



March 6, 2019

Attn: Mr. Marshall Green  
Quick Mount PV  
2700 Mitchell Dr.  
Walnut Creek, CA, 94598

RE: Quick Mount PV – QRail Light  
PV Panel Racking System  
State of Michigan Certification Letter

SEI Project No.: 17549.04

Dear Mr. Green:

Structural Enginuity Inc. (SEI) has completed its review of the Quick Mount PV – QRail Light PV Panel Racking System (QMR-RL) for typical installations in the state of Michigan. The QRail Light is compliant with the sections of the following design references and codes when installed per the conditions and design criteria delineated herein.

**Design References and Codes:**

- ASCE/7-10 – Minimum Design Loads for Buildings and Other Structures
- 2015 Aluminum Design Manual, by the Aluminum Association
- Materials information and section and details provided by Quick Mount PV as appendages to this letter
- 2015 International Building Code and International Residential Code
- AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Modules, November 2012 by ICC-ES

**General Mounting System and Analysis Overview:**

The QRail Light consists of 6005-T5 (acceptable alternative materials include 6005A-T61 and 6061-T6) extruded aluminum per ASTM B221-08. The rails are used in pairs to support photovoltaic solar panels in order to span between points of attachment to the existing roof structure. The following tables and information summarize the structural analysis performed by SEI in order to certify the QRail Light for the state noted above.

The analysis for certification included the following parameters for each rail system.

**QRail Light:**

- Risk Category II
- Roof Slopes up to 45 degrees
- Portrait & Landscape orientation of photovoltaic panels
- Max Module Dimensions = Varies, see tables
- Max Building Height = Varies, see tables (If roof slope < 10°, use eave height)

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- Wind Analysis:
  - o Wind Category: B, C, and D
  - o Roof Zones 1, 2, and 3
  - o Wind Directionality Factor ( $K_d$ ) = 0.85
  - o Topographic Factor ( $K_{zt}$ ) = 1
- Snow Analysis:
  - o Snow Exposure Factor ( $C_e$ ) = 1.0
  - o Thermal Factor ( $C_t$ ) = 1.2
  - o Slope Factor ( $C_s$ ) per ASCE 7-10, Figure 7-2a
  - o Importance Factor ( $I_s$ ) = 1
- Seismic Analysis:
  - o Seismic Design Category E or less ( $S_d$ ) = 2.0 max)
  - o Importance Factor ( $I_p$ ) = 1
  - o Amplification Factor ( $a_p$ ) = 1.0 per ICC-AC428
  - o Component Response Modification Factor ( $R_p$ ) = 1.5 per ICC-AC 428

Applicable loading combinations consisting of dead, wind, snow, and seismic loads in accordance with the governing code requirements were used to determine allowable rail span lengths, based on bending stress capacity, shear capacity, axial capacity, and an assumption of a single-span condition with an allowable deflection of  $L/60$ . Design wind pressures were determined using Components and Cladding calculations per ASCE 7-10, Chapters 26-30 in conjunction with the loading parameters noted above. Applicable roof snow load shall be based on ground snow load maps, equations, and factors of ASCE 7-10, Chapter 7 and applicable sections of the 2015 International Building Code for the location of the project in combination with the loading parameters noted above.

It should be noted that the analysis was limited to the capacity of the QRail Light. Attachments of the rail to the roof structure and analysis of the roof structure itself shall be the responsibility of the installer, and should be reviewed and approved by a registered design professional where required by the local authority having jurisdiction.

### **Installation Notes:**

The QRail Light shall be installed with the following guidelines to be in compliance with attached span tables:

- Tables noted below assume two support rails are being used per each row of photovoltaic modules in a roof solar array.
- Rails shall be continuous and not spliced over a minimum of 2 supports except for span lengths shaded with . In these cases it is acceptable to use a minimum of 1 support per rail section as long as all supports are located at a maximum of 48" on center and the first and last rail sections have a minimum of 2 supports.
- System shall be mounted parallel to roof surface with a 2" to 10" gap between roof surface and bottom of module.
- Installation over roof overhangs or within 10" of any roof edge is not recommended
- Maximum end cantilever of aluminum support rail shall not exceed 1/3 of allowable span in the roof wind pressure zone of the cantilever.
- Tables attached are limited to structural capability of the support rails only; therefore, observe all local jurisdiction requirements regarding roof setback requirements when laying out support rails and solar array.

- Actual span lengths used must be within capacity of roof attachment and structural capacity of roof member supporting solar array.

**Conclusion and Certification Summary:**

Based on the structural analysis performed by SEI in regards to the loading parameters specified above for QRail Light, the following C1 through C48 QRail Span tables for the Quick Mount PV QRail Light System were determined. The various span information is controlled by the applicable wind and snow loads to the structure to which the array is being mounted on the roof and based on the roof zone to which the array is installed on the roof. The tables allow for multiple panel sizes and orientations as follows:

Tables 1-6: 15 ft max mean roof height, panels in portrait orientation with a maximum length of 67.5"

Tables 7-12: 15 ft max mean roof height, panels in landscape orientation with a maximum width of 42"

Tables 13-21: 30 ft max mean roof height, panels in portrait orientation with a maximum length of 67.5"

Tables 22-30: 30 ft max mean roof height, panels in landscape orientation with a maximum width of 42"

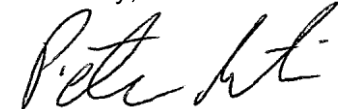
Tables 31-39: 30 ft max mean roof height, panels in portrait orientation with a maximum length of 77"

Tables 40-48: 30 ft max mean roof height, panels in portrait orientation with a maximum length of 80"

This letter is to certify that the loading criteria and design basis used for the structural analysis of the QRail Light PV Panel Racking System for the span tables attached is validated and performed in compliance with the governing building codes for the state of Michigan.

Please contact our office if you have any further questions relating to this matter.

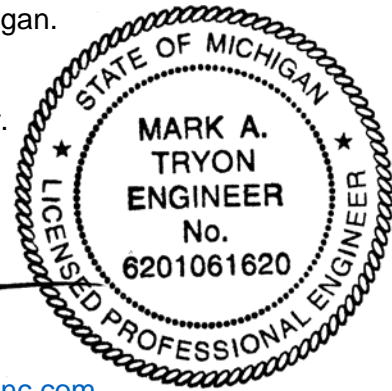
Sincerely,



Peter Martin  
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3/7/2019

**Structural Enginuity Inc.**

**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 1</b> |                  | Mean Roof Height: $0 < h \leq 15$ ft    |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | Exposure Category: C                    |     |     |     |     |     |                             |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 81                                      | 81  | 81  | 81  | 81  | 74  | 69                          | 64  | 60  | 58  | 57  | 53  |
|                | 10               | 80                                      | 80  | 80  | 79  | 78  | 74  | 69                          | 64  | 60  | 58  | 57  | 53  |
|                | 20               | 67                                      | 67  | 67  | 67  | 67  | 67  | 66                          | 64  | 60  | 58  | 57  | 53  |
|                | 30               | 57                                      | 57  | 57  | 57  | 57  | 57  | 57                          | 57  | 57  | 57  | 56  | 53  |
|                | 40               | 50                                      | 50  | 50  | 50  | 50  | 50  | 50                          | 50  | 50  | 50  | 50  | 50  |
|                | 50               | 45                                      | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 45  | 45  | 45  | 45  |
|                | 60               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 42  |
|                | 70               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 39  | 39  |
|                | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
| 90             | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  |     |
| Zone 2         | 0                | 78                                      | 70  | 67  | 64  | 58  | 54  | 50                          | 48  | 44  | 43  | 41  | 39  |
|                | 10               | 78                                      | 70  | 67  | 64  | 58  | 54  | 50                          | 48  | 44  | 43  | 41  | 39  |
|                | 20               | 67                                      | 67  | 67  | 64  | 58  | 54  | 50                          | 48  | 44  | 43  | 41  | 39  |
|                | 30               | 57                                      | 57  | 57  | 57  | 57  | 54  | 50                          | 48  | 44  | 43  | 41  | 39  |
|                | 40               | 50                                      | 50  | 50  | 50  | 50  | 50  | 50                          | 48  | 44  | 43  | 41  | 39  |
|                | 50               | 45                                      | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 44  | 43  | 41  | 39  |
|                | 60               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 41  | 39  |
|                | 70               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 39  | 39  |
|                | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
| 90             | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  |     |
| Zone 3         | 0                | 61                                      | 55  | 53  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 10               | 61                                      | 55  | 53  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 20               | 61                                      | 55  | 53  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 30               | 57                                      | 55  | 53  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 40               | 50                                      | 50  | 50  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 50               | 45                                      | 45  | 45  | 45  | 45  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 60               | 42                                      | 42  | 42  | 42  | 42  | 42  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 70               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 37  | 35  | 34  | 33  | 31  |
|                | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 35  | 34  | 33  | 31  |
| 90             | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 33  | 31  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 2</b> |                  | Mean Roof Height: $0 < h \leq 15$ ft    |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | Exposure Category: D                    |     |     |     |     |     |                             |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 81                                      | 81  | 81  | 79  | 72  | 67  | 62                          | 58  | 54  | 53  | 51  | 48  |
|                | 10               | 80                                      | 79  | 79  | 78  | 72  | 67  | 62                          | 58  | 54  | 53  | 51  | 48  |
|                | 20               | 67                                      | 67  | 67  | 67  | 67  | 66  | 62                          | 58  | 54  | 53  | 51  | 48  |
|                | 30               | 57                                      | 57  | 57  | 57  | 57  | 57  | 57                          | 56  | 54  | 53  | 51  | 48  |
|                | 40               | 50                                      | 50  | 50  | 50  | 50  | 50  | 50                          | 50  | 50  | 50  | 50  | 48  |
|                | 50               | 45                                      | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 45  | 45  | 45  | 45  |
|                | 60               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 42  |
|                | 70               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 39  | 39  |
|                | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
| 90             | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  |     |
| Zone 2         | 0                | 70                                      | 63  | 60  | 57  | 53  | 49  | 45                          | 42  | 40  | 39  | 37  | 35  |
|                | 10               | 70                                      | 63  | 60  | 57  | 53  | 49  | 45                          | 42  | 40  | 39  | 37  | 35  |
|                | 20               | 67                                      | 63  | 60  | 57  | 53  | 49  | 45                          | 42  | 40  | 39  | 37  | 35  |
|                | 30               | 57                                      | 57  | 57  | 57  | 53  | 49  | 45                          | 42  | 40  | 39  | 37  | 35  |
|                | 40               | 50                                      | 50  | 50  | 50  | 50  | 49  | 45                          | 42  | 40  | 39  | 37  | 35  |
|                | 50               | 45                                      | 45  | 45  | 45  | 45  | 45  | 45                          | 42  | 40  | 39  | 37  | 35  |
|                | 60               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 40  | 39  | 37  | 35  |
|                | 70               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 37  | 35  |
|                | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 35  |
| 90             | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  |     |
| Zone 3         | 0                | 55                                      | 50  | 48  | 45  | 42  | 39  | 36                          | 34  | 32  | 31  | 30  | 28  |
|                | 10               | 55                                      | 50  | 48  | 45  | 42  | 39  | 36                          | 34  | 32  | 31  | 30  | 28  |
|                | 20               | 55                                      | 50  | 48  | 45  | 42  | 39  | 36                          | 34  | 32  | 31  | 30  | 28  |
|                | 30               | 55                                      | 50  | 48  | 45  | 42  | 39  | 36                          | 34  | 32  | 31  | 30  | 28  |
|                | 40               | 50                                      | 50  | 48  | 45  | 42  | 39  | 36                          | 34  | 32  | 31  | 30  | 28  |
|                | 50               | 45                                      | 45  | 45  | 45  | 42  | 39  | 36                          | 34  | 32  | 31  | 30  | 28  |
|                | 60               | 42                                      | 42  | 42  | 42  | 42  | 39  | 36                          | 34  | 32  | 31  | 30  | 28  |
|                | 70               | 39                                      | 39  | 39  | 39  | 39  | 39  | 36                          | 34  | 32  | 31  | 30  | 28  |
|                | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 34  | 32  | 31  | 30  | 28  |
| 90             | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 32  | 31  | 30  | 28  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 3</b> |                  | Mean Roof Height: $0 < h \leq 15$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------|------------------|--|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | Exposure Category: C                     |     |     |     |     |     |                             |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                         |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 81                                       | 81  | 81  | 81  | 81  | 76  | 71                          | 66  | 62  | 60  | 59  | 55  |
|                | 10               | 76                                       | 75  | 74  | 73  | 71  | 69  | 67                          | 66  | 62  | 60  | 59  | 55  |
|                | 20               | 61                                       | 61  | 61  | 61  | 60  | 59  | 58                          | 56  | 55  | 55  | 54  | 53  |
|                | 30               | 52                                       | 52  | 52  | 52  | 52  | 52  | 51                          | 50  | 50  | 49  | 49  | 48  |
|                | 40               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 45  | 45  | 45  | 44  |
|                | 50               | 41                                       | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 41  | 41  | 41  | 41  |
|                | 60               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                | 70               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                | 80               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90             | 31               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |
| Zone 2         | 0                | 78                                       | 70  | 67  | 64  | 59  | 55  | 51                          | 48  | 45  | 43  | 42  | 40  |
|                | 10               | 76                                       | 70  | 67  | 64  | 59  | 55  | 51                          | 48  | 45  | 43  | 42  | 40  |
|                | 20               | 61                                       | 61  | 61  | 61  | 59  | 55  | 51                          | 48  | 45  | 43  | 42  | 40  |
|                | 30               | 52                                       | 52  | 52  | 52  | 52  | 52  | 51                          | 48  | 45  | 43  | 42  | 40  |
|                | 40               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 45  | 43  | 42  | 40  |
|                | 50               | 41                                       | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 41  | 41  | 41  | 40  |
|                | 60               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                | 70               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                | 80               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90             | 31               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |
| Zone 3         | 0                | 62                                       | 56  | 54  | 52  | 48  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |
|                | 10               | 62                                       | 56  | 54  | 52  | 48  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |
|                | 20               | 61                                       | 56  | 54  | 52  | 48  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |
|                | 30               | 52                                       | 52  | 52  | 52  | 48  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |
|                | 40               | 45                                       | 45  | 45  | 45  | 45  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |
|                | 50               | 41                                       | 41  | 41  | 41  | 41  | 41  | 41                          | 38  | 36  | 35  | 34  | 32  |
|                | 60               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 36  | 35  | 34  | 32  |
|                | 70               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 34  | 32  |
|                | 80               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 32  |
| 90             | 31               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 4</b> |                  | Mean Roof Height: $0 < h \leq 15$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |    |
|----------------|------------------|--|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|----|
|                |                  | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |                             |     |     |     |     |     |    |
|                |                  | Exposure Category: D                     |     |     |     |     |     |                             |     |     |     |     |     |    |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                         |     |     |     |     |     |                             |     |     |     |     |     |    |
|                |                  | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         | 0                | 81                                       | 81  | 81  | 81  | 74  | 69  | 64                          | 60  | 56  | 55  | 53  | 50  |    |
|                | 10               | 74                                       | 73  | 72  | 71  | 69  | 67  | 64                          | 60  | 56  | 55  | 53  | 50  |    |
|                | 20               | 61                                       | 61  | 60  | 60  | 58  | 57  | 56                          | 55  | 53  | 53  | 52  | 50  |    |
|                | 30               | 52                                       | 52  | 52  | 52  | 52  | 51  | 50                          | 49  | 48  | 48  | 48  | 46  |    |
|                | 40               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 44  | 44  | 43  | 43  |    |
|                | 50               | 41                                       | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 41  | 41  | 41  | 40  | 40 |
|                | 60               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  | 37 |
|                | 70               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  | 35 |
|                | 80               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  | 33 |
| 90             | 31               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  |    |
| Zone 2         | 0                | 70                                       | 64  | 61  | 58  | 53  | 50  | 46                          | 43  | 41  | 39  | 38  | 36  |    |
|                | 10               | 70                                       | 64  | 61  | 58  | 53  | 50  | 46                          | 43  | 41  | 39  | 38  | 36  |    |
|                | 20               | 61                                       | 61  | 60  | 58  | 53  | 50  | 46                          | 43  | 41  | 39  | 38  | 36  |    |
|                | 30               | 52                                       | 52  | 52  | 52  | 52  | 50  | 46                          | 43  | 41  | 39  | 38  | 36  |    |
|                | 40               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                          | 43  | 41  | 39  | 38  | 36  |    |
|                | 50               | 41                                       | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 41  | 39  | 38  | 36  |    |
|                | 60               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 36  |    |
|                | 70               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |    |
|                | 80               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |    |
| 90             | 31               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |    |
| Zone 3         | 0                | 56                                       | 51  | 49  | 48  | 43  | 40  | 37                          | 35  | 33  | 32  | 31  | 29  |    |
|                | 10               | 56                                       | 51  | 49  | 48  | 43  | 40  | 37                          | 35  | 33  | 32  | 31  | 29  |    |
|                | 20               | 56                                       | 51  | 49  | 48  | 43  | 40  | 37                          | 35  | 33  | 32  | 31  | 29  |    |
|                | 30               | 52                                       | 51  | 49  | 48  | 43  | 40  | 37                          | 35  | 33  | 32  | 31  | 29  |    |
|                | 40               | 45                                       | 45  | 45  | 45  | 43  | 40  | 37                          | 35  | 33  | 32  | 31  | 29  |    |
|                | 50               | 41                                       | 41  | 41  | 41  | 41  | 40  | 37                          | 35  | 33  | 32  | 31  | 29  |    |
|                | 60               | 38                                       | 38  | 38  | 38  | 38  | 38  | 37                          | 35  | 33  | 32  | 31  | 29  |    |
|                | 70               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 33  | 32  | 31  | 29  |    |
|                | 80               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 32  | 31  | 29  |    |
| 90             | 31               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 29  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 5</b> |                  | Mean Roof Height: $0 < h \leq 15$ ft      |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | Exposure Category: C                      |     |     |     |     |     |                             |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 81  | 77  | 75  | 72  | 68  | 65  | 61                          | 58  | 55  | 54  | 53  | 50  |
|                | 10               | 72  | 70  | 68  | 67  | 65  | 62  | 60                          | 58  | 55  | 54  | 53  | 50  |
|                | 20               | 62  | 61  | 60  | 59  | 57  | 56  | 54                          | 52  | 51  | 50  | 49  | 48  |
|                | 30               | 56  | 54  | 54  | 53  | 52  | 51  | 49                          | 48  | 48  | 46  | 46  | 45  |
|                | 40               | 50  | 50  | 49  | 49  | 48  | 48  | 46                          | 45  | 44  | 43  | 43  | 42  |
|                | 50               | 45  | 45  | 45  | 45  | 45  | 44  | 43                          | 42  | 41  | 41  | 40  | 40  |
|                | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 40  | 39  | 39  | 38  | 38  |
|                | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 38  | 37  | 37  | 37  | 36  |
|                | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 35  | 35  | 35  |
| 90             | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 33  |     |
| Zone 2         | 0                | 81  | 77  | 75  | 72  | 68  | 64  | 60                          | 56  | 53  | 51  | 50  | 48  |
|                | 10               | 72  | 70  | 68  | 67  | 65  | 62  | 60                          | 56  | 53  | 51  | 50  | 48  |
|                | 20               | 62  | 61  | 60  | 59  | 57  | 56  | 54                          | 52  | 51  | 50  | 49  | 48  |
|                | 30               | 56  | 54  | 54  | 53  | 52  | 51  | 49                          | 48  | 48  | 46  | 46  | 45  |
|                | 40               | 50  | 50  | 49  | 49  | 48  | 48  | 46                          | 45  | 44  | 43  | 43  | 42  |
|                | 50               | 45  | 45  | 45  | 45  | 45  | 44  | 43                          | 42  | 41  | 41  | 40  | 40  |
|                | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 40  | 39  | 39  | 38  | 38  |
|                | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 38  | 37  | 37  | 37  | 36  |
|                | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 35  | 35  | 35  |
| 90             | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 33  |     |
| Zone 3         | 0                | 81  | 77  | 75  | 72  | 68  | 64  | 60                          | 56  | 53  | 51  | 50  | 48  |
|                | 10               | 72  | 70  | 68  | 67  | 65  | 62  | 60                          | 56  | 53  | 51  | 50  | 48  |
|                | 20               | 62  | 61  | 60  | 59  | 57  | 56  | 54                          | 52  | 51  | 50  | 49  | 48  |
|                | 30               | 56  | 54  | 54  | 53  | 52  | 51  | 49                          | 48  | 48  | 46  | 46  | 45  |
|                | 40               | 50  | 50  | 49  | 49  | 48  | 48  | 46                          | 45  | 44  | 43  | 43  | 42  |
|                | 50               | 45  | 45  | 45  | 45  | 45  | 44  | 43                          | 42  | 41  | 41  | 40  | 40  |
|                | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 40  | 39  | 39  | 38  | 38  |
|                | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 38  | 37  | 37  | 37  | 36  |
|                | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 35  | 35  | 35  |
| 90             | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 33  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"



**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 6</b>       |                        | Mean Roof Height: $0 < h \leq 15$ ft      |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------------|------------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                      |                        | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | Exposure Category: D                      |     |     |     |     |     |                             |     |     |     |     |     |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone<br>1            | 0                      | 77  | 72  | 70  | 68  | 64  | 60  | 57                          | 54  | 51  | 50  | 49  | 46  |
|                      | 10                     | 70  | 67  | 65  | 64  | 61  | 59  | 57                          | 54  | 51  | 50  | 49  | 46  |
|                      | 20                     | 61  | 59  | 58  | 57  | 55  | 53  | 51                          | 50  | 48  | 48  | 48  | 45  |
|                      | 30                     | 54  | 53  | 52  | 52  | 50  | 49  | 48                          | 46  | 45  | 44  | 44  | 42  |
|                      | 40                     | 50  | 49  | 48  | 48  | 48  | 45  | 44                          | 43  | 42  | 42  | 41  | 40  |
|                      | 50                     | 45  | 45  | 45  | 44  | 44  | 43  | 42                          | 41  | 40  | 39  | 39  | 38  |
|                      | 60                     | 41  | 41  | 41  | 41  | 41  | 40  | 40                          | 39  | 38  | 38  | 37  | 36  |
|                      | 70                     | 39  | 39  | 39  | 39  | 39  | 38  | 38                          | 37  | 36  | 36  | 36  | 35  |
|                      | 80                     | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 35  | 35  | 34  | 34  | 34  |
| 90                   | 34                     | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 33  | 33  | 33  | 32  |
| Zone<br>2            | 0                      | 77  | 72  | 70  | 68  | 63  | 58  | 54                          | 51  | 48  | 48  | 45  | 43  |
|                      | 10                     | 70  | 67  | 65  | 64  | 61  | 58  | 54                          | 51  | 48  | 48  | 45  | 43  |
|                      | 20                     | 61  | 59  | 58  | 57  | 55  | 53  | 51                          | 50  | 48  | 48  | 45  | 43  |
|                      | 30                     | 54  | 53  | 52  | 52  | 50  | 49  | 48                          | 46  | 45  | 44  | 44  | 42  |
|                      | 40                     | 50  | 49  | 48  | 48  | 48  | 45  | 44                          | 43  | 42  | 42  | 41  | 40  |
|                      | 50                     | 45  | 45  | 45  | 44  | 44  | 43  | 42                          | 41  | 40  | 39  | 39  | 38  |
|                      | 60                     | 41  | 41  | 41  | 41  | 41  | 40  | 40                          | 39  | 38  | 38  | 37  | 36  |
|                      | 70                     | 39  | 39  | 39  | 39  | 39  | 38  | 38                          | 37  | 36  | 36  | 36  | 35  |
|                      | 80                     | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 35  | 35  | 34  | 34  | 34  |
| 90                   | 34                     | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 33  | 33  | 33  | 32  |
| Zone<br>3            | 0                      | 77  | 72  | 70  | 68  | 63  | 58  | 54                          | 51  | 48  | 48  | 45  | 43  |
|                      | 10                     | 70  | 67  | 65  | 64  | 61  | 58  | 54                          | 51  | 48  | 48  | 45  | 43  |
|                      | 20                     | 61  | 59  | 58  | 57  | 55  | 53  | 51                          | 50  | 48  | 48  | 45  | 43  |
|                      | 30                     | 54  | 53  | 52  | 52  | 50  | 49  | 48                          | 46  | 45  | 44  | 44  | 42  |
|                      | 40                     | 50  | 49  | 48  | 48  | 48  | 45  | 44                          | 43  | 42  | 42  | 41  | 40  |
|                      | 50                     | 45  | 45  | 45  | 44  | 44  | 43  | 42                          | 41  | 40  | 39  | 39  | 38  |
|                      | 60                     | 41  | 41  | 41  | 41  | 41  | 40  | 40                          | 39  | 38  | 38  | 37  | 36  |
|                      | 70                     | 39  | 39  | 39  | 39  | 39  | 38  | 38                          | 37  | 36  | 36  | 36  | 35  |
|                      | 80                     | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 35  | 35  | 34  | 34  | 34  |
| 90                   | 34                     | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 33  | 33  | 33  | 32  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 7</b> |                  | Mean Roof Height: $0 < h \leq 15$ ft    |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |    |
|----------------|------------------|---|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|----|
|                |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     |                              |     |     |     |     |     |    |
|                |                  | Exposure Category: C                    |     |     |     |     |     |                              |     |     |     |     |     |    |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |     |                              |     |     |     |     |     |    |
|                |                  | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                          | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         | 0                | 95                                      | 95  | 95  | 95  | 95  | 94  | 87                           | 81  | 76  | 74  | 72  | 68  |    |
|                | 10               | 94                                      | 94  | 93  | 93  | 92  | 91  | 87                           | 81  | 76  | 74  | 72  | 68  |    |
|                | 20               | 79                                      | 79  | 79  | 79  | 79  | 79  | 79                           | 79  | 76  | 74  | 72  | 68  |    |
|                | 30               | 70                                      | 70  | 70  | 70  | 70  | 70  | 70                           | 70  | 70  | 70  | 70  | 68  |    |
|                | 40               | 64                                      | 64  | 64  | 64  | 64  | 64  | 64                           | 64  | 64  | 64  | 64  | 64  |    |
|                | 50               | 58                                      | 58  | 58  | 58  | 58  | 58  | 58                           | 58  | 58  | 58  | 58  | 58  | 58 |
|                | 60               | 53                                      | 53  | 53  | 53  | 53  | 53  | 53                           | 53  | 53  | 53  | 53  | 53  | 53 |
|                | 70               | 49                                      | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 49  | 49  | 49  | 49 |
|                | 80               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 46  | 46 |
| 90             | 44               | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  | 44  |    |
| Zone 2         | 0                | 95                                      | 89  | 85  | 81  | 74  | 69  | 64                           | 60  | 56  | 54  | 53  | 50  |    |
|                | 10               | 94                                      | 89  | 85  | 81  | 74  | 69  | 64                           | 60  | 56  | 54  | 53  | 50  |    |
|                | 20               | 79                                      | 79  | 79  | 79  | 74  | 69  | 64                           | 60  | 56  | 54  | 53  | 50  |    |
|                | 30               | 70                                      | 70  | 70  | 70  | 70  | 69  | 64                           | 60  | 56  | 54  | 53  | 50  |    |
|                | 40               | 64                                      | 64  | 64  | 64  | 64  | 64  | 64                           | 60  | 56  | 54  | 53  | 50  |    |
|                | 50               | 58                                      | 58  | 58  | 58  | 58  | 58  | 58                           | 58  | 56  | 54  | 53  | 50  |    |
|                | 60               | 53                                      | 53  | 53  | 53  | 53  | 53  | 53                           | 53  | 53  | 53  | 53  | 50  |    |
|                | 70               | 49                                      | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 49  | 49  | 49  |    |
|                | 80               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 46  |    |
| 90             | 44               | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  |     |    |
| Zone 3         | 0                | 78                                      | 70  | 67  | 64  | 59  | 54  | 51                           | 48  | 44  | 43  | 42  | 40  |    |
|                | 10               | 78                                      | 70  | 67  | 64  | 59  | 54  | 51                           | 48  | 44  | 43  | 42  | 40  |    |
|                | 20               | 78                                      | 70  | 67  | 64  | 59  | 54  | 51                           | 48  | 44  | 43  | 42  | 40  |    |
|                | 30               | 70                                      | 70  | 67  | 64  | 59  | 54  | 51                           | 48  | 44  | 43  | 42  | 40  |    |
|                | 40               | 64                                      | 64  | 64  | 64  | 59  | 54  | 51                           | 48  | 44  | 43  | 42  | 40  |    |
|                | 50               | 58                                      | 58  | 58  | 58  | 58  | 54  | 51                           | 48  | 44  | 43  | 42  | 40  |    |
|                | 60               | 53                                      | 53  | 53  | 53  | 53  | 53  | 51                           | 48  | 44  | 43  | 42  | 40  |    |
|                | 70               | 49                                      | 49  | 49  | 49  | 49  | 49  | 49                           | 48  | 44  | 43  | 42  | 40  |    |
|                | 80               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 44  | 43  | 42  | 40  |    |
| 90             | 44               | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 43  | 42  | 40  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 8</b> |                  | Mean Roof Height: $0 < h \leq 15$ ft    |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |
|----------------|------------------|---|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     |                              |     |     |     |     |     |
|                |                  | Exposure Category: D                    |     |     |     |     |     |                              |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |     |                              |     |     |     |     |     |
|                |                  | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                          | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 95                                      | 95  | 95  | 95  | 92  | 85  | 79                           | 73  | 69  | 67  | 65  | 61  |
|                | 10               | 94                                      | 93  | 92  | 92  | 90  | 85  | 79                           | 73  | 69  | 67  | 65  | 61  |
|                | 20               | 79                                      | 79  | 79  | 79  | 79  | 79  | 78                           | 73  | 69  | 67  | 65  | 61  |
|                | 30               | 70                                      | 70  | 70  | 70  | 70  | 70  | 70                           | 70  | 69  | 67  | 65  | 61  |
|                | 40               | 64                                      | 64  | 64  | 64  | 64  | 64  | 64                           | 64  | 64  | 64  | 64  | 61  |
|                | 50               | 58                                      | 58  | 58  | 58  | 58  | 58  | 58                           | 58  | 58  | 58  | 58  | 58  |
|                | 60               | 53                                      | 53  | 53  | 53  | 53  | 53  | 53                           | 53  | 53  | 53  | 53  | 53  |
|                | 70               | 49                                      | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 49  | 49  | 49  |
|                | 80               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 46  |
| 90             | 44               | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  |     |
| Zone 2         | 0                | 89                                      | 80  | 76  | 73  | 67  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                | 10               | 89                                      | 80  | 76  | 73  | 67  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                | 20               | 79                                      | 79  | 76  | 73  | 67  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                | 30               | 70                                      | 70  | 70  | 70  | 67  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                | 40               | 64                                      | 64  | 64  | 64  | 64  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                | 50               | 58                                      | 58  | 58  | 58  | 58  | 58  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                | 60               | 53                                      | 53  | 53  | 53  | 53  | 53  | 53                           | 53  | 51  | 49  | 48  | 45  |
|                | 70               | 49                                      | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 49  | 48  | 45  |
|                | 80               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 45  |
| 90             | 44               | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  |     |
| Zone 3         | 0                | 70                                      | 63  | 60  | 58  | 53  | 49  | 46                           | 43  | 40  | 39  | 38  | 36  |
|                | 10               | 70                                      | 63  | 60  | 58  | 53  | 49  | 46                           | 43  | 40  | 39  | 38  | 36  |
|                | 20               | 70                                      | 63  | 60  | 58  | 53  | 49  | 46                           | 43  | 40  | 39  | 38  | 36  |
|                | 30               | 70                                      | 63  | 60  | 58  | 53  | 49  | 46                           | 43  | 40  | 39  | 38  | 36  |
|                | 40               | 64                                      | 63  | 60  | 58  | 53  | 49  | 46                           | 43  | 40  | 39  | 38  | 36  |
|                | 50               | 58                                      | 58  | 58  | 58  | 53  | 49  | 46                           | 43  | 40  | 39  | 38  | 36  |
|                | 60               | 53                                      | 53  | 53  | 53  | 53  | 49  | 46                           | 43  | 40  | 39  | 38  | 36  |
|                | 70               | 49                                      | 49  | 49  | 49  | 49  | 49  | 46                           | 43  | 40  | 39  | 38  | 36  |
|                | 80               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 43  | 40  | 39  | 38  | 36  |
| 90             | 44               | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 43  | 40  | 39  | 38  | 36  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

| <b>Table 9</b> |                  | Mean Roof Height: $0 < h \leq 15$ ft     |     |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |  |
|----------------|------------------|--|-----|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|--|
|                |                  | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |     |                              |     |     |     |     |  |
|                |                  | Exposure Category: C                     |     |     |     |     |     |     |                              |     |     |     |     |  |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                         |     |     |     |     |     |     |                              |     |     |     |     |  |
|                |                  | 100                                      | 110 | 115 | 120 | 130 | 140 | 150 | 160                          | 170 | 175 | 180 | 190 |  |
| Zone 1         | 0                | 95                                       | 95  | 95  | 95  | 95  | 95  | 90  | 84                           | 79  | 77  | 74  | 70  |  |
|                | 10               | 93                                       | 91  | 91  | 90  | 88  | 87  | 85  | 83                           | 79  | 77  | 74  | 70  |  |
|                | 20               | 78                                       | 78  | 78  | 77  | 76  | 75  | 73  | 72                           | 70  | 70  | 69  | 68  |  |
|                | 30               | 65                                       | 65  | 65  | 65  | 65  | 65  | 65  | 64                           | 63  | 62  | 62  | 61  |  |
|                | 40               | 58                                       | 58  | 58  | 58  | 58  | 58  | 58  | 58                           | 57  | 57  | 57  | 56  |  |
|                | 50               | 52                                       | 52  | 52  | 52  | 52  | 52  | 52  | 52                           | 52  | 52  | 52  | 52  |  |
|                | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 48  |  |
|                | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  |  |
|                | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  |  |
| 90             | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  |     |  |
| Zone 2         | 0                | 95                                       | 89  | 85  | 81  | 75  | 69  | 65  | 61                           | 57  | 55  | 54  | 51  |  |
|                | 10               | 93                                       | 89  | 85  | 81  | 75  | 69  | 65  | 61                           | 57  | 55  | 54  | 51  |  |
|                | 20               | 78                                       | 78  | 78  | 77  | 75  | 69  | 65  | 61                           | 57  | 55  | 54  | 51  |  |
|                | 30               | 65                                       | 65  | 65  | 65  | 65  | 65  | 65  | 61                           | 57  | 55  | 54  | 51  |  |
|                | 40               | 58                                       | 58  | 58  | 58  | 58  | 58  | 58  | 58                           | 57  | 55  | 54  | 51  |  |
|                | 50               | 52                                       | 52  | 52  | 52  | 52  | 52  | 52  | 52                           | 52  | 52  | 52  | 51  |  |
|                | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 48  |  |
|                | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  |  |
|                | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  |  |
| 90             | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  |     |  |
| Zone 3         | 0                | 79                                       | 72  | 68  | 65  | 60  | 56  | 52  | 49                           | 46  | 44  | 43  | 41  |  |
|                | 10               | 79                                       | 72  | 68  | 65  | 60  | 56  | 52  | 49                           | 46  | 44  | 43  | 41  |  |
|                | 20               | 78                                       | 72  | 68  | 65  | 60  | 56  | 52  | 49                           | 46  | 44  | 43  | 41  |  |
|                | 30               | 65                                       | 65  | 65  | 65  | 60  | 56  | 52  | 49                           | 46  | 44  | 43  | 41  |  |
|                | 40               | 58                                       | 58  | 58  | 58  | 58  | 56  | 52  | 49                           | 46  | 44  | 43  | 41  |  |
|                | 50               | 52                                       | 52  | 52  | 52  | 52  | 52  | 52  | 49                           | 46  | 44  | 43  | 41  |  |
|                | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48  | 48                           | 46  | 44  | 43  | 41  |  |
|                | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45  | 45                           | 45  | 44  | 43  | 41  |  |
|                | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 41  |  |
| 90             | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  |     |  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $0 < h \leq 15$ ft     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |     |  |
|-----------------|------------------|--|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|-----|--|
| <b>Table 10</b> |                  | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     | Exposure Category: D         |     |     |     |     |     |     |  |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                         |     |     |     |     |                              |     |     |     |     |     |     |  |
|                 |                  | 100                                      | 110 | 115 | 120 | 130 | 140                          | 150 | 160 | 170 | 175 | 180 | 190 |  |
| Zone 1          | 0                | 95                                       | 95  | 95  | 95  | 94  | 87                           | 81  | 76  | 72  | 69  | 67  | 64  |  |
|                 | 10               | 91                                       | 90  | 89  | 88  | 86  | 85                           | 81  | 76  | 72  | 69  | 67  | 64  |  |
|                 | 20               | 78                                       | 77  | 76  | 76  | 74  | 73                           | 71  | 69  | 68  | 67  | 66  | 64  |  |
|                 | 30               | 65                                       | 65  | 65  | 65  | 65  | 65                           | 63  | 62  | 61  | 61  | 60  | 59  |  |
|                 | 40               | 58                                       | 58  | 58  | 58  | 58  | 58                           | 58  | 57  | 56  | 56  | 55  | 54  |  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 52  | 52                           | 52  | 52  | 52  | 52  | 51  | 51  |  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 48  | 48  | 48  |  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  | 45  | 45  |  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  | 42  | 42  |  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  | 40  | 40  |     |  |
| Zone 2          | 0                | 89                                       | 81  | 77  | 74  | 68  | 63                           | 59  | 55  | 52  | 50  | 49  | 46  |  |
|                 | 10               | 89                                       | 81  | 77  | 74  | 68  | 63                           | 59  | 55  | 52  | 50  | 49  | 46  |  |
|                 | 20               | 78                                       | 77  | 76  | 74  | 68  | 63                           | 59  | 55  | 52  | 50  | 49  | 46  |  |
|                 | 30               | 65                                       | 65  | 65  | 65  | 65  | 63                           | 59  | 55  | 52  | 50  | 49  | 46  |  |
|                 | 40               | 58                                       | 58  | 58  | 58  | 58  | 58                           | 58  | 55  | 52  | 50  | 49  | 46  |  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 52  | 52                           | 52  | 52  | 52  | 50  | 49  | 46  |  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 48  | 48  | 46  |  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  | 45  | 45  |  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  | 42  | 42  |  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  | 40  | 40  |     |  |
| Zone 3          | 0                | 72                                       | 65  | 62  | 59  | 55  | 51                           | 48  | 44  | 42  | 40  | 39  | 37  |  |
|                 | 10               | 72                                       | 65  | 62  | 59  | 55  | 51                           | 48  | 44  | 42  | 40  | 39  | 37  |  |
|                 | 20               | 72                                       | 65  | 62  | 59  | 55  | 51                           | 48  | 44  | 42  | 40  | 39  | 37  |  |
|                 | 30               | 65                                       | 65  | 62  | 59  | 55  | 51                           | 48  | 44  | 42  | 40  | 39  | 37  |  |
|                 | 40               | 58                                       | 58  | 58  | 58  | 55  | 51                           | 48  | 44  | 42  | 40  | 39  | 37  |  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 52  | 51                           | 48  | 44  | 42  | 40  | 39  | 37  |  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48                           | 48  | 44  | 42  | 40  | 39  | 37  |  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45                           | 45  | 44  | 42  | 40  | 39  | 37  |  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 40  | 39  | 37  |  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  | 39  | 37  |     |  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |  | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |
|----------------|--|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                |  |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |
| Zone 1         |  | 0                | 95               | 95  | 93  | 91  | 87  | 82  | 78  | 74  | 70  | 69  | 67  | 64  |
|                |  | 10               | 92               | 88  | 87  | 85  | 82  | 79  | 76  | 73  | 70  | 69  | 67  | 64  |
|                |  | 20               | 79               | 77  | 76  | 75  | 73  | 71  | 68  | 66  | 64  | 63  | 62  | 61  |
|                |  | 30               | 71               | 69  | 68  | 68  | 66  | 64  | 63  | 61  | 60  | 59  | 58  | 57  |
|                |  | 40               | 63               | 63  | 63  | 62  | 61  | 60  | 58  | 57  | 56  | 55  | 54  | 53  |
|                |  | 50               | 57               | 57  | 57  | 57  | 57  | 56  | 55  | 54  | 52  | 52  | 51  | 50  |
|                |  | 60               | 53               | 53  | 53  | 53  | 53  | 52  | 52  | 51  | 50  | 49  | 49  | 48  |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 48  | 48  | 48  | 48  | 46  |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 45  | 45  | 45  | 44  |
| Zone 2         |  | 0                | 95               | 95  | 93  | 91  | 87  | 81  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 10               | 92               | 88  | 87  | 85  | 82  | 79  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 20               | 79               | 77  | 76  | 75  | 73  | 71  | 68  | 66  | 64  | 63  | 62  | 60  |
|                |  | 30               | 71               | 69  | 68  | 68  | 66  | 64  | 63  | 61  | 60  | 59  | 58  | 57  |
|                |  | 40               | 63               | 63  | 63  | 62  | 61  | 60  | 58  | 57  | 56  | 55  | 54  | 53  |
|                |  | 50               | 57               | 57  | 57  | 57  | 57  | 56  | 55  | 54  | 52  | 52  | 51  | 50  |
|                |  | 60               | 53               | 53  | 53  | 53  | 53  | 52  | 52  | 51  | 50  | 49  | 49  | 48  |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 48  | 48  | 48  | 48  | 46  |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 45  | 45  | 45  | 44  |
| Zone 3         |  | 0                | 95               | 95  | 93  | 91  | 87  | 81  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 10               | 92               | 88  | 87  | 85  | 82  | 79  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 20               | 79               | 77  | 76  | 75  | 73  | 71  | 68  | 66  | 64  | 63  | 62  | 60  |
|                |  | 30               | 71               | 69  | 68  | 68  | 66  | 64  | 63  | 61  | 60  | 59  | 58  | 57  |
|                |  | 40               | 63               | 63  | 63  | 62  | 61  | 60  | 58  | 57  | 56  | 55  | 54  | 53  |
|                |  | 50               | 57               | 57  | 57  | 57  | 57  | 56  | 55  | 54  | 52  | 52  | 51  | 50  |
|                |  | 60               | 53               | 53  | 53  | 53  | 53  | 52  | 52  | 51  | 50  | 49  | 49  | 48  |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 48  | 48  | 48  | 48  | 46  |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 45  | 45  | 45  | 44  |
| Zone 3         |  | 0                | 95               | 95  | 93  | 91  | 87  | 81  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 10               | 92               | 88  | 87  | 85  | 82  | 79  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 20               | 79               | 77  | 76  | 75  | 73  | 71  | 68  | 66  | 64  | 63  | 62  | 60  |
|                |  | 30               | 71               | 69  | 68  | 68  | 66  | 64  | 63  | 61  | 60  | 59  | 58  | 57  |
|                |  | 40               | 63               | 63  | 63  | 62  | 61  | 60  | 58  | 57  | 56  | 55  | 54  | 53  |
|                |  | 50               | 57               | 57  | 57  | 57  | 57  | 56  | 55  | 54  | 52  | 52  | 51  | 50  |
|                |  | 60               | 53               | 53  | 53  | 53  | 53  | 52  | 52  | 51  | 50  | 49  | 49  | 48  |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 48  | 48  | 48  | 48  | 46  |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 45  | 45  | 45  | 44  |
| Zone 3         |  | 0                | 95               | 95  | 93  | 91  | 87  | 81  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 10               | 92               | 88  | 87  | 85  | 82  | 79  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 20               | 79               | 77  | 76  | 75  | 73  | 71  | 68  | 66  | 64  | 63  | 62  | 60  |
|                |  | 30               | 71               | 69  | 68  | 68  | 66  | 64  | 63  | 61  | 60  | 59  | 58  | 57  |
|                |  | 40               | 63               | 63  | 63  | 62  | 61  | 60  | 58  | 57  | 56  | 55  | 54  | 53  |
|                |  | 50               | 57               | 57  | 57  | 57  | 57  | 56  | 55  | 54  | 52  | 52  | 51  | 50  |
|                |  | 60               | 53               | 53  | 53  | 53  | 53  | 52  | 52  | 51  | 50  | 49  | 49  | 48  |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 48  | 48  | 48  | 48  | 46  |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 45  | 45  | 45  | 44  |
| Zone 3         |  | 0                | 95               | 95  | 93  | 91  | 87  | 81  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 10               | 92               | 88  | 87  | 85  | 82  | 79  | 76  | 71  | 67  | 65  | 63  | 60  |
|                |  | 20               | 79               | 77  | 76  | 75  | 73  | 71  | 68  | 66  | 64  | 63  | 62  | 60  |
|                |  | 30               | 71               | 69  | 68  | 68  | 66  | 64  | 63  | 61  | 60  | 59  | 58  | 57  |
|                |  | 40               | 63               | 63  | 63  | 62  | 61  | 60  | 58  | 57  | 56  | 55  | 54  | 53  |
|                |  | 50               | 57               | 57  | 57  | 57  | 57  | 56  | 55  | 54  | 52  | 52  | 51  | 50  |
|                |  | 60               | 53               | 53  | 53  | 53  | 53  | 52  | 52  | 51  | 50  | 49  | 49  | 48  |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 48  | 48  | 48  | 48  | 46  |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 45  | 45  | 45  | 44  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $0 < h \leq 15$ ft      |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |
|-----------------|------------------|---|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|
| <b>Table 12</b> |                  | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     | Exposure Category: D         |     |     |     |     |     |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                          |     |     |     |     |     |                              |     |     |     |     |     |
|                 |                  | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                          | 160 | 170 | 175 | 180 | 190 |
| Zone 1          | 0                | 95  | 90  | 88  | 86  | 81  | 76  | 72                           | 68  | 65  | 63  | 62  | 59  |
|                 | 10               | 88  | 85  | 83  | 81  | 78  | 75  | 72                           | 68  | 65  | 63  | 62  | 59  |
|                 | 20               | 77  | 75  | 73  | 72  | 70  | 68  | 65                           | 63  | 61  | 60  | 59  | 57  |
|                 | 30               | 69  | 67  | 67  | 66  | 64  | 62  | 60                           | 59  | 57  | 56  | 55  | 54  |
|                 | 40               | 63  | 62  | 61  | 61  | 59  | 58  | 56                           | 55  | 54  | 53  | 52  | 51  |
|                 | 50               | 57  | 57  | 57  | 57  | 55  | 54  | 53                           | 52  | 51  | 50  | 50  | 48  |
|                 | 60               | 53  | 53  | 53  | 53  | 52  | 51  | 50                           | 49  | 48  | 48  | 48  | 46  |
|                 | 70               | 49  | 49  | 49  | 49  | 49  | 49  | 48                           | 48  | 46  | 46  | 45  | 44  |
|                 | 80               | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 45  | 44  | 44  | 43  | 43  |
| 90              | 44               | 44  | 44  | 44  | 44  | 44  | 44  | 43                           | 43  | 42  | 42  | 41  |     |
| Zone 2          | 0                | 95  | 90  | 88  | 86  | 80  | 74  | 69                           | 65  | 61  | 59  | 58  | 54  |
|                 | 10               | 88  | 85  | 83  | 81  | 78  | 74  | 69                           | 65  | 61  | 59  | 58  | 54  |
|                 | 20               | 77  | 75  | 73  | 72  | 70  | 68  | 65                           | 63  | 61  | 59  | 58  | 54  |
|                 | 30               | 69  | 67  | 67  | 66  | 64  | 62  | 60                           | 59  | 57  | 56  | 55  | 54  |
|                 | 40               | 63  | 62  | 61  | 61  | 59  | 58  | 56                           | 55  | 54  | 53  | 52  | 51  |
|                 | 50               | 57  | 57  | 57  | 57  | 55  | 54  | 53                           | 52  | 51  | 50  | 50  | 48  |
|                 | 60               | 53  | 53  | 53  | 53  | 52  | 51  | 50                           | 49  | 48  | 48  | 48  | 46  |
|                 | 70               | 49  | 49  | 49  | 49  | 49  | 49  | 48                           | 48  | 46  | 46  | 45  | 44  |
|                 | 80               | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 45  | 44  | 44  | 43  | 43  |
| 90              | 44               | 44  | 44  | 44  | 44  | 44  | 44  | 43                           | 43  | 42  | 42  | 41  |     |
| Zone 3          | 0                | 95  | 90  | 88  | 86  | 80  | 74  | 69                           | 65  | 61  | 59  | 58  | 54  |
|                 | 10               | 88  | 85  | 83  | 81  | 78  | 74  | 69                           | 65  | 61  | 59  | 58  | 54  |
|                 | 20               | 77  | 75  | 73  | 72  | 70  | 68  | 65                           | 63  | 61  | 59  | 58  | 54  |
|                 | 30               | 69  | 67  | 67  | 66  | 64  | 62  | 60                           | 59  | 57  | 56  | 55  | 54  |
|                 | 40               | 63  | 62  | 61  | 61  | 59  | 58  | 56                           | 55  | 54  | 53  | 52  | 51  |
|                 | 50               | 57  | 57  | 57  | 57  | 55  | 54  | 53                           | 52  | 51  | 50  | 50  | 48  |
|                 | 60               | 53  | 53  | 53  | 53  | 52  | 51  | 50                           | 49  | 48  | 48  | 48  | 46  |
|                 | 70               | 49  | 49  | 49  | 49  | 49  | 49  | 48                           | 48  | 46  | 46  | 45  | 44  |
|                 | 80               | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 45  | 44  | 44  | 43  | 43  |
| 90              | 44               | 44  | 44  | 44  | 44  | 44  | 44  | 43                           | 43  | 42  | 42  | 41  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |  | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |    |
|----------------|--|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                |  |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         |  | 0                | 81               | 81  | 81  | 81  | 81  | 81  | 77  | 71  | 67  | 65  | 63  | 59  |    |
|                |  | 10               | 80               | 80  | 80  | 80  | 79  | 79  | 77  | 71  | 67  | 65  | 63  | 59  |    |
|                |  | 20               | 67               | 67  | 67  | 67  | 67  | 67  | 67  | 67  | 66  | 65  | 63  | 59  |    |
|                |  | 30               | 57               | 57  | 57  | 57  | 57  | 57  | 57  | 57  | 57  | 57  | 57  | 57  |    |
|                |  | 40               | 50               | 50  | 50  | 50  | 50  | 50  | 50  | 50  | 50  | 50  | 50  | 50  |    |
|                |  | 50               | 45               | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45 |
|                |  | 60               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42 |
|                |  | 70               | 39               | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39 |
|                |  | 80               | 36               | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36 |
|                |  | 90               | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34 |
| Zone 2         |  | 0                | 81               | 78  | 74  | 71  | 65  | 60  | 56  | 52  | 49  | 48  | 46  | 43  |    |
|                |  | 10               | 80               | 78  | 74  | 71  | 65  | 60  | 56  | 52  | 49  | 48  | 46  | 43  |    |
|                |  | 20               | 67               | 67  | 67  | 67  | 65  | 60  | 56  | 52  | 49  | 48  | 46  | 43  |    |
|                |  | 30               | 57               | 57  | 57  | 57  | 57  | 57  | 56  | 52  | 49  | 48  | 46  | 43  |    |
|                |  | 40               | 50               | 50  | 50  | 50  | 50  | 50  | 50  | 50  | 49  | 48  | 46  | 43  |    |
|                |  | 50               | 45               | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 43 |
|                |  | 60               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42 |
|                |  | 70               | 39               | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39 |
|                |  | 80               | 36               | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36 |
|                |  | 90               | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34 |
| Zone 3         |  | 0                | 68               | 61  | 58  | 56  | 51  | 48  | 44  | 41  | 39  | 38  | 36  | 34  |    |
|                |  | 10               | 68               | 61  | 58  | 56  | 51  | 48  | 44  | 41  | 39  | 38  | 36  | 34  |    |
|                |  | 20               | 67               | 61  | 58  | 56  | 51  | 48  | 44  | 41  | 39  | 38  | 36  | 34  |    |
|                |  | 30               | 57               | 57  | 57  | 56  | 51  | 48  | 44  | 41  | 39  | 38  | 36  | 34  |    |
|                |  | 40               | 50               | 50  | 50  | 50  | 50  | 48  | 44  | 41  | 39  | 38  | 36  | 34  |    |
|                |  | 50               | 45               | 45  | 45  | 45  | 45  | 45  | 44  | 41  | 39  | 38  | 36  | 34  |    |
|                |  | 60               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 41  | 39  | 38  | 36  | 34  |    |
|                |  | 70               | 39               | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 38  | 36  | 34  |    |
|                |  | 80               | 36               | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 34 |
|                |  | 90               | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34 |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"



**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $15 < h \leq 30$ ft   |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |     |  |
|-----------------|------------------|---|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|-----|--|
| <b>Table 14</b> |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     | Exposure Category: C        |     |     |     |     |     |     |  |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |                             |     |     |     |     |     |     |  |
|                 |                  | 100                                     | 110 | 115 | 120 | 130 | 140                         | 150 | 160 | 170 | 175 | 180 | 190 |  |
| Zone 1          | 0                | 81                                      | 81  | 81  | 81  | 75  | 69                          | 64  | 59  | 56  | 54  | 52  | 49  |  |
|                 | 10               | 80                                      | 79  | 79  | 78  | 75  | 69                          | 64  | 59  | 56  | 54  | 52  | 49  |  |
|                 | 20               | 67                                      | 67  | 67  | 67  | 67  | 66                          | 64  | 59  | 56  | 54  | 52  | 49  |  |
|                 | 30               | 57                                      | 57  | 57  | 57  | 57  | 57                          | 57  | 57  | 56  | 54  | 52  | 49  |  |
|                 | 40               | 50                                      | 50  | 50  | 50  | 50  | 50                          | 50  | 50  | 50  | 50  | 50  | 49  |  |
|                 | 50               | 45                                      | 45  | 45  | 45  | 45  | 45                          | 45  | 45  | 45  | 45  | 45  | 45  |  |
|                 | 60               | 42                                      | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 42  | 42  |  |
|                 | 70               | 39                                      | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 39  | 39  | 39  |  |
|                 | 80               | 36                                      | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  | 36  |  |
| 90              | 34               | 34                                      | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  | 34  |     |  |
| Zone 2          | 0                | 72                                      | 65  | 62  | 59  | 54  | 50                          | 48  | 44  | 41  | 40  | 38  | 36  |  |
|                 | 10               | 72                                      | 65  | 62  | 59  | 54  | 50                          | 48  | 44  | 41  | 40  | 38  | 36  |  |
|                 | 20               | 67                                      | 65  | 62  | 59  | 54  | 50                          | 48  | 44  | 41  | 40  | 38  | 36  |  |
|                 | 30               | 57                                      | 57  | 57  | 57  | 54  | 50                          | 48  | 44  | 41  | 40  | 38  | 36  |  |
|                 | 40               | 50                                      | 50  | 50  | 50  | 50  | 50                          | 48  | 44  | 41  | 40  | 38  | 36  |  |
|                 | 50               | 45                                      | 45  | 45  | 45  | 45  | 45                          | 45  | 44  | 41  | 40  | 38  | 36  |  |
|                 | 60               | 42                                      | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 41  | 40  | 38  | 36  |  |
|                 | 70               | 39                                      | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 39  | 38  | 36  |  |
|                 | 80               | 36                                      | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  | 36  |  |
| 90              | 34               | 34                                      | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  | 34  |     |  |
| Zone 3          | 0                | 57                                      | 51  | 49  | 48  | 43  | 40                          | 37  | 35  | 32  | 32  | 31  | 29  |  |
|                 | 10               | 57                                      | 51  | 49  | 48  | 43  | 40                          | 37  | 35  | 32  | 32  | 31  | 29  |  |
|                 | 20               | 57                                      | 51  | 49  | 48  | 43  | 40                          | 37  | 35  | 32  | 32  | 31  | 29  |  |
|                 | 30               | 57                                      | 51  | 49  | 48  | 43  | 40                          | 37  | 35  | 32  | 32  | 31  | 29  |  |
|                 | 40               | 50                                      | 50  | 49  | 48  | 43  | 40                          | 37  | 35  | 32  | 32  | 31  | 29  |  |
|                 | 50               | 45                                      | 45  | 45  | 45  | 43  | 40                          | 37  | 35  | 32  | 32  | 31  | 29  |  |
|                 | 60               | 42                                      | 42  | 42  | 42  | 42  | 40                          | 37  | 35  | 32  | 32  | 31  | 29  |  |
|                 | 70               | 39                                      | 39  | 39  | 39  | 39  | 39                          | 37  | 35  | 32  | 32  | 31  | 29  |  |
|                 | 80               | 36                                      | 36  | 36  | 36  | 36  | 36                          | 36  | 35  | 32  | 32  | 31  | 29  |  |
| 90              | 34               | 34                                      | 34  | 34  | 34  | 34  | 34                          | 34  | 32  | 32  | 31  | 29  |     |  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $15 < h \leq 30$ ft   |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|-----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
| <b>Table 15</b> |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     | Exposure Category: D        |     |     |     |     |     |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |     |                             |     |     |     |     |     |
|                 |                  | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1          | 0                | 81                                      | 81  | 78  | 74  | 68  | 63  | 58                          | 54  | 51  | 49  | 48  | 45  |
|                 | 10               | 79                                      | 78  | 78  | 74  | 68  | 63  | 58                          | 54  | 51  | 49  | 48  | 45  |
|                 | 20               | 67                                      | 67  | 67  | 67  | 66  | 63  | 58                          | 54  | 51  | 49  | 48  | 45  |
|                 | 30               | 57                                      | 57  | 57  | 57  | 57  | 57  | 57                          | 54  | 51  | 49  | 48  | 45  |
|                 | 40               | 50                                      | 50  | 50  | 50  | 50  | 50  | 50                          | 50  | 50  | 49  | 48  | 45  |
|                 | 50               | 45                                      | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 45  | 45  | 45  | 45  |
|                 | 60               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 42  |
|                 | 70               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 39  | 39  |
|                 | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
| 90              | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  |     |
| Zone 2          | 0                | 66                                      | 59  | 56  | 54  | 50  | 46  | 43                          | 40  | 37  | 36  | 35  | 33  |
|                 | 10               | 66                                      | 59  | 56  | 54  | 50  | 46  | 43                          | 40  | 37  | 36  | 35  | 33  |
|                 | 20               | 66                                      | 59  | 56  | 54  | 50  | 46  | 43                          | 40  | 37  | 36  | 35  | 33  |
|                 | 30               | 57                                      | 57  | 56  | 54  | 50  | 46  | 43                          | 40  | 37  | 36  | 35  | 33  |
|                 | 40               | 50                                      | 50  | 50  | 50  | 50  | 46  | 43                          | 40  | 37  | 36  | 35  | 33  |
|                 | 50               | 45                                      | 45  | 45  | 45  | 45  | 45  | 43                          | 40  | 37  | 36  | 35  | 33  |
|                 | 60               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 40  | 37  | 36  | 35  | 33  |
|                 | 70               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 37  | 36  | 35  | 33  |
|                 | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 35  | 33  |
| 90              | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 33  |     |
| Zone 3          | 0                | 52                                      | 48  | 45  | 43  | 39  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
|                 | 10               | 52                                      | 48  | 45  | 43  | 39  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
|                 | 20               | 52                                      | 48  | 45  | 43  | 39  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
|                 | 30               | 52                                      | 48  | 45  | 43  | 39  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
|                 | 40               | 50                                      | 48  | 45  | 43  | 39  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
|                 | 50               | 45                                      | 45  | 45  | 43  | 39  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
|                 | 60               | 42                                      | 42  | 42  | 42  | 39  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
|                 | 70               | 39                                      | 39  | 39  | 39  | 39  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
|                 | 80               | 36                                      | 36  | 36  | 36  | 36  | 36  | 34                          | 32  | 30  | 29  | 28  | 27  |
| 90              | 34               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 32  | 30  | 29  | 28  | 27  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------------|------------------------|--|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                      |                        | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | Exposure Category: B                     |     |     |     |     |     |                             |     |     |     |     |     |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                         |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone<br>1            | 0                      | 81                                       | 81  | 81  | 81  | 81  | 81  | 78                          | 73  | 69  | 67  | 65  | 61  |
|                      | 10                     | 78                                       | 76  | 75  | 75  | 73  | 71  | 70                          | 68  | 67  | 66  | 65  | 61  |
|                      | 20                     | 61                                       | 61  | 61  | 61  | 61  | 60  | 59                          | 58  | 57  | 57  | 56  | 55  |
|                      | 30                     | 52                                       | 52  | 52  | 52  | 52  | 52  | 52                          | 51  | 51  | 50  | 50  | 49  |
|                      | 40                     | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 45  | 45  | 45  | 45  |
|                      | 50                     | 41                                       | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 41  | 41  | 41  | 41  |
|                      | 60                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                      | 70                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                      | 80                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90                   | 31                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |
| Zone<br>2            | 0                      | 81                                       | 78  | 74  | 71  | 65  | 60  | 56                          | 53  | 50  | 48  | 48  | 44  |
|                      | 10                     | 78                                       | 76  | 74  | 71  | 65  | 60  | 56                          | 53  | 50  | 48  | 48  | 44  |
|                      | 20                     | 61                                       | 61  | 61  | 61  | 61  | 60  | 56                          | 53  | 50  | 48  | 48  | 44  |
|                      | 30                     | 52                                       | 52  | 52  | 52  | 52  | 52  | 52                          | 51  | 50  | 48  | 48  | 44  |
|                      | 40                     | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 45  | 45  | 45  | 44  |
|                      | 50                     | 41                                       | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 41  | 41  | 41  | 41  |
|                      | 60                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                      | 70                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                      | 80                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90                   | 31                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |
| Zone<br>3            | 0                      | 69                                       | 62  | 59  | 57  | 52  | 49  | 45                          | 42  | 40  | 39  | 38  | 36  |
|                      | 10                     | 69                                       | 62  | 59  | 57  | 52  | 49  | 45                          | 42  | 40  | 39  | 38  | 36  |
|                      | 20                     | 61                                       | 61  | 59  | 57  | 52  | 49  | 45                          | 42  | 40  | 39  | 38  | 36  |
|                      | 30                     | 52                                       | 52  | 52  | 52  | 52  | 49  | 45                          | 42  | 40  | 39  | 38  | 36  |
|                      | 40                     | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                          | 42  | 40  | 39  | 38  | 36  |
|                      | 50                     | 41                                       | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 40  | 39  | 38  | 36  |
|                      | 60                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 36  |
|                      | 70                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                      | 80                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90                   | 31                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: 15 < h ≤ 30 ft |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|-----------------|------------------|----------------------------------|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
| <b>Table 17</b> |                  | Roof Angle: 7 < θ ≤ 27 degrees   |     |     |     |     |     | Exposure Category: C        |     |     |     |     |     |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                 |     |     |     |     |     |                             |     |     |     |     |     |
|                 |                  | 100                              | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1          | 0                | 81                               | 81  | 81  | 81  | 76  | 71  | 66                          | 61  | 58  | 56  | 54  | 52  |
|                 | 10               | 75                               | 73  | 72  | 71  | 69  | 67  | 65                          | 61  | 58  | 56  | 54  | 52  |
|                 | 20               | 61                               | 61  | 60  | 60  | 59  | 58  | 56                          | 55  | 54  | 53  | 53  | 52  |
|                 | 30               | 52                               | 52  | 52  | 52  | 52  | 51  | 50                          | 49  | 49  | 48  | 48  | 48  |
|                 | 40               | 45                               | 45  | 45  | 45  | 45  | 45  | 45                          | 45  | 44  | 44  | 44  | 43  |
|                 | 50               | 41                               | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 41  | 41  | 41  | 40  |
|                 | 60               | 38                               | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                 | 70               | 35                               | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                 | 80               | 33                               | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90              | 31               | 31                               | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |
| Zone 2          | 0                | 72                               | 65  | 62  | 60  | 55  | 51  | 48                          | 44  | 42  | 40  | 39  | 37  |
|                 | 10               | 72                               | 65  | 62  | 60  | 55  | 51  | 48                          | 44  | 42  | 40  | 39  | 37  |
|                 | 20               | 61                               | 61  | 60  | 60  | 55  | 51  | 48                          | 44  | 42  | 40  | 39  | 37  |
|                 | 30               | 52                               | 52  | 52  | 52  | 52  | 51  | 48                          | 44  | 42  | 40  | 39  | 37  |
|                 | 40               | 45                               | 45  | 45  | 45  | 45  | 45  | 45                          | 44  | 42  | 40  | 39  | 37  |
|                 | 50               | 41                               | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 41  | 40  | 39  | 37  |
|                 | 60               | 38                               | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 37  |
|                 | 70               | 35                               | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                 | 80               | 33                               | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90              | 31               | 31                               | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |
| Zone 3          | 0                | 58                               | 52  | 50  | 48  | 44  | 41  | 38                          | 36  | 34  | 33  | 32  | 30  |
|                 | 10               | 58                               | 52  | 50  | 48  | 44  | 41  | 38                          | 36  | 34  | 33  | 32  | 30  |
|                 | 20               | 58                               | 52  | 50  | 48  | 44  | 41  | 38                          | 36  | 34  | 33  | 32  | 30  |
|                 | 30               | 52                               | 52  | 50  | 48  | 44  | 41  | 38                          | 36  | 34  | 33  | 32  | 30  |
|                 | 40               | 45                               | 45  | 45  | 45  | 44  | 41  | 38                          | 36  | 34  | 33  | 32  | 30  |
|                 | 50               | 41                               | 41  | 41  | 41  | 41  | 41  | 38                          | 36  | 34  | 33  | 32  | 30  |
|                 | 60               | 38                               | 38  | 38  | 38  | 38  | 38  | 38                          | 36  | 34  | 33  | 32  | 30  |
|                 | 70               | 35                               | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 34  | 33  | 32  | 30  |
|                 | 80               | 33                               | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 32  | 30  |
| 90              | 31               | 31                               | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 30  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |  | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |    |
|----------------|--|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                |  |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         |  | 0                | 81               | 81  | 79  | 76  | 70  | 65  | 60  | 56  | 53  | 51  | 50  | 48  |    |
|                |  | 10               | 73               | 71  | 70  | 69  | 67  | 65  | 60  | 56  | 53  | 51  | 50  | 48  |    |
|                |  | 20               | 61               | 60  | 59  | 59  | 57  | 56  | 55  | 53  | 52  | 51  | 50  | 48  |    |
|                |  | 30               | 52               | 52  | 52  | 52  | 51  | 50  | 49  | 48  | 48  | 48  | 46  | 45  |    |
|                |  | 40               | 45               | 45  | 45  | 45  | 45  | 45  | 45  | 44  | 43  | 43  | 43  | 42  |    |
|                |  | 50               | 41               | 41  | 41  | 41  | 41  | 41  | 41  | 41  | 40  | 40  | 40  | 39  |    |
|                |  | 60               | 38               | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 37  | 37 |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35 |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33 |
|                |  | 90               | 31               | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31 |
| Zone 2         |  | 0                | 66               | 60  | 57  | 55  | 50  | 48  | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                |  | 10               | 66               | 60  | 57  | 55  | 50  | 48  | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                |  | 20               | 61               | 60  | 57  | 55  | 50  | 48  | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                |  | 30               | 52               | 52  | 52  | 52  | 50  | 48  | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                |  | 40               | 45               | 45  | 45  | 45  | 45  | 45  | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                |  | 50               | 41               | 41  | 41  | 41  | 41  | 41  | 41  | 41  | 38  | 37  | 36  | 34  |    |
|                |  | 60               | 38               | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 37  | 36  | 34  |    |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 34  |    |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  |    |
|                |  | 90               | 31               | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  |    |
| Zone 3         |  | 0                | 53               | 48  | 46  | 44  | 40  | 38  | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 10               | 53               | 48  | 46  | 44  | 40  | 38  | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 20               | 53               | 48  | 46  | 44  | 40  | 38  | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 30               | 52               | 48  | 46  | 44  | 40  | 38  | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 40               | 45               | 45  | 45  | 44  | 40  | 38  | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 50               | 41               | 41  | 41  | 41  | 40  | 38  | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 60               | 38               | 38  | 38  | 38  | 38  | 38  | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 31  | 30  | 29  | 27  |    |
|                |  | 90               | 31               | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 30  | 29  | 27  |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $0 < h \leq 30$ ft      |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|-----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
| <b>Table 19</b> |                  | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     | Exposure Category: B        |     |     |     |     |     |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |
|                 |                  | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1          | 0                | 81  | 81  | 79  | 77  | 73  | 70  | 66                          | 63  | 60  | 59  | 57  | 55  |
|                 | 10               | 75  | 72  | 71  | 70  | 68  | 65  | 63                          | 61  | 59  | 58  | 57  | 55  |
|                 | 20               | 64  | 62  | 62  | 61  | 59  | 58  | 56                          | 55  | 53  | 52  | 52  | 50  |
|                 | 30               | 56  | 56  | 55  | 55  | 53  | 52  | 51                          | 50  | 49  | 48  | 48  | 48  |
|                 | 40               | 50  | 50  | 50  | 50  | 49  | 48  | 48                          | 46  | 45  | 45  | 45  | 44  |
|                 | 50               | 45  | 45  | 45  | 45  | 45  | 45  | 44                          | 43  | 43  | 42  | 42  | 41  |
|                 | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 40  | 40  | 40  | 39  |
|                 | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 38  | 38  | 38  | 37  |
|                 | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
| 90              | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  |     |
| Zone 2          | 0                | 81  | 81  | 79  | 77  | 73  | 70  | 66                          | 62  | 58  | 56  | 55  | 52  |
|                 | 10               | 75  | 72  | 71  | 70  | 68  | 65  | 63                          | 61  | 58  | 56  | 55  | 52  |
|                 | 20               | 64  | 62  | 62  | 61  | 59  | 58  | 56                          | 55  | 53  | 52  | 52  | 50  |
|                 | 30               | 56  | 56  | 55  | 55  | 53  | 52  | 51                          | 50  | 49  | 48  | 48  | 48  |
|                 | 40               | 50  | 50  | 50  | 50  | 49  | 48  | 48                          | 46  | 45  | 45  | 45  | 44  |
|                 | 50               | 45  | 45  | 45  | 45  | 45  | 45  | 44                          | 43  | 43  | 42  | 42  | 41  |
|                 | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 40  | 40  | 40  | 39  |
|                 | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 38  | 38  | 38  | 37  |
|                 | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
| 90              | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  |     |
| Zone 3          | 0                | 81  | 81  | 79  | 77  | 73  | 70  | 66                          | 62  | 58  | 56  | 55  | 52  |
|                 | 10               | 75  | 72  | 71  | 70  | 68  | 65  | 63                          | 61  | 58  | 56  | 55  | 52  |
|                 | 20               | 64  | 62  | 62  | 61  | 59  | 58  | 56                          | 55  | 53  | 52  | 52  | 50  |
|                 | 30               | 56  | 56  | 55  | 55  | 53  | 52  | 51                          | 50  | 49  | 48  | 48  | 48  |
|                 | 40               | 50  | 50  | 50  | 50  | 49  | 48  | 48                          | 46  | 45  | 45  | 45  | 44  |
|                 | 50               | 45  | 45  | 45  | 45  | 45  | 45  | 44                          | 43  | 43  | 42  | 42  | 41  |
|                 | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 41  | 40  | 40  | 40  | 39  |
|                 | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 38  | 38  | 38  | 37  |
|                 | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
| 90              | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $15 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|-----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
| <b>Table 20</b> |                  | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     | Exposure Category: C        |     |     |     |     |     |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |
|                 |                  | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1          | 0                | 78  | 73  | 71  | 69  | 65  | 61  | 58                          | 55  | 52  | 51  | 50  | 48  |
|                 | 10               | 70  | 68  | 66  | 65  | 62  | 60  | 57                          | 55  | 52  | 51  | 50  | 48  |
|                 | 20               | 61  | 59  | 58  | 57  | 56  | 54  | 52                          | 50  | 49  | 48  | 48  | 46  |
|                 | 30               | 55  | 53  | 53  | 52  | 51  | 49  | 48                          | 48  | 45  | 45  | 44  | 43  |
|                 | 40               | 50  | 49  | 49  | 48  | 48  | 46  | 45                          | 44  | 43  | 42  | 42  | 40  |
|                 | 50               | 45  | 45  | 45  | 45  | 44  | 43  | 42                          | 41  | 40  | 40  | 39  | 38  |
|                 | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 40                          | 39  | 38  | 38  | 37  | 37  |
|                 | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 38                          | 37  | 37  | 36  | 36  | 35  |
|                 | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 35  | 35  | 34  | 34  |
| 90              | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 33  | 33  | 33  |
| Zone 2          | 0                | 78  | 73  | 71  | 69  | 64  | 60  | 56                          | 52  | 49  | 48  | 46  | 44  |
|                 | 10               | 70  | 68  | 66  | 65  | 62  | 60  | 56                          | 52  | 49  | 48  | 46  | 44  |
|                 | 20               | 61  | 59  | 58  | 57  | 56  | 54  | 52                          | 50  | 49  | 48  | 46  | 44  |
|                 | 30               | 55  | 53  | 53  | 52  | 51  | 49  | 48                          | 48  | 45  | 45  | 44  | 43  |
|                 | 40               | 50  | 49  | 49  | 48  | 48  | 46  | 45                          | 44  | 43  | 42  | 42  | 40  |
|                 | 50               | 45  | 45  | 45  | 45  | 44  | 43  | 42                          | 41  | 40  | 40  | 39  | 38  |
|                 | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 40                          | 39  | 38  | 38  | 37  | 37  |
|                 | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 38                          | 37  | 37  | 36  | 36  | 35  |
|                 | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 35  | 35  | 34  | 34  |
| 90              | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 33  | 33  | 33  |
| Zone 3          | 0                | 78  | 73  | 71  | 69  | 64  | 60  | 56                          | 52  | 49  | 48  | 46  | 44  |
|                 | 10               | 70  | 68  | 66  | 65  | 62  | 60  | 56                          | 52  | 49  | 48  | 46  | 44  |
|                 | 20               | 61  | 59  | 58  | 57  | 56  | 54  | 52                          | 50  | 49  | 48  | 46  | 44  |
|                 | 30               | 55  | 53  | 53  | 52  | 51  | 49  | 48                          | 48  | 45  | 45  | 44  | 43  |
|                 | 40               | 50  | 49  | 49  | 48  | 48  | 46  | 45                          | 44  | 43  | 42  | 42  | 40  |
|                 | 50               | 45  | 45  | 45  | 45  | 44  | 43  | 42                          | 41  | 40  | 40  | 39  | 38  |
|                 | 60               | 41  | 41  | 41  | 41  | 41  | 41  | 40                          | 39  | 38  | 38  | 37  | 37  |
|                 | 70               | 39  | 39  | 39  | 39  | 39  | 39  | 38                          | 37  | 37  | 36  | 36  | 35  |
|                 | 80               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 35  | 35  | 34  | 34  |
| 90              | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 33  | 33  | 33  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $15 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |    |
|----------------------|------------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|----|
| <b>Table 21</b>      |                        | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     | Exposure Category: D        |     |     |     |     |     |    |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |    |
|                      |                        | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |    |
| Zone<br>1            | 0                      | 74  | 69  | 67  | 65  | 61  | 57  | 54                          | 51  | 49  | 48  | 46  | 44  |    |
|                      | 10                     | 68  | 65  | 64  | 62  | 59  | 57  | 54                          | 51  | 49  | 48  | 46  | 44  |    |
|                      | 20                     | 60  | 58  | 57  | 56  | 54  | 52  | 50                          | 48  | 46  | 46  | 45  | 43  |    |
|                      | 30                     | 54  | 52  | 51  | 51  | 49  | 48  | 46                          | 45  | 44  | 43  | 42  | 41  |    |
|                      | 40                     | 49  | 48  | 48  | 48  | 46  | 44  | 43                          | 42  | 41  | 40  | 40  | 39  |    |
|                      | 50                     | 45  | 45  | 44  | 44  | 43  | 42  | 41                          | 40  | 39  | 38  | 38  | 37  |    |
|                      | 60                     | 41  | 41  | 41  | 41  | 40  | 40  | 39                          | 38  | 37  | 37  | 37  | 36  | 35 |
|                      | 70                     | 39  | 39  | 39  | 39  | 38  | 38  | 37                          | 36  | 36  | 35  | 35  | 35  | 34 |
|                      | 80                     | 36  | 36  | 36  | 36  | 36  | 36  | 35                          | 35  | 34  | 34  | 34  | 33  | 33 |
| 90                   | 34                     | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 33  | 33  | 33  | 32  | 32  |    |
| Zone<br>2            | 0                      | 74  | 69  | 67  | 64  | 59  | 55  | 51                          | 48  | 45  | 44  | 43  | 40  |    |
|                      | 10                     | 68  | 65  | 64  | 62  | 59  | 55  | 51                          | 48  | 45  | 44  | 43  | 40  |    |
|                      | 20                     | 60  | 58  | 57  | 56  | 54  | 52  | 50                          | 48  | 45  | 44  | 43  | 40  |    |
|                      | 30                     | 54  | 52  | 51  | 51  | 49  | 48  | 46                          | 45  | 44  | 43  | 42  | 40  |    |
|                      | 40                     | 49  | 48  | 48  | 48  | 46  | 44  | 43                          | 42  | 41  | 40  | 40  | 39  |    |
|                      | 50                     | 45  | 45  | 44  | 44  | 43  | 42  | 41                          | 40  | 39  | 38  | 38  | 37  |    |
|                      | 60                     | 41  | 41  | 41  | 41  | 40  | 40  | 39                          | 38  | 37  | 37  | 36  | 35  |    |
|                      | 70                     | 39  | 39  | 39  | 39  | 38  | 38  | 37                          | 36  | 36  | 35  | 35  | 34  |    |
|                      | 80                     | 36  | 36  | 36  | 36  | 36  | 36  | 35                          | 35  | 34  | 34  | 34  | 33  | 33 |
| 90                   | 34                     | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 33  | 33  | 33  | 32  | 32  |    |
| Zone<br>3            | 0                      | 74  | 69  | 67  | 64  | 59  | 55  | 51                          | 48  | 45  | 44  | 43  | 40  |    |
|                      | 10                     | 68  | 65  | 64  | 62  | 59  | 55  | 51                          | 48  | 45  | 44  | 43  | 40  |    |
|                      | 20                     | 60  | 58  | 57  | 56  | 54  | 52  | 50                          | 48  | 45  | 44  | 43  | 40  |    |
|                      | 30                     | 54  | 52  | 51  | 51  | 49  | 48  | 46                          | 45  | 44  | 43  | 42  | 40  |    |
|                      | 40                     | 49  | 48  | 48  | 48  | 46  | 44  | 43                          | 42  | 41  | 40  | 40  | 39  |    |
|                      | 50                     | 45  | 45  | 44  | 44  | 43  | 42  | 41                          | 40  | 39  | 38  | 38  | 37  |    |
|                      | 60                     | 41  | 41  | 41  | 41  | 40  | 40  | 39                          | 38  | 37  | 37  | 36  | 35  |    |
|                      | 70                     | 39  | 39  | 39  | 39  | 38  | 38  | 37                          | 36  | 36  | 35  | 35  | 34  |    |
|                      | 80                     | 36  | 36  | 36  | 36  | 36  | 36  | 35                          | 35  | 34  | 34  | 34  | 33  | 33 |
| 90                   | 34                     | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 33  | 33  | 33  | 32  | 32  |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 67.5"



**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |    | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |    |
|----------------|----|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                |    |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         |    | 0                | 95               | 95  | 95  | 95  | 95  | 95  | 95  | 95  | 91  | 85  | 82  | 80  | 75 |
|                |    | 10               | 94               | 94  | 94  | 94  | 93  | 92  | 91  | 90  | 85  | 82  | 80  | 75  |    |
|                |    | 20               | 79               | 79  | 79  | 79  | 79  | 79  | 79  | 79  | 79  | 79  | 79  | 78  | 75 |
|                |    | 30               | 70               | 70  | 70  | 70  | 70  | 70  | 70  | 70  | 70  | 70  | 70  | 70  | 70 |
|                |    | 40               | 64               | 64  | 64  | 64  | 64  | 64  | 64  | 64  | 64  | 64  | 64  | 64  | 64 |
|                |    | 50               | 58               | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58 |
|                |    | 60               | 53               | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53 |
|                |    | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49 |
|                |    | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46 |
| 90             | 44 | 44               | 44               | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  |     |    |
| Zone 2         |    | 0                | 95               | 95  | 94  | 90  | 82  | 76  | 71  | 66  | 62  | 60  | 58  | 55  |    |
|                |    | 10               | 94               | 94  | 94  | 90  | 82  | 76  | 71  | 66  | 62  | 60  | 58  | 55  |    |
|                |    | 20               | 79               | 79  | 79  | 79  | 79  | 76  | 71  | 66  | 62  | 60  | 58  | 55  |    |
|                |    | 30               | 70               | 70  | 70  | 70  | 70  | 70  | 70  | 66  | 62  | 60  | 58  | 55  |    |
|                |    | 40               | 64               | 64  | 64  | 64  | 64  | 64  | 64  | 64  | 62  | 60  | 58  | 55  |    |
|                |    | 50               | 58               | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 55 |
|                |    | 60               | 53               | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53 |
|                |    | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49 |
|                |    | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46 |
| 90             | 44 | 44               | 44               | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  |     |    |
| Zone 3         |    | 0                | 86               | 78  | 74  | 71  | 65  | 60  | 56  | 52  | 49  | 48  | 46  | 44  |    |
|                |    | 10               | 86               | 78  | 74  | 71  | 65  | 60  | 56  | 52  | 49  | 48  | 46  | 44  |    |
|                |    | 20               | 79               | 78  | 74  | 71  | 65  | 60  | 56  | 52  | 49  | 48  | 46  | 44  |    |
|                |    | 30               | 70               | 70  | 70  | 70  | 65  | 60  | 56  | 52  | 49  | 48  | 46  | 44  |    |
|                |    | 40               | 64               | 64  | 64  | 64  | 64  | 60  | 56  | 52  | 49  | 48  | 46  | 44  |    |
|                |    | 50               | 58               | 58  | 58  | 58  | 58  | 58  | 56  | 52  | 49  | 48  | 46  | 44  |    |
|                |    | 60               | 53               | 53  | 53  | 53  | 53  | 53  | 53  | 52  | 49  | 48  | 46  | 44  |    |
|                |    | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 48  | 46  | 44  |    |
|                |    | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 44 |
| 90             | 44 | 44               | 44               | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $15 < h \leq 30$ ft   |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |    |
|----------------------|------------------------|---|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|----|
| <b>Table 23</b>      |                        | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     | Exposure Category: C         |     |     |     |     |     |    |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                        |     |     |     |     |     |                              |     |     |     |     |     |    |
|                      |                        | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                          | 160 | 170 | 175 | 180 | 190 |    |
| Zone<br>1            | 0                      | 95                                      | 95  | 95  | 95  | 95  | 87  | 81                           | 75  | 71  | 69  | 67  | 63  |    |
|                      | 10                     | 94                                      | 93  | 92  | 92  | 91  | 87  | 81                           | 75  | 71  | 69  | 67  | 63  |    |
|                      | 20                     | 79                                      | 79  | 79  | 79  | 79  | 79  | 78                           | 75  | 71  | 69  | 67  | 63  |    |
|                      | 30                     | 70                                      | 70  | 70  | 70  | 70  | 70  | 70                           | 70  | 70  | 69  | 67  | 63  |    |
|                      | 40                     | 64                                      | 64  | 64  | 64  | 64  | 64  | 64                           | 64  | 64  | 64  | 64  | 63  |    |
|                      | 50                     | 58                                      | 58  | 58  | 58  | 58  | 58  | 58                           | 58  | 58  | 58  | 58  | 58  | 58 |
|                      | 60                     | 53                                      | 53  | 53  | 53  | 53  | 53  | 53                           | 53  | 53  | 53  | 53  | 53  | 53 |
|                      | 70                     | 49                                      | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 49  | 49  | 49  | 49 |
|                      | 80                     | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 46  | 46 |
| 90                   | 44                     | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  | 44  |    |
| Zone<br>2            | 0                      | 91                                      | 82  | 78  | 75  | 69  | 64  | 59                           | 55  | 52  | 50  | 49  | 46  |    |
|                      | 10                     | 91                                      | 82  | 78  | 75  | 69  | 64  | 59                           | 55  | 52  | 50  | 49  | 46  |    |
|                      | 20                     | 79                                      | 79  | 78  | 75  | 69  | 64  | 59                           | 55  | 52  | 50  | 49  | 46  |    |
|                      | 30                     | 70                                      | 70  | 70  | 70  | 69  | 64  | 59                           | 55  | 52  | 50  | 49  | 46  |    |
|                      | 40                     | 64                                      | 64  | 64  | 64  | 64  | 64  | 59                           | 55  | 52  | 50  | 49  | 46  |    |
|                      | 50                     | 58                                      | 58  | 58  | 58  | 58  | 58  | 58                           | 55  | 52  | 50  | 49  | 46  |    |
|                      | 60                     | 53                                      | 53  | 53  | 53  | 53  | 53  | 53                           | 53  | 52  | 50  | 49  | 46  |    |
|                      | 70                     | 49                                      | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 49  | 49  | 46  |    |
|                      | 80                     | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 46  |    |
| 90                   | 44                     | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  |     |    |
| Zone<br>3            | 0                      | 72                                      | 65  | 62  | 59  | 55  | 50  | 48                           | 44  | 41  | 40  | 39  | 37  |    |
|                      | 10                     | 72                                      | 65  | 62  | 59  | 55  | 50  | 48                           | 44  | 41  | 40  | 39  | 37  |    |
|                      | 20                     | 72                                      | 65  | 62  | 59  | 55  | 50  | 48                           | 44  | 41  | 40  | 39  | 37  |    |
|                      | 30                     | 70                                      | 65  | 62  | 59  | 55  | 50  | 48                           | 44  | 41  | 40  | 39  | 37  |    |
|                      | 40                     | 64                                      | 64  | 62  | 59  | 55  | 50  | 48                           | 44  | 41  | 40  | 39  | 37  |    |
|                      | 50                     | 58                                      | 58  | 58  | 58  | 55  | 50  | 48                           | 44  | 41  | 40  | 39  | 37  |    |
|                      | 60                     | 53                                      | 53  | 53  | 53  | 53  | 50  | 48                           | 44  | 41  | 40  | 39  | 37  |    |
|                      | 70                     | 49                                      | 49  | 49  | 49  | 49  | 49  | 48                           | 44  | 41  | 40  | 39  | 37  |    |
|                      | 80                     | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                           | 44  | 41  | 40  | 39  | 37  |    |
| 90                   | 44                     | 44                                      | 44  | 44  | 44  | 44  | 44  | 44                           | 41  | 40  | 39  | 37  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |  | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |    |
|----------------|--|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                |  |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         |  | 0                | 95               | 95  | 95  | 94  | 86  | 80  | 74  | 69  | 65  | 63  | 61  | 58  |    |
|                |  | 10               | 93               | 92  | 91  | 91  | 86  | 80  | 74  | 69  | 65  | 63  | 61  | 58  |    |
|                |  | 20               | 79               | 79  | 79  | 79  | 79  | 78  | 74  | 69  | 65  | 63  | 61  | 58  |    |
|                |  | 30               | 70               | 70  | 70  | 70  | 70  | 70  | 70  | 69  | 65  | 63  | 61  | 58  |    |
|                |  | 40               | 64               | 64  | 64  | 64  | 64  | 64  | 64  | 64  | 64  | 63  | 61  | 58  |    |
|                |  | 50               | 58               | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 58  | 57 |
|                |  | 60               | 53               | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53 |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 49 |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46 |
| Zone 2         |  | 0                | 83               | 75  | 72  | 69  | 63  | 58  | 54  | 51  | 48  | 46  | 45  | 42  |    |
|                |  | 10               | 83               | 75  | 72  | 69  | 63  | 58  | 54  | 51  | 48  | 46  | 45  | 42  |    |
|                |  | 20               | 79               | 75  | 72  | 69  | 63  | 58  | 54  | 51  | 48  | 46  | 45  | 42  |    |
|                |  | 30               | 70               | 70  | 70  | 69  | 63  | 58  | 54  | 51  | 48  | 46  | 45  | 42  |    |
|                |  | 40               | 64               | 64  | 64  | 64  | 63  | 58  | 54  | 51  | 48  | 46  | 45  | 42  |    |
|                |  | 50               | 58               | 58  | 58  | 58  | 58  | 58  | 54  | 51  | 48  | 46  | 45  | 42  |    |
|                |  | 60               | 53               | 53  | 53  | 53  | 53  | 53  | 53  | 51  | 48  | 46  | 45  | 42  |    |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 49  | 49  | 49  | 48  | 46  | 45  | 42  |    |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 45  | 42  |    |
| Zone 3         |  | 0                | 66               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 10               | 66               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 20               | 66               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 30               | 66               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 40               | 64               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 50               | 58               | 58  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 60               | 53               | 53  | 53  | 53  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
| Zone 4         |  | 0                | 66               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 10               | 66               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 20               | 66               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 30               | 66               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 40               | 64               | 59  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 50               | 58               | 58  | 57  | 54  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 60               | 53               | 53  | 53  | 53  | 50  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 70               | 49               | 49  | 49  | 49  | 49  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |
|                |  | 80               | 46               | 46  | 46  | 46  | 46  | 46  | 43  | 40  | 38  | 37  | 36  | 34  |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $0 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |
|-----------------|------------------|--|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|
| <b>Table 25</b> |                  | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     | Exposure Category: B         |     |     |     |     |     |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                         |     |     |     |     |     |                              |     |     |     |     |     |
|                 |                  | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                          | 160 | 170 | 175 | 180 | 190 |
| Zone 1          | 0                | 95                                       | 95  | 95  | 95  | 95  | 95  | 95                           | 93  | 87  | 85  | 82  | 78  |
|                 | 10               | 94                                       | 93  | 92  | 92  | 90  | 89  | 87                           | 86  | 85  | 83  | 82  | 78  |
|                 | 20               | 78                                       | 78  | 78  | 78  | 78  | 76  | 75                           | 74  | 73  | 72  | 71  | 70  |
|                 | 30               | 65                                       | 65  | 65  | 65  | 65  | 65  | 65                           | 65  | 65  | 64  | 64  | 63  |
|                 | 40               | 58                                       | 58  | 58  | 58  | 58  | 58  | 58                           | 58  | 58  | 58  | 58  | 57  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 52  | 52  | 52                           | 52  | 52  | 52  | 52  | 52  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 48  | 48  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  | 45  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  | 42  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  | 40  |     |
| Zone 2          | 0                | 95                                       | 95  | 94  | 90  | 83  | 77  | 72                           | 67  | 63  | 61  | 59  | 56  |
|                 | 10               | 94                                       | 93  | 92  | 90  | 83  | 77  | 72                           | 67  | 63  | 61  | 59  | 56  |
|                 | 20               | 78                                       | 78  | 78  | 78  | 78  | 76  | 72                           | 67  | 63  | 61  | 59  | 56  |
|                 | 30               | 65                                       | 65  | 65  | 65  | 65  | 65  | 65                           | 65  | 63  | 61  | 59  | 56  |
|                 | 40               | 58                                       | 58  | 58  | 58  | 58  | 58  | 58                           | 58  | 58  | 58  | 58  | 56  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 52  | 52  | 52                           | 52  | 52  | 52  | 52  | 52  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 48  | 48  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  | 45  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  | 42  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  | 40  |     |
| Zone 3          | 0                | 87                                       | 79  | 76  | 72  | 67  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                 | 10               | 87                                       | 79  | 76  | 72  | 67  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                 | 20               | 78                                       | 78  | 76  | 72  | 67  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                 | 30               | 65                                       | 65  | 65  | 65  | 65  | 62  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                 | 40               | 58                                       | 58  | 58  | 58  | 58  | 58  | 58                           | 54  | 51  | 49  | 48  | 45  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 52  | 52  | 52                           | 52  | 51  | 49  | 48  | 45  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 48  | 45  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  | 45  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  | 42  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  | 40  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |    | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |    |
|----------------|----|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                |    |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         |    | 0                | 95               | 95  | 95  | 95  | 95  | 90  | 83  | 78  | 73  | 71  | 69  | 65  |    |
|                |    | 10               | 92               | 90  | 89  | 89  | 87  | 85  | 83  | 78  | 73  | 71  | 69  | 65  |    |
|                |    | 20               | 78               | 78  | 77  | 76  | 75  | 73  | 72  | 70  | 69  | 68  | 67  | 65  |    |
|                |    | 30               | 65               | 65  | 65  | 65  | 65  | 65  | 64  | 63  | 62  | 61  | 61  | 59  |    |
|                |    | 40               | 58               | 58  | 58  | 58  | 58  | 58  | 58  | 57  | 56  | 56  | 56  | 55  |    |
|                |    | 50               | 52               | 52  | 52  | 52  | 52  | 52  | 52  | 52  | 52  | 52  | 52  | 52  | 51 |
|                |    | 60               | 48               | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48 |
|                |    | 70               | 45               | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45 |
|                |    | 80               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42 |
| 90             | 40 | 40               | 40               | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 40  |     |    |
| Zone 2         |    | 0                | 91               | 83  | 79  | 76  | 70  | 65  | 60  | 56  | 53  | 51  | 50  | 48  |    |
|                |    | 10               | 91               | 83  | 79  | 76  | 70  | 65  | 60  | 56  | 53  | 51  | 50  | 48  |    |
|                |    | 20               | 78               | 78  | 77  | 76  | 70  | 65  | 60  | 56  | 53  | 51  | 50  | 48  |    |
|                |    | 30               | 65               | 65  | 65  | 65  | 65  | 65  | 60  | 56  | 53  | 51  | 50  | 48  |    |
|                |    | 40               | 58               | 58  | 58  | 58  | 58  | 58  | 58  | 56  | 53  | 51  | 50  | 48  |    |
|                |    | 50               | 52               | 52  | 52  | 52  | 52  | 52  | 52  | 52  | 52  | 51  | 50  | 48  |    |
|                |    | 60               | 48               | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  |    |
|                |    | 70               | 45               | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 45  |    |
|                |    | 80               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  |    |
| 90             | 40 | 40               | 40               | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 40  |     |    |
| Zone 3         |    | 0                | 73               | 67  | 64  | 61  | 56  | 52  | 48  | 45  | 43  | 41  | 40  | 38  |    |
|                |    | 10               | 73               | 67  | 64  | 61  | 56  | 52  | 48  | 45  | 43  | 41  | 40  | 38  |    |
|                |    | 20               | 73               | 67  | 64  | 61  | 56  | 52  | 48  | 45  | 43  | 41  | 40  | 38  |    |
|                |    | 30               | 65               | 65  | 64  | 61  | 56  | 52  | 48  | 45  | 43  | 41  | 40  | 38  |    |
|                |    | 40               | 58               | 58  | 58  | 58  | 56  | 52  | 48  | 45  | 43  | 41  | 40  | 38  |    |
|                |    | 50               | 52               | 52  | 52  | 52  | 52  | 52  | 48  | 45  | 43  | 41  | 40  | 38  |    |
|                |    | 60               | 48               | 48  | 48  | 48  | 48  | 48  | 48  | 45  | 43  | 41  | 40  | 38  |    |
|                |    | 70               | 45               | 45  | 45  | 45  | 45  | 45  | 45  | 45  | 43  | 41  | 40  | 38  |    |
|                |    | 80               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 41  | 40  | 38  |    |
| 90             | 40 | 40               | 40               | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 40  | 38  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $15 < h \leq 30$ ft    |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |
|-----------------|------------------|--|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|
| <b>Table 27</b> |                  | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     | Exposure Category: D         |     |     |     |     |     |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                         |     |     |     |     |     |                              |     |     |     |     |     |
|                 |                  | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                          | 160 | 170 | 175 | 180 | 190 |
| Zone 1          | 0                | 95                                       | 95  | 95  | 95  | 89  | 82  | 77                           | 72  | 67  | 65  | 63  | 60  |
|                 | 10               | 90                                       | 89  | 88  | 87  | 85  | 82  | 77                           | 72  | 67  | 65  | 63  | 60  |
|                 | 20               | 78                                       | 76  | 75  | 75  | 73  | 71  | 70                           | 68  | 66  | 65  | 63  | 60  |
|                 | 30               | 65                                       | 65  | 65  | 65  | 65  | 64  | 62                           | 61  | 60  | 59  | 59  | 58  |
|                 | 40               | 58                                       | 58  | 58  | 58  | 58  | 58  | 57                           | 56  | 55  | 55  | 54  | 53  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 52  | 52  | 52                           | 52  | 51  | 51  | 51  | 50  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 48  | 48  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  | 45  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  | 42  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  | 40  |     |
| Zone 2          | 0                | 84                                       | 76  | 73  | 69  | 64  | 59  | 55                           | 52  | 49  | 48  | 46  | 43  |
|                 | 10               | 84                                       | 76  | 73  | 69  | 64  | 59  | 55                           | 52  | 49  | 48  | 46  | 43  |
|                 | 20               | 78                                       | 76  | 73  | 69  | 64  | 59  | 55                           | 52  | 49  | 48  | 46  | 43  |
|                 | 30               | 65                                       | 65  | 65  | 65  | 64  | 59  | 55                           | 52  | 49  | 48  | 46  | 43  |
|                 | 40               | 58                                       | 58  | 58  | 58  | 58  | 58  | 55                           | 52  | 49  | 48  | 46  | 43  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 52  | 52  | 52                           | 52  | 49  | 48  | 46  | 43  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                           | 48  | 48  | 48  | 46  | 43  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 45                           | 45  | 45  | 45  | 45  | 43  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 42  | 42  | 42  | 42  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40                           | 40  | 40  | 40  | 40  |     |
| Zone 3          | 0                | 67                                       | 61  | 58  | 56  | 51  | 48  | 44                           | 42  | 39  | 38  | 37  | 35  |
|                 | 10               | 67                                       | 61  | 58  | 56  | 51  | 48  | 44                           | 42  | 39  | 38  | 37  | 35  |
|                 | 20               | 67                                       | 61  | 58  | 56  | 51  | 48  | 44                           | 42  | 39  | 38  | 37  | 35  |
|                 | 30               | 65                                       | 61  | 58  | 56  | 51  | 48  | 44                           | 42  | 39  | 38  | 37  | 35  |
|                 | 40               | 58                                       | 58  | 58  | 56  | 51  | 48  | 44                           | 42  | 39  | 38  | 37  | 35  |
|                 | 50               | 52                                       | 52  | 52  | 52  | 51  | 48  | 44                           | 42  | 39  | 38  | 37  | 35  |
|                 | 60               | 48                                       | 48  | 48  | 48  | 48  | 48  | 44                           | 42  | 39  | 38  | 37  | 35  |
|                 | 70               | 45                                       | 45  | 45  | 45  | 45  | 45  | 44                           | 42  | 39  | 38  | 37  | 35  |
|                 | 80               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                           | 42  | 39  | 38  | 37  | 35  |
| 90              | 40               | 40                                       | 40  | 40  | 40  | 40  | 40  | 40                           | 39  | 38  | 37  | 35  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

|                |                  | Mean Roof Height: $0 < h \leq 30$ ft      |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |
|----------------|------------------|---|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     |                              |     |     |     |     |     |
|                |                  | Exposure Category: B                      |     |     |     |     |     |                              |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                          |     |     |     |     |     |                              |     |     |     |     |     |
|                |                  | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                          | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 95  | 95  | 95  | 95  | 92  | 88  | 84                           | 80  | 76  | 74  | 73  | 70  |
|                | 10               | 95  | 92  | 90  | 89  | 86  | 83  | 80                           | 77  | 75  | 74  | 72  | 70  |
|                | 20               | 81  | 79  | 78  | 77  | 75  | 73  | 71                           | 69  | 68  | 67  | 66  | 64  |
|                | 30               | 71  | 71  | 70  | 69  | 68  | 66  | 65                           | 64  | 62  | 61  | 61  | 59  |
|                | 40               | 63  | 63  | 63  | 63  | 62  | 61  | 60                           | 59  | 58  | 57  | 57  | 55  |
|                | 50               | 57  | 57  | 57  | 57  | 57  | 57  | 56                           | 55  | 54  | 54  | 53  | 52  |
|                | 60               | 53  | 53  | 53  | 53  | 53  | 53  | 53                           | 52  | 51  | 51  | 50  | 50  |
|                | 70               | 49  | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 48  | 48  | 48  |
|                | 80               | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 45  |
|                | 90               | 44  | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  | 43  |
| Zone 2         | 0                | 95  | 95  | 95  | 95  | 92  | 88  | 84                           | 78  | 74  | 72  | 70  | 66  |
|                | 10               | 95  | 92  | 90  | 89  | 86  | 83  | 80                           | 77  | 74  | 72  | 70  | 66  |
|                | 20               | 81  | 79  | 78  | 77  | 75  | 73  | 71                           | 69  | 68  | 67  | 66  | 64  |
|                | 30               | 71  | 71  | 70  | 69  | 68  | 66  | 65                           | 64  | 62  | 61  | 61  | 59  |
|                | 40               | 63  | 63  | 63  | 63  | 62  | 61  | 60                           | 59  | 58  | 57  | 57  | 55  |
|                | 50               | 57  | 57  | 57  | 57  | 57  | 57  | 56                           | 55  | 54  | 54  | 53  | 52  |
|                | 60               | 53  | 53  | 53  | 53  | 53  | 53  | 53                           | 52  | 51  | 51  | 50  | 50  |
|                | 70               | 49  | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 48  | 48  | 48  |
|                | 80               | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 45  |
|                | 90               | 44  | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  | 43  |
| Zone 3         | 0                | 95  | 95  | 95  | 95  | 92  | 88  | 84                           | 78  | 74  | 72  | 70  | 66  |
|                | 10               | 95  | 92  | 90  | 89  | 86  | 83  | 80                           | 77  | 74  | 72  | 70  | 66  |
|                | 20               | 81  | 79  | 78  | 77  | 75  | 73  | 71                           | 69  | 68  | 67  | 66  | 64  |
|                | 30               | 71  | 71  | 70  | 69  | 68  | 66  | 65                           | 64  | 62  | 61  | 61  | 59  |
|                | 40               | 63  | 63  | 63  | 63  | 62  | 61  | 60                           | 59  | 58  | 57  | 57  | 55  |
|                | 50               | 57  | 57  | 57  | 57  | 57  | 57  | 56                           | 55  | 54  | 54  | 53  | 52  |
|                | 60               | 53  | 53  | 53  | 53  | 53  | 53  | 53                           | 52  | 51  | 51  | 50  | 50  |
|                | 70               | 49  | 49  | 49  | 49  | 49  | 49  | 49                           | 49  | 49  | 48  | 48  | 48  |
|                | 80               | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 46  | 46  | 46  | 46  | 45  |
|                | 90               | 44  | 44  | 44  | 44  | 44  | 44  | 44                           | 44  | 44  | 44  | 44  | 43  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $15 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Landscape |     |     |     |     |     |
|----------------------|------------------------|---|-----|-----|-----|-----|-----|------------------------------|-----|-----|-----|-----|-----|
| <b>Table 29</b>      |                        | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     | Exposure Category: C         |     |     |     |     |     |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                          |     |     |     |     |     |                              |     |     |     |     |     |
|                      |                        | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                          | 160 | 170 | 175 | 180 | 190 |
| Zone<br>1            | 0                      | 95  | 92  | 90  | 87  | 82  | 78  | 74                           | 70  | 66  | 65  | 63  | 60  |
|                      | 10                     | 89  | 86  | 84  | 82  | 79  | 76  | 73                           | 70  | 66  | 65  | 63  | 60  |
|                      | 20                     | 78  | 75  | 74  | 73  | 71  | 68  | 66                           | 64  | 62  | 61  | 60  | 58  |
|                      | 30                     | 70  | 68  | 67  | 66  | 64  | 63  | 61                           | 59  | 58  | 57  | 56  | 55  |
|                      | 40                     | 63  | 62  | 62  | 61  | 60  | 58  | 57                           | 55  | 54  | 53  | 53  | 51  |
|                      | 50                     | 57  | 57  | 57  | 57  | 56  | 55  | 53                           | 52  | 51  | 51  | 50  | 49  |
|                      | 60                     | 53  | 53  | 53  | 53  | 53  | 52  | 51                           | 50  | 49  | 48  | 48  | 48  |
|                      | 70                     | 49  | 49  | 49  | 49  | 49  | 49  | 48                           | 48  | 46  | 46  | 46  | 45  |
|                      | 80                     | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 45  | 45  | 44  | 44  | 43  |
|                      | 90                     | 44  | 44  | 44  | 44  | 44  | 44  | 44                           | 43  | 43  | 42  | 42  | 41  |
| Zone<br>2            | 0                      | 95  | 92  | 90  | 87  | 81  | 76  | 71                           | 66  | 62  | 61  | 59  | 56  |
|                      | 10                     | 89  | 86  | 84  | 82  | 79  | 76  | 71                           | 66  | 62  | 61  | 59  | 56  |
|                      | 20                     | 78  | 75  | 74  | 73  | 71  | 68  | 66                           | 64  | 62  | 61  | 59  | 56  |
|                      | 30                     | 70  | 68  | 67  | 66  | 64  | 63  | 61                           | 59  | 58  | 57  | 56  | 55  |
|                      | 40                     | 63  | 62  | 62  | 61  | 60  | 58  | 57                           | 55  | 54  | 53  | 53  | 51  |
|                      | 50                     | 57  | 57  | 57  | 57  | 56  | 55  | 53                           | 52  | 51  | 51  | 50  | 49  |
|                      | 60                     | 53  | 53  | 53  | 53  | 53  | 52  | 51                           | 50  | 49  | 48  | 48  | 48  |
|                      | 70                     | 49  | 49  | 49  | 49  | 49  | 49  | 48                           | 48  | 46  | 46  | 46  | 45  |
|                      | 80                     | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 45  | 45  | 44  | 44  | 43  |
|                      | 90                     | 44  | 44  | 44  | 44  | 44  | 44  | 44                           | 43  | 43  | 42  | 42  | 41  |
| Zone<br>3            | 0                      | 95  | 92  | 90  | 87  | 81  | 76  | 71                           | 66  | 62  | 61  | 59  | 56  |
|                      | 10                     | 89  | 86  | 84  | 82  | 79  | 76  | 71                           | 66  | 62  | 61  | 59  | 56  |
|                      | 20                     | 78  | 75  | 74  | 73  | 71  | 68  | 66                           | 64  | 62  | 61  | 59  | 56  |
|                      | 30                     | 70  | 68  | 67  | 66  | 64  | 63  | 61                           | 59  | 58  | 57  | 56  | 55  |
|                      | 40                     | 63  | 62  | 62  | 61  | 60  | 58  | 57                           | 55  | 54  | 53  | 53  | 51  |
|                      | 50                     | 57  | 57  | 57  | 57  | 56  | 55  | 53                           | 52  | 51  | 51  | 50  | 49  |
|                      | 60                     | 53  | 53  | 53  | 53  | 53  | 52  | 51                           | 50  | 49  | 48  | 48  | 48  |
|                      | 70                     | 49  | 49  | 49  | 49  | 49  | 49  | 48                           | 48  | 46  | 46  | 46  | 45  |
|                      | 80                     | 46  | 46  | 46  | 46  | 46  | 46  | 46                           | 45  | 45  | 44  | 44  | 43  |
|                      | 90                     | 44  | 44  | 44  | 44  | 44  | 44  | 44                           | 43  | 43  | 42  | 42  | 41  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"



**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |    | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |
|----------------|----|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                |    |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 |
| Zone 1         | 0  | 92               | 88               | 85  | 82  | 77  | 73  | 69  | 65  | 62  | 60  | 59  | 56  |
|                | 10 | 86               | 82               | 81  | 79  | 76  | 72  | 69  | 65  | 62  | 60  | 59  | 56  |
|                | 20 | 76               | 73               | 72  | 71  | 68  | 66  | 63  | 61  | 59  | 58  | 57  | 55  |
|                | 30 | 68               | 66               | 65  | 64  | 62  | 61  | 59  | 57  | 55  | 54  | 54  | 52  |
|                | 40 | 62               | 61               | 60  | 60  | 58  | 57  | 55  | 54  | 52  | 51  | 51  | 49  |
|                | 50 | 57               | 57               | 56  | 56  | 54  | 53  | 52  | 51  | 49  | 49  | 48  | 48  |
|                | 60 | 53               | 53               | 53  | 52  | 51  | 50  | 49  | 48  | 48  | 48  | 46  | 45  |
|                | 70 | 49               | 49               | 49  | 49  | 49  | 48  | 48  | 46  | 45  | 45  | 44  | 43  |
|                | 80 | 46               | 46               | 46  | 46  | 46  | 46  | 45  | 44  | 43  | 43  | 43  | 42  |
| Zone 2         | 90 | 44               | 44               | 44  | 44  | 44  | 44  | 43  | 43  | 42  | 41  | 41  | 40  |
|                | 0  | 92               | 88               | 85  | 81  | 75  | 70  | 65  | 61  | 57  | 56  | 54  | 51  |
|                | 10 | 86               | 82               | 81  | 79  | 75  | 70  | 65  | 61  | 57  | 56  | 54  | 51  |
|                | 20 | 76               | 73               | 72  | 71  | 68  | 66  | 63  | 61  | 57  | 56  | 54  | 51  |
|                | 30 | 68               | 66               | 65  | 64  | 62  | 61  | 59  | 57  | 55  | 54  | 54  | 51  |
|                | 40 | 62               | 61               | 60  | 60  | 58  | 57  | 55  | 54  | 52  | 51  | 51  | 49  |
|                | 50 | 57               | 57               | 56  | 56  | 54  | 53  | 52  | 51  | 49  | 49  | 48  | 48  |
|                | 60 | 53               | 53               | 53  | 52  | 51  | 50  | 49  | 48  | 48  | 48  | 46  | 45  |
|                | 70 | 49               | 49               | 49  | 49  | 49  | 48  | 48  | 46  | 45  | 45  | 44  | 43  |
| Zone 3         | 80 | 46               | 46               | 46  | 46  | 46  | 46  | 45  | 44  | 43  | 43  | 43  | 42  |
|                | 90 | 44               | 44               | 44  | 44  | 44  | 44  | 43  | 43  | 42  | 41  | 41  | 40  |
|                | 0  | 92               | 88               | 85  | 81  | 75  | 70  | 65  | 61  | 57  | 56  | 54  | 51  |
|                | 10 | 86               | 82               | 81  | 79  | 75  | 70  | 65  | 61  | 57  | 56  | 54  | 51  |
|                | 20 | 76               | 73               | 72  | 71  | 68  | 66  | 63  | 61  | 57  | 56  | 54  | 51  |
|                | 30 | 68               | 66               | 65  | 64  | 62  | 61  | 59  | 57  | 55  | 54  | 54  | 51  |
|                | 40 | 62               | 61               | 60  | 60  | 58  | 57  | 55  | 54  | 52  | 51  | 51  | 49  |
|                | 50 | 57               | 57               | 56  | 56  | 54  | 53  | 52  | 51  | 49  | 49  | 48  | 48  |
|                | 60 | 53               | 53               | 53  | 52  | 51  | 50  | 49  | 48  | 48  | 48  | 46  | 45  |
| 70             | 49 | 49               | 49               | 49  | 49  | 48  | 48  | 46  | 45  | 45  | 44  | 43  |     |
| 80             | 46 | 46               | 46               | 46  | 46  | 46  | 45  | 44  | 43  | 43  | 43  | 42  |     |
| 90             | 44 | 44               | 44               | 44  | 44  | 44  | 44  | 43  | 43  | 42  | 41  | 41  | 40  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in landscape orientation with a maximum width of 42"

**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |    | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |    |
|----------------|----|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                |    |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         |    | 0                | 81               | 81  | 81  | 81  | 81  | 78  | 72  | 67  | 62  | 61  | 59  | 55  |    |
|                |    | 10               | 77               | 77  | 77  | 77  | 76  | 75  | 72  | 67  | 62  | 61  | 59  | 55  |    |
|                |    | 20               | 63               | 63  | 63  | 63  | 63  | 63  | 63  | 63  | 62  | 61  | 59  | 55  |    |
|                |    | 30               | 53               | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  | 53  |    |
|                |    | 40               | 48               | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 48  |    |
|                |    | 50               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42 |
|                |    | 60               | 39               | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39 |
|                |    | 70               | 36               | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36 |
|                |    | 80               | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34 |
| 90             | 32 | 32               | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  |     |    |
| Zone 2         |    | 0                | 81               | 73  | 69  | 66  | 61  | 56  | 52  | 49  | 46  | 44  | 43  | 41  |    |
|                |    | 10               | 77               | 73  | 69  | 66  | 61  | 56  | 52  | 49  | 46  | 44  | 43  | 41  |    |
|                |    | 20               | 63               | 63  | 63  | 63  | 61  | 56  | 52  | 49  | 46  | 44  | 43  | 41  |    |
|                |    | 30               | 53               | 53  | 53  | 53  | 53  | 53  | 52  | 49  | 46  | 44  | 43  | 41  |    |
|                |    | 40               | 48               | 48  | 48  | 48  | 48  | 48  | 48  | 48  | 46  | 44  | 43  | 41  |    |
|                |    | 50               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 41 |
|                |    | 60               | 39               | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 39 |
|                |    | 70               | 36               | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36 |
|                |    | 80               | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34 |
| 90             | 32 | 32               | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  |     |    |
| Zone 3         |    | 0                | 64               | 57  | 55  | 52  | 48  | 44  | 41  | 39  | 36  | 35  | 34  | 32  |    |
|                |    | 10               | 64               | 57  | 55  | 52  | 48  | 44  | 41  | 39  | 36  | 35  | 34  | 32  |    |
|                |    | 20               | 63               | 57  | 55  | 52  | 48  | 44  | 41  | 39  | 36  | 35  | 34  | 32  |    |
|                |    | 30               | 53               | 53  | 53  | 52  | 48  | 44  | 41  | 39  | 36  | 35  | 34  | 32  |    |
|                |    | 40               | 48               | 48  | 48  | 48  | 48  | 44  | 41  | 39  | 36  | 35  | 34  | 32  |    |
|                |    | 50               | 42               | 42  | 42  | 42  | 42  | 42  | 41  | 39  | 36  | 35  | 34  | 32  |    |
|                |    | 60               | 39               | 39  | 39  | 39  | 39  | 39  | 39  | 39  | 36  | 35  | 34  | 32  |    |
|                |    | 70               | 36               | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 36  | 35  | 34  | 32  |    |
|                |    | 80               | 34               | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 34  | 32 |
| 90             | 32 | 32               | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft    |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------------|------------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
| <b>Table 32</b>      |                        | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     | Exposure Category: C        |     |     |     |     |     |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                        |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone<br>1            | 0                      | 81                                      | 81  | 80  | 76  | 70  | 64  | 60                          | 56  | 52  | 51  | 49  | 46  |
|                      | 10                     | 77                                      | 76  | 75  | 75  | 70  | 64  | 60                          | 56  | 52  | 51  | 49  | 46  |
|                      | 20                     | 63                                      | 63  | 63  | 63  | 63  | 62  | 60                          | 56  | 52  | 51  | 49  | 46  |
|                      | 30                     | 53                                      | 53  | 53  | 53  | 53  | 53  | 53                          | 53  | 52  | 51  | 49  | 46  |
|                      | 40                     | 48                                      | 48  | 48  | 48  | 48  | 48  | 48                          | 48  | 48  | 48  | 48  | 46  |
|                      | 50                     | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 42  |
|                      | 60                     | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 39  | 39  |
|                      | 70                     | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
|                      | 80                     | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  | 34  |
| 90                   | 32                     | 32                                      | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  |     |
| Zone<br>2            | 0                      | 67                                      | 61  | 58  | 55  | 51  | 48  | 44                          | 41  | 38  | 37  | 36  | 34  |
|                      | 10                     | 67                                      | 61  | 58  | 55  | 51  | 48  | 44                          | 41  | 38  | 37  | 36  | 34  |
|                      | 20                     | 63                                      | 61  | 58  | 55  | 51  | 48  | 44                          | 41  | 38  | 37  | 36  | 34  |
|                      | 30                     | 53                                      | 53  | 53  | 53  | 51  | 48  | 44                          | 41  | 38  | 37  | 36  | 34  |
|                      | 40                     | 48                                      | 48  | 48  | 48  | 48  | 48  | 44                          | 41  | 38  | 37  | 36  | 34  |
|                      | 50                     | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 41  | 38  | 37  | 36  | 34  |
|                      | 60                     | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 38  | 37  | 36  | 34  |
|                      | 70                     | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 34  |
|                      | 80                     | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  | 34  |
| 90                   | 32                     | 32                                      | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  |     |
| Zone<br>3            | 0                      | 53                                      | 48  | 46  | 44  | 40  | 37  | 35                          | 32  | 30  | 29  | 29  | 27  |
|                      | 10                     | 53                                      | 48  | 46  | 44  | 40  | 37  | 35                          | 32  | 30  | 29  | 29  | 27  |
|                      | 20                     | 53                                      | 48  | 46  | 44  | 40  | 37  | 35                          | 32  | 30  | 29  | 29  | 27  |
|                      | 30                     | 53                                      | 48  | 46  | 44  | 40  | 37  | 35                          | 32  | 30  | 29  | 29  | 27  |
|                      | 40                     | 48                                      | 48  | 46  | 44  | 40  | 37  | 35                          | 32  | 30  | 29  | 29  | 27  |
|                      | 50                     | 42                                      | 42  | 42  | 42  | 40  | 37  | 35                          | 32  | 30  | 29  | 29  | 27  |
|                      | 60                     | 39                                      | 39  | 39  | 39  | 39  | 37  | 35                          | 32  | 30  | 29  | 29  | 27  |
|                      | 70                     | 36                                      | 36  | 36  | 36  | 36  | 36  | 35                          | 32  | 30  | 29  | 29  | 27  |
|                      | 80                     | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 32  | 30  | 29  | 29  | 27  |
| 90                   | 32                     | 32                                      | 32  | 32  | 32  | 32  | 32  | 32                          | 30  | 29  | 29  | 27  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"

**Rail Spans for Quick Mount PV QRail Light System**

|                |                  | Mean Roof Height: $0 < h \leq 30$ ft    |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | Exposure Category: D                    |     |     |     |     |     |                             |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 81                                      | 77  | 73  | 69  | 64  | 59  | 54                          | 51  | 48  | 46  | 45  | 42  |
|                | 10               | 76                                      | 75  | 73  | 69  | 64  | 59  | 54                          | 51  | 48  | 46  | 45  | 42  |
|                | 20               | 63                                      | 63  | 63  | 63  | 62  | 59  | 54                          | 51  | 48  | 46  | 45  | 42  |
|                | 30               | 53                                      | 53  | 53  | 53  | 53  | 53  | 53                          | 51  | 48  | 46  | 45  | 42  |
|                | 40               | 48                                      | 48  | 48  | 48  | 48  | 48  | 48                          | 48  | 48  | 46  | 45  | 42  |
|                | 50               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 42  |
|                | 60               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 39  | 39  | 39  | 39  |
|                | 70               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 36  |
|                | 80               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  | 34  |
| 90             | 32               | 32                                      | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  |     |
| Zone 2         | 0                | 61                                      | 55  | 53  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 10               | 61                                      | 55  | 53  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 20               | 61                                      | 55  | 53  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 30               | 53                                      | 53  | 53  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 40               | 48                                      | 48  | 48  | 48  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 50               | 42                                      | 42  | 42  | 42  | 42  | 42  | 40                          | 37  | 35  | 34  | 33  | 31  |
|                | 60               | 39                                      | 39  | 39  | 39  | 39  | 39  | 39                          | 37  | 35  | 34  | 33  | 31  |
|                | 70               | 36                                      | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 35  | 34  | 33  | 31  |
|                | 80               | 34                                      | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 33  | 31  |
| 90             | 32               | 32                                      | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 31  |     |
| Zone 3         | 0                | 48                                      | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
|                | 10               | 48                                      | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
|                | 20               | 48                                      | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
|                | 30               | 48                                      | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
|                | 40               | 48                                      | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
|                | 50               | 42                                      | 42  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
|                | 60               | 39                                      | 39  | 39  | 39  | 37  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
|                | 70               | 36                                      | 36  | 36  | 36  | 36  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
|                | 80               | 34                                      | 34  | 34  | 34  | 34  | 34  | 32                          | 30  | 28  | 27  | 26  | 25  |
| 90             | 32               | 32                                      | 32  | 32  | 32  | 32  | 32  | 30                          | 28  | 27  | 26  | 25  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------------|------------------------|--|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                      |                        | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | Exposure Category: B                     |     |     |     |     |     |                             |     |     |     |     |     |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                         |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone<br>1            | 0                      | 81                                       | 81  | 81  | 81  | 81  | 79  | 73                          | 69  | 64  | 62  | 61  | 57  |
|                      | 10                     | 73                                       | 71  | 71  | 70  | 68  | 67  | 65                          | 64  | 62  | 62  | 61  | 57  |
|                      | 20                     | 57                                       | 57  | 57  | 57  | 57  | 56  | 55                          | 54  | 53  | 53  | 53  | 52  |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                          | 48  | 48  | 48  | 48  | 46  |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 42  |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                      | 70                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
|                      | 80                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  |     |
| Zone<br>2            | 0                      | 80                                       | 73  | 69  | 66  | 61  | 57  | 53                          | 49  | 46  | 45  | 44  | 41  |
|                      | 10                     | 73                                       | 71  | 69  | 66  | 61  | 57  | 53                          | 49  | 46  | 45  | 44  | 41  |
|                      | 20                     | 57                                       | 57  | 57  | 57  | 57  | 56  | 53                          | 49  | 46  | 45  | 44  | 41  |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                          | 48  | 46  | 45  | 44  | 41  |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 41  |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                      | 70                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
|                      | 80                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  |     |
| Zone<br>3            | 0                      | 64                                       | 58  | 56  | 53  | 49  | 45  | 42                          | 40  | 37  | 36  | 35  | 33  |
|                      | 10                     | 64                                       | 58  | 56  | 53  | 49  | 45  | 42                          | 40  | 37  | 36  | 35  | 33  |
|                      | 20                     | 57                                       | 57  | 56  | 53  | 49  | 45  | 42                          | 40  | 37  | 36  | 35  | 33  |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 48  | 45  | 42                          | 40  | 37  | 36  | 35  | 33  |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 40  | 37  | 36  | 35  | 33  |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 37  | 36  | 35  | 33  |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 33  |
|                      | 70                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
|                      | 80                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"

**Rail Spans for Quick Mount PV QRail Light System**

|                |                  | Mean Roof Height: $0 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------|------------------|--|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | Exposure Category: C                     |     |     |     |     |     |                             |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                         |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 81                                       | 81  | 81  | 78  | 71  | 66  | 62                          | 58  | 54  | 52  | 51  | 48  |
|                | 10               | 70                                       | 68  | 67  | 67  | 65  | 63  | 61                          | 58  | 54  | 52  | 51  | 48  |
|                | 20               | 57                                       | 57  | 57  | 56  | 55  | 54  | 53                          | 52  | 51  | 50  | 49  | 48  |
|                | 30               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                          | 46  | 45  | 45  | 45  | 44  |
|                | 40               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 41  | 41  | 40  |
|                | 50               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                | 60               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                | 70               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
|                | 80               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  |
| 90             | 29               | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  |     |
| Zone 2         | 0                | 67                                       | 61  | 58  | 56  | 51  | 48  | 44                          | 41  | 39  | 38  | 37  | 35  |
|                | 10               | 67                                       | 61  | 58  | 56  | 51  | 48  | 44                          | 41  | 39  | 38  | 37  | 35  |
|                | 20               | 57                                       | 57  | 57  | 56  | 51  | 48  | 44                          | 41  | 39  | 38  | 37  | 35  |
|                | 30               | 48                                       | 48  | 48  | 48  | 48  | 48  | 44                          | 41  | 39  | 38  | 37  | 35  |
|                | 40               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 41  | 39  | 38  | 37  | 35  |
|                | 50               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 37  | 35  |
|                | 60               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                | 70               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
|                | 80               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  |
| 90             | 29               | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  |     |
| Zone 3         | 0                | 54                                       | 49  | 48  | 45  | 41  | 38  | 36                          | 33  | 31  | 30  | 30  | 28  |
|                | 10               | 54                                       | 49  | 48  | 45  | 41  | 38  | 36                          | 33  | 31  | 30  | 30  | 28  |
|                | 20               | 54                                       | 49  | 48  | 45  | 41  | 38  | 36                          | 33  | 31  | 30  | 30  | 28  |
|                | 30               | 48                                       | 48  | 48  | 45  | 41  | 38  | 36                          | 33  | 31  | 30  | 30  | 28  |
|                | 40               | 42                                       | 42  | 42  | 42  | 41  | 38  | 36                          | 33  | 31  | 30  | 30  | 28  |
|                | 50               | 38                                       | 38  | 38  | 38  | 38  | 38  | 36                          | 33  | 31  | 30  | 30  | 28  |
|                | 60               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 33  | 31  | 30  | 30  | 28  |
|                | 70               | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 31  | 30  | 30  | 28  |
|                | 80               | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 30  | 30  | 28  |
| 90             | 29               | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 28  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |    |
|----------------------|------------------------|--|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|----|
|                      |                        | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |                             |     |     |     |     |     |    |
|                      |                        | Exposure Category: D                     |     |     |     |     |     |                             |     |     |     |     |     |    |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                         |     |     |     |     |     |                             |     |     |     |     |     |    |
|                      |                        | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |    |
| Zone<br>1            | 0                      | 81                                       | 78  | 74  | 71  | 65  | 61  | 56                          | 53  | 50  | 48  | 48  | 44  |    |
|                      | 10                     | 69                                       | 67  | 66  | 65  | 63  | 61  | 56                          | 53  | 50  | 48  | 48  | 44  |    |
|                      | 20                     | 57                                       | 56  | 56  | 55  | 54  | 52  | 51                          | 50  | 49  | 48  | 48  | 44  |    |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 48  | 48  | 46                          | 45  | 44  | 44  | 43  | 42  |    |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 41  | 41  | 40  | 40  | 39  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 37  | 37 |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  | 35 |
|                      | 70                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  | 33 |
|                      | 80                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  | 31 |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  | 29  |    |
| Zone<br>2            | 0                      | 62                                       | 56  | 53  | 51  | 48  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |    |
|                      | 10                     | 62                                       | 56  | 53  | 51  | 48  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |    |
|                      | 20                     | 57                                       | 56  | 53  | 51  | 48  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |    |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 48  | 44  | 41                          | 38  | 36  | 35  | 34  | 32  |    |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42  | 41                          | 38  | 36  | 35  | 34  | 32  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 36  | 35  | 34  | 32 |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 34  | 32 |
|                      | 70                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  | 32 |
|                      | 80                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  | 31 |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  | 29  |    |
| Zone<br>3            | 0                      | 50                                       | 45  | 43  | 41  | 38  | 35  | 33                          | 31  | 29  | 28  | 27  | 26  |    |
|                      | 10                     | 50                                       | 45  | 43  | 41  | 38  | 35  | 33                          | 31  | 29  | 28  | 27  | 26  |    |
|                      | 20                     | 50                                       | 45  | 43  | 41  | 38  | 35  | 33                          | 31  | 29  | 28  | 27  | 26  |    |
|                      | 30                     | 48                                       | 45  | 43  | 41  | 38  | 35  | 33                          | 31  | 29  | 28  | 27  | 26  |    |
|                      | 40                     | 42                                       | 42  | 42  | 41  | 38  | 35  | 33                          | 31  | 29  | 28  | 27  | 26  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 35  | 33                          | 31  | 29  | 28  | 27  | 26  |    |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 33                          | 31  | 29  | 28  | 27  | 26  |    |
|                      | 70                     | 33                                       | 33  | 33  | 33  | 33  | 33  | 33                          | 31  | 29  | 28  | 27  | 26  |    |
|                      | 80                     | 31                                       | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 29  | 28  | 27  | 26  |    |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 28  | 27  | 26  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"

**Rail Spans for Quick Mount PV QRail Light System**

|                |                  | Mean Roof Height: $0 < h \leq 30$ ft      |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |    |
|----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|----|
|                |                  | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     |                             |     |     |     |     |     |    |
|                |                  | Exposure Category: B                      |     |     |     |     |     |                             |     |     |     |     |     |    |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |    |
|                |                  | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         | 0                | 80  | 76  | 74  | 72  | 69  | 65  | 62                          | 59  | 56  | 55  | 54  | 51  |    |
|                | 10               | 70  | 68  | 66  | 65  | 63  | 61  | 59                          | 57  | 55  | 54  | 53  | 51  |    |
|                | 20               | 60  | 58  | 58  | 57  | 56  | 54  | 53                          | 51  | 50  | 49  | 48  | 48  |    |
|                | 30               | 52  | 52  | 52  | 51  | 50  | 49  | 48                          | 48  | 46  | 45  | 45  | 44  |    |
|                | 40               | 46  | 46  | 46  | 46  | 46  | 45  | 44                          | 43  | 43  | 42  | 42  | 41  |    |
|                | 50               | 42  | 42  | 42  | 42  | 42  | 42  | 41                          | 41  | 40  | 40  | 39  | 38  |    |
|                | 60               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 38  | 38  | 37  | 37  | 36 |
|                | 70               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 35  | 35 |
|                | 80               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  | 34  | 33 |
| 90             | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  |    |
| Zone 2         | 0                | 80  | 76  | 74  | 72  | 69  | 65  | 62                          | 58  | 54  | 53  | 51  | 49  |    |
|                | 10               | 70  | 68  | 66  | 65  | 63  | 61  | 59                          | 57  | 54  | 53  | 51  | 49  |    |
|                | 20               | 60  | 58  | 58  | 57  | 56  | 54  | 53                          | 51  | 50  | 49  | 48  | 48  |    |
|                | 30               | 52  | 52  | 52  | 51  | 50  | 49  | 48                          | 48  | 46  | 45  | 45  | 44  |    |
|                | 40               | 46  | 46  | 46  | 46  | 46  | 45  | 44                          | 43  | 43  | 42  | 42  | 41  |    |
|                | 50               | 42  | 42  | 42  | 42  | 42  | 42  | 41                          | 41  | 40  | 40  | 39  | 38  |    |
|                | 60               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 38  | 38  | 37  | 37  | 36 |
|                | 70               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 35  | 35 |
|                | 80               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  | 34  | 33 |
| 90             | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  |    |
| Zone 3         | 0                | 80  | 76  | 74  | 72  | 69  | 65  | 62                          | 58  | 54  | 53  | 51  | 49  |    |
|                | 10               | 70  | 68  | 66  | 65  | 63  | 61  | 59                          | 57  | 54  | 53  | 51  | 49  |    |
|                | 20               | 60  | 58  | 58  | 57  | 56  | 54  | 53                          | 51  | 50  | 49  | 48  | 48  |    |
|                | 30               | 52  | 52  | 52  | 51  | 50  | 49  | 48                          | 48  | 46  | 45  | 45  | 44  |    |
|                | 40               | 46  | 46  | 46  | 46  | 46  | 45  | 44                          | 43  | 43  | 42  | 42  | 41  |    |
|                | 50               | 42  | 42  | 42  | 42  | 42  | 42  | 41                          | 41  | 40  | 40  | 39  | 38  |    |
|                | 60               | 39  | 39  | 39  | 39  | 39  | 39  | 39                          | 39  | 38  | 38  | 37  | 37  | 36 |
|                | 70               | 36  | 36  | 36  | 36  | 36  | 36  | 36                          | 36  | 36  | 36  | 36  | 35  | 35 |
|                | 80               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 34  | 34  | 34  | 34  | 33 |
| 90             | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"



**Rail Spans for Quick Mount PV QRail Light System**

|                |                  | Mean Roof Height: $0 < h \leq 30$ ft      |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | Exposure Category: C                      |     |     |     |     |     |                             |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 73  | 69  | 66  | 64  | 61  | 57  | 54                          | 51  | 49  | 48  | 48  | 44  |
|                | 10               | 66  | 63  | 62  | 61  | 58  | 56  | 54                          | 51  | 49  | 48  | 48  | 44  |
|                | 20               | 57  | 55  | 55  | 54  | 52  | 50  | 49                          | 48  | 46  | 45  | 44  | 43  |
|                | 30               | 51  | 50  | 49  | 49  | 48  | 46  | 45                          | 44  | 42  | 42  | 41  | 40  |
|                | 40               | 46  | 46  | 45  | 45  | 44  | 43  | 42                          | 41  | 40  | 39  | 39  | 38  |
|                | 50               | 42  | 42  | 42  | 42  | 41  | 40  | 39                          | 38  | 38  | 37  | 37  | 36  |
|                | 60               | 39  | 39  | 39  | 39  | 39  | 38  | 37                          | 37  | 36  | 35  | 35  | 34  |
|                | 70               | 36  | 36  | 36  | 36  | 36  | 36  | 35                          | 35  | 34  | 34  | 34  | 33  |
|                | 80               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 33  | 33  | 32  | 32  |
| 90             | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 31  | 31  | 31  | 30  |
| Zone 2         | 0                | 73  | 69  | 66  | 64  | 60  | 56  | 52                          | 49  | 46  | 45  | 43  | 41  |
|                | 10               | 66  | 63  | 62  | 61  | 58  | 56  | 52                          | 49  | 46  | 45  | 43  | 41  |
|                | 20               | 57  | 55  | 55  | 54  | 52  | 50  | 49                          | 48  | 46  | 45  | 43  | 41  |
|                | 30               | 51  | 50  | 49  | 49  | 48  | 46  | 45                          | 44  | 42  | 42  | 41  | 40  |
|                | 40               | 46  | 46  | 45  | 45  | 44  | 43  | 42                          | 41  | 40  | 39  | 39  | 38  |
|                | 50               | 42  | 42  | 42  | 42  | 41  | 40  | 39                          | 38  | 38  | 37  | 37  | 36  |
|                | 60               | 39  | 39  | 39  | 39  | 39  | 38  | 37                          | 37  | 36  | 35  | 35  | 34  |
|                | 70               | 36  | 36  | 36  | 36  | 36  | 36  | 35                          | 35  | 34  | 34  | 34  | 33  |
|                | 80               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 33  | 33  | 32  | 32  |
| 90             | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 31  | 31  | 31  | 30  |
| Zone 3         | 0                | 73  | 69  | 66  | 64  | 60  | 56  | 52                          | 49  | 46  | 45  | 43  | 41  |
|                | 10               | 66  | 63  | 62  | 61  | 58  | 56  | 52                          | 49  | 46  | 45  | 43  | 41  |
|                | 20               | 57  | 55  | 55  | 54  | 52  | 50  | 49                          | 48  | 46  | 45  | 43  | 41  |
|                | 30               | 51  | 50  | 49  | 49  | 48  | 46  | 45                          | 44  | 42  | 42  | 41  | 40  |
|                | 40               | 46  | 46  | 45  | 45  | 44  | 43  | 42                          | 41  | 40  | 39  | 39  | 38  |
|                | 50               | 42  | 42  | 42  | 42  | 41  | 40  | 39                          | 38  | 38  | 37  | 37  | 36  |
|                | 60               | 39  | 39  | 39  | 39  | 39  | 38  | 37                          | 37  | 36  | 35  | 35  | 34  |
|                | 70               | 36  | 36  | 36  | 36  | 36  | 36  | 35                          | 35  | 34  | 34  | 34  | 33  |
|                | 80               | 34  | 34  | 34  | 34  | 34  | 34  | 34                          | 34  | 33  | 33  | 32  | 32  |
| 90             | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 31  | 31  | 31  | 30  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft      |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------------|------------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                      |                        | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | Exposure Category: D                      |     |     |     |     |     |                             |     |     |     |     |     |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone<br>1            | 0                      | 69  | 65  | 62  | 60  | 57  | 54  | 51                          | 48  | 45  | 44  | 43  | 41  |
|                      | 10                     | 63  | 61  | 59  | 58  | 56  | 53  | 51                          | 48  | 45  | 44  | 43  | 41  |
|                      | 20                     | 56  | 54  | 53  | 52  | 50  | 48  | 48                          | 45  | 44  | 43  | 42  | 41  |
|                      | 30                     | 50  | 49  | 48  | 48  | 46  | 45  | 43                          | 42  | 41  | 40  | 39  | 38  |
|                      | 40                     | 46  | 45  | 44  | 44  | 43  | 42  | 41                          | 39  | 38  | 38  | 37  | 36  |
|                      | 50                     | 42  | 42  | 41  | 41  | 40  | 39  | 38                          | 37  | 36  | 36  | 36  | 35  |
|                      | 60                     | 39  | 39  | 39  | 39  | 38  | 37  | 36                          | 35  | 35  | 34  | 34  | 33  |
|                      | 70                     | 36  | 36  | 36  | 36  | 36  | 35  | 35                          | 34  | 33  | 33  | 33  | 32  |
|                      | 80                     | 34  | 34  | 34  | 34  | 34  | 34  | 33                          | 33  | 32  | 32  | 31  | 31  |
| 90                   | 32                     | 32  | 32  | 32  | 32  | 32  | 32  | 31                          | 31  | 30  | 30  | 30  |     |
| Zone<br>2            | 0                      | 69  | 65  | 62  | 60  | 55  | 51  | 48                          | 45  | 42  | 41  | 40  | 38  |
|                      | 10                     | 63  | 61  | 59  | 58  | 55  | 51  | 48                          | 45  | 42  | 41  | 40  | 38  |
|                      | 20                     | 56  | 54  | 53  | 52  | 50  | 48  | 48                          | 45  | 42  | 41  | 40  | 38  |
|                      | 30                     | 50  | 49  | 48  | 48  | 46  | 45  | 43                          | 42  | 41  | 40  | 39  | 38  |
|                      | 40                     | 46  | 45  | 44  | 44  | 43  | 42  | 41                          | 39  | 38  | 38  | 37  | 36  |
|                      | 50                     | 42  | 42  | 41  | 41  | 40  | 39  | 38                          | 37  | 36  | 36  | 36  | 35  |
|                      | 60                     | 39  | 39  | 39  | 39  | 38  | 37  | 36                          | 35  | 35  | 34  | 34  | 33  |
|                      | 70                     | 36  | 36  | 36  | 36  | 36  | 35  | 35                          | 34  | 33  | 33  | 33  | 32  |
|                      | 80                     | 34  | 34  | 34  | 34  | 34  | 34  | 33                          | 33  | 32  | 32  | 31  | 31  |
| 90                   | 32                     | 32  | 32  | 32  | 32  | 32  | 32  | 31                          | 31  | 30  | 30  | 30  |     |
| Zone<br>3            | 0                      | 69  | 65  | 62  | 60  | 55  | 51  | 48                          | 45  | 42  | 41  | 40  | 38  |
|                      | 10                     | 63  | 61  | 59  | 58  | 55  | 51  | 48                          | 45  | 42  | 41  | 40  | 38  |
|                      | 20                     | 56  | 54  | 53  | 52  | 50  | 48  | 48                          | 45  | 42  | 41  | 40  | 38  |
|                      | 30                     | 50  | 49  | 48  | 48  | 46  | 45  | 43                          | 42  | 41  | 40  | 39  | 38  |
|                      | 40                     | 46  | 45  | 44  | 44  | 43  | 42  | 41                          | 39  | 38  | 38  | 37  | 36  |
|                      | 50                     | 42  | 42  | 41  | 41  | 40  | 39  | 38                          | 37  | 36  | 36  | 36  | 35  |
|                      | 60                     | 39  | 39  | 39  | 39  | 38  | 37  | 36                          | 35  | 35  | 34  | 34  | 33  |
|                      | 70                     | 36  | 36  | 36  | 36  | 36  | 35  | 35                          | 34  | 33  | 33  | 33  | 32  |
|                      | 80                     | 34  | 34  | 34  | 34  | 34  | 34  | 33                          | 33  | 32  | 32  | 31  | 31  |
| 90                   | 32                     | 32  | 32  | 32  | 32  | 32  | 32  | 31                          | 31  | 30  | 30  | 30  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 77"

**Rail Spans for Quick Mount PV QRail Light System**

|                |                  | Mean Roof Height: $0 < h \leq 30$ ft    |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |    |
|----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|----|
|                |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     |                             |     |     |     |     |     |    |
|                |                  | Exposure Category: B                    |     |     |     |     |     |                             |     |     |     |     |     |    |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |     |                             |     |     |     |     |     |    |
|                |                  | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         | 0                | 76                                      | 76  | 76  | 76  | 76  | 76  | 70                          | 65  | 61  | 59  | 58  | 54  |    |
|                | 10               | 76                                      | 76  | 76  | 76  | 75  | 74  | 70                          | 65  | 61  | 59  | 58  | 54  |    |
|                | 20               | 62                                      | 62  | 62  | 62  | 62  | 62  | 62                          | 61  | 61  | 59  | 58  | 54  |    |
|                | 30               | 52                                      | 52  | 52  | 52  | 52  | 52  | 52                          | 52  | 52  | 52  | 52  | 52  |    |
|                | 40               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                          | 46  | 46  | 46  | 46  | 46  |    |
|                | 50               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 42  | 42 |
|                | 60               | 38                                      | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  | 38 |
|                | 70               | 35                                      | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  | 35 |
|                | 80               | 33                                      | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  | 33 |
| 90             | 31               | 31                                      | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  | 31  |    |
| Zone 2         | 0                | 76                                      | 72  | 68  | 65  | 60  | 55  | 51                          | 48  | 45  | 43  | 42  | 40  |    |
|                | 10               | 76                                      | 72  | 68  | 65  | 60  | 55  | 51                          | 48  | 45  | 43  | 42  | 40  |    |
|                | 20               | 62                                      | 62  | 62  | 62  | 60  | 55  | 51                          | 48  | 45  | 43  | 42  | 40  |    |
|                | 30               | 52                                      | 52  | 52  | 52  | 52  | 52  | 51                          | 48  | 45  | 43  | 42  | 40  |    |
|                | 40               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                          | 46  | 45  | 43  | 42  | 40  |    |
|                | 50               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 40  |    |
|                | 60               | 38                                      | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |    |
|                | 70               | 35                                      | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |    |
|                | 80               | 33                                      | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |    |
| 90             | 31               | 31                                      | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |    |
| Zone 3         | 0                | 62                                      | 56  | 54  | 51  | 48  | 43  | 40                          | 38  | 35  | 34  | 33  | 32  |    |
|                | 10               | 62                                      | 56  | 54  | 51  | 48  | 43  | 40                          | 38  | 35  | 34  | 33  | 32  |    |
|                | 20               | 62                                      | 56  | 54  | 51  | 48  | 43  | 40                          | 38  | 35  | 34  | 33  | 32  |    |
|                | 30               | 52                                      | 52  | 52  | 51  | 48  | 43  | 40                          | 38  | 35  | 34  | 33  | 32  |    |
|                | 40               | 46                                      | 46  | 46  | 46  | 46  | 43  | 40                          | 38  | 35  | 34  | 33  | 32  |    |
|                | 50               | 42                                      | 42  | 42  | 42  | 42  | 42  | 40                          | 38  | 35  | 34  | 33  | 32  |    |
|                | 60               | 38                                      | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 35  | 34  | 33  | 32  |    |
|                | 70               | 35                                      | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 34  | 33  | 32  |    |
|                | 80               | 33                                      | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 32  |    |
| 90             | 31               | 31                                      | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"

**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |  | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |    |
|----------------|--|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                |  |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         |  | 0                | 76               | 76  | 76  | 75  | 68  | 63  | 58  | 55  | 51  | 50  | 48  | 45  |    |
|                |  | 10               | 76               | 75  | 74  | 74  | 68  | 63  | 58  | 55  | 51  | 50  | 48  | 45  |    |
|                |  | 20               | 62               | 62  | 62  | 62  | 62  | 61  | 58  | 55  | 51  | 50  | 48  | 45  |    |
|                |  | 30               | 52               | 52  | 52  | 52  | 52  | 52  | 52  | 52  | 51  | 50  | 48  | 45  |    |
|                |  | 40               | 46               | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 45  |    |
|                |  | 50               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42  | 42 |
|                |  | 60               | 38               | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 38 |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35 |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33 |
|                |  | 90               | 31               | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31 |
| Zone 2         |  | 0                | 66               | 60  | 57  | 54  | 50  | 46  | 43  | 40  | 37  | 36  | 35  | 33  |    |
|                |  | 10               | 66               | 60  | 57  | 54  | 50  | 46  | 43  | 40  | 37  | 36  | 35  | 33  |    |
|                |  | 20               | 62               | 60  | 57  | 54  | 50  | 46  | 43  | 40  | 37  | 36  | 35  | 33  |    |
|                |  | 30               | 52               | 52  | 52  | 52  | 50  | 46  | 43  | 40  | 37  | 36  | 35  | 33  |    |
|                |  | 40               | 46               | 46  | 46  | 46  | 46  | 46  | 43  | 40  | 37  | 36  | 35  | 33  |    |
|                |  | 50               | 42               | 42  | 42  | 42  | 42  | 42  | 42  | 40  | 37  | 36  | 35  | 33  |    |
|                |  | 60               | 38               | 38  | 38  | 38  | 38  | 38  | 38  | 38  | 37  | 36  | 35  | 33  |    |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 35  | 33 |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33  | 33 |
|                |  | 90               | 31               | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31 |
| Zone 3         |  | 0                | 52               | 48  | 45  | 43  | 39  | 36  | 34  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 10               | 52               | 48  | 45  | 43  | 39  | 36  | 34  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 20               | 52               | 48  | 45  | 43  | 39  | 36  | 34  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 30               | 52               | 48  | 45  | 43  | 39  | 36  | 34  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 40               | 46               | 46  | 45  | 43  | 39  | 36  | 34  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 50               | 42               | 42  | 42  | 42  | 39  | 36  | 34  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 60               | 38               | 38  | 38  | 38  | 38  | 36  | 34  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 34  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 32  | 30  | 29  | 28  | 27  |    |
|                |  | 90               | 31               | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 30  | 29  | 28  | 27  |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"

**Rail Spans for Quick Mount PV QRail Light System**

|                 |                  | Mean Roof Height: $0 < h \leq 30$ ft    |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|-----------------|------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
| <b>Table 42</b> |                  | Roof Angle: $0 < \theta \leq 7$ degrees |     |     |     |     |     | Exposure Category: D        |     |     |     |     |     |
| Roof Wind Zone  | Ground Snow Load | Wind Speed (mph)                        |     |     |     |     |     |                             |     |     |     |     |     |
|                 |                  | 100                                     | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1          | 0                | 76                                      | 75  | 71  | 68  | 62  | 58  | 53                          | 50  | 48  | 45  | 44  | 42  |
|                 | 10               | 75                                      | 74  | 71  | 68  | 62  | 58  | 53                          | 50  | 48  | 45  | 44  | 42  |
|                 | 20               | 62                                      | 62  | 62  | 62  | 61  | 58  | 53                          | 50  | 48  | 45  | 44  | 42  |
|                 | 30               | 52                                      | 52  | 52  | 52  | 52  | 52  | 52                          | 50  | 48  | 45  | 44  | 42  |
|                 | 40               | 46                                      | 46  | 46  | 46  | 46  | 46  | 46                          | 46  | 46  | 45  | 44  | 42  |
|                 | 50               | 42                                      | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 41  |
|                 | 60               | 38                                      | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                 | 70               | 35                                      | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                 | 80               | 33                                      | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90              | 31               | 31                                      | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |
| Zone 2          | 0                | 60                                      | 54  | 52  | 49  | 45  | 42  | 39                          | 37  | 34  | 33  | 32  | 31  |
|                 | 10               | 60                                      | 54  | 52  | 49  | 45  | 42  | 39                          | 37  | 34  | 33  | 32  | 31  |
|                 | 20               | 60                                      | 54  | 52  | 49  | 45  | 42  | 39                          | 37  | 34  | 33  | 32  | 31  |
|                 | 30               | 52                                      | 52  | 52  | 49  | 45  | 42  | 39                          | 37  | 34  | 33  | 32  | 31  |
|                 | 40               | 46                                      | 46  | 46  | 46  | 45  | 42  | 39                          | 37  | 34  | 33  | 32  | 31  |
|                 | 50               | 42                                      | 42  | 42  | 42  | 42  | 42  | 39                          | 37  | 34  | 33  | 32  | 31  |
|                 | 60               | 38                                      | 38  | 38  | 38  | 38  | 38  | 38                          | 37  | 34  | 33  | 32  | 31  |
|                 | 70               | 35                                      | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 34  | 33  | 32  | 31  |
|                 | 80               | 33                                      | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 32  | 31  |
| 90              | 31               | 31                                      | 31  | 31  | 31  | 31  | 31  | 31                          | 31  | 31  | 31  | 31  |     |
| Zone 3          | 0                | 48                                      | 43  | 41  | 39  | 36  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
|                 | 10               | 48                                      | 43  | 41  | 39  | 36  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
|                 | 20               | 48                                      | 43  | 41  | 39  | 36  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
|                 | 30               | 48                                      | 43  | 41  | 39  | 36  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
|                 | 40               | 46                                      | 43  | 41  | 39  | 36  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
|                 | 50               | 42                                      | 42  | 41  | 39  | 36  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
|                 | 60               | 38                                      | 38  | 38  | 38  | 36  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
|                 | 70               | 35                                      | 35  | 35  | 35  | 35  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
|                 | 80               | 33                                      | 33  | 33  | 33  | 33  | 33  | 31                          | 29  | 27  | 26  | 26  | 24  |
| 90              | 31               | 31                                      | 31  | 31  | 31  | 31  | 31  | 29                          | 27  | 26  | 26  | 24  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"

**Rail Spans for Quick Mount PV QRail Light System**

|                |                  | Mean Roof Height: $0 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------|------------------|--|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                |                  | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | Exposure Category: B                     |     |     |     |     |     |                             |     |     |     |     |     |
| Roof Wind Zone | Ground Snow Load | Wind Speed (mph)                         |     |     |     |     |     |                             |     |     |     |     |     |
|                |                  | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone 1         | 0                | 76                                       | 76  | 76  | 76  | 76  | 76  | 72                          | 67  | 63  | 61  | 59  | 56  |
|                | 10               | 71                                       | 70  | 69  | 69  | 67  | 66  | 64                          | 63  | 61  | 60  | 59  | 56  |
|                | 20               | 56                                       | 56  | 56  | 56  | 56  | 55  | 54                          | 53  | 52  | 52  | 52  | 51  |
|                | 30               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                          | 48  | 48  | 46  | 46  | 45  |
|                | 40               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 41  |
|                | 50               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                | 60               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                | 70               | 32                                       | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  |
|                | 80               | 30                                       | 30  | 30  | 30  | 30  | 30  | 30                          | 30  | 30  | 30  | 30  | 30  |
| 90             | 29               | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  |     |
| Zone 2         | 0                | 76                                       | 71  | 68  | 65  | 60  | 56  | 52                          | 48  | 45  | 44  | 43  | 41  |
|                | 10               | 71                                       | 70  | 68  | 65  | 60  | 56  | 52                          | 48  | 45  | 44  | 43  | 41  |
|                | 20               | 56                                       | 56  | 56  | 56  | 56  | 55  | 52                          | 48  | 45  | 44  | 43  | 41  |
|                | 30               | 48                                       | 48  | 48  | 48  | 48  | 48  | 48                          | 48  | 45  | 44  | 43  | 41  |
|                | 40               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 42  | 42  | 42  | 42  | 41  |
|                | 50               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  |
|                | 60               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  |
|                | 70               | 32                                       | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  |
|                | 80               | 30                                       | 30  | 30  | 30  | 30  | 30  | 30                          | 30  | 30  | 30  | 30  | 30  |
| 90             | 29               | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  |     |
| Zone 3         | 0                | 63                                       | 57  | 55  | 52  | 48  | 45  | 42                          | 39  | 37  | 35  | 34  | 33  |
|                | 10               | 63                                       | 57  | 55  | 52  | 48  | 45  | 42                          | 39  | 37  | 35  | 34  | 33  |
|                | 20               | 56                                       | 56  | 55  | 52  | 48  | 45  | 42                          | 39  | 37  | 35  | 34  | 33  |
|                | 30               | 48                                       | 48  | 48  | 48  | 48  | 45  | 42                          | 39  | 37  | 35  | 34  | 33  |
|                | 40               | 42                                       | 42  | 42  | 42  | 42  | 42  | 42                          | 39  | 37  | 35  | 34  | 33  |
|                | 50               | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 37  | 35  | 34  | 33  |
|                | 60               | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 34  | 33  |
|                | 70               | 32                                       | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  |
|                | 80               | 30                                       | 30  | 30  | 30  | 30  | 30  | 30                          | 30  | 30  | 30  | 30  | 30  |
| 90             | 29               | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |     |    |
|----------------------|------------------------|--|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|-----|----|
| <b>Table 44</b>      |                        | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     | Exposure Category: C        |     |     |     |     |     |     |    |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                         |     |     |     |     |                             |     |     |     |     |     |     |    |
|                      |                        | 100                                      | 110 | 115 | 120 | 130 | 140                         | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1               | 0                      | 76                                       | 76  | 76  | 76  | 70  | 65                          | 60  | 56  | 53  | 51  | 50  | 48  |    |
|                      | 10                     | 69                                       | 67  | 66  | 65  | 64  | 62                          | 60  | 56  | 53  | 51  | 50  | 48  |    |
|                      | 20                     | 56                                       | 56  | 56  | 55  | 54  | 53                          | 52  | 51  | 50  | 49  | 48  | 48  |    |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 48  | 48                          | 46  | 45  | 45  | 44  | 44  | 43  |    |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42                          | 42  | 41  | 41  | 40  | 40  | 40  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 38  | 38  | 37  | 37 |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  | 35  | 35 |
|                      | 70                     | 32                                       | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  | 32  | 32 |
|                      | 80                     | 30                                       | 30  | 30  | 30  | 30  | 30                          | 30  | 30  | 30  | 30  | 30  | 30  | 30 |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  | 29  | 29  |    |
| Zone 2               | 0                      | 66                                       | 60  | 57  | 55  | 50  | 48                          | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                      | 10                     | 66                                       | 60  | 57  | 55  | 50  | 48                          | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                      | 20                     | 56                                       | 56  | 56  | 55  | 50  | 48                          | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 48  | 48                          | 43  | 41  | 38  | 37  | 36  | 34  |    |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42                          | 42  | 41  | 38  | 37  | 36  | 34  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 38  | 37  | 36  | 34  |    |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 35  | 34  |    |
|                      | 70                     | 32                                       | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  | 32  |    |
|                      | 80                     | 30                                       | 30  | 30  | 30  | 30  | 30                          | 30  | 30  | 30  | 30  | 30  | 30  |    |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  | 29  |     |    |
| Zone 3               | 0                      | 53                                       | 48  | 46  | 44  | 40  | 38                          | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                      | 10                     | 53                                       | 48  | 46  | 44  | 40  | 38                          | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                      | 20                     | 53                                       | 48  | 46  | 44  | 40  | 38                          | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                      | 30                     | 48                                       | 48  | 46  | 44  | 40  | 38                          | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 40  | 38                          | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38                          | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35                          | 35  | 33  | 31  | 30  | 29  | 27  |    |
|                      | 70                     | 32                                       | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 31  | 30  | 29  | 27  |    |
|                      | 80                     | 30                                       | 30  | 30  | 30  | 30  | 30                          | 30  | 30  | 30  | 30  | 29  | 27  |    |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  | 27  |     |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft     |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |    |
|----------------------|------------------------|--|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|----|
|                      |                        | Roof Angle: $7 < \theta \leq 27$ degrees |     |     |     |     |     |                             |     |     |     |     |     |    |
|                      |                        | Exposure Category: D                     |     |     |     |     |     |                             |     |     |     |     |     |    |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                         |     |     |     |     |     |                             |     |     |     |     |     |    |
|                      |                        | 100                                      | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |    |
| Zone<br>1            | 0                      | 76                                       | 76  | 73  | 70  | 64  | 59  | 55                          | 52  | 49  | 48  | 46  | 43  |    |
|                      | 10                     | 67                                       | 65  | 64  | 63  | 62  | 59  | 55                          | 52  | 49  | 48  | 46  | 43  |    |
|                      | 20                     | 56                                       | 55  | 54  | 54  | 53  | 51  | 50                          | 49  | 48  | 48  | 46  | 43  |    |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 48  | 46  | 45                          | 44  | 43  | 43  | 42  | 42  |    |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42  | 41                          | 41  | 40  | 40  | 39  | 38  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 38  | 37  | 37  | 37  | 36 |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 34  | 34 |
|                      | 70                     | 32                                       | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  | 32 |
|                      | 80                     | 30                                       | 30  | 30  | 30  | 30  | 30  | 30                          | 30  | 30  | 30  | 30  | 30  | 30 |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  | 29  |    |
| Zone<br>2            | 0                      | 61                                       | 55  | 52  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |    |
|                      | 10                     | 61                                       | 55  | 52  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |    |
|                      | 20                     | 56                                       | 55  | 52  | 50  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |    |
|                      | 30                     | 48                                       | 48  | 48  | 48  | 46  | 43  | 40                          | 37  | 35  | 34  | 33  | 31  |    |
|                      | 40                     | 42                                       | 42  | 42  | 42  | 42  | 42  | 40                          | 37  | 35  | 34  | 33  | 31  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 37  | 35  | 34  | 33  | 31 |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 34  | 33  | 31 |
|                      | 70                     | 32                                       | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 32  | 32  | 31 |
|                      | 80                     | 30                                       | 30  | 30  | 30  | 30  | 30  | 30                          | 30  | 30  | 30  | 30  | 30  | 30 |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 29  | 29  | 29  | 29  |    |
| Zone<br>3            | 0                      | 49                                       | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 27  | 25  |    |
|                      | 10                     | 49                                       | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 27  | 25  |    |
|                      | 20                     | 49                                       | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 27  | 25  |    |
|                      | 30                     | 48                                       | 44  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 27  | 25  |    |
|                      | 40                     | 42                                       | 42  | 42  | 40  | 37  | 34  | 32                          | 30  | 28  | 27  | 27  | 25  |    |
|                      | 50                     | 38                                       | 38  | 38  | 38  | 37  | 34  | 32                          | 30  | 28  | 27  | 27  | 25  |    |
|                      | 60                     | 35                                       | 35  | 35  | 35  | 35  | 34  | 32                          | 30  | 28  | 27  | 27  | 25  |    |
|                      | 70                     | 32                                       | 32  | 32  | 32  | 32  | 32  | 32                          | 30  | 28  | 27  | 27  | 25  |    |
|                      | 80                     | 30                                       | 30  | 30  | 30  | 30  | 30  | 30                          | 30  | 28  | 27  | 27  | 25  |    |
| 90                   | 29                     | 29                                       | 29  | 29  | 29  | 29  | 29  | 29                          | 29  | 28  | 27  | 27  | 25  |    |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"



**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft      |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------------|------------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                      |                        | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | Exposure Category: B                      |     |     |     |     |     |                             |     |     |     |     |     |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone<br>1            | 0                      | 76  | 75  | 73  | 71  | 67  | 64  | 61                          | 58  | 55  | 54  | 53  | 50  |
|                      | 10                     | 68  | 66  | 65  | 64  | 62  | 60  | 58                          | 56  | 54  | 53  | 52  | 50  |
|                      | 20                     | 59  | 57  | 57  | 56  | 54  | 53  | 52                          | 50  | 49  | 48  | 48  | 46  |
|                      | 30                     | 51  | 51  | 51  | 50  | 49  | 48  | 48                          | 46  | 45  | 44  | 44  | 43  |
|                      | 40                     | 46  | 46  | 46  | 46  | 45  | 44  | 43                          | 43  | 42  | 41  | 41  | 40  |
|                      | 50                     | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 40  | 39  | 39  | 38  | 38  |
|                      | 60                     | 38  | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 37  | 37  | 36  | 36  |
|                      | 70                     | 35  | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 34  |
|                      | 80                     | 33  | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90                   | 32                     | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 31  |     |
| Zone<br>2            | 0                      | 76  | 75  | 73  | 71  | 67  | 64  | 60                          | 57  | 53  | 52  | 50  | 48  |
|                      | 10                     | 68  | 66  | 65  | 64  | 62  | 60  | 58                          | 56  | 53  | 52  | 50  | 48  |
|                      | 20                     | 59  | 57  | 57  | 56  | 54  | 53  | 52                          | 50  | 49  | 48  | 48  | 46  |
|                      | 30                     | 51  | 51  | 51  | 50  | 49  | 48  | 48                          | 46  | 45  | 44  | 44  | 43  |
|                      | 40                     | 46  | 46  | 46  | 46  | 45  | 44  | 43                          | 43  | 42  | 41  | 41  | 40  |
|                      | 50                     | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 40  | 39  | 39  | 38  | 38  |
|                      | 60                     | 38  | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 37  | 37  | 36  | 36  |
|                      | 70                     | 35  | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 34  |
|                      | 80                     | 33  | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90                   | 32                     | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 31  |     |
| Zone<br>3            | 0                      | 76  | 75  | 73  | 71  | 67  | 64  | 60                          | 57  | 53  | 52  | 50  | 48  |
|                      | 10                     | 68  | 66  | 65  | 64  | 62  | 60  | 58                          | 56  | 53  | 52  | 50  | 48  |
|                      | 20                     | 59  | 57  | 57  | 56  | 54  | 53  | 52                          | 50  | 49  | 48  | 48  | 46  |
|                      | 30                     | 51  | 51  | 51  | 50  | 49  | 48  | 48                          | 46  | 45  | 44  | 44  | 43  |
|                      | 40                     | 46  | 46  | 46  | 46  | 45  | 44  | 43                          | 43  | 42  | 41  | 41  | 40  |
|                      | 50                     | 41  | 41  | 41  | 41  | 41  | 41  | 41                          | 40  | 39  | 39  | 38  | 38  |
|                      | 60                     | 38  | 38  | 38  | 38  | 38  | 38  | 38                          | 38  | 37  | 37  | 36  | 36  |
|                      | 70                     | 35  | 35  | 35  | 35  | 35  | 35  | 35                          | 35  | 35  | 35  | 35  | 34  |
|                      | 80                     | 33  | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 33  | 33  | 33  | 33  |
| 90                   | 32                     | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 32  | 32  | 32  | 31  |     |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"

**Rail Spans for Quick Mount PV QRail Light System**

|                      |                        | Mean Roof Height: $0 < h \leq 30$ ft      |     |     |     |     |     | Panel Orientation: Portrait |     |     |     |     |     |
|----------------------|------------------------|---|-----|-----|-----|-----|-----|-----------------------------|-----|-----|-----|-----|-----|
|                      |                        | Roof Angle: $27 < \theta \leq 45$ degrees |     |     |     |     |     | Exposure Category: C        |     |     |     |     |     |
| Roof<br>Wind<br>Zone | Ground<br>Snow<br>Load | Wind Speed (mph)                          |     |     |     |     |     |                             |     |     |     |     |     |
|                      |                        | 100                                       | 110 | 115 | 120 | 130 | 140 | 150                         | 160 | 170 | 175 | 180 | 190 |
| Zone<br>1            | 0                      | 72  | 67  | 65  | 63  | 60  | 56  | 53                          | 50  | 48  | 48  | 46  | 44  |
|                      | 10                     | 65  | 62  | 61  | 60  | 57  | 55  | 53                          | 50  | 48  | 48  | 46  | 44  |
|                      | 20                     | 56  | 54  | 54  | 53  | 51  | 49  | 48                          | 46  | 45  | 44  | 43  | 42  |
|                      | 30                     | 50  | 49  | 48  | 48  | 48  | 45  | 44                          | 43  | 42  | 41  | 40  | 39  |
|                      | 40                     | 46  | 45  | 45  | 44  | 43  | 42  | 41                          | 40  | 39  | 39  | 38  | 37  |
|                      | 50                     | 41  | 41  | 41  | 41  | 40  | 39  | 39                          | 38  | 37  | 37  | 36  | 35  |
|                      | 60                     | 38  | 38  | 38  | 38  | 38  | 37  | 37                          | 36  | 35  | 35  | 34  | 34  |
|                      | 70                     | 35  | 35  | 35  | 35  | 35  | 35  | 35                          | 34  | 34  | 33  | 33  | 32  |
|                      | 80                     | 33  | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 32  | 32  | 32  | 31  |
|                      | 90                     | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 31  | 31  | 31  | 30  | 30  |
| Zone<br>2            | 0                      | 72  | 67  | 65  | 63  | 59  | 55  | 51                          | 48  | 45  | 44  | 43  | 40  |
|                      | 10                     | 65  | 62  | 61  | 60  | 57  | 55  | 51                          | 48  | 45  | 44  | 43  | 40  |
|                      | 20                     | 56  | 54  | 54  | 53  | 51  | 49  | 48                          | 46  | 45  | 44  | 43  | 40  |
|                      | 30                     | 50  | 49  | 48  | 48  | 48  | 45  | 44                          | 43  | 42  | 41  | 40  | 39  |
|                      | 40                     | 46  | 45  | 45  | 44  | 43  | 42  | 41                          | 40  | 39  | 39  | 38  | 37  |
|                      | 50                     | 41  | 41  | 41  | 41  | 40  | 39  | 39                          | 38  | 37  | 37  | 36  | 35  |
|                      | 60                     | 38  | 38  | 38  | 38  | 38  | 37  | 37                          | 36  | 35  | 35  | 34  | 34  |
|                      | 70                     | 35  | 35  | 35  | 35  | 35  | 35  | 35                          | 34  | 34  | 33  | 33  | 32  |
|                      | 80                     | 33  | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 32  | 32  | 32  | 31  |
|                      | 90                     | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 31  | 31  | 31  | 30  | 30  |
| Zone<br>3            | 0                      | 72  | 67  | 65  | 63  | 59  | 55  | 51                          | 48  | 45  | 44  | 43  | 40  |
|                      | 10                     | 65  | 62  | 61  | 60  | 57  | 55  | 51                          | 48  | 45  | 44  | 43  | 40  |
|                      | 20                     | 56  | 54  | 54  | 53  | 51  | 49  | 48                          | 46  | 45  | 44  | 43  | 40  |
|                      | 30                     | 50  | 49  | 48  | 48  | 48  | 45  | 44                          | 43  | 42  | 41  | 40  | 39  |
|                      | 40                     | 46  | 45  | 45  | 44  | 43  | 42  | 41                          | 40  | 39  | 39  | 38  | 37  |
|                      | 50                     | 41  | 41  | 41  | 41  | 40  | 39  | 39                          | 38  | 37  | 37  | 36  | 35  |
|                      | 60                     | 38  | 38  | 38  | 38  | 38  | 37  | 37                          | 36  | 35  | 35  | 34  | 34  |
|                      | 70                     | 35  | 35  | 35  | 35  | 35  | 35  | 35                          | 34  | 34  | 33  | 33  | 32  |
|                      | 80                     | 33  | 33  | 33  | 33  | 33  | 33  | 33                          | 33  | 32  | 32  | 32  | 31  |
|                      | 90                     | 32  | 32  | 32  | 32  | 32  | 32  | 32                          | 31  | 31  | 31  | 30  | 30  |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"

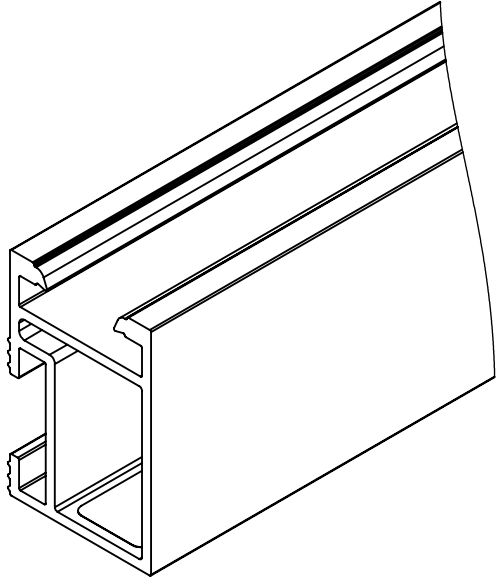
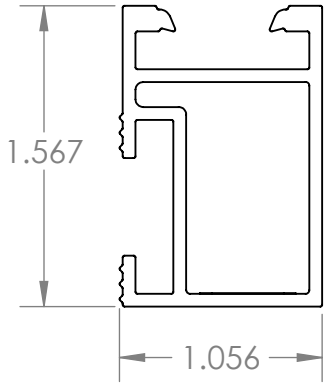
**Rail Spans for Quick Mount PV QRail Light System**

| Roof Wind Zone |  | Ground Snow Load | Wind Speed (mph) |     |     |     |     |     |     |     |     |     |     |     |    |
|----------------|--|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
|                |  |                  | 100              | 110 | 115 | 120 | 130 | 140 | 150 | 160 | 170 | 175 | 180 | 190 |    |
| Zone 1         |  | 0                | 68               | 63  | 61  | 59  | 56  | 53  | 50  | 48  | 45  | 43  | 42  | 40  |    |
|                |  | 10               | 62               | 60  | 58  | 57  | 55  | 52  | 50  | 48  | 45  | 43  | 42  | 40  |    |
|                |  | 20               | 55               | 53  | 52  | 51  | 49  | 48  | 46  | 44  | 43  | 42  | 41  | 40  |    |
|                |  | 30               | 49               | 48  | 48  | 46  | 45  | 44  | 42  | 41  | 40  | 39  | 39  | 38  |    |
|                |  | 40               | 45               | 44  | 44  | 43  | 42  | 41  | 40  | 39  | 38  | 37  | 37  | 36  |    |
|                |  | 50               | 41               | 41  | 41  | 40  | 39  | 38  | 37  | 37  | 36  | 35  | 35  | 34  |    |
|                |  | 60               | 38               | 38  | 38  | 38  | 37  | 36  | 36  | 35  | 34  | 34  | 34  | 33  | 33 |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 34  | 33  | 33  | 32  | 32  | 32  | 31 |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 32  | 32  | 31  | 31  | 31  | 30 |
|                |  | 90               | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 31  | 31  | 30  | 30  | 30  | 29 |
| Zone 2         |  | 0                | 68               | 63  | 61  | 59  | 54  | 50  | 48  | 44  | 41  | 40  | 39  | 37  |    |
|                |  | 10               | 62               | 60  | 58  | 57  | 54  | 50  | 48  | 44  | 41  | 40  | 39  | 37  |    |
|                |  | 20               | 55               | 53  | 52  | 51  | 49  | 48  | 46  | 44  | 41  | 40  | 39  | 37  |    |
|                |  | 30               | 49               | 48  | 48  | 46  | 45  | 44  | 42  | 41  | 40  | 39  | 39  | 37  |    |
|                |  | 40               | 45               | 44  | 44  | 43  | 42  | 41  | 40  | 39  | 38  | 37  | 37  | 36  |    |
|                |  | 50               | 41               | 41  | 41  | 40  | 39  | 38  | 37  | 37  | 36  | 35  | 35  | 34  |    |
|                |  | 60               | 38               | 38  | 38  | 38  | 37  | 36  | 36  | 35  | 34  | 34  | 34  | 33  | 33 |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 34  | 33  | 33  | 32  | 32  | 32  | 31 |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 32  | 32  | 31  | 31  | 31  | 30 |
|                |  | 90               | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 31  | 31  | 30  | 30  | 30  | 29 |
| Zone 3         |  | 0                | 68               | 63  | 61  | 59  | 54  | 50  | 48  | 44  | 41  | 40  | 39  | 37  |    |
|                |  | 10               | 62               | 60  | 58  | 57  | 54  | 50  | 48  | 44  | 41  | 40  | 39  | 37  |    |
|                |  | 20               | 55               | 53  | 52  | 51  | 49  | 48  | 46  | 44  | 41  | 40  | 39  | 37  |    |
|                |  | 30               | 49               | 48  | 48  | 46  | 45  | 44  | 42  | 41  | 40  | 39  | 39  | 37  |    |
|                |  | 40               | 45               | 44  | 44  | 43  | 42  | 41  | 40  | 39  | 38  | 37  | 37  | 36  |    |
|                |  | 50               | 41               | 41  | 41  | 40  | 39  | 38  | 37  | 37  | 36  | 35  | 35  | 34  |    |
|                |  | 60               | 38               | 38  | 38  | 38  | 37  | 36  | 36  | 35  | 34  | 34  | 34  | 33  | 33 |
|                |  | 70               | 35               | 35  | 35  | 35  | 35  | 35  | 34  | 33  | 33  | 32  | 32  | 32  | 31 |
|                |  | 80               | 33               | 33  | 33  | 33  | 33  | 33  | 33  | 32  | 32  | 31  | 31  | 31  | 30 |
|                |  | 90               | 32               | 32  | 32  | 32  | 32  | 32  | 32  | 31  | 31  | 30  | 30  | 30  | 29 |

Notes:

1. Tables are based on critical rail span for load combinations as specified in chapter 2 of the ASCE 7-10 and allowable design loads per the 2015 Aluminum Design Manual.
2. Panels are assumed to be in portrait orientation with a maximum length of 80"

| ITEM NO. | DESCRIPTION            | QTY. |
|----------|------------------------|------|
| 1        | QRAIL, LIGHT, AL, MILL | 1    |



- NOTES:  
 1. AVAILABLE IN 14' AND 17' - 4" LENGTHS  
 2. AVAILABLE IN MILL FINISH AND BLACK FINISH

**Quick Mount PV<sup>®</sup>**

TITLE:

**QMR-RL: QRAIL LIGHT**

|   |          |                  |              |
|---|----------|------------------|--------------|
| UNLESS OTHERWISE SPECIFIED:<br>DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL $\pm 1/8$<br>TWO PLACE DECIMAL $\pm .19$<br>THREE PLACE DECIMAL $\pm .094$ | SIZE     | DRAWN BY: DFM    | REV          |
|   | <b>A</b> | DATE: 12/22/2017 | <b>1</b>     |
| SCALE: 1:1  |          | WEIGHT: 0.50     | SHEET 1 OF 1 |

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DO NOT SCALE DRAWING