**Design Criteria for Span Tables:**

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

Building Assumptions

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

Wind Design Assumptions

- Wind loads used are based on ASCE 7-22 Sec. 29.4.4
- Exposure Category B, C, or D
- Basic Wind Speed = 90 – 180 mph
- Level terrain. Topographic factor, kzt = 1.0
- γE = 1.0 for 'Interior' spans, γE = 1.5 for 'Exposed' spans (ASCE 7-22, Fig. 29.4-7)

Snow Design Assumptions

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

Seismic Design Assumptions

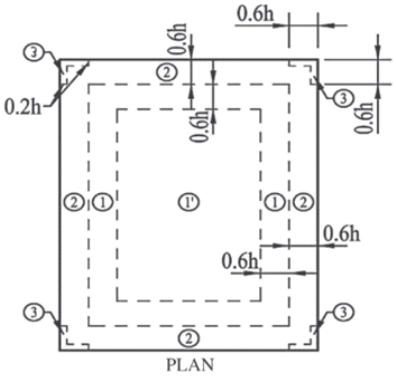
- 0.2-s Spectral Response Acceleration
- $S_S$ = 1.25 and 3 with Sds = 1, 2.4 respectively per criteria shown on individual span tables sheets.
- $S_1$ = 0.5 & Sd1 = 0.6
- Seismic site class D

Array Assumptions

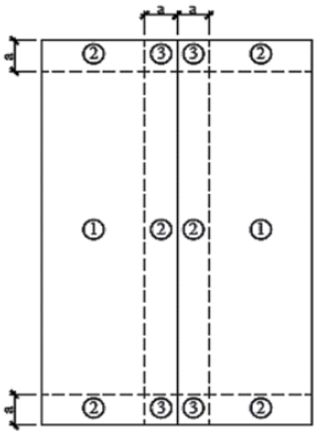
- Module orientation and Rail direction per criteria shown on individual span tables sheets.
- Maximum module dimensions of 40.1" x 67" (~19 sq.ft, 47.65 lbs) and 41" x 80" (~23 sq.ft, 58.6 lbs) per criteria shown on individual span tables sheets.
- Minimum distance between modules and roof edge is at least twice the module height above roof surface.
- Modules are parallel to roof surface and maximum height above roof surface is 5" to 10" depending on attachment type.
- Gaps between module rows and columns is 0.25" in to 1" depending on clamp type.
- The most restrictive of all roof zone spans shall be used when any part of the module is attributed to that span.
- 'Exposed' spans as defined in ASCE 7-22 sec. 29.4.4 shall be used when any part of an exposed module or panel as is attributed to that span.

# Span Tables

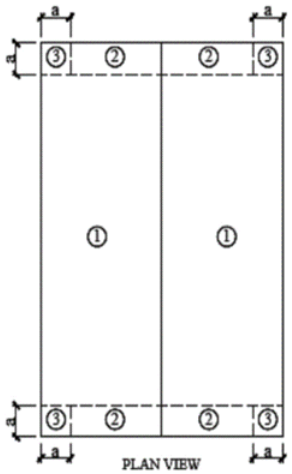
Zone should be considered as per ASCE 7-22, Fig. 30.3-2A to 30.3-2D




Gable Roofs θ ≤ 7°

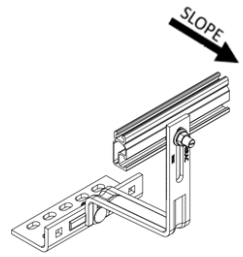


Gable Roofs 7°< θ ≤ 27°




Gable Roofs 27°< θ ≤ 45°

Rails can be installed in these possible orientations.

| | *CT5 |
|---|---|
| Y+ | Alternate orientation not allowed |
| Y- |   |

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 78 | 83 | 83 | 75 | 83 | 82 | 71 | 83 | 79 | 67 | 83 | 76 | 63 | 81 | 70 | 48 | 76 | 63 | 39 | 71 | 51 | 34 | 65 | 42 | 30 | 55 | 37 | 26 | 46 | 33 | 23 |
| | | | Exposed | 83 | 82 | 71 | 83 | 78 | 66 | 83 | 75 | 59 | 82 | 71 | 50 | 79 | 67 | 43 | 76 | 62 | 39 | 72 | 54 | 35 | 65 | 42 | 30 | 54 | 36 | 26 | 43 | 31 | 34 | 38 | 27 | 29 | 33 | 24 | 26 | 29 | 32 | 23 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 72 | 83 | 79 | 67 | 83 | 76 | 62 | 83 | 72 | 53 | 78 | 65 | 40 | 72 | 50 | 35 | 66 | 41 | 30 | 54 | 35 | 26 | 43 | 31 | 23 | 38 | 28 | 31 |
| | | | Exposed | 83 | 79 | 67 | 83 | 75 | 59 | 83 | 70 | 49 | 79 | 66 | 41 | 76 | 58 | 38 | 72 | 49 | 34 | 67 | 42 | 31 | 55 | 36 | 26 | 42 | 31 | 23 | 36 | 26 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 |
| | | 20-27 | Interior | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 83 | 84 | 84 | 79 | 84 | 82 | 76 | 84 | 79 | 72 | 84 | 76 | 68 | 84 | 68 | 55 | 81 | 59 | 42 | 77 | 45 | 36 | 71 | 38 | 32 | 66 | 34 | 28 | 57 | 30 | 25 |
| | | | Exposed | 84 | 82 | 76 | 84 | 78 | 71 | 84 | 75 | 66 | 84 | 70 | 57 | 84 | 65 | 48 | 81 | 57 | 41 | 78 | 49 | 38 | 72 | 39 | 32 | 65 | 33 | 27 | 53 | 29 | 24 | 43 | 25 | 31 | 38 | 33 | 28 | 33 | 30 | 25 |
| | | 27-45 | Interior | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 81 | 84 | 84 | 78 | 84 | 82 | 75 | 82 | 76 | 67 | 76 | 70 | 56 | 70 | 64 | 44 | 64 | 52 | 38 | 51 | 42 | 33 | 42 | 37 | 30 |
| | | | Exposed | 84 | 84 | 81 | 84 | 84 | 77 | 84 | 80 | 73 | 82 | 77 | 68 | 79 | 74 | 64 | 76 | 69 | 55 | 72 | 65 | 47 | 65 | 52 | 38 | 50 | 41 | 33 | 40 | 36 | 28 | 35 | 31 | 25 | 31 | 28 | 33 | 27 | 25 | 29 |
| | C | 0-7 | Interior | 83 | 83 | 73 | 83 | 80 | 68 | 83 | 77 | 64 | 83 | 73 | 54 | 81 | 69 | 47 | 78 | 65 | 41 | 75 | 59 | 37 | 68 | 46 | 32 | 59 | 38 | 27 | 47 | 33 | 23 | 40 | 29 | 31 | 35 | 26 | 27 | 31 | 23 | 24 |
| | | | Exposed | 80 | 69 | 46 | 77 | 64 | 40 | 73 | 55 | 36 | 69 | 48 | 32 | 64 | 42 | 29 | 57 | 38 | 27 | 50 | 35 | 24 | 40 | 29 | 31 | 34 | 25 | 27 | 30 | 33 | 23 | 26 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 83 | 81 | 69 | 83 | 77 | 64 | 83 | 73 | 54 | 81 | 68 | 45 | 78 | 64 | 40 | 75 | 54 | 36 | 70 | 46 | 33 | 61 | 38 | 28 | 46 | 32 | 24 | 38 | 28 | 31 | 33 | 24 | 27 | 29 | 33 | 24 | 26 | 29 | 21 |
| | | | Exposed | 77 | 64 | 40 | 73 | 52 | 35 | 68 | 43 | 32 | 63 | 39 | 29 | 53 | 35 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 34 | 25 | 28 | 29 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 84 | 84 | 78 | 84 | 80 | 73 | 84 | 76 | 68 | 84 | 72 | 64 | 84 | 68 | 53 | 83 | 63 | 45 | 80 | 54 | 40 | 74 | 41 | 34 | 67 | 35 | 29 | 58 | 30 | 25 | 47 | 26 | 33 | 40 | 23 | 29 | 35 | 31 | 26 |
| | | | Exposed | 84 | 67 | 53 | 82 | 61 | 43 | 78 | 50 | 38 | 75 | 42 | 35 | 71 | 38 | 31 | 67 | 35 | 29 | 63 | 32 | 26 | 48 | 27 | 33 | 39 | 23 | 29 | 34 | 30 | 25 | 30 | 26 | 22 | 26 | 23 | 19 | 23 | 21 | 17 |
| | | 27-45 | Interior | 84 | 84 | 82 | 84 | 84 | 79 | 84 | 82 | 75 | 84 | 79 | 71 | 81 | 76 | 66 | 78 | 72 | 61 | 75 | 68 | 52 | 67 | 57 | 41 | 55 | 45 | 35 | 42 | 38 | 30 | 37 | 33 | 26 | 33 | 29 | 23 | 29 | 26 | 31 |
| | | | Exposed | 81 | 76 | 66 | 77 | 71 | 58 | 73 | 66 | 48 | 68 | 60 | 41 | 64 | 51 | 38 | 54 | 44 | 34 | 46 | 40 | 31 | 37 | 34 | 27 | 32 | 29 | 23 | 28 | 25 | 30 | 24 | 33 | 26 | 32 | 29 | 23 | 29 | 26 | 20 |
| | D | 0-7 | Interior | 83 | 78 | 65 | 83 | 74 | 57 | 81 | 70 | 48 | 78 | 65 | 41 | 75 | 59 | 37 | 71 | 51 | 34 | 67 | 45 | 31 | 56 | 37 | 26 | 45 | 32 | 23 | 38 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 75 | 58 | 37 | 70 | 49 | 33 | 65 | 42 | 30 | 58 | 38 | 27 | 50 | 35 | 24 | 44 | 32 | 22 | 40 | 29 | 31 | 33 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 83 | 75 | 58 | 82 | 69 | 47 | 78 | 65 | 40 | 75 | 55 | 36 | 70 | 46 | 33 | 66 | 41 | 30 | 59 | 37 | 28 | 44 | 31 | 23 | 37 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 70 | 46 | 33 | 65 | 40 | 29 | 55 | 36 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 36 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 84 | 78 | 70 | 84 | 74 | 65 | 84 | 68 | 55 | 83 | 64 | 45 | 80 | 54 | 40 | 77 | 45 | 36 | 74 | 40 | 33 | 66 | 34 | 28 | 55 | 29 | 24 | 43 | 25 | 32 | 38 | 33 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 80 | 53 | 40 | 76 | 43 | 35 | 72 | 39 | 32 | 67 | 35 | 29 | 62 | 32 | 26 | 54 | 29 | 24 | 46 | 26 | 33 | 38 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 84 | 83 | 76 | 84 | 80 | 72 | 81 | 76 | 67 | 78 | 72 | 62 | 75 | 68 | 52 | 70 | 64 | 44 | 66 | 56 | 40 | 52 | 43 | 34 | 41 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 33 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 75 | 68 | 52 | 69 | 62 | 43 | 64 | 52 | 38 | 55 | 44 | 35 | 46 | 40 | 31 | 40 | 36 | 29 | 37 | 33 | 26 | 31 | 28 | 33 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| 10 | B | 0-7 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 67 | 71 | 71 | 63 | 71 | 70 | 48 | 71 | 63 | 39 | 71 | 51 | 34 | 65 | 42 | 30 | 55 | 37 | 26 | 46 | 33 | 23 |
| | | | Exposed | 71 | 71 | 71 | 71 | 71 | 66 | 71 | 71 | 59 | 71 | 71 | 50 | 71 | 67 | 43 | 71 | 62 | 39 | 71 | 54 | 35 | 65 | 42 | 30 | 54 | 36 | 26 | 43 | 31 | 34 | 38 | 27 | 29 | 33 | 24 | 26 | 29 | 32 | 23 |
| | | 7-20 | Interior | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 67 | 72 | 72 | 62 | 72 | 72 | 53 | 72 | 65 | 40 | 72 | 50 | 35 | 66 | 41 | 30 | 54 | 35 | 26 | 43 | 31 | 23 | 38 | 28 | 31 |
| | | | Exposed | 72 | 72 | 67 | 72 | 72 | 59 | 72 | 70 | 49 | 72 | 66 | 41 | 72 | 58 | 38 | 72 | 49 | 34 | 67 | 42 | 31 | 55 | 36 | 26 | 42 | 31 | 23 | 36 | 26 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 |
| | | 20-27 | Interior | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 79 | 81 | 81 | 76 | 81 | 79 | 72 | 81 | 76 | 68 | 81 | 68 | 55 | 81 | 59 | 42 | 77 | 45 | 36 | 71 | 38 | 32 | 66 | 34 | 28 | 57 | 30 | 25 |
| | | | Exposed | 81 | 81 | 76 | 81 | 78 | 71 | 81 | 75 | 66 | 81 | 70 | 57 | 81 | 65 | 48 | 81 | 57 | 41 | 78 | 49 | 38 | 72 | 39 | 32 | 65 | 33 | 27 | 53 | 29 | 24 | 43 | 25 | 31 | 38 | 33 | 28 | 33 | 30 | 25 |
| | | 27-45 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 81 | 83 | 83 | 78 | 83 | 82 | 75 | 82 | 76 | 67 | 76 | 70 | 56 | 70 | 64 | 44 | 64 | 52 | 38 | 51 | 42 | 33 | 42 | 37 | 30 |
| | | | Exposed | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 80 | 73 | 82 | 77 | 68 | 79 | 74 | 64 | 76 | 69 | 55 | 72 | 65 | 47 | 65 | 52 | 38 | 50 | 41 | 33 | 40 | 36 | 28 | 35 | 31 | 25 | 31 | 28 | 33 | 27 | 25 | 29 |
| | C | 0-7 | Interior | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 71 | 64 | 71 | 71 | 54 | 71 | 69 | 47 | 71 | 65 | 41 | 71 | 59 | 37 | 68 | 46 | 32 | 59 | 38 | 27 | 47 | 33 | 23 | 40 | 29 | 31 | 35 | 26 | 27 | 31 | 23 | 24 |
| | | | Exposed | 71 | 69 | 46 | 71 | 64 | 40 | 71 | 55 | 36 | 69 | 48 | 32 | 64 | 42 | 29 | 57 | 38 | 27 | 50 | 35 | 24 | 40 | 29 | 31 | 34 | 25 | 27 | 30 | 33 | 23 | 26 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 72 | 72 | 69 | 72 | 72 | 64 | 72 | 72 | 54 | 72 | 68 | 45 | 72 | 64 | 40 | 72 | 54 | 36 | 70 | 46 | 33 | 61 | 38 | 28 | 46 | 32 | 24 | 38 | 28 | 31 | 33 | 24 | 27 | 29 | 33 | 24 | 26 | 29 | 21 |
| | | | Exposed | 72 | 64 | 40 | 72 | 52 | 35 | 68 | 43 | 32 | 63 | 39 | 29 | 53 | 35 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 34 | 25 | 28 | 29 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 81 | 81 | 78 | 81 | 80 | 73 | 81 | 76 | 68 | 81 | 72 | 64 | 81 | 68 | 53 | 81 | 63 | 45 | 80 | 54 | 40 | 74 | 41 | 34 | 67 | 35 | 29 | 58 | 30 | 25 | 47 | 26 | 33 | 40 | 23 | 29 | 35 | 31 | 26 |
| | | | Exposed | 81 | 67 | 53 | 81 | 61 | 43 | 78 | 50 | 38 | 75 | 42 | 35 | 71 | 38 | 31 | 67 | 35 | 29 | 63 | 32 | 26 | 48 | 27 | 33 | 39 | 23 | 29 | 34 | 30 | 25 | 30 | 26 | 22 | 26 | 23 | 19 | 23 | 21 | 17 |
| | | 27-45 | Interior | 83 | 83 | 82 | 83 | 83 | 79 | 83 | 82 | 75 | 83 | 79 | 71 | 81 | 76 | 66 | 78 | 72 | 61 | 75 | 68 | 52 | 67 | 57 | 41 | 55 | 45 | 35 | 42 | 38 | 30 | 37 | 33 | 26 | 33 | 29 | 23 | 29 | 26 | 31 |
| | | | Exposed | 81 | 76 | 66 | 77 | 71 | 58 | 73 | 66 | 48 | 68 | 60 | 41 | 64 | 51 | 38 | 54 | 44 | 34 | 46 | 40 | 31 | 37 | 34 | 27 | 32 | 29 | 23 | 28 | 25 | 30 | 24 | 33 | 26 | 32 | 29 | 23 | 29 | 26 | 20 |
| | D | 0-7 | Interior | 71 | 71 | 65 | 71 | 71 | 57 | 71 | 70 | 48 | 71 | 65 | 41 | 71 | 59 | 37 | 71 | 51 | 34 | 67 | 45 | 31 | 56 | 37 | 26 | 45 | 32 | 23 | 38 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 71 | 58 | 37 | 70 | 49 | 33 | 65 | 42 | 30 | 58 | 38 | 27 | 50 | 35 | 24 | 44 | 32 | 22 | 40 | 29 | 31 | 33 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 72 | 72 | 58 | 72 | 69 | 47 | 72 | 65 | 40 | 72 | 55 | 36 | 70 | 46 | 33 | 66 | 41 | 30 | 59 | 37 | 28 | 44 | 31 | 23 | 37 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 70 | 46 | 33 | 65 | 40 | 29 | 55 | 36 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 36 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 82 | 78 | 70 | 82 | 74 | 65 | 82 | 68 | 55 | 82 | 64 | 45 | 80 | 54 | 40 | 77 | 45 | 36 | 74 | 40 | 33 | 66 | 34 | 28 | 55 | 29 | 24 | 43 | 25 | 32 | 38 | 33 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 80 | 53 | 40 | 76 | 43 | 35 | 72 | 39 | 32 | 67 | 35 | 29 | 62 | 32 | 26 | 54 | 29 | 24 | 46 | 26 | 33 | 38 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 84 | 83 | 76 | 84 | 80 | 72 | 81 | 76 | 67 | 78 | 72 | 62 | 75 | 68 | 52 | 70 | 64 | 44 | 66 | 56 | 40 | 52 | 43 | 34 | 41 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 33 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 75 | 68 | 52 | 69 | 62 | 43 | 64 | 52 | 38 | 55 | 44 | 35 | 46 | 40 | 31 | 40 | 36 | 29 | 37 | 33 | 26 | 31 | 28 | 33 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| 20 | B | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 48 | 53 | 53 | 39 | 53 | 51 | 34 | 53 | 42 | 30 | 53 | 37 | 26 | 46 | 33 | 23 |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 50 | 53 | 53 | 43 | 53 | 53 | 39 | 53 | 53 | 35 | 53 | 42 | 30 | 53 | 36 | 26 | 43 | 31 | 34 | 38 | 27 | 29 | 33 | 24 | 26 | 29 | 32 | 23 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 40 | 53 | 50 | 35 | 53 | 41 | 30 | 53 | 35 | 26 | 43 | 31 | 23 | 38 | 28 | 31 |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 49 | 53 | 53 | 41 | 53 | 53 | 38 | 53 | 49 | 34 | 53 | 42 | 31 | 53 | 36 | 26 | 42 | 31 | 23 | 36 | 26 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 |
| | | 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 | 55 | 61 | 59 | 42 | 61 | 45 | 36 | 61 | 38 | 32 | 61 | 34 | 28 | 57 | 30 | 25 |
| | | | Exposed | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 57 | 61 | 61 | 48 | 61 | 57 | 41 | 61 | 49 | 38 | 61 | 39 | 32 | 61 | 33 | 27 | 53 | 29 | 24 | 43 | 25 | 31 | 38 | 33 | 28 | 33 | 30 | 25 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 44 | 56 | 52 | 38 | 51 | 42 | 33 | 42 | 37 | 30 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 55 | 56 | 56 | 47 | 56 | 52 | 38 | 50 | 41 | 33 | 40 | 36 | 28 | 35 | 31 | 25 | 31 | 28 | 33 | 27 | 25 | 29 |
| | C | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 47 | 53 | 53 | 41 | 53 | 53 | 37 | 53 | 46 | 32 | 53 | 38 | 27 | 47 | 33 | 23 | 40 | 29 | 31 | 35 | 26 | 27 | 31 | 23 | 24 |
| | | | Exposed | 53 | 53 | 46 | 53 | 53 | 40 | 53 | 53 | 36 | 53 | 48 | 32 | 53 | 42 | 29 | 53 | 38 | 27 | 50 | 35 | 24 | 40 | 29 | 31 | 34 | 25 | 27 | 30 | 33 | 23 | 26 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 45 | 53 | 53 | 40 | 53 | 53 | 36 | 53 | 46 | 33 | 53 | 38 | 28 | 46 | 32 | 24 | 38 | 28 | 31 | 33 | 24 | 27 | 29 | 33 | 24 | 26 | 29 | 21 |
| | | | Exposed | 53 | 53 | 40 | 53 | 52 | 35 | 53 | 43 | 32 | 53 | 39 | 29 | 53 | 35 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 34 | 25 | 28 | 29 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 53 | 61 | 61 | 45 | 61 | 54 | 40 | 61 | 41 | 34 | 61 | 35 | 29 | 58 | 30 | 25 | 47 | 26 | 33 | 40 | 23 | 29 | 35 | 31 | 26 |
| | | | Exposed | 61 | 61 | 53 | 61 | 61 | 43 | 61 | 50 | 38 | 61 | 42 | 35 | 61 | 38 | 31 | 61 | 35 | 29 | 61 | 32 | 26 | 48 | 27 | 33 | 39 | 23 | 29 | 34 | 30 | 25 | 30 | 26 | 22 | 26 | 23 | 19 | 23 | 21 | 17 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 52 | 56 | 56 | 41 | 55 | 45 | 35 | 42 | 38 | 30 | 37 | 33 | 26 | 33 | 29 | 23 | 29 | 26 | 31 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 48 | 56 | 56 | 41 | 56 | 51 | 38 | 54 | 44 | 34 | 46 | 40 | 31 | 37 | 34 | 27 | 32 | 29 | 23 | 28 | 25 | 30 | 24 | 33 | 26 | 32 | 29 | 23 | 29 | 26 | 20 |
| | D | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 48 | 53 | 53 | 41 | 53 | 53 | 37 | 53 | 51 | 34 | 53 | 45 | 31 | 53 | 37 | 26 | 45 | 32 | 23 | 38 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 53 | 53 | 37 | 53 | 49 | 33 | 53 | 42 | 30 | 53 | 38 | 27 | 50 | 35 | 24 | 44 | 32 | 22 | 40 | 29 | 31 | 33 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 47 | 53 | 53 | 40 | 53 | 53 | 36 | 53 | 46 | 33 | 53 | 41 | 30 | 53 | 37 | 28 | 44 | 31 | 23 | 37 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 53 | 46 | 33 | 53 | 40 | 29 | 53 | 36 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 36 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 66 | 66 | 66 | 66 | 66 | 65 | 66 | 66 | 55 | 66 | 64 | 45 | 66 | 54 | 40 | 66 | 45 | 36 | 66 | 40 | 33 | 66 | 34 | 28 | 55 | 29 | 24 | 43 | 25 | 32 | 38 | 33 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 66 | 53 | 40 | 66 | 43 | 35 | 66 | 39 | 32 | 66 | 35 | 29 | 62 | 32 | 26 | 54 | 29 | 24 | 46 | 26 | 33 | 38 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 44 | 60 | 56 | 40 | 52 | 43 | 34 | 41 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 33 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 60 | 60 | 52 | 60 | 60 | 43 | 60 | 52 | 38 | 55 | 44 | 35 | 46 | 40 | 31 | 40 | 36 | 29 | 37 | 33 | 26 | 31 | 28 | 33 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 23 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 34 | 28 | 27 | 29 | 28 | 24 | 26 | 28 | 32 | 23 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 23 | 28 | 28 | 31 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 23 | 29 | 26 | 30 | 29 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 |
| | | 20-27 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 31 | 24 | 33 | 28 | 24 | 30 | 25 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 33 | 34 | 34 | 29 |
| | C | 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 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 23 | 28 | 28 | 31 | 28 | 26 | 27 | 28 | 23 | 24 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 24 | 28 | 28 | 31 | 28 | 25 | 27 | 28 | 33 | 23 | 26 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 29 | 29 | 24 | 28 | 28 | 31 | 27 | 24 | 27 | 26 | 33 | 24 | 26 | 29 | 21 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 24 | 29 | 29 | 33 | 29 | 25 | 28 | 29 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 33 | 24 | 23 | 29 | 24 | 31 | 26 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 33 | 24 | 23 | 29 | 24 | 30 | 25 | 24 | 26 | 22 | 24 | 23 | 19 | 23 | 21 | 17 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 31 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 33 | 26 | 32 | 29 | 23 | 29 | 26 | 20 |
| | D | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 26 | 31 | 31 | 23 | 31 | 28 | 30 | 31 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 27 | 31 | 31 | 24 | 31 | 31 | 22 | 31 | 29 | 31 | 31 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 28 | 31 | 31 | 23 | 30 | 27 | 30 | 29 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 29 | 32 | 32 | 26 | 32 | 32 | 24 | 32 | 29 | 33 | 32 | 27 | 30 | 32 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 25 | 32 | 26 | 33 | 28 | 26 | 29 | 24 | 26 | 26 | 22 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 33 | 26 | 22 | 28 | 26 | 29 | 24 | 26 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 33 | 25 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 33 | 25 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| 70 | B | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 34 | 24 | 24 | 29 | 24 | 24 | 26 | 24 | 32 | 23 |
| | | 7-20 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 31 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 30 | 25 | 23 | 26 | 25 | 31 | 23 | 25 | 27 | 20 |
| | | 20-27 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 30 | 25 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | C | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 31 | 24 | 24 | 27 | 24 | 23 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 31 | 24 | 24 | 27 | 24 | 33 | 23 | 24 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 31 | 25 | 24 | 27 | 24 | 33 | 24 | 23 | 29 | 21 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 33 | 25 | 25 | 28 | 25 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 31 | 26 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 30 | 25 | 31 | 26 | 22 | 31 | 23 | 19 | 31 | 21 | 17 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 23 | 29 | 26 | 20 |
| | 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 | 26 | 27 | 27 | 23 | 27 | 27 | 30 | 27 | 24 | 26 | 27 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 24 | 27 | 27 | 22 | 27 | 27 | 31 | 27 | 24 | 26 | 27 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 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 | 23 | 27 | 27 | 30 | 26 | 23 | 26 | 25 | 31 | 23 | 24 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 24 | 27 | 27 | 33 | 27 | 27 | 30 | 27 | 24 | 27 | 27 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 33 | 28 | 34 | 29 | 24 | 34 | 26 | 22 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 33 | 34 | 34 | 28 | 34 | 29 | 24 | 34 | 25 | 21 | 34 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 29 | 32 | 32 | 26 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 29 | 32 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| 80 | B | 0-7 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 32 | 21 | 21 | 29 | 21 | 21 | 26 | 21 | 32 | 23 |
| | | 7-20 | 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 | 31 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 26 | 33 | 31 | 23 | 33 | 27 | 20 |
| | | 20-27 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 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 | 25 |
| | | 27-45 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| | | | 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 | 26 | 26 |
| | C | 0-7 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 31 | 21 | 21 | 27 | 21 | 21 | 24 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 27 | 21 | 32 | 23 | 21 | 29 | 20 | 21 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | 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 | 31 | 33 | 33 | 27 | 33 | 33 | 24 | 33 | 29 | 21 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 28 | 33 | 32 | 24 | 33 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 |
| | | | 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 | 25 | 27 | 26 | 22 | 27 | 23 | 19 | 27 | 21 | 17 |
| | | 27-45 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| | | | 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 | 23 | 26 | 26 | 20 |
| | D | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 30 | 24 | 24 | 26 | 24 | 32 | 23 | 24 | 29 | 20 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 31 | 24 | 24 | 26 | 24 | 32 | 22 | 24 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 30 | 24 | 23 | 26 | 23 | 31 | 23 | 22 | 27 | 20 | 32 | 24 | 18 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 33 | 24 | 24 | 30 | 24 | 24 | 27 | 24 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 29 | 24 | 30 | 26 | 22 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 29 | 24 | 30 | 25 | 21 | 30 | 22 | 18 | 30 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 25 | 29 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 95 | 98 | 98 | 91 | 98 | 98 | 86 | 98 | 96 | 83 | 98 | 92 | 79 | 98 | 85 | 73 | 92 | 79 | 65 | 86 | 75 | 57 | 81 | 68 | 50 | 76 | 62 | 44 | 71 | 55 | 39 |
| | | | Exposed | 98 | 98 | 86 | 98 | 95 | 82 | 98 | 90 | 78 | 98 | 86 | 74 | 95 | 82 | 69 | 91 | 79 | 64 | 88 | 76 | 60 | 81 | 68 | 50 | 76 | 61 | 43 | 69 | 53 | 37 | 63 | 46 | 49 | 56 | 41 | 44 | 49 | 54 | 39 |
| | | 7-20 | Interior | 99 | 99 | 99 | 99 | 99 | 98 | 99 | 99 | 92 | 99 | 99 | 87 | 99 | 97 | 83 | 99 | 92 | 79 | 99 | 88 | 76 | 96 | 81 | 66 | 88 | 75 | 58 | 82 | 66 | 50 | 76 | 60 | 44 | 69 | 52 | 39 | 64 | 47 | 52 |
| | | | Exposed | 99 | 97 | 83 | 99 | 91 | 78 | 99 | 86 | 74 | 97 | 82 | 67 | 92 | 78 | 63 | 87 | 74 | 58 | 83 | 69 | 53 | 77 | 60 | 45 | 68 | 52 | 38 | 61 | 45 | 50 | 53 | 39 | 44 | 47 | 52 | 39 | 42 | 46 | 34 |
| | | 20-27 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 97 | 99 | 99 | 92 | 99 | 97 | 87 | 99 | 92 | 83 | 99 | 84 | 77 | 99 | 78 | 68 | 93 | 71 | 61 | 87 | 64 | 53 | 82 | 57 | 47 | 77 | 50 | 42 |
| | | | Exposed | 99 | 99 | 92 | 99 | 95 | 86 | 99 | 90 | 82 | 99 | 85 | 78 | 99 | 81 | 73 | 99 | 77 | 67 | 95 | 74 | 63 | 87 | 64 | 54 | 81 | 56 | 46 | 76 | 48 | 40 | 69 | 42 | 53 | 63 | 37 | 46 | 56 | 50 | 41 |
| | | 27-45 | Interior | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 94 | 100 | 100 | 90 | 100 | 92 | 83 | 93 | 85 | 77 | 86 | 80 | 70 | 80 | 75 | 64 | 75 | 68 | 56 | 68 | 63 | 50 |
| | | | Exposed | 100 | 100 | 99 | 100 | 100 | 93 | 100 | 98 | 88 | 100 | 93 | 84 | 97 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 73 | 81 | 75 | 64 | 75 | 67 | 55 | 65 | 60 | 48 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 50 |
| | C | 0-7 | Interior | 98 | 98 | 89 | 98 | 97 | 84 | 98 | 93 | 80 | 98 | 88 | 76 | 98 | 84 | 72 | 94 | 81 | 67 | 90 | 78 | 63 | 83 | 71 | 53 | 78 | 64 | 46 | 72 | 56 | 40 | 65 | 49 | 52 | 59 | 43 | 46 | 52 | 38 | 41 |
| | | | Exposed | 98 | 84 | 71 | 93 | 80 | 65 | 88 | 76 | 60 | 84 | 72 | 55 | 81 | 67 | 49 | 77 | 64 | 45 | 74 | 58 | 41 | 66 | 49 | 53 | 58 | 42 | 45 | 50 | 55 | 39 | 44 | 48 | 34 | 39 | 43 | 30 | 52 | 38 | 27 |
| | | 7-20 | Interior | 99 | 99 | 85 | 99 | 94 | 80 | 99 | 89 | 76 | 99 | 84 | 71 | 95 | 80 | 65 | 90 | 76 | 61 | 86 | 72 | 56 | 79 | 63 | 47 | 72 | 54 | 40 | 64 | 47 | 53 | 56 | 41 | 46 | 50 | 55 | 41 | 44 | 49 | 36 |
| | | | Exposed | 94 | 80 | 65 | 89 | 76 | 59 | 84 | 69 | 53 | 80 | 64 | 48 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 57 | 42 | 47 | 49 | 54 | 40 | 42 | 47 | 35 | 37 | 41 | 30 | 49 | 36 | 27 | 44 | 32 | 24 |
| | | 20-27 | Interior | 99 | 99 | 95 | 99 | 99 | 89 | 99 | 93 | 84 | 99 | 88 | 80 | 99 | 83 | 76 | 99 | 80 | 71 | 97 | 76 | 65 | 89 | 67 | 57 | 83 | 59 | 49 | 78 | 51 | 42 | 72 | 45 | 37 | 65 | 39 | 49 | 59 | 53 | 44 |
| | | | Exposed | 99 | 83 | 76 | 99 | 79 | 69 | 95 | 75 | 64 | 90 | 68 | 58 | 86 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 73 | 45 | 37 | 65 | 39 | 48 | 57 | 50 | 42 | 50 | 44 | 37 | 44 | 39 | 32 | 39 | 35 | 29 |
| | | 27-45 | Interior | 100 | 100 | 100 | 100 | 100 | 96 | 100 | 100 | 91 | 100 | 96 | 86 | 100 | 91 | 82 | 95 | 87 | 79 | 91 | 84 | 75 | 83 | 77 | 66 | 77 | 70 | 58 | 69 | 64 | 51 | 62 | 56 | 44 | 55 | 49 | 39 | 49 | 44 | 52 |
| | | | Exposed | 100 | 91 | 82 | 94 | 86 | 78 | 89 | 82 | 73 | 84 | 78 | 67 | 80 | 75 | 63 | 76 | 70 | 58 | 72 | 65 | 53 | 63 | 56 | 45 | 54 | 48 | 38 | 47 | 42 | 50 | 41 | 55 | 44 | 54 | 49 | 39 | 48 | 43 | 35 |
| | D | 0-7 | Interior | 98 | 94 | 81 | 98 | 89 | 77 | 98 | 85 | 73 | 94 | 81 | 67 | 90 | 78 | 63 | 86 | 75 | 57 | 83 | 70 | 53 | 77 | 63 | 44 | 70 | 54 | 38 | 64 | 47 | 50 | 56 | 41 | 44 | 49 | 54 | 38 | 44 | 48 | 34 |
| | | | Exposed | 90 | 78 | 63 | 85 | 74 | 56 | 81 | 68 | 50 | 78 | 64 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 65 | 49 | 52 | 56 | 41 | 44 | 48 | 53 | 38 | 42 | 46 | 33 | 55 | 40 | 29 | 49 | 36 | 25 | 43 | 32 | 22 |
| | | 7-20 | Interior | 99 | 90 | 78 | 99 | 85 | 72 | 95 | 81 | 66 | 90 | 77 | 61 | 86 | 72 | 56 | 82 | 66 | 51 | 78 | 63 | 46 | 70 | 53 | 39 | 62 | 45 | 51 | 54 | 39 | 44 | 47 | 52 | 39 | 41 | 46 | 34 | 55 | 41 | 30 |
| | | | Exposed | 86 | 72 | 55 | 81 | 65 | 49 | 77 | 60 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 61 | 45 | 50 | 56 | 41 | 46 | 47 | 52 | 39 | 41 | 45 | 33 | 53 | 39 | 29 | 46 | 34 | 25 | 41 | 30 | 22 | 37 | 27 | 20 |
| | | 20-27 | Interior | 99 | 95 | 86 | 99 | 89 | 81 | 99 | 84 | 77 | 99 | 80 | 71 | 97 | 76 | 65 | 93 | 71 | 61 | 89 | 66 | 56 | 82 | 57 | 47 | 76 | 49 | 41 | 69 | 43 | 53 | 63 | 37 | 46 | 56 | 49 | 41 | 50 | 44 | 36 |
| | | | Exposed | 97 | 76 | 65 | 92 | 70 | 60 | 87 | 64 | 54 | 83 | 59 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 55 | 64 | 38 | 47 | 55 | 49 | 40 | 47 | 42 | 35 | 41 | 37 | 31 | 55 | 33 | 27 | 49 | 29 | 24 |
| | | 27-45 | Interior | 100 | 100 | 93 | 100 | 97 | 87 | 100 | 92 | 83 | 95 | 87 | 79 | 91 | 84 | 75 | 86 | 80 | 70 | 82 | 77 | 65 | 76 | 69 | 57 | 66 | 61 | 49 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 49 | 41 | 55 | 44 |
| | | | Exposed | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 75 | 64 | 77 | 70 | 58 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 56 | 44 | 53 | 47 | 37 | 45 | 40 | 48 | 39 | 53 | 42 | 52 | 46 | 37 | 46 | 41 | 32 | 40 | 36 | 29 |
| 10 | B | 0-7 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 91 | 92 | 92 | 86 | 92 | 92 | 83 | 92 | 92 | 79 | 92 | 85 | 73 | 92 | 79 | 65 | 86 | 75 | 57 | 81 | 68 | 50 | 76 | 62 | 44 | 71 | 55 | 39 |
| | | | Exposed | 92 | 92 | 86 | 92 | 92 | 82 | 92 | 90 | 78 | 92 | 86 | 74 | 92 | 82 | 69 | 91 | 79 | 64 | 88 | 76 | 60 | 81 | 68 | 50 | 76 | 61 | 43 | 69 | 53 | 37 | 63 | 46 | 49 | 56 | 41 | 44 | 49 | 54 | 39 |
| | | 7-20 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 87 | 92 | 92 | 83 | 92 | 92 | 79 | 92 | 88 | 76 | 92 | 81 | 66 | 88 | 75 | 58 | 82 | 66 | 50 | 76 | 60 | 44 | 69 | 52 | 39 | 64 | 47 | 52 |
| | | | Exposed | 92 | 92 | 83 | 92 | 91 | 78 | 92 | 86 | 74 | 92 | 82 | 67 | 92 | 78 | 63 | 87 | 74 | 58 | 83 | 69 | 53 | 77 | 60 | 45 | 68 | 52 | 38 | 61 | 45 | 50 | 53 | 39 | 44 | 47 | 52 | 39 | 42 | 46 | 34 |
| | | 20-27 | Interior | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 92 | 96 | 96 | 87 | 96 | 92 | 83 | 96 | 84 | 77 | 96 | 78 | 68 | 93 | 71 | 61 | 87 | 64 | 53 | 82 | 57 | 47 | 77 | 50 | 42 |
| | | | Exposed | 96 | 96 | 92 | 96 | 95 | 86 | 96 | 90 | 82 | 96 | 85 | 78 | 96 | 81 | 73 | 96 | 77 | 67 | 95 | 74 | 63 | 87 | 64 | 54 | 81 | 56 | 46 | 76 | 48 | 40 | 69 | 42 | 53 | 63 | 37 | 46 | 56 | 50 | 41 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 94 | 99 | 99 | 90 | 99 | 92 | 83 | 93 | 85 | 77 | 86 | 80 | 70 | 80 | 75 | 64 | 75 | 68 | 56 | 68 | 63 | 50 |
| | | | Exposed | 99 | 99 | 99 | 99 | 99 | 93 | 99 | 98 | 88 | 99 | 93 | 84 | 97 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 73 | 81 | 75 | 64 | 75 | 67 | 55 | 65 | 60 | 48 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 50 |
| | C | 0-7 | Interior | 92 | 92 | 89 | 92 | 92 | 84 | 92 | 92 | 80 | 92 | 88 | 76 | 92 | 84 | 72 | 92 | 81 | 67 | 90 | 78 | 63 | 83 | 71 | 53 | 78 | 64 | 46 | 72 | 56 | 40 | 65 | 49 | 52 | 59 | 43 | 46 | 52 | 38 | 41 |
| | | | Exposed | 92 | 84 | 71 | 92 | 80 | 65 | 88 | 76 | 60 | 84 | 72 | 55 | 81 | 67 | 49 | 77 | 64 | 45 | 74 | 58 | 41 | 66 | 49 | 53 | 58 | 42 | 45 | 50 | 55 | 39 | 44 | 48 | 34 | 39 | 43 | 30 | 52 | 38 | 27 |
| | | 7-20 | Interior | 92 | 92 | 85 | 92 | 92 | 80 | 92 | 89 | 76 | 92 | 84 | 71 | 92 | 80 | 65 | 90 | 76 | 61 | 86 | 72 | 56 | 79 | 63 | 47 | 72 | 54 | 40 | 64 | 47 | 53 | 56 | 41 | 46 | 50 | 55 | 41 | 44 | 49 | 36 |
| | | | Exposed | 92 | 80 | 65 | 89 | 76 | 59 | 84 | 69 | 53 | 80 | 64 | 48 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 57 | 42 | 47 | 49 | 54 | 40 | 42 | 47 | 35 | 37 | 41 | 30 | 49 | 36 | 27 | 44 | 32 | 24 |
| | | 20-27 | Interior | 96 | 96 | 95 | 96 | 96 | 89 | 96 | 93 | 84 | 96 | 88 | 80 | 96 | 83 | 76 | 96 | 80 | 71 | 96 | 76 | 65 | 89 | 67 | 57 | 83 | 59 | 49 | 78 | 51 | 42 | 72 | 45 | 37 | 65 | 39 | 49 | 59 | 53 | 44 |
| | | | Exposed | 96 | 83 | 76 | 96 | 79 | 69 | 95 | 75 | 64 | 90 | 68 | 58 | 86 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 73 | 45 | 37 | 65 | 39 | 48 | 57 | 50 | 42 | 50 | 44 | 37 | 44 | 39 | 32 | 39 | 35 | 29 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 96 | 99 | 99 | 91 | 99 | 96 | 86 | 99 | 91 | 82 | 95 | 87 | 79 | 91 | 84 | 75 | 83 | 77 | 66 | 77 | 70 | 58 | 69 | 64 | 51 | 62 | 56 | 44 | 55 | 49 | 39 | 49 | 44 | 52 |
| | | | Exposed | 99 | 91 | 82 | 94 | 86 | 78 | 89 | 82 | 73 | 84 | 78 | 67 | 80 | 75 | 63 | 76 | 70 | 58 | 72 | 65 | 53 | 63 | 56 | 45 | 54 | 48 | 38 | 47 | 42 | 50 | 41 | 55 | 44 | 54 | 49 | 39 | 48 | 43 | 35 |
| | D | 0-7 | Interior | 92 | 92 | 81 | 92 | 89 | 77 | 92 | 85 | 73 | 92 | 81 | 67 | 90 | 78 | 63 | 86 | 75 | 57 | 83 | 70 | 53 | 77 | 63 | 44 | 70 | 54 | 38 | 64 | 47 | 50 | 56 | 41 | 44 | 49 | 54 | 38 | 44 | 48 | 34 |
| | | | Exposed | 90 | 78 | 63 | 85 | 74 | 56 | 81 | 68 | 50 | 78 | 64 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 65 | 49 | 52 | 56 | 41 | 44 | 48 | 53 | 38 | 42 | 46 | 33 | 55 | 40 | 29 | 49 | 36 | 25 | 43 | 32 | 22 |
| | | 7-20 | Interior | 92 | 90 | 78 | 92 | 85 | 72 | 92 | 81 | 66 | 90 | 77 | 61 | 86 | 72 | 56 | 82 | 66 | 51 | 78 | 63 | 46 | 70 | 53 | 39 | 62 | 45 | 51 | 54 | 39 | 44 | 47 | 52 | 39 | 41 | 46 | 34 | 55 | 41 | 30 |
| | | | Exposed | 86 | 72 | 55 | 81 | 65 | 49 | 77 | 60 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 61 | 45 | 50 | 56 | 41 | 46 | 47 | 52 | 39 | 41 | 45 | 33 | 53 | 39 | 29 | 46 | 34 | 25 | 41 | 30 | 22 | 37 | 27 | 20 |
| | | 20-27 | Interior | 97 | 95 | 86 | 97 | 89 | 81 | 97 | 84 | 77 | 97 | 80 | 71 | 97 | 76 | 65 | 93 | 71 | 61 | 89 | 66 | 56 | 82 | 57 | 47 | 76 | 49 | 41 | 69 | 43 | 53 | 63 | 37 | 46 | 56 | 49 | 41 | 50 | 44 | 36 |
| | | | Exposed | 97 | 76 | 65 | 92 | 70 | 60 | 87 | 64 | 54 | 83 | 59 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 55 | 64 | 38 | 47 | 55 | 49 | 40 | 47 | 42 | 35 | 41 | 37 | 31 | 55 | 33 | 27 | 49 | 29 | 24 |
| | | 27-45 | Interior | 99 | 99 | 93 | 99 | 97 | 87 | 99 | 92 | 83 | 95 | 87 | 79 | 91 | 84 | 75 | 86 | 80 | 70 | 82 | 77 | 65 | 76 | 69 | 57 | 66 | 61 | 49 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 49 | 41 | 55 | 44 |
| | | | Exposed | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 75 | 64 | 77 | 70 | 58 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 56 | 44 | 53 | 47 | 37 | 45 | 40 | 48 | 39 | 53 | 42 | 52 | 46 | 37 | 46 | 41 | 32 | 40 | 36 | 29 |
| 20 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 73 | 83 | 79 | 65 | 83 | 75 | 57 | 81 | 68 | 50 | 76 | 62 | 44 | 71 | 55 | 39 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 78 | 83 | 83 | 74 | 83 | 82 | 69 | 83 | 79 | 64 | 83 | 76 | 60 | 81 | 68 | 50 | 76 | 61 | 43 | 69 | 53 | 37 | 63 | 46 | 49 | 56 | 41 | 44 | 49 | 54 | 39 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 76 | 83 | 81 | 66 | 83 | 75 | 58 | 82 | 66 | 50 | 76 | 60 | 44 | 69 | 52 | 39 | 64 | 47 | 52 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 78 | 83 | 83 | 74 | 83 | 82 | 67 | 83 | 78 | 63 | 83 | 74 | 58 | 83 | 69 | 53 | 77 | 60 | 45 | 68 | 52 | 38 | 61 | 45 | 50 | 53 | 39 | 44 | 47 | 52 | 39 | 42 | 46 | 34 |
| | | 20-27 | Interior | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 87 | 89 | 89 | 83 | 89 | 84 | 77 | 89 | 78 | 68 | 89 | 71 | 61 | 87 | 64 | 53 | 82 | 57 | 47 | 77 | 50 | 42 |
| | | | Exposed | 89 | 89 | 89 | 89 | 89 | 86 | 89 | 89 | 82 | 89 | 85 | 78 | 89 | 81 | 73 | 89 | 77 | 67 | 89 | 74 | 63 | 87 | 64 | 54 | 81 | 56 | 46 | 76 | 48 | 40 | 69 | 42 | 53 | 63 | 37 | 46 | 56 | 50 | 41 |
| | | 27-45 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 90 | 92 | 92 | 83 | 92 | 85 | 77 | 86 | 80 | 70 | 80 | 75 | 64 | 75 | 68 | 56 | 68 | 63 | 50 |
| | | | Exposed | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 88 | 92 | 92 | 84 | 92 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 73 | 81 | 75 | 64 | 75 | 67 | 55 | 65 | 60 | 48 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 50 |
| | C | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 72 | 83 | 81 | 67 | 83 | 78 | 63 | 83 | 71 | 53 | 78 | 64 | 46 | 72 | 56 | 40 | 65 | 49 | 52 | 59 | 43 | 46 | 52 | 38 | 41 |
| | | | Exposed | 83 | 83 | 71 | 83 | 80 | 65 | 83 | 76 | 60 | 83 | 72 | 55 | 81 | 67 | 49 | 77 | 64 | 45 | 74 | 58 | 41 | 66 | 49 | 53 | 58 | 42 | 45 | 50 | 55 | 39 | 44 | 48 | 34 | 39 | 43 | 30 | 52 | 38 | 27 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 71 | 83 | 80 | 65 | 83 | 76 | 61 | 83 | 72 | 56 | 79 | 63 | 47 | 72 | 54 | 40 | 64 | 47 | 53 | 56 | 41 | 46 | 50 | 55 | 41 | 44 | 49 | 36 |
| | | | Exposed | 83 | 80 | 65 | 83 | 76 | 59 | 83 | 69 | 53 | 80 | 64 | 48 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 57 | 42 | 47 | 49 | 54 | 40 | 42 | 47 | 35 | 37 | 41 | 30 | 49 | 36 | 27 | 44 | 32 | 24 |
| | | 20-27 | Interior | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 84 | 89 | 88 | 80 | 89 | 83 | 76 | 89 | 80 | 71 | 89 | 76 | 65 | 89 | 67 | 57 | 83 | 59 | 49 | 78 | 51 | 42 | 72 | 45 | 37 | 65 | 39 | 49 | 59 | 53 | 44 |
| | | | Exposed | 89 | 83 | 76 | 89 | 79 | 69 | 89 | 75 | 64 | 89 | 68 | 58 | 86 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 73 | 45 | 37 | 65 | 39 | 48 | 57 | 50 | 42 | 50 | 44 | 37 | 44 | 39 | 32 | 39 | 35 | 29 |
| | | 27-45 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 91 | 92 | 92 | 86 | 92 | 91 | 82 | 92 | 87 | 79 | 91 | 84 | 75 | 83 | 77 | 66 | 77 | 70 | 58 | 69 | 64 | 51 | 62 | 56 | 44 | 55 | 49 | 39 | 49 | 44 | 52 |
| | | | Exposed | 92 | 91 | 82 | 92 | 86 | 78 | 89 | 82 | 73 | 84 | 78 | 67 | 80 | 75 | 63 | 76 | 70 | 58 | 72 | 65 | 53 | 63 | 56 | 45 | 54 | 48 | 38 | 47 | 42 | 50 | 41 | 55 | 44 | 54 | 49 | 39 | 48 | 43 | 35 |
| | D | 0-7 | Interior | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 73 | 83 | 81 | 67 | 83 | 78 | 63 | 83 | 75 | 57 | 83 | 70 | 53 | 77 | 63 | 44 | 70 | 54 | 38 | 64 | 47 | 50 | 56 | 41 | 44 | 49 | 54 | 38 | 44 | 48 | 34 |
| | | | Exposed | 83 | 78 | 63 | 83 | 74 | 56 | 81 | 68 | 50 | 78 | 64 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 65 | 49 | 52 | 56 | 41 | 44 | 48 | 53 | 38 | 42 | 46 | 33 | 55 | 40 | 29 | 49 | 36 | 25 | 43 | 32 | 22 |
| | | 7-20 | Interior | 83 | 83 | 78 | 83 | 83 | 72 | 83 | 81 | 66 | 83 | 77 | 61 | 83 | 72 | 56 | 82 | 66 | 51 | 78 | 63 | 46 | 70 | 53 | 39 | 62 | 45 | 51 | 54 | 39 | 44 | 47 | 52 | 39 | 41 | 46 | 34 | 55 | 41 | 30 |
| | | | Exposed | 83 | 72 | 55 | 81 | 65 | 49 | 77 | 60 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 61 | 45 | 50 | 56 | 41 | 46 | 47 | 52 | 39 | 41 | 45 | 33 | 53 | 39 | 29 | 46 | 34 | 25 | 41 | 30 | 22 | 37 | 27 | 20 |
| | | 20-27 | Interior | 90 | 90 | 86 | 90 | 89 | 81 | 90 | 84 | 77 | 90 | 80 | 71 | 90 | 76 | 65 | 90 | 71 | 61 | 89 | 66 | 56 | 82 | 57 | 47 | 76 | 49 | 41 | 69 | 43 | 53 | 63 | 37 | 46 | 56 | 49 | 41 | 50 | 44 | 36 |
| | | | Exposed | 90 | 76 | 65 | 90 | 70 | 60 | 87 | 64 | 54 | 83 | 59 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 55 | 64 | 38 | 47 | 55 | 49 | 40 | 47 | 42 | 35 | 41 | 37 | 31 | 55 | 33 | 27 | 49 | 29 | 24 |
| | | 27-45 | Interior | 93 | 93 | 93 | 93 | 93 | 87 | 93 | 92 | 83 | 93 | 87 | 79 | 91 | 84 | 75 | 86 | 80 | 70 | 82 | 77 | 65 | 76 | 69 | 57 | 66 | 61 | 49 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 49 | 41 | 55 | 44 |
| | | | Exposed | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 75 | 64 | 77 | 70 | 58 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 56 | 44 | 53 | 47 | 37 | 45 | 40 | 48 | 39 | 53 | 42 | 52 | 46 | 37 | 46 | 41 | 32 | 40 | 36 | 29 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 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 | 44 | 47 | 47 | 39 |
| | | | Exposed | 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 | 43 | 47 | 47 | 37 | 47 | 46 | 49 | 47 | 41 | 44 | 47 | 54 | 39 |
| | | 7-20 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 44 | 48 | 48 | 39 | 47 | 47 | 52 |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 45 | 48 | 48 | 38 | 48 | 45 | 50 | 48 | 39 | 44 | 47 | 52 | 39 | 42 | 46 | ~~34~~ |
| | | 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 |
| | | | 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 | 53 | 40 | 37 | 46 | 40 | 50 | 41 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 |
| | | | Exposed | 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 | 50 |
| | C | 0-7 | Interior | 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 | 46 | 47 | 47 | 40 | 47 | 47 | 52 | 47 | 43 | 46 | 47 | 38 | 41 |
| | | | Exposed | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 45 | 47 | 47 | 41 | 47 | 47 | 53 | 47 | 42 | 45 | 47 | 55 | 39 | 44 | 48 | ~~34~~ | 39 | 43 | ~~30~~ | 52 | 38 | ~~27~~ |
| | | 7-20 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 47 | 48 | 48 | 40 | 47 | 47 | 53 | 46 | 41 | 46 | 44 | 55 | 41 | 43 | 49 | ~~36~~ |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 44 | 48 | 48 | 40 | 48 | 48 | 55 | 48 | 42 | 47 | 48 | 54 | 40 | 42 | 47 | ~~35~~ | 37 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 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 | 37 | 40 | 39 | 49 | 40 | 53 | 44 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 37 | 40 | 39 | 48 | 40 | 50 | 42 | 40 | 44 | ~~37~~ | 40 | 39 | ~~32~~ | 39 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 52 |
| | | | Exposed | 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 | 50 | 56 | 55 | 44 | 54 | 49 | 39 | 48 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 44 | 52 | 52 | 38 | 52 | 47 | 50 | 52 | 41 | 44 | 49 | 54 | 38 | 44 | 48 | ~~34~~ |
| | | | Exposed | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 50 | 52 | 52 | 45 | 52 | 52 | 41 | 52 | 52 | 38 | 52 | 49 | 52 | 52 | 41 | 44 | 48 | 53 | 38 | 42 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 51 | 53 | 53 | 46 | 52 | 52 | 39 | 50 | 45 | 51 | 49 | 39 | 44 | 47 | 52 | 39 | 41 | 46 | ~~34~~ | 55 | 41 | ~~30~~ |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 49 | 53 | 53 | 44 | 53 | 53 | 40 | 53 | 49 | 55 | 53 | 45 | 50 | 53 | 41 | 46 | 47 | 52 | 39 | 41 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 20-27 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 43 | 53 | 44 | 37 | 46 | 44 | 49 | 41 | 44 | 44 | ~~36~~ |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 40 | 44 | 44 | 55 | 44 | 38 | 47 | 44 | 49 | 40 | 44 | 42 | ~~35~~ | 41 | ~~37~~ | ~~31~~ | 55 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 27-45 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 41 | ~~49~~ | 41 | 55 | 44 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 40 | 48 | 39 | 53 | 42 | 52 | 46 | ~~37~~ | 46 | 41 | ~~32~~ | 40 | ~~36~~ | ~~29~~ |
| 70 | 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 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 39 |
| | | | 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 | 41 | 41 | 37 | 41 | 41 | ~~49~~ | 41 | 41 | 44 | 41 | 54 | 39 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 39 | 41 | 41 | 52 |
| | | | 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 | 38 | 41 | 41 | 50 | 41 | 39 | 44 | 41 | 52 | 39 | 41 | 46 | ~~34~~ |
| | | 20-27 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| | | | Exposed | 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 | 47 | 52 | 50 | 41 |
| | | 27-45 | Interior | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| | | | 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 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| | 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 | 41 | 41 | 40 | 41 | 41 | 52 | 41 | 41 | 46 | 41 | 38 | 41 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 53 | 41 | 41 | 45 | 41 | 55 | 39 | 41 | 48 | ~~34~~ | 39 | 43 | ~~30~~ | 52 | 38 | ~~27~~ |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | 41 | 41 | 53 | 41 | 41 | 46 | 40 | 55 | 41 | 39 | 49 | ~~36~~ |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | 41 | 41 | 55 | 41 | 41 | 47 | 41 | 54 | 40 | 41 | 47 | ~~35~~ | 37 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 20-27 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 49 | 52 | 52 | 44 |
| | | | Exposed | 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 | 48 | 52 | 51 | 42 | 52 | 44 | ~~37~~ | 52 | 39 | ~~32~~ | 52 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| | | | 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 | 49 | 49 | 49 | 49 | 44 | 49 | 49 | 39 | 48 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 44 | 45 | 45 | 38 | 45 | 45 | 50 | 45 | 41 | 44 | 45 | 54 | 38 | 44 | 48 | ~~34~~ |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 41 | 45 | 45 | 38 | 45 | 45 | 52 | 45 | 41 | 44 | 45 | 53 | 38 | 42 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 7-20 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 39 | 45 | 45 | 51 | 44 | 39 | 44 | 42 | 52 | 39 | 41 | 46 | ~~34~~ | 55 | 41 | ~~30~~ |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 44 | 46 | 46 | 40 | 46 | 46 | 55 | 46 | 45 | 50 | 46 | 41 | 46 | 46 | 52 | 39 | 41 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 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 | 53 | 57 | 56 | 46 | 57 | 49 | 41 | 57 | 44 | ~~36~~ |
| | | | Exposed | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 55 | 57 | 57 | 47 | 57 | 49 | 40 | 57 | 42 | ~~35~~ | 57 | 37 | ~~31~~ | 55 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 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 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 49 | 54 | 54 | 44 |
| | | | 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 | 48 | 54 | 53 | 42 | 52 | 46 | ~~37~~ | 46 | 41 | ~~33~~ | 40 | ~~36~~ | ~~29~~ |
| 80 | B | 0-7 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 49 | 36 | 36 | 44 | 36 | 54 | 39 |
| | | 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 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 52 |
| | | | 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 | 50 | 55 | 55 | 44 | 55 | 52 | 39 | 55 | 46 | ~~34~~ |
| | | 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 |
| | | | 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 | 41 |
| | | 27-45 | Interior | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | | | Exposed | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | C | 0-7 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 52 | 36 | 36 | 46 | 36 | 36 | 41 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 53 | 36 | 36 | 45 | 36 | 54 | 39 | 36 | 48 | ~~34~~ | 36 | 43 | ~~30~~ | 52 | 38 | ~~27~~ |
| | | 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 | 55 | 55 | 55 | 55 | 53 | 55 | 55 | 46 | 55 | 55 | 41 | 55 | 49 | ~~36~~ |
| | | | Exposed | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 47 | 55 | 54 | 40 | 55 | 47 | ~~35~~ | 55 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 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 | 44 |
| | | | 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 | 42 | 46 | 44 | ~~37~~ | 46 | 39 | ~~32~~ | 46 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | | | Exposed | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 39 | 43 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 50 | 40 | 40 | 44 | 40 | 54 | 38 | 40 | 48 | ~~34~~ |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 40 | 52 | 40 | 40 | 44 | 40 | 53 | 38 | 40 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 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 | 39 | 40 | 40 | 51 | 40 | 39 | 44 | 39 | 52 | 39 | 37 | 46 | ~~34~~ | 54 | 41 | ~~30~~ |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 55 | 40 | 40 | 50 | 40 | 40 | 46 | 40 | 52 | 39 | 40 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 20-27 | Interior | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 46 | 50 | 50 | 41 | 50 | 44 | ~~36~~ |
| | | | Exposed | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 47 | 50 | 49 | 40 | 50 | 42 | ~~35~~ | 50 | 37 | ~~31~~ | 50 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 27-45 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 44 |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 42 | 48 | 46 | ~~37~~ | 46 | 41 | ~~33~~ | 40 | ~~36~~ | ~~29~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 71 | 74 | 74 | 66 | 74 | 74 | 61 | 74 | 72 | 52 | 74 | 65 | 40 | 72 | 53 | 33 | 66 | 43 | 28 | 56 | 35 | 25 | 46 | 31 | 22 | 39 | 27 | 29 |
| | | | Exposed | 74 | 74 | 66 | 74 | 74 | 58 | 74 | 70 | 49 | 74 | 66 | 42 | 74 | 60 | 36 | 72 | 52 | 32 | 68 | 45 | 30 | 57 | 35 | 25 | 45 | 30 | 32 | 36 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 72 | 74 | 74 | 67 | 74 | 74 | 62 | 74 | 73 | 52 | 74 | 68 | 44 | 74 | 56 | 34 | 68 | 42 | 29 | 58 | 34 | 25 | 45 | 30 | 22 | 36 | 26 | 29 | 32 | 23 | 26 |
| | | | Exposed | 74 | 74 | 62 | 74 | 71 | 50 | 74 | 66 | 41 | 74 | 59 | 35 | 72 | 49 | 31 | 68 | 41 | 29 | 63 | 35 | 26 | 46 | 30 | 22 | 35 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 72 | 75 | 75 | 68 | 75 | 73 | 64 | 75 | 64 | 46 | 75 | 49 | 35 | 73 | 38 | 30 | 67 | 32 | 26 | 58 | 28 | 23 | 48 | 25 | 31 |
| | | | Exposed | 75 | 75 | 72 | 75 | 75 | 67 | 75 | 70 | 59 | 75 | 66 | 48 | 75 | 57 | 40 | 75 | 48 | 35 | 75 | 41 | 32 | 67 | 32 | 27 | 57 | 28 | 23 | 44 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 75 | 76 | 76 | 71 | 76 | 72 | 63 | 73 | 65 | 47 | 66 | 54 | 37 | 55 | 43 | 32 | 43 | 35 | 28 | 35 | 31 | 25 |
| | | | Exposed | 76 | 76 | 76 | 76 | 76 | 74 | 76 | 76 | 69 | 76 | 73 | 64 | 76 | 69 | 55 | 73 | 65 | 46 | 68 | 58 | 40 | 56 | 44 | 32 | 42 | 35 | 27 | 33 | 30 | 24 | 29 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 74 | 74 | 69 | 74 | 74 | 64 | 74 | 73 | 54 | 74 | 68 | 45 | 74 | 64 | 39 | 74 | 56 | 34 | 70 | 49 | 31 | 62 | 38 | 26 | 49 | 32 | 23 | 39 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 74 | 64 | 39 | 73 | 54 | 33 | 68 | 46 | 30 | 64 | 40 | 27 | 55 | 35 | 25 | 48 | 32 | 22 | 42 | 29 | 31 | 34 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 74 | 74 | 65 | 74 | 74 | 55 | 74 | 69 | 45 | 74 | 64 | 37 | 74 | 54 | 33 | 70 | 46 | 30 | 66 | 39 | 28 | 51 | 32 | 23 | 38 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 74 | 54 | 33 | 69 | 44 | 29 | 64 | 36 | 26 | 53 | 32 | 24 | 44 | 29 | 22 | 37 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 75 | 75 | 75 | 75 | 75 | 69 | 75 | 73 | 64 | 75 | 68 | 53 | 75 | 64 | 44 | 75 | 53 | 37 | 75 | 45 | 33 | 70 | 34 | 28 | 62 | 29 | 24 | 49 | 25 | 32 | 39 | 22 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 75 | 63 | 44 | 75 | 51 | 36 | 75 | 41 | 32 | 71 | 35 | 29 | 66 | 32 | 26 | 61 | 29 | 24 | 52 | 26 | 22 | 40 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 71 | 76 | 76 | 66 | 76 | 71 | 60 | 75 | 67 | 51 | 71 | 63 | 44 | 63 | 48 | 34 | 46 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 76 | 71 | 60 | 74 | 66 | 49 | 69 | 59 | 40 | 64 | 50 | 35 | 54 | 42 | 31 | 45 | 37 | 29 | 38 | 33 | 26 | 31 | 28 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 74 | 74 | 57 | 74 | 69 | 47 | 74 | 65 | 40 | 74 | 57 | 35 | 70 | 49 | 31 | 66 | 43 | 28 | 61 | 38 | 26 | 47 | 31 | 22 | 37 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 70 | 49 | 31 | 65 | 41 | 28 | 57 | 35 | 25 | 49 | 32 | 23 | 42 | 29 | 31 | 37 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 74 | 71 | 48 | 74 | 65 | 39 | 74 | 56 | 34 | 71 | 46 | 30 | 66 | 39 | 28 | 59 | 34 | 25 | 50 | 31 | 23 | 36 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 66 | 38 | 27 | 56 | 33 | 25 | 46 | 30 | 22 | 38 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 75 | 75 | 66 | 75 | 69 | 56 | 75 | 64 | 46 | 75 | 54 | 38 | 75 | 45 | 33 | 73 | 38 | 30 | 69 | 34 | 28 | 59 | 28 | 23 | 46 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 75 | 44 | 33 | 72 | 36 | 30 | 67 | 32 | 27 | 62 | 29 | 24 | 52 | 26 | 22 | 45 | 24 | 30 | 39 | 22 | 27 | 32 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 76 | 76 | 73 | 76 | 76 | 68 | 76 | 72 | 62 | 75 | 68 | 52 | 71 | 63 | 44 | 66 | 54 | 37 | 61 | 47 | 33 | 44 | 36 | 28 | 34 | 31 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 71 | 63 | 43 | 65 | 52 | 36 | 56 | 44 | 32 | 46 | 37 | 29 | 38 | 33 | 26 | 34 | 30 | 24 | 31 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 10 | B | 0-7 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 40 | 60 | 53 | 33 | 60 | 43 | 28 | 56 | 35 | 25 | 46 | 31 | 22 | 39 | 27 | 29 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 58 | 60 | 60 | 49 | 60 | 60 | 42 | 60 | 60 | 36 | 60 | 52 | 32 | 60 | 45 | 30 | 57 | 35 | 25 | 45 | 30 | 32 | 36 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 44 | 60 | 56 | 34 | 60 | 42 | 29 | 58 | 34 | 25 | 45 | 30 | 22 | 36 | 26 | 29 | 32 | 23 | 26 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 50 | 60 | 60 | 41 | 60 | 59 | 35 | 60 | 49 | 31 | 60 | 41 | 29 | 60 | 35 | 26 | 46 | 30 | 22 | 35 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 68 | 69 | 69 | 64 | 69 | 64 | 46 | 69 | 49 | 35 | 69 | 38 | 30 | 67 | 32 | 26 | 58 | 28 | 23 | 48 | 25 | 31 |
| | | | Exposed | 69 | 69 | 69 | 69 | 69 | 67 | 69 | 69 | 59 | 69 | 66 | 48 | 69 | 57 | 40 | 69 | 48 | 35 | 69 | 41 | 32 | 67 | 32 | 27 | 57 | 28 | 23 | 44 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 71 | 72 | 72 | 63 | 72 | 65 | 47 | 66 | 54 | 37 | 55 | 43 | 32 | 43 | 35 | 28 | 35 | 31 | 25 |
| | | | Exposed | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 69 | 72 | 72 | 64 | 72 | 69 | 55 | 72 | 65 | 46 | 68 | 58 | 40 | 56 | 44 | 32 | 42 | 35 | 27 | 33 | 30 | 24 | 29 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 54 | 60 | 60 | 45 | 60 | 60 | 39 | 60 | 56 | 34 | 60 | 49 | 31 | 60 | 38 | 26 | 49 | 32 | 23 | 39 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 60 | 60 | 39 | 60 | 54 | 33 | 60 | 46 | 30 | 60 | 40 | 27 | 55 | 35 | 25 | 48 | 32 | 22 | 42 | 29 | 31 | 34 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 60 | 60 | 60 | 60 | 60 | 55 | 60 | 60 | 45 | 60 | 60 | 37 | 60 | 54 | 33 | 60 | 46 | 30 | 60 | 39 | 28 | 51 | 32 | 23 | 38 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 60 | 54 | 33 | 60 | 44 | 29 | 60 | 36 | 26 | 53 | 32 | 24 | 44 | 29 | 22 | 37 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 64 | 69 | 68 | 53 | 69 | 64 | 44 | 69 | 53 | 37 | 69 | 45 | 33 | 69 | 34 | 28 | 62 | 29 | 24 | 49 | 25 | 32 | 39 | 22 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 69 | 63 | 44 | 69 | 51 | 36 | 69 | 41 | 32 | 69 | 35 | 29 | 66 | 32 | 26 | 61 | 29 | 24 | 52 | 26 | 22 | 40 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 71 | 72 | 72 | 66 | 72 | 71 | 60 | 72 | 67 | 51 | 71 | 63 | 44 | 63 | 48 | 34 | 46 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 72 | 71 | 60 | 72 | 66 | 49 | 69 | 59 | 40 | 64 | 50 | 35 | 54 | 42 | 31 | 45 | 37 | 29 | 38 | 33 | 26 | 31 | 28 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 60 | 60 | 57 | 60 | 60 | 47 | 60 | 60 | 40 | 60 | 57 | 35 | 60 | 49 | 31 | 60 | 43 | 28 | 60 | 38 | 26 | 47 | 31 | 22 | 37 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 60 | 49 | 31 | 60 | 41 | 28 | 57 | 35 | 25 | 49 | 32 | 23 | 42 | 29 | 31 | 37 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 60 | 60 | 48 | 60 | 60 | 39 | 60 | 56 | 34 | 60 | 46 | 30 | 60 | 39 | 28 | 59 | 34 | 25 | 50 | 31 | 23 | 36 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 60 | 38 | 27 | 56 | 33 | 25 | 46 | 30 | 22 | 38 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 70 | 70 | 66 | 70 | 69 | 56 | 70 | 64 | 46 | 70 | 54 | 38 | 70 | 45 | 33 | 70 | 38 | 30 | 69 | 34 | 28 | 59 | 28 | 23 | 46 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 70 | 44 | 33 | 70 | 36 | 30 | 67 | 32 | 27 | 62 | 29 | 24 | 52 | 26 | 22 | 45 | 24 | 30 | 39 | 22 | 27 | 32 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 75 | 75 | 73 | 75 | 75 | 68 | 75 | 72 | 62 | 75 | 68 | 52 | 71 | 63 | 44 | 66 | 54 | 37 | 61 | 47 | 33 | 44 | 36 | 28 | 34 | 31 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 71 | 63 | 43 | 65 | 52 | 36 | 56 | 44 | 32 | 46 | 37 | 29 | 38 | 33 | 26 | 34 | 30 | 24 | 31 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 20 | B | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 40 | 44 | 44 | 33 | 44 | 43 | 28 | 44 | 35 | 25 | 44 | 31 | 22 | 39 | 27 | 29 |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 42 | 44 | 44 | 36 | 44 | 44 | 32 | 44 | 44 | 30 | 44 | 35 | 25 | 44 | 30 | 32 | 36 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 44 | 45 | 45 | 34 | 45 | 42 | 29 | 45 | 34 | 25 | 45 | 30 | 22 | 36 | 26 | 29 | 32 | 23 | 26 |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 41 | 45 | 45 | 35 | 45 | 45 | 31 | 45 | 41 | 29 | 45 | 35 | 26 | 45 | 30 | 22 | 35 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 46 | 51 | 49 | 35 | 51 | 38 | 30 | 51 | 32 | 26 | 51 | 28 | 23 | 48 | 25 | 31 |
| | | | Exposed | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 48 | 51 | 51 | 40 | 51 | 48 | 35 | 51 | 41 | 32 | 51 | 32 | 27 | 51 | 28 | 23 | 44 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 37 | 46 | 43 | 32 | 43 | 35 | 28 | 35 | 31 | 25 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 40 | 46 | 44 | 32 | 42 | 35 | 27 | 33 | 30 | 24 | 29 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 39 | 44 | 44 | 34 | 44 | 44 | 31 | 44 | 38 | 26 | 44 | 32 | 23 | 39 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 44 | 44 | 39 | 44 | 44 | 33 | 44 | 44 | 30 | 44 | 40 | 27 | 44 | 35 | 25 | 44 | 32 | 22 | 42 | 29 | 31 | 34 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 37 | 45 | 45 | 33 | 45 | 45 | 30 | 45 | 39 | 28 | 45 | 32 | 23 | 38 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 45 | 45 | 33 | 45 | 44 | 29 | 45 | 36 | 26 | 45 | 32 | 24 | 44 | 29 | 22 | 37 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 44 | 51 | 51 | 37 | 51 | 45 | 33 | 51 | 34 | 28 | 51 | 29 | 24 | 49 | 25 | 32 | 39 | 22 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 51 | 51 | 44 | 51 | 51 | 36 | 51 | 41 | 32 | 51 | 35 | 29 | 51 | 32 | 26 | 51 | 29 | 24 | 51 | 26 | 22 | 40 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 44 | 46 | 46 | 34 | 46 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 40 | 46 | 46 | 35 | 46 | 42 | 31 | 45 | 37 | 29 | 38 | 33 | 26 | 31 | 28 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 40 | 44 | 44 | 35 | 44 | 44 | 31 | 44 | 43 | 28 | 44 | 38 | 26 | 44 | 31 | 22 | 37 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 44 | 44 | 31 | 44 | 41 | 28 | 44 | 35 | 25 | 44 | 32 | 23 | 42 | 29 | 31 | 37 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 39 | 45 | 45 | 34 | 45 | 45 | 30 | 45 | 39 | 28 | 45 | 34 | 25 | 45 | 31 | 23 | 36 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 45 | 38 | 27 | 45 | 33 | 25 | 45 | 30 | 22 | 38 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 46 | 55 | 54 | 38 | 55 | 45 | 33 | 55 | 38 | 30 | 55 | 34 | 28 | 55 | 28 | 23 | 46 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 55 | 44 | 33 | 55 | 36 | 30 | 55 | 32 | 27 | 55 | 29 | 24 | 52 | 26 | 22 | 45 | 24 | 30 | 39 | 22 | 27 | 32 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 44 | 50 | 50 | 37 | 50 | 47 | 33 | 44 | 36 | 28 | 34 | 31 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 50 | 50 | 43 | 50 | 50 | 36 | 50 | 44 | 32 | 46 | 37 | 29 | 38 | 33 | 26 | 34 | 30 | 24 | 31 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 30 | B | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 28 | 35 | 35 | 25 | 35 | 31 | 22 | 35 | 27 | 29 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 30 | 35 | 35 | 25 | 35 | 30 | 32 | 35 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 29 | 35 | 34 | 25 | 35 | 30 | 22 | 34 | 26 | 29 | 32 | 23 | 26 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 30 | 22 | 35 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 37 | 37 | 30 | 37 | 32 | 26 | 37 | 28 | 23 | 37 | 25 | 31 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 37 | 37 | 32 | 37 | 32 | 27 | 37 | 28 | 23 | 37 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 34 | 28 | 34 | 31 | 25 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 27 | 33 | 30 | 24 | 29 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 | 29 | 26 | 25 |
| | C | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 31 | 35 | 35 | 26 | 35 | 32 | 23 | 35 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 30 | 35 | 35 | 27 | 35 | 35 | 25 | 35 | 32 | 22 | 35 | 29 | 31 | 34 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 30 | 35 | 35 | 28 | 35 | 32 | 23 | 34 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 35 | 35 | 33 | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 32 | 24 | 35 | 29 | 22 | 35 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 34 | 28 | 37 | 29 | 24 | 37 | 25 | 32 | 37 | 22 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 32 | 37 | 35 | 29 | 37 | 32 | 26 | 37 | 29 | 24 | 37 | 26 | 22 | 37 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 29 | 34 | 32 | 25 | 31 | 28 | 22 | 27 | 24 | 29 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 31 | 34 | 34 | 29 | 34 | 33 | 26 | 31 | 28 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 31 | 22 | 35 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 25 | 35 | 32 | 23 | 35 | 29 | 31 | 35 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 35 | 35 | 28 | 35 | 34 | 25 | 35 | 31 | 23 | 34 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 35 | 35 | 27 | 35 | 33 | 25 | 35 | 30 | 22 | 35 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 33 | 40 | 38 | 30 | 40 | 34 | 28 | 40 | 28 | 23 | 40 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 40 | 40 | 33 | 40 | 36 | 30 | 40 | 32 | 27 | 40 | 29 | 24 | 40 | 26 | 22 | 40 | 24 | 30 | 39 | 22 | 27 | 32 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 36 | 28 | 34 | 31 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 32 | 37 | 37 | 29 | 37 | 33 | 26 | 34 | 30 | 24 | 31 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 40 | B | 0-7 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 28 | 33 | 33 | 25 | 33 | 31 | 22 | 33 | 27 | 29 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 32 | 33 | 33 | 30 | 33 | 33 | 25 | 33 | 30 | 32 | 33 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | 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 | 29 | 33 | 33 | 25 | 33 | 30 | 22 | 32 | 26 | 29 | 31 | 23 | 26 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 29 | 33 | 33 | 26 | 33 | 30 | 22 | 33 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 28 | 23 | 29 | 25 | 31 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 27 | 29 | 28 | 23 | 29 | 24 | 30 | 29 | 32 | 26 | 29 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 25 |
| | | | 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 | 24 | 27 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 26 | 33 | 32 | 23 | 33 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 27 | 33 | 33 | 25 | 33 | 32 | 22 | 33 | 29 | 31 | 33 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 28 | 33 | 32 | 23 | 32 | 27 | 30 | 31 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 29 | 33 | 33 | 26 | 33 | 32 | 24 | 33 | 29 | 22 | 33 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 24 | 29 | 25 | 32 | 29 | 22 | 28 | 29 | 29 | 24 | 29 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 24 | 29 | 26 | 22 | 29 | 22 | 28 | 29 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 25 | 27 | 27 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 31 | 22 | 35 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 25 | 35 | 32 | 23 | 35 | 29 | 31 | 35 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 35 | 35 | 28 | 35 | 34 | 25 | 35 | 31 | 23 | 34 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 35 | 35 | 27 | 35 | 33 | 25 | 35 | 30 | 22 | 35 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 28 | 31 | 28 | 23 | 31 | 24 | 30 | 31 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 27 | 31 | 29 | 24 | 31 | 26 | 22 | 31 | 24 | 30 | 31 | 22 | 27 | 31 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 29 | 29 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 24 | 29 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 50 | 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 22 | 28 | 27 | 29 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 32 | 28 | 26 | 28 | 28 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 22 | 27 | 26 | 29 | 27 | 23 | 26 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 22 | 28 | 26 | 29 | 28 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 30 | 35 | 32 | 26 | 35 | 28 | 23 | 35 | 25 | 20 |
| | | 27-45 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 28 | 33 | 31 | 33 | 25 |
| | C | 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 | 28 | 26 | 28 | 28 | 23 | 28 | 28 | 30 | 28 | 24 | 26 | 28 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 25 | 28 | 28 | 22 | 28 | 28 | 31 | 28 | 24 | 26 | 28 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 23 | 28 | 27 | 30 | 27 | 23 | 26 | 26 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 24 | 28 | 28 | 22 | 28 | 27 | 30 | 28 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 33 | 28 | 35 | 29 | 24 | 35 | 26 | 22 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 34 | 28 | 35 | 29 | 24 | 35 | 25 | 21 | 35 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 29 | 33 | 33 | 26 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 29 | 33 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 30 | 26 | 30 | 30 | 22 | 30 | 27 | 28 | 30 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 30 | 25 | 30 | 30 | 23 | 30 | 29 | 31 | 30 | 26 | 28 | 30 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 30 | 25 | 30 | 30 | 23 | 30 | 26 | 29 | 28 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 30 | 30 | 27 | 30 | 30 | 25 | 30 | 30 | 22 | 30 | 27 | 30 | 30 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 23 | 26 | 24 | 30 | 26 | 32 | 26 | 26 | 28 | 23 | 26 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 22 | 26 | 24 | 30 | 26 | 22 | 27 | 26 | 28 | 23 | 26 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 32 | 24 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 29 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 32 | 24 | 24 | 28 | 24 | 23 | 24 | 24 | 30 | 22 | 24 | 27 | 19 |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 29 | 24 | 23 | 26 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 29 | 24 | 22 | 25 | 24 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 26 | 30 | 28 | 23 | 30 | 25 | 20 |
| | | 27-45 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 |
| | C | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 30 | 24 | 24 | 26 | 24 | 32 | 23 | 24 | 29 | 20 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 31 | 24 | 24 | 26 | 24 | 32 | 22 | 24 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 30 | 24 | 23 | 26 | 23 | 31 | 23 | 22 | 27 | 20 | 21 | 24 | 18 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 30 | 24 | 24 | 27 | 24 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 29 | 24 | 30 | 26 | 22 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 29 | 24 | 30 | 25 | 21 | 30 | 22 | 18 | 30 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 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 | 22 | 26 | 26 | 28 | 26 | 23 | 25 | 26 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 23 | 26 | 26 | 31 | 26 | 26 | 28 | 26 | 24 | 26 | 26 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 23 | 26 | 26 | 29 | 25 | 22 | 25 | 24 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 22 | 26 | 26 | 30 | 26 | 24 | 27 | 26 | 22 | 25 | 26 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 32 | 26 | 33 | 28 | 23 | 33 | 25 | 20 | 33 | 22 | 18 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 27 | 33 | 28 | 23 | 33 | 24 | 20 | 33 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 70 | B | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 29 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 31 | 20 | 20 | 28 | 20 | 20 | 24 | 20 | 30 | 22 | 20 | 27 | 19 |
| | | 7-20 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 23 | 26 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 31 | 25 | 31 | 29 | 22 | 31 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| | | | 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 | 23 | 26 | 25 | 20 |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| | C | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 30 | 20 | 20 | 26 | 20 | 31 | 23 | 20 | 29 | 20 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 31 | 20 | 20 | 26 | 20 | 31 | 22 | 20 | 27 | 19 | 31 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 26 | 31 | 31 | 23 | 31 | 27 | 20 | 31 | 24 | 18 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 27 | 31 | 31 | 23 | 31 | 27 | 20 | 31 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 22 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 25 | 21 | 26 | 22 | 18 | 26 | 19 | 16 | 26 | 17 | 14 |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 28 | 22 | 22 | 25 | 22 | 30 | 22 | 22 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 31 | 22 | 22 | 28 | 22 | 22 | 26 | 22 | 31 | 22 | 22 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 29 | 34 | 34 | 25 | 34 | 29 | 22 | 34 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 33 | 34 | 34 | 30 | 34 | 34 | 27 | 34 | 34 | 25 | 34 | 31 | 23 | 34 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 23 | 28 | 25 | 20 | 28 | 22 | 18 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 23 | 28 | 24 | 20 | 28 | 21 | 17 | 28 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 24 | 27 | 27 | 22 |
| | | | 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 | 24 | 27 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 80 | B | 0-7 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 27 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 27 | 18 | 18 | 27 | 18 | 18 | 24 | 18 | 27 | 22 | 18 | 27 | 19 |
| | | 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 | 26 |
| | | | 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 | 25 | 27 | 27 | 22 | 27 | 26 | 19 | 27 | 23 | 17 |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 20 |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | C | 0-7 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 27 | 18 | 18 | 26 | 18 | 27 | 23 | 18 | 27 | 20 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 27 | 18 | 18 | 26 | 18 | 27 | 22 | 18 | 27 | 19 | 27 | 24 | 17 | 27 | 21 | 15 | 26 | 19 | 13 |
| | | 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 | 26 | 27 | 27 | 23 | 27 | 27 | 20 | 27 | 24 | 18 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 23 | 27 | 27 | 20 | 27 | 23 | 17 | 27 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 21 | 23 | 22 | 18 | 23 | 19 | 16 | 23 | 17 | 14 |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 | 22 | 22 | 17 |
| | D | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 28 | 20 | 20 | 25 | 20 | 30 | 22 | 20 | 27 | 19 | 30 | 24 | 17 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 30 | 20 | 20 | 28 | 20 | 20 | 26 | 20 | 30 | 22 | 20 | 26 | 19 | 30 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 29 | 30 | 30 | 25 | 30 | 29 | 22 | 30 | 26 | 19 | 28 | 23 | 17 | 27 | 20 | 15 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 27 | 30 | 30 | 25 | 30 | 30 | 23 | 30 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 24 | 20 | 25 | 21 | 17 | 25 | 18 | 15 | 25 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 94 | 98 | 98 | 90 | 98 | 98 | 86 | 98 | 95 | 82 | 98 | 91 | 79 | 98 | 84 | 71 | 91 | 79 | 64 | 85 | 73 | 56 | 80 | 67 | 49 | 76 | 61 | 43 | 70 | 54 | 58 |
| | | | Exposed | 98 | 98 | 85 | 98 | 94 | 81 | 98 | 89 | 77 | 98 | 85 | 73 | 95 | 82 | 67 | 90 | 78 | 64 | 87 | 75 | 58 | 80 | 67 | 49 | 75 | 60 | 42 | 68 | 52 | 55 | 62 | 45 | 48 | 55 | 40 | 43 | 48 | 53 | 38 |
| | | 7-20 | Interior | 98 | 98 | 98 | 98 | 98 | 97 | 98 | 98 | 91 | 98 | 98 | 86 | 98 | 96 | 82 | 98 | 91 | 78 | 98 | 87 | 75 | 95 | 80 | 65 | 87 | 74 | 57 | 81 | 65 | 49 | 75 | 58 | 43 | 68 | 51 | 38 | 62 | 46 | 51 |
| | | | Exposed | 98 | 96 | 82 | 98 | 90 | 77 | 98 | 85 | 72 | 96 | 81 | 66 | 91 | 77 | 62 | 86 | 73 | 56 | 82 | 67 | 51 | 76 | 59 | 44 | 67 | 50 | 56 | 60 | 44 | 49 | 52 | 38 | 43 | 46 | 51 | 38 | 41 | 45 | 34 |
| | | 20-27 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 96 | 98 | 98 | 91 | 98 | 96 | 86 | 98 | 91 | 83 | 98 | 83 | 76 | 98 | 77 | 67 | 92 | 69 | 60 | 86 | 63 | 52 | 81 | 55 | 46 | 77 | 49 | 41 |
| | | | Exposed | 98 | 98 | 91 | 98 | 94 | 85 | 98 | 89 | 81 | 98 | 84 | 77 | 98 | 80 | 72 | 98 | 77 | 66 | 94 | 72 | 62 | 86 | 63 | 53 | 80 | 54 | 45 | 75 | 47 | 39 | 68 | 41 | 51 | 62 | 55 | 45 | 55 | 49 | 40 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 98 | 99 | 99 | 93 | 99 | 99 | 89 | 99 | 91 | 82 | 92 | 85 | 76 | 85 | 79 | 69 | 79 | 74 | 62 | 74 | 67 | 55 | 67 | 62 | 49 |
| | | | Exposed | 99 | 99 | 98 | 99 | 99 | 92 | 99 | 97 | 87 | 99 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 76 | 87 | 81 | 71 | 80 | 75 | 63 | 73 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 41 | 49 |
| | C | 0-7 | Interior | 98 | 98 | 88 | 98 | 96 | 83 | 98 | 92 | 79 | 98 | 87 | 75 | 97 | 84 | 70 | 93 | 80 | 65 | 89 | 77 | 62 | 83 | 70 | 52 | 77 | 63 | 45 | 71 | 55 | 58 | 64 | 48 | 51 | 58 | 42 | 45 | 51 | 56 | 40 |
| | | | Exposed | 97 | 83 | 70 | 92 | 79 | 65 | 87 | 76 | 59 | 83 | 71 | 53 | 80 | 66 | 48 | 77 | 62 | 44 | 73 | 57 | 40 | 65 | 48 | 52 | 57 | 41 | 44 | 49 | 54 | 38 | 43 | 47 | 34 | 57 | 42 | 30 | 51 | 37 | 26 |
| | | 7-20 | Interior | 98 | 98 | 84 | 98 | 93 | 80 | 98 | 88 | 75 | 98 | 83 | 69 | 94 | 79 | 64 | 89 | 76 | 59 | 85 | 71 | 54 | 78 | 62 | 46 | 70 | 53 | 39 | 63 | 46 | 52 | 55 | 40 | 45 | 49 | 54 | 40 | 43 | 48 | 35 |
| | | | Exposed | 93 | 79 | 64 | 88 | 75 | 58 | 83 | 68 | 52 | 79 | 63 | 47 | 75 | 58 | 43 | 69 | 53 | 39 | 65 | 48 | 54 | 56 | 41 | 46 | 48 | 53 | 39 | 41 | 46 | 34 | 54 | 40 | 30 | 48 | 35 | 26 | 43 | 31 | 23 |
| | | 20-27 | Interior | 98 | 98 | 94 | 98 | 97 | 88 | 98 | 92 | 83 | 98 | 87 | 79 | 98 | 83 | 75 | 98 | 79 | 69 | 96 | 75 | 65 | 89 | 65 | 56 | 82 | 58 | 48 | 77 | 50 | 41 | 71 | 44 | 54 | 64 | 38 | 48 | 58 | 51 | 43 |
| | | | Exposed | 98 | 82 | 75 | 98 | 78 | 68 | 94 | 73 | 63 | 90 | 67 | 57 | 85 | 62 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 71 | 44 | 55 | 64 | 38 | 47 | 56 | 49 | 41 | 49 | 43 | 36 | 43 | 38 | 32 | 57 | 34 | 28 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 95 | 99 | 99 | 90 | 99 | 95 | 85 | 99 | 90 | 81 | 94 | 86 | 78 | 90 | 83 | 75 | 82 | 77 | 65 | 76 | 69 | 57 | 67 | 62 | 50 | 61 | 55 | 43 | 54 | 48 | 38 | 48 | 43 | 51 |
| | | | Exposed | 99 | 90 | 81 | 93 | 85 | 77 | 88 | 81 | 72 | 83 | 77 | 66 | 79 | 74 | 62 | 75 | 68 | 56 | 70 | 64 | 52 | 62 | 55 | 44 | 53 | 47 | 57 | 46 | 41 | 49 | 40 | 54 | 43 | 53 | 48 | 38 | 47 | 42 | 34 |
| | D | 0-7 | Interior | 98 | 93 | 80 | 98 | 89 | 76 | 98 | 84 | 71 | 93 | 81 | 66 | 89 | 77 | 62 | 85 | 74 | 56 | 82 | 69 | 51 | 76 | 61 | 43 | 69 | 53 | 56 | 62 | 45 | 49 | 55 | 60 | 43 | 48 | 53 | 38 | 43 | 47 | 33 |
| | | | Exposed | 89 | 77 | 61 | 84 | 72 | 55 | 80 | 67 | 49 | 77 | 63 | 44 | 73 | 57 | 40 | 68 | 52 | 55 | 64 | 47 | 51 | 55 | 40 | 43 | 47 | 52 | 37 | 41 | 45 | 32 | 54 | 39 | 28 | 47 | 35 | 25 | 42 | 31 | 22 |
| | | 7-20 | Interior | 98 | 89 | 77 | 98 | 84 | 71 | 94 | 80 | 65 | 89 | 76 | 60 | 85 | 71 | 54 | 81 | 65 | 50 | 77 | 61 | 45 | 68 | 52 | 38 | 61 | 44 | 50 | 53 | 38 | 43 | 46 | 51 | 38 | 40 | 45 | 33 | 54 | 40 | 30 |
| | | | Exposed | 85 | 70 | 54 | 80 | 64 | 48 | 76 | 59 | 43 | 70 | 53 | 39 | 65 | 48 | 54 | 60 | 44 | 49 | 55 | 40 | 45 | 46 | 51 | 38 | 40 | 44 | 33 | 52 | 38 | 28 | 45 | 33 | 25 | 40 | 29 | 22 | 36 | 26 | 19 |
| | | 20-27 | Interior | 98 | 94 | 85 | 98 | 88 | 80 | 98 | 83 | 76 | 98 | 79 | 70 | 96 | 75 | 64 | 92 | 70 | 60 | 88 | 65 | 55 | 81 | 56 | 46 | 76 | 48 | 40 | 68 | 42 | 52 | 62 | 55 | 45 | 55 | 48 | 40 | 48 | 43 | 36 |
| | | | Exposed | 96 | 75 | 64 | 91 | 68 | 58 | 86 | 63 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 75 | 47 | 39 | 70 | 43 | 54 | 63 | 55 | 46 | 54 | 48 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 54 | 32 | 26 | 48 | 28 | 23 |
| | | 27-45 | Interior | 99 | 99 | 92 | 99 | 96 | 87 | 99 | 91 | 82 | 94 | 87 | 78 | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 76 | 64 | 75 | 67 | 56 | 65 | 60 | 48 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 40 | 48 | 40 | 54 | 43 |
| | | | Exposed | 89 | 83 | 74 | 84 | 78 | 68 | 80 | 75 | 63 | 76 | 69 | 57 | 70 | 64 | 52 | 65 | 59 | 47 | 61 | 54 | 43 | 51 | 46 | 55 | 44 | 40 | 47 | 38 | 52 | 41 | 50 | 45 | 36 | 44 | 40 | 32 | 40 | 36 | 28 |
| 10 | B | 0-7 | Interior | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 90 | 91 | 91 | 86 | 91 | 91 | 82 | 91 | 91 | 79 | 91 | 84 | 71 | 91 | 79 | 64 | 85 | 73 | 56 | 80 | 67 | 49 | 76 | 61 | 43 | 70 | 54 | 58 |
| | | | Exposed | 91 | 91 | 85 | 91 | 91 | 81 | 91 | 89 | 77 | 91 | 85 | 73 | 91 | 82 | 67 | 90 | 78 | 64 | 87 | 75 | 58 | 80 | 67 | 49 | 75 | 60 | 42 | 68 | 52 | 55 | 62 | 45 | 48 | 55 | 40 | 43 | 48 | 53 | 38 |
| | | 7-20 | Interior | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 86 | 91 | 91 | 82 | 91 | 91 | 78 | 91 | 87 | 75 | 91 | 80 | 65 | 87 | 74 | 57 | 81 | 65 | 49 | 75 | 58 | 43 | 68 | 51 | 38 | 62 | 46 | 51 |
| | | | Exposed | 91 | 91 | 82 | 91 | 90 | 77 | 91 | 85 | 72 | 91 | 81 | 66 | 91 | 77 | 62 | 86 | 73 | 56 | 82 | 67 | 51 | 76 | 59 | 44 | 67 | 50 | 56 | 60 | 44 | 49 | 52 | 38 | 43 | 46 | 51 | 38 | 41 | 45 | 34 |
| | | 20-27 | Interior | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 91 | 95 | 95 | 86 | 95 | 91 | 83 | 95 | 83 | 76 | 95 | 77 | 67 | 92 | 69 | 60 | 86 | 63 | 52 | 81 | 55 | 46 | 77 | 49 | 41 |
| | | | Exposed | 95 | 95 | 91 | 95 | 94 | 85 | 95 | 89 | 81 | 95 | 84 | 77 | 95 | 80 | 72 | 95 | 77 | 66 | 94 | 72 | 62 | 86 | 63 | 53 | 80 | 54 | 45 | 75 | 47 | 39 | 68 | 41 | 51 | 62 | 55 | 45 | 55 | 49 | 40 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 93 | 98 | 98 | 89 | 98 | 91 | 82 | 92 | 85 | 76 | 85 | 79 | 69 | 79 | 74 | 62 | 74 | 67 | 55 | 67 | 62 | 49 |
| | | | Exposed | 98 | 98 | 98 | 98 | 98 | 92 | 98 | 97 | 87 | 98 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 76 | 87 | 81 | 71 | 80 | 75 | 63 | 73 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 41 | 49 |
| | C | 0-7 | Interior | 91 | 91 | 88 | 91 | 91 | 83 | 91 | 91 | 79 | 91 | 87 | 75 | 91 | 84 | 70 | 91 | 80 | 65 | 89 | 77 | 62 | 83 | 70 | 52 | 77 | 63 | 45 | 71 | 55 | 58 | 64 | 48 | 51 | 58 | 42 | 45 | 51 | 56 | 40 |
| | | | Exposed | 91 | 83 | 70 | 91 | 79 | 65 | 87 | 76 | 59 | 83 | 71 | 53 | 80 | 66 | 48 | 77 | 62 | 44 | 73 | 57 | 40 | 65 | 48 | 52 | 57 | 41 | 44 | 49 | 54 | 38 | 43 | 47 | 34 | 57 | 42 | 30 | 51 | 37 | 26 |
| | | 7-20 | Interior | 91 | 91 | 84 | 91 | 91 | 80 | 91 | 88 | 75 | 91 | 83 | 69 | 91 | 79 | 64 | 89 | 76 | 59 | 85 | 71 | 54 | 78 | 62 | 46 | 70 | 53 | 39 | 63 | 46 | 52 | 55 | 40 | 45 | 49 | 54 | 40 | 43 | 48 | 35 |
| | | | Exposed | 91 | 79 | 64 | 88 | 75 | 58 | 83 | 68 | 52 | 79 | 63 | 47 | 75 | 58 | 43 | 69 | 53 | 39 | 65 | 48 | 54 | 56 | 41 | 46 | 48 | 53 | 39 | 41 | 46 | 34 | 54 | 40 | 30 | 48 | 35 | 26 | 43 | 31 | 23 |
| | | 20-27 | Interior | 95 | 95 | 94 | 95 | 95 | 88 | 95 | 92 | 83 | 95 | 87 | 79 | 95 | 83 | 75 | 95 | 79 | 69 | 95 | 75 | 65 | 89 | 65 | 56 | 82 | 58 | 48 | 77 | 50 | 41 | 71 | 44 | 54 | 64 | 38 | 48 | 58 | 51 | 43 |
| | | | Exposed | 95 | 82 | 75 | 95 | 78 | 68 | 94 | 73 | 63 | 90 | 67 | 57 | 85 | 62 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 71 | 44 | 55 | 64 | 38 | 47 | 56 | 49 | 41 | 49 | 43 | 36 | 43 | 38 | 32 | 57 | 34 | 28 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 95 | 98 | 98 | 90 | 98 | 95 | 85 | 98 | 90 | 81 | 94 | 86 | 78 | 90 | 83 | 75 | 82 | 77 | 65 | 76 | 69 | 57 | 67 | 62 | 50 | 61 | 55 | 43 | 54 | 48 | 38 | 48 | 43 | 51 |
| | | | Exposed | 98 | 90 | 81 | 93 | 85 | 77 | 88 | 81 | 72 | 83 | 77 | 66 | 79 | 74 | 62 | 75 | 68 | 56 | 70 | 64 | 52 | 62 | 55 | 44 | 53 | 47 | 57 | 46 | 41 | 49 | 40 | 54 | 43 | 53 | 48 | 38 | 47 | 42 | 34 |
| | D | 0-7 | Interior | 91 | 91 | 80 | 91 | 89 | 76 | 91 | 84 | 71 | 91 | 81 | 66 | 89 | 77 | 62 | 85 | 74 | 56 | 82 | 69 | 51 | 76 | 61 | 43 | 69 | 53 | 56 | 62 | 45 | 49 | 55 | 60 | 43 | 48 | 53 | 38 | 43 | 47 | 33 |
| | | | Exposed | 89 | 77 | 61 | 84 | 72 | 55 | 80 | 67 | 49 | 77 | 63 | 44 | 73 | 57 | 40 | 68 | 52 | 55 | 64 | 47 | 51 | 55 | 40 | 43 | 47 | 52 | 37 | 41 | 45 | 32 | 54 | 39 | 28 | 47 | 35 | 25 | 42 | 31 | 22 |
| | | 7-20 | Interior | 91 | 89 | 77 | 91 | 84 | 71 | 91 | 80 | 65 | 89 | 76 | 60 | 85 | 71 | 54 | 81 | 65 | 50 | 77 | 61 | 45 | 68 | 52 | 38 | 61 | 44 | 50 | 53 | 38 | 43 | 46 | 51 | 38 | 40 | 45 | 33 | 54 | 40 | 30 |
| | | | Exposed | 85 | 70 | 54 | 80 | 64 | 48 | 76 | 59 | 43 | 70 | 53 | 39 | 65 | 48 | 54 | 60 | 44 | 49 | 55 | 40 | 45 | 46 | 51 | 38 | 40 | 44 | 33 | 52 | 38 | 28 | 45 | 33 | 25 | 40 | 29 | 22 | 36 | 26 | 19 |
| | | 20-27 | Interior | 96 | 94 | 85 | 96 | 88 | 80 | 96 | 83 | 76 | 96 | 79 | 70 | 96 | 75 | 64 | 92 | 70 | 60 | 88 | 65 | 55 | 81 | 56 | 46 | 76 | 48 | 40 | 68 | 42 | 52 | 62 | 55 | 45 | 55 | 48 | 40 | 48 | 43 | 36 |
| | | | Exposed | 96 | 75 | 64 | 91 | 68 | 58 | 86 | 63 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 75 | 47 | 39 | 70 | 43 | 54 | 63 | 55 | 46 | 54 | 48 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 54 | 32 | 26 | 48 | 28 | 23 |
| | | 27-45 | Interior | 99 | 99 | 92 | 99 | 96 | 87 | 99 | 91 | 82 | 94 | 87 | 78 | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 76 | 64 | 75 | 67 | 56 | 65 | 60 | 48 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 40 | 48 | 40 | 54 | 43 |
| | | | Exposed | 89 | 83 | 74 | 84 | 78 | 68 | 80 | 75 | 63 | 76 | 69 | 57 | 70 | 64 | 52 | 65 | 59 | 47 | 61 | 54 | 43 | 51 | 46 | 55 | 44 | 40 | 47 | 38 | 52 | 41 | 50 | 45 | 36 | 44 | 40 | 32 | 40 | 36 | 28 |
| 20 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 79 | 83 | 83 | 71 | 83 | 79 | 64 | 83 | 73 | 56 | 80 | 67 | 49 | 76 | 61 | 43 | 70 | 54 | 58 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 73 | 83 | 82 | 67 | 83 | 78 | 64 | 83 | 75 | 58 | 80 | 67 | 49 | 75 | 60 | 42 | 68 | 52 | 55 | 62 | 45 | 48 | 55 | 40 | 43 | 48 | 53 | 38 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 78 | 83 | 83 | 75 | 83 | 80 | 65 | 83 | 74 | 57 | 81 | 65 | 49 | 75 | 58 | 43 | 68 | 51 | 38 | 62 | 46 | 51 |
| | | | Exposed | 83 | 83 | 82 | 83 | 83 | 77 | 83 | 83 | 72 | 83 | 81 | 66 | 83 | 77 | 62 | 83 | 73 | 56 | 82 | 67 | 51 | 76 | 59 | 44 | 67 | 50 | 56 | 60 | 44 | 49 | 52 | 38 | 43 | 46 | 51 | 38 | 41 | 45 | 34 |
| | | 20-27 | Interior | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 86 | 88 | 88 | 83 | 88 | 83 | 76 | 88 | 77 | 67 | 88 | 69 | 60 | 86 | 63 | 52 | 81 | 55 | 46 | 77 | 49 | 41 |
| | | | Exposed | 88 | 88 | 88 | 88 | 88 | 85 | 88 | 88 | 81 | 88 | 84 | 77 | 88 | 80 | 72 | 88 | 77 | 66 | 88 | 72 | 62 | 86 | 63 | 53 | 80 | 54 | 45 | 75 | 47 | 39 | 68 | 41 | 51 | 62 | 55 | 45 | 55 | 49 | 40 |
| | | 27-45 | Interior | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 89 | 90 | 90 | 82 | 90 | 85 | 76 | 85 | 79 | 69 | 79 | 74 | 62 | 74 | 67 | 55 | 67 | 62 | 49 |
| | | | Exposed | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 87 | 90 | 90 | 83 | 90 | 88 | 79 | 90 | 84 | 76 | 87 | 81 | 71 | 80 | 75 | 63 | 73 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 41 | 49 |
| | C | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 83 | 70 | 83 | 80 | 65 | 83 | 77 | 62 | 83 | 70 | 52 | 77 | 63 | 45 | 71 | 55 | 58 | 64 | 48 | 51 | 58 | 42 | 45 | 51 | 56 | 40 |
| | | | Exposed | 83 | 83 | 70 | 83 | 79 | 65 | 83 | 76 | 59 | 83 | 71 | 53 | 80 | 66 | 48 | 77 | 62 | 44 | 73 | 57 | 40 | 65 | 48 | 52 | 57 | 41 | 44 | 49 | 54 | 38 | 43 | 47 | 34 | 57 | 42 | 30 | 51 | 37 | 26 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 75 | 83 | 83 | 69 | 83 | 79 | 64 | 83 | 76 | 59 | 83 | 71 | 54 | 78 | 62 | 46 | 70 | 53 | 39 | 63 | 46 | 52 | 55 | 40 | 45 | 49 | 54 | 40 | 43 | 48 | 35 |
| | | | Exposed | 83 | 79 | 64 | 83 | 75 | 58 | 83 | 68 | 52 | 79 | 63 | 47 | 75 | 58 | 43 | 69 | 53 | 39 | 65 | 48 | 54 | 56 | 41 | 46 | 48 | 53 | 39 | 41 | 46 | 34 | 54 | 40 | 30 | 48 | 35 | 26 | 43 | 31 | 23 |
| | | 20-27 | Interior | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 83 | 88 | 87 | 79 | 88 | 83 | 75 | 88 | 79 | 69 | 88 | 75 | 65 | 88 | 65 | 56 | 82 | 58 | 48 | 77 | 50 | 41 | 71 | 44 | 54 | 64 | 38 | 48 | 58 | 51 | 43 |
| | | | Exposed | 88 | 82 | 75 | 88 | 78 | 68 | 88 | 73 | 63 | 88 | 67 | 57 | 85 | 62 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 71 | 44 | 55 | 64 | 38 | 47 | 56 | 49 | 41 | 49 | 43 | 36 | 43 | 38 | 32 | 57 | 34 | 28 |
| | | 27-45 | Interior | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 85 | 90 | 90 | 81 | 90 | 86 | 78 | 90 | 83 | 75 | 82 | 77 | 65 | 76 | 69 | 57 | 67 | 62 | 50 | 61 | 55 | 43 | 54 | 48 | 38 | 48 | 43 | 51 |
| | | | Exposed | 90 | 90 | 81 | 90 | 85 | 77 | 88 | 81 | 72 | 83 | 77 | 66 | 79 | 74 | 62 | 75 | 68 | 56 | 70 | 64 | 52 | 62 | 55 | 44 | 53 | 47 | 57 | 46 | 41 | 49 | 40 | 54 | 43 | 53 | 48 | 38 | 47 | 42 | 34 |
| | D | 0-7 | Interior | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 71 | 83 | 81 | 66 | 83 | 77 | 62 | 83 | 74 | 56 | 82 | 69 | 51 | 76 | 61 | 43 | 69 | 53 | 56 | 62 | 45 | 49 | 55 | 60 | 43 | 48 | 53 | 38 | 43 | 47 | 33 |
| | | | Exposed | 83 | 77 | 61 | 83 | 72 | 55 | 80 | 67 | 49 | 77 | 63 | 44 | 73 | 57 | 40 | 68 | 52 | 55 | 64 | 47 | 51 | 55 | 40 | 43 | 47 | 52 | 37 | 41 | 45 | 32 | 54 | 39 | 28 | 47 | 35 | 25 | 42 | 31 | 22 |
| | | 7-20 | Interior | 83 | 83 | 77 | 83 | 83 | 71 | 83 | 80 | 65 | 83 | 76 | 60 | 83 | 71 | 54 | 81 | 65 | 50 | 77 | 61 | 45 | 68 | 52 | 38 | 61 | 44 | 50 | 53 | 38 | 43 | 46 | 51 | 38 | 40 | 45 | 33 | 54 | 40 | 30 |
| | | | Exposed | 83 | 70 | 54 | 80 | 64 | 48 | 76 | 59 | 43 | 70 | 53 | 39 | 65 | 48 | 54 | 60 | 44 | 49 | 55 | 40 | 45 | 46 | 51 | 38 | 40 | 44 | 33 | 52 | 38 | 28 | 45 | 33 | 25 | 40 | 29 | 22 | 36 | 26 | 19 |
| | | 20-27 | Interior | 90 | 90 | 85 | 90 | 88 | 80 | 90 | 83 | 76 | 90 | 79 | 70 | 90 | 75 | 64 | 90 | 70 | 60 | 88 | 65 | 55 | 81 | 56 | 46 | 76 | 48 | 40 | 68 | 42 | 52 | 62 | 55 | 45 | 55 | 48 | 40 | 48 | 43 | 36 |
| | | | Exposed | 90 | 75 | 64 | 90 | 68 | 58 | 86 | 63 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 75 | 47 | 39 | 70 | 43 | 54 | 63 | 55 | 46 | 54 | 48 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 54 | 32 | 26 | 48 | 28 | 23 |
| | | 27-45 | Interior | 93 | 93 | 92 | 93 | 93 | 87 | 93 | 91 | 82 | 93 | 87 | 78 | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 76 | 64 | 75 | 67 | 56 | 65 | 60 | 48 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 40 | 48 | 40 | 54 | 43 |
| | | | Exposed | 89 | 83 | 74 | 84 | 78 | 68 | 80 | 75 | 63 | 76 | 69 | 57 | 70 | 64 | 52 | 65 | 59 | 47 | 61 | 54 | 43 | 51 | 46 | 55 | 44 | 40 | 47 | 38 | 52 | 41 | 50 | 45 | 36 | 44 | 40 | 32 | 40 | 36 | 28 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 78 | 83 | 83 | 75 | 83 | 82 | 71 | 83 | 79 | 67 | 83 | 76 | 63 | 81 | 70 | 48 | 76 | 63 | 39 | 71 | 51 | 34 | 65 | 42 | 30 | 55 | 37 | 26 | 46 | 33 | 23 |
| | | | Exposed | 83 | 82 | 71 | 83 | 78 | 66 | 83 | 75 | 59 | 82 | 71 | 50 | 79 | 67 | 43 | 76 | 62 | 39 | 72 | 54 | 35 | 65 | 42 | 30 | 54 | 36 | 26 | 43 | 31 | 34 | 38 | 27 | 29 | 33 | 24 | 26 | 29 | 32 | 23 |
| | | 7-20 | Interior | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 72 | 76 | 76 | 67 | 76 | 76 | 62 | 76 | 72 | 53 | 76 | 65 | 40 | 72 | 50 | 35 | 66 | 41 | 30 | 54 | 35 | 26 | 43 | 31 | 23 | 38 | 28 | 31 |
| | | | Exposed | 76 | 76 | 67 | 76 | 75 | 59 | 76 | 70 | 49 | 76 | 66 | 41 | 76 | 58 | 38 | 72 | 49 | 34 | 67 | 42 | 31 | 55 | 36 | 26 | 42 | 31 | 23 | 36 | 26 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 |
| | | 20-27 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 68 | 55 | 71 | 59 | 42 | 71 | 45 | 36 | 71 | 38 | 32 | 66 | 34 | 28 | 57 | 30 | 25 |
| | | | Exposed | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 66 | 71 | 70 | 57 | 71 | 65 | 48 | 71 | 57 | 41 | 71 | 49 | 38 | 71 | 39 | 32 | 65 | 33 | 27 | 53 | 29 | 24 | 43 | 25 | 31 | 38 | 33 | 28 | 33 | 30 | 25 |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 56 | 67 | 64 | 44 | 64 | 52 | 38 | 51 | 42 | 33 | 42 | 37 | 30 |
| | | | Exposed | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 64 | 67 | 67 | 55 | 67 | 65 | 47 | 65 | 52 | 38 | 50 | 41 | 33 | 40 | 36 | 28 | 35 | 31 | 25 | 31 | 28 | 33 | 27 | 25 | 29 |
| | C | 0-7 | Interior | 83 | 83 | 73 | 83 | 80 | 68 | 83 | 77 | 64 | 83 | 73 | 54 | 81 | 69 | 47 | 78 | 65 | 41 | 75 | 59 | 37 | 68 | 46 | 32 | 59 | 38 | 27 | 47 | 33 | 23 | 40 | 29 | 31 | 35 | 26 | 27 | 31 | 23 | 24 |
| | | | Exposed | 80 | 69 | 46 | 77 | 64 | 40 | 73 | 55 | 36 | 69 | 48 | 32 | 64 | 42 | 29 | 57 | 38 | 27 | 50 | 35 | 24 | 40 | 29 | 31 | 34 | 25 | 27 | 30 | 33 | 23 | 26 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 76 | 76 | 69 | 76 | 76 | 64 | 76 | 73 | 54 | 76 | 68 | 45 | 76 | 64 | 40 | 75 | 54 | 36 | 70 | 46 | 33 | 61 | 38 | 28 | 46 | 32 | 24 | 38 | 28 | 31 | 33 | 24 | 27 | 29 | 33 | 24 | 26 | 29 | 21 |
| | | | Exposed | 76 | 64 | 40 | 73 | 52 | 35 | 68 | 43 | 32 | 63 | 39 | 29 | 53 | 35 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 34 | 25 | 28 | 29 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 71 | 64 | 71 | 68 | 53 | 71 | 63 | 45 | 71 | 54 | 40 | 71 | 41 | 34 | 67 | 35 | 29 | 58 | 30 | 25 | 47 | 26 | 33 | 40 | 23 | 29 | 35 | 31 | 26 |
| | | | Exposed | 71 | 67 | 53 | 71 | 61 | 43 | 71 | 50 | 38 | 71 | 42 | 35 | 71 | 38 | 31 | 67 | 35 | 29 | 63 | 32 | 26 | 48 | 27 | 33 | 39 | 23 | 29 | 34 | 30 | 25 | 30 | 26 | 22 | 26 | 23 | 19 | 23 | 21 | 17 |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 66 | 67 | 67 | 61 | 67 | 67 | 52 | 67 | 57 | 41 | 55 | 45 | 35 | 42 | 38 | 30 | 37 | 33 | 26 | 33 | 29 | 23 | 29 | 26 | 31 |
| | | | Exposed | 67 | 67 | 66 | 67 | 67 | 58 | 67 | 66 | 48 | 67 | 60 | 41 | 64 | 51 | 38 | 54 | 44 | 34 | 46 | 40 | 31 | 37 | 34 | 27 | 32 | 29 | 23 | 28 | 25 | 30 | 24 | 33 | 26 | 32 | 29 | 23 | 29 | 26 | 20 |
| | D | 0-7 | Interior | 83 | 78 | 65 | 83 | 74 | 57 | 81 | 70 | 48 | 78 | 65 | 41 | 75 | 59 | 37 | 71 | 51 | 34 | 67 | 45 | 31 | 56 | 37 | 26 | 45 | 32 | 23 | 38 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 75 | 58 | 37 | 70 | 49 | 33 | 65 | 42 | 30 | 58 | 38 | 27 | 50 | 35 | 24 | 44 | 32 | 22 | 40 | 29 | 31 | 33 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 76 | 75 | 58 | 76 | 69 | 47 | 76 | 65 | 40 | 75 | 55 | 36 | 70 | 46 | 33 | 66 | 41 | 30 | 59 | 37 | 28 | 44 | 31 | 23 | 37 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 70 | 46 | 33 | 65 | 40 | 29 | 55 | 36 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 36 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 71 | 71 | 70 | 71 | 71 | 65 | 71 | 68 | 55 | 71 | 64 | 45 | 71 | 54 | 40 | 71 | 45 | 36 | 71 | 40 | 33 | 66 | 34 | 28 | 55 | 29 | 24 | 43 | 25 | 32 | 38 | 33 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 71 | 53 | 40 | 71 | 43 | 35 | 71 | 39 | 32 | 67 | 35 | 29 | 62 | 32 | 26 | 54 | 29 | 24 | 46 | 26 | 33 | 38 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 62 | 67 | 67 | 52 | 67 | 64 | 44 | 66 | 56 | 40 | 52 | 43 | 34 | 41 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 33 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 67 | 67 | 52 | 67 | 62 | 43 | 64 | 52 | 38 | 55 | 44 | 35 | 46 | 40 | 31 | 40 | 36 | 29 | 37 | 33 | 26 | 31 | 28 | 33 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| 10 | B | 0-7 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 67 | 71 | 71 | 63 | 71 | 70 | 48 | 71 | 63 | 39 | 71 | 51 | 34 | 65 | 42 | 30 | 55 | 37 | 26 | 46 | 33 | 23 |
| | | | Exposed | 71 | 71 | 71 | 71 | 71 | 66 | 71 | 71 | 59 | 71 | 71 | 50 | 71 | 67 | 43 | 71 | 62 | 39 | 71 | 54 | 35 | 65 | 42 | 30 | 54 | 36 | 26 | 43 | 31 | 34 | 38 | 27 | 29 | 33 | 24 | 26 | 29 | 32 | 23 |
| | | 7-20 | Interior | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 67 | 72 | 72 | 62 | 72 | 72 | 53 | 72 | 65 | 40 | 72 | 50 | 35 | 66 | 41 | 30 | 54 | 35 | 26 | 43 | 31 | 23 | 38 | 28 | 31 |
| | | | Exposed | 72 | 72 | 67 | 72 | 72 | 59 | 72 | 70 | 49 | 72 | 66 | 41 | 72 | 58 | 38 | 72 | 49 | 34 | 67 | 42 | 31 | 55 | 36 | 26 | 42 | 31 | 23 | 36 | 26 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 |
| | | 20-27 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 68 | 55 | 71 | 59 | 42 | 71 | 45 | 36 | 71 | 38 | 32 | 66 | 34 | 28 | 57 | 30 | 25 |
| | | | Exposed | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 66 | 71 | 70 | 57 | 71 | 65 | 48 | 71 | 57 | 41 | 71 | 49 | 38 | 71 | 39 | 32 | 65 | 33 | 27 | 53 | 29 | 24 | 43 | 25 | 31 | 38 | 33 | 28 | 33 | 30 | 25 |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 56 | 67 | 64 | 44 | 64 | 52 | 38 | 51 | 42 | 33 | 42 | 37 | 30 |
| | | | Exposed | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 64 | 67 | 67 | 55 | 67 | 65 | 47 | 65 | 52 | 38 | 50 | 41 | 33 | 40 | 36 | 28 | 35 | 31 | 25 | 31 | 28 | 33 | 27 | 25 | 29 |
| | C | 0-7 | Interior | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 71 | 64 | 71 | 71 | 54 | 71 | 69 | 47 | 71 | 65 | 41 | 71 | 59 | 37 | 68 | 46 | 32 | 59 | 38 | 27 | 47 | 33 | 23 | 40 | 29 | 31 | 35 | 26 | 27 | 31 | 23 | 24 |
| | | | Exposed | 71 | 69 | 46 | 71 | 64 | 40 | 71 | 55 | 36 | 69 | 48 | 32 | 64 | 42 | 29 | 57 | 38 | 27 | 50 | 35 | 24 | 40 | 29 | 31 | 34 | 25 | 27 | 30 | 33 | 23 | 26 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 72 | 72 | 69 | 72 | 72 | 64 | 72 | 72 | 54 | 72 | 68 | 45 | 72 | 64 | 40 | 72 | 54 | 36 | 70 | 46 | 33 | 61 | 38 | 28 | 46 | 32 | 24 | 38 | 28 | 31 | 33 | 24 | 27 | 29 | 33 | 24 | 26 | 29 | 21 |
| | | | Exposed | 72 | 64 | 40 | 72 | 52 | 35 | 68 | 43 | 32 | 63 | 39 | 29 | 53 | 35 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 34 | 25 | 28 | 29 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 71 | 64 | 71 | 68 | 53 | 71 | 63 | 45 | 71 | 54 | 40 | 71 | 41 | 34 | 67 | 35 | 29 | 58 | 30 | 25 | 47 | 26 | 33 | 40 | 23 | 29 | 35 | 31 | 26 |
| | | | Exposed | 71 | 67 | 53 | 71 | 61 | 43 | 71 | 50 | 38 | 71 | 42 | 35 | 71 | 38 | 31 | 67 | 35 | 29 | 63 | 32 | 26 | 48 | 27 | 33 | 39 | 23 | 29 | 34 | 30 | 25 | 30 | 26 | 22 | 26 | 23 | 19 | 23 | 21 | 17 |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 66 | 67 | 67 | 61 | 67 | 67 | 52 | 67 | 57 | 41 | 55 | 45 | 35 | 42 | 38 | 30 | 37 | 33 | 26 | 33 | 29 | 23 | 29 | 26 | 31 |
| | | | Exposed | 67 | 67 | 66 | 67 | 67 | 58 | 67 | 66 | 48 | 67 | 60 | 41 | 64 | 51 | 38 | 54 | 44 | 34 | 46 | 40 | 31 | 37 | 34 | 27 | 32 | 29 | 23 | 28 | 25 | 30 | 24 | 33 | 26 | 32 | 29 | 23 | 29 | 26 | 20 |
| | D | 0-7 | Interior | 71 | 71 | 65 | 71 | 71 | 57 | 71 | 70 | 48 | 71 | 65 | 41 | 71 | 59 | 37 | 71 | 51 | 34 | 67 | 45 | 31 | 56 | 37 | 26 | 45 | 32 | 23 | 38 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 71 | 58 | 37 | 70 | 49 | 33 | 65 | 42 | 30 | 58 | 38 | 27 | 50 | 35 | 24 | 44 | 32 | 22 | 40 | 29 | 31 | 33 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 72 | 72 | 58 | 72 | 69 | 47 | 72 | 65 | 40 | 72 | 55 | 36 | 70 | 46 | 33 | 66 | 41 | 30 | 59 | 37 | 28 | 44 | 31 | 23 | 37 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 70 | 46 | 33 | 65 | 40 | 29 | 55 | 36 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 36 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 71 | 71 | 70 | 71 | 71 | 65 | 71 | 68 | 55 | 71 | 64 | 45 | 71 | 54 | 40 | 71 | 45 | 36 | 71 | 40 | 33 | 66 | 34 | 28 | 55 | 29 | 24 | 43 | 25 | 32 | 38 | 33 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 71 | 53 | 40 | 71 | 43 | 35 | 71 | 39 | 32 | 67 | 35 | 29 | 62 | 32 | 26 | 54 | 29 | 24 | 46 | 26 | 33 | 38 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 62 | 67 | 67 | 52 | 67 | 64 | 44 | 66 | 56 | 40 | 52 | 43 | 34 | 41 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 33 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 67 | 67 | 52 | 67 | 62 | 43 | 64 | 52 | 38 | 55 | 44 | 35 | 46 | 40 | 31 | 40 | 36 | 29 | 37 | 33 | 26 | 31 | 28 | 33 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| 20 | B | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 48 | 53 | 53 | 39 | 53 | 51 | 34 | 53 | 42 | 30 | 53 | 37 | 26 | 46 | 33 | 23 |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 50 | 53 | 53 | 43 | 53 | 53 | 39 | 53 | 53 | 35 | 53 | 42 | 30 | 53 | 36 | 26 | 43 | 31 | 34 | 38 | 27 | 29 | 33 | 24 | 26 | 29 | 32 | 23 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 40 | 53 | 50 | 35 | 53 | 41 | 30 | 53 | 35 | 26 | 43 | 31 | 23 | 38 | 28 | 31 |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 49 | 53 | 53 | 41 | 53 | 53 | 38 | 53 | 49 | 34 | 53 | 42 | 31 | 53 | 36 | 26 | 42 | 31 | 23 | 36 | 26 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 |
| | | 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 | 55 | 61 | 59 | 42 | 61 | 45 | 36 | 61 | 38 | 32 | 61 | 34 | 28 | 57 | 30 | 25 |
| | | | Exposed | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 57 | 61 | 61 | 48 | 61 | 57 | 41 | 61 | 49 | 38 | 61 | 39 | 32 | 61 | 33 | 27 | 53 | 29 | 24 | 43 | 25 | 31 | 38 | 33 | 28 | 33 | 30 | 25 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 44 | 56 | 52 | 38 | 51 | 42 | 33 | 42 | 37 | 30 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 55 | 56 | 56 | 47 | 56 | 52 | 38 | 50 | 41 | 33 | 40 | 36 | 28 | 35 | 31 | 25 | 31 | 28 | 33 | 27 | 25 | 29 |
| | C | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 47 | 53 | 53 | 41 | 53 | 53 | 37 | 53 | 46 | 32 | 53 | 38 | 27 | 47 | 33 | 23 | 40 | 29 | 31 | 35 | 26 | 27 | 31 | 23 | 24 |
| | | | Exposed | 53 | 53 | 46 | 53 | 53 | 40 | 53 | 53 | 36 | 53 | 48 | 32 | 53 | 42 | 29 | 53 | 38 | 27 | 50 | 35 | 24 | 40 | 29 | 31 | 34 | 25 | 27 | 30 | 33 | 23 | 26 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 45 | 53 | 53 | 40 | 53 | 53 | 36 | 53 | 46 | 33 | 53 | 38 | 28 | 46 | 32 | 24 | 38 | 28 | 31 | 33 | 24 | 27 | 29 | 33 | 24 | 26 | 29 | 21 |
| | | | Exposed | 53 | 53 | 40 | 53 | 52 | 35 | 53 | 43 | 32 | 53 | 39 | 29 | 53 | 35 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 34 | 25 | 28 | 29 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 53 | 61 | 61 | 45 | 61 | 54 | 40 | 61 | 41 | 34 | 61 | 35 | 29 | 58 | 30 | 25 | 47 | 26 | 33 | 40 | 23 | 29 | 35 | 31 | 26 |
| | | | Exposed | 61 | 61 | 53 | 61 | 61 | 43 | 61 | 50 | 38 | 61 | 42 | 35 | 61 | 38 | 31 | 61 | 35 | 29 | 61 | 32 | 26 | 48 | 27 | 33 | 39 | 23 | 29 | 34 | 30 | 25 | 30 | 26 | 22 | 26 | 23 | 19 | 23 | 21 | 17 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 52 | 56 | 56 | 41 | 55 | 45 | 35 | 42 | 38 | 30 | 37 | 33 | 26 | 33 | 29 | 23 | 29 | 26 | 31 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 48 | 56 | 56 | 41 | 56 | 51 | 38 | 54 | 44 | 34 | 46 | 40 | 31 | 37 | 34 | 27 | 32 | 29 | 23 | 28 | 25 | 30 | 24 | 33 | 26 | 32 | 29 | 23 | 29 | 26 | 20 |
| | D | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 48 | 53 | 53 | 41 | 53 | 53 | 37 | 53 | 51 | 34 | 53 | 45 | 31 | 53 | 37 | 26 | 45 | 32 | 23 | 38 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 53 | 53 | 37 | 53 | 49 | 33 | 53 | 42 | 30 | 53 | 38 | 27 | 50 | 35 | 24 | 44 | 32 | 22 | 40 | 29 | 31 | 33 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 47 | 53 | 53 | 40 | 53 | 53 | 36 | 53 | 46 | 33 | 53 | 41 | 30 | 53 | 37 | 28 | 44 | 31 | 23 | 37 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 53 | 46 | 33 | 53 | 40 | 29 | 53 | 36 | 26 | 45 | 32 | 24 | 40 | 29 | 33 | 36 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 66 | 66 | 66 | 66 | 66 | 65 | 66 | 66 | 55 | 66 | 64 | 45 | 66 | 54 | 40 | 66 | 45 | 36 | 66 | 40 | 33 | 66 | 34 | 28 | 55 | 29 | 24 | 43 | 25 | 32 | 38 | 33 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 66 | 53 | 40 | 66 | 43 | 35 | 66 | 39 | 32 | 66 | 35 | 29 | 62 | 32 | 26 | 54 | 29 | 24 | 46 | 26 | 33 | 38 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 44 | 60 | 56 | 40 | 52 | 43 | 34 | 41 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 33 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 60 | 60 | 52 | 60 | 60 | 43 | 60 | 52 | 38 | 55 | 44 | 35 | 46 | 40 | 31 | 40 | 36 | 29 | 37 | 33 | 26 | 31 | 28 | 33 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 23 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 34 | 28 | 27 | 29 | 28 | 24 | 26 | 28 | 32 | 23 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 23 | 28 | 28 | 31 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 23 | 29 | 26 | 30 | 29 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 |
| | | 20-27 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 31 | 24 | 33 | 28 | 24 | 30 | 25 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 33 | 34 | 34 | 29 |
| | C | 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 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 23 | 28 | 28 | 31 | 28 | 26 | 27 | 28 | 23 | 24 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 24 | 28 | 28 | 31 | 28 | 25 | 27 | 28 | 33 | 23 | 26 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 29 | 29 | 24 | 28 | 28 | 31 | 27 | 24 | 27 | 26 | 33 | 24 | 26 | 29 | 21 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 24 | 29 | 29 | 33 | 29 | 25 | 28 | 29 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 33 | 24 | 23 | 29 | 24 | 31 | 26 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 33 | 24 | 23 | 29 | 24 | 30 | 25 | 24 | 26 | 22 | 24 | 23 | 19 | 23 | 21 | 17 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 31 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 33 | 26 | 32 | 29 | 23 | 29 | 26 | 20 |
| | D | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 26 | 31 | 31 | 23 | 31 | 28 | 30 | 31 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 27 | 31 | 31 | 24 | 31 | 31 | 22 | 31 | 29 | 31 | 31 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 28 | 31 | 31 | 23 | 30 | 27 | 30 | 29 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 29 | 32 | 32 | 26 | 32 | 32 | 24 | 32 | 29 | 33 | 32 | 27 | 30 | 32 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 25 | 32 | 26 | 33 | 28 | 26 | 29 | 24 | 26 | 26 | 22 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 33 | 26 | 22 | 28 | 26 | 29 | 24 | 26 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 33 | 25 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 33 | 25 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| 70 | B | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 34 | 24 | 24 | 29 | 24 | 24 | 26 | 24 | 32 | 23 |
| | | 7-20 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 31 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 30 | 25 | 23 | 26 | 25 | 31 | 23 | 25 | 27 | 20 |
| | | 20-27 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 30 | 25 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | C | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 31 | 24 | 24 | 27 | 24 | 23 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 31 | 24 | 24 | 27 | 24 | 33 | 23 | 24 | 29 | 20 | 23 | 25 | 18 | 31 | 22 | 16 |
| | | 7-20 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 31 | 25 | 24 | 27 | 24 | 33 | 24 | 23 | 29 | 21 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 33 | 25 | 25 | 28 | 25 | 32 | 24 | 25 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 31 | 26 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 30 | 25 | 31 | 26 | 22 | 31 | 23 | 19 | 31 | 21 | 17 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 23 | 29 | 26 | 20 |
| | 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 | 26 | 27 | 27 | 23 | 27 | 27 | 30 | 27 | 24 | 26 | 27 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 24 | 27 | 27 | 22 | 27 | 27 | 31 | 27 | 24 | 26 | 27 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 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 | 23 | 27 | 27 | 30 | 26 | 23 | 26 | 25 | 31 | 23 | 24 | 27 | 20 | 33 | 24 | 18 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 24 | 27 | 27 | 33 | 27 | 27 | 30 | 27 | 24 | 27 | 27 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 33 | 28 | 34 | 29 | 24 | 34 | 26 | 22 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 33 | 34 | 34 | 28 | 34 | 29 | 24 | 34 | 25 | 21 | 34 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 29 | 32 | 32 | 26 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 29 | 32 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| 80 | B | 0-7 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 32 | 21 | 21 | 29 | 21 | 21 | 26 | 21 | 32 | 23 |
| | | 7-20 | 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 | 31 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 26 | 33 | 31 | 23 | 33 | 27 | 20 |
| | | 20-27 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 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 | 25 |
| | | 27-45 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| | | | 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 | 26 | 26 |
| | C | 0-7 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 31 | 21 | 21 | 27 | 21 | 21 | 24 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 27 | 21 | 32 | 23 | 21 | 29 | 20 | 21 | 25 | 18 | 31 | 22 | 16 | 31 | 22 | 16 |
| | | 7-20 | 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 | 31 | 33 | 33 | 27 | 33 | 33 | 24 | 33 | 29 | 21 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 28 | 33 | 32 | 24 | 33 | 28 | 21 | 33 | 24 | 18 | 29 | 21 | 16 | 26 | 19 | 14 |
| | | 20-27 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 |
| | | | 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 | 25 | 27 | 26 | 22 | 27 | 23 | 19 | 27 | 21 | 17 |
| | | 27-45 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| | | | 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 | 23 | 26 | 26 | 20 |
| | D | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 30 | 24 | 24 | 26 | 24 | 32 | 23 | 24 | 29 | 20 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 31 | 24 | 24 | 26 | 24 | 32 | 22 | 24 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 30 | 24 | 23 | 26 | 23 | 31 | 23 | 22 | 27 | 20 | 32 | 24 | 18 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 33 | 24 | 24 | 30 | 24 | 24 | 27 | 24 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 29 | 24 | 30 | 26 | 22 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 29 | 24 | 30 | 25 | 21 | 30 | 22 | 18 | 30 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 25 | 29 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Roof Wind Zone | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 95 | 98 | 98 | 91 | 98 | 98 | 86 | 98 | 96 | 83 | 98 | 92 | 79 | 98 | 85 | 73 | 92 | 79 | 65 | 86 | 75 | 57 | 81 | 68 | 50 | 76 | 62 | 44 | 71 | 55 | 39 |
| | | | Exposed | 98 | 98 | 86 | 98 | 95 | 82 | 98 | 90 | 78 | 98 | 86 | 74 | 95 | 82 | 69 | 91 | 79 | 64 | 88 | 76 | 60 | 81 | 68 | 50 | 76 | 61 | 43 | 69 | 53 | 37 | 63 | 46 | 49 | 56 | 41 | 44 | 49 | 54 | 39 |
| | | 7-20 | Interior | 99 | 99 | 99 | 99 | 99 | 98 | 99 | 99 | 92 | 99 | 99 | 87 | 99 | 97 | 83 | 99 | 92 | 79 | 99 | 88 | 76 | 96 | 81 | 66 | 88 | 75 | 58 | 82 | 66 | 50 | 76 | 60 | 44 | 69 | 52 | 39 | 64 | 47 | 52 |
| | | | Exposed | 99 | 97 | 83 | 99 | 91 | 78 | 99 | 86 | 74 | 97 | 82 | 67 | 92 | 78 | 63 | 87 | 74 | 58 | 83 | 69 | 53 | 77 | 60 | 45 | 68 | 52 | 38 | 61 | 45 | 50 | 53 | 39 | 44 | 47 | 52 | 39 | 42 | 46 | ~~34~~ |
| | | 20-27 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 97 | 99 | 99 | 92 | 99 | 97 | 87 | 99 | 92 | 83 | 99 | 84 | 77 | 99 | 78 | 68 | 93 | 71 | 61 | 87 | 64 | 53 | 82 | 57 | 47 | 77 | 50 | 42 |
| | | | Exposed | 99 | 99 | 92 | 99 | 95 | 86 | 99 | 90 | 82 | 99 | 85 | 78 | 99 | 81 | 73 | 99 | 77 | 67 | 95 | 74 | 63 | 87 | 64 | 54 | 81 | 56 | 46 | 76 | 48 | 40 | 69 | 42 | 53 | 63 | 37 | 46 | 56 | 50 | 41 |
| | | 27-45 | Interior | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 94 | 100 | 100 | 90 | 100 | 92 | 83 | 93 | 85 | 77 | 86 | 80 | 70 | 80 | 75 | 64 | 75 | 68 | 56 | 68 | 63 | 50 |
| | | | Exposed | 100 | 100 | 99 | 100 | 100 | 93 | 100 | 98 | 88 | 100 | 93 | 84 | 97 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 73 | 81 | 75 | 64 | 75 | 67 | 55 | 65 | 60 | 48 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 50 |
| | C | 0-7 | Interior | 98 | 98 | 89 | 98 | 97 | 84 | 98 | 93 | 80 | 98 | 88 | 76 | 98 | 84 | 72 | 94 | 81 | 67 | 90 | 78 | 63 | 83 | 71 | 53 | 78 | 64 | 46 | 72 | 56 | 40 | 65 | 49 | 52 | 59 | 43 | 46 | 52 | 38 | 41 |
| | | | Exposed | 98 | 84 | 71 | 93 | 80 | 65 | 88 | 76 | 60 | 84 | 72 | 55 | 81 | 67 | 49 | 77 | 64 | 45 | 74 | 58 | 41 | 66 | 49 | 53 | 58 | 42 | 45 | 50 | 55 | 39 | 44 | 48 | ~~34~~ | 39 | 43 | ~~30~~ | 52 | 38 | ~~27~~ |
| | | 7-20 | Interior | 99 | 99 | 85 | 99 | 94 | 80 | 99 | 89 | 76 | 99 | 84 | 71 | 95 | 80 | 65 | 90 | 76 | 61 | 86 | 72 | 56 | 79 | 63 | 47 | 72 | 54 | 40 | 64 | 47 | 53 | 56 | 41 | 46 | 50 | 55 | 41 | 44 | 49 | ~~36~~ |
| | | | Exposed | 94 | 80 | 65 | 89 | 76 | 59 | 84 | 69 | 53 | 80 | 64 | 48 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 57 | 42 | 47 | 49 | 54 | 40 | 42 | 47 | ~~35~~ | 37 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 20-27 | Interior | 99 | 99 | 95 | 99 | 99 | 89 | 99 | 93 | 84 | 99 | 88 | 80 | 99 | 83 | 76 | 99 | 80 | 71 | 97 | 76 | 65 | 89 | 67 | 57 | 83 | 59 | 49 | 78 | 51 | 42 | 72 | 45 | 37 | 65 | 39 | 49 | 59 | 53 | 44 |
| | | | Exposed | 99 | 83 | 76 | 99 | 79 | 69 | 95 | 75 | 64 | 90 | 68 | 58 | 86 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 73 | 45 | 37 | 65 | 39 | 48 | 57 | 50 | 42 | 50 | 44 | ~~37~~ | 44 | 39 | ~~32~~ | 39 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 100 | 100 | 100 | 100 | 100 | 96 | 100 | 100 | 91 | 100 | 96 | 86 | 100 | 91 | 82 | 95 | 87 | 79 | 91 | 84 | 75 | 83 | 77 | 66 | 77 | 70 | 58 | 69 | 64 | 51 | 62 | 56 | 44 | 55 | 49 | 39 | 49 | 44 | 52 |
| | | | Exposed | 100 | 91 | 82 | 94 | 86 | 78 | 89 | 82 | 73 | 84 | 78 | 67 | 80 | 75 | 63 | 76 | 70 | 58 | 72 | 65 | 53 | 63 | 56 | 45 | 54 | 48 | 38 | 47 | 42 | 50 | 41 | 55 | 44 | 54 | 49 | 39 | 48 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 98 | 94 | 81 | 98 | 89 | 77 | 98 | 85 | 73 | 94 | 81 | 67 | 90 | 78 | 63 | 86 | 75 | 57 | 83 | 70 | 53 | 77 | 63 | 44 | 70 | 54 | 38 | 64 | 47 | 50 | 56 | 41 | 44 | 49 | 54 | 38 | 44 | 48 | ~~34~~ |
| | | | Exposed | 90 | 78 | 63 | 85 | 74 | 56 | 81 | 68 | 50 | 78 | 64 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 65 | 49 | 52 | 56 | 41 | 44 | 48 | 53 | 38 | 42 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 7-20 | Interior | 99 | 90 | 78 | 99 | 85 | 72 | 95 | 81 | 66 | 90 | 77 | 61 | 86 | 72 | 56 | 82 | 66 | 51 | 78 | 63 | 46 | 70 | 53 | 39 | 62 | 45 | 51 | 54 | 39 | 44 | 47 | 52 | 39 | 41 | 46 | ~~34~~ | 55 | 41 | ~~30~~ |
| | | | Exposed | 86 | 72 | 55 | 81 | 65 | 49 | 77 | 60 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 61 | 45 | 50 | 56 | 41 | 46 | 47 | 52 | 39 | 41 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 20-27 | Interior | 99 | 95 | 86 | 99 | 89 | 81 | 99 | 84 | 77 | 99 | 80 | 71 | 97 | 76 | 65 | 93 | 71 | 61 | 89 | 66 | 56 | 82 | 57 | 47 | 76 | 49 | 41 | 69 | 43 | 53 | 63 | 37 | 46 | 56 | 49 | 41 | 50 | 44 | ~~36~~ |
| | | | Exposed | 97 | 76 | 65 | 92 | 70 | 60 | 87 | 64 | 54 | 83 | 59 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 55 | 64 | 38 | 47 | 55 | 49 | 40 | 47 | 42 | ~~35~~ | 41 | ~~37~~ | ~~31~~ | 55 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 27-45 | Interior | 100 | 100 | 93 | 100 | 97 | 87 | 100 | 92 | 83 | 95 | 87 | 79 | 91 | 84 | 75 | 86 | 80 | 70 | 82 | 77 | 65 | 76 | 69 | 57 | 66 | 61 | 49 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 49 | 41 | 55 | 44 |
| | | | Exposed | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 75 | 64 | 77 | 70 | 58 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 56 | 44 | 53 | 47 | 37 | 45 | 40 | 48 | 39 | 53 | 42 | 52 | 46 | ~~37~~ | 46 | 41 | ~~32~~ | 40 | ~~36~~ | ~~29~~ |
| 10 | B | 0-7 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 91 | 92 | 92 | 86 | 92 | 92 | 83 | 92 | 92 | 79 | 92 | 85 | 73 | 92 | 79 | 65 | 86 | 75 | 57 | 81 | 68 | 50 | 76 | 62 | 44 | 71 | 55 | 39 |
| | | | Exposed | 92 | 92 | 86 | 92 | 92 | 82 | 92 | 90 | 78 | 92 | 86 | 74 | 92 | 82 | 69 | 91 | 79 | 64 | 88 | 76 | 60 | 81 | 68 | 50 | 76 | 61 | 43 | 69 | 53 | 37 | 63 | 46 | 49 | 56 | 41 | 44 | 49 | 54 | 39 |
| | | 7-20 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 87 | 92 | 92 | 83 | 92 | 92 | 79 | 92 | 88 | 76 | 92 | 81 | 66 | 88 | 75 | 58 | 82 | 66 | 50 | 76 | 60 | 44 | 69 | 52 | 39 | 64 | 47 | 52 |
| | | | Exposed | 92 | 92 | 83 | 92 | 91 | 78 | 92 | 86 | 74 | 92 | 82 | 67 | 92 | 78 | 63 | 87 | 74 | 58 | 83 | 69 | 53 | 77 | 60 | 45 | 68 | 52 | 38 | 61 | 45 | 50 | 53 | 39 | 44 | 47 | 52 | 39 | 42 | 46 | ~~34~~ |
| | | 20-27 | Interior | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 92 | 96 | 96 | 87 | 96 | 92 | 83 | 96 | 84 | 77 | 96 | 78 | 68 | 93 | 71 | 61 | 87 | 64 | 53 | 82 | 57 | 47 | 77 | 50 | 42 |
| | | | Exposed | 96 | 96 | 92 | 96 | 95 | 86 | 96 | 90 | 82 | 96 | 85 | 78 | 96 | 81 | 73 | 96 | 77 | 67 | 95 | 74 | 63 | 87 | 64 | 54 | 81 | 56 | 46 | 76 | 48 | 40 | 69 | 42 | 53 | 63 | 37 | 46 | 56 | 50 | 41 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 94 | 99 | 99 | 90 | 99 | 92 | 83 | 93 | 85 | 77 | 86 | 80 | 70 | 80 | 75 | 64 | 75 | 68 | 56 | 68 | 63 | 50 |
| | | | Exposed | 99 | 99 | 99 | 99 | 99 | 93 | 99 | 98 | 88 | 99 | 93 | 84 | 97 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 73 | 81 | 75 | 64 | 75 | 67 | 55 | 65 | 60 | 48 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 50 |
| | C | 0-7 | Interior | 92 | 92 | 89 | 92 | 92 | 84 | 92 | 92 | 80 | 92 | 88 | 76 | 92 | 84 | 72 | 92 | 81 | 67 | 90 | 78 | 63 | 83 | 71 | 53 | 78 | 64 | 46 | 72 | 56 | 40 | 65 | 49 | 52 | 59 | 43 | 46 | 52 | 38 | 41 |
| | | | Exposed | 92 | 84 | 71 | 92 | 80 | 65 | 88 | 76 | 60 | 84 | 72 | 55 | 81 | 67 | 49 | 77 | 64 | 45 | 74 | 58 | 41 | 66 | 49 | 53 | 58 | 42 | 45 | 50 | 55 | 39 | 44 | 48 | ~~34~~ | 39 | 43 | ~~30~~ | 52 | 38 | ~~27~~ |
| | | 7-20 | Interior | 92 | 92 | 85 | 92 | 92 | 80 | 92 | 89 | 76 | 92 | 84 | 71 | 92 | 80 | 65 | 90 | 76 | 61 | 86 | 72 | 56 | 79 | 63 | 47 | 72 | 54 | 40 | 64 | 47 | 53 | 56 | 41 | 46 | 50 | 55 | 41 | 44 | 49 | ~~36~~ |
| | | | Exposed | 92 | 80 | 65 | 89 | 76 | 59 | 84 | 69 | 53 | 80 | 64 | 48 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 57 | 42 | 47 | 49 | 54 | 40 | 42 | 47 | ~~35~~ | 37 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 20-27 | Interior | 96 | 96 | 95 | 96 | 96 | 89 | 96 | 93 | 84 | 96 | 88 | 80 | 96 | 83 | 76 | 96 | 80 | 71 | 96 | 76 | 65 | 89 | 67 | 57 | 83 | 59 | 49 | 78 | 51 | 42 | 72 | 45 | 37 | 65 | 39 | 49 | 59 | 53 | 44 |
| | | | Exposed | 96 | 83 | 76 | 96 | 79 | 69 | 95 | 75 | 64 | 90 | 68 | 58 | 86 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 73 | 45 | 37 | 65 | 39 | 48 | 57 | 50 | 42 | 50 | 44 | ~~37~~ | 44 | 39 | ~~32~~ | 39 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 96 | 99 | 99 | 91 | 99 | 96 | 86 | 99 | 91 | 82 | 95 | 87 | 79 | 91 | 84 | 75 | 83 | 77 | 66 | 77 | 70 | 58 | 69 | 64 | 51 | 62 | 56 | 44 | 55 | 49 | 39 | 49 | 44 | 52 |
| | | | Exposed | 99 | 91 | 82 | 94 | 86 | 78 | 89 | 82 | 73 | 84 | 78 | 67 | 80 | 75 | 63 | 76 | 70 | 58 | 72 | 65 | 53 | 63 | 56 | 45 | 54 | 48 | 38 | 47 | 42 | 50 | 41 | 55 | 44 | 54 | 49 | 39 | 48 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 92 | 92 | 81 | 92 | 89 | 77 | 92 | 85 | 73 | 92 | 81 | 67 | 90 | 78 | 63 | 86 | 75 | 57 | 83 | 70 | 53 | 77 | 63 | 44 | 70 | 54 | 38 | 64 | 47 | 50 | 56 | 41 | 44 | 49 | 54 | 38 | 44 | 48 | ~~34~~ |
| | | | Exposed | 90 | 78 | 63 | 85 | 74 | 56 | 81 | 68 | 50 | 78 | 64 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 65 | 49 | 52 | 56 | 41 | 44 | 48 | 53 | 38 | 42 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 7-20 | Interior | 92 | 90 | 78 | 92 | 85 | 72 | 92 | 81 | 66 | 90 | 77 | 61 | 86 | 72 | 56 | 82 | 66 | 51 | 78 | 63 | 46 | 70 | 53 | 39 | 62 | 45 | 51 | 54 | 39 | 44 | 47 | 52 | 39 | 41 | 46 | ~~34~~ | 55 | 41 | ~~30~~ |
| | | | Exposed | 86 | 72 | 55 | 81 | 65 | 49 | 77 | 60 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 61 | 45 | 50 | 56 | 41 | 46 | 47 | 52 | 39 | 41 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 20-27 | Interior | 97 | 95 | 86 | 97 | 89 | 81 | 97 | 84 | 77 | 97 | 80 | 71 | 97 | 76 | 65 | 93 | 71 | 61 | 89 | 66 | 56 | 82 | 57 | 47 | 76 | 49 | 41 | 69 | 43 | 53 | 63 | 37 | 46 | 56 | 49 | 41 | 50 | 44 | ~~36~~ |
| | | | Exposed | 97 | 76 | 65 | 92 | 70 | 60 | 87 | 64 | 54 | 83 | 59 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 55 | 64 | 38 | 47 | 55 | 49 | 40 | 47 | 42 | ~~35~~ | 41 | ~~37~~ | ~~31~~ | 55 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 27-45 | Interior | 99 | 99 | 93 | 99 | 97 | 87 | 99 | 92 | 83 | 95 | 87 | 79 | 91 | 84 | 75 | 86 | 80 | 70 | 82 | 77 | 65 | 76 | 69 | 57 | 66 | 61 | 49 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 49 | 41 | 55 | 44 |
| | | | Exposed | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 75 | 64 | 77 | 70 | 58 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 56 | 44 | 53 | 47 | 37 | 45 | 40 | 48 | 39 | 53 | 42 | 52 | 46 | ~~37~~ | 46 | 41 | ~~32~~ | 40 | ~~36~~ | ~~29~~ |
| 20 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 73 | 83 | 79 | 65 | 83 | 75 | 57 | 81 | 68 | 50 | 76 | 62 | 44 | 71 | 55 | 39 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 78 | 83 | 83 | 74 | 83 | 82 | 69 | 83 | 79 | 64 | 83 | 76 | 60 | 81 | 68 | 50 | 76 | 61 | 43 | 69 | 53 | 37 | 63 | 46 | 49 | 56 | 41 | 44 | 49 | 54 | 39 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 76 | 83 | 81 | 66 | 83 | 75 | 58 | 82 | 66 | 50 | 76 | 60 | 44 | 69 | 52 | 39 | 64 | 47 | 52 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 78 | 83 | 83 | 74 | 83 | 82 | 67 | 83 | 78 | 63 | 83 | 74 | 58 | 83 | 69 | 53 | 77 | 60 | 45 | 68 | 52 | 38 | 61 | 45 | 50 | 53 | 39 | 44 | 47 | 52 | 39 | 42 | 46 | ~~34~~ |
| | | 20-27 | Interior | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 87 | 89 | 89 | 83 | 89 | 84 | 77 | 89 | 78 | 68 | 89 | 71 | 61 | 87 | 64 | 53 | 82 | 57 | 47 | 77 | 50 | 42 |
| | | | Exposed | 89 | 89 | 89 | 89 | 89 | 86 | 89 | 89 | 82 | 89 | 85 | 78 | 89 | 81 | 73 | 89 | 77 | 67 | 89 | 74 | 63 | 87 | 64 | 54 | 81 | 56 | 46 | 76 | 48 | 40 | 69 | 42 | 53 | 63 | 37 | 46 | 56 | 50 | 41 |
| | | 27-45 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 90 | 92 | 92 | 83 | 92 | 85 | 77 | 86 | 80 | 70 | 80 | 75 | 64 | 75 | 68 | 56 | 68 | 63 | 50 |
| | | | Exposed | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 88 | 92 | 92 | 84 | 92 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 73 | 81 | 75 | 64 | 75 | 67 | 55 | 65 | 60 | 48 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 50 |
| | C | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 72 | 83 | 81 | 67 | 83 | 78 | 63 | 83 | 71 | 53 | 78 | 64 | 46 | 72 | 56 | 40 | 65 | 49 | 52 | 59 | 43 | 46 | 52 | 38 | 41 |
| | | | Exposed | 83 | 83 | 71 | 83 | 80 | 65 | 83 | 76 | 60 | 83 | 72 | 55 | 81 | 67 | 49 | 77 | 64 | 45 | 74 | 58 | 41 | 66 | 49 | 53 | 58 | 42 | 45 | 50 | 55 | 39 | 44 | 48 | ~~34~~ | 39 | 43 | ~~30~~ | 52 | 38 | ~~27~~ |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 71 | 83 | 80 | 65 | 83 | 76 | 61 | 83 | 72 | 56 | 79 | 63 | 47 | 72 | 54 | 40 | 64 | 47 | 53 | 56 | 41 | 46 | 50 | 55 | 41 | 44 | 49 | ~~36~~ |
| | | | Exposed | 83 | 80 | 65 | 83 | 76 | 59 | 83 | 69 | 53 | 80 | 64 | 48 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 57 | 42 | 47 | 49 | 54 | 40 | 42 | 47 | ~~35~~ | 37 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 20-27 | Interior | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 84 | 89 | 88 | 80 | 89 | 83 | 76 | 89 | 80 | 71 | 89 | 76 | 65 | 89 | 67 | 57 | 83 | 59 | 49 | 78 | 51 | 42 | 72 | 45 | 37 | 65 | 39 | 49 | 59 | 53 | 44 |
| | | | Exposed | 89 | 83 | 76 | 89 | 79 | 69 | 89 | 75 | 64 | 89 | 68 | 58 | 86 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 73 | 45 | 37 | 65 | 39 | 48 | 57 | 50 | 42 | 50 | 44 | ~~37~~ | 44 | 39 | ~~32~~ | 39 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 91 | 92 | 92 | 86 | 92 | 91 | 82 | 92 | 87 | 79 | 91 | 84 | 75 | 83 | 77 | 66 | 77 | 70 | 58 | 69 | 64 | 51 | 62 | 56 | 44 | 55 | 49 | 39 | 49 | 44 | 52 |
| | | | Exposed | 92 | 91 | 82 | 92 | 86 | 78 | 89 | 82 | 73 | 84 | 78 | 67 | 80 | 75 | 63 | 76 | 70 | 58 | 72 | 65 | 53 | 63 | 56 | 45 | 54 | 48 | 38 | 47 | 42 | 50 | 41 | 55 | 44 | 54 | 49 | 39 | 48 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 73 | 83 | 81 | 67 | 83 | 78 | 63 | 83 | 75 | 57 | 83 | 70 | 53 | 77 | 63 | 44 | 70 | 54 | 38 | 64 | 47 | 50 | 56 | 41 | 44 | 49 | 54 | 38 | 44 | 48 | ~~34~~ |
| | | | Exposed | 83 | 78 | 63 | 83 | 74 | 56 | 81 | 68 | 50 | 78 | 64 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 65 | 49 | 52 | 56 | 41 | 44 | 48 | 53 | 38 | 42 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 7-20 | Interior | 83 | 83 | 78 | 83 | 83 | 72 | 83 | 81 | 66 | 83 | 77 | 61 | 83 | 72 | 56 | 82 | 66 | 51 | 78 | 63 | 46 | 70 | 53 | 39 | 62 | 45 | 51 | 54 | 39 | 44 | 47 | 52 | 39 | 41 | 46 | ~~34~~ | 55 | 41 | ~~30~~ |
| | | | Exposed | 83 | 72 | 55 | 81 | 65 | 49 | 77 | 60 | 44 | 71 | 54 | 40 | 65 | 49 | 55 | 61 | 45 | 50 | 56 | 41 | 46 | 47 | 52 | 39 | 41 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 20-27 | Interior | 90 | 90 | 86 | 90 | 89 | 81 | 90 | 84 | 77 | 90 | 80 | 71 | 90 | 76 | 65 | 90 | 71 | 61 | 89 | 66 | 56 | 82 | 57 | 47 | 76 | 49 | 41 | 69 | 43 | 53 | 63 | 37 | 46 | 56 | 49 | 41 | 50 | 44 | ~~36~~ |
| | | | Exposed | 90 | 76 | 65 | 90 | 70 | 60 | 87 | 64 | 54 | 83 | 59 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 55 | 64 | 38 | 47 | 55 | 49 | 40 | 47 | 42 | ~~35~~ | 41 | ~~37~~ | ~~31~~ | 55 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 27-45 | Interior | 93 | 93 | 93 | 93 | 93 | 87 | 93 | 92 | 83 | 93 | 87 | 79 | 91 | 84 | 75 | 86 | 80 | 70 | 82 | 77 | 65 | 76 | 69 | 57 | 66 | 61 | 49 | 59 | 53 | 42 | 52 | 47 | 37 | 46 | 41 | 49 | 41 | 55 | 44 |
| | | | Exposed | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 75 | 64 | 77 | 70 | 58 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 56 | 44 | 53 | 47 | 37 | 45 | 40 | 48 | 39 | 53 | 42 | 52 | 46 | ~~37~~ | 46 | 41 | ~~32~~ | 40 | ~~36~~ | ~~29~~ |

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 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 | 44 | 47 | 47 | 39 |
| | | | Exposed | 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 | 43 | 47 | 47 | 37 | 47 | 46 | 49 | 47 | 41 | 44 | 47 | 54 | 39 |
| | | 7-20 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 44 | 48 | 48 | 39 | 47 | 47 | 52 |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 45 | 48 | 48 | 38 | 48 | 45 | 50 | 48 | 39 | 44 | 47 | 52 | 39 | 42 | 46 | ~~34~~ |
| | | 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 |
| | | | 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 | 53 | 40 | 37 | 46 | 40 | 50 | 41 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 |
| | | | Exposed | 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 | 50 |
| | C | 0-7 | Interior | 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 | 46 | 47 | 47 | 40 | 47 | 47 | 52 | 47 | 43 | 46 | 47 | 38 | 41 |
| | | | Exposed | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 45 | 47 | 47 | 41 | 47 | 47 | 53 | 47 | 42 | 45 | 47 | 55 | 39 | 44 | 48 | ~~34~~ | 39 | 43 | ~~30~~ | 52 | 38 | ~~27~~ |
| | | 7-20 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 47 | 48 | 48 | 40 | 47 | 47 | 53 | 46 | 41 | 46 | 44 | 55 | 41 | 43 | 49 | ~~36~~ |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 44 | 48 | 48 | 40 | 48 | 48 | 55 | 48 | 42 | 47 | 48 | 54 | 40 | 42 | 47 | ~~35~~ | 37 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 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 | 37 | 40 | 39 | 49 | 40 | 53 | 44 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 37 | 40 | 39 | 48 | 40 | 50 | 42 | 40 | 44 | ~~37~~ | 40 | 39 | ~~32~~ | 39 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 52 |
| | | | Exposed | 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 | 50 | 56 | 55 | 44 | 54 | 49 | 39 | 48 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 44 | 52 | 52 | 38 | 52 | 47 | 50 | 52 | 41 | 44 | 49 | 54 | 38 | 44 | 48 | ~~34~~ |
| | | | Exposed | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 50 | 52 | 52 | 45 | 52 | 52 | 41 | 52 | 52 | 38 | 52 | 49 | 52 | 52 | 41 | 44 | 48 | 53 | 38 | 42 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 51 | 53 | 53 | 46 | 52 | 52 | 39 | 50 | 45 | 51 | 49 | 39 | 44 | 47 | 52 | 39 | 41 | 46 | ~~34~~ | 55 | 41 | ~~30~~ |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 49 | 53 | 53 | 44 | 53 | 53 | 40 | 53 | 49 | 55 | 53 | 45 | 50 | 53 | 41 | 46 | 47 | 52 | 39 | 41 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 20-27 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 43 | 53 | 44 | 37 | 46 | 44 | 49 | 41 | 44 | 44 | ~~36~~ |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 40 | 44 | 44 | 55 | 44 | 38 | 47 | 44 | 49 | 40 | 44 | 42 | ~~35~~ | 41 | ~~37~~ | ~~31~~ | 55 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 27-45 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 41 | ~~49~~ | 41 | 55 | 44 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 40 | 48 | 39 | 53 | 42 | 52 | 46 | ~~37~~ | 46 | 41 | ~~32~~ | 40 | ~~36~~ | ~~29~~ |
| 70 | 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 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 39 |
| | | | 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 | 41 | 41 | 37 | 41 | 41 | 49 | 41 | 41 | 44 | 41 | 54 | 39 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 39 | 41 | 41 | 52 |
| | | | 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 | 38 | 41 | 41 | 50 | 41 | 39 | 44 | 41 | 52 | 39 | 41 | 46 | ~~34~~ |
| | | 20-27 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| | | | Exposed | 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 | 47 | 52 | 50 | 41 |
| | | 27-45 | Interior | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| | | | 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 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| | 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 | 41 | 41 | 40 | 41 | 41 | 52 | 41 | 41 | 46 | 41 | 38 | 41 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 45 | 41 | 55 | 39 | 41 | 48 | ~~34~~ | 39 | 43 | ~~30~~ | 52 | 38 | ~~27~~ | 52 | 38 | ~~27~~ |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | 41 | 41 | 53 | 41 | 41 | 46 | 40 | 55 | 41 | 39 | 49 | ~~36~~ |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | 41 | 41 | 41 | 55 | 41 | 41 | 47 | 41 | 54 | 40 | 41 | 47 | ~~35~~ | 37 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 20-27 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 49 | 52 | 52 | 44 |
| | | | Exposed | 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 | 48 | 52 | 51 | 42 | 52 | 44 | ~~37~~ | 52 | 39 | ~~32~~ | 52 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| | | | 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 | 49 | 49 | 49 | 49 | 44 | 49 | 49 | 39 | 48 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 44 | 45 | 45 | 38 | 45 | 45 | 50 | 45 | 41 | 44 | 45 | 54 | 38 | 44 | 48 | ~~34~~ |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 41 | 45 | 45 | 38 | 45 | 45 | 52 | 45 | 41 | 44 | 45 | 53 | 38 | 42 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 7-20 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 39 | 45 | 45 | 51 | 44 | 39 | 44 | 42 | 52 | 39 | 41 | 46 | ~~34~~ | 55 | 41 | ~~30~~ |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 44 | 46 | 46 | 40 | 46 | 46 | 55 | 46 | 45 | 50 | 46 | 41 | 46 | 46 | 52 | 39 | 41 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 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 | 53 | 57 | 56 | 46 | 57 | 49 | 41 | 57 | 44 | ~~36~~ |
| | | | Exposed | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 57 | 55 | 57 | 57 | 47 | 57 | 49 | 40 | 57 | 42 | ~~35~~ | 57 | 37 | ~~31~~ | 55 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 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 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 49 | 54 | 54 | 44 |
| | | | 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 | 48 | 54 | 53 | 42 | 52 | 46 | ~~37~~ | 46 | 41 | ~~33~~ | 40 | ~~36~~ | ~~29~~ |
| 80 | B | 0-7 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 49 | 36 | 36 | 44 | 36 | 54 | 39 |
| | | 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 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 52 |
| | | | 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 | 50 | 55 | 55 | 44 | 55 | 52 | 39 | 55 | 46 | ~~34~~ |
| | | 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 |
| | | | 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 | 41 |
| | | 27-45 | Interior | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | | | Exposed | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | C | 0-7 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 52 | 36 | 36 | 46 | 36 | 36 | 41 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 53 | 36 | 36 | 45 | 36 | 54 | 39 | 36 | 48 | ~~34~~ | 36 | 43 | ~~30~~ | 52 | 38 | ~~27~~ |
| | | 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 | 55 | 55 | 55 | 55 | 53 | 55 | 55 | 46 | 55 | 55 | 41 | 55 | 49 | ~~36~~ |
| | | | Exposed | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 47 | 55 | 54 | 40 | 55 | 47 | ~~35~~ | 55 | 41 | ~~30~~ | 49 | ~~36~~ | ~~27~~ | 44 | ~~32~~ | ~~24~~ |
| | | 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 | 44 |
| | | | 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 | 42 | 46 | 44 | ~~37~~ | 46 | 39 | ~~32~~ | 46 | ~~35~~ | ~~29~~ |
| | | 27-45 | Interior | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | | | Exposed | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 39 | 43 | 43 | ~~35~~ |
| | D | 0-7 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 50 | 40 | 40 | 44 | 40 | 54 | 38 | 40 | 48 | ~~34~~ |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 40 | 52 | 40 | 40 | 44 | 40 | 53 | 38 | 40 | 46 | ~~33~~ | 55 | 40 | ~~29~~ | 49 | ~~36~~ | ~~25~~ | 43 | ~~32~~ | ~~22~~ |
| | | 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 | 39 | 40 | 40 | 51 | 40 | 39 | 44 | 39 | 52 | 39 | 37 | 46 | ~~34~~ | 54 | 41 | ~~30~~ |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 55 | 40 | 40 | 50 | 40 | 40 | 46 | 40 | 52 | 39 | 40 | 45 | ~~33~~ | 53 | 39 | ~~29~~ | 46 | ~~34~~ | ~~25~~ | 41 | ~~30~~ | ~~22~~ | ~~37~~ | ~~27~~ | ~~20~~ |
| | | 20-27 | Interior | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 46 | 50 | 50 | 41 | 50 | 44 | ~~36~~ |
| | | | Exposed | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 47 | 50 | 49 | 40 | 50 | 42 | ~~35~~ | 50 | 37 | ~~31~~ | 50 | ~~33~~ | ~~27~~ | 49 | ~~29~~ | ~~24~~ |
| | | 27-45 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 44 |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 42 | 48 | 46 | ~~37~~ | 46 | 41 | ~~33~~ | 40 | ~~36~~ | ~~29~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 71 | 74 | 74 | 66 | 74 | 74 | 61 | 74 | 72 | 52 | 74 | 65 | 40 | 72 | 53 | 33 | 66 | 43 | 28 | 56 | 35 | 25 | 46 | 31 | 22 | 39 | 27 | 29 |
| | | | Exposed | 74 | 74 | 66 | 74 | 74 | 58 | 74 | 70 | 49 | 74 | 66 | 42 | 74 | 60 | 36 | 72 | 52 | 32 | 68 | 45 | 30 | 57 | 35 | 25 | 45 | 30 | 32 | 36 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 62 | 64 | 64 | 52 | 64 | 64 | 44 | 64 | 56 | 34 | 64 | 42 | 29 | 58 | 34 | 25 | 45 | 30 | 22 | 36 | 26 | 29 | 32 | 23 | 26 |
| | | | Exposed | 64 | 64 | 62 | 64 | 64 | 50 | 64 | 64 | 41 | 64 | 59 | 35 | 64 | 49 | 31 | 64 | 41 | 29 | 63 | 35 | 26 | 46 | 30 | 22 | 35 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 46 | 60 | 49 | 35 | 60 | 38 | 30 | 60 | 32 | 26 | 58 | 28 | 23 | 48 | 25 | 31 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 59 | 60 | 60 | 48 | 60 | 57 | 40 | 60 | 48 | 35 | 60 | 41 | 32 | 60 | 32 | 27 | 57 | 28 | 23 | 44 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 47 | 56 | 54 | 37 | 55 | 43 | 32 | 43 | 35 | 28 | 35 | 31 | 25 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 55 | 56 | 56 | 46 | 56 | 56 | 40 | 56 | 44 | 32 | 42 | 35 | 27 | 33 | 30 | 24 | 29 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 74 | 74 | 69 | 74 | 74 | 64 | 74 | 73 | 54 | 74 | 68 | 45 | 74 | 64 | 39 | 74 | 56 | 34 | 70 | 49 | 31 | 62 | 38 | 26 | 49 | 32 | 23 | 39 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 74 | 64 | 39 | 73 | 54 | 33 | 68 | 46 | 30 | 64 | 40 | 27 | 55 | 35 | 25 | 48 | 32 | 22 | 42 | 29 | 31 | 34 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 64 | 64 | 64 | 64 | 64 | 55 | 64 | 64 | 45 | 64 | 64 | 37 | 64 | 54 | 33 | 64 | 46 | 30 | 64 | 39 | 28 | 51 | 32 | 23 | 38 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 64 | 54 | 33 | 64 | 44 | 29 | 64 | 36 | 26 | 53 | 32 | 24 | 44 | 29 | 22 | 37 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 53 | 60 | 60 | 44 | 60 | 53 | 37 | 60 | 45 | 33 | 60 | 34 | 28 | 60 | 29 | 24 | 49 | 25 | 32 | 39 | 22 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 60 | 60 | 44 | 60 | 51 | 36 | 60 | 41 | 32 | 60 | 35 | 29 | 60 | 32 | 26 | 60 | 29 | 24 | 52 | 26 | 22 | 40 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 51 | 56 | 56 | 44 | 56 | 48 | 34 | 46 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 49 | 56 | 56 | 40 | 56 | 50 | 35 | 54 | 42 | 31 | 45 | 37 | 29 | 38 | 33 | 26 | 31 | 28 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 74 | 74 | 57 | 74 | 69 | 47 | 74 | 65 | 40 | 74 | 57 | 35 | 70 | 49 | 31 | 66 | 43 | 28 | 61 | 38 | 26 | 47 | 31 | 22 | 37 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 70 | 49 | 31 | 65 | 41 | 28 | 57 | 35 | 25 | 49 | 32 | 23 | 42 | 29 | 31 | 37 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 64 | 64 | 48 | 64 | 64 | 39 | 64 | 56 | 34 | 64 | 46 | 30 | 64 | 39 | 28 | 59 | 34 | 25 | 50 | 31 | 23 | 36 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 64 | 38 | 27 | 56 | 33 | 25 | 46 | 30 | 22 | 38 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 56 | 60 | 60 | 46 | 60 | 54 | 38 | 60 | 45 | 33 | 60 | 38 | 30 | 60 | 34 | 28 | 59 | 28 | 23 | 46 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 60 | 44 | 33 | 60 | 36 | 30 | 60 | 32 | 27 | 60 | 29 | 24 | 52 | 26 | 22 | 45 | 24 | 30 | 39 | 22 | 27 | 32 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 52 | 56 | 56 | 44 | 56 | 54 | 37 | 56 | 47 | 33 | 44 | 36 | 28 | 34 | 31 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 56 | 56 | 43 | 56 | 52 | 36 | 56 | 44 | 32 | 46 | 37 | 29 | 38 | 33 | 26 | 34 | 30 | 24 | 31 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 10 | B | 0-7 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 40 | 60 | 53 | 33 | 60 | 43 | 28 | 56 | 35 | 25 | 46 | 31 | 22 | 39 | 27 | 29 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 58 | 60 | 60 | 49 | 60 | 60 | 42 | 60 | 60 | 36 | 60 | 52 | 32 | 60 | 45 | 30 | 57 | 35 | 25 | 45 | 30 | 32 | 36 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 44 | 60 | 56 | 34 | 60 | 42 | 29 | 58 | 34 | 25 | 45 | 30 | 22 | 36 | 26 | 29 | 32 | 23 | 26 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 50 | 60 | 60 | 41 | 60 | 59 | 35 | 60 | 49 | 31 | 60 | 41 | 29 | 60 | 35 | 26 | 46 | 30 | 22 | 35 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 46 | 60 | 49 | 35 | 60 | 38 | 30 | 60 | 32 | 26 | 58 | 28 | 23 | 48 | 25 | 31 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 59 | 60 | 60 | 48 | 60 | 57 | 40 | 60 | 48 | 35 | 60 | 41 | 32 | 60 | 32 | 27 | 57 | 28 | 23 | 44 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 47 | 56 | 54 | 37 | 55 | 43 | 32 | 43 | 35 | 28 | 35 | 31 | 25 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 55 | 56 | 56 | 46 | 56 | 56 | 40 | 56 | 44 | 32 | 42 | 35 | 27 | 33 | 30 | 24 | 29 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 54 | 60 | 60 | 45 | 60 | 60 | 39 | 60 | 56 | 34 | 60 | 49 | 31 | 60 | 38 | 26 | 49 | 32 | 23 | 39 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 60 | 60 | 39 | 60 | 54 | 33 | 60 | 46 | 30 | 60 | 40 | 27 | 55 | 35 | 25 | 48 | 32 | 22 | 42 | 29 | 31 | 34 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 60 | 60 | 60 | 60 | 60 | 55 | 60 | 60 | 45 | 60 | 60 | 37 | 60 | 54 | 33 | 60 | 46 | 30 | 60 | 39 | 28 | 51 | 32 | 23 | 38 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 60 | 54 | 33 | 60 | 44 | 29 | 60 | 36 | 26 | 53 | 32 | 24 | 44 | 29 | 22 | 37 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 53 | 60 | 60 | 44 | 60 | 53 | 37 | 60 | 45 | 33 | 60 | 34 | 28 | 60 | 29 | 24 | 49 | 25 | 32 | 39 | 22 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 60 | 60 | 44 | 60 | 51 | 36 | 60 | 41 | 32 | 60 | 35 | 29 | 60 | 32 | 26 | 60 | 29 | 24 | 52 | 26 | 22 | 40 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 51 | 56 | 56 | 44 | 56 | 48 | 34 | 46 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 49 | 56 | 56 | 40 | 56 | 50 | 35 | 54 | 42 | 31 | 45 | 37 | 29 | 38 | 33 | 26 | 31 | 28 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 60 | 60 | 57 | 60 | 60 | 47 | 60 | 60 | 40 | 60 | 57 | 35 | 60 | 49 | 31 | 60 | 43 | 28 | 60 | 38 | 26 | 47 | 31 | 22 | 37 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 60 | 49 | 31 | 60 | 41 | 28 | 57 | 35 | 25 | 49 | 32 | 23 | 42 | 29 | 31 | 37 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 60 | 60 | 48 | 60 | 60 | 39 | 60 | 56 | 34 | 60 | 46 | 30 | 60 | 39 | 28 | 59 | 34 | 25 | 50 | 31 | 23 | 36 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 60 | 38 | 27 | 56 | 33 | 25 | 46 | 30 | 22 | 38 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 56 | 60 | 60 | 46 | 60 | 54 | 38 | 60 | 45 | 33 | 60 | 38 | 30 | 60 | 34 | 28 | 59 | 28 | 23 | 46 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 60 | 44 | 33 | 60 | 36 | 30 | 60 | 32 | 27 | 60 | 29 | 24 | 52 | 26 | 22 | 45 | 24 | 30 | 39 | 22 | 27 | 32 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 52 | 56 | 56 | 44 | 56 | 54 | 37 | 56 | 47 | 33 | 44 | 36 | 28 | 34 | 31 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 56 | 56 | 43 | 56 | 52 | 36 | 56 | 44 | 32 | 46 | 37 | 29 | 38 | 33 | 26 | 34 | 30 | 24 | 31 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 20 | B | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 40 | 44 | 44 | 33 | 44 | 43 | 28 | 44 | 35 | 25 | 44 | 31 | 22 | 39 | 27 | 29 |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 42 | 44 | 44 | 36 | 44 | 44 | 32 | 44 | 44 | 30 | 44 | 35 | 25 | 44 | 30 | 32 | 36 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 44 | 45 | 45 | 34 | 45 | 42 | 29 | 45 | 34 | 25 | 45 | 30 | 22 | 36 | 26 | 29 | 32 | 23 | 26 |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 41 | 45 | 45 | 35 | 45 | 45 | 31 | 45 | 41 | 29 | 45 | 35 | 26 | 45 | 30 | 22 | 35 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 46 | 51 | 49 | 35 | 51 | 38 | 30 | 51 | 32 | 26 | 51 | 28 | 23 | 48 | 25 | 31 |
| | | | Exposed | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 48 | 51 | 51 | 40 | 51 | 48 | 35 | 51 | 41 | 32 | 51 | 32 | 27 | 51 | 28 | 23 | 44 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 37 | 46 | 43 | 32 | 43 | 35 | 28 | 35 | 31 | 25 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 40 | 46 | 44 | 32 | 42 | 35 | 27 | 33 | 30 | 24 | 29 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 39 | 44 | 44 | 34 | 44 | 44 | 31 | 44 | 38 | 26 | 44 | 32 | 23 | 39 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 44 | 44 | 39 | 44 | 44 | 33 | 44 | 44 | 30 | 44 | 40 | 27 | 44 | 35 | 25 | 44 | 32 | 22 | 42 | 29 | 31 | 34 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 37 | 45 | 45 | 33 | 45 | 45 | 30 | 45 | 39 | 28 | 45 | 32 | 23 | 38 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 45 | 45 | 33 | 45 | 44 | 29 | 45 | 36 | 26 | 45 | 32 | 24 | 44 | 29 | 22 | 37 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 44 | 51 | 51 | 37 | 51 | 45 | 33 | 51 | 34 | 28 | 51 | 29 | 24 | 49 | 25 | 32 | 39 | 22 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 51 | 51 | 44 | 51 | 51 | 36 | 51 | 41 | 32 | 51 | 35 | 29 | 51 | 32 | 26 | 51 | 29 | 24 | 51 | 26 | 22 | 40 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 44 | 46 | 46 | 34 | 46 | 37 | 29 | 35 | 32 | 25 | 31 | 28 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 40 | 46 | 46 | 35 | 46 | 42 | 31 | 45 | 37 | 29 | 38 | 33 | 26 | 31 | 28 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 40 | 44 | 44 | 35 | 44 | 44 | 31 | 44 | 43 | 28 | 44 | 38 | 26 | 44 | 31 | 22 | 37 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 44 | 44 | 31 | 44 | 41 | 28 | 44 | 35 | 25 | 44 | 32 | 23 | 42 | 29 | 31 | 37 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 39 | 45 | 45 | 34 | 45 | 45 | 30 | 45 | 39 | 28 | 45 | 34 | 25 | 45 | 31 | 23 | 36 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 45 | 38 | 27 | 45 | 33 | 25 | 45 | 30 | 22 | 38 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 46 | 55 | 54 | 38 | 55 | 45 | 33 | 55 | 38 | 30 | 55 | 34 | 28 | 55 | 28 | 23 | 46 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 55 | 44 | 33 | 55 | 36 | 30 | 55 | 32 | 27 | 55 | 29 | 24 | 52 | 26 | 22 | 45 | 24 | 30 | 39 | 22 | 27 | 32 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 44 | 50 | 50 | 37 | 50 | 47 | 33 | 44 | 36 | 28 | 34 | 31 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 50 | 50 | 43 | 50 | 50 | 36 | 50 | 44 | 32 | 46 | 37 | 29 | 38 | 33 | 26 | 34 | 30 | 24 | 31 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 30 | B | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 28 | 35 | 35 | 25 | 35 | 31 | 22 | 35 | 27 | 29 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 30 | 35 | 35 | 25 | 35 | 30 | 32 | 35 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 29 | 35 | 34 | 25 | 35 | 30 | 22 | 34 | 26 | 29 | 32 | 23 | 26 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 30 | 22 | 35 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 37 | 37 | 30 | 37 | 32 | 26 | 37 | 28 | 23 | 37 | 25 | 31 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 37 | 37 | 32 | 37 | 32 | 27 | 37 | 28 | 23 | 37 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 34 | 28 | 34 | 31 | 25 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 34 | 27 | 33 | 30 | 24 | 29 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 31 | 35 | 35 | 26 | 35 | 32 | 23 | 35 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 30 | 35 | 35 | 27 | 35 | 35 | 25 | 35 | 32 | 22 | 35 | 29 | 31 | 34 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 30 | 35 | 35 | 28 | 35 | 32 | 23 | 34 | 27 | 30 | 32 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 35 | 35 | 33 | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 32 | 24 | 35 | 29 | 22 | 35 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 34 | 28 | 37 | 29 | 24 | 37 | 25 | 32 | 37 | 22 | 28 | 33 | 29 | 24 | 29 | 26 | 22 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 32 | 37 | 35 | 29 | 37 | 32 | 26 | 37 | 29 | 24 | 37 | 26 | 22 | 37 | 22 | 28 | 33 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 29 | 34 | 32 | 25 | 31 | 28 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 31 | 34 | 34 | 29 | 34 | 33 | 26 | 31 | 28 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 31 | 22 | 35 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 25 | 35 | 32 | 23 | 35 | 29 | 31 | 35 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 35 | 35 | 28 | 35 | 34 | 25 | 35 | 31 | 23 | 34 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 35 | 35 | 27 | 35 | 33 | 25 | 35 | 30 | 22 | 35 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 33 | 40 | 38 | 30 | 40 | 34 | 28 | 40 | 28 | 23 | 40 | 24 | 30 | 36 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 40 | 40 | 33 | 40 | 36 | 30 | 40 | 32 | 27 | 40 | 29 | 24 | 40 | 26 | 22 | 40 | 24 | 30 | 39 | 22 | 27 | 32 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 36 | 28 | 34 | 31 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 32 | 37 | 37 | 29 | 37 | 33 | 26 | 34 | 30 | 24 | 31 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 40 | B | 0-7 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 28 | 33 | 33 | 25 | 33 | 31 | 22 | 33 | 27 | 29 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 32 | 33 | 33 | 30 | 33 | 33 | 25 | 33 | 30 | 32 | 33 | 26 | 28 | 31 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | 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 | 29 | 33 | 33 | 25 | 33 | 30 | 22 | 32 | 26 | 29 | 31 | 23 | 26 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 29 | 33 | 33 | 26 | 33 | 30 | 22 | 33 | 26 | 29 | 30 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 28 | 23 | 29 | 25 | 31 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 27 | 29 | 28 | 23 | 29 | 24 | 30 | 29 | 32 | 26 | 29 | 28 | 23 | 28 | 25 | 20 |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 25 |
| | | | 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 | 24 | 27 | 26 | 31 | 26 | 23 | 28 | 23 | 31 | 25 |
| | C | 0-7 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 26 | 33 | 32 | 23 | 33 | 28 | 30 | 33 | 24 | 26 | 29 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 27 | 33 | 33 | 25 | 33 | 32 | 22 | 33 | 29 | 31 | 33 | 24 | 26 | 29 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 28 | 33 | 32 | 23 | 32 | 27 | 30 | 31 | 23 | 26 | 28 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 29 | 33 | 33 | 26 | 33 | 32 | 24 | 33 | 29 | 22 | 33 | 27 | 30 | 33 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 24 | 29 | 25 | 32 | 29 | 22 | 28 | 29 | 29 | 24 | 29 | 26 | 22 | 29 | 26 | 22 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 24 | 29 | 26 | 22 | 29 | 22 | 28 | 29 | 29 | 24 | 28 | 25 | 21 | 25 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 25 | 27 | 27 | 22 | 27 | 24 | 29 | 24 | 33 | 26 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 22 | 27 | 24 | 29 | 23 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 31 | 22 | 35 | 27 | 28 | 32 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 25 | 35 | 32 | 23 | 35 | 29 | 31 | 35 | 26 | 28 | 33 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 30 | 35 | 35 | 28 | 35 | 34 | 25 | 35 | 31 | 23 | 34 | 26 | 29 | 31 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 35 | 35 | 27 | 35 | 33 | 25 | 35 | 30 | 22 | 35 | 27 | 30 | 33 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 28 | 31 | 28 | 23 | 31 | 24 | 30 | 31 | 32 | 26 | 31 | 28 | 23 | 28 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 27 | 31 | 29 | 24 | 31 | 26 | 22 | 31 | 24 | 30 | 31 | 22 | 27 | 31 | 28 | 23 | 27 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 29 | 29 | 24 | 29 | 26 | 32 | 26 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 24 | 29 | 28 | 22 | 26 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 50 | 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 22 | 28 | 27 | 29 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 32 | 28 | 26 | 28 | 28 | 23 | 24 | 28 | 30 | 22 | 25 | 27 | 19 |
| | | 7-20 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 22 | 27 | 26 | 29 | 27 | 23 | 26 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 22 | 28 | 26 | 29 | 28 | 22 | 25 | 26 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 30 | 35 | 32 | 26 | 35 | 28 | 23 | 35 | 25 | 20 |
| | | 27-45 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 28 | 33 | 31 | 33 | 25 |
| | C | 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 | 28 | 26 | 28 | 28 | 23 | 28 | 28 | 30 | 28 | 24 | 26 | 28 | 32 | 23 | 26 | 29 | 20 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 25 | 28 | 28 | 22 | 28 | 28 | 31 | 28 | 24 | 26 | 28 | 32 | 22 | 25 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 23 | 28 | 27 | 30 | 27 | 23 | 26 | 26 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 24 | 28 | 28 | 22 | 28 | 27 | 30 | 28 | 24 | 27 | 28 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 33 | 28 | 35 | 29 | 24 | 35 | 26 | 22 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 34 | 28 | 35 | 29 | 24 | 35 | 25 | 21 | 35 | 22 | 18 | 33 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 29 | 33 | 33 | 26 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 29 | 33 | 31 | 25 | 31 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 0-7 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 30 | 26 | 30 | 30 | 22 | 30 | 27 | 28 | 30 | 23 | 25 | 28 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 30 | 25 | 30 | 30 | 23 | 30 | 29 | 31 | 30 | 26 | 28 | 30 | 24 | 26 | 28 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 30 | 25 | 30 | 30 | 23 | 30 | 26 | 29 | 28 | 22 | 25 | 27 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 30 | 30 | 27 | 30 | 30 | 25 | 30 | 30 | 22 | 30 | 27 | 30 | 30 | 24 | 27 | 30 | 22 | 25 | 28 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 23 | 26 | 24 | 30 | 26 | 32 | 26 | 26 | 28 | 23 | 26 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 22 | 26 | 24 | 30 | 26 | 22 | 27 | 26 | 28 | 23 | 26 | 24 | 20 | 24 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 32 | 24 | 23 | 28 | 23 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 23 | 28 | 22 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 29 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 32 | 24 | 24 | 28 | 24 | 23 | 24 | 24 | 30 | 22 | 24 | 27 | 19 |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 29 | 24 | 23 | 26 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 29 | 24 | 22 | 25 | 24 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 26 | 30 | 28 | 23 | 30 | 25 | 20 |
| | | 27-45 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 |
| | C | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 30 | 24 | 24 | 26 | 24 | 32 | 23 | 24 | 29 | 20 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 31 | 24 | 24 | 26 | 24 | 32 | 22 | 24 | 27 | 19 | 33 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 30 | 24 | 23 | 26 | 23 | 31 | 23 | 22 | 27 | 20 | 21 | 24 | 18 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 30 | 24 | 24 | 27 | 24 | 31 | 23 | 24 | 27 | 20 | 32 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 29 | 24 | 30 | 26 | 22 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 29 | 24 | 30 | 25 | 21 | 30 | 22 | 18 | 30 | 19 | 16 | 29 | 17 | 14 |
| | | 27-45 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 27 | 22 | 27 | 24 | 19 | 24 | 22 | 17 |
| | D | 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 | 22 | 26 | 26 | 28 | 26 | 23 | 25 | 26 | 30 | 22 | 24 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 23 | 26 | 26 | 31 | 26 | 26 | 28 | 26 | 24 | 26 | 26 | 31 | 22 | 24 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 23 | 26 | 26 | 29 | 25 | 22 | 25 | 24 | 29 | 22 | 23 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 22 | 26 | 26 | 30 | 26 | 24 | 27 | 26 | 22 | 25 | 26 | 31 | 23 | 24 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 32 | 26 | 33 | 28 | 23 | 33 | 25 | 20 | 33 | 22 | 18 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 27 | 33 | 28 | 23 | 33 | 24 | 20 | 33 | 21 | 17 | 31 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 31 | 24 | 30 | 27 | 22 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 30 | 24 | 29 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 70 | B | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 29 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 31 | 20 | 20 | 28 | 20 | 20 | 24 | 20 | 30 | 22 | 20 | 27 | 19 |
| | | 7-20 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 31 | 26 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 31 | 25 | 31 | 29 | 22 | 31 | 26 | 19 | 31 | 23 | 17 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| | | | 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 | 23 | 26 | 25 | 20 |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| | C | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 30 | 20 | 20 | 26 | 20 | 31 | 23 | 20 | 29 | 20 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 31 | 20 | 20 | 26 | 20 | 31 | 22 | 20 | 27 | 19 | 31 | 24 | 17 | 29 | 21 | 15 | 26 | 19 | 13 |
| | | 7-20 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 26 | 31 | 31 | 23 | 31 | 27 | 20 | 31 | 24 | 18 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 27 | 31 | 31 | 23 | 31 | 27 | 20 | 31 | 23 | 17 | 28 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 22 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 25 | 21 | 26 | 22 | 18 | 26 | 19 | 16 | 26 | 17 | 14 |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 24 | 22 | 17 | | | |
| | D | 0-7 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 28 | 22 | 22 | 25 | 22 | 30 | 22 | 22 | 27 | 19 | 33 | 24 | 17 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 31 | 22 | 22 | 28 | 22 | 22 | 26 | 22 | 31 | 22 | 22 | 26 | 19 | 31 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 29 | 34 | 34 | 25 | 34 | 29 | 22 | 34 | 26 | 19 | 31 | 23 | 17 | 28 | 20 | 15 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 33 | 34 | 34 | 30 | 34 | 34 | 27 | 34 | 34 | 25 | 34 | 31 | 23 | 34 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 23 | 28 | 25 | 20 | 28 | 22 | 18 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 23 | 28 | 24 | 20 | 28 | 21 | 17 | 28 | 18 | 15 | 27 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 24 | 27 | 27 | 22 |
| | | | 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 | 24 | 27 | 26 | 21 | 26 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |
| 80 | B | 0-7 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 27 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 27 | 18 | 18 | 27 | 18 | 18 | 24 | 18 | 27 | 22 | 18 | 27 | 19 |
| | | 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 | 26 |
| | | | 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 | 25 | 27 | 27 | 22 | 27 | 26 | 19 | 27 | 23 | 17 |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 20 |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | C | 0-7 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 27 | 18 | 18 | 26 | 18 | 27 | 23 | 18 | 27 | 20 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 27 | 18 | 18 | 26 | 18 | 27 | 22 | 18 | 27 | 19 | 27 | 24 | 17 | 27 | 21 | 15 | 26 | 19 | 13 |
| | | 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 | 26 | 27 | 27 | 23 | 27 | 27 | 20 | 27 | 24 | 18 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 23 | 27 | 27 | 20 | 27 | 23 | 17 | 27 | 20 | 15 | 24 | 18 | 13 | 22 | 16 | 12 |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 21 | 23 | 22 | 18 | 23 | 19 | 16 | 23 | 17 | 14 |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 | 22 | 22 | 17 |
| | D | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 28 | 20 | 20 | 25 | 20 | 30 | 22 | 20 | 27 | 19 | 30 | 24 | 17 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 30 | 20 | 20 | 28 | 20 | 20 | 26 | 20 | 30 | 22 | 20 | 26 | 19 | 30 | 23 | 16 | 27 | 20 | 14 | 24 | 18 | 12 | 21 | 16 | 11 |
| | | 7-20 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 29 | 30 | 30 | 25 | 30 | 29 | 22 | 30 | 26 | 19 | 28 | 23 | 17 | 27 | 20 | 15 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 27 | 30 | 30 | 25 | 30 | 30 | 23 | 30 | 26 | 19 | 30 | 22 | 16 | 26 | 19 | 14 | 23 | 17 | 12 | 20 | 15 | 11 | 18 | 13 | 10 |
| | | 20-27 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 20 | 25 | 22 | 18 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 24 | 20 | 25 | 21 | 17 | 25 | 18 | 15 | 25 | 16 | 13 | 24 | 14 | 12 |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 23 | 18 | 23 | 20 | 16 | 20 | 18 | 14 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 94 | 98 | 98 | 90 | 98 | 98 | 86 | 98 | 95 | 82 | 98 | 91 | 79 | 98 | 84 | 71 | 91 | 79 | 64 | 85 | 73 | 56 | 80 | 67 | 49 | 76 | 61 | 43 | 70 | 54 | 58 |
| | | | Exposed | 98 | 98 | 85 | 98 | 94 | 81 | 98 | 89 | 77 | 98 | 85 | 73 | 95 | 82 | 67 | 90 | 78 | 64 | 87 | 75 | 58 | 80 | 67 | 49 | 75 | 60 | 42 | 68 | 52 | 55 | 62 | 45 | 48 | 55 | 40 | 43 | 48 | 53 | 38 |
| | | 7-20 | Interior | 98 | 98 | 98 | 98 | 98 | 97 | 98 | 98 | 91 | 98 | 98 | 86 | 98 | 96 | 82 | 98 | 91 | 78 | 98 | 87 | 75 | 95 | 80 | 65 | 87 | 74 | 57 | 81 | 65 | 49 | 75 | 58 | 43 | 68 | 51 | 38 | 62 | 46 | 51 |
| | | | Exposed | 98 | 96 | 82 | 98 | 90 | 77 | 98 | 85 | 72 | 96 | 81 | 66 | 91 | 77 | 62 | 86 | 73 | 56 | 82 | 67 | 51 | 76 | 59 | 44 | 67 | 50 | 56 | 60 | 44 | 49 | 52 | 38 | 43 | 46 | 51 | 38 | 41 | 45 | 34 |
| | | 20-27 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 96 | 98 | 98 | 91 | 98 | 96 | 86 | 98 | 91 | 83 | 98 | 83 | 76 | 98 | 77 | 67 | 92 | 69 | 60 | 86 | 63 | 52 | 81 | 55 | 46 | 77 | 49 | 41 |
| | | | Exposed | 98 | 98 | 91 | 98 | 94 | 85 | 98 | 89 | 81 | 98 | 84 | 77 | 98 | 80 | 72 | 98 | 77 | 66 | 94 | 72 | 62 | 86 | 63 | 53 | 80 | 54 | 45 | 75 | 47 | 39 | 68 | 41 | 51 | 62 | 55 | 45 | 55 | 49 | 40 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 98 | 99 | 99 | 93 | 99 | 99 | 89 | 99 | 91 | 82 | 92 | 85 | 76 | 85 | 79 | 69 | 79 | 74 | 62 | 74 | 67 | 55 | 67 | 62 | 49 |
| | | | Exposed | 99 | 99 | 98 | 99 | 99 | 92 | 99 | 97 | 87 | 99 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 76 | 87 | 81 | 71 | 80 | 75 | 63 | 73 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 41 | 49 |
| | C | 0-7 | Interior | 98 | 98 | 88 | 98 | 96 | 83 | 98 | 92 | 79 | 98 | 87 | 75 | 97 | 84 | 70 | 93 | 80 | 65 | 89 | 77 | 62 | 83 | 70 | 52 | 77 | 63 | 45 | 71 | 55 | 58 | 64 | 48 | 51 | 58 | 42 | 45 | 51 | 56 | 40 |
| | | | Exposed | 97 | 83 | 70 | 92 | 79 | 65 | 87 | 76 | 59 | 83 | 71 | 53 | 80 | 66 | 48 | 77 | 62 | 44 | 73 | 57 | 40 | 65 | 48 | 52 | 57 | 41 | 44 | 49 | 54 | 38 | 43 | 47 | 34 | 57 | 42 | 30 | 51 | 37 | 26 |
| | | 7-20 | Interior | 98 | 98 | 84 | 98 | 93 | 80 | 98 | 88 | 75 | 98 | 83 | 69 | 94 | 79 | 64 | 89 | 76 | 59 | 85 | 71 | 54 | 78 | 62 | 46 | 70 | 53 | 39 | 63 | 46 | 52 | 55 | 40 | 45 | 49 | 54 | 40 | 43 | 48 | 35 |
| | | | Exposed | 93 | 79 | 64 | 88 | 75 | 58 | 83 | 68 | 52 | 79 | 63 | 47 | 75 | 58 | 43 | 69 | 53 | 39 | 65 | 48 | 54 | 56 | 41 | 46 | 48 | 53 | 39 | 41 | 46 | 34 | 54 | 40 | 30 | 48 | 35 | 26 | 43 | 31 | 23 |
| | | 20-27 | Interior | 98 | 98 | 94 | 98 | 97 | 88 | 98 | 92 | 83 | 98 | 87 | 79 | 98 | 83 | 75 | 98 | 79 | 69 | 96 | 75 | 65 | 89 | 65 | 56 | 82 | 58 | 48 | 77 | 50 | 41 | 71 | 44 | 54 | 64 | 38 | 48 | 58 | 51 | 43 |
| | | | Exposed | 98 | 82 | 75 | 98 | 78 | 68 | 94 | 73 | 63 | 90 | 67 | 57 | 85 | 62 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 71 | 44 | 55 | 64 | 38 | 47 | 56 | 49 | 41 | 49 | 43 | 36 | 43 | 38 | 32 | 57 | 34 | 28 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 95 | 99 | 99 | 90 | 99 | 95 | 85 | 99 | 90 | 81 | 94 | 86 | 78 | 90 | 83 | 75 | 82 | 77 | 65 | 76 | 69 | 57 | 67 | 62 | 50 | 61 | 55 | 43 | 54 | 48 | 38 | 48 | 43 | 51 |
| | | | Exposed | 99 | 90 | 81 | 93 | 85 | 77 | 88 | 81 | 72 | 83 | 77 | 66 | 79 | 74 | 62 | 75 | 68 | 56 | 70 | 64 | 52 | 62 | 55 | 44 | 53 | 47 | 57 | 46 | 41 | 49 | 40 | 54 | 43 | 53 | 48 | 38 | 47 | 42 | 34 |
| | D | 0-7 | Interior | 98 | 93 | 80 | 98 | 89 | 76 | 98 | 84 | 71 | 93 | 81 | 66 | 89 | 77 | 62 | 85 | 74 | 56 | 82 | 69 | 51 | 76 | 61 | 43 | 69 | 53 | 56 | 62 | 45 | 49 | 55 | 60 | 43 | 48 | 53 | 38 | 43 | 47 | 33 |
| | | | Exposed | 89 | 77 | 61 | 84 | 72 | 55 | 80 | 67 | 49 | 77 | 63 | 44 | 73 | 57 | 40 | 68 | 52 | 55 | 64 | 47 | 51 | 55 | 40 | 43 | 47 | 52 | 37 | 41 | 45 | 32 | 54 | 39 | 28 | 47 | 35 | 25 | 42 | 31 | 22 |
| | | 7-20 | Interior | 98 | 89 | 77 | 98 | 84 | 71 | 94 | 80 | 65 | 89 | 76 | 60 | 85 | 71 | 54 | 81 | 65 | 50 | 77 | 61 | 45 | 68 | 52 | 38 | 61 | 44 | 50 | 53 | 38 | 43 | 46 | 51 | 38 | 40 | 45 | 33 | 54 | 40 | 30 |
| | | | Exposed | 85 | 70 | 54 | 80 | 64 | 48 | 76 | 59 | 43 | 70 | 53 | 39 | 65 | 48 | 54 | 60 | 44 | 49 | 55 | 40 | 45 | 46 | 51 | 38 | 40 | 44 | 33 | 52 | 38 | 28 | 45 | 33 | 25 | 40 | 29 | 22 | 36 | 26 | 19 |
| | | 20-27 | Interior | 98 | 94 | 85 | 98 | 88 | 80 | 98 | 83 | 76 | 98 | 79 | 70 | 96 | 75 | 64 | 92 | 70 | 60 | 88 | 65 | 55 | 81 | 56 | 46 | 76 | 48 | 40 | 68 | 42 | 52 | 62 | 55 | 45 | 55 | 48 | 40 | 48 | 43 | 36 |
| | | | Exposed | 96 | 75 | 64 | 91 | 68 | 58 | 86 | 63 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 75 | 47 | 39 | 70 | 43 | 54 | 63 | 55 | 46 | 54 | 48 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 54 | 32 | 26 | 48 | 28 | 23 |
| | | 27-45 | Interior | 99 | 99 | 92 | 99 | 96 | 87 | 99 | 91 | 82 | 94 | 87 | 78 | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 76 | 64 | 75 | 67 | 56 | 65 | 60 | 48 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 40 | 48 | 40 | 54 | 43 |
| | | | Exposed | 89 | 83 | 74 | 84 | 78 | 68 | 80 | 75 | 63 | 76 | 69 | 57 | 70 | 64 | 52 | 65 | 59 | 47 | 61 | 54 | 43 | 51 | 46 | 55 | 44 | 40 | 47 | 38 | 52 | 41 | 50 | 45 | 36 | 44 | 40 | 32 | 40 | 36 | 28 |
| 10 | B | 0-7 | Interior | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 90 | 91 | 91 | 86 | 91 | 91 | 82 | 91 | 91 | 79 | 91 | 84 | 71 | 91 | 79 | 64 | 85 | 73 | 56 | 80 | 67 | 49 | 76 | 61 | 43 | 70 | 54 | 58 |
| | | | Exposed | 91 | 91 | 85 | 91 | 91 | 81 | 91 | 89 | 77 | 91 | 85 | 73 | 91 | 82 | 67 | 90 | 78 | 64 | 87 | 75 | 58 | 80 | 67 | 49 | 75 | 60 | 42 | 68 | 52 | 55 | 62 | 45 | 48 | 55 | 40 | 43 | 48 | 53 | 38 |
| | | 7-20 | Interior | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 86 | 91 | 91 | 82 | 91 | 91 | 78 | 91 | 87 | 75 | 91 | 80 | 65 | 87 | 74 | 57 | 81 | 65 | 49 | 75 | 58 | 43 | 68 | 51 | 38 | 62 | 46 | 51 |
| | | | Exposed | 91 | 91 | 82 | 91 | 90 | 77 | 91 | 85 | 72 | 91 | 81 | 66 | 91 | 77 | 62 | 86 | 73 | 56 | 82 | 67 | 51 | 76 | 59 | 44 | 67 | 50 | 56 | 60 | 44 | 49 | 52 | 38 | 43 | 46 | 51 | 38 | 41 | 45 | 34 |
| | | 20-27 | Interior | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 91 | 95 | 95 | 86 | 95 | 91 | 83 | 95 | 83 | 76 | 95 | 77 | 67 | 92 | 69 | 60 | 86 | 63 | 52 | 81 | 55 | 46 | 77 | 49 | 41 |
| | | | Exposed | 95 | 95 | 91 | 95 | 94 | 85 | 95 | 89 | 81 | 95 | 84 | 77 | 95 | 80 | 72 | 95 | 77 | 66 | 94 | 72 | 62 | 86 | 63 | 53 | 80 | 54 | 45 | 75 | 47 | 39 | 68 | 41 | 51 | 62 | 55 | 45 | 55 | 49 | 40 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 93 | 98 | 98 | 89 | 98 | 91 | 82 | 92 | 85 | 76 | 85 | 79 | 69 | 79 | 74 | 62 | 74 | 67 | 55 | 67 | 62 | 49 |
| | | | Exposed | 98 | 98 | 98 | 98 | 98 | 92 | 98 | 97 | 87 | 98 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 76 | 87 | 81 | 71 | 80 | 75 | 63 | 73 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 41 | 49 |
| | C | 0-7 | Interior | 91 | 91 | 88 | 91 | 91 | 83 | 91 | 91 | 79 | 91 | 87 | 75 | 91 | 84 | 70 | 91 | 80 | 65 | 89 | 77 | 62 | 83 | 70 | 52 | 77 | 63 | 45 | 71 | 55 | 58 | 64 | 48 | 51 | 58 | 42 | 45 | 51 | 56 | 40 |
| | | | Exposed | 91 | 83 | 70 | 91 | 79 | 65 | 87 | 76 | 59 | 83 | 71 | 53 | 80 | 66 | 48 | 77 | 62 | 44 | 73 | 57 | 40 | 65 | 48 | 52 | 57 | 41 | 44 | 49 | 54 | 38 | 43 | 47 | 34 | 57 | 42 | 30 | 51 | 37 | 26 |
| | | 7-20 | Interior | 91 | 91 | 84 | 91 | 91 | 80 | 91 | 88 | 75 | 91 | 83 | 69 | 91 | 79 | 64 | 89 | 76 | 59 | 85 | 71 | 54 | 78 | 62 | 46 | 70 | 53 | 39 | 63 | 46 | 52 | 55 | 40 | 45 | 49 | 54 | 40 | 43 | 48 | 35 |
| | | | Exposed | 91 | 79 | 64 | 88 | 75 | 58 | 83 | 68 | 52 | 79 | 63 | 47 | 75 | 58 | 43 | 69 | 53 | 39 | 65 | 48 | 54 | 56 | 41 | 46 | 48 | 53 | 39 | 41 | 46 | 34 | 54 | 40 | 30 | 48 | 35 | 26 | 43 | 31 | 23 |
| | | 20-27 | Interior | 95 | 95 | 94 | 95 | 95 | 88 | 95 | 92 | 83 | 95 | 87 | 79 | 95 | 83 | 75 | 95 | 79 | 69 | 95 | 75 | 65 | 89 | 65 | 56 | 82 | 58 | 48 | 77 | 50 | 41 | 71 | 44 | 54 | 64 | 38 | 48 | 58 | 51 | 43 |
| | | | Exposed | 95 | 82 | 75 | 95 | 78 | 68 | 94 | 73 | 63 | 90 | 67 | 57 | 85 | 62 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 71 | 44 | 55 | 64 | 38 | 47 | 56 | 49 | 41 | 49 | 43 | 36 | 43 | 38 | 32 | 57 | 34 | 28 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 95 | 98 | 98 | 90 | 98 | 95 | 85 | 98 | 90 | 81 | 94 | 86 | 78 | 90 | 83 | 75 | 82 | 77 | 65 | 76 | 69 | 57 | 67 | 62 | 50 | 61 | 55 | 43 | 54 | 48 | 38 | 48 | 43 | 51 |
| | | | Exposed | 98 | 90 | 81 | 93 | 85 | 77 | 88 | 81 | 72 | 83 | 77 | 66 | 79 | 74 | 62 | 75 | 68 | 56 | 70 | 64 | 52 | 62 | 55 | 44 | 53 | 47 | 57 | 46 | 41 | 49 | 40 | 54 | 43 | 53 | 48 | 38 | 47 | 42 | 34 |
| | D | 0-7 | Interior | 91 | 91 | 80 | 91 | 89 | 76 | 91 | 84 | 71 | 91 | 81 | 66 | 89 | 77 | 62 | 85 | 74 | 56 | 82 | 69 | 51 | 76 | 61 | 43 | 69 | 53 | 56 | 62 | 45 | 49 | 55 | 60 | 43 | 48 | 53 | 38 | 43 | 47 | 33 |
| | | | Exposed | 89 | 77 | 61 | 84 | 72 | 55 | 80 | 67 | 49 | 77 | 63 | 44 | 73 | 57 | 40 | 68 | 52 | 55 | 64 | 47 | 51 | 55 | 40 | 43 | 47 | 52 | 37 | 41 | 45 | 32 | 54 | 39 | 28 | 47 | 35 | 25 | 42 | 31 | 22 |
| | | 7-20 | Interior | 91 | 89 | 77 | 91 | 84 | 71 | 91 | 80 | 65 | 89 | 76 | 60 | 85 | 71 | 54 | 81 | 65 | 50 | 77 | 61 | 45 | 68 | 52 | 38 | 61 | 44 | 50 | 53 | 38 | 43 | 46 | 51 | 38 | 40 | 45 | 33 | 54 | 40 | 30 |
| | | | Exposed | 85 | 70 | 54 | 80 | 64 | 48 | 76 | 59 | 43 | 70 | 53 | 39 | 65 | 48 | 54 | 60 | 44 | 49 | 55 | 40 | 45 | 46 | 51 | 38 | 40 | 44 | 33 | 52 | 38 | 28 | 45 | 33 | 25 | 40 | 29 | 22 | 36 | 26 | 19 |
| | | 20-27 | Interior | 96 | 94 | 85 | 96 | 88 | 80 | 96 | 83 | 76 | 96 | 79 | 70 | 96 | 75 | 64 | 92 | 70 | 60 | 88 | 65 | 55 | 81 | 56 | 46 | 76 | 48 | 40 | 68 | 42 | 52 | 62 | 55 | 45 | 55 | 48 | 40 | 48 | 43 | 36 |
| | | | Exposed | 96 | 75 | 64 | 91 | 68 | 58 | 86 | 63 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 75 | 47 | 39 | 70 | 43 | 54 | 63 | 55 | 46 | 54 | 48 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 54 | 32 | 26 | 48 | 28 | 23 |
| | | 27-45 | Interior | 99 | 99 | 92 | 99 | 96 | 87 | 99 | 91 | 82 | 94 | 87 | 78 | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 76 | 64 | 75 | 67 | 56 | 65 | 60 | 48 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 40 | 48 | 40 | 54 | 43 |
| | | | Exposed | 89 | 83 | 74 | 84 | 78 | 68 | 80 | 75 | 63 | 76 | 69 | 57 | 70 | 64 | 52 | 65 | 59 | 47 | 61 | 54 | 43 | 51 | 46 | 55 | 44 | 40 | 47 | 38 | 52 | 41 | 50 | 45 | 36 | 44 | 40 | 32 | 40 | 36 | 28 |
| 20 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 79 | 83 | 83 | 71 | 83 | 79 | 64 | 83 | 73 | 56 | 80 | 67 | 49 | 76 | 61 | 43 | 70 | 54 | 58 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 73 | 83 | 82 | 67 | 83 | 78 | 64 | 83 | 75 | 58 | 80 | 67 | 49 | 75 | 60 | 42 | 68 | 52 | 55 | 62 | 45 | 48 | 55 | 40 | 43 | 48 | 53 | 38 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 78 | 83 | 83 | 75 | 83 | 80 | 65 | 83 | 74 | 57 | 81 | 65 | 49 | 75 | 58 | 43 | 68 | 51 | 38 | 62 | 46 | 51 |
| | | | Exposed | 83 | 83 | 82 | 83 | 83 | 77 | 83 | 83 | 72 | 83 | 81 | 66 | 83 | 77 | 62 | 83 | 73 | 56 | 82 | 67 | 51 | 76 | 59 | 44 | 67 | 50 | 56 | 60 | 44 | 49 | 52 | 38 | 43 | 46 | 51 | 38 | 41 | 45 | 34 |
| | | 20-27 | Interior | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 86 | 88 | 88 | 83 | 88 | 83 | 76 | 88 | 77 | 67 | 88 | 69 | 60 | 86 | 63 | 52 | 81 | 55 | 46 | 77 | 49 | 41 |
| | | | Exposed | 88 | 88 | 88 | 88 | 88 | 85 | 88 | 88 | 81 | 88 | 84 | 77 | 88 | 80 | 72 | 88 | 77 | 66 | 88 | 72 | 62 | 86 | 63 | 53 | 80 | 54 | 45 | 75 | 47 | 39 | 68 | 41 | 51 | 62 | 55 | 45 | 55 | 49 | 40 |
| | | 27-45 | Interior | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 89 | 90 | 90 | 82 | 90 | 85 | 76 | 85 | 79 | 69 | 79 | 74 | 62 | 74 | 67 | 55 | 67 | 62 | 49 |
| | | | Exposed | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 87 | 90 | 90 | 83 | 90 | 88 | 79 | 90 | 84 | 76 | 87 | 81 | 71 | 80 | 75 | 63 | 73 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 41 | 49 |
| | C | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 83 | 70 | 83 | 80 | 65 | 83 | 77 | 62 | 83 | 70 | 52 | 77 | 63 | 45 | 71 | 55 | 58 | 64 | 48 | 51 | 58 | 42 | 45 | 51 | 56 | 40 |
| | | | Exposed | 83 | 83 | 70 | 83 | 79 | 65 | 83 | 76 | 59 | 83 | 71 | 53 | 80 | 66 | 48 | 77 | 62 | 44 | 73 | 57 | 40 | 65 | 48 | 52 | 57 | 41 | 44 | 49 | 54 | 38 | 43 | 47 | 34 | 57 | 42 | 30 | 51 | 37 | 26 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 75 | 83 | 83 | 69 | 83 | 79 | 64 | 83 | 76 | 59 | 83 | 71 | 54 | 78 | 62 | 46 | 70 | 53 | 39 | 63 | 46 | 52 | 55 | 40 | 45 | 49 | 54 | 40 | 43 | 48 | 35 |
| | | | Exposed | 83 | 79 | 64 | 83 | 75 | 58 | 83 | 68 | 52 | 79 | 63 | 47 | 75 | 58 | 43 | 69 | 53 | 39 | 65 | 48 | 54 | 56 | 41 | 46 | 48 | 53 | 39 | 41 | 46 | 34 | 54 | 40 | 30 | 48 | 35 | 26 | 43 | 31 | 23 |
| | | 20-27 | Interior | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 83 | 88 | 87 | 79 | 88 | 83 | 75 | 88 | 79 | 69 | 88 | 75 | 65 | 88 | 65 | 56 | 82 | 58 | 48 | 77 | 50 | 41 | 71 | 44 | 54 | 64 | 38 | 48 | 58 | 51 | 43 |
| | | | Exposed | 88 | 82 | 75 | 88 | 78 | 68 | 88 | 73 | 63 | 88 | 67 | 57 | 85 | 62 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 71 | 44 | 55 | 64 | 38 | 47 | 56 | 49 | 41 | 49 | 43 | 36 | 43 | 38 | 32 | 57 | 34 | 28 |
| | | 27-45 | Interior | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 85 | 90 | 90 | 81 | 90 | 86 | 78 | 90 | 83 | 75 | 82 | 77 | 65 | 76 | 69 | 57 | 67 | 62 | 50 | 61 | 55 | 43 | 54 | 48 | 38 | 48 | 43 | 51 |
| | | | Exposed | 90 | 90 | 81 | 90 | 85 | 77 | 88 | 81 | 72 | 83 | 77 | 66 | 79 | 74 | 62 | 75 | 68 | 56 | 70 | 64 | 52 | 62 | 55 | 44 | 53 | 47 | 57 | 46 | 41 | 49 | 40 | 54 | 43 | 53 | 48 | 38 | 47 | 42 | 34 |
| | D | 0-7 | Interior | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 71 | 83 | 81 | 66 | 83 | 77 | 62 | 83 | 74 | 56 | 82 | 69 | 51 | 76 | 61 | 43 | 69 | 53 | 56 | 62 | 45 | 49 | 55 | 60 | 43 | 48 | 53 | 38 | 43 | 47 | 33 |
| | | | Exposed | 83 | 77 | 61 | 83 | 72 | 55 | 80 | 67 | 49 | 77 | 63 | 44 | 73 | 57 | 40 | 68 | 52 | 55 | 64 | 47 | 51 | 55 | 40 | 43 | 47 | 52 | 37 | 41 | 45 | 32 | 54 | 39 | 28 | 47 | 35 | 25 | 42 | 31 | 22 |
| | | 7-20 | Interior | 83 | 83 | 77 | 83 | 83 | 71 | 83 | 80 | 65 | 83 | 76 | 60 | 83 | 71 | 54 | 81 | 65 | 50 | 77 | 61 | 45 | 68 | 52 | 38 | 61 | 44 | 50 | 53 | 38 | 43 | 46 | 51 | 38 | 40 | 45 | 33 | 54 | 40 | 30 |
| | | | Exposed | 83 | 70 | 54 | 80 | 64 | 48 | 76 | 59 | 43 | 70 | 53 | 39 | 65 | 48 | 54 | 60 | 44 | 49 | 55 | 40 | 45 | 46 | 51 | 38 | 40 | 44 | 33 | 52 | 38 | 28 | 45 | 33 | 25 | 40 | 29 | 22 | 36 | 26 | 19 |
| | | 20-27 | Interior | 90 | 90 | 85 | 90 | 88 | 80 | 90 | 83 | 76 | 90 | 79 | 70 | 90 | 75 | 64 | 90 | 70 | 60 | 88 | 65 | 55 | 81 | 56 | 46 | 76 | 48 | 40 | 68 | 42 | 52 | 62 | 55 | 45 | 55 | 48 | 40 | 48 | 43 | 36 |
| | | | Exposed | 90 | 75 | 64 | 90 | 68 | 58 | 86 | 63 | 52 | 82 | 57 | 47 | 78 | 52 | 43 | 75 | 47 | 39 | 70 | 43 | 54 | 63 | 55 | 46 | 54 | 48 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 54 | 32 | 26 | 48 | 28 | 23 |
| | | 27-45 | Interior | 93 | 93 | 92 | 93 | 93 | 87 | 93 | 91 | 82 | 93 | 87 | 78 | 90 | 83 | 75 | 85 | 79 | 69 | 81 | 76 | 64 | 75 | 67 | 56 | 65 | 60 | 48 | 58 | 52 | 41 | 51 | 46 | 55 | 45 | 40 | 48 | 40 | 54 | 43 |
| | | | Exposed | 89 | 83 | 74 | 84 | 78 | 68 | 80 | 75 | 63 | 76 | 69 | 57 | 70 | 64 | 52 | 65 | 59 | 47 | 61 | 54 | 43 | 51 | 46 | 55 | 44 | 40 | 47 | 38 | 52 | 41 | 50 | 45 | 36 | 44 | 40 | 32 | 40 | 36 | 28 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | PRO SERIES | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 77 | 83 | 83 | 73 | 83 | 80 | 68 | 83 | 77 | 64 | 83 | 75 | 56 | 79 | 67 | 43 | 74 | 57 | 37 | 68 | 46 | 32 | 61 | 39 | 28 | 50 | 34 | 24 | 42 | 30 | 22 |
| | | | Exposed | 83 | 80 | 68 | 83 | 77 | 63 | 83 | 72 | 52 | 80 | 68 | 44 | 77 | 64 | 40 | 74 | 56 | 36 | 70 | 49 | 33 | 62 | 39 | 28 | 48 | 34 | 24 | 40 | 29 | 21 | 35 | 25 | 18 | 31 | 22 | 24 | 27 | 20 | 21 |
| | | 7-20 | Interior | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 74 | 83 | 80 | 69 | 83 | 77 | 64 | 83 | 74 | 55 | 82 | 69 | 46 | 76 | 59 | 38 | 69 | 44 | 32 | 62 | 38 | 28 | 47 | 33 | 24 | 40 | 29 | 21 | 35 | 26 | 19 |
| | | | Exposed | 83 | 77 | 64 | 83 | 73 | 52 | 80 | 67 | 43 | 77 | 62 | 39 | 73 | 52 | 35 | 69 | 43 | 32 | 65 | 39 | 29 | 48 | 33 | 25 | 39 | 28 | 21 | 34 | 25 | 18 | 29 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 |
| | | 20-27 | Interior | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 81 | 84 | 84 | 77 | 84 | 80 | 73 | 84 | 77 | 69 | 84 | 74 | 65 | 84 | 66 | 48 | 79 | 52 | 39 | 75 | 41 | 34 | 68 | 36 | 29 | 62 | 31 | 26 | 51 | 28 | 23 |
| | | | Exposed | 84 | 80 | 73 | 84 | 76 | 68 | 84 | 71 | 62 | 84 | 67 | 50 | 82 | 60 | 42 | 79 | 50 | 38 | 76 | 43 | 35 | 69 | 36 | 30 | 61 | 31 | 25 | 48 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 |
| | | 27-45 | Interior | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 82 | 84 | 84 | 79 | 84 | 83 | 76 | 84 | 80 | 72 | 80 | 74 | 64 | 74 | 67 | 50 | 67 | 58 | 40 | 58 | 46 | 35 | 45 | 39 | 31 | 39 | 35 | 28 |
| | | | Exposed | 84 | 84 | 79 | 84 | 82 | 75 | 84 | 78 | 70 | 80 | 75 | 65 | 77 | 71 | 58 | 74 | 67 | 49 | 69 | 62 | 42 | 59 | 47 | 36 | 44 | 39 | 31 | 37 | 33 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 26 | 23 | 18 |
| | C | 0-7 | Interior | 83 | 82 | 70 | 83 | 78 | 65 | 83 | 75 | 57 | 82 | 70 | 49 | 79 | 66 | 42 | 76 | 61 | 38 | 72 | 53 | 35 | 65 | 42 | 29 | 53 | 36 | 25 | 42 | 31 | 22 | 37 | 27 | 19 | 33 | 24 | 25 | 29 | 21 | 23 |
| | | | Exposed | 79 | 66 | 42 | 75 | 59 | 37 | 70 | 50 | 33 | 66 | 43 | 30 | 60 | 39 | 27 | 52 | 35 | 25 | 45 | 32 | 23 | 37 | 27 | 19 | 32 | 23 | 25 | 28 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 83 | 79 | 66 | 83 | 75 | 58 | 82 | 70 | 47 | 79 | 65 | 41 | 76 | 57 | 37 | 71 | 48 | 34 | 67 | 42 | 31 | 54 | 35 | 26 | 41 | 30 | 22 | 36 | 26 | 19 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 | 20 |
| | | | Exposed | 75 | 57 | 37 | 70 | 46 | 33 | 65 | 40 | 29 | 56 | 36 | 27 | 47 | 33 | 24 | 41 | 30 | 22 | 37 | 27 | 20 | 31 | 23 | 26 | 27 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 84 | 82 | 76 | 84 | 78 | 70 | 84 | 74 | 65 | 84 | 69 | 56 | 84 | 65 | 47 | 81 | 56 | 41 | 78 | 47 | 37 | 71 | 38 | 31 | 65 | 33 | 27 | 52 | 28 | 23 | 42 | 25 | 20 | 37 | 22 | 18 | 33 | 19 | 24 |
| | | | Exposed | 84 | 65 | 46 | 80 | 53 | 40 | 76 | 44 | 36 | 73 | 39 | 32 | 68 | 35 | 29 | 64 | 32 | 27 | 56 | 29 | 24 | 42 | 25 | 21 | 36 | 21 | 18 | 31 | 18 | 23 | 27 | 24 | 20 | 24 | 22 | 18 | 21 | 19 | ~~16~~ |
| | | 27-45 | Interior | 84 | 84 | 80 | 84 | 84 | 77 | 84 | 80 | 73 | 82 | 77 | 68 | 79 | 73 | 64 | 76 | 69 | 54 | 72 | 65 | 46 | 64 | 51 | 38 | 48 | 41 | 32 | 39 | 35 | 28 | 34 | 31 | 24 | 30 | 27 | 22 | 27 | 24 | 19 |
| | | | Exposed | 79 | 73 | 63 | 75 | 68 | 52 | 70 | 63 | 43 | 65 | 53 | 39 | 57 | 45 | 35 | 47 | 40 | 32 | 41 | 37 | 29 | 35 | 31 | 25 | 30 | 27 | 21 | 26 | 23 | 18 | 23 | 20 | 24 | 20 | 18 | 21 | 18 | 24 | 19 |
| | D | 0-7 | Interior | 83 | 76 | 61 | 83 | 72 | 51 | 79 | 67 | 43 | 76 | 62 | 38 | 72 | 53 | 35 | 68 | 46 | 32 | 64 | 41 | 29 | 51 | 35 | 25 | 41 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 72 | 53 | 35 | 67 | 45 | 31 | 61 | 39 | 28 | 52 | 35 | 25 | 45 | 32 | 23 | 40 | 29 | 21 | 37 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 83 | 72 | 51 | 80 | 66 | 42 | 76 | 59 | 38 | 72 | 49 | 34 | 67 | 42 | 31 | 62 | 38 | 28 | 52 | 35 | 26 | 40 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 67 | 41 | 31 | 59 | 37 | 27 | 48 | 33 | 25 | 41 | 30 | 22 | 37 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 84 | 76 | 67 | 84 | 70 | 59 | 84 | 65 | 48 | 81 | 57 | 41 | 78 | 47 | 37 | 75 | 41 | 34 | 71 | 37 | 31 | 63 | 32 | 26 | 49 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 78 | 47 | 37 | 74 | 40 | 33 | 69 | 36 | 30 | 64 | 32 | 27 | 56 | 29 | 24 | 48 | 27 | 22 | 42 | 24 | 20 | 35 | 21 | 26 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 84 | 81 | 75 | 83 | 78 | 69 | 79 | 74 | 64 | 76 | 69 | 55 | 72 | 65 | 46 | 67 | 58 | 41 | 64 | 50 | 37 | 46 | 40 | 31 | 38 | 34 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | 24 |
| | | | Exposed | 72 | 65 | 46 | 66 | 56 | 40 | 59 | 47 | 36 | 48 | 41 | 32 | 41 | 37 | 29 | 37 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |
| 10 | B | 0-7 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 71 | 64 | 71 | 71 | 56 | 71 | 67 | 43 | 71 | 57 | 37 | 68 | 46 | 32 | 61 | 39 | 28 | 50 | 34 | 24 | 42 | 30 | 22 |
| | | | Exposed | 71 | 71 | 68 | 71 | 71 | 63 | 71 | 71 | 52 | 71 | 68 | 44 | 71 | 64 | 40 | 71 | 56 | 36 | 70 | 49 | 33 | 62 | 39 | 28 | 48 | 34 | 24 | 40 | 29 | 21 | 35 | 25 | 18 | 31 | 22 | 24 | 27 | 20 | 21 |
| | | 7-20 | Interior | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 69 | 72 | 72 | 64 | 72 | 72 | 55 | 72 | 69 | 46 | 72 | 59 | 38 | 69 | 44 | 32 | 62 | 38 | 28 | 47 | 33 | 24 | 40 | 29 | 21 | 35 | 26 | 19 |
| | | | Exposed | 72 | 72 | 64 | 72 | 72 | 52 | 72 | 67 | 43 | 72 | 62 | 39 | 72 | 52 | 35 | 69 | 43 | 32 | 65 | 39 | 29 | 48 | 33 | 25 | 39 | 28 | 21 | 34 | 25 | 18 | 29 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 |
| | | 20-27 | Interior | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 77 | 81 | 80 | 73 | 81 | 77 | 69 | 81 | 74 | 65 | 81 | 66 | 48 | 79 | 52 | 39 | 75 | 41 | 34 | 68 | 36 | 29 | 62 | 31 | 26 | 51 | 28 | 23 |
| | | | Exposed | 81 | 80 | 73 | 81 | 76 | 68 | 81 | 71 | 62 | 81 | 67 | 50 | 81 | 60 | 42 | 79 | 50 | 38 | 76 | 43 | 35 | 69 | 36 | 30 | 61 | 31 | 25 | 48 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 |
| | | 27-45 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 82 | 83 | 83 | 79 | 83 | 83 | 76 | 83 | 80 | 72 | 80 | 74 | 64 | 74 | 67 | 50 | 67 | 58 | 40 | 58 | 46 | 35 | 45 | 39 | 31 | 39 | 35 | 28 |
| | | | Exposed | 83 | 83 | 79 | 83 | 82 | 75 | 83 | 78 | 70 | 80 | 75 | 65 | 77 | 71 | 58 | 74 | 67 | 49 | 69 | 62 | 42 | 59 | 47 | 36 | 44 | 39 | 31 | 37 | 33 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 26 | 23 | 18 |
| | C | 0-7 | Interior | 71 | 71 | 70 | 71 | 71 | 65 | 71 | 71 | 57 | 71 | 70 | 49 | 71 | 66 | 42 | 71 | 61 | 38 | 71 | 53 | 35 | 65 | 42 | 29 | 53 | 36 | 25 | 42 | 31 | 22 | 37 | 27 | 19 | 33 | 24 | 25 | 29 | 21 | 23 |
| | | | Exposed | 71 | 66 | 42 | 71 | 59 | 37 | 70 | 50 | 33 | 66 | 43 | 30 | 60 | 39 | 27 | 52 | 35 | 25 | 45 | 32 | 23 | 37 | 27 | 19 | 32 | 23 | 25 | 28 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 72 | 72 | 66 | 72 | 72 | 58 | 72 | 70 | 47 | 72 | 65 | 41 | 72 | 57 | 37 | 71 | 48 | 34 | 67 | 42 | 31 | 54 | 35 | 26 | 41 | 30 | 22 | 36 | 26 | 19 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 | 20 |
| | | | Exposed | 72 | 57 | 37 | 70 | 46 | 33 | 65 | 40 | 29 | 56 | 36 | 27 | 47 | 33 | 24 | 41 | 30 | 22 | 37 | 27 | 20 | 31 | 23 | 26 | 27 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 81 | 81 | 76 | 81 | 78 | 70 | 81 | 74 | 65 | 81 | 69 | 56 | 81 | 65 | 47 | 81 | 56 | 41 | 78 | 47 | 37 | 71 | 38 | 31 | 65 | 33 | 27 | 52 | 28 | 23 | 42 | 25 | 20 | 37 | 22 | 18 | 33 | 19 | 24 |
| | | | Exposed | 81 | 65 | 46 | 80 | 53 | 40 | 76 | 44 | 36 | 73 | 39 | 32 | 68 | 35 | 29 | 64 | 32 | 27 | 56 | 29 | 24 | 42 | 25 | 21 | 36 | 21 | 18 | 31 | 18 | 23 | 27 | 24 | 20 | 24 | 22 | 18 | 21 | 19 | ~~16~~ |
| | | 27-45 | Interior | 83 | 83 | 80 | 83 | 83 | 77 | 83 | 80 | 73 | 82 | 77 | 68 | 79 | 73 | 64 | 76 | 69 | 54 | 72 | 65 | 46 | 64 | 51 | 38 | 48 | 41 | 32 | 39 | 35 | 28 | 34 | 31 | 24 | 30 | 27 | 22 | 27 | 24 | 19 |
| | | | Exposed | 79 | 73 | 63 | 75 | 68 | 52 | 70 | 63 | 43 | 65 | 53 | 39 | 57 | 45 | 35 | 47 | 40 | 32 | 41 | 37 | 29 | 35 | 31 | 25 | 30 | 27 | 21 | 26 | 23 | 18 | 23 | 20 | 24 | 20 | 18 | 21 | 18 | 24 | 19 |
| | D | 0-7 | Interior | 71 | 71 | 61 | 71 | 71 | 51 | 71 | 67 | 43 | 71 | 62 | 38 | 71 | 53 | 35 | 68 | 46 | 32 | 64 | 41 | 29 | 51 | 35 | 25 | 41 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 71 | 53 | 35 | 67 | 45 | 31 | 61 | 39 | 28 | 52 | 35 | 25 | 45 | 32 | 23 | 40 | 29 | 21 | 37 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 72 | 72 | 51 | 72 | 66 | 42 | 72 | 59 | 38 | 72 | 49 | 34 | 67 | 42 | 31 | 62 | 38 | 28 | 52 | 35 | 26 | 40 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 67 | 41 | 31 | 59 | 37 | 27 | 48 | 33 | 25 | 41 | 30 | 22 | 37 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 82 | 76 | 67 | 82 | 70 | 59 | 82 | 65 | 48 | 81 | 57 | 41 | 78 | 47 | 37 | 75 | 41 | 34 | 71 | 37 | 31 | 63 | 32 | 26 | 49 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 78 | 47 | 37 | 74 | 40 | 33 | 69 | 36 | 30 | 64 | 32 | 27 | 56 | 29 | 24 | 48 | 27 | 22 | 42 | 24 | 20 | 35 | 21 | 26 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 84 | 81 | 75 | 83 | 78 | 69 | 79 | 74 | 64 | 76 | 69 | 55 | 72 | 65 | 46 | 67 | 58 | 41 | 64 | 50 | 37 | 46 | 40 | 31 | 38 | 34 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | 24 |
| | | | Exposed | 72 | 65 | 46 | 66 | 56 | 40 | 59 | 47 | 36 | 48 | 41 | 32 | 41 | 37 | 29 | 37 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |
| 20 | B | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 43 | 53 | 53 | 37 | 53 | 46 | 32 | 53 | 39 | 28 | 50 | 34 | 24 | 42 | 30 | 22 |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 44 | 53 | 53 | 40 | 53 | 53 | 36 | 53 | 49 | 33 | 53 | 39 | 28 | 48 | 34 | 24 | 40 | 29 | 21 | 35 | 25 | 18 | 31 | 22 | 24 | 27 | 20 | 21 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 46 | 53 | 53 | 38 | 53 | 44 | 32 | 53 | 38 | 28 | 47 | 33 | 24 | 40 | 29 | 21 | 35 | 26 | 19 |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 43 | 53 | 53 | 39 | 53 | 52 | 35 | 53 | 43 | 32 | 53 | 39 | 29 | 48 | 33 | 25 | 39 | 28 | 21 | 34 | 25 | 18 | 29 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 |
| | | 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 | 48 | 61 | 52 | 39 | 61 | 41 | 34 | 61 | 36 | 29 | 61 | 31 | 26 | 51 | 28 | 23 |
| | | | Exposed | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 50 | 61 | 60 | 42 | 61 | 50 | 38 | 61 | 43 | 35 | 61 | 36 | 30 | 61 | 31 | 25 | 48 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 50 | 56 | 56 | 40 | 56 | 46 | 35 | 45 | 39 | 31 | 39 | 35 | 28 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 49 | 56 | 56 | 42 | 56 | 47 | 36 | 44 | 39 | 31 | 37 | 33 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 26 | 23 | 18 |
| | C | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 49 | 53 | 53 | 42 | 53 | 53 | 38 | 53 | 53 | 35 | 53 | 42 | 29 | 53 | 36 | 25 | 42 | 31 | 22 | 37 | 27 | 19 | 33 | 24 | 25 | 29 | 21 | 23 |
| | | | Exposed | 53 | 53 | 42 | 53 | 53 | 37 | 53 | 50 | 33 | 53 | 43 | 30 | 53 | 39 | 27 | 52 | 35 | 25 | 45 | 32 | 23 | 37 | 27 | 19 | 32 | 23 | 25 | 28 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 47 | 53 | 53 | 41 | 53 | 53 | 37 | 53 | 48 | 34 | 53 | 42 | 31 | 53 | 35 | 26 | 41 | 30 | 22 | 36 | 26 | 19 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 | 20 |
| | | | Exposed | 53 | 53 | 37 | 53 | 46 | 33 | 53 | 40 | 29 | 53 | 36 | 27 | 47 | 33 | 24 | 41 | 30 | 22 | 37 | 27 | 20 | 31 | 23 | 26 | 27 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 56 | 61 | 61 | 47 | 61 | 56 | 41 | 61 | 47 | 37 | 61 | 38 | 31 | 61 | 33 | 27 | 52 | 28 | 23 | 42 | 25 | 20 | 37 | 22 | 18 | 33 | 19 | 24 |
| | | | Exposed | 61 | 61 | 46 | 61 | 53 | 40 | 61 | 44 | 36 | 61 | 39 | 32 | 61 | 35 | 29 | 61 | 32 | 27 | 56 | 29 | 24 | 42 | 25 | 21 | 36 | 21 | 18 | 31 | 18 | 23 | 27 | 24 | 20 | 24 | 22 | 18 | 21 | 19 | ~~16~~ |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 54 | 56 | 56 | 46 | 56 | 51 | 38 | 48 | 41 | 32 | 39 | 35 | 28 | 34 | 31 | 24 | 30 | 27 | 22 | 27 | 24 | 19 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 52 | 56 | 56 | 43 | 56 | 53 | 39 | 56 | 45 | 35 | 47 | 40 | 32 | 41 | 37 | 29 | 35 | 31 | 25 | 30 | 27 | 21 | 26 | 23 | 18 | 23 | 20 | 24 | 20 | 18 | 21 | 18 | 24 | 19 |
| | D | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 51 | 53 | 53 | 43 | 53 | 53 | 38 | 53 | 53 | 35 | 53 | 46 | 32 | 53 | 41 | 29 | 51 | 35 | 25 | 41 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 53 | 53 | 35 | 53 | 45 | 31 | 53 | 39 | 28 | 52 | 35 | 25 | 45 | 32 | 23 | 40 | 29 | 21 | 37 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 53 | 53 | 51 | 53 | 53 | 42 | 53 | 53 | 38 | 53 | 49 | 34 | 53 | 42 | 31 | 53 | 38 | 28 | 52 | 35 | 26 | 40 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 53 | 41 | 31 | 53 | 37 | 27 | 48 | 33 | 25 | 41 | 30 | 22 | 37 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 66 | 66 | 66 | 66 | 66 | 59 | 66 | 65 | 48 | 66 | 57 | 41 | 66 | 47 | 37 | 66 | 41 | 34 | 66 | 37 | 31 | 63 | 32 | 26 | 49 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 66 | 47 | 37 | 66 | 40 | 33 | 66 | 36 | 30 | 64 | 32 | 27 | 56 | 29 | 24 | 48 | 27 | 22 | 42 | 24 | 20 | 35 | 21 | 26 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 55 | 60 | 60 | 46 | 60 | 58 | 41 | 60 | 50 | 37 | 46 | 40 | 31 | 38 | 34 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | 24 |
| | | | Exposed | 60 | 60 | 46 | 60 | 56 | 40 | 59 | 47 | 36 | 48 | 41 | 32 | 41 | 37 | 29 | 37 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 24 | 28 | 28 | 22 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 24 | 28 | 28 | 21 | 28 | 25 | 18 | 28 | 22 | 24 | 27 | 20 | 21 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 29 | 29 | 24 | 29 | 29 | 21 | 28 | 26 | 19 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 25 | 29 | 28 | 21 | 29 | 25 | 18 | 29 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 |
| | | 20-27 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 23 | 19 | 24 | 21 | 26 | 24 | 18 | 23 |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 18 |
| | C | 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 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 22 | 28 | 27 | 19 | 28 | 24 | 25 | 28 | 21 | 23 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 28 | 25 | 28 | 28 | 23 | 28 | 27 | 19 | 28 | 23 | 25 | 28 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 22 | 28 | 26 | 19 | 27 | 23 | 25 | 26 | 20 | 22 | 24 | 18 | 20 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 27 | 29 | 29 | 24 | 29 | 29 | 22 | 29 | 27 | 20 | 29 | 23 | 26 | 27 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 20 | 24 | 22 | 18 | 24 | 19 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 21 | 18 | 24 | 18 | 23 | 24 | 24 | 20 | 24 | 22 | 18 | 21 | 19 | ~~16~~ |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 18 | 22 | 20 | 24 | 20 | 18 | 21 | 18 | 24 | 19 |
| | D | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 31 | 25 | 31 | 30 | 21 | 31 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 31 | 25 | 31 | 31 | 23 | 31 | 29 | 21 | 31 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 31 | 32 | 32 | 28 | 32 | 32 | 26 | 31 | 29 | 22 | 30 | 25 | 19 | 28 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 32 | 32 | 31 | 32 | 32 | 27 | 32 | 32 | 25 | 32 | 30 | 22 | 32 | 27 | 20 | 32 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 22 | 26 | 23 | 19 | 26 | 21 | 26 | 26 | 18 | 23 | 26 | 24 | 20 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 22 | 26 | 24 | 20 | 26 | 21 | 26 | 26 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 20 | 25 | 23 | 18 | 22 | 20 | 24 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |
| 70 | B | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 24 | 18 | 24 | 22 | 24 | 24 | 20 | 21 |
| | | 7-20 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 21 | 25 | 25 | 19 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 21 | 25 | 25 | 18 | 25 | 22 | 24 | 25 | 19 | 21 | 23 | 25 | 19 | 23 | 25 | 19 |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 26 | 20 | 18 | 23 |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 |
| | C | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 24 | 24 | 25 | 24 | 21 | 23 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 19 | 24 | 23 | 25 | 24 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 22 | 25 | 25 | 19 | 24 | 23 | 25 | 23 | 20 | 22 | 23 | 18 | 20 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 22 | 25 | 25 | 20 | 25 | 23 | 26 | 25 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 24 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 18 | 23 | 20 | 24 | 20 | 20 | 22 | 18 | 20 | 19 | ~~16~~ |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 24 | 19 | 18 | 21 | 18 | 24 | 19 |
| | 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 | 25 | 27 | 27 | 21 | 27 | 26 | 18 | 27 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 25 | 27 | 27 | 23 | 27 | 27 | 21 | 27 | 27 | 19 | 27 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 22 | 27 | 25 | 19 | 26 | 22 | 24 | 25 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 25 | 27 | 27 | 22 | 27 | 27 | 20 | 27 | 25 | 18 | 27 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 19 | 23 | 21 | 26 | 23 | 18 | 23 | 23 | 24 | 20 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 20 | 23 | 21 | 26 | 23 | 18 | 22 | 23 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 21 | 21 | 18 | 21 | 20 | 24 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 18 | 21 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |
| 80 | B | 0-7 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 18 | 21 | 21 | 24 | 21 | 20 | 21 |
| | | 7-20 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 19 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 18 | 22 | 22 | 24 | 22 | 19 | 21 | 22 | 25 | 19 |
| | | 20-27 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 26 | 18 | 18 | 23 |
| | | 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 |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| | C | 0-7 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 19 | 21 | 21 | 25 | 21 | 21 | 23 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 25 | 21 | 20 | 22 | 21 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 | 22 | 22 | 25 | 21 | 20 | 22 | 21 | 18 | 20 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 20 | 22 | 22 | 26 | 22 | 20 | 22 | 22 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 23 | 18 | 24 | 20 | 18 | 22 | 18 | 18 | 19 | ~~16~~ |
| | | 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 |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 24 | 17 | 17 | 21 | 17 | 24 | 19 |
| | D | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 24 | 18 | 24 | 22 | 24 | 24 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 21 | 24 | 24 | 19 | 24 | 23 | 24 | 24 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 23 | 22 | 24 | 23 | 19 | 21 | 22 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 20 | 24 | 24 | 18 | 24 | 23 | 25 | 24 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 26 | 20 | 18 | 23 | 20 | 24 | 20 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 26 | 20 | 18 | 22 | 20 | 23 | 19 | 20 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 24 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 93 | 98 | 98 | 88 | 98 | 98 | 84 | 98 | 93 | 80 | 98 | 89 | 77 | 96 | 83 | 69 | 89 | 77 | 61 | 84 | 71 | 53 | 79 | 64 | 46 | 74 | 58 | 41 | 68 | 51 | 36 |
| | | | Exposed | 98 | 97 | 84 | 98 | 92 | 79 | 98 | 88 | 75 | 97 | 84 | 70 | 93 | 80 | 65 | 89 | 77 | 61 | 85 | 73 | 55 | 79 | 65 | 47 | 73 | 57 | 40 | 65 | 49 | 35 | 59 | 43 | 30 | 52 | 38 | 41 | 46 | 34 | 36 |
| | | 7-20 | Interior | 99 | 99 | 99 | 99 | 99 | 95 | 99 | 99 | 89 | 99 | 99 | 84 | 99 | 94 | 80 | 99 | 89 | 77 | 99 | 85 | 72 | 93 | 78 | 63 | 85 | 71 | 54 | 79 | 63 | 47 | 73 | 55 | 41 | 65 | 49 | 36 | 59 | 43 | 32 |
| | | | Exposed | 99 | 94 | 80 | 99 | 88 | 76 | 99 | 83 | 69 | 94 | 79 | 64 | 89 | 75 | 59 | 85 | 70 | 54 | 81 | 65 | 49 | 74 | 56 | 41 | 64 | 48 | 36 | 57 | 42 | 31 | 50 | 36 | 41 | 44 | 32 | 36 | 39 | 43 | 32 |
| | | 20-27 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 94 | 99 | 99 | 89 | 99 | 94 | 85 | 99 | 89 | 81 | 99 | 82 | 74 | 97 | 75 | 64 | 90 | 66 | 57 | 84 | 60 | 50 | 79 | 53 | 44 | 75 | 47 | 39 |
| | | | Exposed | 99 | 99 | 89 | 99 | 92 | 84 | 99 | 87 | 79 | 99 | 83 | 75 | 99 | 79 | 69 | 96 | 75 | 64 | 92 | 69 | 59 | 85 | 61 | 50 | 79 | 52 | 43 | 73 | 45 | 37 | 65 | 39 | 33 | 59 | 35 | 43 | 52 | 31 | 38 |
| | | 27-45 | Interior | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 96 | 100 | 100 | 92 | 100 | 97 | 88 | 98 | 89 | 81 | 90 | 83 | 75 | 83 | 78 | 66 | 78 | 71 | 59 | 71 | 65 | 52 | 64 | 59 | 47 |
| | | | Exposed | 100 | 100 | 96 | 100 | 100 | 90 | 100 | 95 | 86 | 99 | 90 | 81 | 94 | 86 | 78 | 89 | 82 | 74 | 85 | 79 | 68 | 78 | 72 | 60 | 70 | 64 | 52 | 63 | 56 | 45 | 55 | 49 | 39 | 48 | 43 | 34 | 43 | 39 | 31 |
| | C | 0-7 | Interior | 98 | 98 | 86 | 98 | 95 | 81 | 98 | 90 | 77 | 98 | 86 | 73 | 95 | 82 | 68 | 91 | 79 | 64 | 87 | 76 | 59 | 81 | 67 | 50 | 76 | 60 | 43 | 68 | 52 | 37 | 62 | 45 | 32 | 55 | 40 | 43 | 49 | 36 | 38 |
| | | | Exposed | 95 | 82 | 67 | 90 | 78 | 63 | 86 | 74 | 56 | 82 | 68 | 51 | 78 | 64 | 46 | 75 | 59 | 42 | 70 | 54 | 38 | 63 | 46 | 33 | 54 | 39 | 42 | 47 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 99 | 97 | 82 | 99 | 91 | 78 | 99 | 86 | 73 | 97 | 81 | 66 | 92 | 77 | 62 | 87 | 73 | 57 | 83 | 68 | 52 | 76 | 59 | 44 | 67 | 51 | 38 | 60 | 44 | 33 | 52 | 38 | 43 | 46 | 34 | 38 | 41 | 30 | 34 |
| | | | Exposed | 91 | 77 | 62 | 86 | 72 | 55 | 81 | 65 | 50 | 77 | 61 | 45 | 72 | 55 | 41 | 66 | 50 | 37 | 63 | 46 | 34 | 53 | 39 | 43 | 45 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 99 | 99 | 92 | 99 | 95 | 86 | 99 | 90 | 81 | 99 | 85 | 77 | 99 | 81 | 72 | 99 | 77 | 66 | 94 | 73 | 63 | 87 | 64 | 53 | 81 | 55 | 45 | 75 | 47 | 39 | 68 | 42 | 34 | 62 | 37 | 30 | 55 | 33 | 41 |
| | | | Exposed | 99 | 81 | 72 | 98 | 76 | 65 | 92 | 70 | 60 | 88 | 64 | 54 | 84 | 59 | 49 | 80 | 54 | 45 | 77 | 50 | 41 | 69 | 42 | 35 | 61 | 36 | 30 | 53 | 31 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 36 | 32 | 27 |
| | | 27-45 | Interior | 100 | 100 | 99 | 100 | 100 | 93 | 100 | 98 | 88 | 100 | 93 | 84 | 97 | 89 | 80 | 92 | 85 | 76 | 88 | 81 | 72 | 80 | 75 | 63 | 74 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 36 | 45 | 41 | 32 |
| | | | Exposed | 97 | 88 | 80 | 91 | 84 | 75 | 86 | 80 | 69 | 81 | 76 | 64 | 77 | 71 | 59 | 73 | 66 | 54 | 67 | 62 | 49 | 59 | 53 | 42 | 50 | 45 | 36 | 44 | 39 | 31 | 38 | 34 | 41 | 34 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 98 | 92 | 79 | 98 | 87 | 75 | 96 | 83 | 69 | 92 | 79 | 64 | 87 | 76 | 59 | 84 | 71 | 53 | 80 | 67 | 49 | 75 | 58 | 41 | 66 | 50 | 35 | 59 | 43 | 31 | 52 | 38 | 41 | 46 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 87 | 76 | 58 | 83 | 70 | 52 | 79 | 65 | 47 | 75 | 60 | 42 | 70 | 54 | 38 | 66 | 49 | 35 | 62 | 45 | 32 | 52 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 99 | 87 | 75 | 98 | 82 | 68 | 92 | 78 | 63 | 87 | 74 | 57 | 83 | 68 | 52 | 79 | 64 | 47 | 76 | 58 | 43 | 65 | 49 | 37 | 58 | 42 | 31 | 50 | 37 | 41 | 44 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 83 | 67 | 52 | 78 | 62 | 46 | 74 | 56 | 41 | 67 | 50 | 37 | 63 | 46 | 34 | 57 | 42 | 31 | 52 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | Interior | 99 | 92 | 83 | 99 | 86 | 78 | 99 | 82 | 74 | 99 | 77 | 67 | 94 | 73 | 62 | 90 | 67 | 57 | 86 | 63 | 52 | 80 | 53 | 44 | 74 | 46 | 38 | 65 | 40 | 33 | 59 | 35 | 43 | 52 | 31 | 38 | 46 | 41 | 34 |
| | | | Exposed | 94 | 73 | 62 | 89 | 65 | 56 | 84 | 60 | 50 | 80 | 55 | 45 | 77 | 49 | 41 | 73 | 45 | 37 | 68 | 41 | 34 | 59 | 35 | 44 | 51 | 30 | 38 | 44 | 39 | 33 | 39 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 100 | 100 | 90 | 100 | 94 | 85 | 98 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 72 | 83 | 78 | 66 | 80 | 74 | 62 | 72 | 65 | 53 | 64 | 57 | 45 | 55 | 50 | 39 | 48 | 43 | 34 | 43 | 38 | 30 | 38 | 34 | 41 |
| | | | Exposed | 87 | 81 | 71 | 82 | 77 | 65 | 78 | 72 | 60 | 74 | 66 | 54 | 67 | 62 | 49 | 63 | 56 | 45 | 58 | 52 | 41 | 49 | 44 | 35 | 42 | 38 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |
| 10 | B | 0-7 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 88 | 92 | 92 | 84 | 92 | 92 | 80 | 92 | 89 | 77 | 92 | 83 | 69 | 89 | 77 | 61 | 84 | 71 | 53 | 79 | 64 | 46 | 74 | 58 | 41 | 68 | 51 | 36 |
| | | | Exposed | 92 | 92 | 84 | 92 | 92 | 79 | 92 | 88 | 75 | 92 | 84 | 70 | 92 | 80 | 65 | 89 | 77 | 61 | 85 | 73 | 55 | 79 | 65 | 47 | 73 | 57 | 40 | 65 | 49 | 35 | 59 | 43 | 30 | 52 | 38 | 41 | 46 | 34 | 36 |
| | | 7-20 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 89 | 92 | 92 | 84 | 92 | 92 | 80 | 92 | 89 | 77 | 92 | 85 | 72 | 92 | 78 | 63 | 85 | 71 | 54 | 79 | 63 | 47 | 73 | 55 | 41 | 65 | 49 | 36 | 59 | 43 | 32 |
| | | | Exposed | 92 | 92 | 80 | 92 | 88 | 76 | 92 | 83 | 69 | 92 | 79 | 64 | 89 | 75 | 59 | 85 | 70 | 54 | 81 | 65 | 49 | 74 | 56 | 41 | 64 | 48 | 36 | 57 | 42 | 31 | 50 | 36 | 41 | 44 | 32 | 36 | 39 | 43 | 32 |
| | | 20-27 | Interior | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 94 | 96 | 96 | 89 | 96 | 94 | 85 | 96 | 89 | 81 | 96 | 82 | 74 | 96 | 75 | 64 | 90 | 66 | 57 | 84 | 60 | 50 | 79 | 53 | 44 | 75 | 47 | 39 |
| | | | Exposed | 96 | 96 | 89 | 96 | 92 | 84 | 96 | 87 | 79 | 96 | 83 | 75 | 96 | 79 | 69 | 96 | 75 | 64 | 92 | 69 | 59 | 85 | 61 | 50 | 79 | 52 | 43 | 73 | 45 | 37 | 65 | 39 | 33 | 59 | 35 | 43 | 52 | 31 | 38 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 96 | 99 | 99 | 92 | 99 | 97 | 88 | 98 | 89 | 81 | 90 | 83 | 75 | 83 | 78 | 66 | 78 | 71 | 59 | 71 | 65 | 52 | 64 | 59 | 47 |
| | | | Exposed | 99 | 99 | 96 | 99 | 99 | 90 | 99 | 95 | 86 | 99 | 90 | 81 | 94 | 86 | 78 | 89 | 82 | 74 | 85 | 79 | 68 | 78 | 72 | 60 | 70 | 64 | 52 | 63 | 56 | 45 | 55 | 49 | 39 | 48 | 43 | 34 | 43 | 39 | 31 |
| | C | 0-7 | Interior | 92 | 92 | 86 | 92 | 92 | 81 | 92 | 90 | 77 | 92 | 86 | 73 | 92 | 82 | 68 | 91 | 79 | 64 | 87 | 76 | 59 | 81 | 67 | 50 | 76 | 60 | 43 | 68 | 52 | 37 | 62 | 45 | 32 | 55 | 40 | 43 | 49 | 36 | 38 |
| | | | Exposed | 92 | 82 | 67 | 90 | 78 | 63 | 86 | 74 | 56 | 82 | 68 | 51 | 78 | 64 | 46 | 75 | 59 | 42 | 70 | 54 | 38 | 63 | 46 | 33 | 54 | 39 | 42 | 47 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 92 | 92 | 82 | 92 | 91 | 78 | 92 | 86 | 73 | 92 | 81 | 66 | 92 | 77 | 62 | 87 | 73 | 57 | 83 | 68 | 52 | 76 | 59 | 44 | 67 | 51 | 38 | 60 | 44 | 33 | 52 | 38 | 43 | 46 | 34 | 38 | 41 | 30 | 34 |
| | | | Exposed | 91 | 77 | 62 | 86 | 72 | 55 | 81 | 65 | 50 | 77 | 61 | 45 | 72 | 55 | 41 | 66 | 50 | 37 | 63 | 46 | 34 | 53 | 39 | 43 | 45 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 96 | 96 | 92 | 96 | 95 | 86 | 96 | 90 | 81 | 96 | 85 | 77 | 96 | 81 | 72 | 96 | 77 | 66 | 94 | 73 | 63 | 87 | 64 | 53 | 81 | 55 | 45 | 75 | 47 | 39 | 68 | 42 | 34 | 62 | 37 | 30 | 55 | 33 | 41 |
| | | | Exposed | 96 | 81 | 72 | 96 | 76 | 65 | 92 | 70 | 60 | 88 | 64 | 54 | 84 | 59 | 49 | 80 | 54 | 45 | 77 | 50 | 41 | 69 | 42 | 35 | 61 | 36 | 30 | 53 | 31 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 36 | 32 | 27 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 93 | 99 | 98 | 88 | 99 | 93 | 84 | 97 | 89 | 80 | 92 | 85 | 76 | 88 | 81 | 72 | 80 | 75 | 63 | 74 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 36 | 45 | 41 | 32 |
| | | | Exposed | 97 | 88 | 80 | 91 | 84 | 75 | 86 | 80 | 69 | 81 | 76 | 64 | 77 | 71 | 59 | 73 | 66 | 54 | 67 | 62 | 49 | 59 | 53 | 42 | 50 | 45 | 36 | 44 | 39 | 31 | 38 | 34 | 41 | 34 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 92 | 92 | 79 | 92 | 87 | 75 | 92 | 83 | 69 | 92 | 79 | 64 | 87 | 76 | 59 | 84 | 71 | 53 | 80 | 67 | 49 | 75 | 58 | 41 | 66 | 50 | 35 | 59 | 43 | 31 | 52 | 38 | 41 | 46 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 87 | 76 | 58 | 83 | 70 | 52 | 79 | 65 | 47 | 75 | 60 | 42 | 70 | 54 | 38 | 66 | 49 | 35 | 62 | 45 | 32 | 52 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 92 | 87 | 75 | 92 | 82 | 68 | 92 | 78 | 63 | 87 | 74 | 57 | 83 | 68 | 52 | 79 | 64 | 47 | 76 | 58 | 43 | 65 | 49 | 37 | 58 | 42 | 31 | 50 | 37 | 41 | 44 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 83 | 67 | 52 | 78 | 62 | 46 | 74 | 56 | 41 | 67 | 50 | 37 | 63 | 46 | 34 | 57 | 42 | 31 | 52 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | Interior | 97 | 92 | 83 | 97 | 86 | 78 | 97 | 82 | 74 | 97 | 77 | 67 | 94 | 73 | 62 | 90 | 67 | 57 | 86 | 63 | 52 | 80 | 53 | 44 | 74 | 46 | 38 | 65 | 40 | 33 | 59 | 35 | 43 | 52 | 31 | 38 | 46 | 41 | 34 |
| | | | Exposed | 94 | 73 | 62 | 89 | 65 | 56 | 84 | 60 | 50 | 80 | 55 | 45 | 77 | 49 | 41 | 73 | 45 | 37 | 68 | 41 | 34 | 59 | 35 | 44 | 51 | 30 | 38 | 44 | 39 | 33 | 39 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 99 | 99 | 90 | 99 | 94 | 85 | 98 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 72 | 83 | 78 | 66 | 80 | 74 | 62 | 72 | 65 | 53 | 64 | 57 | 45 | 55 | 50 | 39 | 48 | 43 | 34 | 43 | 38 | 30 | 38 | 34 | 41 |
| | | | Exposed | 87 | 81 | 71 | 82 | 77 | 65 | 78 | 72 | 60 | 74 | 66 | 54 | 67 | 62 | 49 | 63 | 56 | 45 | 58 | 52 | 41 | 49 | 44 | 35 | 42 | 38 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |
| 20 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 77 | 83 | 83 | 69 | 83 | 77 | 61 | 83 | 71 | 53 | 79 | 64 | 46 | 74 | 58 | 41 | 68 | 51 | 36 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 83 | 70 | 83 | 80 | 65 | 83 | 77 | 61 | 83 | 73 | 55 | 79 | 65 | 47 | 73 | 57 | 40 | 65 | 49 | 35 | 59 | 43 | 30 | 52 | 38 | 41 | 46 | 34 | 36 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 77 | 83 | 83 | 72 | 83 | 78 | 63 | 83 | 71 | 54 | 79 | 63 | 47 | 73 | 55 | 41 | 65 | 49 | 36 | 59 | 43 | 32 |
| | | | Exposed | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 69 | 83 | 79 | 64 | 83 | 75 | 59 | 83 | 70 | 54 | 81 | 65 | 49 | 74 | 56 | 41 | 64 | 48 | 36 | 57 | 42 | 31 | 50 | 36 | 41 | 44 | 32 | 36 | 39 | 43 | 32 |
| | | 20-27 | Interior | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 85 | 89 | 89 | 81 | 89 | 82 | 74 | 89 | 75 | 64 | 89 | 66 | 57 | 84 | 60 | 50 | 79 | 53 | 44 | 75 | 47 | 39 |
| | | | Exposed | 89 | 89 | 89 | 89 | 89 | 84 | 89 | 87 | 79 | 89 | 83 | 75 | 89 | 79 | 69 | 89 | 75 | 64 | 89 | 69 | 59 | 85 | 61 | 50 | 79 | 52 | 43 | 73 | 45 | 37 | 65 | 39 | 33 | 59 | 35 | 43 | 52 | 31 | 38 |
| | | 27-45 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 88 | 92 | 89 | 81 | 90 | 83 | 75 | 83 | 78 | 66 | 78 | 71 | 59 | 71 | 65 | 52 | 64 | 59 | 47 |
| | | | Exposed | 92 | 92 | 92 | 92 | 92 | 90 | 92 | 92 | 86 | 92 | 90 | 81 | 92 | 86 | 78 | 89 | 82 | 74 | 85 | 79 | 68 | 78 | 72 | 60 | 70 | 64 | 52 | 63 | 56 | 45 | 55 | 49 | 39 | 48 | 43 | 34 | 43 | 39 | 31 |
| | C | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 73 | 83 | 82 | 68 | 83 | 79 | 64 | 83 | 76 | 59 | 81 | 67 | 50 | 76 | 60 | 43 | 68 | 52 | 37 | 62 | 45 | 32 | 55 | 40 | 43 | 49 | 36 | 38 |
| | | | Exposed | 83 | 82 | 67 | 83 | 78 | 63 | 83 | 74 | 56 | 82 | 68 | 51 | 78 | 64 | 46 | 75 | 59 | 42 | 70 | 54 | 38 | 63 | 46 | 33 | 54 | 39 | 42 | 47 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 83 | 83 | 82 | 83 | 83 | 78 | 83 | 83 | 73 | 83 | 81 | 66 | 83 | 77 | 62 | 83 | 73 | 57 | 83 | 68 | 52 | 76 | 59 | 44 | 67 | 51 | 38 | 60 | 44 | 33 | 52 | 38 | 43 | 46 | 34 | 38 | 41 | 30 | 34 |
| | | | Exposed | 83 | 77 | 62 | 83 | 72 | 55 | 81 | 65 | 50 | 77 | 61 | 45 | 72 | 55 | 41 | 66 | 50 | 37 | 63 | 46 | 34 | 53 | 39 | 43 | 45 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 89 | 89 | 89 | 89 | 89 | 86 | 89 | 89 | 81 | 89 | 85 | 77 | 89 | 81 | 72 | 89 | 77 | 66 | 89 | 73 | 63 | 87 | 64 | 53 | 81 | 55 | 45 | 75 | 47 | 39 | 68 | 42 | 34 | 62 | 37 | 30 | 55 | 33 | 41 |
| | | | Exposed | 89 | 81 | 72 | 89 | 76 | 65 | 89 | 70 | 60 | 88 | 64 | 54 | 84 | 59 | 49 | 80 | 54 | 45 | 77 | 50 | 41 | 69 | 42 | 35 | 61 | 36 | 30 | 53 | 31 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 36 | 32 | 27 |
| | | 27-45 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 88 | 92 | 92 | 84 | 92 | 89 | 80 | 92 | 85 | 76 | 88 | 81 | 72 | 80 | 75 | 63 | 74 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 36 | 45 | 41 | 32 |
| | | | Exposed | 92 | 88 | 80 | 91 | 84 | 75 | 86 | 80 | 69 | 81 | 76 | 64 | 77 | 71 | 59 | 73 | 66 | 54 | 67 | 62 | 49 | 59 | 53 | 42 | 50 | 45 | 36 | 44 | 39 | 31 | 38 | 34 | 41 | 34 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 83 | 69 | 83 | 79 | 64 | 83 | 76 | 59 | 83 | 71 | 53 | 80 | 67 | 49 | 75 | 58 | 41 | 66 | 50 | 35 | 59 | 43 | 31 | 52 | 38 | 41 | 46 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 83 | 76 | 58 | 83 | 70 | 52 | 79 | 65 | 47 | 75 | 60 | 42 | 70 | 54 | 38 | 66 | 49 | 35 | 62 | 45 | 32 | 52 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 83 | 83 | 75 | 83 | 82 | 68 | 83 | 78 | 63 | 83 | 74 | 57 | 83 | 68 | 52 | 79 | 64 | 47 | 76 | 58 | 43 | 65 | 49 | 37 | 58 | 42 | 31 | 50 | 37 | 41 | 44 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 83 | 67 | 52 | 78 | 62 | 46 | 74 | 56 | 41 | 67 | 50 | 37 | 63 | 46 | 34 | 57 | 42 | 31 | 52 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | Interior | 90 | 90 | 83 | 90 | 86 | 78 | 90 | 82 | 74 | 90 | 77 | 67 | 90 | 73 | 62 | 90 | 67 | 57 | 86 | 63 | 52 | 80 | 53 | 44 | 74 | 46 | 38 | 65 | 40 | 33 | 59 | 35 | 43 | 52 | 31 | 38 | 46 | 41 | 34 |
| | | | Exposed | 90 | 73 | 62 | 89 | 65 | 56 | 84 | 60 | 50 | 80 | 55 | 45 | 77 | 49 | 41 | 73 | 45 | 37 | 68 | 41 | 34 | 59 | 35 | 44 | 51 | 30 | 38 | 44 | 39 | 33 | 39 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 93 | 93 | 90 | 93 | 93 | 85 | 93 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 72 | 83 | 78 | 66 | 80 | 74 | 62 | 72 | 65 | 53 | 64 | 57 | 45 | 55 | 50 | 39 | 48 | 43 | 34 | 43 | 38 | 30 | 38 | 34 | 41 |
| | | | Exposed | 87 | 81 | 71 | 82 | 77 | 65 | 78 | 72 | 60 | 74 | 66 | 54 | 67 | 62 | 49 | 63 | 56 | 45 | 58 | 52 | 41 | 49 | 44 | 35 | 42 | 38 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 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 | 46 | 47 | 47 | 41 | 47 | 47 | 36 |
| | | | Exposed | 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 | 40 | 47 | 47 | 35 | 47 | 43 | 30 | 47 | 38 | 41 | 46 | 34 | 36 |
| | | 7-20 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 47 | 48 | 48 | 41 | 48 | 48 | 36 | 46 | 43 | 32 |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 41 | 48 | 48 | 36 | 48 | 42 | 31 | 48 | 36 | 41 | 44 | 32 | 36 | 39 | 43 | 32 |
| | | 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 | 39 |
| | | | 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 | 37 | 40 | 39 | 33 | 40 | 35 | 43 | 40 | 31 | 38 |
| | | 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 |
| | | | 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 | 38 | 38 | 38 | 38 | 38 | 38 | 34 | 38 | 38 | 31 |
| | C | 0-7 | Interior | 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 | 43 | 47 | 47 | 37 | 47 | 45 | 32 | 47 | 40 | 43 | 47 | 36 | 38 |
| | | | Exposed | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 46 | 47 | 47 | 42 | 47 | 47 | 38 | 47 | 46 | 33 | 47 | 39 | 42 | 47 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 44 | 48 | 48 | 38 | 47 | 44 | 33 | 45 | 38 | 43 | 43 | 34 | 38 | 41 | 30 | 34 |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 45 | 48 | 48 | 41 | 48 | 48 | 37 | 48 | 46 | 34 | 48 | 39 | 43 | 45 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 39 | 40 | 40 | 34 | 40 | 37 | 30 | 40 | 33 | 41 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 35 | 40 | 36 | 30 | 40 | 31 | 39 | 40 | 41 | 34 | 40 | 36 | 30 | 36 | 32 | 27 |
| | | 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 | 36 | 38 | 38 | 32 |
| | | | 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 | 36 | 38 | 38 | 31 | 38 | 34 | 41 | 34 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 49 | 52 | 52 | 41 | 52 | 50 | 35 | 52 | 43 | 31 | 52 | 38 | 41 | 46 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 47 | 52 | 52 | 42 | 52 | 52 | 38 | 52 | 49 | 35 | 52 | 45 | 32 | 52 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 47 | 53 | 53 | 43 | 52 | 49 | 37 | 50 | 42 | 31 | 48 | 37 | 41 | 44 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 53 | 53 | 52 | 53 | 53 | 46 | 53 | 53 | 41 | 53 | 50 | 37 | 53 | 46 | 34 | 53 | 42 | 31 | 52 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 38 | 44 | 40 | 33 | 44 | 35 | 43 | 44 | 31 | 38 | 44 | 41 | 34 |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 44 | 37 | 44 | 41 | 34 | 44 | 35 | 44 | 44 | 30 | 38 | 44 | 39 | 33 | 39 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 39 | 41 | 41 | 34 | 41 | 38 | 30 | 38 | 34 | 41 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 35 | 41 | 38 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |
| 70 | 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 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 36 |
| | | | 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 | 40 | 41 | 41 | 35 | 41 | 41 | 30 | 41 | 38 | 41 | 41 | 34 | 36 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 36 | 41 | 41 | 32 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 36 | 41 | 41 | 31 | 41 | 36 | 41 | 41 | 32 | 36 | 39 | 43 | 32 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 43 | 34 | 31 | 38 |
| | | 27-45 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 |
| | 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 | 41 | 41 | 37 | 41 | 41 | 32 | 41 | 40 | 43 | 41 | 36 | 38 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 38 | 41 | 41 | 33 | 41 | 39 | 42 | 41 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 38 | 41 | 41 | 33 | 41 | 38 | 43 | 39 | 34 | 38 | 38 | 30 | 34 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 41 | 34 | 41 | 39 | 43 | 41 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 33 | 41 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 31 | 39 | 34 | 41 | 34 | 34 | 36 | 30 | 34 | 32 | 27 |
| | | 27-45 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 32 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 41 | 33 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 35 | 45 | 43 | 31 | 45 | 38 | 41 | 45 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 42 | 45 | 45 | 38 | 45 | 45 | 35 | 45 | 45 | 32 | 45 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 43 | 46 | 46 | 37 | 45 | 42 | 31 | 43 | 37 | 41 | 41 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 41 | 46 | 46 | 37 | 46 | 46 | 34 | 46 | 42 | 31 | 46 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | 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 | 33 | 38 | 35 | 43 | 38 | 31 | 38 | 38 | 41 | 34 |
| | | | Exposed | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 37 | 38 | 38 | 34 | 38 | 35 | 44 | 38 | 30 | 38 | 38 | 39 | 33 | 38 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 34 | 36 | 36 | 30 | 36 | 34 | 41 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |
| 80 | B | 0-7 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 30 | 36 | 36 | 41 | 36 | 34 | 36 |
| | | 7-20 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 32 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 31 | 37 | 36 | 41 | 37 | 32 | 36 | 37 | 43 | 32 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 43 | 30 | 30 | 38 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | C | 0-7 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 32 | 36 | 36 | 43 | 36 | 36 | 38 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 33 | 36 | 36 | 42 | 36 | 34 | 37 | 36 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 37 | 43 | 36 | 34 | 38 | 35 | 30 | 34 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 34 | 37 | 37 | 43 | 37 | 33 | 37 | 37 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 41 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 39 | 30 | 41 | 34 | 30 | 36 | 30 | 30 | 32 | 27 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 41 | 29 | 29 | 36 | 29 | 40 | 32 |
| | D | 0-7 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 35 | 40 | 40 | 31 | 40 | 38 | 41 | 40 | 33 | 36 | 40 | 30 | 32 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 35 | 40 | 40 | 32 | 40 | 38 | 41 | 40 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 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 | 37 | 40 | 40 | 31 | 39 | 37 | 41 | 38 | 32 | 36 | 37 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 37 | 40 | 40 | 34 | 40 | 40 | 31 | 40 | 38 | 43 | 40 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 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 | 43 | 33 | 31 | 38 | 33 | 41 | 34 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 44 | 33 | 30 | 38 | 33 | 39 | 33 | 33 | 34 | 28 | 33 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 41 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 73 | 74 | 74 | 68 | 74 | 74 | 64 | 74 | 74 | 55 | 74 | 70 | 47 | 74 | 61 | 36 | 69 | 48 | 30 | 63 | 38 | 26 | 51 | 33 | 23 | 42 | 29 | 20 | 35 | 25 | 18 |
| | | | Exposed | 74 | 74 | 64 | 74 | 73 | 52 | 74 | 68 | 44 | 74 | 63 | 37 | 73 | 54 | 33 | 69 | 47 | 30 | 65 | 41 | 28 | 52 | 33 | 23 | 41 | 28 | 20 | 34 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 70 | 74 | 74 | 65 | 74 | 74 | 55 | 74 | 70 | 46 | 74 | 65 | 39 | 73 | 50 | 31 | 65 | 37 | 27 | 51 | 31 | 23 | 40 | 27 | 20 | 33 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 74 | 74 | 54 | 74 | 68 | 44 | 74 | 63 | 36 | 74 | 52 | 32 | 69 | 43 | 29 | 65 | 36 | 27 | 56 | 33 | 24 | 40 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 69 | 75 | 74 | 65 | 75 | 70 | 56 | 75 | 59 | 40 | 75 | 43 | 33 | 70 | 34 | 28 | 64 | 30 | 25 | 52 | 26 | 22 | 43 | 23 | 19 |
| | | | Exposed | 75 | 75 | 69 | 75 | 73 | 64 | 75 | 67 | 52 | 75 | 62 | 42 | 75 | 50 | 35 | 75 | 42 | 32 | 72 | 36 | 29 | 65 | 30 | 25 | 51 | 26 | 21 | 40 | 22 | 18 | 33 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 72 | 76 | 76 | 68 | 76 | 70 | 56 | 70 | 62 | 42 | 64 | 48 | 34 | 48 | 38 | 30 | 38 | 33 | 26 | 33 | 29 | 23 |
| | | | Exposed | 76 | 76 | 76 | 76 | 76 | 71 | 76 | 75 | 66 | 76 | 71 | 58 | 75 | 66 | 48 | 70 | 61 | 41 | 65 | 52 | 35 | 49 | 39 | 30 | 36 | 32 | 26 | 31 | 28 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 |
| | C | 0-7 | Interior | 74 | 74 | 66 | 74 | 74 | 58 | 74 | 70 | 48 | 74 | 66 | 41 | 74 | 59 | 35 | 71 | 51 | 32 | 67 | 44 | 29 | 56 | 35 | 25 | 44 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 74 | 59 | 35 | 70 | 49 | 31 | 66 | 42 | 28 | 58 | 36 | 25 | 50 | 32 | 23 | 43 | 29 | 21 | 38 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 74 | 74 | 61 | 74 | 71 | 49 | 74 | 66 | 40 | 74 | 58 | 34 | 72 | 48 | 31 | 67 | 40 | 28 | 63 | 35 | 26 | 45 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 72 | 47 | 31 | 66 | 38 | 27 | 58 | 33 | 25 | 47 | 30 | 22 | 39 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 75 | 75 | 72 | 75 | 75 | 66 | 75 | 70 | 58 | 75 | 65 | 47 | 75 | 56 | 39 | 75 | 47 | 34 | 75 | 39 | 31 | 67 | 32 | 26 | 56 | 27 | 22 | 44 | 24 | 19 | 35 | 21 | 17 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 75 | 56 | 39 | 75 | 45 | 33 | 73 | 36 | 30 | 68 | 32 | 27 | 64 | 29 | 24 | 55 | 27 | 22 | 47 | 25 | 20 | 35 | 21 | 17 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 76 | 76 | 76 | 76 | 76 | 74 | 76 | 76 | 68 | 76 | 73 | 64 | 76 | 69 | 54 | 73 | 65 | 45 | 68 | 57 | 39 | 55 | 43 | 32 | 40 | 34 | 27 | 33 | 30 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 76 | 69 | 53 | 71 | 64 | 43 | 66 | 53 | 36 | 58 | 44 | 32 | 47 | 38 | 29 | 39 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 74 | 72 | 51 | 74 | 67 | 42 | 74 | 61 | 36 | 72 | 52 | 32 | 67 | 44 | 29 | 63 | 39 | 26 | 55 | 34 | 24 | 42 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 67 | 44 | 29 | 61 | 37 | 26 | 51 | 33 | 23 | 44 | 30 | 21 | 38 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 74 | 68 | 42 | 74 | 61 | 35 | 73 | 49 | 31 | 68 | 41 | 28 | 63 | 35 | 26 | 52 | 32 | 23 | 44 | 29 | 21 | 34 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 62 | 35 | 26 | 49 | 31 | 23 | 40 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 75 | 72 | 63 | 75 | 67 | 49 | 75 | 58 | 40 | 75 | 47 | 34 | 75 | 39 | 31 | 70 | 34 | 28 | 66 | 31 | 26 | 53 | 26 | 22 | 41 | 23 | 19 | 33 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 75 | 39 | 31 | 69 | 33 | 28 | 64 | 30 | 25 | 55 | 27 | 22 | 47 | 25 | 20 | 40 | 22 | 18 | 35 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 76 | 76 | 70 | 76 | 75 | 65 | 76 | 70 | 55 | 73 | 65 | 46 | 68 | 57 | 39 | 64 | 49 | 34 | 53 | 42 | 31 | 38 | 33 | 26 | 32 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 68 | 57 | 38 | 61 | 47 | 33 | 49 | 39 | 30 | 40 | 34 | 27 | 34 | 31 | 24 | 31 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 10 | B | 0-7 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 55 | 60 | 60 | 47 | 60 | 60 | 36 | 60 | 48 | 30 | 60 | 38 | 26 | 51 | 33 | 23 | 42 | 29 | 20 | 35 | 25 | 18 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 44 | 60 | 60 | 37 | 60 | 54 | 33 | 60 | 47 | 30 | 60 | 41 | 28 | 52 | 33 | 23 | 41 | 28 | 20 | 34 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 55 | 60 | 60 | 46 | 60 | 60 | 39 | 60 | 50 | 31 | 60 | 37 | 27 | 51 | 31 | 23 | 40 | 27 | 20 | 33 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 60 | 60 | 54 | 60 | 60 | 44 | 60 | 60 | 36 | 60 | 52 | 32 | 60 | 43 | 29 | 60 | 36 | 27 | 56 | 33 | 24 | 40 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 65 | 69 | 69 | 56 | 69 | 59 | 40 | 69 | 43 | 33 | 69 | 34 | 28 | 64 | 30 | 25 | 52 | 26 | 22 | 43 | 23 | 19 |
| | | | Exposed | 69 | 69 | 69 | 69 | 69 | 64 | 69 | 67 | 52 | 69 | 62 | 42 | 69 | 50 | 35 | 69 | 42 | 32 | 69 | 36 | 29 | 65 | 30 | 25 | 51 | 26 | 21 | 40 | 22 | 18 | 33 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 68 | 72 | 70 | 56 | 70 | 62 | 42 | 64 | 48 | 34 | 48 | 38 | 30 | 38 | 33 | 26 | 33 | 29 | 23 |
| | | | Exposed | 72 | 72 | 72 | 72 | 72 | 71 | 72 | 72 | 66 | 72 | 71 | 58 | 72 | 66 | 48 | 70 | 61 | 41 | 65 | 52 | 35 | 49 | 39 | 30 | 36 | 32 | 26 | 31 | 28 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 |
| | C | 0-7 | Interior | 60 | 60 | 60 | 60 | 60 | 58 | 60 | 60 | 48 | 60 | 60 | 41 | 60 | 59 | 35 | 60 | 51 | 32 | 60 | 44 | 29 | 56 | 35 | 25 | 44 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 60 | 59 | 35 | 60 | 49 | 31 | 60 | 42 | 28 | 58 | 36 | 25 | 50 | 32 | 23 | 43 | 29 | 21 | 38 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 60 | 60 | 60 | 60 | 60 | 49 | 60 | 60 | 40 | 60 | 58 | 34 | 60 | 48 | 31 | 60 | 40 | 28 | 60 | 35 | 26 | 45 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 60 | 47 | 31 | 60 | 38 | 27 | 58 | 33 | 25 | 47 | 30 | 22 | 39 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 69 | 69 | 69 | 69 | 69 | 66 | 69 | 69 | 58 | 69 | 65 | 47 | 69 | 56 | 39 | 69 | 47 | 34 | 69 | 39 | 31 | 67 | 32 | 26 | 56 | 27 | 22 | 44 | 24 | 19 | 35 | 21 | 17 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 69 | 56 | 39 | 69 | 45 | 33 | 69 | 36 | 30 | 68 | 32 | 27 | 64 | 29 | 24 | 55 | 27 | 22 | 47 | 25 | 20 | 35 | 21 | 17 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 68 | 72 | 72 | 64 | 72 | 69 | 54 | 72 | 65 | 45 | 68 | 57 | 39 | 55 | 43 | 32 | 40 | 34 | 27 | 33 | 30 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 72 | 69 | 53 | 71 | 64 | 43 | 66 | 53 | 36 | 58 | 44 | 32 | 47 | 38 | 29 | 39 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 60 | 60 | 51 | 60 | 60 | 42 | 60 | 60 | 36 | 60 | 52 | 32 | 60 | 44 | 29 | 60 | 39 | 26 | 55 | 34 | 24 | 42 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 60 | 44 | 29 | 60 | 37 | 26 | 51 | 33 | 23 | 44 | 30 | 21 | 38 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 60 | 60 | 42 | 60 | 60 | 35 | 60 | 49 | 31 | 60 | 41 | 28 | 60 | 35 | 26 | 52 | 32 | 23 | 44 | 29 | 21 | 34 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 60 | 35 | 26 | 49 | 31 | 23 | 40 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 70 | 70 | 63 | 70 | 67 | 49 | 70 | 58 | 40 | 70 | 47 | 34 | 70 | 39 | 31 | 70 | 34 | 28 | 66 | 31 | 26 | 53 | 26 | 22 | 41 | 23 | 19 | 33 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 70 | 39 | 31 | 69 | 33 | 28 | 64 | 30 | 25 | 55 | 27 | 22 | 47 | 25 | 20 | 40 | 22 | 18 | 35 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 75 | 75 | 70 | 75 | 75 | 65 | 75 | 70 | 55 | 73 | 65 | 46 | 68 | 57 | 39 | 64 | 49 | 34 | 53 | 42 | 31 | 38 | 33 | 26 | 32 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 68 | 57 | 38 | 61 | 47 | 33 | 49 | 39 | 30 | 40 | 34 | 27 | 34 | 31 | 24 | 31 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 20 | B | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 36 | 44 | 44 | 30 | 44 | 38 | 26 | 44 | 33 | 23 | 42 | 29 | 20 | 35 | 25 | 18 |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 37 | 44 | 44 | 33 | 44 | 44 | 30 | 44 | 41 | 28 | 44 | 33 | 23 | 41 | 28 | 20 | 34 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 39 | 45 | 45 | 31 | 45 | 37 | 27 | 45 | 31 | 23 | 40 | 27 | 20 | 33 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 44 | 45 | 45 | 36 | 45 | 45 | 32 | 45 | 43 | 29 | 45 | 36 | 27 | 45 | 33 | 24 | 40 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 40 | 51 | 43 | 33 | 51 | 34 | 28 | 51 | 30 | 25 | 51 | 26 | 22 | 43 | 23 | 19 |
| | | | Exposed | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 42 | 51 | 50 | 35 | 51 | 42 | 32 | 51 | 36 | 29 | 51 | 30 | 25 | 51 | 26 | 21 | 40 | 22 | 18 | 33 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 42 | 46 | 46 | 34 | 46 | 38 | 30 | 38 | 33 | 26 | 33 | 29 | 23 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 41 | 46 | 46 | 35 | 46 | 39 | 30 | 36 | 32 | 26 | 31 | 28 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 |
| | C | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 44 | 35 | 44 | 44 | 32 | 44 | 44 | 29 | 44 | 35 | 25 | 44 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 44 | 44 | 35 | 44 | 44 | 31 | 44 | 42 | 28 | 44 | 36 | 25 | 44 | 32 | 23 | 43 | 29 | 21 | 38 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 40 | 45 | 45 | 34 | 45 | 45 | 31 | 45 | 40 | 28 | 45 | 35 | 26 | 45 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 45 | 45 | 31 | 45 | 38 | 27 | 45 | 33 | 25 | 45 | 30 | 22 | 39 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 47 | 51 | 51 | 39 | 51 | 47 | 34 | 51 | 39 | 31 | 51 | 32 | 26 | 51 | 27 | 22 | 44 | 24 | 19 | 35 | 21 | 17 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 51 | 51 | 39 | 51 | 45 | 33 | 51 | 36 | 30 | 51 | 32 | 27 | 51 | 29 | 24 | 51 | 27 | 22 | 47 | 25 | 20 | 35 | 21 | 17 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 45 | 46 | 46 | 39 | 46 | 43 | 32 | 40 | 34 | 27 | 33 | 30 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 43 | 46 | 46 | 36 | 46 | 44 | 32 | 46 | 38 | 29 | 39 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 42 | 44 | 44 | 36 | 44 | 44 | 32 | 44 | 44 | 29 | 44 | 39 | 26 | 44 | 34 | 24 | 42 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 44 | 44 | 29 | 44 | 37 | 26 | 44 | 33 | 23 | 44 | 30 | 21 | 38 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 45 | 45 | 42 | 45 | 45 | 35 | 45 | 45 | 31 | 45 | 41 | 28 | 45 | 35 | 26 | 45 | 32 | 23 | 44 | 29 | 21 | 34 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 45 | 35 | 26 | 45 | 31 | 23 | 40 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 55 | 55 | 55 | 55 | 55 | 49 | 55 | 55 | 40 | 55 | 47 | 34 | 55 | 39 | 31 | 55 | 34 | 28 | 55 | 31 | 26 | 53 | 26 | 22 | 41 | 23 | 19 | 33 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 55 | 39 | 31 | 55 | 33 | 28 | 55 | 30 | 25 | 55 | 27 | 22 | 47 | 25 | 20 | 40 | 22 | 18 | 35 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 46 | 50 | 50 | 39 | 50 | 49 | 34 | 50 | 42 | 31 | 38 | 33 | 26 | 32 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 50 | 50 | 38 | 50 | 47 | 33 | 49 | 39 | 30 | 40 | 34 | 27 | 34 | 31 | 24 | 31 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 30 | B | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 30 | 35 | 35 | 26 | 35 | 33 | 23 | 35 | 29 | 20 | 35 | 25 | 18 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 30 | 35 | 35 | 28 | 35 | 33 | 23 | 35 | 28 | 20 | 34 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 27 | 35 | 31 | 23 | 35 | 27 | 20 | 33 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 29 | 35 | 35 | 27 | 35 | 33 | 24 | 35 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 34 | 28 | 37 | 30 | 25 | 37 | 26 | 22 | 37 | 23 | 19 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 37 | 37 | 32 | 37 | 36 | 29 | 37 | 30 | 25 | 37 | 26 | 21 | 37 | 22 | 18 | 33 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 33 | 26 | 33 | 29 | 23 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 32 | 26 | 31 | 28 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 |
| | C | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 29 | 35 | 35 | 25 | 35 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 25 | 35 | 32 | 23 | 35 | 29 | 21 | 35 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 35 | 35 | 31 | 35 | 35 | 27 | 35 | 33 | 25 | 35 | 30 | 22 | 35 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 34 | 37 | 37 | 31 | 37 | 32 | 26 | 37 | 27 | 22 | 37 | 24 | 19 | 35 | 21 | 17 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 36 | 30 | 37 | 32 | 27 | 37 | 29 | 24 | 37 | 27 | 22 | 37 | 25 | 20 | 35 | 21 | 17 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 34 | 27 | 33 | 30 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 34 | 29 | 34 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 34 | 24 | 35 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 33 | 23 | 35 | 30 | 21 | 35 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 32 | 23 | 35 | 29 | 21 | 33 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 35 | 35 | 26 | 35 | 31 | 23 | 35 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 34 | 40 | 39 | 31 | 40 | 34 | 28 | 40 | 31 | 26 | 40 | 26 | 22 | 40 | 23 | 19 | 33 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 40 | 39 | 31 | 40 | 33 | 28 | 40 | 30 | 25 | 40 | 27 | 22 | 40 | 25 | 20 | 40 | 22 | 18 | 35 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 34 | 37 | 37 | 31 | 37 | 33 | 26 | 32 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 37 | 30 | 37 | 34 | 27 | 34 | 31 | 24 | 31 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 40 | B | 0-7 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 26 | 33 | 33 | 23 | 33 | 29 | 20 | 33 | 25 | 18 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 28 | 33 | 33 | 23 | 33 | 28 | 20 | 33 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | 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 | 27 | 33 | 31 | 23 | 32 | 27 | 20 | 31 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 32 | 33 | 33 | 29 | 33 | 33 | 27 | 33 | 33 | 24 | 33 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 29 | 29 | 25 | 29 | 26 | 22 | 29 | 23 | 19 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 25 | 29 | 26 | 21 | 29 | 22 | 18 | 29 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 23 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 26 | 27 | 27 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 |
| | C | 0-7 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 32 | 33 | 33 | 29 | 33 | 33 | 25 | 33 | 30 | 21 | 33 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 28 | 33 | 33 | 25 | 33 | 32 | 23 | 33 | 29 | 21 | 33 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 28 | 33 | 33 | 26 | 33 | 29 | 22 | 31 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 33 | 33 | 31 | 33 | 33 | 27 | 33 | 33 | 25 | 33 | 30 | 22 | 33 | 27 | 20 | 33 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 27 | 22 | 29 | 24 | 19 | 29 | 21 | 17 | 29 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 27 | 29 | 29 | 24 | 29 | 27 | 22 | 29 | 25 | 20 | 29 | 21 | 17 | 29 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 23 | 27 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 24 | 27 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 34 | 24 | 35 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 33 | 23 | 35 | 30 | 21 | 35 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 32 | 23 | 35 | 29 | 21 | 33 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 35 | 35 | 26 | 35 | 31 | 23 | 35 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 31 | 26 | 31 | 26 | 22 | 31 | 23 | 19 | 31 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 30 | 25 | 31 | 27 | 22 | 31 | 25 | 20 | 31 | 22 | 18 | 31 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 27 | 29 | 29 | 24 | 29 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 50 | 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 23 | 28 | 28 | 20 | 28 | 25 | 18 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 23 | 28 | 28 | 20 | 28 | 24 | 17 | 28 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 23 | 28 | 27 | 20 | 27 | 24 | 18 | 26 | 21 | 24 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 24 | 28 | 28 | 21 | 28 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 19 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 21 | 23 | 22 | 18 | 23 | 19 | 24 | 23 | 17 | 21 | 23 | 23 | 19 | 23 | 23 | 19 |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 | 22 | 21 | 17 | 21 | 19 | 23 |
| | C | 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 | 28 | 25 | 28 | 28 | 21 | 28 | 26 | 18 | 28 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 23 | 28 | 28 | 21 | 28 | 27 | 19 | 28 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 22 | 27 | 25 | 19 | 26 | 22 | 24 | 25 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 25 | 28 | 28 | 22 | 28 | 27 | 20 | 28 | 25 | 18 | 28 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 19 | 23 | 21 | 17 | 23 | 18 | 23 | 23 | 23 | 18 | 23 | 24 | 20 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 20 | 23 | 21 | 17 | 23 | 18 | 22 | 23 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 20 | 22 | 22 | 18 | 22 | 20 | 24 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 29 | 30 | 30 | 26 | 30 | 30 | 24 | 30 | 29 | 20 | 30 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 30 | 30 | 29 | 30 | 30 | 26 | 30 | 30 | 23 | 30 | 30 | 21 | 30 | 27 | 19 | 30 | 24 | 17 | 30 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 30 | 26 | 30 | 30 | 23 | 30 | 29 | 21 | 29 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 30 | 30 | 26 | 30 | 30 | 23 | 30 | 28 | 20 | 30 | 25 | 18 | 30 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 22 | 26 | 23 | 19 | 26 | 20 | 24 | 26 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 22 | 26 | 25 | 20 | 26 | 22 | 18 | 26 | 20 | 26 | 26 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 22 | 24 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 20 | 24 | 24 | 18 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 20 | 24 | 24 | 17 | 24 | 21 | 23 | 24 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 20 | 24 | 24 | 18 | 23 | 21 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 24 | 18 | 24 | 21 | 23 | 24 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 19 | 24 | 20 | 17 | 21 | 20 | 23 | 19 | | | |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 17 | 19 | 19 | 23 |
| | C | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 24 | 18 | 24 | 22 | 24 | 24 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 21 | 24 | 24 | 19 | 24 | 23 | 24 | 24 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 23 | 22 | 24 | 22 | 19 | 21 | 22 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 20 | 24 | 24 | 18 | 24 | 23 | 25 | 24 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 17 | 20 | 18 | 23 | 20 | 24 | 20 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 17 | 20 | 18 | 22 | 20 | 23 | 19 | 20 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 24 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 20 | 26 | 25 | 18 | 26 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 23 | 26 | 26 | 21 | 26 | 26 | 19 | 26 | 24 | 17 | 26 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 23 | 26 | 26 | 21 | 26 | 24 | 18 | 25 | 21 | 23 | 24 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 23 | 26 | 26 | 20 | 26 | 25 | 18 | 26 | 23 | 25 | 26 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 | 22 | 20 | 24 | 22 | 17 | 21 | 22 | 23 | 19 | 22 | 20 | ~~17~~ |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 20 | 22 | 22 | 18 | 22 | 20 | 26 | 22 | 17 | 22 | 22 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 19 | 21 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 21 | 21 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 70 | B | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 17 | 20 | 20 | 23 | 20 | 19 | 20 | 20 | 25 | ~~18~~ |
| | | 7-20 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 21 | 21 | 18 | 21 | 21 | 24 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 18 | 21 | 21 | 23 | 21 | 18 | 20 | 21 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 24 | 17 | 17 | 21 | 17 | 23 | 19 |
| | | 27-45 | Interior | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| | | | Exposed | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 23 |
| | C | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 20 | 24 | 20 | 20 | 21 | 20 | 18 | 19 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 24 | 20 | 19 | 21 | 20 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 19 | 21 | 21 | 24 | 20 | 19 | 21 | 20 | 25 | 19 | 19 | 22 | ~~17~~ |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 21 | 21 | 18 | 21 | 21 | 25 | 21 | 19 | 21 | 21 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | 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 | 23 | 17 | 24 | 20 |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 22 | 17 | 23 | 19 | 17 | 20 | ~~17~~ | 17 | 18 | ~~15~~ | 17 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 24 |
| | | | Exposed | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 23 | 16 | 25 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 18 | 22 | 21 | 23 | 22 | 19 | 20 | 22 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 19 | 22 | 22 | 17 | 22 | 22 | 22 | 24 | 22 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | 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 | 22 | 21 | 23 | 21 | 18 | 20 | 21 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 20 | 23 | 23 | 18 | 23 | 23 | 25 | 23 | 21 | 23 | 23 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 24 | 19 | 17 | 21 | 19 | 23 | 19 | 19 | 20 | ~~17~~ |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 26 | 19 | 17 | 22 | 19 | 22 | 19 | 19 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 17 | 18 | 18 | 23 | 18 | 25 | 20 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 17 | 18 | 18 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 80 | B | 0-7 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 17 | 18 | 18 | 23 | 18 | 18 | 20 | 18 | 25 | ~~18~~ |
| | | 7-20 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 23 | 18 | 18 | 20 | 18 | 24 | ~~18~~ | 18 | 21 | ~~16~~ |
| | | 20-27 | Interior | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | | Exposed | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 23 | 15 | 15 | 21 | 15 | 23 | 19 |
| | | 27-45 | Interior | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 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 | 22 |
| | C | 0-7 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 | 18 | 18 | 21 | 18 | 18 | 19 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 | 18 | 18 | 21 | 18 | 25 | 18 | 18 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 | 18 | 18 | 21 | 18 | 25 | 19 | 17 | 22 | ~~17~~ |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 25 | 18 | 18 | 21 | 18 | 25 | 18 | 18 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 23 | 15 | 23 | 20 |
| | | | Exposed | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 22 | 15 | 23 | 19 | 15 | 20 | ~~17~~ | 15 | 18 | ~~15~~ | 15 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 22 |
| | | | 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 | 22 | 14 | 22 | 20 | 22 | 22 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 20 | 23 | 20 | 19 | 20 | 20 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 17 | 20 | 20 | 20 | 24 | 20 | 19 | 20 | 20 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 20 | 23 | 20 | 18 | 20 | 19 | 24 | ~~18~~ | 18 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 20 | 25 | 20 | 20 | 23 | 20 | 19 | 21 | 20 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | 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 | 24 | 17 | 17 | 21 | 17 | 23 | 19 | 17 | 20 | ~~17~~ |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 25 | 17 | 17 | 22 | 17 | 22 | 19 | 17 | 19 | ~~16~~ | 17 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 23 | 16 | 24 | 20 |
| | | | Exposed | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 22 | 16 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 98 | 98 | 98 | 98 | 98 | 97 | 98 | 98 | 92 | 98 | 98 | 87 | 98 | 97 | 83 | 98 | 92 | 79 | 98 | 89 | 76 | 95 | 82 | 68 | 88 | 77 | 60 | 83 | 70 | 52 | 78 | 64 | 45 | 73 | 57 | 40 | 66 | 50 | 36 |
| | | | Exposed | 98 | 97 | 83 | 98 | 91 | 79 | 98 | 87 | 75 | 96 | 83 | 69 | 92 | 79 | 64 | 88 | 76 | 59 | 84 | 72 | 54 | 78 | 64 | 46 | 72 | 56 | 39 | 65 | 48 | 34 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 |
| | | 7-20 | Interior | 98 | 98 | 98 | 98 | 98 | 94 | 98 | 98 | 88 | 98 | 98 | 83 | 98 | 93 | 79 | 98 | 88 | 76 | 98 | 84 | 71 | 92 | 77 | 62 | 84 | 69 | 53 | 78 | 62 | 46 | 72 | 54 | 40 | 64 | 48 | 35 | 58 | 42 | 31 |
| | | | Exposed | 98 | 93 | 79 | 98 | 87 | 75 | 98 | 82 | 68 | 93 | 78 | 63 | 88 | 74 | 57 | 84 | 68 | 52 | 80 | 64 | 48 | 72 | 55 | 41 | 64 | 47 | 35 | 56 | 41 | 30 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 93 | 98 | 98 | 88 | 98 | 93 | 84 | 98 | 88 | 80 | 98 | 81 | 72 | 96 | 75 | 64 | 89 | 65 | 55 | 83 | 59 | 48 | 78 | 52 | 43 | 74 | 46 | 38 |
| | | | Exposed | 98 | 98 | 88 | 98 | 91 | 83 | 98 | 86 | 78 | 98 | 82 | 74 | 98 | 78 | 67 | 95 | 74 | 63 | 91 | 68 | 58 | 84 | 59 | 49 | 78 | 51 | 42 | 71 | 44 | 36 | 64 | 38 | 32 | 58 | 34 | 42 | 51 | 30 | 38 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 95 | 99 | 99 | 91 | 99 | 96 | 87 | 97 | 88 | 80 | 89 | 82 | 73 | 82 | 77 | 65 | 77 | 70 | 58 | 70 | 64 | 51 | 64 | 57 | 46 |
| | | | Exposed | 99 | 99 | 95 | 99 | 99 | 89 | 99 | 94 | 85 | 98 | 89 | 81 | 93 | 85 | 77 | 88 | 82 | 73 | 84 | 78 | 67 | 77 | 71 | 59 | 69 | 63 | 50 | 61 | 55 | 44 | 54 | 48 | 38 | 47 | 42 | 34 | 42 | 38 | 30 |
| | C | 0-7 | Interior | 98 | 98 | 85 | 98 | 94 | 81 | 98 | 89 | 77 | 98 | 85 | 72 | 94 | 81 | 67 | 90 | 78 | 63 | 87 | 75 | 57 | 80 | 66 | 49 | 75 | 59 | 42 | 67 | 51 | 36 | 61 | 44 | 31 | 54 | 39 | 42 | 48 | 35 | 37 |
| | | | Exposed | 94 | 81 | 66 | 89 | 77 | 61 | 85 | 73 | 55 | 81 | 67 | 50 | 78 | 63 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 62 | 45 | 32 | 53 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 98 | 96 | 82 | 98 | 90 | 77 | 98 | 85 | 71 | 96 | 80 | 65 | 91 | 77 | 61 | 86 | 72 | 55 | 82 | 66 | 51 | 75 | 58 | 43 | 66 | 50 | 37 | 59 | 43 | 32 | 51 | 38 | 42 | 45 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 90 | 76 | 60 | 85 | 70 | 54 | 80 | 64 | 49 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 36 | 61 | 45 | 33 | 52 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 98 | 98 | 91 | 98 | 94 | 85 | 98 | 89 | 80 | 98 | 84 | 76 | 98 | 80 | 71 | 98 | 76 | 65 | 93 | 71 | 61 | 86 | 63 | 52 | 80 | 54 | 44 | 75 | 46 | 38 | 67 | 41 | 34 | 61 | 36 | 30 | 54 | 32 | 40 |
| | | | Exposed | 98 | 80 | 71 | 97 | 75 | 64 | 91 | 69 | 59 | 87 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 67 | 41 | 34 | 60 | 35 | 44 | 52 | 30 | 38 | 45 | 40 | 33 | 40 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 99 | 99 | 98 | 99 | 99 | 92 | 99 | 97 | 87 | 99 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 75 | 87 | 80 | 70 | 79 | 74 | 62 | 72 | 65 | 53 | 64 | 58 | 46 | 57 | 51 | 40 | 50 | 45 | 36 | 44 | 40 | 32 |
| | | | Exposed | 96 | 87 | 79 | 90 | 83 | 75 | 85 | 79 | 68 | 80 | 75 | 63 | 76 | 70 | 58 | 71 | 65 | 53 | 66 | 61 | 48 | 57 | 51 | 41 | 49 | 44 | 35 | 43 | 38 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 98 | 91 | 78 | 98 | 86 | 74 | 95 | 82 | 67 | 91 | 78 | 63 | 87 | 75 | 57 | 83 | 70 | 52 | 80 | 66 | 48 | 73 | 57 | 40 | 65 | 49 | 35 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 86 | 75 | 57 | 82 | 69 | 51 | 78 | 64 | 46 | 75 | 58 | 41 | 69 | 53 | 38 | 65 | 48 | 34 | 61 | 44 | 31 | 51 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 98 | 87 | 74 | 97 | 82 | 67 | 91 | 77 | 62 | 86 | 72 | 56 | 82 | 66 | 51 | 78 | 62 | 46 | 75 | 57 | 42 | 65 | 48 | 36 | 56 | 41 | 31 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 82 | 66 | 50 | 77 | 61 | 45 | 72 | 55 | 40 | 66 | 49 | 37 | 61 | 45 | 33 | 56 | 41 | 30 | 51 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 98 | 91 | 82 | 98 | 85 | 77 | 98 | 81 | 72 | 98 | 77 | 65 | 93 | 71 | 61 | 89 | 65 | 56 | 85 | 62 | 51 | 79 | 52 | 43 | 72 | 45 | 37 | 65 | 39 | 32 | 58 | 34 | 42 | 51 | 30 | 37 | 45 | 40 | 33 |
| | | | Exposed | 93 | 71 | 61 | 88 | 65 | 54 | 84 | 59 | 49 | 80 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 37 | 67 | 40 | 33 | 58 | 34 | 43 | 50 | 44 | 37 | 43 | 38 | 32 | 38 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 99 | 99 | 89 | 99 | 93 | 84 | 97 | 88 | 80 | 91 | 84 | 76 | 87 | 80 | 70 | 82 | 77 | 65 | 79 | 73 | 61 | 70 | 64 | 52 | 62 | 56 | 44 | 54 | 48 | 39 | 47 | 42 | 34 | 42 | 37 | 45 | 37 | 33 | 40 |
| | | | Exposed | 86 | 80 | 70 | 81 | 76 | 64 | 77 | 71 | 59 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 55 | 44 | 56 | 51 | 40 | 48 | 43 | 34 | 41 | 37 | 44 | 36 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 10 | B | 0-7 | Interior | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 87 | 91 | 91 | 83 | 91 | 91 | 79 | 91 | 89 | 76 | 91 | 82 | 68 | 88 | 77 | 60 | 83 | 70 | 52 | 78 | 64 | 45 | 73 | 57 | 40 | 66 | 50 | 36 |
| | | | Exposed | 91 | 91 | 83 | 91 | 91 | 79 | 91 | 87 | 75 | 91 | 83 | 69 | 91 | 79 | 64 | 88 | 76 | 59 | 84 | 72 | 54 | 78 | 64 | 46 | 72 | 56 | 39 | 65 | 48 | 34 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 |
| | | 7-20 | Interior | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 88 | 91 | 91 | 83 | 91 | 91 | 79 | 91 | 88 | 76 | 91 | 84 | 71 | 91 | 77 | 62 | 84 | 69 | 53 | 78 | 62 | 46 | 72 | 54 | 40 | 64 | 48 | 35 | 58 | 42 | 31 |
| | | | Exposed | 91 | 91 | 79 | 91 | 87 | 75 | 91 | 82 | 68 | 91 | 78 | 63 | 88 | 74 | 57 | 84 | 68 | 52 | 80 | 64 | 48 | 72 | 55 | 41 | 64 | 47 | 35 | 56 | 41 | 30 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 93 | 95 | 95 | 88 | 95 | 93 | 84 | 95 | 88 | 80 | 95 | 81 | 72 | 95 | 75 | 64 | 89 | 65 | 55 | 83 | 59 | 48 | 78 | 52 | 43 | 74 | 46 | 38 |
| | | | Exposed | 95 | 95 | 88 | 95 | 91 | 83 | 95 | 86 | 78 | 95 | 82 | 74 | 95 | 78 | 67 | 95 | 74 | 63 | 91 | 68 | 58 | 84 | 59 | 49 | 78 | 51 | 42 | 71 | 44 | 36 | 64 | 38 | 32 | 58 | 34 | 42 | 51 | 30 | 38 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 95 | 98 | 98 | 91 | 98 | 96 | 87 | 97 | 88 | 80 | 89 | 82 | 73 | 82 | 77 | 65 | 77 | 70 | 58 | 70 | 64 | 51 | 64 | 57 | 46 |
| | | | Exposed | 98 | 98 | 95 | 98 | 98 | 89 | 98 | 94 | 85 | 98 | 89 | 81 | 93 | 85 | 77 | 88 | 82 | 73 | 84 | 78 | 67 | 77 | 71 | 59 | 69 | 63 | 50 | 61 | 55 | 44 | 54 | 48 | 38 | 47 | 42 | 34 | 42 | 38 | 30 |
| | C | 0-7 | Interior | 91 | 91 | 85 | 91 | 91 | 81 | 91 | 89 | 77 | 91 | 85 | 72 | 91 | 81 | 67 | 90 | 78 | 63 | 87 | 75 | 57 | 80 | 66 | 49 | 75 | 59 | 42 | 67 | 51 | 36 | 61 | 44 | 31 | 54 | 39 | 42 | 48 | 35 | 37 |
| | | | Exposed | 91 | 81 | 66 | 89 | 77 | 61 | 85 | 73 | 55 | 81 | 67 | 50 | 78 | 63 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 62 | 45 | 32 | 53 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 91 | 91 | 82 | 91 | 90 | 77 | 91 | 85 | 71 | 91 | 80 | 65 | 91 | 77 | 61 | 86 | 72 | 55 | 82 | 66 | 51 | 75 | 58 | 43 | 66 | 50 | 37 | 59 | 43 | 32 | 51 | 38 | 42 | 45 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 90 | 76 | 60 | 85 | 70 | 54 | 80 | 64 | 49 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 36 | 61 | 45 | 33 | 52 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 95 | 91 | 91 | 95 | 94 | 85 | 95 | 89 | 80 | 95 | 84 | 76 | 95 | 80 | 71 | 95 | 76 | 65 | 93 | 71 | 61 | 86 | 63 | 52 | 80 | 54 | 44 | 75 | 46 | 38 | 67 | 41 | 34 | 61 | 36 | 30 | 54 | 32 | 40 |
| | | | Exposed | 95 | 80 | 71 | 95 | 75 | 64 | 91 | 69 | 59 | 87 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 67 | 41 | 34 | 60 | 35 | 44 | 52 | 30 | 38 | 45 | 40 | 33 | 40 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 92 | 98 | 97 | 87 | 98 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 75 | 87 | 80 | 70 | 79 | 74 | 62 | 72 | 65 | 53 | 64 | 58 | 46 | 57 | 51 | 40 | 50 | 45 | 36 | 44 | 40 | 32 |
| | | | Exposed | 96 | 87 | 79 | 90 | 83 | 75 | 85 | 79 | 68 | 80 | 75 | 63 | 76 | 70 | 58 | 71 | 65 | 53 | 66 | 61 | 48 | 57 | 51 | 41 | 49 | 44 | 35 | 43 | 38 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 91 | 91 | 78 | 91 | 86 | 74 | 91 | 82 | 67 | 91 | 78 | 63 | 87 | 75 | 57 | 83 | 70 | 52 | 80 | 66 | 48 | 73 | 57 | 40 | 65 | 49 | 35 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 86 | 75 | 57 | 82 | 69 | 51 | 78 | 64 | 46 | 75 | 58 | 41 | 69 | 53 | 38 | 65 | 48 | 34 | 61 | 44 | 31 | 51 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 91 | 91 | 82 | 91 | 90 | 77 | 91 | 85 | 71 | 91 | 80 | 65 | 91 | 77 | 61 | 86 | 72 | 55 | 82 | 66 | 51 | 75 | 58 | 43 | 66 | 50 | 37 | 59 | 43 | 32 | 51 | 38 | 42 | 45 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 90 | 76 | 60 | 85 | 70 | 54 | 80 | 64 | 49 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 36 | 61 | 45 | 33 | 52 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 95 | 95 | 91 | 95 | 94 | 85 | 95 | 89 | 80 | 95 | 84 | 76 | 95 | 80 | 71 | 95 | 76 | 65 | 93 | 71 | 61 | 86 | 63 | 52 | 80 | 54 | 44 | 75 | 46 | 38 | 67 | 41 | 34 | 61 | 36 | 30 | 54 | 32 | 40 |
| | | | Exposed | 95 | 80 | 71 | 95 | 75 | 64 | 91 | 69 | 59 | 87 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 67 | 41 | 34 | 60 | 35 | 44 | 52 | 30 | 38 | 45 | 40 | 33 | 40 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 92 | 98 | 97 | 87 | 98 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 75 | 87 | 80 | 70 | 79 | 74 | 62 | 72 | 65 | 53 | 64 | 58 | 46 | 57 | 51 | 40 | 50 | 45 | 36 | 44 | 40 | 32 |
| | | | Exposed | 96 | 87 | 79 | 90 | 83 | 75 | 85 | 79 | 68 | 80 | 75 | 63 | 76 | 70 | 58 | 71 | 65 | 53 | 66 | 61 | 48 | 57 | 51 | 41 | 49 | 44 | 35 | 43 | 38 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| 20 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 76 | 83 | 82 | 68 | 83 | 77 | 60 | 83 | 70 | 52 | 78 | 64 | 45 | 73 | 57 | 40 | 66 | 50 | 36 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 83 | 69 | 83 | 79 | 64 | 83 | 76 | 59 | 83 | 72 | 54 | 78 | 64 | 46 | 72 | 56 | 39 | 65 | 48 | 34 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 76 | 83 | 83 | 71 | 83 | 77 | 62 | 83 | 69 | 53 | 78 | 62 | 46 | 72 | 54 | 40 | 64 | 48 | 35 | 58 | 42 | 31 |
| | | | Exposed | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 82 | 68 | 83 | 78 | 63 | 83 | 74 | 57 | 83 | 68 | 52 | 80 | 64 | 48 | 72 | 55 | 41 | 64 | 47 | 35 | 56 | 41 | 30 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 84 | 88 | 88 | 80 | 88 | 81 | 72 | 88 | 75 | 64 | 88 | 65 | 55 | 83 | 59 | 48 | 78 | 52 | 43 | 74 | 46 | 38 |
| | | | Exposed | 88 | 88 | 88 | 88 | 88 | 83 | 88 | 86 | 78 | 88 | 82 | 74 | 88 | 78 | 67 | 88 | 74 | 63 | 88 | 68 | 58 | 84 | 59 | 49 | 78 | 51 | 42 | 71 | 44 | 36 | 64 | 38 | 32 | 58 | 34 | 42 | 51 | 30 | 38 |
| | | 27-45 | Interior | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 87 | 90 | 88 | 80 | 89 | 82 | 73 | 82 | 77 | 65 | 77 | 70 | 58 | 70 | 64 | 51 | 64 | 57 | 46 |
| | | | Exposed | 90 | 90 | 90 | 90 | 90 | 89 | 90 | 90 | 85 | 90 | 89 | 81 | 90 | 85 | 77 | 88 | 82 | 73 | 84 | 78 | 67 | 77 | 71 | 59 | 69 | 63 | 50 | 61 | 55 | 44 | 54 | 48 | 38 | 47 | 42 | 34 | 42 | 38 | 30 |
| | C | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 72 | 83 | 81 | 67 | 83 | 78 | 63 | 83 | 75 | 57 | 80 | 66 | 49 | 75 | 59 | 42 | 67 | 51 | 36 | 61 | 44 | 31 | 54 | 39 | 42 | 48 | 35 | 37 |
| | | | Exposed | 83 | 81 | 66 | 83 | 77 | 61 | 83 | 73 | 55 | 81 | 67 | 50 | 78 | 63 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 62 | 45 | 32 | 53 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 83 | 83 | 82 | 83 | 83 | 77 | 83 | 83 | 71 | 83 | 80 | 65 | 83 | 77 | 61 | 83 | 72 | 55 | 82 | 66 | 51 | 75 | 58 | 43 | 66 | 50 | 37 | 59 | 43 | 32 | 51 | 38 | 42 | 45 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 83 | 76 | 60 | 83 | 70 | 54 | 80 | 64 | 49 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 36 | 61 | 45 | 33 | 52 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 88 | 88 | 88 | 88 | 88 | 85 | 88 | 88 | 80 | 88 | 84 | 76 | 88 | 80 | 71 | 88 | 76 | 65 | 88 | 71 | 61 | 86 | 63 | 52 | 80 | 54 | 44 | 75 | 46 | 38 | 67 | 41 | 34 | 61 | 36 | 30 | 54 | 32 | 40 |
| | | | Exposed | 88 | 80 | 71 | 88 | 75 | 64 | 88 | 69 | 59 | 87 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 67 | 41 | 34 | 60 | 35 | 44 | 52 | 30 | 38 | 45 | 40 | 33 | 40 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 87 | 90 | 90 | 83 | 90 | 88 | 79 | 90 | 84 | 75 | 87 | 80 | 70 | 79 | 74 | 62 | 72 | 65 | 53 | 64 | 58 | 46 | 57 | 51 | 40 | 50 | 45 | 36 | 44 | 40 | 32 |
| | | | Exposed | 90 | 87 | 79 | 90 | 83 | 75 | 85 | 79 | 68 | 80 | 75 | 63 | 76 | 70 | 58 | 71 | 65 | 53 | 66 | 61 | 48 | 57 | 51 | 41 | 49 | 44 | 35 | 43 | 38 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 83 | 83 | 78 | 83 | 83 | 74 | 83 | 82 | 67 | 83 | 78 | 63 | 83 | 75 | 57 | 83 | 70 | 52 | 80 | 66 | 48 | 73 | 57 | 40 | 65 | 49 | 35 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 83 | 75 | 57 | 82 | 69 | 51 | 78 | 64 | 46 | 75 | 58 | 41 | 69 | 53 | 38 | 65 | 48 | 34 | 61 | 44 | 31 | 51 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 83 | 83 | 74 | 83 | 82 | 67 | 83 | 77 | 62 | 83 | 72 | 56 | 82 | 66 | 51 | 78 | 62 | 46 | 75 | 57 | 42 | 65 | 48 | 36 | 56 | 41 | 31 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 82 | 66 | 50 | 77 | 61 | 45 | 72 | 55 | 40 | 66 | 49 | 37 | 61 | 45 | 33 | 56 | 41 | 30 | 51 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 90 | 90 | 82 | 90 | 85 | 77 | 90 | 81 | 72 | 90 | 77 | 65 | 90 | 71 | 61 | 89 | 65 | 56 | 85 | 62 | 51 | 79 | 52 | 43 | 72 | 45 | 37 | 65 | 39 | 32 | 58 | 34 | 42 | 51 | 30 | 37 | 45 | 40 | 33 |
| | | | Exposed | 90 | 71 | 61 | 88 | 65 | 54 | 84 | 59 | 49 | 80 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 37 | 67 | 40 | 33 | 58 | 34 | 43 | 50 | 44 | 37 | 43 | 38 | 32 | 38 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 93 | 93 | 89 | 93 | 93 | 84 | 93 | 88 | 80 | 91 | 84 | 76 | 87 | 80 | 70 | 82 | 77 | 65 | 79 | 73 | 61 | 70 | 64 | 52 | 62 | 56 | 44 | 54 | 48 | 39 | 47 | 42 | 34 | 42 | 37 | 45 | 37 | 33 | 40 |
| | | | Exposed | 86 | 80 | 70 | 81 | 76 | 64 | 77 | 71 | 59 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 55 | 44 | 56 | 51 | 40 | 48 | 43 | 34 | 41 | 37 | 44 | 36 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 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 | 45 | 46 | 46 | 40 | 46 | 46 | 36 |
| | | | 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 | 39 | 46 | 46 | 34 | 46 | 42 | 45 | 46 | 37 | 40 | 45 | 33 | 35 |
| | | 7-20 | Interior | 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 | 46 | 47 | 47 | 40 | 47 | 47 | 35 | 45 | 42 | 31 |
| | | | Exposed | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 41 | 47 | 47 | 35 | 47 | 41 | 30 | 47 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 38 |
| | | | Exposed | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 36 | 39 | 38 | 32 | 39 | 34 | 42 | 39 | 30 | 38 |
| | | 27-45 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 34 | 37 | 37 | 30 |
| | C | 0-7 | 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 | 42 | 46 | 46 | 36 | 46 | 44 | 31 | 46 | 39 | 42 | 46 | 35 | 37 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 45 | 46 | 46 | 41 | 46 | 46 | 38 | 46 | 45 | 32 | 46 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 43 | 47 | 47 | 37 | 46 | 43 | 32 | 44 | 38 | 42 | 43 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 44 | 47 | 47 | 40 | 47 | 47 | 36 | 47 | 45 | 33 | 47 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 38 | 39 | 39 | 34 | 39 | 36 | 30 | 39 | 32 | 40 |
| | | | Exposed | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 34 | 39 | 35 | 44 | 39 | 30 | 38 | 39 | 40 | 33 | 39 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 32 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 37 | 37 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 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 | 49 | 35 | 51 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 46 | 51 | 51 | 41 | 51 | 51 | 38 | 51 | 48 | 34 | 51 | 44 | 31 | 51 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 51 | 52 | 52 | 46 | 52 | 52 | 42 | 50 | 48 | 36 | 48 | 41 | 31 | 47 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 52 | 52 | 50 | 52 | 52 | 45 | 52 | 52 | 40 | 52 | 49 | 37 | 52 | 45 | 33 | 52 | 41 | 30 | 51 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | 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 | 37 | 43 | 39 | 32 | 43 | 34 | 42 | 43 | 30 | 37 | 43 | 40 | 33 |
| | | | Exposed | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 40 | 43 | 43 | 37 | 43 | 40 | 33 | 43 | 34 | 43 | 43 | 44 | 37 | 43 | 38 | 32 | 38 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 39 | 40 | 40 | 34 | 40 | 37 | 45 | 37 | 33 | 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 | 34 | 40 | 37 | 44 | 36 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 70 | B | 0-7 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 36 |
| | | | 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 | 39 | 40 | 40 | 34 | 40 | 40 | 45 | 40 | 37 | 40 | 40 | 33 | 35 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | 41 | 41 | 35 | 41 | 41 | 31 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 35 | 41 | 41 | 30 | 41 | 36 | 40 | 41 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 42 | 34 | 30 | 38 |
| | | 27-45 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 |
| | C | 0-7 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 36 | 40 | 40 | 31 | 40 | 39 | 42 | 40 | 35 | 37 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 32 | 40 | 38 | 41 | 40 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 41 | 32 | 40 | 38 | 42 | 38 | 33 | 37 | 37 | 44 | 33 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | 41 | 41 | 36 | 41 | 41 | 33 | 41 | 38 | 42 | 41 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 32 | 40 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 44 | 34 | 30 | 38 | 34 | 40 | 33 | 34 | 36 | 29 | 34 | 32 | 26 |
| | | 27-45 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 40 | 32 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 35 | 44 | 42 | 45 | 44 | 37 | 40 | 44 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 44 | 38 | 44 | 44 | 34 | 44 | 44 | 31 | 44 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 42 | 45 | 45 | 36 | 44 | 41 | 31 | 42 | 36 | 40 | 41 | 31 | 35 | 38 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 40 | 45 | 45 | 37 | 45 | 45 | 33 | 45 | 41 | 30 | 45 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 32 | 37 | 34 | 42 | 37 | 30 | 37 | 37 | 40 | 33 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 34 | 43 | 37 | 44 | 37 | 37 | 38 | 32 | 37 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 45 | 35 | 33 | 40 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 44 | 35 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 80 | B | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 45 | 35 | 35 | 40 | 35 | 33 | 35 |
| | | 7-20 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 31 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 30 | 36 | 36 | 40 | 36 | 31 | 35 | 36 | 42 | 31 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 42 | 30 | 30 | 38 |
| | | 27-45 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | C | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 42 | 35 | 35 | 37 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 41 | 35 | 33 | 36 | 35 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 32 | 36 | 36 | 42 | 35 | 33 | 37 | 34 | 44 | 33 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 33 | 36 | 36 | 42 | 36 | 33 | 36 | 36 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 40 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 44 | 30 | 30 | 38 | 30 | 40 | 33 | 30 | 36 | 29 | 30 | 32 | 26 |
| | | 27-45 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 40 | 28 | 43 | 35 | 43 | 40 | 31 |
| | D | 0-7 | Interior | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 35 | 39 | 39 | 45 | 39 | 37 | 40 | 39 | 33 | 35 | 39 | 44 | 31 |
| | | | Exposed | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 38 | 39 | 39 | 34 | 39 | 39 | 31 | 39 | 37 | 40 | 39 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 36 | 39 | 39 | 31 | 38 | 36 | 40 | 37 | 31 | 35 | 36 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 37 | 39 | 39 | 33 | 39 | 39 | 30 | 39 | 37 | 42 | 39 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 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 | 32 | 33 | 33 | 42 | 33 | 30 | 37 | 33 | 40 | 33 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 43 | 33 | 44 | 37 | 33 | 38 | 32 | 33 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 45 | 31 | 31 | 40 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 44 | 31 | 31 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 1.25 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 90 | B | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 45 | 31 | 31 | 40 | 31 | 31 | 35 |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 31 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 40 | 32 | 31 | 35 | 32 | 42 | 31 |
| | | 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 |
| | | | 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 | 38 |
| | | 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 |
| | | | 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 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 |
| | C | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 42 | 31 | 31 | 37 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 41 | 31 | 31 | 36 | 31 | 44 | 31 | 31 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 42 | 32 | 32 | 37 | 31 | 44 | 33 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 42 | 32 | 32 | 36 | 32 | 43 | 32 | 32 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 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 |
| | | | 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 | 38 | 40 | 40 | 33 | 40 | 36 | 29 | 40 | 32 | 26 |
| | | 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 |
| | | | 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 | 38 | 38 | 38 | 38 | 38 | 38 | 35 | 38 | 38 | 32 |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 45 | 35 | 35 | 40 | 35 | 33 | 35 | 35 | 44 | 31 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 31 | 35 | 35 | 40 | 35 | 32 | 34 | 35 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 40 | 34 | 31 | 35 | 33 | 42 | 31 | 32 | 37 | 28 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 30 | 35 | 35 | 42 | 35 | 32 | 35 | 35 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 42 | 29 | 29 | 37 | 29 | 40 | 33 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 43 | 29 | 44 | 37 | 29 | 38 | 32 | 29 | 34 | 28 | 29 | 30 | 25 | 44 | 26 | 22 |
| | | 27-45 | Interior | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 40 |
| | | | Exposed | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 38 | 42 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 100 | 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 43 | 28 | 28 | 40 | 28 | 28 | 35 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 40 | 29 | 29 | 35 | 29 | 42 | 31 |
| | | 20-27 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | C | 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 42 | 28 | 28 | 37 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 41 | 28 | 28 | 36 | 28 | 43 | 31 | 28 | 39 | 28 | 28 | 34 | 25 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 42 | 29 | 29 | 37 | 29 | 43 | 33 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 42 | 29 | 29 | 36 | 29 | 43 | 32 | 29 | 37 | 28 | 29 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 33 | 36 | 36 | 29 | 36 | 32 | 26 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 |
| | D | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 45 | 31 | 31 | 40 | 31 | 31 | 35 | 31 | 44 | 31 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 40 | 31 | 31 | 34 | 31 | 42 | 30 | 31 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 31 | 32 | 32 | 40 | 32 | 31 | 35 | 31 | 42 | 31 | 30 | 37 | 28 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 42 | 32 | 32 | 35 | 32 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 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 | 37 | 40 | 40 | 33 |
| | | | 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 | 37 | 40 | 38 | 32 | 40 | 34 | 28 | 40 | 30 | 25 | 40 | 26 | 22 |
| | | 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 |
| | | | 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 | 38 | 38 | 38 | 34 | 38 | 37 | 30 | 37 | 33 | 26 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 77 | 83 | 83 | 73 | 83 | 80 | 68 | 83 | 77 | 64 | 83 | 75 | 56 | 79 | 67 | 43 | 74 | 57 | 37 | 68 | 46 | 32 | 61 | 39 | 28 | 50 | 34 | 24 | 42 | 30 | 22 |
| | | | Exposed | 83 | 80 | 68 | 83 | 77 | 63 | 83 | 72 | 52 | 80 | 68 | 44 | 77 | 64 | 40 | 74 | 56 | 36 | 70 | 49 | 33 | 62 | 39 | 28 | 48 | 34 | 24 | 40 | 29 | 21 | 35 | 25 | 18 | 31 | 22 | 24 | 27 | 20 | 21 |
| | | 7-20 | Interior | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 74 | 76 | 76 | 69 | 76 | 76 | 64 | 76 | 74 | 55 | 76 | 69 | 46 | 76 | 59 | 38 | 69 | 44 | 32 | 62 | 38 | 28 | 47 | 33 | 24 | 40 | 29 | 21 | 35 | 26 | 19 |
| | | | Exposed | 76 | 76 | 64 | 76 | 73 | 52 | 76 | 67 | 43 | 76 | 62 | 39 | 73 | 52 | 35 | 69 | 43 | 32 | 65 | 39 | 29 | 48 | 33 | 25 | 39 | 28 | 21 | 34 | 25 | 18 | 29 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 |
| | | 20-27 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 69 | 71 | 71 | 65 | 71 | 66 | 48 | 71 | 52 | 39 | 71 | 41 | 34 | 68 | 36 | 29 | 62 | 31 | 26 | 51 | 28 | 23 |
| | | | Exposed | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 71 | 62 | 71 | 67 | 50 | 71 | 60 | 42 | 71 | 50 | 38 | 71 | 43 | 35 | 69 | 36 | 30 | 61 | 31 | 25 | 48 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 64 | 67 | 67 | 50 | 67 | 58 | 40 | 58 | 46 | 35 | 45 | 39 | 31 | 39 | 35 | 28 |
| | | | Exposed | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 65 | 67 | 67 | 58 | 67 | 67 | 49 | 67 | 62 | 42 | 59 | 47 | 36 | 44 | 39 | 31 | 37 | 33 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 26 | 23 | 18 |
| | C | 0-7 | Interior | 83 | 82 | 70 | 83 | 78 | 65 | 83 | 75 | 57 | 82 | 70 | 49 | 79 | 66 | 42 | 76 | 61 | 38 | 72 | 53 | 35 | 65 | 42 | 29 | 53 | 36 | 25 | 42 | 31 | 22 | 37 | 27 | 19 | 33 | 24 | 25 | 29 | 21 | 23 |
| | | | Exposed | 79 | 66 | 42 | 75 | 59 | 37 | 70 | 50 | 33 | 66 | 43 | 30 | 60 | 39 | 27 | 52 | 35 | 25 | 45 | 32 | 23 | 37 | 27 | 19 | 32 | 23 | 25 | 28 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 76 | 76 | 66 | 76 | 75 | 58 | 76 | 70 | 47 | 76 | 65 | 41 | 76 | 57 | 37 | 71 | 48 | 34 | 67 | 42 | 31 | 54 | 35 | 26 | 41 | 30 | 22 | 36 | 26 | 19 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 | 20 |
| | | | Exposed | 75 | 57 | 37 | 70 | 46 | 33 | 65 | 40 | 29 | 56 | 36 | 27 | 47 | 33 | 24 | 41 | 30 | 22 | 37 | 27 | 20 | 31 | 23 | 26 | 27 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 71 | 71 | 71 | 71 | 71 | 70 | 71 | 71 | 65 | 71 | 69 | 56 | 71 | 65 | 47 | 71 | 56 | 41 | 71 | 47 | 37 | 71 | 38 | 31 | 65 | 33 | 27 | 52 | 28 | 23 | 42 | 25 | 20 | 37 | 22 | 18 | 33 | 19 | 24 |
| | | | Exposed | 71 | 65 | 46 | 71 | 53 | 40 | 71 | 44 | 36 | 71 | 39 | 32 | 68 | 35 | 29 | 64 | 32 | 27 | 56 | 29 | 24 | 42 | 25 | 21 | 36 | 21 | 18 | 31 | 18 | 23 | 27 | 24 | 20 | 24 | 22 | 18 | 21 | 19 | ~~16~~ |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 64 | 67 | 67 | 54 | 67 | 65 | 46 | 64 | 51 | 38 | 48 | 41 | 32 | 39 | 35 | 28 | 34 | 31 | 24 | 30 | 27 | 22 | 27 | 24 | 19 |
| | | | Exposed | 67 | 67 | 63 | 67 | 67 | 52 | 67 | 63 | 43 | 65 | 53 | 39 | 57 | 45 | 35 | 47 | 40 | 32 | 41 | 37 | 29 | 35 | 31 | 25 | 30 | 27 | 21 | 26 | 23 | 18 | 23 | 20 | 24 | 20 | 18 | 21 | 18 | 24 | 19 |
| | D | 0-7 | Interior | 83 | 76 | 61 | 83 | 72 | 51 | 79 | 67 | 43 | 76 | 62 | 38 | 72 | 53 | 35 | 68 | 46 | 32 | 64 | 41 | 29 | 51 | 35 | 25 | 41 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 72 | 53 | 35 | 67 | 45 | 31 | 61 | 39 | 28 | 52 | 35 | 25 | 45 | 32 | 23 | 40 | 29 | 21 | 37 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 76 | 72 | 51 | 76 | 66 | 42 | 76 | 59 | 38 | 72 | 49 | 34 | 67 | 42 | 31 | 62 | 38 | 28 | 52 | 35 | 26 | 40 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 67 | 41 | 31 | 59 | 37 | 27 | 48 | 33 | 25 | 41 | 30 | 22 | 37 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 71 | 71 | 67 | 71 | 70 | 59 | 71 | 65 | 48 | 71 | 57 | 41 | 71 | 47 | 37 | 71 | 41 | 34 | 71 | 37 | 31 | 63 | 32 | 26 | 49 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 71 | 47 | 37 | 71 | 40 | 33 | 69 | 36 | 30 | 64 | 32 | 27 | 56 | 29 | 24 | 48 | 27 | 22 | 42 | 24 | 20 | 35 | 21 | 26 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 64 | 67 | 67 | 55 | 67 | 65 | 46 | 67 | 58 | 41 | 64 | 50 | 37 | 46 | 40 | 31 | 38 | 34 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | 24 |
| | | | Exposed | 67 | 65 | 46 | 66 | 56 | 40 | 59 | 47 | 36 | 48 | 41 | 32 | 41 | 37 | 29 | 37 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |
| 10 | B | 0-7 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 71 | 64 | 71 | 71 | 56 | 71 | 67 | 43 | 71 | 57 | 37 | 68 | 46 | 32 | 61 | 39 | 28 | 50 | 34 | 24 | 42 | 30 | 22 |
| | | | Exposed | 71 | 71 | 68 | 71 | 71 | 63 | 71 | 71 | 52 | 71 | 68 | 44 | 71 | 64 | 40 | 71 | 56 | 36 | 70 | 49 | 33 | 62 | 39 | 28 | 48 | 34 | 24 | 40 | 29 | 21 | 35 | 25 | 18 | 31 | 22 | 24 | 27 | 20 | 21 |
| | | 7-20 | Interior | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 69 | 72 | 72 | 64 | 72 | 72 | 55 | 72 | 69 | 46 | 72 | 59 | 38 | 69 | 44 | 32 | 62 | 38 | 28 | 47 | 33 | 24 | 40 | 29 | 21 | 35 | 26 | 19 |
| | | | Exposed | 72 | 72 | 64 | 72 | 72 | 52 | 72 | 67 | 43 | 72 | 62 | 39 | 72 | 52 | 35 | 69 | 43 | 32 | 65 | 39 | 29 | 48 | 33 | 25 | 39 | 28 | 21 | 34 | 25 | 18 | 29 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 |
| | | 20-27 | Interior | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 69 | 71 | 71 | 65 | 71 | 66 | 48 | 71 | 52 | 39 | 71 | 41 | 34 | 68 | 36 | 29 | 62 | 31 | 26 | 51 | 28 | 23 |
| | | | Exposed | 71 | 71 | 71 | 71 | 71 | 68 | 71 | 71 | 62 | 71 | 67 | 50 | 71 | 60 | 42 | 71 | 50 | 38 | 71 | 43 | 35 | 69 | 36 | 30 | 61 | 31 | 25 | 48 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 64 | 67 | 67 | 50 | 67 | 58 | 40 | 58 | 46 | 35 | 45 | 39 | 31 | 39 | 35 | 28 |
| | | | Exposed | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 65 | 67 | 67 | 58 | 67 | 67 | 49 | 67 | 62 | 42 | 59 | 47 | 36 | 44 | 39 | 31 | 37 | 33 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 26 | 23 | 18 |
| | C | 0-7 | Interior | 71 | 71 | 70 | 71 | 71 | 65 | 71 | 71 | 57 | 71 | 70 | 49 | 71 | 66 | 42 | 71 | 61 | 38 | 71 | 53 | 35 | 65 | 42 | 29 | 53 | 36 | 25 | 42 | 31 | 22 | 37 | 27 | 19 | 33 | 24 | 25 | 29 | 21 | 23 |
| | | | Exposed | 71 | 66 | 42 | 71 | 59 | 37 | 70 | 50 | 33 | 66 | 43 | 30 | 60 | 39 | 27 | 52 | 35 | 25 | 45 | 32 | 23 | 37 | 27 | 19 | 32 | 23 | 25 | 28 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 72 | 72 | 66 | 72 | 72 | 58 | 72 | 70 | 47 | 72 | 65 | 41 | 72 | 57 | 37 | 71 | 48 | 34 | 67 | 42 | 31 | 54 | 35 | 26 | 41 | 30 | 22 | 36 | 26 | 19 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 | 20 |
| | | | Exposed | 72 | 57 | 37 | 70 | 46 | 33 | 65 | 40 | 29 | 56 | 36 | 27 | 47 | 33 | 24 | 41 | 30 | 22 | 37 | 27 | 20 | 31 | 23 | 26 | 27 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 71 | 71 | 71 | 71 | 71 | 70 | 71 | 71 | 65 | 71 | 69 | 56 | 71 | 65 | 47 | 71 | 56 | 41 | 71 | 47 | 37 | 71 | 38 | 31 | 65 | 33 | 27 | 52 | 28 | 23 | 42 | 25 | 20 | 37 | 22 | 18 | 33 | 19 | 24 |
| | | | Exposed | 71 | 65 | 46 | 71 | 53 | 40 | 71 | 44 | 36 | 71 | 39 | 32 | 68 | 35 | 29 | 64 | 32 | 27 | 56 | 29 | 24 | 42 | 25 | 21 | 36 | 21 | 18 | 31 | 18 | 23 | 27 | 24 | 20 | 24 | 22 | 18 | 21 | 19 | ~~16~~ |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 64 | 67 | 67 | 54 | 67 | 65 | 46 | 64 | 51 | 38 | 48 | 41 | 32 | 39 | 35 | 28 | 34 | 31 | 24 | 30 | 27 | 22 | 27 | 24 | 19 |
| | | | Exposed | 67 | 67 | 63 | 67 | 67 | 52 | 67 | 63 | 43 | 65 | 53 | 39 | 57 | 45 | 35 | 47 | 40 | 32 | 41 | 37 | 29 | 35 | 31 | 25 | 30 | 27 | 21 | 26 | 23 | 18 | 23 | 20 | 24 | 20 | 18 | 21 | 18 | 24 | 19 |
| | D | 0-7 | Interior | 71 | 71 | 61 | 71 | 71 | 51 | 71 | 67 | 43 | 71 | 62 | 38 | 71 | 53 | 35 | 68 | 46 | 32 | 64 | 41 | 29 | 51 | 35 | 25 | 41 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 71 | 53 | 35 | 67 | 45 | 31 | 61 | 39 | 28 | 52 | 35 | 25 | 45 | 32 | 23 | 40 | 29 | 21 | 37 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 72 | 72 | 51 | 72 | 66 | 42 | 72 | 59 | 38 | 72 | 49 | 34 | 67 | 42 | 31 | 62 | 38 | 28 | 52 | 35 | 26 | 40 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 67 | 41 | 31 | 59 | 37 | 27 | 48 | 33 | 25 | 41 | 30 | 22 | 37 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 71 | 71 | 67 | 71 | 70 | 59 | 71 | 65 | 48 | 71 | 57 | 41 | 71 | 47 | 37 | 71 | 41 | 34 | 71 | 37 | 31 | 63 | 32 | 26 | 49 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 71 | 47 | 37 | 71 | 40 | 33 | 69 | 36 | 30 | 64 | 32 | 27 | 56 | 29 | 24 | 48 | 27 | 22 | 42 | 24 | 20 | 35 | 21 | 26 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 67 | 64 | 67 | 67 | 55 | 67 | 65 | 46 | 67 | 58 | 41 | 64 | 50 | 37 | 46 | 40 | 31 | 38 | 34 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | 24 |
| | | | Exposed | 67 | 65 | 46 | 66 | 56 | 40 | 59 | 47 | 36 | 48 | 41 | 32 | 41 | 37 | 29 | 37 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |
| 20 | B | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 43 | 53 | 53 | 37 | 53 | 46 | 32 | 53 | 39 | 28 | 50 | 34 | 24 | 42 | 30 | 22 |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 44 | 53 | 53 | 40 | 53 | 53 | 36 | 53 | 49 | 33 | 53 | 39 | 28 | 48 | 34 | 24 | 40 | 29 | 21 | 35 | 25 | 18 | 31 | 22 | 24 | 27 | 20 | 21 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 46 | 53 | 53 | 38 | 53 | 44 | 32 | 53 | 38 | 28 | 47 | 33 | 24 | 40 | 29 | 21 | 35 | 26 | 19 |
| | | | Exposed | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 43 | 53 | 53 | 39 | 53 | 52 | 35 | 53 | 43 | 32 | 53 | 39 | 29 | 48 | 33 | 25 | 39 | 28 | 21 | 34 | 25 | 18 | 29 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 |
| | | 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 | 48 | 61 | 52 | 39 | 61 | 41 | 34 | 61 | 36 | 29 | 61 | 31 | 26 | 51 | 28 | 23 |
| | | | Exposed | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 50 | 61 | 60 | 42 | 61 | 50 | 38 | 61 | 43 | 35 | 61 | 36 | 30 | 61 | 31 | 25 | 48 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 50 | 56 | 56 | 40 | 56 | 46 | 35 | 45 | 39 | 31 | 39 | 35 | 28 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 49 | 56 | 56 | 42 | 56 | 47 | 36 | 44 | 39 | 31 | 37 | 33 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 26 | 23 | 18 |
| | C | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 49 | 53 | 53 | 42 | 53 | 53 | 38 | 53 | 53 | 35 | 53 | 42 | 29 | 53 | 36 | 25 | 42 | 31 | 22 | 37 | 27 | 19 | 33 | 24 | 25 | 29 | 21 | 23 |
| | | | Exposed | 53 | 53 | 42 | 53 | 53 | 37 | 53 | 50 | 33 | 53 | 43 | 30 | 53 | 39 | 27 | 52 | 35 | 25 | 45 | 32 | 23 | 37 | 27 | 19 | 32 | 23 | 25 | 28 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 47 | 53 | 53 | 41 | 53 | 53 | 37 | 53 | 48 | 34 | 53 | 42 | 31 | 53 | 35 | 26 | 41 | 30 | 22 | 36 | 26 | 19 | 31 | 23 | 25 | 27 | 20 | 22 | 24 | 18 | 20 |
| | | | Exposed | 53 | 53 | 37 | 53 | 46 | 33 | 53 | 40 | 29 | 53 | 36 | 27 | 47 | 33 | 24 | 41 | 30 | 22 | 37 | 27 | 20 | 31 | 23 | 26 | 27 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 56 | 61 | 61 | 47 | 61 | 56 | 41 | 61 | 47 | 37 | 61 | 38 | 31 | 61 | 33 | 27 | 52 | 28 | 23 | 42 | 25 | 20 | 37 | 22 | 18 | 33 | 19 | 24 |
| | | | Exposed | 61 | 61 | 46 | 61 | 53 | 40 | 61 | 44 | 36 | 61 | 39 | 32 | 61 | 35 | 29 | 61 | 32 | 27 | 56 | 29 | 24 | 42 | 25 | 21 | 36 | 21 | 18 | 31 | 18 | 23 | 27 | 24 | 20 | 24 | 22 | 18 | 21 | 19 | ~~16~~ |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 54 | 56 | 56 | 46 | 56 | 51 | 38 | 48 | 41 | 32 | 39 | 35 | 28 | 34 | 31 | 24 | 30 | 27 | 22 | 27 | 24 | 19 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 52 | 56 | 56 | 43 | 56 | 53 | 39 | 56 | 45 | 35 | 47 | 40 | 32 | 41 | 37 | 29 | 35 | 31 | 25 | 30 | 27 | 21 | 26 | 23 | 18 | 23 | 20 | 24 | 20 | 18 | 21 | 18 | 24 | 19 |
| | D | 0-7 | Interior | 53 | 53 | 53 | 53 | 53 | 51 | 53 | 53 | 43 | 53 | 53 | 38 | 53 | 53 | 35 | 53 | 46 | 32 | 53 | 41 | 29 | 51 | 35 | 25 | 41 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 53 | 53 | 35 | 53 | 45 | 31 | 53 | 39 | 28 | 52 | 35 | 25 | 45 | 32 | 23 | 40 | 29 | 21 | 37 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 53 | 53 | 51 | 53 | 53 | 42 | 53 | 53 | 38 | 53 | 49 | 34 | 53 | 42 | 31 | 53 | 38 | 28 | 52 | 35 | 26 | 40 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 53 | 41 | 31 | 53 | 37 | 27 | 48 | 33 | 25 | 41 | 30 | 22 | 37 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 66 | 66 | 66 | 66 | 66 | 59 | 66 | 65 | 48 | 66 | 57 | 41 | 66 | 47 | 37 | 66 | 41 | 34 | 66 | 37 | 31 | 63 | 32 | 26 | 49 | 27 | 22 | 40 | 23 | 19 | 35 | 21 | 26 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 66 | 47 | 37 | 66 | 40 | 33 | 66 | 36 | 30 | 64 | 32 | 27 | 56 | 29 | 24 | 48 | 27 | 22 | 42 | 24 | 20 | 35 | 21 | 26 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 55 | 60 | 60 | 46 | 60 | 58 | 41 | 60 | 50 | 37 | 46 | 40 | 31 | 38 | 34 | 27 | 33 | 29 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | 24 |
| | | | Exposed | 60 | 60 | 46 | 60 | 56 | 40 | 59 | 47 | 36 | 48 | 41 | 32 | 41 | 37 | 29 | 37 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 24 | 28 | 28 | 22 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 24 | 28 | 28 | 21 | 28 | 25 | 18 | 28 | 22 | 24 | 27 | 20 | 21 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 29 | 29 | 24 | 29 | 29 | 21 | 28 | 26 | 19 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 25 | 29 | 28 | 21 | 29 | 25 | 18 | 29 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 |
| | | 20-27 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 23 | 19 | 24 | 21 | 26 | 24 | 18 | 23 |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 18 |
| | C | 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 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 22 | 28 | 27 | 19 | 28 | 24 | 25 | 28 | 21 | 23 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 28 | 25 | 28 | 28 | 23 | 28 | 27 | 19 | 28 | 23 | 25 | 28 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 29 | 22 | 28 | 26 | 19 | 27 | 23 | 25 | 26 | 20 | 22 | 24 | 18 | 20 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 27 | 29 | 29 | 24 | 29 | 29 | 22 | 29 | 27 | 20 | 29 | 23 | 26 | 27 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 20 | 24 | 22 | 18 | 24 | 19 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 21 | 18 | 24 | 18 | 23 | 24 | 24 | 20 | 24 | 22 | 18 | 21 | 19 | ~~16~~ |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 18 | 22 | 20 | 24 | 20 | 18 | 21 | 18 | 24 | 19 |
| | D | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 31 | 31 | 25 | 31 | 30 | 21 | 31 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 31 | 25 | 31 | 31 | 23 | 31 | 29 | 21 | 31 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 31 | 32 | 32 | 28 | 32 | 32 | 26 | 31 | 29 | 22 | 30 | 25 | 19 | 28 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 32 | 32 | 31 | 32 | 32 | 27 | 32 | 32 | 25 | 32 | 30 | 22 | 32 | 27 | 20 | 32 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 22 | 26 | 23 | 19 | 26 | 21 | 26 | 26 | 18 | 23 | 26 | 24 | 20 |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 22 | 26 | 24 | 20 | 26 | 21 | 26 | 26 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 23 | 25 | 25 | 20 | 25 | 23 | 18 | 22 | 20 | 24 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |
| 70 | B | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 24 | 18 | 24 | 22 | 24 | 24 | 20 | 21 |
| | | 7-20 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 21 | 25 | 25 | 19 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 21 | 25 | 25 | 18 | 25 | 22 | 24 | 25 | 19 | 21 | 23 | 25 | 19 |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 26 | 20 | 18 | 23 |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 |
| | C | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 24 | 24 | 25 | 24 | 21 | 23 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 19 | 24 | 23 | 25 | 24 | 20 | 22 | 24 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 22 | 25 | 25 | 19 | 24 | 23 | 25 | 23 | 20 | 22 | 23 | 18 | 20 |
| | | | Exposed | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 25 | 25 | 22 | 25 | 25 | 20 | 25 | 23 | 26 | 25 | 20 | 22 | 23 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 24 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 18 | 23 | 20 | 24 | 20 | 20 | 22 | 18 | 20 | 19 | ~~16~~ |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 24 | 19 | 18 | 21 | 18 | 24 | 19 |
| | 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 | 25 | 27 | 27 | 21 | 27 | 26 | 18 | 27 | 22 | 24 | 27 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 25 | 27 | 27 | 23 | 27 | 27 | 21 | 27 | 27 | 19 | 27 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 22 | 27 | 25 | 19 | 26 | 22 | 24 | 25 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 25 | 27 | 27 | 22 | 27 | 27 | 20 | 27 | 25 | 18 | 27 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 19 | 23 | 21 | 26 | 23 | 18 | 23 | 23 | 24 | 20 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 20 | 23 | 21 | 26 | 23 | 18 | 22 | 23 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 21 | 21 | 18 | 21 | 20 | 24 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 18 | 21 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |
| 80 | B | 0-7 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 18 | 21 | 21 | 24 | 21 | 20 | 21 |
| | | 7-20 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 19 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 18 | 22 | 22 | 24 | 22 | 19 | 21 | 22 | 25 | 19 |
| | | 20-27 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 26 | 18 | 18 | 23 |
| | | 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 |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| | C | 0-7 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 19 | 21 | 21 | 25 | 21 | 21 | 23 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 25 | 21 | 20 | 22 | 21 | 18 | 19 | 21 | 24 | ~~17~~ | 19 | 21 | ~~15~~ | 19 | 21 | ~~15~~ |
| | | 7-20 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 | 22 | 22 | 25 | 21 | 20 | 22 | 21 | 18 | 20 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 20 | 22 | 22 | 26 | 22 | 20 | 22 | 22 | 26 | 19 | 20 | 23 | ~~17~~ | 18 | 20 | ~~15~~ | 24 | 18 | ~~13~~ |
| | | 20-27 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 23 | 18 | 24 | 20 | 18 | 22 | 18 | 18 | 19 | ~~16~~ |
| | | 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 |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 24 | 17 | 17 | 21 | 17 | 24 | 19 |
| | D | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 24 | 18 | 24 | 22 | 24 | 24 | 20 | 21 | 24 | 27 | 19 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 21 | 24 | 24 | 19 | 24 | 23 | 24 | 24 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 23 | 22 | 24 | 23 | 19 | 21 | 22 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 20 | 24 | 24 | 18 | 24 | 23 | 25 | 24 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 26 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 26 | 20 | 18 | 23 | 20 | 24 | 20 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 26 | 20 | 18 | 22 | 20 | 23 | 19 | 20 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 24 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | 18 | 22 | 20 | ~~16~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 93 | 98 | 98 | 88 | 98 | 98 | 84 | 98 | 93 | 80 | 98 | 89 | 77 | 96 | 83 | 69 | 89 | 77 | 61 | 84 | 71 | 53 | 79 | 64 | 46 | 74 | 58 | 41 | 68 | 51 | 36 |
| | | | Exposed | 98 | 97 | 84 | 98 | 92 | 79 | 98 | 88 | 75 | 97 | 84 | 70 | 93 | 80 | 65 | 89 | 77 | 61 | 85 | 73 | 55 | 79 | 65 | 47 | 73 | 57 | 40 | 65 | 49 | 35 | 59 | 43 | 30 | 52 | 38 | 41 | 46 | 34 | 36 |
| | | 7-20 | Interior | 99 | 99 | 99 | 99 | 99 | 95 | 99 | 99 | 89 | 99 | 99 | 84 | 99 | 94 | 80 | 99 | 89 | 77 | 99 | 85 | 72 | 93 | 78 | 63 | 85 | 71 | 54 | 79 | 63 | 47 | 73 | 55 | 41 | 65 | 49 | 36 | 59 | 43 | 32 |
| | | | Exposed | 99 | 94 | 80 | 99 | 88 | 76 | 99 | 83 | 69 | 94 | 79 | 64 | 89 | 75 | 59 | 85 | 70 | 54 | 81 | 65 | 49 | 74 | 56 | 41 | 64 | 48 | 36 | 57 | 42 | 31 | 50 | 36 | 41 | 44 | 32 | 36 | 39 | 43 | 32 |
| | | 20-27 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 94 | 99 | 99 | 89 | 99 | 94 | 85 | 99 | 89 | 81 | 99 | 82 | 74 | 97 | 75 | 64 | 90 | 66 | 57 | 84 | 60 | 50 | 79 | 53 | 44 | 75 | 47 | 39 |
| | | | Exposed | 99 | 99 | 89 | 99 | 92 | 84 | 99 | 87 | 79 | 99 | 83 | 75 | 99 | 79 | 69 | 96 | 75 | 64 | 92 | 69 | 59 | 85 | 61 | 50 | 79 | 52 | 43 | 73 | 45 | 37 | 65 | 39 | 33 | 59 | 35 | 43 | 52 | 31 | 38 |
| | | 27-45 | Interior | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 96 | 100 | 100 | 92 | 100 | 97 | 88 | 98 | 89 | 81 | 90 | 83 | 75 | 83 | 78 | 66 | 78 | 71 | 59 | 71 | 65 | 52 | 64 | 59 | 47 |
| | | | Exposed | 100 | 100 | 96 | 100 | 100 | 90 | 100 | 95 | 86 | 99 | 90 | 81 | 94 | 86 | 78 | 89 | 82 | 74 | 85 | 79 | 68 | 78 | 72 | 60 | 70 | 64 | 52 | 63 | 56 | 45 | 55 | 49 | 39 | 48 | 43 | 34 | 43 | 39 | 31 |
| | C | 0-7 | Interior | 98 | 98 | 86 | 98 | 95 | 81 | 98 | 90 | 77 | 98 | 86 | 73 | 95 | 82 | 68 | 91 | 79 | 64 | 87 | 76 | 59 | 81 | 67 | 50 | 76 | 60 | 43 | 68 | 52 | 37 | 62 | 45 | 32 | 55 | 40 | 43 | 49 | 36 | 38 |
| | | | Exposed | 95 | 82 | 67 | 90 | 78 | 63 | 86 | 74 | 56 | 82 | 68 | 51 | 78 | 64 | 46 | 75 | 59 | 42 | 70 | 54 | 38 | 63 | 46 | 33 | 54 | 39 | 42 | 47 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 99 | 97 | 82 | 99 | 91 | 78 | 99 | 86 | 73 | 97 | 81 | 66 | 92 | 77 | 62 | 87 | 73 | 57 | 83 | 68 | 52 | 76 | 59 | 44 | 67 | 51 | 38 | 60 | 44 | 33 | 52 | 38 | 43 | 46 | 34 | 38 | 41 | 30 | 34 |
| | | | Exposed | 91 | 77 | 62 | 86 | 72 | 55 | 81 | 65 | 50 | 77 | 61 | 45 | 72 | 55 | 41 | 66 | 50 | 37 | 63 | 46 | 34 | 53 | 39 | 43 | 45 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 99 | 99 | 92 | 99 | 95 | 86 | 99 | 90 | 81 | 99 | 85 | 77 | 99 | 81 | 72 | 99 | 77 | 66 | 94 | 73 | 63 | 87 | 64 | 53 | 81 | 55 | 45 | 75 | 47 | 39 | 68 | 42 | 34 | 62 | 37 | 30 | 55 | 33 | 41 |
| | | | Exposed | 99 | 81 | 72 | 98 | 76 | 65 | 92 | 70 | 60 | 88 | 64 | 54 | 84 | 59 | 49 | 80 | 54 | 45 | 77 | 50 | 41 | 69 | 42 | 35 | 61 | 36 | 30 | 53 | 31 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 36 | 32 | 27 |
| | | 27-45 | Interior | 100 | 100 | 99 | 100 | 100 | 93 | 100 | 98 | 88 | 100 | 93 | 84 | 97 | 89 | 80 | 92 | 85 | 76 | 88 | 81 | 72 | 80 | 75 | 63 | 74 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 36 | 45 | 41 | 32 |
| | | | Exposed | 97 | 88 | 80 | 91 | 84 | 75 | 86 | 80 | 69 | 81 | 76 | 64 | 77 | 71 | 59 | 73 | 66 | 54 | 67 | 62 | 49 | 59 | 53 | 42 | 50 | 45 | 36 | 44 | 39 | 31 | 38 | 34 | 41 | 34 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 98 | 92 | 79 | 98 | 87 | 75 | 96 | 83 | 69 | 92 | 79 | 64 | 87 | 76 | 59 | 84 | 71 | 53 | 80 | 67 | 49 | 75 | 58 | 41 | 66 | 50 | 35 | 59 | 43 | 31 | 52 | 38 | 41 | 46 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 87 | 76 | 58 | 83 | 70 | 52 | 79 | 65 | 47 | 75 | 60 | 42 | 70 | 54 | 38 | 66 | 49 | 35 | 62 | 45 | 32 | 52 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 99 | 87 | 75 | 98 | 82 | 68 | 92 | 78 | 63 | 87 | 74 | 57 | 83 | 68 | 52 | 79 | 64 | 47 | 76 | 58 | 43 | 65 | 49 | 37 | 58 | 42 | 31 | 50 | 37 | 41 | 44 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 83 | 67 | 52 | 78 | 62 | 46 | 74 | 56 | 41 | 67 | 50 | 37 | 63 | 46 | 34 | 57 | 42 | 31 | 52 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | Interior | 99 | 92 | 83 | 99 | 86 | 78 | 99 | 82 | 74 | 99 | 77 | 67 | 94 | 73 | 62 | 90 | 67 | 57 | 86 | 63 | 52 | 80 | 53 | 44 | 74 | 46 | 38 | 65 | 40 | 33 | 59 | 35 | 43 | 52 | 31 | 38 | 46 | 41 | 34 |
| | | | Exposed | 94 | 73 | 62 | 89 | 65 | 56 | 84 | 60 | 50 | 80 | 55 | 45 | 77 | 49 | 41 | 73 | 45 | 37 | 68 | 41 | 34 | 59 | 35 | 44 | 51 | 30 | 38 | 44 | 39 | 33 | 39 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 100 | 100 | 90 | 100 | 94 | 85 | 98 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 72 | 83 | 78 | 66 | 80 | 74 | 62 | 72 | 65 | 53 | 64 | 57 | 45 | 55 | 50 | 39 | 48 | 43 | 34 | 43 | 38 | 30 | 38 | 34 | 41 |
| | | | Exposed | 87 | 81 | 71 | 82 | 77 | 65 | 78 | 72 | 60 | 74 | 66 | 54 | 67 | 62 | 49 | 63 | 56 | 45 | 58 | 52 | 41 | 49 | 44 | 35 | 42 | 38 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |
| 10 | B | 0-7 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 88 | 92 | 92 | 84 | 92 | 92 | 80 | 92 | 89 | 77 | 92 | 83 | 69 | 89 | 77 | 61 | 84 | 71 | 53 | 79 | 64 | 46 | 74 | 58 | 41 | 68 | 51 | 36 |
| | | | Exposed | 92 | 92 | 84 | 92 | 92 | 79 | 92 | 88 | 75 | 92 | 84 | 70 | 92 | 80 | 65 | 89 | 77 | 61 | 85 | 73 | 55 | 79 | 65 | 47 | 73 | 57 | 40 | 65 | 49 | 35 | 59 | 43 | 30 | 52 | 38 | 41 | 46 | 34 | 36 |
| | | 7-20 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 89 | 92 | 92 | 84 | 92 | 92 | 80 | 92 | 89 | 77 | 92 | 85 | 72 | 92 | 78 | 63 | 85 | 71 | 54 | 79 | 63 | 47 | 73 | 55 | 41 | 65 | 49 | 36 | 59 | 43 | 32 |
| | | | Exposed | 92 | 92 | 80 | 92 | 88 | 76 | 92 | 83 | 69 | 92 | 79 | 64 | 89 | 75 | 59 | 85 | 70 | 54 | 81 | 65 | 49 | 74 | 56 | 41 | 64 | 48 | 36 | 57 | 42 | 31 | 50 | 36 | 41 | 44 | 32 | 36 | 39 | 43 | 32 |
| | | 20-27 | Interior | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 94 | 96 | 96 | 89 | 96 | 94 | 85 | 96 | 89 | 81 | 96 | 82 | 74 | 96 | 75 | 64 | 90 | 66 | 57 | 84 | 60 | 50 | 79 | 53 | 44 | 75 | 47 | 39 |
| | | | Exposed | 96 | 96 | 89 | 96 | 92 | 84 | 96 | 87 | 79 | 96 | 83 | 75 | 96 | 79 | 69 | 96 | 75 | 64 | 92 | 69 | 59 | 85 | 61 | 50 | 79 | 52 | 43 | 73 | 45 | 37 | 65 | 39 | 33 | 59 | 35 | 43 | 52 | 31 | 38 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 96 | 99 | 99 | 92 | 99 | 97 | 88 | 98 | 89 | 81 | 90 | 83 | 75 | 83 | 78 | 66 | 78 | 71 | 59 | 71 | 65 | 52 | 64 | 59 | 47 |
| | | | Exposed | 99 | 99 | 96 | 99 | 99 | 90 | 99 | 95 | 86 | 99 | 90 | 81 | 94 | 86 | 78 | 89 | 82 | 74 | 85 | 79 | 68 | 78 | 72 | 60 | 70 | 64 | 52 | 63 | 56 | 45 | 55 | 49 | 39 | 48 | 43 | 34 | 43 | 39 | 31 |
| | C | 0-7 | Interior | 92 | 92 | 86 | 92 | 92 | 81 | 92 | 90 | 77 | 92 | 86 | 73 | 92 | 82 | 68 | 91 | 79 | 64 | 87 | 76 | 59 | 81 | 67 | 50 | 76 | 60 | 43 | 68 | 52 | 37 | 62 | 45 | 32 | 55 | 40 | 43 | 49 | 36 | 38 |
| | | | Exposed | 92 | 82 | 67 | 90 | 78 | 63 | 86 | 74 | 56 | 82 | 68 | 51 | 78 | 64 | 46 | 75 | 59 | 42 | 70 | 54 | 38 | 63 | 46 | 33 | 54 | 39 | 42 | 47 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 92 | 92 | 82 | 92 | 91 | 78 | 92 | 86 | 73 | 92 | 81 | 66 | 92 | 77 | 62 | 87 | 73 | 57 | 83 | 68 | 52 | 76 | 59 | 44 | 67 | 51 | 38 | 60 | 44 | 33 | 52 | 38 | 43 | 46 | 34 | 38 | 41 | 30 | 34 |
| | | | Exposed | 91 | 77 | 62 | 86 | 72 | 55 | 81 | 65 | 50 | 77 | 61 | 45 | 72 | 55 | 41 | 66 | 50 | 37 | 63 | 46 | 34 | 53 | 39 | 43 | 45 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 96 | 96 | 92 | 96 | 95 | 86 | 96 | 90 | 81 | 96 | 85 | 77 | 96 | 81 | 72 | 96 | 77 | 66 | 94 | 73 | 63 | 87 | 64 | 53 | 81 | 55 | 45 | 75 | 47 | 39 | 68 | 42 | 34 | 62 | 37 | 30 | 55 | 33 | 41 |
| | | | Exposed | 96 | 81 | 72 | 96 | 76 | 65 | 92 | 70 | 60 | 88 | 64 | 54 | 84 | 59 | 49 | 80 | 54 | 45 | 77 | 50 | 41 | 69 | 42 | 35 | 61 | 36 | 30 | 53 | 31 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 36 | 32 | 27 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 93 | 99 | 98 | 88 | 99 | 93 | 84 | 97 | 89 | 80 | 92 | 85 | 76 | 88 | 81 | 72 | 80 | 75 | 63 | 74 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 36 | 45 | 41 | 32 |
| | | | Exposed | 97 | 88 | 80 | 91 | 84 | 75 | 86 | 80 | 69 | 81 | 76 | 64 | 77 | 71 | 59 | 73 | 66 | 54 | 67 | 62 | 49 | 59 | 53 | 42 | 50 | 45 | 36 | 44 | 39 | 31 | 38 | 34 | 41 | 34 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 92 | 92 | 79 | 92 | 87 | 75 | 92 | 83 | 69 | 92 | 79 | 64 | 87 | 76 | 59 | 84 | 71 | 53 | 80 | 67 | 49 | 75 | 58 | 41 | 66 | 50 | 35 | 59 | 43 | 31 | 52 | 38 | 41 | 46 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 87 | 76 | 58 | 83 | 70 | 52 | 79 | 65 | 47 | 75 | 60 | 42 | 70 | 54 | 38 | 66 | 49 | 35 | 62 | 45 | 32 | 52 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 92 | 87 | 75 | 92 | 82 | 68 | 92 | 78 | 63 | 87 | 74 | 57 | 83 | 68 | 52 | 79 | 64 | 47 | 76 | 58 | 43 | 65 | 49 | 37 | 58 | 42 | 31 | 50 | 37 | 41 | 44 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 83 | 67 | 52 | 78 | 62 | 46 | 74 | 56 | 41 | 67 | 50 | 37 | 63 | 46 | 34 | 57 | 42 | 31 | 52 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | Interior | 97 | 92 | 83 | 97 | 86 | 78 | 97 | 82 | 74 | 97 | 77 | 67 | 94 | 73 | 62 | 90 | 67 | 57 | 86 | 63 | 52 | 80 | 53 | 44 | 74 | 46 | 38 | 65 | 40 | 33 | 59 | 35 | 43 | 52 | 31 | 38 | 46 | 41 | 34 |
| | | | Exposed | 94 | 73 | 62 | 89 | 65 | 56 | 84 | 60 | 50 | 80 | 55 | 45 | 77 | 49 | 41 | 73 | 45 | 37 | 68 | 41 | 34 | 59 | 35 | 44 | 51 | 30 | 38 | 44 | 39 | 33 | 39 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 99 | 99 | 90 | 99 | 94 | 85 | 98 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 72 | 83 | 78 | 66 | 80 | 74 | 62 | 72 | 65 | 53 | 64 | 57 | 45 | 55 | 50 | 39 | 48 | 43 | 34 | 43 | 38 | 30 | 38 | 34 | 41 |
| | | | Exposed | 87 | 81 | 71 | 82 | 77 | 65 | 78 | 72 | 60 | 74 | 66 | 54 | 67 | 62 | 49 | 63 | 56 | 45 | 58 | 52 | 41 | 49 | 44 | 35 | 42 | 38 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |
| 20 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 77 | 83 | 83 | 69 | 83 | 77 | 61 | 83 | 71 | 53 | 79 | 64 | 46 | 74 | 58 | 41 | 68 | 51 | 36 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 83 | 70 | 83 | 80 | 65 | 83 | 77 | 61 | 83 | 73 | 55 | 79 | 65 | 47 | 73 | 57 | 40 | 65 | 49 | 35 | 59 | 43 | 30 | 52 | 38 | 41 | 46 | 34 | 36 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 80 | 83 | 83 | 77 | 83 | 83 | 72 | 83 | 78 | 63 | 83 | 71 | 54 | 79 | 63 | 47 | 73 | 55 | 41 | 65 | 49 | 36 | 59 | 43 | 32 |
| | | | Exposed | 83 | 83 | 80 | 83 | 83 | 76 | 83 | 83 | 69 | 83 | 79 | 64 | 83 | 75 | 59 | 83 | 70 | 54 | 81 | 65 | 49 | 74 | 56 | 41 | 64 | 48 | 36 | 57 | 42 | 31 | 50 | 36 | 41 | 44 | 32 | 36 | 39 | 43 | 32 |
| | | 20-27 | Interior | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 89 | 85 | 89 | 89 | 81 | 89 | 82 | 74 | 89 | 75 | 64 | 89 | 66 | 57 | 84 | 60 | 50 | 79 | 53 | 44 | 75 | 47 | 39 |
| | | | Exposed | 89 | 89 | 89 | 89 | 89 | 84 | 89 | 87 | 79 | 89 | 83 | 75 | 89 | 79 | 69 | 89 | 75 | 64 | 89 | 69 | 59 | 85 | 61 | 50 | 79 | 52 | 43 | 73 | 45 | 37 | 65 | 39 | 33 | 59 | 35 | 43 | 52 | 31 | 38 |
| | | 27-45 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 88 | 92 | 89 | 81 | 90 | 83 | 75 | 83 | 78 | 66 | 78 | 71 | 59 | 71 | 65 | 52 | 64 | 59 | 47 |
| | | | Exposed | 92 | 92 | 92 | 92 | 92 | 90 | 92 | 92 | 86 | 92 | 90 | 81 | 92 | 86 | 78 | 89 | 82 | 74 | 85 | 79 | 68 | 78 | 72 | 60 | 70 | 64 | 52 | 63 | 56 | 45 | 55 | 49 | 39 | 48 | 43 | 34 | 43 | 39 | 31 |
| | C | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 73 | 83 | 82 | 68 | 83 | 79 | 64 | 83 | 76 | 59 | 81 | 67 | 50 | 76 | 60 | 43 | 68 | 52 | 37 | 62 | 45 | 32 | 55 | 40 | 43 | 49 | 36 | 38 |
| | | | Exposed | 83 | 82 | 67 | 83 | 78 | 63 | 83 | 74 | 56 | 82 | 68 | 51 | 78 | 64 | 46 | 75 | 59 | 42 | 70 | 54 | 38 | 63 | 46 | 33 | 54 | 39 | 42 | 47 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 83 | 83 | 82 | 83 | 83 | 78 | 83 | 83 | 73 | 83 | 81 | 66 | 83 | 77 | 62 | 83 | 73 | 57 | 83 | 68 | 52 | 76 | 59 | 44 | 67 | 51 | 38 | 60 | 44 | 33 | 52 | 38 | 43 | 46 | 34 | 38 | 41 | 30 | 34 |
| | | | Exposed | 83 | 77 | 62 | 83 | 72 | 55 | 81 | 65 | 50 | 77 | 61 | 45 | 72 | 55 | 41 | 66 | 50 | 37 | 63 | 46 | 34 | 53 | 39 | 43 | 45 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 89 | 89 | 89 | 89 | 89 | 86 | 89 | 89 | 81 | 89 | 85 | 77 | 89 | 81 | 72 | 89 | 77 | 66 | 89 | 73 | 63 | 87 | 64 | 53 | 81 | 55 | 45 | 75 | 47 | 39 | 68 | 42 | 34 | 62 | 37 | 30 | 55 | 33 | 41 |
| | | | Exposed | 89 | 81 | 72 | 89 | 76 | 65 | 89 | 70 | 60 | 88 | 64 | 54 | 84 | 59 | 49 | 80 | 54 | 45 | 77 | 50 | 41 | 69 | 42 | 35 | 61 | 36 | 30 | 53 | 31 | 39 | 46 | 41 | 34 | 41 | 36 | 30 | 36 | 32 | 27 |
| | | 27-45 | Interior | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 88 | 92 | 92 | 84 | 92 | 89 | 80 | 92 | 85 | 76 | 88 | 81 | 72 | 80 | 75 | 63 | 74 | 66 | 54 | 65 | 59 | 47 | 58 | 52 | 41 | 51 | 46 | 36 | 45 | 41 | 32 |
| | | | Exposed | 92 | 88 | 80 | 91 | 84 | 75 | 86 | 80 | 69 | 81 | 76 | 64 | 77 | 71 | 59 | 73 | 66 | 54 | 67 | 62 | 49 | 59 | 53 | 42 | 50 | 45 | 36 | 44 | 39 | 31 | 38 | 34 | 41 | 34 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 83 | 69 | 83 | 79 | 64 | 83 | 76 | 59 | 83 | 71 | 53 | 80 | 67 | 49 | 75 | 58 | 41 | 66 | 50 | 35 | 59 | 43 | 31 | 52 | 38 | 41 | 46 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 83 | 76 | 58 | 83 | 70 | 52 | 79 | 65 | 47 | 75 | 60 | 42 | 70 | 54 | 38 | 66 | 49 | 35 | 62 | 45 | 32 | 52 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 83 | 83 | 75 | 83 | 82 | 68 | 83 | 78 | 63 | 83 | 74 | 57 | 83 | 68 | 52 | 79 | 64 | 47 | 76 | 58 | 43 | 65 | 49 | 37 | 58 | 42 | 31 | 50 | 37 | 41 | 44 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 83 | 67 | 52 | 78 | 62 | 46 | 74 | 56 | 41 | 67 | 50 | 37 | 63 | 46 | 34 | 57 | 42 | 31 | 52 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | Interior | 90 | 90 | 83 | 90 | 86 | 78 | 90 | 82 | 74 | 90 | 77 | 67 | 90 | 73 | 62 | 90 | 67 | 57 | 86 | 63 | 52 | 80 | 53 | 44 | 74 | 46 | 38 | 65 | 40 | 33 | 59 | 35 | 43 | 52 | 31 | 38 | 46 | 41 | 34 |
| | | | Exposed | 90 | 73 | 62 | 89 | 65 | 56 | 84 | 60 | 50 | 80 | 55 | 45 | 77 | 49 | 41 | 73 | 45 | 37 | 68 | 41 | 34 | 59 | 35 | 44 | 51 | 30 | 38 | 44 | 39 | 33 | 39 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 93 | 93 | 90 | 93 | 93 | 85 | 93 | 89 | 80 | 92 | 85 | 77 | 88 | 81 | 72 | 83 | 78 | 66 | 80 | 74 | 62 | 72 | 65 | 53 | 64 | 57 | 45 | 55 | 50 | 39 | 48 | 43 | 34 | 43 | 38 | 30 | 38 | 34 | 41 |
| | | | Exposed | 87 | 81 | 71 | 82 | 77 | 65 | 78 | 72 | 60 | 74 | 66 | 54 | 67 | 62 | 49 | 63 | 56 | 45 | 58 | 52 | 41 | 49 | 44 | 35 | 42 | 38 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 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 | 46 | 47 | 47 | 41 | 47 | 47 | 36 |
| | | | Exposed | 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 | 40 | 47 | 47 | 35 | 47 | 43 | 30 | 47 | 38 | 41 | 46 | 34 | 36 |
| | | 7-20 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 47 | 48 | 48 | 41 | 48 | 48 | 36 | 46 | 43 | 32 |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 41 | 48 | 48 | 36 | 48 | 42 | 31 | 48 | 36 | 41 | 44 | 32 | 36 | 39 | 43 | 32 |
| | | 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 | 39 |
| | | | 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 | 37 | 40 | 39 | 33 | 40 | 35 | 43 | 40 | 31 | 38 |
| | | 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 |
| | | | 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 | 38 | 38 | 38 | 38 | 38 | 38 | 34 | 38 | 38 | 31 |
| | C | 0-7 | Interior | 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 | 43 | 47 | 47 | 37 | 47 | 45 | 32 | 47 | 40 | 43 | 47 | 36 | 38 |
| | | | Exposed | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 46 | 47 | 47 | 42 | 47 | 47 | 38 | 47 | 46 | 33 | 47 | 39 | 42 | 47 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 44 | 48 | 48 | 38 | 47 | 44 | 33 | 45 | 38 | 43 | 43 | 34 | 38 | 41 | 30 | 34 |
| | | | Exposed | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 45 | 48 | 48 | 41 | 48 | 48 | 37 | 48 | 46 | 34 | 48 | 39 | 43 | 45 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 39 | 40 | 40 | 34 | 40 | 37 | 30 | 40 | 33 | 41 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 35 | 40 | 36 | 30 | 40 | 31 | 39 | 40 | 41 | 34 | 40 | 36 | 30 | 36 | 32 | 27 |
| | | 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 | 36 | 38 | 38 | 32 |
| | | | 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 | 36 | 38 | 38 | 31 | 38 | 34 | 41 | 34 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 49 | 52 | 52 | 41 | 52 | 50 | 35 | 52 | 43 | 31 | 52 | 38 | 41 | 46 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 47 | 52 | 52 | 42 | 52 | 52 | 38 | 52 | 49 | 35 | 52 | 45 | 32 | 52 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 52 | 53 | 53 | 47 | 53 | 53 | 43 | 52 | 49 | 37 | 50 | 42 | 31 | 48 | 37 | 41 | 44 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 53 | 53 | 52 | 53 | 53 | 46 | 53 | 53 | 41 | 53 | 50 | 37 | 53 | 46 | 34 | 53 | 42 | 31 | 52 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 38 | 44 | 40 | 33 | 44 | 35 | 43 | 44 | 31 | 38 | 44 | 41 | 34 |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 44 | 37 | 44 | 41 | 34 | 44 | 35 | 44 | 44 | 30 | 38 | 44 | 39 | 33 | 39 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 39 | 41 | 41 | 34 | 41 | 38 | 30 | 38 | 34 | 41 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 35 | 41 | 38 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |
| 70 | 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 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 36 |
| | | | 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 | 40 | 41 | 41 | 35 | 41 | 41 | 30 | 41 | 38 | 41 | 41 | 34 | 36 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 36 | 41 | 41 | 32 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 36 | 41 | 41 | 31 | 41 | 36 | 41 | 41 | 32 | 36 | 39 | 43 | 32 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 43 | 34 | 31 | 38 |
| | | 27-45 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 |
| | 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 | 41 | 41 | 37 | 41 | 41 | 32 | 41 | 40 | 43 | 41 | 36 | 38 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 38 | 41 | 41 | 33 | 41 | 39 | 42 | 41 | 34 | 37 | 41 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 38 | 41 | 41 | 33 | 41 | 38 | 43 | 39 | 34 | 38 | 38 | 30 | 34 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 41 | 34 | 41 | 39 | 43 | 41 | 33 | 37 | 39 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 33 | 41 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 31 | 39 | 34 | 41 | 34 | 34 | 36 | 30 | 34 | 32 | 27 |
| | | 27-45 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 32 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 41 | 33 | 30 | 36 | 30 | 40 | 32 |
| | D | 0-7 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 41 | 45 | 45 | 35 | 45 | 43 | 31 | 45 | 38 | 41 | 45 | 33 | 36 | 41 | 30 | 32 |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 42 | 45 | 45 | 38 | 45 | 45 | 35 | 45 | 45 | 32 | 45 | 38 | 41 | 45 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 7-20 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 43 | 46 | 46 | 37 | 45 | 42 | 31 | 43 | 37 | 41 | 41 | 32 | 36 | 39 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 41 | 46 | 46 | 37 | 46 | 46 | 34 | 46 | 42 | 31 | 46 | 38 | 43 | 44 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 20-27 | 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 | 33 | 38 | 35 | 43 | 38 | 31 | 38 | 38 | 41 | 34 |
| | | | Exposed | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 37 | 38 | 38 | 34 | 38 | 35 | 44 | 38 | 30 | 38 | 38 | 39 | 33 | 38 | 34 | 28 | 34 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 34 | 36 | 36 | 30 | 36 | 34 | 41 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 30 | 36 | 33 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |
| 80 | B | 0-7 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 30 | 36 | 36 | 41 | 36 | 34 | 36 |
| | | 7-20 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 32 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 31 | 37 | 36 | 41 | 37 | 32 | 36 | 37 | 43 | 32 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 43 | 30 | 30 | 38 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | C | 0-7 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 32 | 36 | 36 | 43 | 36 | 36 | 38 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 33 | 36 | 36 | 42 | 36 | 34 | 37 | 36 | 30 | 32 | 36 | 40 | 28 | 32 | 35 | 25 |
| | | 7-20 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 37 | 43 | 36 | 34 | 38 | 35 | 30 | 34 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 34 | 37 | 37 | 43 | 37 | 33 | 37 | 37 | 43 | 32 | 34 | 38 | 28 | 30 | 34 | 25 | 41 | 30 | 22 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 41 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 39 | 30 | 41 | 34 | 30 | 36 | 30 | 30 | 32 | 27 |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 41 | 29 | 29 | 36 | 29 | 40 | 32 |
| | D | 0-7 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 35 | 40 | 40 | 31 | 40 | 38 | 41 | 40 | 33 | 36 | 40 | 30 | 32 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 35 | 40 | 40 | 32 | 40 | 38 | 41 | 40 | 33 | 35 | 39 | 43 | 30 | 34 | 38 | 27 | 30 | 33 | 24 | 40 | 29 | 21 |
| | | 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 | 37 | 40 | 40 | 31 | 39 | 37 | 41 | 38 | 32 | 36 | 37 | 43 | 32 | 34 | 38 | 28 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 37 | 40 | 40 | 34 | 40 | 40 | 31 | 40 | 38 | 43 | 40 | 32 | 36 | 38 | 42 | 31 | 33 | 36 | 27 | 43 | 32 | 24 | 38 | 28 | 21 | 34 | 25 | 19 |
| | | 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 | 43 | 33 | 31 | 38 | 33 | 41 | 34 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 44 | 33 | 30 | 38 | 33 | 39 | 33 | 33 | 34 | 28 | 33 | 30 | 25 | 30 | 27 | 22 |
| | | 27-45 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 41 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 39 | 32 | 43 | 34 | 42 | 38 | 30 | 38 | 34 | 27 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 19 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 74 | 73 | 74 | 74 | 68 | 74 | 74 | 64 | 74 | 74 | 55 | 74 | 70 | 47 | 74 | 61 | 36 | 69 | 48 | 30 | 63 | 38 | 26 | 51 | 33 | 23 | 42 | 29 | 20 | 35 | 25 | 18 |
| | | | Exposed | 74 | 74 | 64 | 74 | 73 | 52 | 74 | 68 | 44 | 74 | 63 | 37 | 73 | 54 | 33 | 69 | 47 | 30 | 65 | 41 | 28 | 52 | 33 | 23 | 41 | 28 | 20 | 34 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 55 | 64 | 64 | 46 | 64 | 64 | 39 | 64 | 50 | 31 | 64 | 37 | 27 | 51 | 31 | 23 | 40 | 27 | 20 | 33 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 64 | 64 | 54 | 64 | 64 | 44 | 64 | 63 | 36 | 64 | 52 | 32 | 64 | 43 | 29 | 64 | 36 | 27 | 56 | 33 | 24 | 40 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 56 | 60 | 59 | 40 | 60 | 43 | 33 | 60 | 34 | 28 | 60 | 30 | 25 | 52 | 26 | 22 | 43 | 23 | 19 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 42 | 60 | 50 | 35 | 60 | 42 | 32 | 60 | 36 | 29 | 60 | 30 | 25 | 51 | 26 | 21 | 40 | 22 | 18 | 33 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 42 | 56 | 48 | 34 | 48 | 38 | 30 | 38 | 33 | 26 | 33 | 29 | 23 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 48 | 56 | 56 | 41 | 56 | 52 | 35 | 49 | 39 | 30 | 36 | 32 | 26 | 31 | 28 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 |
| | C | 0-7 | Interior | 74 | 74 | 66 | 74 | 74 | 58 | 74 | 70 | 48 | 74 | 66 | 41 | 74 | 59 | 35 | 71 | 51 | 32 | 67 | 44 | 29 | 56 | 35 | 25 | 44 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 74 | 59 | 35 | 70 | 49 | 31 | 66 | 42 | 28 | 58 | 36 | 25 | 50 | 32 | 23 | 43 | 29 | 21 | 38 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 64 | 64 | 61 | 64 | 64 | 49 | 64 | 64 | 40 | 64 | 58 | 34 | 64 | 48 | 31 | 64 | 40 | 28 | 63 | 35 | 26 | 45 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 64 | 47 | 31 | 64 | 38 | 27 | 58 | 33 | 25 | 47 | 30 | 22 | 39 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 58 | 60 | 60 | 47 | 60 | 56 | 39 | 60 | 47 | 34 | 60 | 39 | 31 | 60 | 32 | 26 | 56 | 27 | 22 | 44 | 24 | 19 | 35 | 21 | 17 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 60 | 56 | 39 | 60 | 45 | 33 | 60 | 36 | 30 | 60 | 32 | 27 | 60 | 29 | 24 | 55 | 27 | 22 | 47 | 25 | 20 | 35 | 21 | 17 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 54 | 56 | 56 | 45 | 56 | 56 | 39 | 55 | 43 | 32 | 40 | 34 | 27 | 33 | 30 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 56 | 56 | 53 | 56 | 56 | 43 | 56 | 53 | 36 | 56 | 44 | 32 | 47 | 38 | 29 | 39 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 74 | 72 | 51 | 74 | 67 | 42 | 74 | 61 | 36 | 72 | 52 | 32 | 67 | 44 | 29 | 63 | 39 | 26 | 55 | 34 | 24 | 42 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 67 | 44 | 29 | 61 | 37 | 26 | 51 | 33 | 23 | 44 | 30 | 21 | 38 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 64 | 64 | 42 | 64 | 61 | 35 | 64 | 49 | 31 | 64 | 41 | 28 | 63 | 35 | 26 | 52 | 32 | 23 | 44 | 29 | 21 | 34 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 62 | 35 | 26 | 49 | 31 | 23 | 40 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 49 | 60 | 58 | 40 | 60 | 47 | 34 | 60 | 39 | 31 | 60 | 34 | 28 | 60 | 31 | 26 | 53 | 26 | 22 | 41 | 23 | 19 | 33 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 60 | 39 | 31 | 60 | 33 | 28 | 60 | 30 | 25 | 55 | 27 | 22 | 47 | 25 | 20 | 40 | 22 | 18 | 35 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 55 | 56 | 56 | 46 | 56 | 56 | 39 | 56 | 49 | 34 | 53 | 42 | 31 | 38 | 33 | 26 | 32 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 56 | 56 | 38 | 56 | 47 | 33 | 49 | 39 | 30 | 40 | 34 | 27 | 34 | 31 | 24 | 31 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 10 | B | 0-7 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 55 | 60 | 60 | 47 | 60 | 60 | 36 | 60 | 48 | 30 | 60 | 38 | 26 | 51 | 33 | 23 | 42 | 29 | 20 | 35 | 25 | 18 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 44 | 60 | 60 | 37 | 60 | 54 | 33 | 60 | 47 | 30 | 60 | 41 | 28 | 52 | 33 | 23 | 41 | 28 | 20 | 34 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 55 | 60 | 60 | 46 | 60 | 60 | 39 | 60 | 50 | 31 | 60 | 37 | 27 | 51 | 31 | 23 | 40 | 27 | 20 | 33 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 60 | 60 | 54 | 60 | 60 | 44 | 60 | 60 | 36 | 60 | 52 | 32 | 60 | 43 | 29 | 60 | 36 | 27 | 56 | 33 | 24 | 40 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 56 | 60 | 59 | 40 | 60 | 43 | 33 | 60 | 34 | 28 | 60 | 30 | 25 | 52 | 26 | 22 | 43 | 23 | 19 |
| | | | Exposed | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 52 | 60 | 60 | 42 | 60 | 50 | 35 | 60 | 42 | 32 | 60 | 36 | 29 | 60 | 30 | 25 | 51 | 26 | 21 | 40 | 22 | 18 | 33 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 42 | 56 | 48 | 34 | 48 | 38 | 30 | 38 | 33 | 26 | 33 | 29 | 23 |
| | | | Exposed | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 48 | 56 | 56 | 41 | 56 | 52 | 35 | 49 | 39 | 30 | 36 | 32 | 26 | 31 | 28 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 |
| | C | 0-7 | Interior | 60 | 60 | 60 | 60 | 60 | 58 | 60 | 60 | 48 | 60 | 60 | 41 | 60 | 59 | 35 | 60 | 51 | 32 | 60 | 44 | 29 | 56 | 35 | 25 | 44 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 60 | 59 | 35 | 60 | 49 | 31 | 60 | 42 | 28 | 58 | 36 | 25 | 50 | 32 | 23 | 43 | 29 | 21 | 38 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 60 | 60 | 60 | 60 | 60 | 49 | 60 | 60 | 40 | 60 | 58 | 34 | 60 | 48 | 31 | 60 | 40 | 28 | 60 | 35 | 26 | 45 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 60 | 47 | 31 | 60 | 38 | 27 | 58 | 33 | 25 | 47 | 30 | 22 | 39 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 58 | 60 | 60 | 47 | 60 | 56 | 39 | 60 | 47 | 34 | 60 | 39 | 31 | 60 | 32 | 26 | 56 | 27 | 22 | 44 | 24 | 19 | 35 | 21 | 17 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 60 | 56 | 39 | 60 | 45 | 33 | 60 | 36 | 30 | 60 | 32 | 27 | 60 | 29 | 24 | 55 | 27 | 22 | 47 | 25 | 20 | 35 | 21 | 17 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 54 | 56 | 56 | 45 | 56 | 56 | 39 | 55 | 43 | 32 | 40 | 34 | 27 | 33 | 30 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 56 | 56 | 53 | 56 | 56 | 43 | 56 | 53 | 36 | 56 | 44 | 32 | 47 | 38 | 29 | 39 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 60 | 60 | 51 | 60 | 60 | 42 | 60 | 60 | 36 | 60 | 52 | 32 | 60 | 44 | 29 | 60 | 39 | 26 | 55 | 34 | 24 | 42 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 60 | 44 | 29 | 60 | 37 | 26 | 51 | 33 | 23 | 44 | 30 | 21 | 38 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 60 | 60 | 42 | 60 | 60 | 35 | 60 | 49 | 31 | 60 | 41 | 28 | 60 | 35 | 26 | 52 | 32 | 23 | 44 | 29 | 21 | 34 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 60 | 35 | 26 | 49 | 31 | 23 | 40 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 60 | 60 | 60 | 60 | 60 | 49 | 60 | 58 | 40 | 60 | 47 | 34 | 60 | 39 | 31 | 60 | 34 | 28 | 60 | 31 | 26 | 53 | 26 | 22 | 41 | 23 | 19 | 33 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 60 | 39 | 31 | 60 | 33 | 28 | 60 | 30 | 25 | 55 | 27 | 22 | 47 | 25 | 20 | 40 | 22 | 18 | 35 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 55 | 56 | 56 | 46 | 56 | 56 | 39 | 56 | 49 | 34 | 53 | 42 | 31 | 38 | 33 | 26 | 32 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 56 | 56 | 38 | 56 | 47 | 33 | 49 | 39 | 30 | 40 | 34 | 27 | 34 | 31 | 24 | 31 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 20 | B | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 36 | 44 | 44 | 30 | 44 | 38 | 26 | 44 | 33 | 23 | 42 | 29 | 20 | 35 | 25 | 18 |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 37 | 44 | 44 | 33 | 44 | 44 | 30 | 44 | 41 | 28 | 44 | 33 | 23 | 41 | 28 | 20 | 34 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 39 | 45 | 45 | 31 | 45 | 37 | 27 | 45 | 31 | 23 | 40 | 27 | 20 | 33 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 44 | 45 | 45 | 36 | 45 | 45 | 32 | 45 | 43 | 29 | 45 | 36 | 27 | 45 | 33 | 24 | 40 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 40 | 51 | 43 | 33 | 51 | 34 | 28 | 51 | 30 | 25 | 51 | 26 | 22 | 43 | 23 | 19 |
| | | | Exposed | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 42 | 51 | 50 | 35 | 51 | 42 | 32 | 51 | 36 | 29 | 51 | 30 | 25 | 51 | 26 | 21 | 40 | 22 | 18 | 33 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 42 | 46 | 46 | 34 | 46 | 38 | 30 | 38 | 33 | 26 | 33 | 29 | 23 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 41 | 46 | 46 | 35 | 46 | 39 | 30 | 36 | 32 | 26 | 31 | 28 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 |
| | C | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 44 | 35 | 44 | 44 | 32 | 44 | 44 | 29 | 44 | 35 | 25 | 44 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 44 | 44 | 35 | 44 | 44 | 31 | 44 | 42 | 28 | 44 | 36 | 25 | 44 | 32 | 23 | 43 | 29 | 21 | 38 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 40 | 45 | 45 | 34 | 45 | 45 | 31 | 45 | 40 | 28 | 45 | 35 | 26 | 45 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 45 | 45 | 31 | 45 | 38 | 27 | 45 | 33 | 25 | 45 | 30 | 22 | 39 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 47 | 51 | 51 | 39 | 51 | 47 | 34 | 51 | 39 | 31 | 51 | 32 | 26 | 51 | 27 | 22 | 44 | 24 | 19 | 35 | 21 | 17 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 51 | 51 | 39 | 51 | 45 | 33 | 51 | 36 | 30 | 51 | 32 | 27 | 51 | 29 | 24 | 51 | 27 | 22 | 47 | 25 | 20 | 35 | 21 | 17 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 45 | 46 | 46 | 39 | 46 | 43 | 32 | 40 | 34 | 27 | 33 | 30 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 43 | 46 | 46 | 36 | 46 | 44 | 32 | 46 | 38 | 29 | 39 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 42 | 44 | 44 | 36 | 44 | 44 | 32 | 44 | 44 | 29 | 44 | 39 | 26 | 44 | 34 | 24 | 42 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 44 | 44 | 29 | 44 | 37 | 26 | 44 | 33 | 23 | 44 | 30 | 21 | 38 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 45 | 45 | 42 | 45 | 45 | 35 | 45 | 45 | 31 | 45 | 41 | 28 | 45 | 35 | 26 | 45 | 32 | 23 | 44 | 29 | 21 | 34 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 45 | 35 | 26 | 45 | 31 | 23 | 40 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 55 | 55 | 55 | 55 | 55 | 49 | 55 | 55 | 40 | 55 | 47 | 34 | 55 | 39 | 31 | 55 | 34 | 28 | 55 | 31 | 26 | 53 | 26 | 22 | 41 | 23 | 19 | 33 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 55 | 39 | 31 | 55 | 33 | 28 | 55 | 30 | 25 | 55 | 27 | 22 | 47 | 25 | 20 | 40 | 22 | 18 | 35 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 46 | 50 | 50 | 39 | 50 | 49 | 34 | 50 | 42 | 31 | 38 | 33 | 26 | 32 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 50 | 50 | 38 | 50 | 47 | 33 | 49 | 39 | 30 | 40 | 34 | 27 | 34 | 31 | 24 | 31 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 30 | B | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 30 | 35 | 35 | 26 | 35 | 33 | 23 | 35 | 29 | 20 | 35 | 25 | 18 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 30 | 35 | 35 | 28 | 35 | 33 | 23 | 35 | 28 | 20 | 34 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 27 | 35 | 31 | 23 | 35 | 27 | 20 | 33 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 29 | 35 | 35 | 27 | 35 | 33 | 24 | 35 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 34 | 28 | 37 | 30 | 25 | 37 | 26 | 22 | 37 | 23 | 19 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 37 | 37 | 32 | 37 | 36 | 29 | 37 | 30 | 25 | 37 | 26 | 21 | 37 | 22 | 18 | 33 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 33 | 26 | 33 | 29 | 23 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 32 | 26 | 31 | 28 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | | | |
| | C | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 29 | 35 | 35 | 25 | 35 | 30 | 21 | 35 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 25 | 35 | 32 | 23 | 35 | 29 | 21 | 35 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 29 | 22 | 34 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 35 | 35 | 31 | 35 | 35 | 27 | 35 | 33 | 25 | 35 | 30 | 22 | 35 | 27 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 34 | 37 | 37 | 31 | 37 | 32 | 26 | 37 | 27 | 22 | 37 | 24 | 19 | 35 | 21 | 17 | 31 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 36 | 30 | 37 | 32 | 27 | 37 | 29 | 24 | 37 | 27 | 22 | 37 | 25 | 20 | 35 | 21 | 17 | 30 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 34 | 27 | 33 | 30 | 23 | 29 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 | 34 | 34 | 29 | 34 | 34 | 27 | 34 | 31 | 24 | 29 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 34 | 24 | 35 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 33 | 23 | 35 | 30 | 21 | 35 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 32 | 23 | 35 | 29 | 21 | 33 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 35 | 35 | 26 | 35 | 31 | 23 | 35 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 34 | 40 | 39 | 31 | 40 | 34 | 28 | 40 | 31 | 26 | 40 | 26 | 22 | 40 | 23 | 19 | 33 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 40 | 39 | 31 | 40 | 33 | 28 | 40 | 30 | 25 | 40 | 27 | 22 | 40 | 25 | 20 | 40 | 22 | 18 | 35 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 34 | 37 | 37 | 31 | 37 | 33 | 26 | 32 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 37 | 30 | 37 | 34 | 27 | 34 | 31 | 24 | 31 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 40 | B | 0-7 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 26 | 33 | 33 | 23 | 33 | 29 | 20 | 33 | 25 | 18 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 30 | 33 | 33 | 28 | 33 | 33 | 23 | 33 | 28 | 20 | 33 | 24 | 17 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 27 | 33 | 31 | 23 | 32 | 27 | 20 | 31 | 24 | 18 | 29 | 21 | 24 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 32 | 33 | 33 | 29 | 33 | 33 | 27 | 33 | 33 | 24 | 33 | 28 | 21 | 33 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 29 | 29 | 25 | 29 | 26 | 22 | 29 | 23 | 19 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 25 | 29 | 26 | 21 | 29 | 22 | 18 | 29 | 19 | 24 | 29 | 17 | 21 | 26 | 23 | 19 |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 23 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 22 | 27 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | | | |
| | C | 0-7 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 32 | 33 | 33 | 29 | 33 | 33 | 25 | 33 | 30 | 21 | 33 | 26 | 18 | 31 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 28 | 33 | 33 | 25 | 33 | 32 | 23 | 33 | 29 | 21 | 33 | 27 | 19 | 31 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 31 | 33 | 33 | 28 | 33 | 33 | 26 | 33 | 29 | 22 | 31 | 25 | 19 | 30 | 22 | 24 | 26 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 33 | 33 | 31 | 33 | 33 | 27 | 33 | 33 | 25 | 33 | 30 | 22 | 33 | 27 | 20 | 33 | 25 | 18 | 31 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 27 | 22 | 29 | 24 | 19 | 29 | 21 | 17 | 29 | 18 | 23 | 27 | 24 | 20 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 27 | 29 | 29 | 24 | 29 | 27 | 22 | 29 | 25 | 20 | 29 | 21 | 17 | 29 | 18 | 22 | 26 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 23 | 27 | 26 | 20 | 25 | 23 | 18 | 23 | 20 | 24 |
| | | | Exposed | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 24 | 27 | 26 | 21 | 25 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 34 | 24 | 35 | 29 | 20 | 34 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 35 | 35 | 29 | 35 | 35 | 26 | 35 | 33 | 23 | 35 | 30 | 21 | 35 | 27 | 19 | 34 | 24 | 17 | 31 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 28 | 35 | 35 | 26 | 35 | 32 | 23 | 35 | 29 | 21 | 33 | 24 | 18 | 29 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 35 | 35 | 26 | 35 | 31 | 23 | 35 | 28 | 20 | 34 | 25 | 18 | 31 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 31 | 26 | 31 | 26 | 22 | 31 | 23 | 19 | 31 | 20 | 24 | 29 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 28 | 31 | 30 | 25 | 31 | 27 | 22 | 31 | 25 | 20 | 31 | 22 | 18 | 31 | 20 | 26 | 30 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 26 | 29 | 28 | 22 | 27 | 25 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 27 | 29 | 29 | 24 | 29 | 28 | 22 | 29 | 26 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 50 | 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 23 | 28 | 28 | 20 | 28 | 25 | 18 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 23 | 28 | 28 | 20 | 28 | 24 | 17 | 28 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 23 | 28 | 27 | 20 | 27 | 24 | 18 | 26 | 21 | 24 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 24 | 28 | 28 | 21 | 28 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 19 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 21 | 23 | 22 | 18 | 23 | 19 | 24 | 23 | 17 | 21 | 23 | 23 | 19 | | | |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 | 22 | 21 | 17 | 21 | 19 | 23 |
| | C | 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 | 28 | 25 | 28 | 28 | 21 | 28 | 26 | 18 | 28 | 22 | 24 | 27 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 25 | 28 | 28 | 23 | 28 | 28 | 21 | 28 | 27 | 19 | 28 | 23 | 24 | 27 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 26 | 28 | 28 | 22 | 27 | 25 | 19 | 26 | 22 | 24 | 25 | 19 | 21 | 23 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 27 | 28 | 28 | 25 | 28 | 28 | 22 | 28 | 27 | 20 | 28 | 25 | 18 | 28 | 23 | 25 | 26 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 19 | 23 | 21 | 17 | 23 | 18 | 23 | 23 | 23 | 20 | 23 | 24 | 20 |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 23 | 23 | 20 | 23 | 21 | 17 | 23 | 18 | 22 | 23 | 23 | 19 | 23 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 20 | 22 | 22 | 18 | 22 | 20 | 24 |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 18 | 22 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 29 | 30 | 30 | 26 | 30 | 30 | 24 | 30 | 29 | 20 | 30 | 25 | 18 | 29 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 30 | 30 | 29 | 30 | 30 | 26 | 30 | 30 | 23 | 30 | 30 | 21 | 30 | 27 | 19 | 30 | 24 | 17 | 30 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 28 | 30 | 30 | 26 | 30 | 30 | 23 | 30 | 29 | 21 | 29 | 24 | 18 | 28 | 21 | 23 | 25 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 30 | 30 | 26 | 30 | 30 | 23 | 30 | 28 | 20 | 30 | 25 | 18 | 30 | 23 | 25 | 28 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 22 | 26 | 23 | 19 | 26 | 20 | 24 | 26 | 17 | 21 | 26 | 23 | 19 | 23 | 20 | ~~17~~ |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 25 | 26 | 26 | 22 | 26 | 25 | 20 | 26 | 22 | 18 | 26 | 20 | 26 | 26 | 17 | 22 | 25 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 24 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 20 | 24 | 22 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 20 | 24 | 24 | 18 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 20 | 24 | 24 | 17 | 24 | 21 | 23 | 24 | 19 | 20 | 23 | 25 | ~~18~~ |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 20 | 24 | 24 | 18 | 23 | 21 | 24 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 24 | 18 | 24 | 21 | 23 | 24 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 19 | 24 | 20 | 17 | 21 | 20 | 23 | 19 | | | |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 17 | 19 | 19 | 23 |
| | C | 0-7 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 21 | 24 | 24 | 18 | 24 | 22 | 24 | 24 | 20 | 21 | 24 | 18 | 19 |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 23 | 24 | 24 | 21 | 24 | 24 | 19 | 24 | 23 | 24 | 19 | 21 | 23 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ | | |
| | | 7-20 | Interior | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 19 | 23 | 22 | 24 | 22 | 19 | 21 | 22 | 25 | 19 | 20 | 22 | ~~17~~ |
| | | | Exposed | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 22 | 24 | 24 | 20 | 24 | 24 | 18 | 24 | 23 | 25 | 24 | 19 | 21 | 22 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 17 | 20 | 18 | 23 | 20 | 24 | 20 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 17 | 20 | 18 | 22 | 20 | 23 | 19 | 20 | 20 | ~~17~~ | 20 | 18 | ~~15~~ | 18 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 24 |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 23 | 19 | 26 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 24 | 26 | 26 | 20 | 26 | 25 | 18 | 26 | 21 | 23 | 26 | 19 | 20 | 23 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 23 | 26 | 26 | 21 | 26 | 26 | 19 | 26 | 24 | 17 | 26 | 22 | 24 | 26 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 23 | 26 | 26 | 21 | 26 | 24 | 18 | 25 | 21 | 23 | 24 | 18 | 20 | 22 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 26 | 26 | 26 | 26 | 26 | 23 | 26 | 26 | 20 | 26 | 25 | 18 | 26 | 23 | 25 | 26 | 21 | 23 | 26 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 19 | 22 | 20 | 24 | 22 | 17 | 21 | 22 | 23 | 19 | 22 | 20 | ~~17~~ |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 20 | 22 | 22 | 18 | 22 | 20 | 26 | 22 | 17 | 22 | 22 | 22 | 19 | 22 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 19 | 21 | 21 | 17 | 21 | 19 | 23 | 19 | 25 | 20 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 21 | 21 | 17 | 21 | 19 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 70 | B | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 17 | 20 | 20 | 23 | 20 | 19 | 20 | 20 | 25 | ~~18~~ |
| | | 7-20 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 21 | 21 | 18 | 21 | 21 | 24 |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 18 | 21 | 21 | 23 | 21 | 18 | 20 | 21 | 24 | ~~18~~ | 19 | 21 | ~~16~~ |
| | | 20-27 | Interior | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 24 | 17 | 17 | 21 | 17 | 23 | 19 |
| | | 27-45 | Interior | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| | | | Exposed | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 23 |
| | C | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 20 | 24 | 20 | 20 | 21 | 20 | 18 | 19 |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 24 | 20 | 19 | 21 | 20 | 25 | 18 | 20 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 19 | 21 | 21 | 24 | 20 | 19 | 21 | 20 | 25 | 19 | 19 | 22 | ~~17~~ |
| | | | Exposed | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 20 | 21 | 21 | 18 | 21 | 21 | 25 | 21 | 19 | 21 | 21 | 21 | 25 | 18 | 19 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | 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 | 23 | 17 | 24 | 20 |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 22 | 17 | 23 | 19 | 17 | 20 | ~~17~~ | 17 | 18 | ~~15~~ | 17 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 24 |
| | | | Exposed | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 23 | 16 | 25 | 20 | 25 | 23 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 18 | 22 | 21 | 23 | 22 | 19 | 20 | 22 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 21 | 22 | 22 | 19 | 22 | 22 | 17 | 22 | 22 | 24 | 22 | 19 | 20 | 22 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 21 | 23 | 23 | 18 | 22 | 21 | 23 | 21 | 18 | 20 | 21 | 24 | ~~18~~ | 19 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 20 | 23 | 23 | 18 | 23 | 23 | 25 | 23 | 21 | 23 | 23 | 19 | 21 | 22 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | Interior | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 24 | 19 | 17 | 21 | 19 | 23 | 19 | 19 | 20 | ~~17~~ |
| | | | Exposed | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 19 | 26 | 19 | 17 | 22 | 19 | 22 | 19 | 19 | 19 | ~~16~~ | 19 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 17 | 18 | 18 | 23 | 18 | 25 | 20 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 17 | 18 | 18 | 22 | 18 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |
| 80 | B | 0-7 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 17 | 18 | 18 | 23 | 18 | 18 | 20 | 18 | 25 | ~~18~~ |
| | | 7-20 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 23 | 18 | 18 | 20 | 18 | 24 | ~~18~~ | 18 | 21 | ~~16~~ |
| | | 20-27 | Interior | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | | Exposed | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 23 | 15 | 15 | 21 | 15 | 23 | 19 |
| | | 27-45 | Interior | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 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 | 22 |
| | C | 0-7 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 | 18 | 18 | 21 | 18 | 18 | 19 |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 | 18 | 18 | 21 | 18 | 25 | 18 | 18 | 22 | ~~16~~ | 18 | 20 | ~~14~~ | 24 | ~~17~~ | ~~12~~ |
| | | 7-20 | Interior | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 24 | 18 | 18 | 21 | 18 | 25 | 19 | 17 | 22 | ~~17~~ |
| | | | Exposed | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 25 | 18 | 18 | 21 | 18 | 25 | 18 | 18 | 22 | ~~16~~ | 17 | 19 | ~~14~~ | 23 | ~~17~~ | ~~12~~ | 20 | ~~15~~ | ~~11~~ |
| | | 20-27 | Interior | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 23 | 15 | 23 | 20 |
| | | | Exposed | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 22 | 15 | 23 | 19 | 15 | 20 | ~~17~~ | 15 | 18 | ~~15~~ | 15 | ~~16~~ | ~~13~~ |
| | | 27-45 | Interior | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 22 |
| | | | 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 | 22 | 14 | 22 | 20 | 22 | 22 | ~~18~~ | 22 | 20 | ~~16~~ |
| | D | 0-7 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 20 | 23 | 20 | 19 | 20 | 20 | 25 | ~~18~~ | 20 | 22 | ~~16~~ |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 19 | 20 | 20 | 17 | 20 | 20 | 24 | 20 | 19 | 20 | 20 | 25 | ~~17~~ | 19 | 21 | ~~15~~ | 25 | 19 | ~~13~~ | 22 | ~~16~~ | ~~12~~ | 20 | ~~14~~ | ~~10~~ |
| | | 7-20 | Interior | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 20 | 23 | 20 | 18 | 20 | 19 | 24 | ~~18~~ | 18 | 21 | ~~16~~ | 26 | 19 | ~~14~~ |
| | | | Exposed | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 18 | 20 | 20 | 25 | 20 | 20 | 23 | 20 | 19 | 21 | 20 | 24 | ~~18~~ | 19 | 21 | ~~15~~ | 25 | ~~18~~ | ~~13~~ | 21 | ~~16~~ | ~~12~~ | 19 | ~~14~~ | ~~10~~ | ~~17~~ | ~~12~~ | 9 |
| | | 20-27 | 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 | 24 | 17 | 17 | 21 | 17 | 23 | 19 | 17 | 20 | ~~17~~ |
| | | | Exposed | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 25 | 17 | 17 | 22 | 17 | 22 | 19 | 17 | 19 | ~~16~~ | 17 | ~~17~~ | ~~14~~ | 25 | ~~15~~ | ~~12~~ | 23 | ~~13~~ | ~~11~~ |
| | | 27-45 | Interior | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 23 | 16 | 24 | 20 |
| | | | Exposed | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 22 | 16 | 24 | 19 | 24 | 21 | ~~17~~ | 21 | 19 | ~~15~~ | 19 | ~~17~~ | ~~13~~ |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | PORTRAIT | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | B | 0-7 | Interior | 98 | 98 | 98 | 98 | 98 | 97 | 98 | 98 | 92 | 98 | 98 | 87 | 98 | 97 | 83 | 98 | 92 | 79 | 98 | 89 | 76 | 95 | 82 | 68 | 88 | 77 | 60 | 83 | 70 | 52 | 78 | 64 | 45 | 73 | 57 | 40 | 66 | 50 | 36 |
| | | | Exposed | 98 | 97 | 83 | 98 | 91 | 79 | 98 | 87 | 75 | 96 | 83 | 69 | 92 | 79 | 64 | 88 | 76 | 59 | 84 | 72 | 54 | 78 | 64 | 46 | 72 | 56 | 39 | 65 | 48 | 34 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 |
| | | 7-20 | Interior | 98 | 98 | 98 | 98 | 98 | 94 | 98 | 98 | 88 | 98 | 98 | 83 | 98 | 93 | 79 | 98 | 88 | 76 | 98 | 84 | 71 | 92 | 77 | 62 | 84 | 69 | 53 | 78 | 62 | 46 | 72 | 54 | 40 | 64 | 48 | 35 | 58 | 42 | 31 |
| | | | Exposed | 98 | 93 | 79 | 98 | 87 | 75 | 98 | 82 | 68 | 93 | 78 | 63 | 88 | 74 | 57 | 84 | 68 | 52 | 80 | 64 | 48 | 72 | 55 | 41 | 64 | 47 | 35 | 56 | 41 | 30 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 93 | 98 | 98 | 88 | 98 | 93 | 84 | 98 | 88 | 80 | 98 | 81 | 72 | 96 | 75 | 64 | 89 | 65 | 55 | 83 | 59 | 48 | 78 | 52 | 43 | 74 | 46 | 38 |
| | | | Exposed | 98 | 98 | 88 | 98 | 91 | 83 | 98 | 86 | 78 | 98 | 82 | 74 | 98 | 78 | 67 | 95 | 74 | 63 | 91 | 68 | 58 | 84 | 59 | 49 | 78 | 51 | 42 | 71 | 44 | 36 | 64 | 38 | 32 | 58 | 34 | 42 | 51 | 30 | 38 |
| | | 27-45 | Interior | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 95 | 99 | 99 | 91 | 99 | 96 | 87 | 97 | 88 | 80 | 89 | 82 | 73 | 82 | 77 | 65 | 77 | 70 | 58 | 70 | 64 | 51 | 64 | 57 | 46 |
| | | | Exposed | 99 | 99 | 95 | 99 | 99 | 89 | 99 | 94 | 85 | 98 | 89 | 81 | 93 | 85 | 77 | 88 | 82 | 73 | 84 | 78 | 67 | 77 | 71 | 59 | 69 | 63 | 50 | 61 | 55 | 44 | 54 | 48 | 38 | 47 | 42 | 34 | 42 | 38 | 30 |
| | C | 0-7 | Interior | 98 | 98 | 85 | 98 | 94 | 81 | 98 | 89 | 77 | 98 | 85 | 72 | 94 | 81 | 67 | 90 | 78 | 63 | 87 | 75 | 57 | 80 | 66 | 49 | 75 | 59 | 42 | 67 | 51 | 36 | 61 | 44 | 31 | 54 | 39 | 42 | 48 | 35 | 37 |
| | | | Exposed | 94 | 81 | 66 | 89 | 77 | 61 | 85 | 73 | 55 | 81 | 67 | 50 | 78 | 63 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 62 | 45 | 32 | 53 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 98 | 96 | 82 | 98 | 90 | 77 | 98 | 85 | 71 | 96 | 80 | 65 | 91 | 77 | 61 | 86 | 72 | 55 | 82 | 66 | 51 | 75 | 58 | 43 | 66 | 50 | 37 | 59 | 43 | 32 | 51 | 38 | 42 | 45 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 90 | 76 | 60 | 85 | 70 | 54 | 80 | 64 | 49 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 36 | 61 | 45 | 33 | 52 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 98 | 98 | 91 | 98 | 94 | 85 | 98 | 89 | 80 | 98 | 84 | 76 | 98 | 80 | 71 | 98 | 76 | 65 | 93 | 71 | 61 | 86 | 63 | 52 | 80 | 54 | 44 | 75 | 46 | 38 | 67 | 41 | 34 | 61 | 36 | 30 | 54 | 32 | 40 |
| | | | Exposed | 98 | 80 | 71 | 97 | 75 | 64 | 91 | 69 | 59 | 87 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 67 | 41 | 34 | 60 | 35 | 44 | 52 | 30 | 38 | 45 | 40 | 33 | 40 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 99 | 99 | 98 | 99 | 99 | 92 | 99 | 97 | 87 | 99 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 75 | 87 | 80 | 70 | 79 | 74 | 62 | 72 | 65 | 53 | 64 | 58 | 46 | 57 | 51 | 40 | 50 | 45 | 36 | 44 | 40 | 32 |
| | | | Exposed | 96 | 87 | 79 | 90 | 83 | 75 | 85 | 79 | 68 | 80 | 75 | 63 | 76 | 70 | 58 | 71 | 65 | 53 | 66 | 61 | 48 | 57 | 51 | 41 | 49 | 44 | 35 | 43 | 38 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 98 | 91 | 78 | 98 | 86 | 74 | 95 | 82 | 67 | 91 | 78 | 63 | 87 | 75 | 57 | 83 | 70 | 52 | 80 | 66 | 48 | 73 | 57 | 40 | 65 | 49 | 35 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 86 | 75 | 57 | 82 | 69 | 51 | 78 | 64 | 46 | 75 | 58 | 41 | 69 | 53 | 38 | 65 | 48 | 34 | 61 | 44 | 31 | 51 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 98 | 87 | 74 | 97 | 82 | 67 | 91 | 77 | 62 | 86 | 72 | 56 | 82 | 66 | 51 | 78 | 62 | 46 | 75 | 57 | 42 | 65 | 48 | 36 | 56 | 41 | 31 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 82 | 66 | 50 | 77 | 61 | 45 | 72 | 55 | 40 | 66 | 49 | 37 | 61 | 45 | 33 | 56 | 41 | 30 | 51 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 98 | 91 | 82 | 98 | 85 | 77 | 98 | 81 | 72 | 98 | 77 | 65 | 93 | 71 | 61 | 89 | 65 | 56 | 85 | 62 | 51 | 79 | 52 | 43 | 72 | 45 | 37 | 65 | 39 | 32 | 58 | 34 | 42 | 51 | 30 | 37 | 45 | 40 | 33 |
| | | | Exposed | 93 | 71 | 61 | 88 | 65 | 54 | 84 | 59 | 49 | 80 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 37 | 67 | 40 | 33 | 58 | 34 | 43 | 50 | 44 | 37 | 43 | 38 | 32 | 38 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 99 | 99 | 89 | 99 | 93 | 84 | 97 | 88 | 80 | 91 | 84 | 76 | 87 | 80 | 70 | 82 | 77 | 65 | 79 | 73 | 61 | 70 | 64 | 52 | 62 | 56 | 44 | 54 | 48 | 39 | 47 | 42 | 34 | 42 | 37 | 45 | 37 | 33 | 40 |
| | | | Exposed | 86 | 80 | 70 | 81 | 76 | 64 | 77 | 71 | 59 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 55 | 44 | 56 | 51 | 40 | 48 | 43 | 34 | 41 | 37 | 44 | 36 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 10 | B | 0-7 | Interior | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 87 | 91 | 91 | 83 | 91 | 91 | 79 | 91 | 89 | 76 | 91 | 82 | 68 | 88 | 77 | 60 | 83 | 70 | 52 | 78 | 64 | 45 | 73 | 57 | 40 | 66 | 50 | 36 |
| | | | Exposed | 91 | 91 | 83 | 91 | 91 | 79 | 91 | 87 | 75 | 91 | 83 | 69 | 91 | 79 | 64 | 88 | 76 | 59 | 84 | 72 | 54 | 78 | 64 | 46 | 72 | 56 | 39 | 65 | 48 | 34 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 |
| | | 7-20 | Interior | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 88 | 91 | 91 | 83 | 91 | 91 | 79 | 91 | 88 | 76 | 91 | 84 | 71 | 91 | 77 | 62 | 84 | 69 | 53 | 78 | 62 | 46 | 72 | 54 | 40 | 64 | 48 | 35 | 58 | 42 | 31 |
| | | | Exposed | 91 | 91 | 79 | 91 | 87 | 75 | 91 | 82 | 68 | 91 | 78 | 63 | 88 | 74 | 57 | 84 | 68 | 52 | 80 | 64 | 48 | 72 | 55 | 41 | 64 | 47 | 35 | 56 | 41 | 30 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 93 | 95 | 95 | 88 | 95 | 93 | 84 | 95 | 88 | 80 | 95 | 81 | 72 | 95 | 75 | 64 | 89 | 65 | 55 | 83 | 59 | 48 | 78 | 52 | 43 | 74 | 46 | 38 |
| | | | Exposed | 95 | 95 | 88 | 95 | 91 | 83 | 95 | 86 | 78 | 95 | 82 | 74 | 95 | 78 | 67 | 95 | 74 | 63 | 91 | 68 | 58 | 84 | 59 | 49 | 78 | 51 | 42 | 71 | 44 | 36 | 64 | 38 | 32 | 58 | 34 | 42 | 51 | 30 | 38 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 95 | 98 | 98 | 91 | 98 | 96 | 87 | 97 | 88 | 80 | 89 | 82 | 73 | 82 | 77 | 65 | 77 | 70 | 58 | 70 | 64 | 51 | 64 | 57 | 46 |
| | | | Exposed | 98 | 98 | 95 | 98 | 98 | 89 | 98 | 94 | 85 | 98 | 89 | 81 | 93 | 85 | 77 | 88 | 82 | 73 | 84 | 78 | 67 | 77 | 71 | 59 | 69 | 63 | 50 | 61 | 55 | 44 | 54 | 48 | 38 | 47 | 42 | 34 | 42 | 38 | 30 |
| | C | 0-7 | Interior | 91 | 91 | 85 | 91 | 91 | 81 | 91 | 89 | 77 | 91 | 85 | 72 | 91 | 81 | 67 | 90 | 78 | 63 | 87 | 75 | 57 | 80 | 66 | 49 | 75 | 59 | 42 | 67 | 51 | 36 | 61 | 44 | 31 | 54 | 39 | 42 | 48 | 35 | 37 |
| | | | Exposed | 91 | 81 | 66 | 89 | 77 | 61 | 85 | 73 | 55 | 81 | 67 | 50 | 78 | 63 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 62 | 45 | 32 | 53 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 91 | 91 | 82 | 91 | 90 | 77 | 91 | 85 | 71 | 91 | 80 | 65 | 91 | 77 | 61 | 86 | 72 | 55 | 82 | 66 | 51 | 75 | 58 | 43 | 66 | 50 | 37 | 59 | 43 | 32 | 51 | 38 | 42 | 45 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 90 | 76 | 60 | 85 | 70 | 54 | 80 | 64 | 49 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 36 | 61 | 45 | 33 | 52 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 95 | 91 | 91 | 95 | 94 | 85 | 95 | 89 | 80 | 95 | 84 | 76 | 95 | 80 | 71 | 95 | 76 | 65 | 93 | 71 | 61 | 86 | 63 | 52 | 80 | 54 | 44 | 75 | 46 | 38 | 67 | 41 | 34 | 61 | 36 | 30 | 54 | 32 | 40 |
| | | | Exposed | 95 | 80 | 71 | 95 | 75 | 64 | 91 | 69 | 59 | 87 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 67 | 41 | 34 | 60 | 35 | 44 | 52 | 30 | 38 | 45 | 40 | 33 | 40 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 98 | 98 | 98 | 98 | 98 | 92 | 98 | 97 | 87 | 98 | 92 | 83 | 96 | 88 | 79 | 91 | 84 | 75 | 87 | 80 | 70 | 79 | 74 | 62 | 72 | 65 | 53 | 64 | 58 | 46 | 57 | 51 | 40 | 50 | 45 | 36 | 44 | 40 | 32 |
| | | | Exposed | 96 | 87 | 79 | 90 | 83 | 75 | 85 | 79 | 68 | 80 | 75 | 63 | 76 | 70 | 58 | 71 | 65 | 53 | 66 | 61 | 48 | 57 | 51 | 41 | 49 | 44 | 35 | 43 | 38 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 91 | 91 | 78 | 91 | 86 | 74 | 91 | 82 | 67 | 91 | 78 | 63 | 87 | 75 | 57 | 83 | 70 | 52 | 80 | 66 | 48 | 73 | 57 | 40 | 65 | 49 | 35 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 86 | 75 | 57 | 82 | 69 | 51 | 78 | 64 | 46 | 75 | 58 | 41 | 69 | 53 | 38 | 65 | 48 | 34 | 61 | 44 | 31 | 51 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 91 | 81 | 66 | 89 | 77 | 61 | 85 | 73 | 55 | 81 | 67 | 50 | 78 | 63 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 62 | 45 | 32 | 53 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | | Exposed | 82 | 66 | 50 | 77 | 61 | 45 | 72 | 55 | 40 | 66 | 49 | 37 | 61 | 45 | 33 | 56 | 41 | 30 | 51 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 96 | 91 | 82 | 96 | 85 | 77 | 96 | 81 | 72 | 96 | 77 | 65 | 93 | 71 | 61 | 89 | 65 | 56 | 85 | 62 | 51 | 79 | 52 | 43 | 72 | 45 | 37 | 65 | 39 | 32 | 58 | 34 | 42 | 51 | 30 | 37 | 45 | 40 | 33 |
| | | | Exposed | 93 | 71 | 61 | 88 | 65 | 54 | 84 | 59 | 49 | 80 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 37 | 67 | 40 | 33 | 58 | 34 | 43 | 50 | 44 | 37 | 43 | 38 | 32 | 38 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 99 | 99 | 89 | 99 | 93 | 84 | 97 | 88 | 80 | 91 | 84 | 76 | 87 | 80 | 70 | 82 | 77 | 65 | 79 | 73 | 61 | 70 | 64 | 52 | 62 | 56 | 44 | 54 | 48 | 39 | 47 | 42 | 34 | 42 | 37 | 45 | 37 | 33 | 40 |
| | | | Exposed | 86 | 80 | 70 | 81 | 76 | 64 | 77 | 71 | 59 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 55 | 44 | 56 | 51 | 40 | 48 | 43 | 34 | 41 | 37 | 44 | 36 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 20 | B | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 76 | 83 | 82 | 68 | 83 | 77 | 60 | 83 | 70 | 52 | 78 | 64 | 45 | 73 | 57 | 40 | 66 | 50 | 36 |
| | | | Exposed | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 83 | 69 | 83 | 79 | 64 | 83 | 76 | 59 | 83 | 72 | 54 | 78 | 64 | 46 | 72 | 56 | 39 | 65 | 48 | 34 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 |
| | | 7-20 | Interior | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 79 | 83 | 83 | 76 | 83 | 83 | 71 | 83 | 77 | 62 | 83 | 69 | 53 | 78 | 62 | 46 | 72 | 54 | 40 | 64 | 48 | 35 | 58 | 42 | 31 |
| | | | Exposed | 83 | 83 | 79 | 83 | 83 | 75 | 83 | 82 | 68 | 83 | 78 | 63 | 83 | 74 | 57 | 83 | 68 | 52 | 80 | 64 | 48 | 72 | 55 | 41 | 64 | 47 | 35 | 56 | 41 | 30 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 84 | 88 | 88 | 80 | 88 | 81 | 72 | 88 | 75 | 64 | 88 | 65 | 55 | 83 | 59 | 48 | 78 | 52 | 43 | 74 | 46 | 38 |
| | | | Exposed | 88 | 88 | 88 | 88 | 88 | 83 | 88 | 86 | 78 | 88 | 82 | 74 | 88 | 78 | 67 | 88 | 74 | 63 | 88 | 68 | 58 | 84 | 59 | 49 | 78 | 51 | 42 | 71 | 44 | 36 | 64 | 38 | 32 | 58 | 34 | 42 | 51 | 30 | 38 |
| | | 27-45 | Interior | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 87 | 90 | 88 | 80 | 89 | 82 | 73 | 82 | 77 | 65 | 77 | 70 | 58 | 70 | 64 | 51 | 64 | 57 | 46 |
| | | | Exposed | 90 | 90 | 90 | 90 | 90 | 89 | 90 | 90 | 85 | 90 | 89 | 81 | 90 | 85 | 77 | 88 | 82 | 73 | 84 | 78 | 67 | 77 | 71 | 59 | 69 | 63 | 50 | 61 | 55 | 44 | 54 | 48 | 38 | 47 | 42 | 34 | 42 | 38 | 30 |
| | C | 0-7 | Interior | 83 | 83 | 83 | 83 | 83 | 81 | 83 | 83 | 77 | 83 | 83 | 72 | 83 | 81 | 67 | 83 | 78 | 63 | 83 | 75 | 57 | 80 | 66 | 49 | 75 | 59 | 42 | 67 | 51 | 36 | 61 | 44 | 31 | 54 | 39 | 42 | 48 | 35 | 37 |
| | | | Exposed | 83 | 81 | 66 | 83 | 77 | 61 | 83 | 73 | 55 | 81 | 67 | 50 | 78 | 63 | 45 | 74 | 58 | 41 | 69 | 53 | 38 | 62 | 45 | 32 | 53 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 83 | 83 | 82 | 83 | 83 | 77 | 83 | 83 | 71 | 83 | 80 | 65 | 83 | 77 | 61 | 83 | 72 | 55 | 82 | 66 | 51 | 75 | 58 | 43 | 66 | 50 | 37 | 59 | 43 | 32 | 51 | 38 | 42 | 45 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 83 | 76 | 60 | 83 | 70 | 54 | 80 | 64 | 49 | 76 | 59 | 44 | 71 | 54 | 40 | 65 | 49 | 36 | 61 | 45 | 33 | 52 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 88 | 88 | 88 | 88 | 88 | 85 | 88 | 88 | 80 | 88 | 84 | 76 | 88 | 80 | 71 | 88 | 76 | 65 | 88 | 71 | 61 | 86 | 63 | 52 | 80 | 54 | 44 | 75 | 46 | 38 | 67 | 41 | 34 | 61 | 36 | 30 | 54 | 32 | 40 |
| | | | Exposed | 88 | 80 | 71 | 88 | 75 | 64 | 88 | 69 | 59 | 87 | 64 | 53 | 83 | 58 | 48 | 79 | 53 | 44 | 76 | 48 | 40 | 67 | 41 | 34 | 60 | 35 | 44 | 52 | 30 | 38 | 45 | 40 | 33 | 40 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 87 | 90 | 90 | 83 | 90 | 88 | 79 | 90 | 84 | 75 | 87 | 80 | 70 | 79 | 74 | 62 | 72 | 65 | 53 | 64 | 58 | 46 | 57 | 51 | 40 | 50 | 45 | 36 | 44 | 40 | 32 |
| | | | Exposed | 90 | 87 | 79 | 90 | 83 | 75 | 85 | 79 | 68 | 80 | 75 | 63 | 76 | 70 | 58 | 71 | 65 | 53 | 66 | 61 | 48 | 57 | 51 | 41 | 49 | 44 | 35 | 43 | 38 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 83 | 83 | 78 | 83 | 83 | 74 | 83 | 82 | 67 | 83 | 78 | 63 | 83 | 75 | 57 | 83 | 70 | 52 | 80 | 66 | 48 | 73 | 57 | 40 | 65 | 49 | 35 | 58 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 83 | 75 | 57 | 82 | 69 | 51 | 78 | 64 | 46 | 75 | 58 | 41 | 69 | 53 | 38 | 65 | 48 | 34 | 61 | 44 | 31 | 51 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 83 | 83 | 74 | 83 | 82 | 67 | 83 | 77 | 62 | 83 | 72 | 56 | 82 | 66 | 51 | 78 | 62 | 46 | 75 | 57 | 42 | 65 | 48 | 36 | 56 | 41 | 31 | 49 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 82 | 66 | 50 | 77 | 61 | 45 | 72 | 55 | 40 | 66 | 49 | 37 | 61 | 45 | 33 | 56 | 41 | 30 | 51 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 90 | 90 | 82 | 90 | 85 | 77 | 90 | 81 | 72 | 90 | 77 | 65 | 90 | 71 | 61 | 89 | 65 | 56 | 85 | 62 | 51 | 79 | 52 | 43 | 72 | 45 | 37 | 65 | 39 | 32 | 58 | 34 | 42 | 51 | 30 | 37 | 45 | 40 | 33 |
| | | | Exposed | 90 | 71 | 61 | 88 | 65 | 54 | 84 | 59 | 49 | 80 | 53 | 44 | 76 | 48 | 40 | 72 | 44 | 37 | 67 | 40 | 33 | 58 | 34 | 43 | 50 | 44 | 37 | 43 | 38 | 32 | 38 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 93 | 93 | 89 | 93 | 93 | 84 | 93 | 88 | 80 | 91 | 84 | 76 | 87 | 80 | 70 | 82 | 77 | 65 | 79 | 73 | 61 | 70 | 64 | 52 | 62 | 56 | 44 | 54 | 48 | 39 | 47 | 42 | 34 | 42 | 37 | 45 | 37 | 33 | 40 |
| | | | Exposed | 86 | 80 | 70 | 81 | 76 | 64 | 77 | 71 | 59 | 72 | 65 | 53 | 66 | 61 | 48 | 62 | 55 | 44 | 56 | 51 | 40 | 48 | 43 | 34 | 41 | 37 | 44 | 36 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

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

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 60 | B | 0-7 | Interior | 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 | 45 | 46 | 46 | 40 | 46 | 46 | 36 |
| | | | 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 | 39 | 46 | 46 | 34 | 46 | 42 | 45 | 46 | 37 | 40 | 45 | 33 | 35 |
| | | 7-20 | Interior | 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 | 46 | 47 | 47 | 40 | 47 | 47 | 35 | 45 | 42 | 31 |
| | | | Exposed | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 41 | 47 | 47 | 35 | 47 | 41 | 30 | 47 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 38 |
| | | | Exposed | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 36 | 39 | 38 | 32 | 39 | 34 | 42 | 39 | 30 | 38 |
| | | 27-45 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 34 | 37 | 37 | 30 |
| | C | 0-7 | 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 | 42 | 46 | 46 | 36 | 46 | 44 | 31 | 46 | 39 | 42 | 46 | 35 | 37 |
| | | | Exposed | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 45 | 46 | 46 | 41 | 46 | 46 | 38 | 46 | 45 | 32 | 46 | 38 | 41 | 46 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 43 | 47 | 47 | 37 | 46 | 43 | 32 | 44 | 38 | 42 | 43 | 33 | 37 | 40 | 44 | 33 |
| | | | Exposed | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 44 | 47 | 47 | 40 | 47 | 47 | 36 | 47 | 45 | 33 | 47 | 38 | 42 | 44 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 38 | 39 | 39 | 34 | 39 | 36 | 30 | 39 | 32 | 40 |
| | | | Exposed | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 34 | 39 | 35 | 44 | 39 | 30 | 38 | 39 | 40 | 33 | 39 | 36 | 29 | 35 | 32 | 26 |
| | | 27-45 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 36 | 37 | 37 | 32 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 37 | 37 | 30 | 37 | 33 | 40 | 33 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 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 | 49 | 35 | 51 | 42 | 45 | 51 | 37 | 40 | 45 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 51 | 46 | 51 | 51 | 41 | 51 | 51 | 38 | 51 | 48 | 34 | 51 | 44 | 31 | 51 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 51 | 52 | 52 | 46 | 52 | 52 | 42 | 50 | 48 | 36 | 48 | 41 | 31 | 47 | 36 | 40 | 43 | 31 | 35 | 38 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 52 | 52 | 50 | 52 | 52 | 45 | 52 | 52 | 40 | 52 | 49 | 37 | 52 | 45 | 33 | 52 | 41 | 30 | 51 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | 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 | 37 | 43 | 39 | 32 | 43 | 34 | 42 | 43 | 30 | 37 | 43 | 40 | 33 |
| | | | Exposed | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 40 | 43 | 43 | 37 | 43 | 40 | 33 | 43 | 34 | 43 | 43 | 44 | 37 | 43 | 38 | 32 | 38 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 39 | 40 | 40 | 34 | 40 | 37 | 45 | 37 | 33 | 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 | 34 | 40 | 37 | 44 | 36 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 70 | B | 0-7 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 36 |
| | | | 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 | 39 | 40 | 40 | 34 | 40 | 40 | 45 | 40 | 37 | 40 | 40 | 33 | 35 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | 41 | 41 | 35 | 41 | 41 | 31 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 35 | 41 | 41 | 30 | 41 | 36 | 40 | 41 | 31 | 35 | 38 | 42 | 31 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 42 | 34 | 30 | 38 |
| | | 27-45 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 |
| | C | 0-7 | Interior | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 36 | 40 | 40 | 31 | 40 | 39 | 42 | 40 | 35 | 37 |
| | | | Exposed | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 38 | 40 | 40 | 32 | 40 | 38 | 41 | 40 | 33 | 36 | 40 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 37 | 41 | 41 | 32 | 40 | 38 | 42 | 38 | 33 | 37 | 37 | 44 | 33 |
| | | | Exposed | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 40 | 41 | 41 | 36 | 41 | 41 | 33 | 41 | 38 | 42 | 41 | 33 | 36 | 38 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 30 | 34 | 32 | 40 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 44 | 34 | 30 | 38 | 34 | 40 | 33 | 34 | 36 | 29 | 34 | 32 | 26 |
| | | 27-45 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 40 | 32 | 45 | 35 | 44 | 40 | 31 |
| | D | 0-7 | Interior | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 35 | 44 | 42 | 45 | 44 | 37 | 40 | 44 | 33 | 35 | 40 | 44 | 31 |
| | | | Exposed | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 41 | 44 | 44 | 38 | 44 | 44 | 34 | 44 | 44 | 31 | 44 | 37 | 40 | 44 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 42 | 45 | 45 | 36 | 44 | 41 | 31 | 42 | 36 | 40 | 41 | 31 | 35 | 38 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 40 | 45 | 45 | 37 | 45 | 45 | 33 | 45 | 41 | 30 | 45 | 37 | 42 | 43 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 32 | 37 | 34 | 42 | 37 | 30 | 37 | 37 | 40 | 33 |
| | | | Exposed | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 33 | 37 | 34 | 43 | 37 | 44 | 37 | 37 | 38 | 32 | 37 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 45 | 35 | 33 | 40 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 44 | 35 | 32 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 80 | B | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 45 | 35 | 35 | 40 | 35 | 33 | 35 |
| | | 7-20 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 31 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 35 | 36 | 36 | 30 | 36 | 36 | 40 | 36 | 31 | 35 | 36 | 42 | 31 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 42 | 30 | 30 | 38 |
| | | 27-45 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | C | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 42 | 35 | 35 | 37 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 41 | 35 | 33 | 36 | 35 | 44 | 31 | 35 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 32 | 36 | 36 | 42 | 35 | 33 | 37 | 34 | 44 | 33 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 33 | 36 | 36 | 42 | 36 | 33 | 36 | 36 | 43 | 32 | 34 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 40 |
| | | | Exposed | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 44 | 30 | 30 | 38 | 30 | 40 | 33 | 30 | 36 | 29 | 30 | 32 | 26 |
| | | 27-45 | Interior | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 40 | 28 | 43 | 35 | 43 | 40 | 31 |
| | D | 0-7 | Interior | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 35 | 39 | 39 | 45 | 39 | 37 | 40 | 39 | 33 | 35 | 39 | 44 | 31 |
| | | | Exposed | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 38 | 39 | 39 | 34 | 39 | 39 | 31 | 39 | 37 | 40 | 39 | 32 | 34 | 38 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 36 | 39 | 39 | 31 | 38 | 36 | 40 | 37 | 31 | 35 | 36 | 42 | 31 | 33 | 37 | 28 |
| | | | Exposed | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 37 | 39 | 39 | 33 | 39 | 39 | 30 | 39 | 37 | 42 | 39 | 32 | 35 | 37 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 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 | 32 | 33 | 33 | 42 | 33 | 30 | 37 | 33 | 40 | 33 |
| | | | Exposed | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 43 | 33 | 44 | 37 | 33 | 38 | 32 | 33 | 34 | 28 | 33 | 30 | 25 | 45 | 26 | 22 |
| | | 27-45 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 45 | 31 | 31 | 40 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 44 | 31 | 31 | 38 | 31 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |

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

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

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

UNIRAC

| ASCE 7-22 | II | 30 ft | Ss = 3.00 | 23 sq.ft | LANDSCAPE | CROSS-SLOPE | SML | UAF | Solarhooks CT5 |
|---|---|---|---|---|---|---|---|---|---|
| Design Standard | Risk Category | Roof Height | Seismic | Module Area | Orientation | Rail Direction | Rail Type | Clamp | Attachment |

# SPAN TABLES

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

| Ground Snow Load (psf) | Wind Exposure Category | Roof Tilt Angle (deg) | Panel Exposure | Basic Wind Speed (mph) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 90 | | | 95 | | | 100 | | | 105 | | | 110 | | | 115 | | | 120 | | | 130 | | | 140 | | | 150 | | | 160 | | | 170 | | | 180 | | |
| | | | | Roof Wind Zone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 90 | B | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 45 | 31 | 31 | 40 | 31 | 31 | 35 |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 31 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 40 | 32 | 31 | 35 | 32 | 42 | 31 |
| | | 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 |
| | | | 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 | 38 |
| | | 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 |
| | | | 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 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 |
| | C | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 42 | 31 | 31 | 37 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 41 | 31 | 31 | 36 | 31 | 44 | 31 | 31 | 39 | 28 | 31 | 34 | 25 |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 42 | 32 | 32 | 37 | 31 | 44 | 33 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 42 | 32 | 32 | 36 | 32 | 43 | 32 | 32 | 37 | 28 | 30 | 33 | 24 | 40 | 29 | 22 |
| | | 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 |
| | | | 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 | 38 | 40 | 40 | 33 | 40 | 36 | 29 | 40 | 32 | 26 |
| | | 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 |
| | | | 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 | 38 | 38 | 38 | 38 | 38 | 38 | 35 | 38 | 38 | 32 |
| | D | 0-7 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 45 | 35 | 35 | 40 | 35 | 33 | 35 | 35 | 44 | 31 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 34 | 35 | 35 | 31 | 35 | 35 | 40 | 35 | 32 | 34 | 35 | 42 | 30 | 33 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 31 | 35 | 35 | 40 | 34 | 31 | 35 | 33 | 42 | 31 | 32 | 37 | 28 |
| | | | Exposed | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 33 | 35 | 35 | 30 | 35 | 35 | 42 | 35 | 32 | 35 | 35 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 20-27 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 42 | 29 | 29 | 37 | 29 | 40 | 33 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 43 | 29 | 44 | 37 | 29 | 38 | 32 | 29 | 34 | 28 | 29 | 30 | 25 | 44 | 26 | 22 |
| | | 27-45 | Interior | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 40 |
| | | | Exposed | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 38 | 42 | 42 | 34 | 41 | 37 | 30 | 37 | 33 | 26 |
| 100 | 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 43 | 28 | 28 | 40 | 28 | 28 | 35 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 40 | 29 | 29 | 35 | 29 | 42 | 31 |
| | | 20-27 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | C | 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 42 | 28 | 28 | 37 |
| | | | Exposed | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 41 | 28 | 28 | 36 | 28 | 43 | 31 | 28 | 39 | 28 | 28 | 34 | 25 |
| | | 7-20 | Interior | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 42 | 29 | 29 | 37 | 29 | 43 | 33 |
| | | | Exposed | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 42 | 29 | 29 | 36 | 29 | 43 | 32 | 29 | 37 | 28 | 29 | 33 | 24 | 40 | 29 | 22 |
| | | 20-27 | Interior | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| | | | Exposed | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 33 | 36 | 36 | 29 | 36 | 32 | 26 |
| | | 27-45 | Interior | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | | | Exposed | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 32 |
| | D | 0-7 | Interior | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 45 | 31 | 31 | 40 | 31 | 31 | 35 | 31 | 44 | 31 |
| | | | Exposed | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 40 | 31 | 31 | 34 | 31 | 42 | 30 | 31 | 37 | 26 | 44 | 32 | 28 | 39 | 29 | 20 |
| | | 7-20 | Interior | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 31 | 32 | 32 | 40 | 32 | 31 | 35 | 31 | 42 | 31 | 30 | 37 | 28 |
| | | | Exposed | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 30 | 32 | 32 | 42 | 32 | 32 | 35 | 32 | 41 | 30 | 32 | 36 | 26 | 42 | 31 | 23 | 37 | 27 | 20 | 33 | 24 | 18 |
| | | 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 | 37 | 40 | 40 | 33 |
| | | | 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 | 37 | 40 | 38 | 32 | 40 | 34 | 28 | 40 | 30 | 25 | 40 | 26 | 22 |
| | | 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 |
| | | | 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 | 38 | 38 | 38 | 34 | 38 | 37 | 30 | 37 | 33 | 26 |

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

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

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