

Design Criteria for Span Tables:

Values in the maximum allowable rail span tables provided herein are subject to the following general criteria and additional criteria shown on individual span tables sheets. Values in span tables are based on the same engineering methodology and calculation algorithms used for U-Builder and are provided here for reference.

Building Assumptions

- Building Risk Category: II
- Mean Roof Height: 30 ft
- Roof Pitch: 0°-45°
- Site Elevation: 0 ft

Wind Design Assumptions

- Wind loads used are based on ASCE 7-10 Sec 30.4.2
- Exposure Category B, C, or D
- Basic Wind Speed = 90 – 180 mph
- Level terrain. Topographic factor, $k_{zt} = 1.0$

Snow Design Assumptions

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

Seismic Design Assumptions

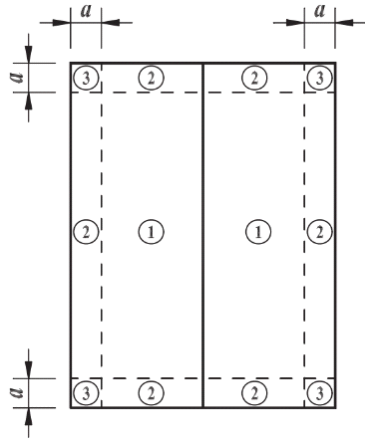
- 0.2-s Spectral Response Acceleration
- $S_s = 1.25$ and 3 per criteria shown on individual span tables sheets.
- $S_1 = 0.5$
- Seismic site class D

Array Assumptions

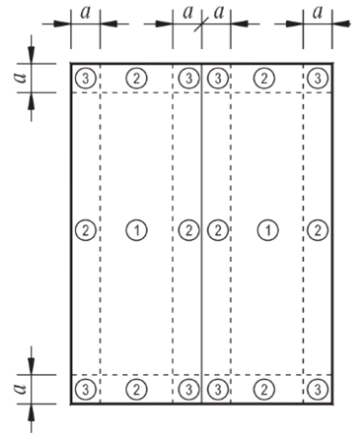
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at least twice the module height above roof surface.
- Modules are parallel to roof surface and maximum height above roof surface is 5" to 10" depending on attachment type.
- Gaps between module rows and columns is 0.25" in to 1" depending on clamp type.
- The most restrictive of all roof zone spans shall be used when any part of the module is attributed to that span.

Span Tables

Zone should be considered as per ASCE 7-10, Fig. 30.4-2A to 30.4-2D

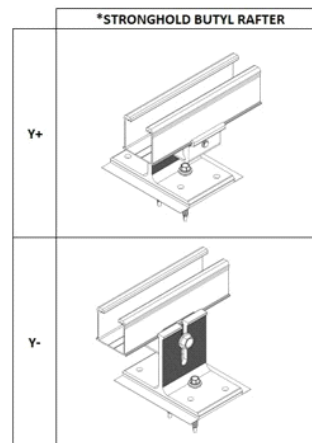


Gable Roofs $\theta \leq 7^\circ$



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

Rails can be installed in these possible orientations.





30 ft

Roof Height

S_s = 1.25
Seismic

18.66 sq.ft

Module Area

ORIENTATION

CROSS-SLOPE
Rail Direction

NXT

NXT COMBO

Stronghold BUTYL Rafter
Attachment

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)			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	86	86	80	86	86	76	86	85	73	86	82	70	86	79	68	86	76	64	86	74	56	84	69	44	79	64	37	75	54	32	72	46	28	69	40	25	66	35	22				
		7-27	86	86	78	86	86	75	86	85	72	86	82	70	86	79	67	86	77	64	86	74	58	86	70	48	82	66	40	78	57	35	75	48	31	71	42	27	68	37	24				
		27-45	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	84	84	84	81	81	81	76	76	76	71	71	71	67	67	67	63	63	59	59	59	56	54	54				
	C	0-7	86	81	69	86	77	66	86	74	58	86	72	50	84	69	44	81	67	40	79	62	36	74	50	31	70	42	26	67	36	23	59	32	30	52	28	27	46	25	24				
		7-27	86	81	69	86	78	66	86	75	59	86	72	53	86	70	47	84	67	43	81	65	39	77	53	33	73	44	28	69	38	25	66	33	21	58	29	29	51	26	25				
		27-45	87	87	87	86	86	86	82	82	82	79	79	79	76	76	76	73	73	73	70	70	70	65	65	65	61	61	61	57	56	56	54	48	51	42	42	45	37	37					
D	0-7	86	76	62	86	72	53	85	70	45	82	67	40	79	62	37	76	56	33	74	50	30	70	41	26	66	35	22	57	30	29	49	26	25	43	23	22	38	21	20					
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		7-27	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	58	61	61	58	61	61	40	61	57	35	59	48	31	58	42	27	57	37	24					
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D	0-7	60	60	60	60	60	53	60	60	45	60	60	40	60	60	37	60	56	33	60	50	30	60	41	26	60	35	22	57	30	29	49	26	25	43	23	22	38	21	20					
	7-27	61	61	61	61	61	55	61	61	49	61	61	43	61	61	39	61	58	36	60	53	33	58	43	28	57	37	24	55	32	21	54	28	27	48	25	24	43	22	21					
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		27-45	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	70	70	70	68	68	66	66	66	63	63	63	61	61	61	59	59	59	57	57	55	54	54					
	C	0-7	59	59	59	59	59	59	59	59	58	59	59	59	59	59	59	59	59	59	59	56	59	59	44	59	59	36	59	54	32	59	46	28	59	40	25	59	35	22					
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D	0-7	60	60	60	60	60	53	60	60	45	60	60	40	60	60	37	60	56	33	60	50	30	60	41	26	60	35	22	57	30	29	49	26	25	43	23	22	38	21	20					
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		27-45	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	65	65	65	64	64	64	62	62	62	60	60	60	58	58	56	56	56	54	54	52	52	52					
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		27-45	66	66	66	66	66	66	66	64	64	63	63	63	62	62	62	61	61	61	59	59	57	57																					

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

SPAN TABLES

- Cells with an asterisks indicates that the L-foot must be oriented in the Y- direction as indicated in the image.
- 10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.
- 10 Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.



30 ft
Roof Height

Ss = 1.25
Seismic

18.66 sq.ft

LANDSCAPE

CROSS-SLOPE
Rail Direction

NXT
Rail Type

NXT COMBO

Stronghold BUTYL Rafter
Attachment

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)			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	102	102	96	102	102	91	102	102	87	102	98	83	102	94	80	102	91	77	102	88	74	100	82	69	95	77	63	90	73	55	86	69	48	82	66	42	78	59	37															
		7-27	102	102	93	102	102	89	102	102	86	102	99	83	102	95	80	102	92	77	102	88	75	102	83	70	98	78	66	93	74	59	89	71	51	85	67	45	81	63	40															
		27-45	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	101	101	101	99	99	99	94	93	93	90	88	88	86	84	84	81	80	80	77	76	76	73	73	73															
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10	B	0-7	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															
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		27-45	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	101	101	101	99	99	99	94	93	93	90	88	88	86	84	84	81	80	80	77	76	76	73	73	73															
	C	0-7	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	75	53	34	72	47	45	69	42	40															
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		27-45	102	102	102	102	102	102	99	99	99	97	96	96	94	93	93	92	90	90	89	87	87	84	82	82	79	78	78	74	74	74	69	69	65	65	65	62	62	62																
	D	0-7	91	90	76	91	86	73	91	83	69	91	79	67	91	76	61	91	74	56	88	71	51	83	67	43	78	59	37	74	51	49	71	45	43	68	39	38	64	35	33															
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		27-45	101	101	101	98	98	98	95	94	94	92	90	90	87	87	84	84	84	82	82	78	77	77	72	72	72	68	68	68	64	64	64	60	59	59	57	53	53																	
20	B	0-7	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	77	78	78	74	78	69	78	77	63	78	73	55	78	68	68	48	78	66	42	78	59	37															
		7-27	78	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	78	74	59	77	71	51	75	67	45	73	63	40																
		27-45	96	96	96	96	96	96	96	96	96	96	96	96	96	96	94	94	94	93	93	90	90	88	88	88	84	84	84	81	80	80	77	76	76	73	73	73																		
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		7-27	78	78	78	78	78	78	78	78	75	78	78	73	78	78	70	78	68	78	77	66	78	73	56	78	63	43	78	59	37	74	51	49	71	45	43	68	39	38	64	35	33													
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	D	0-7	78	78	76	78	78	73	78	78	69	78	78	67	78	76	61	78	74	56	78	71	51	78	67	43	78	59	37	74	51	49	71	45	43	68	39	38	64	35	33															
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		7-27	78	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	78	74	59	77	71	51	75	67	45	73	63	40																
		27-45	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	89	89	89	88	88	85	85	82	82	79	79	79	76	76	73	73	73	70	70																		
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		7-27	78	78	78	78	78	78	78	78	75	78	78	73	78	78	70	78	68	78	77	66	78	73	56	76	69	48	74	64	41	72	56	36	70	50	48	68	44	43																
		27-45	90	90	90	90	90	90	88	88	88	87	87	85	85	85	83	83	83	81	81	81	78	78	74	74	74	71	71	68	68	65	65	65	62	62	62																			
	D	0-7	78	78	76	78	78	73	78	78	69	78	78	67	78	76	61	78	74	56	78	71	51	78	67	43	78	59	37	74	51	49	71	45	43	68	39	38	64	35	33															
		7-27	78	78	77	78	78	74	78	78	71	78	68	78	66	78	75	60	78	73	55	75	68	73	55	75	68	47	73	62	40	71	54	35	69	47	46	67	42	41	65	37	36													
		27-45	90	90	90	89	89	89	87	87	87	85	85	85	83	83	83	81	81	81	79	79	79	75	75	75	71	71	71	68	68	68	64	64	64	60	59	59	57	53	53															
40	B	0-7	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	69	70	70	69	70	70	63	70	55	70	69	48	70	66	42	70	59	37																
		7-27	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	70	70	67	67	67																	
		27-45	86	86	86	86	86	86	86	86	86	86	86	86	86	86	84	84	84	83	83	83	80	80	80	77	77	77	75	75	72	72	72	70	70	67	67	67																		
	C	0-7	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	69	70	70	61	70	52	70	67	44	70	67	44	70	61	38	70	53	34	69	47	45	68	42	40															
		7-27	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	70	70	67	67	67																
		27-45	86	86	86	85	85	85	83	83	83	82	8																																											

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

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

10 Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.



30 ft
Roof Height

Ss = 1.25
Seismic

18.66 sq.ft

Module Area

LANDSCAPE

CROSS-SLOPE
Rail Direction

NXT

NXT COMBO

Stronghold BUTYL Rafter
Attachment

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

[illegible]

• Cells with an asterisks indicates that the L-root must be oriented in the Y- direction as indicated in the image.

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

10 Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

22.78 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

NXT
Rail Type

NXT COMBO
Clamp

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)	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	79	79	76	79	79	73	79	79	70	79	78	67	79	75	61	79	72	53	79	70	47	79	66	37	75	54	31	71	45	27	68	38	24	63	33	21	56	29	28	
		7-27	79	79	74	79	79	71	79	79	68	79	78	66	79	75	59	79	73	53	79	70	48	79	66	40	78	56	34	74	47	29	70	40	25	67	35	22	63	31	30	
		27-45	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	77	77	77	74	74	74	69	69	69	65	65	65	61	61	61	58	58	58	54	51	51	52	45	45	
	C	0-7	79	77	66	79	74	57	79	71	49	79	68	42	79	65	37	77	58	33	74	52	30	70	42	26	66	35	22	57	30	29	50	26	25	43	23	22	38	21	20	
		7-27	79	77	64	79	74	56	79	71	50	79	68	44	79	66	40	79	60	36	77	54	33	72	44	28	69	37	24	64	32	20	56	28	27	49	25	24	43	22	21	
		27-45	80	80	80	79	79	79	75	75	75	72	72	69	69	67	67	67	64	64	64	60	60	60	60	60	56	54	54	52	47	49	40	40	43	35	35	38	31	31		
	D	0-7	79	72	52	79	69	44	79	66	38	77	59	34	74	52	31	72	46	28	70	42	25	66	34	21	56	29	28	48	25	24	41	22	21	36	29	19	32	26	17	
		7-27	79	72	52	79	69	46	79	67	41	79	61	36	77	54	33	75	49	30	72	44	27	68	36	23	62	31	30	53	27	26	46	23	23	40	21	20	36	28	18	
		27-45	77	77	77	73	73	73	70	70	67	67	67	64	64	64	62	62	62	59	59	59	55	53	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26		
10	B	0-7	66	66	66	66	66	66	66	66	66	66	66	66	66	66	61	66	66	53	66	66	47	66	66	37	66	54	31	66	45	27	66	38	24	63	33	21	56	29	28	
		7-27	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	53	66	66	48	66	66	40	66	56	34	66	47	29	65	40	25	63	35	22	61	31	30	
		27-45	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	77	77	77	74	74	74	69	69	69	65	65	65	61	61	61	58	58	58	54	51	51	52	45	45	
	C	0-7	66	66	66	66	66	57	66	66	49	66	66	42	66	65	37	66	58	33	66	52	30	66	42	26	66	35	22	57	30	29	50	26	25	43	23	22	38	21	20	
		7-27	66	66	64	66	66	56	66	66	50	66	66	44	66	66	40	66	60	36	66	54	33	66	44	28	64	37	24	62	32	20	56	28	27	49	25	24	43	22	21	
		27-45	79	79	79	78	78	78	75	75	75	72	72	69	69	69	67	67	67	64	64	64	60	60	60	60	56	54	54	52	47	49	40	40	43	35	35	38	31	31		
	D	0-7	66	66	52	66	66	44	66	66	38	66	59	34	66	52	31	66	46	28	66	42	25	66	34	21	56	29	28	48	25	24	41	22	21	36	29	19	32	26	17	
		7-27	66	66	52	66	66	46	66	66	41	66	61	36	66	54	33	66	49	30	66	44	27	64	36	23	61	31	30	53	27	26	46	23	23	40	21	20	36	28	18	
		27-45	77	77	77	73	73	73	70	70	67	67	67	64	64	64	62	62	62	59	59	59	55	53	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26		
20	B	0-7	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	55	55	47	55	55	37	55	54	31	55	45	27	55	38	24	55	33	21	55	29	28	
		7-27	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	55	55	48	55	55	40	55	55	34	55	47	29	54	40	25	53	35	22	52	31	30	
		27-45	71	71	71	71	71	71	71	71	71	71	71	71	71	71	69	69	69	68	68	65	65	65	62	62	62	60	60	60	57	57	57	54	51	51	52	45	45			
	C	0-7	55	55	55	55	55	55	55	55	55	55	55	42	55	55	37	55	55	33	55	52	30	55	42	26	55	35	22	55	30	29	50	26	25	43	23	22	38	21	20	
		7-27	55	55	55	55	55	55	55	55	50	55	55	44	55	55	40	55	55	36	55	54	33	55	44	28	54	37	24	52	32	20	51	28	27	49	25	24	43	22	21	
		27-45	71	71	71	70	70	70	68	68	67	67	67	65	65	65	63	63	63	62	62	62	59	59	59	55	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26
	D	0-7	55	55	52	55	55	44	55	55	38	55	55	34	55	55	31	55	46	28	55	42	25	55	34	21	55	29	28	48	25	24	41	22	21	36	29	19	32	26	17	
		7-27	55	55	52	55	55	46	55	55	41	55	55	36	55	55	44	55	55	49	30	55	44	27	54	36	23	52	31	30	51	27	26	46	23	23	40	21	20	36	28	18
		27-45	70	70	70	68	68	66	66	66	64	64	64	63	63	63	61	61	61	59	59	59	55	53	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26		
30	B	0-7	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	53	54	54	47	54	54	37	54	54	31	54	45	27	54	38	24	54	33	21	54	29	28	
		7-27	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	55	55	48	55	55	40	55	55	34	55	47	29	54	40	25	53	35	22	52	31	30	
		27-45	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	64	64	63	63	60	60	60	58	58	56	56	54	54	52	47	49	40	43	35	35	38	31	31
	C	0-7	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	29	50	26	25	43	23	22	38	21	20	
		7-27	55	55	55	55	55	55	55	55	50	55	55	44	55	55	40	55	55	36	55	54	33	55	44	28	54	37	24	52	32	20	51	28	27	49	25	24	43	22	21	
		27-45	65	65	65	65	65	65	65	65	63	63	63	62	62	62	60	60	60	59	59	59	55	53	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26		
	D	0-7	55	55	52	55	55	44	55	55	38	55	55	34	55	55	31	55	46	28	55	42	25	55	34	21	55	29	28	48	25	24	41	22	21	36	29	19	32	26	17	
		7-27	55	55	52	55	55	46	55	55	41	55	55	36	55	55	44	55	55	49	30	55	44	27	54	36	23	52	31	30	51	27	26	46	23	23	40	21	20	36	28	18
		27-45	65	65	65	64	64	64	62	62	62	60	60	60	59	59	59	57	57	57	56	56	56	53	53	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26	
40	B	0-7	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	47	49	49	37	49	49	31	49	45	27	49	38	24	49	33	21	49	29	28		
		7-27	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	48	51	51	40	51	51	34	51	47	29	50	40	25	49	35	22	48	31	30	
		27-45	61	61	61	61	61	61	61	61	61	61	61	61	61	61	60	60	60	59	59	59	57	57	57	55	55	55	53	53	51	51	51	49	49	48	45	45				
	C	0-7	49	49	49	49	49	49	49	4																																



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 1.25
Seismic

22.78 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

NXT
Rail Type

NXT COMBO
Clamp

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)	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	101	101	95	101	101	91	101	101	86	101	98	82	101	94	79	101	90	76	101	87	73	99	81	68	94	77	62	89	72	53	85	69	47	81	65	41	78	58	37	
		7-27	102	102	92	102	102	89	102	102	85	102	98	82	102	94	79	102	91	76	102	88	74	102	82	70	98	78	66	93	74	57	88	70	50	84	67	44	81	61	39	
		27-45	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	100	100	100	98	98	98	94	92	92	90	87	87	85	83	80	79	79	76	76	76	72	72	72		
	C	0-7	101	96	81	101	92	78	101	88	74	101	84	71	99	81	68	96	78	65	93	76	60	87	71	51	83	67	43	79	59	38	75	52	50	72	46	44	69	41	39	
		7-27	102	97	81	102	92	78	102	89	75	102	85	72	102	82	70	100	79	67	96	77	64	91	72	54	86	68	47	82	63	40	78	55	53	74	48	47	71	43	42	
		27-45	103	103	103	102	102	102	99	99	99	96	96	96	93	92	92	91	89	89	86	86	83	81	81	78	77	77	73	73	73	68	68	68	64	64	64	61	61	61		
	D	0-7	101	90	75	101	86	72	100	82	69	96	79	66	93	76	60	90	73	55	87	71	50	82	66	42	78	58	36	74	50	48	70	44	42	67	38	37	63	52	39	
		7-27	102	90	76	102	86	73	102	83	70	100	80	68	97	77	65	93	74	59	90	72	54	85	68	46	81	61	39	77	53	51	73	46	45	70	41	40	67	55	35	
		27-45	100	100	100	97	97	97	94	93	93	91	90	90	89	87	87	86	84	84	83	81	81	77	77	72	72	72	67	67	67	63	63	63	59	58	58	56	52	52		
10	B	0-7	90	90	90	90	90	90	90	86	90	90	82	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	91	91	91	91	91	89	91	91	85	91	91	82	91	91	79	91	91	76	91	88	74	91	82	70	91	78	66	91	74	57	88	70	50	84	67	44	81	61	39	
		27-45	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	100	100	100	98	98	98	94	92	92	90	87	87	85	83	80	79	79	76	76	76	72	72	72		
	C	0-7	90	90	81	90	90	78	90	88	74	90	84	71	90	81	68	90	78	65	90	76	60	87	71	51	83	67	43	79	59	38	75	52	50	72	46	44	69	41	39	
		7-27	91	91	81	91	91	78	91	89	75	91	85	72	91	82	70	91	79	67	91	77	64	91	72	54	86	68	47	82	63	40	78	55	53	74	48	47	71	43	42	
		27-45	101	101	101	101	101	101	99	99	99	96	96	96	93	92	92	91	89	89	89	86	86	83	81	81	78	77	77	73	73	73	68	68	68	64	64	64	61	61	61	
	D	0-7	90	90	75	90	86	72	90	82	69	90	79	66	90	76	60	90	73	55	87	71	50	82	66	42	78	58	36	74	50	48	70	44	42	67	38	37	63	52	39	
		7-27	91	90	76	91	86	73	91	83	70	91	80	68	91	77	65	91	74	59	90	72	54	85	68	46	81	61	39	77	53	51	73	46	45	70	41	40	67	55	35	
		27-45	100	100	100	97	97	97	94	93	93	91	90	90	89	87	87	86	84	84	83	81	81	77	77	72	72	72	67	67	67	63	63	63	59	58	58	56	52	52		
20	B	0-7	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	76	77	77	73	77	77	68	77	77	68	77	77	62	77	72	53	77	69	47	77	65	41	77	58	37
		7-27	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	76	77	77	74	77	77	77	77	70	77	77	66	77	74	57	76	70	50	74	67	44	72	61	39	
		27-45	95	95	95	95	95	95	95	95	95	95	95	95	95	95	94	94	94	92	92	92	89	89	87	87	87	83	83	83	80	79	79	76	76	76	72	72	72			
	C	0-7	77	77	77	77	77	77	77	77	74	77	77	71	77	77	68	77	77	65	77	76	60	77	71	51	77	67	43	77	59	38	75	52	50	72	46	44	69	41	39	
		7-27	77	77	77	77	77	77	77	77	75	77	77	72	77	77	77	77	77	67	77	77	70	77	72	54	75	68	47	73	63	40	71	55	53	69	48	47	67	43	42	
		27-45	95	95	95	94	94	94	93	93	93	91	91	89	89	88	88	86	86	86	86	82	81	81	78	77	77	73	73	73	68	68	68	64	64	64	61	61	61			
	D	0-7	77	77	75	77	77	72	77	77	69	77	77	66	77	76	60	77	73	55	77	71	50	77	66	42	77	58	36	74	50	48	70	44	42	67	38	37	63	52	39	
		7-27	77	77	76	77	77	73	77	77	70	77	77	68	77	77	65	77	74	59	77	72	54	74	68	46	72	61	39	70	53	51	68	46	45	66	41	40	64	55	35	
		27-45	94	94	94	93	93	93	91	91	89	89	89	87	87	87	85	84	84	83	81	81	77	77	77	72	72	72	67	67	67	63	63	63	59	58	58	56	52	52		
30	B	0-7	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	76	76	76	76	76	76	76	76	76	76	76	76	76	76	
		7-27	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	77	77	77	77	77	77	77	77	77	77	77	77	77	
		27-45	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	
	C	0-7	76	76	76	76	76	76	76	76	74	76	76	71	76	76	68	76	76	65	76	76	60	76	71	51	76	67	43	76	59	38	75	52	50	72	46	44	69	41	39	
		7-27	77	77	77	77	77	77	77	77	75	77	77	72	77	77	77	77	77	67	77	77	70	77	72	54	75	68	47	73	63	40	71	55	53	69	48	47	67	43	42	
		27-45	90	90	90	89	89	89	88	88	88	86	86	86	84	84	84	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	77	77	75	77	77	72	77	77	69	77	77	66	77	76	60	77	73	55	77	71	50	77	66	42	77	58	36	74	50	48	70	44	42	67	38	37	63	52	39	
		7-27	77	77	76	77	77	73	77	77	70	77	77	68	77	77	65	77	74	59	77	72	54	74	68	46	72	61	39	70	53	51	68	46	45	66	41	40	64	55	35	
		27-45	90	90	90	88	88	88	86	86	86	84	84	84	82	82	82	80	80	80	78	78	78	74	74	74	74	74	74	71	71	67	67	67	63	63	63	59	58	58	56	52
40	B	0-7	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69		
		7-27	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	71	71	71	71	71	71	71	71	71	71	71	71	71		
		27-45	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	85	85	85	85	85	85	85	85	85	85	85	85	85		
	C	0-7	690																																							



30 ft
Roof Height

Ss = 1.25
Seismic

22.78 sq.ft

LANDSCAPE

CROSS-SLOPE
Rail Direction

NXT

NXT COMBO

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)			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	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	53	57	57	47	57	57	41	57	57	37									
		7-27	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	50	60	60	44	59	59	39										
		27-45	75	75	75	75	75	75	75	75	75	75	75	75	75	75	74	74	74	73	73	71	71	71	69	69	69	67	67	65	65	65	63	63	63	62	62	62	62								
	C	0-7	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	51	57	57	43	57	57	38	57	52	50	57	46	44	57	41	39								
		7-27	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	54	60	60	47	59	59	40	58	55	53	57	48	47	56	43	42								
		27-45	75	75	75	74	74	74	73	73	73	72	72	72	71	71	71	70	70	70	69	69	69	66	66	66	64	64	64	62	62	62	60	60	58	58	58	56	56	56	56						
D	0-7	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	55	60	60	55	60	60	60	42	60	58	36	60	50	48	60	44	42	60	38	37	59	52	93								
	7-27	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	59	63	63	54	62	62	46	61	61	39	60	53	51	58	46	45	57	41	40	56	55	95									
	27-45	76	76	76	75	75	75	73	73	73	72	72	72	71	71	71	69	69	69	68	68	68	65	65	65	63	63	63	61	61	58	58	58	56	56	56	54	52	52								
70	B	0-7	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	47	53	53	41	53	53	37							
		7-27	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56							
		27-45	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	70	70	70	70	70	70	68	68	68	66	66	66	64	64	63	63	63	61	61	61	59	59	59	59						
	C	0-7	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	51	53	53	43	53	53	38	53	52	50	53	46	44	53	41	39								
		7-27	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56							
		27-45	71	71	71	71	71	71	70	70	70	69	69	69	68	68	68	67	67	67	66	66	66	64	64	64	62	62	62	60	60	58	58	58	56	56	56	54	52	52							
D	0-7	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	55	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56							
	7-27	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58							
	27-45	73	73	73	71	71	71	70	70	70	69	69	69	68	68	68	67	67	67	65	65	65	63	63	63	61	61	61	59	59	59	57	57	55	55	55	53	52	52								
80	B	0-7	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	37							
		7-27	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52							
		27-45	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*	78*							
	C	0-7	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50						
		7-27	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52							
		27-45	78*	78*	78*	81*	81*	81*	67	67	66	66	66	65	65	65	64	64	64	63	63	63	61	61	61	60	60	58	58	58	56	56	56	55	55	55	55	53	53	53	53						
D	0-7	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53							
	7-27	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55							
	27-45	70	70	70	69	69	69	67	67	66	66	66	65	65	65	64	64	64	63	63	63	61	61	61	59	59	59	57	57	57	55	55	55	53	53	53	52	52	52								
90	B	0-7	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47							
		7-27	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49							
		27-45	72*	72*	72*	72*	72*	72*	72*	72*	72*	72*	72*	72*	72*	72*	71*	71*	71*	70*	70*	70*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*	71*						
	C	0-7	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47						
		7-27	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49						
		27-45	72*	72*	72*	71*	71*	71*	70*	70*	69*	69*	69*	71*	71*	71*	73*	73*	61	61	61	59	59	59	58	58	58	56	56	55	55	55	55	53	53	53	52	52	52	52							
D	0-7	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50							
	7-27	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52							
	27-45	80*	80*	80*	66	66	66	65	65	65	64	64	64	63	63	63	62	62	62	61	61	61	59	59	59	57	57	57	56	56	56	54	54	54	52	52	52	50	50	50							
100	B	0-7	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							
		7-27	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47							
		27-45	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*						
	C	0-7	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						
		7-27	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47						
		27-45	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*	65*										

- Cells with an asterisks indicates that the L-foot must be oriented in the Y- direction as indicated in the image.
- 10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.
- 10 Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

18.66 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

NXT
Rail Type

NXT COMBO
Clamp

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)	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	86	86	80	86	86	76	86	85	73	86	82	70	86	79	68	86	76	64	86	74	56	84	69	44	79	64	37	75	54	32	72	46	28	69	40	25	66	35	22	
		7-27	86	86	78	86	86	75	86	85	72	86	82	70	86	79	67	86	77	64	86	74	58	86	70	48	82	66	40	78	57	35	75	48	31	71	42	27	68	37	24	
		27-45	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	84	84	84	81	81	81	76	76	76	71	71	67	67	67	63	63	59	59	59	56	54	54		
	C	0-7	86	81	69	86	77	66	86	74	58	86	72	50	84	69	44	81	67	40	79	62	36	74	50	31	70	42	26	67	36	23	59	32	30	52	28	27	46	25	24	
		7-27	86	81	69	86	78	66	86	75	59	86	72	53	86	70	47	84	67	43	81	65	39	77	53	33	73	44	28	69	38	25	66	33	21	58	29	29	51	26	25	
		27-45	87	87	87	86	86	86	82	82	82	79	79	79	76	76	76	73	73	70	70	70	65	65	65	61	61	61	57	56	56	56	54	48	48	51	42	42	45	37	37	
D	0-7	86	76	62	86	72	53	85	70	45	82	67	40	79	62	37	76	56	33	74	50	30	70	41	26	66	35	22	57	30	29	49	26	25	43	23	22	38	21	29		
	7-27	86	76	62	86	73	55	86	70	49	85	68	43	82	65	39	79	58	36	77	53	33	72	43	28	68	37	24	64	32	21	55	28	27	48	25	24	43	22	21		
	27-45	84	84	84	80	80	80	76	76	76	73	73	73	70	70	70	67	67	67	65	65	65	60	60	60	56	54	54	53	46	46	49	40	40	43	35	35	38	31	31		
10	B	0-7	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	64	37	72	54	32	72	46	28	69	40	25	66	35	22	
		7-27	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	71	48	31	69	42	27	67	37	24	
		27-45	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	84	84	84	81	81	81	76	76	76	71	71	67	67	67	63	63	63	59	59	59	56	54	54	
	C	0-7	72	72	69	72	72	66	72	72	58	72	72	50	72	69	44	72	67	40	72	62	36	72	50	31	70	42	26	67	36	23	59	32	30	52	28	27	46	25	24	
		7-27	72	72	69	72	72	66	72	72	59	72	72	53	72	70	47	72	67	43	72	65	39	72	53	33	70	44	28	67	38	25	65	33	21	58	29	29	51	26	25	
		27-45	86	86	86	85	85	85	82	82	82	79	79	79	76	76	76	73	73	70	70	70	65	65	65	61	61	61	57	56	56	56	54	48	48	51	42	42	45	37	37	
D	0-7	72	72	62	72	72	53	72	70	45	72	67	40	72	62	37	72	56	33	72	50	30	70	41	26	66	35	22	57	30	29	49	26	25	43	23	22	38	21	29		
	7-27	72	72	62	72	72	55	72	70	49	72	68	43	72	65	39	72	58	36	72	53	33	69	43	28	67	37	24	64	32	21	55	28	27	48	25	24	43	22	21		
	27-45	84	84	84	80	80	80	76	76	76	73	73	73	70	70	70	67	67	67	65	65	65	60	60	60	56	54	54	53	46	46	49	40	40	43	35	35	38	31	31		
20	B	0-7	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	56	60	60	44	60	60	37	60	54	32	60	46	28	60	40	25	60	35	22			
		7-27	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	58	61	61	58	61	61	48	61	61	40	61	57	35	59	48	31	58	42	27	57	37	24
		27-45	78	78	78	78	78	78	78	78	78	78	78	78	78	77	77	76	76	76	74	74	74	71	71	71	68	68	68	65	65	65	62	62	62	59	59	59	56	54	54	
	C	0-7	60	60	60	60	60	60	60	58	60	60	50	60	60	44	60	60	40	60	60	36	60	50	31	60	42	26	60	36	23	59	32	30	52	28	27	46	25	24		
		7-27	61	61	61	61	61	61	61	59	61	61	53	61	61	47	61	61	43	61	61	39	60	53	33	59	44	28	57	38	25	56	33	21	54	29	29	51	26	25		
		27-45	78	78	78	77	77	77	75	75	75	73	73	73	71	71	69	69	67	67	67	64	64	64	61	61	61	57	56	56	56	54	48	48	51	42	42	45	37	37		
D	0-7	60	60	60	60	60	53	60	45	60	60	40	60	60	37	60	56	33	60	50	30	60	41	26	60	35	22	57	30	29	49	26	25	43	23	22	38	21	29			
	7-27	61	61	61	61	61	55	61	61	49	61	61	43	61	61	39	61	58	36	60	53	33	58	43	28	57	37	24	55	32	21	54	28	27	48	25	24	43	22	21		
	27-45	77	77	77	75	75	75	72	72	72	70	70	68	68	68	66	66	66	65	65	65	60	60	60	56	54	54	53	46	46	49	40	40	43	35	35	38	31	31			
30	B	0-7	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	56	59	59	44	59	59	37	59	54	32	59	46	28	59	40	25	59	35	22			
		7-27	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	58	61	61	58	61	61	48	61	61	40	61	57	35	59	48	31	58	42	27	57	37	24
		27-45	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	70	70	70	68	68	68	66	66	66	63	63	63	61	61	61	59	59	59	57	57	55	54
	C	0-7	59	59	59	59	59	59	59	59	58	59	59	50	59	59	44	59	59	40	59	59	36	59	50	31	59	42	26	59	36	23	59	32	30	52	28	27	46	25	24	
		7-27	61	61	61	61	61	61	61	61	59	61	61	53	61	61	47	61	61	43	61	61	39	60	53	33	59	44	28	57	38	25	56	33	21	54	29	29	51	26	25	
		27-45	71	71	71	70	70	70	69	69	67	67	67	66	66	66	64	64	64	63	63	63	60	60	60	58	58	58	55	55	55	53	48	48	50	42	42	45	37	37		
D	0-7	60	60	60	60	60	53	60	45	60	60	40	60	60	37	60	56	33	60	50	30	60	41	26	60	35	22	57	30	29	49	26	25	43	23	22	38	21	29			
	7-27	61	61	61	61	61	55	61	61	49	61	61	43	61	61	39	61	58	36	60	53	33	58	43	28	57	37	24	55	32	21	54	28	27	48	25	24	43	22	21		
	27-45	71	71	71	69	69	69	68	68	68	66	66	66	64	64	64	63	63	63	63	63	61	61	61	58	58	58	55	54	54	53	46	46	49	40	40	43	35	35	38	31	31
40	B	0-7	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	44	54	54	37	54	54	32	54	46	28	54	40	25	54	35	22			
		7-27	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	48	56	56	40	56	56	35	55	48	31	54	42	27	53	37	24		
		27-45	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	65	65	65	64	64	64	62	62	62	60	60	60	58	58	56	56	54	54	54	52	52	52		
	C	0-7	54	54	54	54	54	54	54	54	54	54	54	54	54	54</																										



30 ft
Roof Height

Ss = 3.00
Seismic

18.66 sq.ft
Module Area

ORIENTATION

CROSS-SLOPE
Rail Direction

NXT

NXT COMBO
Clamp

Stronghold BUTYL Rafter
Attachment

• Cells with an asterisks indicates that the L-root must be oriented in the Y- direction as indicated in the image.

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

10 Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

18.66 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

NXT
Rail Type

NXT COMBO
Clamp

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)	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	102	102	96	102	102	91	102	102	87	102	98	83	102	94	80	102	91	77	102	88	74	100	82	69	95	77	63	90	73	55	86	69	48	82	66	42	78	59	37	
		7-27	102	102	93	102	102	89	102	102	86	102	99	83	102	95	80	102	92	77	102	88	75	102	83	70	98	78	66	93	74	59	89	71	51	85	67	45	81	63	40	
		27-45	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	101	101	99	99	99	99	94	93	90	88	88	86	84	84	81	80	80	77	76	76	73	73	73		
	C	0-7	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	75	53	34	72	47	45	69	42	40	
		7-27	102	97	82	102	93	78	102	89	75	102	86	73	102	83	70	100	80	68	97	77	66	91	73	56	86	69	48	82	64	41	78	56	36	75	50	48	72	44	43	
		27-45	103	103	103	102	102	102	99	99	99	97	96	96	94	93	93	92	90	90	89	87	87	84	82	82	79	78	78	74	74	69	69	65	65	65	62	62	62	62		
	D	0-7	102	90	76	102	86	73	101	83	69	97	79	67	94	76	61	91	74	56	88	71	51	83	67	43	78	59	37	74	51	49	71	45	43	68	39	38	64	35	33	
		7-27	102	91	77	102	87	74	102	84	71	101	80	68	97	78	66	94	75	60	91	73	55	86	68	47	81	62	40	77	54	35	74	47	46	71	42	41	68	37	36	
		27-45	101	101	101	98	98	98	95	94	94	92	90	90	90	87	87	84	84	84	82	82	78	77	77	72	72	72	68	68	68	64	64	60	59	59	57	53	53	53		
10	B	0-7	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	91	91	91	91	91	89	91	91	86	91	91	83	91	91	80	91	91	77	91	88	75	91	83	70	91	78	66	91	74	59	89	71	51	85	67	45	81	63	40	
		27-45	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	101	101	99	99	99	94	93	93	90	88	88	86	84	84	81	80	80	77	76	76	73	73	73		
	C	0-7	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	75	53	34	72	47	45	69	42	40	
		7-27	91	91	82	91	91	78	91	89	75	91	86	73	91	83	70	91	80	68	91	77	66	91	73	56	86	69	48	82	64	41	78	56	36	75	50	48	72	44	43	
		27-45	102	102	102	102	102	99	99	99	97	96	96	94	93	93	92	90	90	89	87	87	84	82	82	79	78	78	74	74	69	69	65	65	65	62	62	62	62			
	D	0-7	91	90	76	91	86	73	91	83	69	91	79	67	91	76	61	91	74	56	88	71	51	83	67	43	78	59	37	74	51	49	71	45	43	68	39	38	64	35	33	
		7-27	91	91	77	91	87	74	91	84	71	91	80	68	91	78	66	91	75	60	91	73	55	86	68	47	81	62	40	77	54	35	74	47	46	71	42	41	68	37	36	
		27-45	101	101	101	98	98	98	95	94	94	92	90	90	90	87	87	84	84	84	82	82	78	77	77	72	72	72	68	68	68	64	64	60	59	59	57	53	53	53		
20	B	0-7	78	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	78	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	66	78	74	59	77	71	51	75	67	45	73	63	40	
		27-45	96	96	96	96	96	96	96	96	96	96	96	96	96	94	94	93	93	93	90	90	90	88	88	88	88	84	84	84	81	80	80	77	76	76	73	73	73			
	C	0-7	78	78	78	78	78	78	78	78	75	78	78	72	78	69	78	78	66	78	76	61	78	72	52	78	67	44	78	61	38	75	53	34	72	47	45	69	42	40		
		7-27	78	78	78	78	78	78	78	75	78	78	73	78	78	78	78	78	78	77	66	78	73	56	78	73	56	78	69	48	74	64	41	72	56	36	70	50	48	68	44	43
		27-45	96	96	96	95	95	95	93	93	93	92	92	92	90	90	90	89	89	89	87	87	87	83	82	82	79	78	78	74	74	69	69	65	65	65	62	62	62			
	D	0-7	78	78	76	78	78	73	78	78	69	78	78	67	78	76	61	78	74	56	78	71	51	78	67	43	78	59	37	74	51	49	71	45	43	68	39	38	64	35	33	
		7-27	78	78	77	78	78	74	78	78	71	78	78	68	78	78	66	78	75	60	78	73	55	75	68	47	73	62	40	71	54	35	69	47	46	67	42	41	65	37	36	
		27-45	95	95	95	93	93	93	91	91	91	90	90	90	88	87	87	86	84	84	84	82	82	78	77	77	72	72	68	68	68	64	64	60	59	59	57	53	53	53		
30	B	0-7	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	74	77	77	69	77	77	63	77	73	55	77	69	48	77	66	42	77	59	37		
		7-27	78	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	66	78	74	59	77	71	51	75	67	45	73	63	40	
		27-45	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	77	77	77	77	77	77	77	77	75	77	77	72	77	69	77	77	66	77	76	61	77	72	52	77	67	44	77	61	38	75	53	34	72	47	45	69	42	40		
		7-27	78	78	78	78	78	78	78	75	78	78	73	78	78	78	78	78	78	68	78	77	66	78	73	56	78	69	48	74	64	41	72	56	36	70	50	48	68	44	43	
		27-45	90	90	90	90	90	90	88	88	88	87	87	87	85	85	85	83	83	83	81	81	81	78	78	74	74	74	71	71	68	68	65	65	65	62	62	62				
	D	0-7	78	78	76	78	78	73	78	78	69	78	78	67	78	76	61	78	74	56	78	71	51	78	67	43	78	59	37	74	51	49	71	45	43	68	39	38	64	35	33	
		7-27	78	78	77	78	78	74	78	78	71	78	78	68	78	78	66	78	75	60	78	73	55	75	68	47	73	62	40	71	54	35	69	47	46	67	42	41	65	37	36	
		27-45	90	90	90	89	89	89	87	87	87	85	85	85	83	83	83	81	81	81	79	79	79	75	75	75	71	71	71	68	68	68	64	64	60	59	59	57	53	53		
40	B	0-7	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	69	70	70	63	70	70	63	70	55	70	69	48	70	66	42	70	59	37		
		7-27	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	66	72	72	59	70	70	51	69	67	45	68	63	40	
		27-45	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	84	84	84	83	83	83	80	80	80	77	77	77	75	75	75	72	72	70	70	70	67	67	67		
	C	0-7	70	70	70	70	70	70	70	70	70	70	70</																													



30 ft
Roof Height

Ss = 3.00

18.66 sq.ft

Module Area

LANDSCAPE

CROSS-SLOPE
Rail Direction

NXT
Rail Type

NXT COMBO

Stronghold BUTYL Rafter
Attachment

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.

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ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

22.78 sq.ft
Module Area

PORTRAIT
Orientation

CROSS-SLOPE
Rail Direction

NXT
Rail Type

NXT COMBO
Clamp

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)	Basic Wind Speed (mph)																																							
			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	79	79	76	79	79	73	79	79	70	79	78	67	79	75	61	79	72	53	79	70	47	79	66	37	75	54	31	71	45	27	68	38	24	63	33	21	56	29	28	
		7-27	79	79	74	79	79	71	79	79	68	79	78	66	79	75	59	79	73	53	79	70	48	79	66	40	78	56	34	74	47	29	70	40	25	67	35	22	63	31	30	
		27-45	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	77	77	77	74	74	74	69	69	69	65	65	65	61	61	61	58	58	58	54	51	51	52	45	45	
	C	0-7	79	77	66	79	74	57	79	71	49	79	68	42	79	65	37	77	58	33	74	52	30	70	42	26	66	35	22	57	30	29	50	26	25	43	23	22	38	21	20	
		7-27	79	77	64	79	74	56	79	71	50	79	68	44	79	66	40	79	60	36	77	54	33	72	44	28	69	37	24	64	32	20	56	28	27	49	25	24	43	22	21	
		27-45	80	80	80	79	79	79	75	75	75	72	72	69	69	67	67	67	64	64	64	60	60	60	60	60	56	54	54	52	47	49	40	40	43	35	35	38	31	31		
	D	0-7	79	72	52	79	69	44	79	66	38	77	59	34	74	52	31	72	46	28	70	42	25	66	34	21	56	29	28	48	25	24	41	22	21	36	29	19	32	26	17	
		7-27	79	72	52	79	69	46	79	67	41	79	61	36	77	54	33	75	49	30	72	44	27	68	36	23	62	31	30	53	27	26	46	23	23	40	21	20	36	28	18	
		27-45	77	77	77	73	73	73	70	70	70	67	67	67	64	64	64	62	62	62	59	59	59	55	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26		
10	B	0-7	66	66	66	66	66	66	66	66	66	66	66	66	66	66	61	66	66	53	66	66	47	66	66	37	66	54	31	66	45	27	66	38	24	63	33	21	56	29	28	
		7-27	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	66	66	66	66	66	66	66	66	66	
		27-45	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	77	77	77	74	74	74	69	69	69	65	65	65	61	61	61	58	58	58	54	51	51	52	45	45	
	C	0-7	66	66	66	66	66	57	66	66	49	66	66	42	66	65	37	66	58	33	66	52	30	66	42	26	66	35	22	57	30	29	50	26	25	43	23	22	38	21	20	
		7-27	66	66	64	66	66	56	66	66	50	66	66	44	66	66	40	66	60	36	66	54	33	66	44	28	64	37	24	62	32	20	56	28	27	49	25	24	43	22	21	
		27-45	79	79	79	78	78	78	75	75	75	72	72	69	69	69	67	67	67	64	64	64	60	60	60	56	54	54	52	47	49	40	40	43	35	35	38	31	31			
	D	0-7	66	66	52	66	66	44	66	66	38	66	59	34	66	52	31	66	46	28	66	42	25	66	34	21	56	29	28	48	25	24	41	22	21	36	29	19	32	26	17	
		7-27	66	66	52	66	66	46	66	66	41	66	61	36	66	54	33	66	49	30	66	44	27	64	36	23	61	31	30	53	27	26	46	23	23	40	21	20	36	28	18	
		27-45	77	77	77	73	73	73	70	70	70	67	67	67	64	64	64	62	62	62	59	59	59	55	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26		
20	B	0-7	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
		7-27	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
		27-45	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	69	69	69	68	68	65	65	65	62	62	62	60	60	60	57	57	57	54	51	51	52	45	45		
	C	0-7	55	55	55	55	55	55	55	55	55	55	55	42	55	55	37	55	55	33	55	52	30	55	42	26	55	35	22	55	30	29	50	26	25	43	23	22	38	21	20	
		7-27	55	55	55	55	55	55	55	55	55	55	55	44	55	55	40	55	55	36	55	54	33	55	44	28	54	37	24	52	32	20	51	28	27	49	25	24	43	22	21	
		27-45	71	71	71	70	70	70	68	68	68	67	67	67	65	65	65	63	63	63	62	62	62	59	59	59	55	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26
	D	0-7	55	55	52	55	55	44	55	55	38	55	55	34	55	55	31	55	46	28	55	42	25	55	34	21	55	29	28	48	25	24	41	22	21	36	29	19	32	26	17	
		7-27	55	55	52	55	55	46	55	55	41	55	55	36	55	55	33	55	49	30	55	44	27	54	36	23	52	31	30	51	27	26	46	23	23	40	21	20	36	28	18	
		27-45	70	70	70	68	68	68	66	66	66	64	64	64	63	63	63	61	61	61	59	59	59	55	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26		
30	B	0-7	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	54	54	54	54	54	54	54	54	54	54		
		7-27	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
		27-45	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	
	C	0-7	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	29	50	26	25	43	23	22	38	21	20	
		7-27	55	55	55	55	55	55	55	55	50	55	55	44	55	55	40	55	55	36	55	54	33	55	44	28	54	37	24	52	32	20	51	28	27	49	25	24	43	22	21	
		27-45	65	65	65	65	65	65	65	65	63	63	62	62	62	60	60	60	59	59	59	59	59	58	58	55	55	55	53	53	50	47	48	40	43	35	35	38	31	31		
	D	0-7	55	55	52	55	55	44	55	55	38	55	55	34	55	55	31	55	46	28	55	42	25	55	34	21	55	29	28	48	25	24	41	22	21	36	29	19	32	26	17	
		7-27	55	55	52	55	55	46	55	55	41	55	55	36	55	55	33	55	49	30	55	44	27	54	36	23	52	31	30	51	27	26	46	23	23	40	21	20	36	28	18	
		27-45	65	65	65	64	64	64	62	62	62	60	60	60	59	59	59	57	57	57	56	56	56	53	53	53	51	45	45	48	38	38	41	33	33	36	29	29	32	26	26	
40	B	0-7	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49		
		7-27	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	
		27-45	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	60	60	60	59	59	59	57	57	57	55	55	55	53	53	51	51	51	51	51	51	51	51	51	51	
	C	0-7	49	49	49	49	49	49	49	49	49	49	49	49																												



30 ft
Roof Height

Ss = 3.00
Seismic

22.78 sq.ft

ORIENTATION

CROSS-SLOPE
Rail Direction

NXT

NXT COMBO

Stronghold BUTYL Rafter
Attachment

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

[illegible]

• Cells with an asterisks indicates that the L-root must be oriented in the Y- direction as indicated in the image.

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

10 Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.



ASCE 7-10
Design Standard

II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

22.78 sq.ft
Module Area

LANDSCAPE
Orientation

CROSS-SLOPE
Rail Direction

NXT
Rail Type

NXT COMBO
Clamp

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)	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	101	101	95	101	101	91	101	101	86	101	98	82	101	94	79	101	90	76	101	87	73	99	81	68	94	77	62	89	72	53	85	69	47	81	65	41	78	58	37
		7-27	102	102	92	102	102	89	102	102	85	102	98	82	102	94	79	102	91	76	102	88	74	102	82	70	98	78	66	93	74	57	88	70	50	84	67	44	81	61	39
		27-45	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	100	100	100	98	98	98	94	92	92	90	87	87	85	83	83	80	79	79	76	76	76	72	72	72
	C	0-7	101	96	81	101	92	78	101	88	74	101	84	71	99	81	68	96	78	65	93	76	60	87	71	51	83	67	43	79	59	38	75	52	50	72	46	44	69	41	39
		7-27	102	97	81	102	92	78	102	89	75	102	85	72	102	82	70	100	79	67	96	77	64	91	72	54	86	68	47	82	63	40	78	55	53	74	48	47	71	43	42
		27-45	103	103	103	102	102	102	99	99	99	96	96	96	93	92	92	91	89	89	86	86	83	81	81	78	77	77	73	73	73	68	68	68	64	64	64	61	61	61	61
	D	0-7	101	90	75	101	86	72	100	82	69	96	79	66	93	76	60	90	73	55	87	71	50	82	66	42	78	58	36	74	50	48	70	44	42	67	38	37	63	52	39
		7-27	102	90	76	102	86	73	102	83	70	100	80	68	97	77	65	93	74	59	90	72	54	85	68	46	81	61	39	77	53	51	73	46	45	70	41	40	67	55	35
		27-45	100	100	100	97	97	97	94	93	93	91	90	90	89	87	87	86	84	84	83	81	81	77	77	77	72	72	72	67	67	67	63	63	63	59	58	58	56	52	52
10	B	0-7	90	90	90	90	90	90	90	86	90	90	82	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	91	91	91	91	91	89	91	91	85	91	91	82	91	91	79	91	91	76	91	88	74	91	82	70	91	78	66	91	74	57	88	70	50	84	67	44	81	61	39
		27-45	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	100	100	100	98	98	98	94	92	92	90	87	87	85	83	83	80	79	79	76	76	76	72	72	72
	C	0-7	90	90	81	90	90	78	90	88	74	90	84	71	90	81	68	90	78	65	90	76	60	87	71	51	83	67	43	79	59	38	75	52	50	72	46	44	69	41	39
		7-27	91	91	81	91	91	78	91	89	75	91	85	72	91	82	70	91	79	67	91	77	64	91	72	54	86	68	47	82	63	40	78	55	53	74	48	47	71	43	42
		27-45	101	101	101	101	101	101	99	99	99	96	96	96	93	92	92	91	89	89	89	86	86	83	81	81	78	77	77	73	73	73	68	68	68	64	64	64	61	61	61
	D	0-7	90	90	75	90	86	72	90	82	69	90	79	66	90	76	60	90	73	55	87	71	50	82	66	42	78	58	36	74	50	48	70	44	42	67	38	37	63	52	39
		7-27	91	90	76	91	86	73	91	83	70	91	80	68	91	77	65	91	74	59	90	72	54	85	68	46	81	61	39	77	53	51	73	46	45	70	41	40	67	55	35
		27-45	100	100	100	97	97	97	94	93	93	91	90	90	89	87	87	86	84	84	83	81	81	77	77	77	72	72	72	67	67	67	63	63	63	59	58	58	56	52	52
20	B	0-7	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	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	76	77	77	74	77	77	70	77	77	66	77	74	57	76	70	50	74	67	44	72	61	39	
		27-45	95	95	95	95	95	95	95	95	95	95	95	95	95	95	94	94	94	92	92	92	89	89	87	87	87	83	83	83	80	79	79	76	76	76	72	72	72		
	C	0-7	77	77	77	77	77	77	77	77	74	77	77	71	77	68	77	77	65	77	76	60	77	71	51	77	67	43	77	59	38	75	52	50	72	46	44	69	41	39	
		7-27	77	77	77	77	77	77	77	77	75	77	77	72	77	77	77	77	67	77	77	64	77	72	54	75	68	47	73	63	40	71	55	53	69	48	47	67	43	42	
		27-45	95	95	95	94	94	94	93	93	93	91	91	89	89	88	88	86	86	86	86	82	81	81	78	77	77	73	73	73	68	68	68	64	64	64	61	61	61	61	
	D	0-7	77	77	75	77	77	72	77	69	77	77	66	77	76	60	77	73	55	77	71	50	77	66	42	77	58	36	74	50	48	70	44	42	67	38	37	63	52	39	
		7-27	77	77	76	77	77	73	77	77	70	77	68	77	77	65	77	74	59	77	72	54	74	68	46	72	61	39	70	53	51	68	46	45	66	41	40	64	55	35	
		27-45	94	94	94	93	93	93	91	91	89	89	87	87	87	85	84	84	83	81	81	77	77	77	72	72	72	67	67	67	63	63	63	59	58	58	56	52	52		
30	B	0-7	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	68	76	76	62	76	72	53	76	69	47	76	65	41	76	58	37		
		7-27	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	77	77	77	77	77	77	77	77	77	77	77		
		27-45	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	
	C	0-7	76	76	76	76	76	76	76	76	74	76	76	71	76	68	76	76	65	76	76	60	76	71	51	76	67	43	76	59	38	75	52	50	72	46	44	69	41	39	
		7-27	77	77	77	77	77	77	77	77	75	77	77	72	77	77	77	77	67	77	77	64	77	72	54	75	68	47	73	63	40	71	55	53	69	48	47	67	43	42	
		27-45	90	90	90	89	89	89	88	88	88	86	86	86	84	84	84	82	82	82	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
	D	0-7	77	77	75	77	77	72	77	69	77	77	66	77	76	60	77	73	55	77	71	50	77	66	42	77	58	36	74	50	48	70	44	42	67	38	37	63	52	39	
		7-27	77	77	76	77	77	73	77	77	70	77	68	77	77	65	77	74	59	77	72	54	74	68	46	72	61	39	70	53	51	68	46	45	66	41	40	64	55	35	
		27-45	90	90	90	88	88	88	86	86	86	84	84	84	82	82	82	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	
40	B	0-7	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69		
		7-27	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	71	71	71	71	71	71	71	71	71	71	71	71		
		27-45	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	85	85	85	85	85	85	85	85	85	85	85	85	85	
	C	0-7	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69																							



II
Risk Category

30 ft
Roof Height

Ss = 3.00
Seismic

22.78 sq.ft

LANDSCAPE

CROSS-SLOPE
Rail Direction

NXT

NXT COMBO

Clamp

Stronghold BUTYL Rafter
Attachment

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

[illegible]

• Cells with an asterisks indicates that the L-root must be oriented in the Y- direction as indicated in the image.

10 Highlighted cell indicate 3-rail system span. Contact Unirac Engineering Services for support.

10 Highlighted cell with strikethrough indicate 3-rail system span and module clamp allowable capacity exceeds with 3-rails. 4-Rail system required. Contact Unirac Engineering Services for support.