	9	22	13	9	19	11	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X	
			Exposed	26	15	10	24	14	9	21	12	8	19	11	7	17	10	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X	8	X	X	7	X	X	6	X	X	
	27-45		Interior	28	28	22	28	27	19	27	24	16	24	21	14	22	19	13	20	18	11	18	16	10	15	13	8	13	11	7	11	10	6	10	9	5	8</						

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																										
				90			95			100			105			110			115			120			130			140			150			160			170			180						
				Roof Wind Zone																																										
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3											
20	B	0-7	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	14	10	14	12	9	14	11	8	13	9	7	12	8	6			
			Exposed	14	14	14	14	14	14	14	14	14	14	14	14	12	14	14	11	14	14	10	14	13	9	14	11	8	13	9	6	11	8	6	10	7	5	8	6	X	7	5	X			
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	13	10	14	11	9	14	9	8	13	8	7	11	7	6	10	6	5
			Exposed	14	14	14	14	14	14	13	14	14	12	14	13	11	14	12	10	14	11	9	14	10	8	13	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X			
		20-27	Interior	20	20	20	20	20	20	20	20	20	20	20	17	20	20	15	20	20	14	20	19	12	20	16	10	20	13	9	20	11	8	17	10	7	15	9	6	13	8	5				
			Exposed	20	20	15	20	20	13	20	18	12	20	16	11	20	14	10	20	13	9	20	12	8	17	10	7	15	8	6	13	7	5	11	6	4	10	5	4	9	5	X				
		27-45	Interior	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	18	23	23	16	22	19	13	19	17	11	16	14	9	14	12	8	12	11	7	11	10	6					
			Exposed	23	23	20	23	23	17	23	22	15	22	20	13	20	18	12	18	16	10	17	15	9	14	13	8	12	11	6	10	9	5	9	8	5	8	7	4	7	6	4				
	C	0-7	Interior	14	14	14	14	14	14	14	14	14	14	13	14	14	12	14	14	11	14	14	10	14	14	10	14	12	8	14	10	7	12	9	6	10	7	5	9	7	X	8	6	X		
			Exposed	14	14	12	14	14	10	14	13	9	14	12	8	14	11	8	14	10	7	13	9	6	11	8	5	9	6	X	8	5	X	7	5	X	6	X	X	5	X	X				
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	13	14	14	11	14	13	10	14	12	9	14	10	9	14	9	7	12	7	6	10	6	5	9	6	5	8	5	X	7	X	X		
			Exposed	14	13	10	14	11	9	14	10	8	14	9	7	13	8	7	12	7	6	10	7	5	9	6	5	7	5	X	6	X	X	6	X	X	5	X	X	X	X	X				
		20-27	Interior	20	20	17	20	20	14	20	19	13	20	17	11	20	15	10	20	14	9	20	13	9	19	11	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X				
			Exposed	20	15	10	20	14	9	20	12	8	19	11	7	17	10	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X	8	X	X	7	X	X	6	X	X				
		27-45	Interior	23	23	22	23	23	19	23	23	16	23	21	14	22	19	13	20	18	11	18	16	10	15	13	8	13	11	7	11	10	6	10	9	5	8	8	4	7	7	4				
			Exposed	22	19	13	19	17	11	17	15	10	15	14	9	14	12	8	13	11	7	12	10	6	10	9	5	8	7	4	7	6	4	6	6	X	5	5	X	5	X	X				
	D	0-7	Interior	14	14	14	14	14	14	14	14	14	12	14	14	11	14	14	10	14	13	9	14	12	8	14	10	7	12	8	6	10	7	5	9	6	X	8	5	X	7	5	X			
			Exposed	14	14	10	14	14	13	9	14	11	8	14	10	7	13	9	6	11	8	6	10	7	5	9	6	X	7	5	X	6	X	X	6	X	X	5	X	X	X	X				
		7-20	Interior	14	14	13	14	14	12	14	13	11	14	12	10	14	11	9	14	10	8	14	9	7	11	7	6	10	6	5	8	5	X	7	5	X	6	X	X	6	X	X				
			Exposed	14	10	9	14	9	8	13	8	7	12	7	6	11	7	6	10	6	5	9	6	5	7	5	X	6	X	X	5	X	X	X	X	X	X	X	X	X	X					
		20-27	Interior	21	20	13	21	18	12	21	16	11	21	14	10	21	13	9	20	12	8	19	11	7	16	9	6	13	8	5	11	6	4	10	6	4	9	5	X	8	X	X				
			Exposed	21	13	9	20	11	8	18	10	7	16	9	6	14	8	5	13	7	5	12	7	5	10	6	4	8	5	X	7	X	X	6	X	X	6	X	X	5	X	X				
27-45		Interior	24	24	17	24	22	15	22	20	13	20	18	12	18	16	10	16	15	9	15	13	8	13	11	7	11	10	6	9	8	5	8	7	4	7	6	4	6	6	X					
		Exposed	18	16	10	16	14	9	14	13	8	13	12	7	12	10	6	11	9	6	10	9	5	8	7	4	7	6	4	6	5	X	5	5	X	X	X	X	X	X	X					
30	B	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	10	13	12	9	13	11	8	13	9	7	12	8	6			
			Exposed	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	13	9	13	11	8	13	9	6	11	8	6	10	7	5	8	6	X	7	5	X				
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	13	10	14	11	9	14	9	8	13	8	7	11	7	6	10	6	5
			Exposed	14	14	14	14	14	13	14	14	12	14	13	11	14	12	10	14	11	9	14	10	8	13	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X				
		20-27	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	15	17	17	14	17	17	12	17	16	10	17	13	9	17	12	8	17	10	7	15	9	6	13	8	5				
			Exposed	17	17	15	17	17	13	17	17	12	17	16	11	17	14	10	17	13	9	17	12	8	17	10	7	15	8	6	13	7	5	11	6	4	10	5	4	9	5	X				
		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	17	11	16	14	9	14	12	8	12	11	7	11	10	6				
			Exposed	19	19	19	19	19	17	19	19	15	19	19	13	19	18	12	18	16	10	17	15	9	14	13	8	12	11	6	10	9	5	9	8	5	8	7	4	7	6	4				
	C	0-7	Interior	13	13	13	13	13	13	13	13	13	13	13	13	13	12	13	13	11	13	13	10	13	12	8	13	10	7	12	9	6	10	7	5	9	7	X	8	6	X					
			Exposed	13	13	12	13	13	10	13	13	9	13	12	8	13	11	8	13	10	7	13	9	6	11	8	5	9	6	X	8	5	X	7	5	X	6	X	X	5	X	X				
		7-20	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	13	10	14	11	9	14	9	8	13	8	7	11	7	6	10	6	5
			Exposed	14	13	10	14	11	9	14	10	8	14	9	7	13	8	7	12	7	6	10	7	5	9	6	5	7	5	X	6	X	X	6	X	X	5	X	X	X	X	X				
		20-27	Interior	17	17	17	17	17	14	17	17	13	17	17	11	17	15	10	17	14	9	17	13	9	17	11	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X				
			Exposed	17	15	10	17	14	9	17	12	8	17	11	7	17	10	7	16	9	6	14	8	5	12	7	5	10	6	4	9	5	X	8	X	X	7	X	X	6	X	X				
		27-45	Interior	19	19	19	19	19	19	19	19	16	19	19	14	19																														

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																											
				Roof Wind Zone																																											
				90			95			100			105			110			115			120			130			140			150			160			170			180							
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3											
40	B	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	9	7	11	8	6							
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	9	11	11	8	11	9	6	11	8	6	10	7	5	8	6	X	7	5	X					
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	12	10	12	11	9	12	9	8	11	8	7	11	7	6	10	6	5		
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	11	9	12	10	8	12	8	7	11	7	6	9	6	5	8	5	X	7	X	X	6	X	X					
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	14	14	10	14	13	9	14	12	8	14	11	8	14	10	7	14	9	6	13	8	5		
			Exposed	14	14	14	14	14	13	14	14	12	14	14	11	14	14	10	14	13	9	14	12	8	14	10	7	14	8	6	13	7	5	11	6	4	10	5	4	9	5	X					
	27-45	Interior	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	17	17	16	17	13	9	14	12	8	14	12	8	12	11	7	11	10	6	6					
		Exposed	17	17	17	17	17	17	17	17	17	15	17	17	13	17	17	12	17	16	10	17	15	9	14	13	8	12	11	6	10	9	5	9	8	5	8	7	4	7	6	4					
	C	0-7	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	8	11	10	7	11	9	6	11	8	5	9	7	X	8	6	X				
			Exposed	11	11	11	11	11	11	10	11	11	9	11	11	8	11	11	8	11	10	7	11	9	6	11	8	5	9	6	X	8	5	X	7	5	X	6	X	X	5	X	X				
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	12	10	9	12	9	7	11	7	6	10	6	5	8	5	X	7	X	X	X	X	X		
			Exposed	12	12	10	12	11	9	12	10	8	12	9	7	12	8	7	12	7	6	10	7	5	9	6	5	7	5	X	6	X	X	6	X	X	5	X	X	X	X	X					
		20-27	Interior	14	14	14	14	14	14	14	14	14	14	13	14	14	11	14	14	10	14	14	9	14	13	9	14	11	7	14	9	6	13	8	5	12	7	5	10	6	4	9	5	X			
			Exposed	14	14	10	14	14	9	14	12	8	14	11	7	14	10	7	14	9	6	14	8	5	12	7	5	10	6	4	9	5	X	8	X	X	7	X	X	6	X	X					
	27-45	Interior	17	17	17	17	17	17	17	17	16	17	17	14	17	17	13	16	16	11	16	16	10	15	13	8	13	11	7	11	10	6	10	9	5	8	8	4	7	7	4						
		Exposed	17	17	13	17	17	11	17	15	10	15	14	9	14	12	8	13	11	7	12	10	6	10	9	5	8	7	4	7	6	4	6	5	X	5	5	X	5	X	X						
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	10	7	12	8	6	10	7	5	9	6	X	8	5	X	7	5	X	X					
			Exposed	12	12	10	12	12	9	12	11	8	12	10	7	12	9	6	11	8	6	10	7	5	9	6	X	7	5	X	6	X	X	6	X	X	5	X	X	X	X	X					
7-20		Interior	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	11	9	12	10	8	12	9	7	11	7	6	10	6	5	8	5	X	7	X	X	6	X	X	X	X	X				
		Exposed	12	10	9	12	9	8	12	8	7	12	7	6	11	7	6	10	6	5	9	6	5	7	5	X	6	X	X	5	X	X	X	X	X	X	X	X	X	X	X						
20-27		Interior	15	15	13	15	15	12	15	15	11	15	14	10	15	13	9	15	12	8	15	11	7	15	9	6	13	8	5	11	6	4	10	6	4	9	5	X	8	X	X	X	X				
		Exposed	15	13	9	15	11	8	15	10	7	15	9	6	14	8	5	13	7	5	12	7	5	10	6	4	8	5	X	7	X	X	6	X	X	5	X	X	5	X	X						
27-45	Interior	18	18	17	18	18	15	18	18	13	17	17	12	17	16	10	16	15	9	15	13	8	13	11	7	11	10	6	9	8	5	8	7	4	7	6	4	6	6	X	X						
	Exposed	18	16	10	16	14	9	14	13	8	13	12	7	17	12	10	6	11	9	6	10	9	5	8	7	4	7	6	5	X	5	5	X	X	X	X	X	X	X	X							
50	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9			
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
			Exposed	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	9	12	12	8	12	10	7	12	8	6	12	8	5	11	6	4	10	5	4	9	5	X		
	27-45	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
		Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	15	10	15	15	9	14	13	8	12	11	6	10	9	5	9	8	5	8	7	4	7	6	4			
	C	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9		
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9		
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
		20-27	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
			Exposed	12	12	10	12																																								



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				Roof Wind Zone																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				1	2	3	1	2	3	1	2	3	1	2	3	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	46	46	40	46	46	35	46	46	32	46	41	28	46	37	26	46	33	23	43	30	21	36	25	18	30	22	15	26	19	13	22	16	11	20	14	10	17	13	9	
			Exposed	46	37	25	46	33	23	41	29	20	36	26	18	33	23	16	30	21	15	27	19	14	23	16	11	19	14	10	17	12	8	14	10	7	13	9	6	11	8	X	
		7-20	Interior	46	43	35	46	38	31	46	34	28	46	30	25	43	27	22	39	25	20	35	23	18	30	19	16	25	16	13	22	14	11	19	12	10	16	11	9	15	9	8	
			Exposed	43	27	22	38	24	20	34	22	18	30	19	16	27	18	14	25	16	13	23	15	12	19	12	10	16	10	9	14	9	7	12	8	6	11	7	X	9	6	X	
		20-27	Interior	47	47	44	47	47	37	47	41	32	47	37	28	47	33	24	47	30	21	47	27	19	40	23	15	34	20	13	29	17	11	26	15	10	22	13	9	20	11	8	
			Exposed	47	33	24	47	29	21	47	26	18	41	24	16	37	21	14	34	19	13	31	18	12	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	
		27-45	Interior	47	47	47	47	47	47	47	47	47	40	47	47	35	47	42	31	42	38	27	39	34	24	32	29	20	28	25	16	24	21	14	21	18	12	18	16	10	16	14	9
			Exposed	47	41	31	41	37	27	37	33	23	33	30	20	30	27	18	27	24	16	25	22	15	21	19	12	18	16	10	15	14	8	13	12	7	12	11	6	10	9	6	
	C	0-7	Interior	46	40	27	46	35	24	45	31	22	39	28	20	35	25	18	32	23	16	29	21	15	24	18	12	21	15	10	18	13	9	16	11	8	14	10	7	12	9	6	
			Exposed	35	25	18	31	22	16	28	20	14	25	18	13	23	16	11	20	15	10	19	13	9	16	11	8	13	10	7	12	8	X	10	7	X	9	6	X	8	X	X	
		7-20	Interior	46	29	24	41	26	21	36	23	19	33	21	17	29	19	15	27	17	14	24	16	13	20	13	11	17	11	9	15	10	8	13	8	7	11	7	6	10	6	X	
			Exposed	29	19	15	26	17	14	23	15	12	21	13	11	19	12	10	17	11	9	16	10	8	13	8	7	11	7	6	10	6	X	8	X	X	7	X	X	6	X	X	
		20-27	Interior	47	36	26	47	32	23	47	28	20	45	25	17	40	23	15	36	21	14	33	19	13	28	16	11	24	14	9	20	12	8	18	10	7	16	9	6	14	8	5	
			Exposed	40	23	15	36	20	14	32	18	12	28	16	11	26	15	10	23	13	9	21	12	8	18	10	7	15	9	6	13	8	5	11	7	X	10	X	X	9	X	X	
		27-45	Interior	47	46	33	46	40	29	40	35	25	36	32	22	32	29	20	29	26	18	27	24	16	22	20	13	19	17	11	17	15	9	14	13	8	13	11	7	11	10	6	
			Exposed	32	29	20	29	25	17	26	23	15	23	21	13	21	19	12	19	17	11	17	15	10	15	13	8	12	11	7	11	10	6	9	8	5	8	7	X	7	6	X	
	D	0-7	Interior	46	33	23	41	29	20	36	26	18	33	23	16	29	21	15	27	19	13	24	17	12	20	15	10	17	12	9	15	11	7	13	9	7	11	8	X	10	7	X	
			Exposed	29	21	15	26	19	13	23	17	12	21	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	X	10	7	X	8	6	X	7	X	X	6	X	X	
		7-20	Interior	38	24	20	34	22	18	30	19	16	27	17	14	24	16	13	22	14	12	20	13	11	17	11	9	14	9	8	12	8	7	11	7	X	10	6	X	8	X	X	
			Exposed	24	16	13	22	14	11	19	12	10	17	11	9	16	10	8	14	9	8	13	8	7	11	7	X	9	6	X	8	X	X	7	X	X	6	X	X				
		20-27	Interior	47	30	21	47	26	18	41	23	16	37	21	14	33	19	13	30	17	12	28	16	11	23	13	9	20	11	8	17	10	7	15	8	6	13	7	5	11	7	X	
			Exposed	33	19	13	29	17	11	26	15	10	24	14	9	21	12	8	19	11	8	18	10	7	15	9	6	13	7	5	11	6	X	10	X	X	8	X	X	7	X	X	
		27-45	Interior	42	37	27	37	33	23	33	29	20	30	26	18	27	24	16	24	22	14	22	20	13	19	17	11	16	14	9	14	12	7	12	11	6	11	9	6	9	8	5	
			Exposed	27	24	16	24	21	14	21	19	12	19	17	11	17	16	10	16	14	9	14	13	8	12	11	7	10	9	6	9	8	5	8	7	X	7	6	X	6	X	X	
10	B	0-7	Interior	33	33	33	33	33	33	33	33	32	33	33	28	33	33	26	33	33	23	33	30	21	33	25	18	30	22	15	26	19	13	22	16	11	20	14	10	17	13	9	
			Exposed	33	33	25	33	33	23	33	29	20	33	26	18	33	23	16	30	21	15	27	19	14	23	16	11	19	14	10	17	12	8	14	10	7	13	9	6	11	8	X	
		7-20	Interior	33	33	33	33	33	31	33	33	28	33	30	25	33	27	22	33	25	20	33	23	18	30	19	16	25	16	13	22	14	11	19	12	10	16	11	9	15	9	8	
			Exposed	33	27	22	33	24	20	33	22	18	30	19	16	27	18	14	25	16	13	23	15	12	19	12	10	16	10	9	14	9	7	12	8	6	11	7	X	9	6	X	
		20-27	Interior	43	43	43	43	43	37	43	41	32	43	37	28	43	33	24	43	30	21	43	27	19	40	23	15	34	20	13	29	17	11	26	15	10	22	13	9	20	11	8	
			Exposed	43	33	24	43	29	21	43	26	18	41	24	16	37	21	14	34	19	13	31	18	12	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5	
		27-45	Interior	46	46	46	46	46	46	46	46	40	46	46	35	46	42	31	42	38	27	39	34	24	32	29	20	28	25	16	24	21	14	21	18	12	18	16	10	16	14	9	
			Exposed	46	41	31	41	37	27	37	33	23	33	30	20	30	27	18	27	24	16	25	22	15	21	19	12	18	16	10	15	14	8	13	12	7	12	11	6	10	9	6	
	C	0-7	Interior	33	33	27	33	33	24	33	31	22	33	28	20	33	25	18	32	23	16	29	21	15	24	18	12	21	15	10	18	13	9	16	11	8	14	10	7	12	9	6	
			Exposed	33	25	18	31	22	16	28	20	14	25	18	13	23	16	11	20	15	10	19	13	9	16	11	8	13	10	7	12	8	X	10	7	X	9	6	X	8	X	X	
		7-20	Interior	33	29	24	33	26	21	33	23	19	33	21	17	29	19	15	27	17	14	24	16	13	20	13	11	17	11	9	15	10	8	13	8	7	11	7	6	10	6	X	
			Exposed	29	19	15	26	17	14	23	15	12	21	13	11	19	12	10	17	11	9	16	10	8	13	8	7	11	7	6	10	6	X	8	X	X	7	X	X	6	X	X	
		20-27	Interior	43	36	26	43	32	23	43	28	20	43	25	17	40	23	15	36	21	14	33	19	13	28	16	11	24	14	9	20	12	8	18	10	7	16	9	6	14	8	5	
			Exposed	40	23	15	36	20	14	32	18	12	28	16	11	26	15	10	23	13	9	21	12	8	18	10	7	15	9	6	13	8	5	11	7	X	10	X					

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																								
				90			95			100			105			110			115			120			130			140			150			160			170			180				
				Roof Wind Zone																																								
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3									
20	B	0-7	Interior	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	22	15	23	19	13	22	16	11	20	14	10	17	13	9		
			Exposed	23	23	23	23	23	23	23	23	20	23	23	18	23	23	16	23	21	15	23	19	14	23	16	11	19	14	10	17	12	8	14	10	7	13	9	6	11	8	X		
		7-20	Interior	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	20	23	23	18	23	19	16	23	16	13	22	14	11	19	12	10	16	11	9	15	9	8	
			Exposed	23	23	22	23	23	20	23	22	18	23	19	16	23	18	14	23	16	13	23	15	12	19	12	10	16	10	9	14	9	7	12	8	6	11	7	X	9	6	X		
		20-27	Interior	34	34	34	34	34	34	34	34	34	34	32	34	34	28	34	33	24	34	30	21	34	27	19	34	23	15	34	20	13	29	17	11	26	15	10	22	13	9	20	11	8
			Exposed	34	33	24	34	29	21	34	26	18	34	24	16	34	21	14	34	19	13	31	18	12	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5		
		27-45	Interior	38	38	38	38	38	38	38	38	38	38	38	38	38	38	31	38	38	27	38	34	24	32	29	20	28	25	16	24	21	14	21	18	12	18	16	10	16	14	9		
			Exposed	38	38	31	38	37	27	37	33	23	33	30	20	30	27	18	27	24	16	25	22	15	21	19	12	18	16	10	15	14	8	13	12	7	12	11	6	10	9	6		
	C	0-7	Interior	23	23	23	23	23	23	23	23	22	23	23	20	23	23	18	23	23	16	23	21	15	23	18	12	21	15	10	18	13	9	16	11	8	14	10	7	12	9	6		
			Exposed	23	23	18	23	22	16	23	20	14	23	18	13	23	16	11	20	15	10	19	13	9	16	11	8	13	10	7	12	8	X	10	7	X	9	6	X	8	X	X		
		7-20	Interior	23	23	23	23	23	21	23	19	23	21	17	23	19	15	23	17	14	23	16	13	20	13	11	17	11	9	15	10	8	13	8	7	11	7	6	10	6	X			
			Exposed	23	19	15	23	17	14	23	15	12	21	13	11	19	12	10	17	11	9	16	10	8	13	8	7	11	7	6	10	6	X	8	X	X	7	X	X	6	X	X		
		20-27	Interior	34	34	26	34	32	23	34	28	20	34	25	17	34	23	15	34	21	14	33	19	13	28	16	11	24	14	9	20	12	8	18	10	7	16	9	6	14	8	5		
			Exposed	34	23	15	34	20	14	32	18	12	28	16	11	26	15	10	23	13	9	21	12	8	18	10	7	15	9	6	13	8	5	11	7	X	10	X	X	9	X	X		
		27-45	Interior	38	38	33	38	38	29	38	35	25	36	32	22	32	29	20	29	26	18	27	24	16	22	20	13	19	17	11	17	15	9	14	13	8	13	11	7	11	10	6		
			Exposed	32	29	20	29	25	17	26	23	15	23	21	13	21	19	12	19	17	11	17	15	10	15	13	8	12	11	7	11	10	6	9	8	5	8	7	X	7	6	X		
	D	0-7	Interior	23	23	23	23	23	20	23	23	18	23	23	16	23	21	15	23	19	13	23	17	12	20	15	10	17	12	9	15	11	7	13	9	7	11	8	X	10	7	X		
			Exposed	23	21	15	23	19	13	23	17	12	21	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	X	10	7	X	8	6	X	7	X	X	6	X	X		
		7-20	Interior	23	23	20	23	22	18	23	19	16	23	17	14	23	16	13	22	14	12	20	13	11	17	11	9	14	9	8	12	8	7	11	7	X	10	6	X	8	X	X		
			Exposed	23	16	13	22	14	11	19	12	10	17	11	9	16	10	8	14	9	8	13	8	7	11	7	X	9	6	X	8	X	X	7	X	X	6	X	X	X	X			
		20-27	Interior	35	30	21	35	26	18	35	23	16	35	21	14	33	19	13	30	17	12	28	16	11	23	13	9	20	11	8	17	10	7	15	8	6	13	7	5	11	7	X		
			Exposed	33	19	13	29	17	11	26	15	10	24	14	9	21	12	8	19	11	8	18	10	7	15	9	6	13	7	5	11	6	X	10	X	X	8	X	X	7	X	X		
		27-45	Interior	39	37	27	37	33	23	33	29	20	30	26	18	27	24	16	24	22	14	22	20	13	19	17	11	16	14	9	14	12	7	12	11	6	11	9	6	9	8	5		
			Exposed	27	24	16	24	21	14	21	19	12	19	17	11	17	16	10	16	14	9	14	13	8	12	11	7	10	9	6	9	8	5	8	7	6	X	6	X	X				
30	B	0-7	Interior	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	15	22	19	13	22	16	11	20	14	10	17	13	9			
			Exposed	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	19	14	22	16	11	19	14	10	17	12	8	14	10	7	13	9	6	11	8	X			
		7-20	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	22	23	23	20	23	23	18	23	19	16	23	16	13	22	14	11	19	12	10	16	11	9	15	9	8	X		
			Exposed	23	23	22	23	23	20	23	22	18	23	19	16	23	18	14	23	16	13	23	15	12	19	12	10	16	10	9	14	9	7	12	8	6	11	7	X	9	6	X		
		20-27	Interior	28	28	28	28	28	28	28	28	28	28	28	28	28	28	24	28	28	21	28	27	19	28	23	15	28	20	13	28	17	11	26	15	10	22	13	9	20	11	8		
			Exposed	28	28	24	28	28	21	28	26	18	28	24	16	28	21	14	28	19	13	28	18	12	26	15	10	22	13	9	19	11	7	16	9	6	14	8	6	13	7	5		
		27-45	Interior	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	32	27	32	27	32	24	32	29	20	28	25	16	24	21	14	21	18	12	18	16	10	16	14	9		
			Exposed	32	32	31	32	32	27	32	32	23	32	30	20	30	27	18	27	24	16	25	22	15	21	19	12	18	16	10	15	14	8	13	12	7	12	11	6	10	9	6		
	C	0-7	Interior	22	22	22	22	22	22	22	22	22	22	20	22	22	18	22	22	16	22	21	15	22	18	12	21	15	10	18	13	9	16	11	8	14	10	7	12	9	6			
			Exposed	22	22	18	22	22	16	22	20	14	22	18	13	22	16	11	20	15	10	19	13	9	16	11	8	13	10	7	12	8	X	10	7	X	9	6	X	8	X	X		
		7-20	Interior	23	23	23	23	23	21	23	19	23	21	17	23	19	15	23	17	14	23	16	13	20	13	11	17	11	9	15	10	8	13	8	7	11	7	6	10	6	X			
			Exposed	23	19	15	23	17	14	23	15	12	21	13	11	19	12	10	17	11	9	16	10	8	13	8	7	11	7	6	10	6	X	8	X	X	7	X	X	6	X	X		
		20-27	Interior	28	28	26	28	28	23	28	28	20	28	25	17	28	23	15	28	21	14	28	19	13	28	16	11	24	14	9	20	12	8	18	10	7	16	9	6	14	8	5		
			Exposed	28	23	15	28	20	14	28	18	12	28	16	11	26	15	10	23	13	9	21	12	8	18	10	7	15	9	6</														



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180		
				Roof Wind Zone																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
0	B	0-7	Interior	38	38	33	38	38	30	38	38	26	38	34	24	38	31	21	38	28	19	36	25	18	30	21	15	25	18	13	22	15	11	19	13	9	16	12	8	14	10	7
			Exposed	38	31	21	38	27	19	34	24	17	30	22	15	27	20	14	25	18	12	23	16	11	19	14	9	16	12	8	14	10	7	12	9	6	11	8	X	9	7	X
		7-20	Interior	38	36	29	38	32	26	38	28	23	38	25	21	36	23	19	32	21	17	29	19	15	25	16	13	21	13	11	18	12	9	16	10	8	14	9	7	12	8	6
			Exposed	36	23	19	32	20	16	28	18	15	25	16	13	23	15	12	21	13	11	19	12	10	16	10	8	13	9	7	12	7	6	10	6	X	9	X	X	8	X	X
		20-27	Interior	39	39	37	39	39	31	39	34	26	39	31	23	39	28	20	39	25	18	39	23	16	34	19	13	29	16	11	25	14	9	21	12	8	19	11	7	16	9	6
			Exposed	39	28	20	39	24	17	39	22	15	35	20	13	31	18	12	28	16	11	26	15	10	22	12	8	18	11	7	16	9	6	14	8	5	12	7	5	11	6	X
	27-45	Interior	40	40	40	40	40	39	40	40	33	40	40	29	40	35	26	35	31	23	32	29	20	27	24	17	23	21	14	20	18	12	17	15	10	15	13	8	13	12	7	
		Exposed	40	35	26	34	31	22	31	27	19	28	25	17	25	22	15	23	20	14	21	18	12	17	16	10	15	13	8	13	11	7	11	10	6	10	9	5	9	8	5	
	C	0-7	Interior	38	33	23	38	29	20	37	26	18	33	23	16	30	21	15	27	19	13	24	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	X	10	7	X
			Exposed	29	21	15	26	19	13	23	17	12	21	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	X	10	7	X	8	6	X	7	X	X	6	X	X
		7-20	Interior	38	24	20	34	22	18	30	19	16	27	17	14	25	16	13	22	14	12	20	13	11	17	11	9	14	9	8	12	8	7	11	7	6	9	6	X	8	X	X
			Exposed	24	16	13	22	14	11	19	12	10	17	11	9	16	10	8	14	9	8	13	8	7	11	7	6	9	6	X	8	X	X	7	X	X	6	X	X	X	X	X
		20-27	Interior	39	30	22	39	26	19	39	24	16	38	21	14	34	19	13	30	17	12	28	16	11	23	13	9	20	11	8	17	10	7	15	8	6	13	7	5	11	7	X
			Exposed	34	19	13	30	17	11	26	15	10	24	14	9	21	12	8	19	11	7	18	10	7	15	9	6	13	7	5	11	6	X	9	X	X	8	X	X	7	X	X
	27-45	Interior	40	38	28	39	33	24	33	30	21	30	27	19	27	24	17	24	22	15	22	20	13	19	17	11	16	14	9	14	12	8	12	11	6	11	9	6	9	8	5	
		Exposed	27	24	16	24	21	14	21	19	13	19	17	11	17	15	10	16	14	9	14	13	8	12	11	6	10	9	6	9	8	5	8	7	X	7	6	X	6	X	X	
	D	0-7	Interior	38	27	19	34	24	17	30	22	15	27	19	14	24	18	12	22	16	11	20	14	10	17	12	8	14	10	7	12	9	6	11	8	X	9	7	X	8	6	X
			Exposed	24	17	12	22	16	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	6	11	8	X	9	7	X	8	X	X	7	X	X	6	X	X	X	X	
7-20		Interior	32	20	17	28	18	15	25	16	13	23	14	12	20	13	11	18	12	10	17	11	9	14	9	7	12	8	6	10	7	X	9	6	X	8	X	X	7	X	X	
		Exposed	20	13	11	18	12	9	16	10	8	14	9	8	13	8	7	12	8	6	11	7	6	9	6	X	8	X	X	7	X	X	X	X	X	X	X	X	X	X		
20-27		Interior	39	25	17	39	22	15	35	20	13	31	18	12	28	16	11	25	14	10	23	13	9	19	11	7	16	9	6	14	8	5	12	7	5	11	6	X	9	X	X	
		Exposed	28	16	11	25	14	9	22	13	8	20	11	8	18	10	7	16	9	6	15	8	6	12	7	5	11	6	X	9	X	X	8	X	X	7	X	X	6	X	X	
27-45	Interior	35	31	22	31	27	19	28	25	17	25	22	15	22	20	13	20	18	12	19	17	11	16	14	9	13	12	7	11	10	6	10	9	5	9	8	5	8	7	X		
	Exposed	22	20	13	20	18	12	18	16	10	16	14	9	14	13	8	13	12	7	12	11	6	10	9	5	9	8	5	7	7	X	6	6	X	X	X	X	X	X	X		
10	B	0-7	Interior	27	27	27	27	27	27	27	26	27	27	24	27	27	21	27	27	19	27	25	18	27	21	15	25	18	13	22	15	11	19	13	9	16	12	8	14	10	7	
			Exposed	27	27	21	27	27	19	27	24	17	27	22	15	27	20	14	25	18	12	23	16	11	19	14	9	16	12	8	14	10	7	12	9	6	11	8	X	9	7	X
		7-20	Interior	27	27	27	27	27	26	27	27	23	27	25	21	27	23	19	27	21	17	27	19	15	25	16	13	21	13	11	18	12	9	16	10	8	14	9	7	12	8	6
			Exposed	27	23	19	27	20	16	27	18	15	25	16	13	23	15	12	21	13	11	19	12	10	16	10	8	13	9	7	12	7	6	10	6	X	9	X	X	8	X	X
		20-27	Interior	36	36	36	36	36	31	36	34	26	36	31	23	36	28	20	36	25	18	36	23	16	34	19	13	29	16	11	25	14	9	21	12	8	19	11	7	16	9	6
			Exposed	36	28	20	36	24	17	36	22	15	35	20	13	31	18	12	28	16	11	26	15	10	22	12	8	18	11	7	16	9	6	14	8	5	12	7	5	11	6	X
	27-45	Interior	38	38	38	38	38	38	38	38	33	38	38	29	38	35	26	35	31	23	32	29	20	27	24	17	23	21	14	20	18	12	17	15	10	15	13	8	13	12	7	
		Exposed	38	35	26	34	31	22	31	27	19	28	25	17	25	22	15	23	20	14	21	18	12	17	16	10	15	13	8	13	11	7	11	10	6	10	9	5	9	8	5	
	C	0-7	Interior	27	27	23	27	27	20	27	26	18	27	23	16	27	21	15	27	19	13	24	17	12	20	15	10	17	12	9	15	11	7	13	9	6	11	8	X	10	7	X
			Exposed	27	21	15	26	19	13	23	17	12	21	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	X	10	7	X	8	6	X	7	X	X	6	X	X
		7-20	Interior	27	24	20	27	22	18	27	19	16	27	17	14	25	16	13	22	14	12	20	13	11	17	11	9	14	9	8	12	8	7	11	7	6	9	6	X	8	X	X
			Exposed	24	16	13	22	14	11	19	12	10	17	11	9	16	10	8	14	9	8	13	8	7	11	7	6	9	6	X	8	X	X	7	X	X	6	X	X	X	X	
		20-27	Interior	36	30	22	36	26	19	36	24	16	36	21	14	34	19	13	30	17	12	28	16	11	23	13	9	20	11	8	17	10	7	15	8	6	13	7	5	11	7	X
			Exposed	34	19	13	30	17	11	26	15	10	24	14	9	21	12	8	19	11	7	18	10	7	15	9	6	13	7	5	11	6	X	9	X	X	8	X	X	7	X	X
	27-45	Interior	38	38	28	38	33	24																																		

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																								
				Roof Wind Zone																																								
				90			95			100			105			110			115			120			130			140			150			160			170			180				
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3								
20	B	0-7	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	19	19	15	19	18	13	19	15	11	19	13	9	16	12	8	14	10	7			
			Exposed	19	19	19	19	19	19	19	19	17	19	19	15	19	19	14	19	18	12	19	16	11	19	14	9	16	12	8	14	10	7	12	9	6	11	8	X	9	7	X		
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	16	13	19	16	13	19	13	11	18	12	9	16	10	8	14	9	7	12	8	6
			Exposed	19	19	19	19	19	19	16	19	18	15	19	16	13	19	15	12	19	13	11	19	12	10	16	10	8	13	9	7	12	7	6	10	6	X	9	X	X	8	X	X	
		20-27	Interior	28	28	28	28	28	28	28	28	26	28	28	23	28	28	20	28	25	18	28	23	16	28	19	13	28	16	11	25	14	9	21	12	8	19	11	7	16	9	6		
			Exposed	28	28	20	28	24	17	28	22	15	28	20	13	28	18	12	28	16	11	26	15	10	22	12	8	18	11	7	16	9	6	14	8	5	12	7	5	11	6	X		
	27-45	Interior	31	31	31	31	31	31	31	31	31	31	31	29	31	31	26	31	23	31	29	20	27	24	17	23	21	14	20	18	12	17	15	10	15	13	8	13	12	7				
		Exposed	31	31	26	31	31	22	31	27	19	28	25	17	25	22	15	23	20	14	21	18	12	17	16	10	15	13	8	13	11	7	11	10	6	10	9	5	9	8	5			
	C	0-7	Interior	19	19	19	19	19	19	19	19	18	19	19	16	19	19	15	19	19	13	19	17	12	19	15	10	17	12	9	15	11	7	13	9	6	11	8	X	10	7	X		
			Exposed	19	19	15	19	19	13	19	17	12	19	15	10	19	14	9	17	12	9	16	11	8	13	9	7	11	8	X	10	7	X	8	6	X	7	X	X	6	X	X		
		7-20	Interior	19	19	19	19	19	19	18	19	19	16	19	17	14	19	16	13	19	14	12	19	13	11	17	11	9	14	9	8	12	8	7	11	7	6	9	6	X	8	X	X	
			Exposed	19	16	13	19	14	11	19	12	10	17	11	9	16	10	8	14	9	8	13	8	7	11	7	6	9	6	X	8	X	X	7	X	X	6	X	X	X	X	X		
		20-27	Interior	28	28	22	28	26	19	28	24	16	28	21	14	28	19	13	28	17	12	28	16	11	23	13	9	20	11	8	17	10	7	15	8	6	13	7	5	11	7	X		
			Exposed	28	19	13	28	17	11	26	15	10	24	14	9	21	12	8	19	11	7	18	10	7	15	9	6	13	7	5	11	6	X	9	X	X	8	X	X	7	X	X		
	27-45	Interior	31	31	28	31	31	24	31	30	21	30	27	19	27	24	17	24	22	15	22	20	13	19	17	11	16	14	9	14	12	8	12	11	6	11	9	6	9	8	5			
		Exposed	27	24	16	24	21	14	21	19	13	19	17	11	17	15	10	16	14	9	14	13	8	12	11	6	10	9	6	10	9	8	5	8	7	X	7	6	X	6	X	X		
D	0-7	Interior	19	19	19	19	19	17	19	19	15	19	19	14	19	18	12	19	16	11	19	14	10	17	12	8	14	10	7	12	9	6	11	8	X	9	7	X	8	6	X			
		Exposed	19	17	12	19	16	11	19	14	10	17	12	9	16	11	8	14	10	7	13	9	6	11	8	X	9	7	X	8	X	X	7	X	X	6	X	X	X	X	X			
	7-20	Interior	19	19	17	19	18	15	19	16	13	19	14	12	19	13	11	18	12	10	17	11	9	14	9	7	12	8	6	10	7	X	9	6	X	8	X	X	7	X	X			
		Exposed	19	13	11	18	12	9	16	10	8	14	9	8	13	8	7	12	8	6	11	7	6	9	6	X	8	X	X	7	X	X	X	X	X	X	X	X	X	X				
	20-27	Interior	29	25	17	29	22	15	29	20	13	29	18	12	28	16	11	25	14	10	23	13	9	19	11	7	16	9	6	14	8	5	12	7	5	11	6	X	9	X	X			
		Exposed	28	16	11	25	14	9	22	13	8	20	11	8	18	10	7	16	9	6	15	8	6	12	7	5	11	6	X	9	X	X	8	X	X	7	X	X	6	X	X			
27-45	Interior	33	31	22	31	27	19	28	25	17	25	22	15	22	20	13	20	18	12	19	17	11	16	14	9	13	12	7	11	10	6	10	9	5	9	8	5	8	7	X				
	Exposed	22	20	13	20	18	12	18	16	10	16	14	9	14	13	8	13	12	7	12	11	6	10	9	5	9	8	5	7	7	X	6	6	X	X	X	X	X	X	X				
30	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	15	18	18	13	18	15	11	18	13	9	16	12	8	14	10	7			
			Exposed	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	18	12	18	16	11	18	14	9	16	12	8	14	10	7	12	9	6	11	8	X	9	7	X		
		7-20	Interior	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	17	19	19	15	19	16	13	19	13	11	18	12	9	16	10	8	14	9	7	12	8	6			
			Exposed	19	19	19	19	19	16	19	18	15	19	16	13	19	15	12	19	13	11	19	12	10	16	10	8	13	9	7	12	7	6	10	6	X	9	X	X	8	X	X		
		20-27	Interior	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	23	23	18	23	23	16	23	19	13	23	16	11	23	14	9	21	12	8	19	11	7	16	9	6		
			Exposed	23	23	20	23	23	17	23	22	15	23	20	13	23	18	12	23	16	11	23	15	10	22	12	8	18	11	7	16	9	6	14	8	5	12	7	5	11	6	X		
	27-45	Interior	27	27	27	27	27	27	27	27	27	27	27	27	27	26	27	27	23	27	27	20	27	24	17	23	21	14	20	18	12	17	15	10	15	13	8	13	12	7				
		Exposed	27	27	26	27	27	22	27	27	19	27	25	17	25	22	15	23	20	14	21	18	12	17	16	10	15	13	8	13	11	7	11	10	6	10	9	5	9	8	5			
	C	0-7	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	12	18	15	10	17	12	9	15	11	7	13	9	6	11	8	X	10	7	X		
			Exposed	18	18	15	18	18	13	18	17	12	18	15	10	18	14	9	17	12	9	16	11	8	13	9	7	11	8	X	10	7	X	8	6	X	7	X	X	6	X	X		
		7-20	Interior	19	19	19	19	19	18	19	19	16	19	17	14	19	16	13	19	14	12	19	13	11	17	11	9	14	9	8	12	8	7	11	7	6	9	6	X	8	X	X		
			Exposed	19	16	13	19	14	11	19	12	10	17	11	9	16	10	8	14	9	8	13	8	7	11	7	6	9	6	X	8	X	X	7	X	X	6	X	X	X	X	X		
		20-27	Interior	23	23	22	23	23	19	23	23	16	23	21	14	23	19	13	23	17	12	23	16	11	23	13	9	20	11	8	17	10	7	15	8	6	13	7	5	11	7	X		
			Exposed	23	19	13	23	17	11	23	15	10	23	14	9	21	12	8	19	11	7	18	10	7	15	9	6	13	7	5	11	6	X	9	X	X	8	X	X	7	X	X		
	27-45	Interior	27	27	27	27	27	24	27	27	21	27																																



**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																																																																																																																																																																																																																																					
				Roof Wind Zone																																																																																																																																																																																																																																																																																					
				90			95			100			105			110			115			120			130			140			150			160			170			180																																																																																																																																																																																																																																																	
				1	2	3	1	2	3	1	2	3	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	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7																																																																																																																																																																																																																																																		
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	8	10	10	7	10	9	6	10	8	X	9	7	X																																																																																																																																																																																																																																															
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	8	11	9	7	11	8	6																																																																																																																																																																																																																																																
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	10	8	11	9	7	11	7	6	10	6	X	9	X	X	8	X	X																																																																																																																																																																																																																																															
		20-27	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	11	15	14	9	15	12	8	15	11	7	14	9	6																																																																																																																																																																																																																																																
			Exposed	15	15	15	15	15	15	15	15	15	15	15	15	15	13	15	15	12	15	15	11	15	15	10	15	12	8	15	11	7	15	9	6	14	8	5	12	7	5	11	6	X																																																																																																																																																																																																																																													
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	14	17	17	12	16	15	10	15	13	8	13	12	7																																																																																																																																																																																																																																															
			Exposed	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	18	18	14	18	18	12	17	16	10	15	13	8	13	11	7	11	10	6	10	9	5	9	8	5																																																																																																																																																																																																																																													
	C	0-7	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	8	X	10	7	X																																																																																																																																																																																																																																																			
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	9	10	10	8	10	9	7	10	8	X	10	7	X	8	6	X	7	X	X	6	X	X																																																																																																																																																																																																																																															
		7-20	Interior	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	8	11	7	11	7	6	9	6	X	8	X	X																																																																																																																																																																																																																																															
			Exposed	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	9	11	8	11	8	7	11	7	6	9	6	X	8	X	X																																																																																																																																																																																																																																															
		20-27	Interior	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	15	13	15	15	12	15	15	11	15	13	9	15	11	8	14	10	7	14	8	6	13	7	5	11	7	X																																																																																																																																																																																																																																													
			Exposed	15	15	13	15	15	11	15	15	10	15	14	9	15	12	8	15	11	7	15	10	7	15	9	6	13	7	5	11	6	X	9	X	X	8	X	X	7	X	X																																																																																																																																																																																																																																															
		27-45	Interior	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17	18	18	15	17	17	13	16	16	11	15	14	9	14	12	8	12	11	6	11	9	6	9	8	5																																																																																																																																																																																																																																														
			Exposed	18	18	16	18	18	14	18	18	13	18	17	11	17	15	10	16	14	9	14	13	8	12	11	6	10	9	6	9	8	5	8	7	X	7	6	X	6	X	X																																																																																																																																																																																																																																															
	D	0-7	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	12	8	12	10	7	12	9	6	11	8	X	9	7	X	8	6	X																																																																																																																																																																																																																																																
			Exposed	12	12	12	12	12	12	11	12	12	12	12	12	12	12	12	11	8	12	10	7	12	9	6	11	8	X	9	7	X	8	X	X	6	X	X	X	X	X																																																																																																																																																																																																																																																
		7-20	Interior	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	10	12	11	9	12	9	7	12	8	6	10	7	X	9	6	X	8	X	X	7	X	X																																																																																																																																																																																																																																													
			Exposed	12	12	11	12	12	9	12	10	8	12	9	8	12	8	7	12	8	6	11	7	6	9	6	X	8	X	X	7	X	X	X	X	X	X	X	X	X	X																																																																																																																																																																																																																																																
		20-27	Interior	16	16	16	16	16	16	15	16	16	16	13	16	16	12	16	16	11	16	14	10	16	13	9	16	11	7	15	9	6	14	8	5	12	7	5	11	6	X	9	X	X																																																																																																																																																																																																																																													
			Exposed	16	16	11	16	14	9	16	13	8	16	11	8	16	10	7	16	9	6	15	8	6	12	7	5	11	6	X	9	X	X	8	X	X	7	X	X	6	X	X																																																																																																																																																																																																																																															
		27-45	Interior	19	19	19	19	19	19	19	19	19	17	19	19	15	18	18	13	18	18	12	17	17	11	16	14	9	13	12	7	11	10	6	10	9	5	9	8	5	8	7	X																																																																																																																																																																																																																																														
			Exposed	19	19	13	19	18	12	18	16	10	16	14	9	14	13	8	13	12	7	12	11	6	10	9	5	9	8	5	7	7	X	6	6	X	X	X	X	X	X	X																																																																																																																																																																																																																																															
70	B	0-7	Interior	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	7																																																																																																																																																																																																																																														
			Exposed	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	X																																																																																																																																																																																																																																														
		7-20	Interior	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	8	6																																																																																																																																																																																																																																										
			Exposed	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				Roof Wind Zone																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				1	2	3	1	2	3	1	2	3	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	85	85	85	85	85	85	85	85	83	85	85	79	85	85	76	85	84	74	85	81	71	85	75	66	81	71	54	76	67	43	72	58	37	69	49	33	65	41	29	
			Exposed	85	85	76	85	83	73	85	79	70	85	76	67	83	73	61	80	71	53	77	68	46	72	59	38	68	47	32	61	40	28	50	35	25	42	31	22	37	27	X	
		7-20	Interior	85	85	85	85	85	84	85	85	80	85	83	77	85	80	74	85	77	71	83	74	69	78	69	59	73	62	45	69	48	38	66	40	33	57	35	29	49	31	26	
			Exposed	85	80	74	85	76	70	82	73	67	78	70	61	76	67	51	73	61	44	71	52	40	66	40	33	56	35	29	47	30	25	40	26	22	35	23	X	31	20	X	
		20-27	Interior	86	86	86	86	86	86	86	86	86	86	86	85	86	86	81	86	83	78	86	80	75	86	74	70	82	70	66	78	66	50	74	53	40	70	43	34	67	38	29	
			Exposed	86	86	81	86	82	77	86	78	74	86	75	71	85	72	68	82	69	64	79	67	54	74	54	41	70	42	33	66	36	28	57	32	23	49	28	20	42	25	17	
		27-45	Interior	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	81	86	86	79	86	80	74	81	76	69	76	71	64	72	68	52	68	61	42	63	50	37	
			Exposed	86	86	85	86	86	81	86	85	77	86	81	74	84	78	71	80	75	69	77	73	66	72	68	53	68	59	41	58	47	35	46	40	30	39	35	25	35	31	22	
	C	0-7	Interior	85	85	78	85	85	75	85	82	72	85	78	69	85	75	66	82	73	59	80	70	51	74	66	41	70	52	35	66	43	30	55	37	26	46	33	23	40	29	21	
			Exposed	85	75	66	82	72	57	78	69	48	75	66	42	72	59	38	70	51	34	67	45	31	56	38	27	45	32	23	38	28	X	33	24	X	29	21	X	26	X	X	
		7-20	Interior	85	82	76	85	78	72	84	75	69	81	72	67	78	69	58	75	66	49	72	59	42	68	44	36	61	37	31	51	32	27	43	28	23	38	25	20	34	22	X	
			Exposed	77	69	58	74	66	47	71	55	41	69	46	37	66	40	33	60	37	30	54	34	28	44	28	23	37	24	20	32	21	X	28	X	X	25	X	X	22	X	X	
		20-27	Interior	86	86	84	86	84	80	86	80	76	86	77	73	86	74	70	84	71	67	81	69	62	76	60	45	72	47	36	68	39	30	63	34	25	53	30	22	46	27	19	
			Exposed	86	74	70	83	71	67	80	68	57	77	63	47	74	53	40	71	46	36	69	41	32	63	34	26	52	29	21	44	25	18	38	22	X	33	X	X	30	X	X	
		27-45	Interior	86	86	86	86	86	83	86	86	79	86	84	76	86	80	73	83	77	71	80	75	68	74	70	59	70	66	46	66	53	38	52	43	32	42	38	28	37	33	24	
			Exposed	86	80	73	82	77	70	78	73	67	75	71	61	72	68	52	69	65	45	67	56	40	53	43	33	41	37	27	36	32	23	31	28	19	27	25	X	24	22	X	
	D	0-7	Interior	85	83	73	85	79	70	85	76	67	83	73	60	80	70	52	77	68	45	74	65	40	69	51	34	65	41	29	52	36	25	43	31	22	38	27	X	33	24	X	
			Exposed	80	70	51	76	67	43	73	61	39	70	53	35	67	46	32	63	41	29	56	37	26	44	31	22	37	27	X	32	23	X	28	20	X	25	X	22	X	X		
		7-20	Interior	85	76	71	82	73	67	78	70	61	75	67	51	73	60	43	70	51	39	68	43	36	59	36	30	49	31	26	41	27	22	36	24	X	32	21	X	28	X	X	
			Exposed	72	59	43	70	48	38	67	41	34	61	37	31	54	34	28	48	31	25	43	28	23	36	24	X	31	20	X	27	X	X	24	X	X	21	X	X				
		20-27	Interior	86	82	77	86	78	74	86	75	71	84	72	68	81	69	63	78	67	53	76	60	45	71	45	35	67	38	29	59	33	24	50	28	20	43	25	17	38	22	X	
			Exposed	81	69	62	78	66	50	75	55	42	72	47	36	69	41	32	67	37	28	63	34	25	51	29	21	42	25	17	36	21	X	32	X	X	28	X	X	25	X	X	
		27-45	Interior	86	86	81	86	85	77	86	81	74	83	78	71	80	75	69	77	72	66	74	70	58	69	64	44	63	50	36	48	41	31	40	36	26	35	31	22	31	28	20	
			Exposed	80	75	68	76	71	65	73	69	54	70	66	46	67	57	40	61	49	36	52	43	32	40	36	26	35	31	22	30	27	19	26	23	X	23	21	X	20	X	X	
10	B	0-7	Interior	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	71	72	72	66	72	71	54	72	67	43	72	58	37	69	49	33	65	41	29		
			Exposed	72	72	72	72	72	72	72	70	72	72	67	72	72	61	72	71	53	72	68	46	72	59	38	68	47	32	61	40	28	50	35	25	42	31	22	37	27	X		
		7-20	Interior	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	71	72	72	69	72	69	59	72	62	45	69	48	38	66	40	33	57	35	29	49	31	26		
			Exposed	72	72	72	72	72	70	72	72	67	72	70	61	72	67	51	72	61	44	71	52	40	66	40	33	56	35	29	47	30	25	40	26	22	35	23	X	31	20	X	
		20-27	Interior	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	81	82	82	78	82	80	75	82	74	70	82	70	66	78	66	50	74	53	40	70	43	34	67	38	29
			Exposed	82	82	81	82	82	77	82	78	74	82	75	71	82	72	68	82	69	64	79	67	54	74	54	41	70	42	33	66	36	28	57	32	23	49	28	20	42	25	17	
		27-45	Interior	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	81	85	85	79	85	80	74	81	76	69	76	71	64	72	68	52	68	61	42	63	50	37		
			Exposed	85	85	85	85	85	81	85	85	77	85	81	74	84	78	71	80	75	69	77	73	66	72	68	53	68	59	41	58	47	35	46	40	30	39	35	25	35	31	22	
	C	0-7	Interior	72	72	72	72	72	72	72	72	72	72	69	72	72	66	72	72	59	72	70	51	72	66	41	70	52	35	66	43	30	55	37	26	46	33	23	40	29	21		
			Exposed	72	72	66	72	72	57	72	69	48	72	66	42	72	59	38	70	51	34	67	45	31	56	38	27	45	32	23	38	28	X	33	24	X	29	21	X	26	X	X	
		7-20	Interior	72	72	72	72	72	72	72	72	69	72	72	67	72	69	58	72	66	49	72	59	42	68	44	36	61	37	31	51	32	27	43	28	23	38	25	20	34	22	X	
			Exposed	72	69	58	72	66	47	71	55	41	69	46	37	66	40	33	60	37	30	54	34	28	44	28	23	37	24	20	32	21	X	28	X	X	25	X	X	22	X	X	
		20-27	Interior	82	82	82	82	82	80	82	80	76	82	77	73	82	74	70	82	71	67	81	69	62	76	60	45	72	47	36	68	39	30	63	34	25	53						

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																							
				90			95			100			105			110			115			120			130			140			150			160			170			180			
				Roof Wind Zone																																							
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3								
20	B	0-7	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	54	60	60	43	60	58	37	60	49	33	60	41	29			
			Exposed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	53	60	60	46	60	59	38	60	47	32	60	40	28	50	35	25	42	31	22	37	27	X		
		7-20	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	59	60	60	45	60	48	38	60	40	33	57	35	29	49	31	26	
			Exposed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	51	60	60	44	60	52	40	60	40	33	56	35	29	47	30	25	40	26	22	35	23	X	31	20	X	
		20-27	Interior	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	70	73	70	66	73	66	50	73	53	40	70	43	34	67	38	29	
			Exposed	73	73	73	73	73	73	73	73	73	73	73	71	73	72	68	73	69	64	73	67	54	73	54	41	70	42	33	66	36	28	57	32	23	49	28	20	42	25	17	
		27-45	Interior	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	74	77	76	69	76	71	64	72	68	52	68	61	42	63	50	37	
			Exposed	77	77	77	77	77	77	77	77	77	77	77	77	77	77	74	77	77	71	77	75	69	77	73	66	72	68	53	68	59	41	58	47	35	46	40	30	39	35	25	35
	C	0-7	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	59	60	60	51	60	60	41	60	52	35	60	43	30	55	37	26	46	33	23	40	29	21		
			Exposed	60	60	60	60	60	60	57	60	60	48	60	60	42	60	59	38	60	51	34	60	45	31	56	38	27	45	32	23	38	28	X	33	24	X	29	21	X	26	X	X
		7-20	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	58	60	60	49	60	59	42	60	44	36	60	37	31	51	32	27	43	28	23	38	25	20	34	22	X	
			Exposed	60	60	58	60	60	47	60	55	41	60	46	37	60	40	33	60	37	30	54	34	28	44	28	23	37	24	20	32	21	X	28	X	X	25	X	X	22	X	X	
		20-27	Interior	73	73	73	73	73	73	73	73	73	73	73	73	73	70	73	71	67	73	69	62	73	60	45	72	47	36	68	39	30	63	34	25	53	30	22	46	27	19		
			Exposed	73	73	70	73	71	67	73	68	57	73	63	47	73	53	40	71	46	36	69	41	32	63	34	26	52	29	21	44	25	18	38	22	X	33	X	X	30	X	X	
		27-45	Interior	77	77	77	77	77	77	77	77	77	77	77	76	77	77	73	77	77	71	77	75	68	74	70	59	70	66	46	66	53	38	52	43	32	42	38	28	37	33	24	
			Exposed	77	77	73	77	77	70	77	73	67	75	71	61	72	68	52	69	65	45	67	56	40	53	43	33	41	37	27	36	32	23	31	28	19	27	25	X	24	22	X	
	D	0-7	Interior	60	60	60	60	60	60	60	60	60	60	60	60	52	60	60	45	60	60	40	60	51	34	60	41	29	52	36	25	43	31	22	38	27	X	33	24	X			
			Exposed	60	60	51	60	60	43	60	60	39	60	53	35	60	46	32	60	41	29	56	37	26	44	31	22	37	27	X	32	23	X	28	20	X	25	X	22	X	X		
		7-20	Interior	60	60	60	60	60	60	60	60	60	60	60	60	51	60	60	43	60	51	39	60	43	36	59	36	30	49	31	26	41	27	22	36	24	X	32	21	X	28	X	X
			Exposed	60	59	43	60	48	38	60	41	34	60	37	31	54	34	28	48	31	25	43	28	23	36	24	X	31	20	X	27	X	X	24	X	X	21	X	X	X	X		
		20-27	Interior	75	75	75	75	75	74	75	75	71	75	72	68	75	69	63	75	67	53	75	60	45	71	45	35	67	38	29	59	33	24	50	28	20	43	25	17	38	22	X	
			Exposed	75	69	62	75	66	50	75	55	42	72	47	36	69	41	32	67	37	28	63	34	25	51	29	21	42	25	17	36	21	X	32	X	X	28	X	X	25	X	X	
		27-45	Interior	78	78	78	78	78	77	78	78	74	78	78	71	78	75	69	77	72	66	74	70	58	69	64	44	63	50	36	48	41	31	40	36	26	35	31	22	31	28	20	
			Exposed	78	75	68	76	71	65	73	69	54	70	66	46	67	57	40	61	49	36	52	43	32	40	36	26	35	31	22	30	27	19	26	23	X	23	21	X	20	X	X	
30	B	0-7	Interior	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	54	59	59	43	59	58	37	59	49	33	59	41	29				
			Exposed	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	53	59	59	46	59	59	38	59	47	32	59	40	28	50	35	25	42	31	22	37	27	X		
		7-20	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	59	60	60	45	60	48	38	60	40	33	57	35	29	49	31	26
			Exposed	60	60	60	60	60	60	60	60	60	60	60	60	60	60	51	60	60	44	60	52	40	60	40	33	56	35	29	47	30	25	40	26	22	35	23	X	31	20	X	
		20-27	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	66	66	66	66	50	66	53	40	66	43	34	66	38	29
			Exposed	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	64	66	66	54	66	54	41	66	42	33	66	36	28	57	32	23	49	28	20	42	25	17	
		27-45	Interior	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	69	70	70	64	68	52	66	61	42	63	50	37			
			Exposed	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	69	71	71	66	71	68	53	68	59	41	58	47	35	46	40	30	39	35	25	35	31	22	
	C	0-7	Interior	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	51	59	59	41	59	52	35	59	43	30	55	37	26	46	33	23	40	29	21		
			Exposed	59	59	59	59	59	57	59	59	48	59	59	42	59	59	38	59	51	34	59	45	31	56	38	27	45	32	23	38	28	X	33	24	X	29	21	X	26	X	X	
		7-20	Interior	60	60	60	60	60	60	60	60	60	60	60	60	60	60	58	60	60	49	60	59	42	60	44	36	60	37	31	51	32	27	43	28	23	38	25	20	34	22	X	
			Exposed	60	60	58	60	60	47	60	55	41	60	46	37	60	40	33	60	37	30	54	34	28	44	28	23	37	24	20	32	21	X	28	X	X	25	X	X</				

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																										
				90			95			100			105			110			115			120			130			140			150			160			170			180						
				Roof Wind Zone																																										
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3											
40	B	0-7	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	43	54	54	37	54	49	33	54	41	29							
			Exposed	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	53	54	54	46	54	54	38	54	47	32	54	40	28	50	35	25	42	31	22	37	27	X					
		7-20	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	45	55	48	38	55	40	33	55	35	29	49	31	26					
			Exposed	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	51	55	55	44	55	52	40	55	40	33	55	35	29	47	30	25	40	26	22	35	23	X	31	20	X			
		20-27	Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	50	61	53	40	61	43	34	61	38	29							
			Exposed	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	54	61	54	41	61	42	33	61	36	28	57	32	23	49	28	20	42	25	17				
		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	65	64	63	63	52	61	61	42	60	50	37						
			Exposed	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	53	66	59	41	58	47	35	46	40	30	39	35	25	35	31	22		
	C	0-7	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	51	54	54	41	54	52	35	54	43	30	54	37	26	46	33	23	40	29	21			
			Exposed	54	54	54	54	54	54	54	48	54	54	42	54	54	38	54	51	34	54	45	31	54	38	27	45	32	23	38	28	X	33	24	X	29	21	X	26	X	X					
		7-20	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	49	55	55	42	55	44	36	55	37	31	51	32	27	43	28	23	38	25	20	34	22	X	X				
			Exposed	55	55	55	55	55	47	55	55	41	55	46	37	55	40	33	55	37	30	54	34	28	44	28	23	37	24	20	32	21	X	28	X	X	25	X	X	22	X	X				
		20-27	Interior	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	60	45	61	47	36	61	39	30	61	34	25	53	30	22	46	27	19					
			Exposed	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	41	32	61	34	26	52	29	21	44	25	18	38	22	X	33	X	X	30	X	X		
		27-45	Interior	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	64	64	59	62	62	46	60	53	38	52	43	32	42	38	28	37	33	24				
			Exposed	66	66	66	66	66	66	66	66	66	66	66	61	66	66	52	66	65	45	66	56	40	53	43	33	41	37	27	36	32	23	31	28	19	27	25	X	24	22	X				
	D	0-7	Interior	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	45	56	56	40	56	51	34	56	41	29	52	36	25	43	31	22	38	27	X	33	24	X						
			Exposed	56	56	51	56	56	43	56	56	39	56	53	35	56	46	32	56	41	29	56	37	26	44	31	22	37	27	X	32	23	X	28	20	X	25	X	22	X	X					
		7-20	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	51	57	57	43	57	51	39	57	43	36	57	36	30	49	31	26	41	27	22	36	24	X	32	21	X	28	X	X
			Exposed	57	57	43	57	48	38	57	41	34	57	37	31	54	34	28	48	31	25	43	28	23	36	24	X	31	20	X	27	X	X	24	X	X	21	X	X	X	X					
		20-27	Interior	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	53	63	60	45	63	45	35	63	38	29	59	33	24	50	28	20	43	25	17	38	22	X					
			Exposed	63	63	62	63	63	50	63	55	42	63	47	36	63	41	32	63	37	28	63	34	25	51	29	21	42	25	36	21	X	32	X	X	28	X	X	25	X	X					
		27-45	Interior	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	67	67	66	66	66	58	63	44	61	50	36	48	41	31	40	36	26	35	31	22	31	28	20					
			Exposed	68	68	68	68	68	65	68	68	54	68	66	46	67	57	40	61	49	36	52	43	32	40	36	26	35	31	22	30	27	19	26	23	X	23	21	X	20	X	X				
50	B	0-7	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	43	49	49	37	49	49	33	49	41	29							
			Exposed	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	46	49	49	38	49	47	32	49	40	28	49	35	25	42	31	22	37	27	X					
		7-20	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	45	51	48	38	51	40	33	51	35	29	49	31	26					
			Exposed	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	44	51	51	40	51	40	33	51	35	29	47	30	25	40	26	22	35	23	X	31	20	X					
		20-27	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57				
			Exposed	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	54	57	54	41	57	42	33	57	36	28	57	32	23	49	28	20	42	25	17				
		27-45	Interior	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	61	61	61	59	59	52	58	58	42	56	50	37					
			Exposed	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	61	58	47	35	46	40	30	39	35	25	35	31	22			
	C	0-7	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	43	49	49	37	49	49	33	49	41	29							
			Exposed	49	49	49	49	49	49	49	49	49	49	48	49	49	49	49	49	34	49	45	31	49	38	27	45	32	23	38	28	X	33	24	X	29	21	X	26	X	X					
		7-20	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	49	51	51	42	51	44	36	51	37	31	51	32	27	43	28	23	38	25	20	34	22	X					
			Exposed	51	51	51	51	51	47	51	51	41	51	46	37	51	40	33	51	37	30	51	34	28	44	28	23	37	24	20	32	21	X	28	X	25	X	X	22	X	X					
		20-27	Interior	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57				
			Exposed	57	57	57	57	57	57																																					

**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																									
				Roof Wind Zone																																									
				90			95			100			105			110			115			120			130			140			150			160			170			180					
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3										
0	B	0-7	Interior	78	78	78	78	78	78	78	78	78	78	78	76	78	78	73	78	78	71	78	77	68	78	72	58	77	68	45	73	60	36	69	49	31	65	41	28	54	35	24			
			Exposed	78	78	73	78	78	70	78	76	67	78	73	60	78	70	51	77	67	44	74	64	38	69	50	32	63	40	27	51	33	23	42	29	20	35	25	X	31	23	X			
		7-20	Interior	78	78	78	78	78	78	78	78	78	78	74	78	77	71	78	74	69	78	71	66	74	67	49	70	52	37	66	40	32	56	33	28	48	29	24	41	26	22				
			Exposed	78	77	71	78	73	68	78	70	62	75	67	51	72	60	43	69	51	37	67	43	33	57	34	28	47	29	24	39	25	21	33	22	X	29	X	X	26	X	X			
		20-27	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	75	78	77	73	78	71	68	78	67	55	74	56	42	70	44	34	67	36	28	60	32	24				
			Exposed	78	78	78	78	78	75	78	75	71	78	72	68	78	69	65	78	67	54	75	60	45	70	45	34	66	35	28	57	30	23	48	26	19	41	23	16	35	21	X			
		27-45	Interior	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	78	79	79	76	79	77	71	78	73	66	74	69	54	69	63	43	66	51	35	53	42	31			
			Exposed	79	79	79	79	79	79	78	79	79	74	79	78	71	79	75	69	78	72	66	75	70	58	70	64	44	65	49	35	49	39	29	38	33	25	33	29	21	29	26	18		
	C	0-7	Interior	78	78	75	78	78	72	78	78	69	78	75	66	78	72	57	78	69	49	76	67	43	71	55	34	67	44	29	57	36	25	46	31	22	39	27	X	33	24	X			
			Exposed	78	72	57	78	69	47	75	66	40	72	57	35	69	49	32	67	43	29	60	38	26	47	31	22	38	27	X	32	23	X	28	20	X	25	X	X	22	X	X			
		7-20	Interior	78	78	73	78	75	70	78	72	67	78	69	58	74	66	49	71	58	41	69	49	35	62	37	30	51	31	26	43	27	22	36	23	19	32	21	X	28	X	X			
			Exposed	74	66	48	71	55	40	68	46	34	64	38	31	57	34	28	50	31	25	45	28	23	36	24	20	31	20	X	27	X	X	23	X	X	21	X	X	X	X	X			
		20-27	Interior	78	78	78	78	78	77	78	78	73	78	74	70	78	71	68	78	69	62	77	66	52	72	50	38	68	39	30	62	32	25	52	28	21	45	25	18	38	22	X			
			Exposed	78	71	67	78	68	59	76	63	48	73	53	40	70	44	34	68	38	30	66	34	27	53	29	21	44	25	18	36	21	X	32	X	X	28	X	X	25	X	X			
		27-45	Interior	79	79	79	79	79	79	79	79	76	79	79	73	79	77	71	79	74	68	77	72	65	72	67	49	67	55	38	56	44	32	43	36	27	35	31	23	31	28	20			
			Exposed	79	77	70	79	74	67	76	70	61	73	68	51	70	63	44	67	54	38	61	47	33	44	36	27	34	31	23	30	27	19	26	23	X	23	21	X	20	X	X			
	D	0-7	Interior	78	78	70	78	76	67	78	73	60	78	70	50	76	67	43	73	62	38	71	54	34	66	43	28	54	34	24	44	30	21	36	26	X	31	23	X	28	20	X			
			Exposed	76	67	43	73	60	36	70	51	32	67	44	29	61	38	26	53	34	24	46	31	22	36	26	X	31	23	X	27	X	X	23	X	X	21	X	X	X	X	X			
		7-20	Interior	78	73	68	78	70	62	75	67	51	72	59	42	69	50	36	67	42	32	62	36	30	50	30	25	41	26	21	34	23	X	30	20	X	26	X	X	23	X	X	X	X	X
			Exposed	69	49	36	66	41	32	58	34	28	51	31	26	45	28	23	40	26	21	36	23	19	30	20	X	26	X	X	23	X	X	X	X	X	X	X	X	X	X				
		20-27	Interior	78	78	75	78	75	71	78	72	68	78	69	64	78	66	53	75	58	44	72	50	37	68	38	30	60	31	24	50	27	20	42	24	17	36	21	X	32	X	X			
			Exposed	78	66	52	74	56	42	71	46	35	68	39	30	66	34	27	59	31	24	52	28	21	42	24	17	35	21	X	30	X	X	27	X	X	23	X	X	21	X	X			
		27-45	Interior	79	79	78	79	79	74	79	78	71	79	75	68	77	72	66	74	69	56	72	67	49	67	54	37	53	42	30	40	34	26	33	30	22	29	26	19	26	23	X			
			Exposed	77	72	66	74	69	54	70	66	45	67	56	39	62	47	34	51	41	30	43	36	27	34	30	22	29	26	18	25	22	X	22	20	X	X	X	X	X	X	X			
10	B	0-7	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	58	65	65	45	65	60	36	65	49	31	65	41	28	54	35	24						
			Exposed	65	65	65	65	65	65	65	65	65	65	60	65	65	51	65	65	44	65	64	38	65	50	32	63	40	27	51	33	23	42	29	20	35	25	X	31	23	X				
		7-20	Interior	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	49	66	52	37	66	40	32	56	33	28	48	29	24	41	26	22				
			Exposed	66	66	66	66	66	66	66	66	62	66	66	51	66	60	43	66	51	37	66	43	33	57	34	28	47	29	24	39	25	21	33	22	X	29	X	X	26	X	X			
		20-27	Interior	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	73	75	71	68	75	67	55	74	56	42	70	44	34	67	36	28	60	32	24				
			Exposed	75	75	75	75	75	75	75	75	71	75	72	68	75	69	65	75	67	54	75	60	45	70	45	34	66	35	28	57	30	23	48	26	19	41	23	16	35	21	X			
		27-45	Interior	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	77	71	78	73	66	74	69	54	69	63	43	66	51	35	53	42	31					
			Exposed	78	78	78	78	78	78	78	78	74	78	78	71	78	75	69	78	72	66	75	70	58	70	64	44	65	49	35	49	39	29	38	33	25	33	29	21	29	26	18			
	C	0-7	Interior	65	65	65	65	65	65	65	65	65	65	65	65	65	65	57	65	65	49	65	65	43	65	55	34	65	44	29	57	36	25	46	31	22	39	27	X	33	24	X			
			Exposed	65	65	57	65	65	47	65	65	40	65	57	35	65	49	32	65	43	29	60	38	26	47	31	22	38	27	X	32	23	X	28	20	X	25	X	X	22	X	X			
		7-20	Interior	66	66	66	66	66	66	66	66	66	66	66	66	66	66	58	66	49	66	49	35	62	37	30	51	31	26	43	27	22	36	23	19	32	21	X	28	X	X				
			Exposed	66	66	48	66	55	40	66	46	34	64	38	31	57	34	28	50	31	25	45	28	23	36	24	20	31	20	X	27	X	X	23	X	X	21	X	X	X	X	X			
		20-27	Interior	75	75	75	75	75	75	75	75	73	75	74	70	75	71	68	75	69	62	75	66	52	72	50	38	68	39	30	62	32	25	52	28	21	45	25	18	38	22	X			
			Exposed	75	71	67	75	68	59	75	63																																		

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
				90			95			100			105			110			115			120			130			140			150			160			170			180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
				Roof Wind Zone																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
20	B	0-7	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	45	55	55	36	55	49	31	55	41	28	54	35	24																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
			Exposed	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55

**Wind loads used to generate the span tables for modules with maximum dimensions of 67in x 40.1in (60 Cell) and 80in x 41in (72 Cell) are based on ASCE 7-16, Section 29.4.4 with Provisions from SEAOC PV2-2017

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

Ground Snow Load (psf)	Wind Exposure Category	Roof Tilt Angle (deg)	Panel Exposure	Basic Wind Speed (mph)																																													
				90			95			100			105			110			115			120			130			140			150			160			170			180									
				Roof Wind Zone																																													
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3														
60	B	0-7	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	36	41	41	31	41	41	28	41	35	24									
			Exposed	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	33	23	41	29	20	35	25	X	31	23	X								
		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	43	43	43	43	43	40	32	43	33	28	43	29	24	41	26	22							
			Exposed	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	37	43	43	33	43	34	28	43	29	24	39	25	21	33	22	X	29	X	X	26	X	X							
		20-27	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	42	49	44	34	49	36	28	49	32	24								
			Exposed	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	30	23	48	26	19	41	23	16	35	21	X							
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	53	53	52	52	43	50	50	35	49	42	31								
			Exposed	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	44	54	49	35	49	39	29	38	33	25	33	29	21	29	26	18		
	C	0-7	Interior	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	36	25	41	31	22	39	27	X	33	24	X								
			Exposed	41	41	41	41	41	41	41	41	41	40	41	41	35	41	41	32	41	41	29	41	38	26	41	31	22	38	27	X	32	23	X	28	20	X	25	X	X	22	X	X						
		7-20	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	41	43	43	35	43	37	30	43	31	26	43	27	22	36	23	19	32	21	X	28	X	X	22	X	X				
			Exposed	43	43	43	43	43	43	43	43	43	43	34	43	38	31	43	34	28	43	31	25	43	28	23	36	24	20	31	20	X	27	X	X	23	X	X	21	X	X	X	X	X					
		20-27	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	32	25	49	28	21	45	25	18	38	22	X							
			Exposed	49	49	49	49	49	49	49	49	49	49	48	49	49	40	49	44	34	49	38	30	49	34	27	49	29	21	44	25	18	36	21	X	X	28	X	X	25	X	X	X	X					
		27-45	Interior	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	52	52	49	51	51	38	50	44	32	43	36	27	35	31	23	31	28	20		
			Exposed	54	54	54	54	54	54	54	54	54	54	54	54	51	54	54	44	54	54	38	54	47	33	44	36	27	34	31	23	30	27	19	26	23	X	23	21	X	20	X	X						
	D	0-7	Interior	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	34	43	34	43	34	24	43	30	21	36	26	X	31	23	X	28	20	X								
			Exposed	43	43	43	43	43	43	43	43	43	32	43	43	29	43	38	26	43	34	24	43	31	22	36	26	X	31	23	X	27	X	X	23	X	X	21	X	X	X	X	X						
		7-20	Interior	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45				
			Exposed	45	45	36	45	41	32	45	34	28	45	31	26	45	28	23	40	26	21	36	23	19	30	20	X	26	X	X	23	X	X	20	X	X	X	X	X	X	X	X	X						
		20-27	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	44	51	50	37	51	38	30	51	31	24	50	27	20	42	24	17	36	21	X	32	X	32	X	X					
			Exposed	51	51	51	51	51	51	51	42	51	46	35	51	39	30	51	34	27	51	31	24	51	28	21	42	24	17	35	21	X	30	X	X	27	X	X	23	X	X	21	X	X					
		27-45	Interior	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	54	49	52	52	37	51	42	30	40	34	26	33	30	22	29	26	19	26	23	X							
			Exposed	55	55	55	55	55	55	54	55	55	45	55	55	39	55	47	34	51	41	30	43	36	27	34	30	22	29	26	18	25	22	X	22	20	X	X	X	X	X	X	X	X					
70	B	0-7	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	36	38	38	31	38	38	28	38	35	24									
			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	32	38	38	29	20	35	25	X	31	23	X							
		7-20	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40		
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40		
		20-27	Interior	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46		
			Exposed	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46		
		27-45	Interior	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	50	50	50	49	49	43	48	48	35	47	42	31						
			Exposed	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51		
	C	0-7	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	36	25	38	31	22	38	27	X	33	24	X							
			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	32	38	31	22	38	27	X	32	23	X	28	20	X	25	X	22	X
		7-20	Interior	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
			Exposed	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40																							