

March 4, 2016

Everest Solar Systems, LLC  
3809 Ocean Ranch Blvd, Suite 111  
Oceanside, CA 92056  
Attn: Andy Neshat



**RE: *CrossRail PV Panel Mounting System Evaluation***

To whom it may concern:

Per your request, Moment Engineering + Design has performed a comprehensive structural analysis of the Everest Solar CrossRail Solar PV Mounting System for typical installations in the State of Ohio. When installed per the conditions and design criteria described herein, the CrossRail Solar PV Mounting System is compliant with the sections of the design reference documents noted below.

#### **Design Reference Documents**

- *2009 International Building Code, as amended*
- *2013 Residential Code of Ohio*
- *ASCE/SEI 7-10 – Minimum Design Loads for Buildings and Other Structures*
- *2010 Aluminum Design Manual, by the Aluminum Association*
- Section and materials data provided by Everest Solar Systems
  - Rail section properties appear in the appendix to this report

#### **Overview**

The CrossRail PV-panel roof mounting system consists of extruded aluminum support rails spanning between points of attachment on an existing roof structure. This analysis is limited to capacity of the CrossRail only. Attachment of the CrossRail Mounting System to the existing roof structure shall be the responsibility of the installer, and should be analyzed by a registered design professional where required by the local authority having jurisdiction.

#### **Methods & Design Parameters**

Applicable combinations of dead, wind, snow, and seismic loads were evaluated in accordance with current code requirements to determine allowable rail span lengths, based on assumptions of single-span conditions and allowable deflection of  $L/60$ .

Design wind pressures were determined using Components and Cladding calculations in Chapter 26-30 of ASCE 7-10, using the loading parameters listed below. Configurations not conforming to these parameters will require additional analysis. Calculation of applicable roof snow load should be based upon ground snow load maps and equations and factors of ASCE 7-10, Chapter 7 and applicable sections of the 2012 IBC. For designated Case Study areas noted in the 2009 International Building Code, as amended, refer to local jurisdiction requirements for snow and

wind load determination. Seismic criteria were considered per provisions of ASCE 7-10 Chapter 13 with parameters specified below. While seismic effects did not appear to govern the capacity of this system, applicable seismic detailing requirements should be satisfied when installed per the manufacturer instructions and additional installation notes specified herein.

#### **Loading Parameters:**

- Ground snow load: Varies
- Ultimate 3-second gust wind speed ( $V$ ): 110-200 mph
- Building roof mean height: 30 ft. or less
- Roof wind pressure region: Zone 1 - Zone 3
- Structural risk category: II
- Wind exposure: B, C, D
- Seismic site class: D
- Seismic design category: A through E
- 0.2s  $MCE_R$  ground motion parameter ( $S_S$ ): Not to exceed 2.000
- 1s  $MCE_R$  ground motion parameter ( $S_1$ ): Not to exceed 1.250
- Component importance factor ( $I_p$ ): 1.0
- Component acceleration factor, ( $a_p$ ): 1.0
- Component response modification factor ( $R_p$ ): 1.5
- Panel orientation: Portrait or Landscape
- Panel installation angle: Flush with roof slope
- Roof slope ( $\theta$ ): 0-7°, >7-27°, >27-45°

#### **Design Results**

The allowable span lengths of the system are principally controlled by applicable wind and snow loads to the structure. Refer to the CrossRail span tables in the appendix to this document for recommended rail configurations based on combinations of these loading parameters. Note that reaction loads provided in the attached tables are only applicable when used with the corresponding span length recommendations provided therein. These reactions may be scaled linearly when shorter spans are used.

#### **Installation Notes**

The following guidelines apply to all installations using the CrossRail product line:

- Tables assume two independent support rails per row with either panel orientation.
- Maximum end cantilever of aluminum support rail shall not exceed one-third (1/3) of allowable span in the roof wind pressure zone of the cantilever.
- Rails shall be continuous (not spliced) over a minimum of two supports.
- Installation over roof overhangs or within 10" of any roof edge is not advised.
- Observe all local jurisdictional requirements regarding roof setback requirements.
- Ensure that actual span length does not exceed capacity of roof attachment.

**Summary**

This assessment has provided design validation for code-compliant installations of the CrossRail PV Mounting System in the State of Ohio. For the configurations and design loadings noted previously, the attached span tables represent maximum span lengths based on allowable stresses and deflection criteria. For all other configurations, refer to Everest Solar Systems for engineering support.

This report does not provide analysis of roof attachment hardware, nor of any existing structures, as may be required by the local authority having jurisdiction.

We appreciate the opportunity to have assisted you with this project. Should you have any further questions regarding this analysis, please feel free to contact us by phone or email.

Best Regards,



Shawn P. Kelley, P.E.

**Principal**

moment ENGINEERING + DESIGN

spkelley@msegllc.com

| Table 1.1: Maximum Span Length (in.) - Wind Exposure B Condition |                              |           |                           |     |     |    |    |    |                           |     |     |    |    |    |                           |     |     |    |    |    |
|--|------------------------------|-----------|---------------------------|-----|-----|----|----|----|---------------------------|-----|-----|----|----|----|---------------------------|-----|-----|----|----|----|
| Exposure<br><b>B</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |    |    |    | Roof Wind Pressure Zone 2 |     |     |    |    |    | Roof Wind Pressure Zone 3 |     |     |    |    |    |
|  |                              |           | Roof Snow Load (psf)      |     |     |    |    |    | Roof Snow Load (psf)      |     |     |    |    |    | Roof Snow Load (psf)      |     |     |    |    |    |
|  |                              |           | 0                         | 10  | 20  | 30 | 40 | 50 | 0                         | 10  | 20  | 30 | 40 | 50 | 0                         | 10  | 20  | 30 | 40 | 50 |
| <b>ROOFS 0° TO 7°</b>  | <b>110</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 128                       | 118 | 108 | 99 | 87 | 78 | 111                       | 111 | 108 | 99 | 87 | 78 |
|  |                              | X48       | 96                        | 88  | 81  | 72 | 63 | 56 | 89                        | 88  | 81  | 72 | 63 | 56 | 76                        | 76  | 76  | 72 | 63 | 56 |
|  |                              | 48-S      | 93                        | 85  | 73  | 63 | 55 | 50 | 84                        | 84  | 73  | 63 | 55 | 50 | 68                        | 68  | 68  | 63 | 55 | 50 |
|  | <b>115</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 126                       | 118 | 108 | 99 | 87 | 78 | 106                       | 106 | 106 | 99 | 87 | 78 |
|  |                              | X48       | 96                        | 88  | 81  | 72 | 63 | 56 | 86                        | 86  | 81  | 72 | 63 | 56 | 73                        | 73  | 73  | 72 | 63 | 56 |
|  |                              | 48-S      | 93                        | 85  | 73  | 63 | 55 | 50 | 81                        | 81  | 73  | 63 | 55 | 50 | 65                        | 65  | 65  | 63 | 55 | 50 |
|  | <b>120</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 122                       | 118 | 108 | 99 | 87 | 78 | 102                       | 102 | 102 | 99 | 87 | 78 |
|  |                              | X48       | 96                        | 88  | 81  | 72 | 63 | 56 | 83                        | 83  | 81  | 72 | 63 | 56 | 69                        | 69  | 69  | 69 | 63 | 56 |
|  |                              | 48-S      | 93                        | 85  | 73  | 63 | 55 | 50 | 77                        | 77  | 73  | 63 | 55 | 50 | 62                        | 62  | 62  | 62 | 55 | 50 |
|  | <b>130</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 116                       | 116 | 108 | 99 | 87 | 78 | 93                        | 93  | 93  | 93 | 87 | 78 |
|  |                              | X48       | 95                        | 88  | 81  | 72 | 63 | 56 | 79                        | 79  | 79  | 72 | 63 | 56 | 64                        | 64  | 64  | 64 | 63 | 56 |
|  |                              | 48-S      | 90                        | 85  | 73  | 63 | 55 | 50 | 71                        | 71  | 71  | 63 | 55 | 50 | 57                        | 57  | 57  | 57 | 55 | 50 |
|  | <b>140</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 107                       | 107 | 107 | 99 | 87 | 78 | 87                        | 87  | 87  | 87 | 87 | 78 |
|  |                              | X48       | 90                        | 88  | 81  | 72 | 63 | 56 | 73                        | 73  | 73  | 72 | 63 | 56 | 59                        | 59  | 59  | 59 | 59 | 56 |
|  |                              | 48-S      | 85                        | 85  | 73  | 63 | 55 | 50 | 65                        | 65  | 65  | 63 | 55 | 50 | 53                        | 53  | 53  | 53 | 53 | 50 |
|  | <b>150</b>                   | X80       | 125                       | 117 | 107 | 99 | 87 | 78 | 100                       | 100 | 100 | 99 | 87 | 78 | 81                        | 81  | 81  | 81 | 81 | 78 |
|  |                              | X48       | 85                        | 85  | 80  | 72 | 63 | 56 | 68                        | 68  | 68  | 68 | 63 | 56 | 55                        | 55  | 55  | 55 | 55 | 55 |
|  |                              | 48-S      | 80                        | 80  | 73  | 63 | 55 | 50 | 61                        | 61  | 61  | 61 | 55 | 50 | 49                        | 49  | 49  | 49 | 49 | 49 |
|  | <b>160</b>                   | X80       | 120                       | 116 | 106 | 99 | 87 | 78 | 93                        | 93  | 93  | 93 | 87 | 78 | 76                        | 76  | 76  | 76 | 76 | 76 |
|  |                              | X48       | 81                        | 81  | 80  | 71 | 63 | 56 | 64                        | 64  | 64  | 64 | 63 | 56 | 52                        | 52  | 52  | 52 | 52 | 52 |
|  |                              | 48-S      | 75                        | 75  | 72  | 63 | 55 | 50 | 57                        | 57  | 57  | 57 | 55 | 50 | 46                        | 46  | 46  | 46 | 46 | 46 |
|  | <b>170</b>                   | X80       | 114                       | 114 | 105 | 99 | 87 | 78 | 88                        | 88  | 88  | 88 | 87 | 78 | 71                        | 71  | 71  | 71 | 71 | 71 |
|  |                              | X48       | 78                        | 78  | 78  | 70 | 63 | 56 | 60                        | 60  | 60  | 60 | 60 | 56 | 48                        | 48  | 48  | 48 | 48 | 48 |
|  |                              | 48-S      | 70                        | 70  | 70  | 62 | 55 | 50 | 54                        | 54  | 54  | 54 | 54 | 50 | 43                        | 43  | 43  | 43 | 43 | 43 |
| <b>180</b>   | X80                          | 108       | 108                       | 104 | 97  | 87 | 78 | 83 | 83                        | 83  | 83  | 83 | 78 | 67 | 67                        | 67  | 67  | 67 | 67 |    |
|  | X48                          | 74        | 74                        | 74  | 69  | 63 | 56 | 56 | 56                        | 56  | 56  | 56 | 56 | 46 | 46                        | 46  | 46  | 46 | 46 |    |
|  | 48-S                         | 66        | 66                        | 66  | 61  | 55 | 50 | 50 | 50                        | 50  | 50  | 50 | 50 | 41 | 41                        | 41  | 41  | 41 | 41 |    |
| <b>200</b>   | X80                          | 97        | 97                        | 97  | 94  | 86 | 78 | 74 | 74                        | 74  | 74  | 74 | 74 | 60 | 60                        | 60  | 60  | 60 | 60 |    |
|  | X48                          | 66        | 66                        | 66  | 66  | 61 | 56 | 51 | 51                        | 51  | 51  | 51 | 51 | 41 | 41                        | 41  | 41  | 41 | 41 |    |
|  | 48-S                         | 59        | 59                        | 59  | 59  | 54 | 50 | 45 | 45                        | 45  | 45  | 45 | 45 | 37 | 37                        | 37  | 37  | 37 | 37 |    |

| Table 1.2: Maximum Uplift (lb.) - Wind Exposure B Condition |                              |           |                           |      |      |      |      |      |                           |       |       |       |       |       |                           |       |       |       |       |       |
|---|------------------------------|-----------|---------------------------|------|------|------|------|------|---------------------------|-------|-------|-------|-------|-------|---------------------------|-------|-------|-------|-------|-------|
| Exposure<br><b>B</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |      |      |      |      |      | Roof Wind Pressure Zone 2 |       |       |       |       |       | Roof Wind Pressure Zone 3 |       |       |       |       |       |
|   |                              |           | Roof Snow Load (psf)      |      |      |      |      |      | Roof Snow Load (psf)      |       |       |       |       |       | Roof Snow Load (psf)      |       |       |       |       |       |
|   |                              |           | 0                         | 10   | 20   | 30   | 40   | 50   | 0                         | 10    | 20    | 30    | 40    | 50    | 0                         | 10    | 20    | 30    | 40    | 50    |
| <b>ROOFS 0° TO 7°</b>                                       | <b>110</b>                   | X80       | -335                      | -308 | -282 | -259 | -227 | -204 | -595                      | -546  | -500  | -460  | -403  | -362  | -799                      | -799  | -774  | -712  | -624  | -561  |
|   |                              | X48       | -251                      | -231 | -211 | -187 | -164 | -148 | -411                      | -409  | -374  | -332  | -291  | -262  | -546                      | -546  | -546  | -515  | -450  | -406  |
|   |                              | 48-S      | -242                      | -223 | -192 | -165 | -145 | -130 | -392                      | -392  | -341  | -293  | -257  | -231  | -489                      | -489  | -489  | -454  | -397  | -358  |
|   | <b>115</b>                   | X80       | -371                      | -340 | -311 | -287 | -251 | -226 | -644                      | -601  | -550  | -506  | -443  | -399  | -837                      | -837  | -837  | -782  | -685  | -616  |
|   |                              | X48       | -278                      | -255 | -233 | -207 | -181 | -163 | -438                      | -438  | -412  | -366  | -320  | -288  | -573                      | -573  | -573  | -565  | -494  | -445  |
|   |                              | 48-S      | -268                      | -246 | -212 | -183 | -160 | -144 | -412                      | -412  | -375  | -323  | -282  | -254  | -513                      | -513  | -513  | -498  | -436  | -393  |
|   | <b>120</b>                   | X80       | -408                      | -374 | -343 | -315 | -276 | -248 | -685                      | -660  | -604  | -555  | -486  | -438  | -876                      | -876  | -876  | -854  | -748  | -673  |
|   |                              | X48       | -305                      | -280 | -257 | -228 | -199 | -179 | -466                      | -466  | -452  | -401  | -351  | -316  | -599                      | -599  | -599  | -599  | -540  | -486  |
|   |                              | 48-S      | -295                      | -271 | -234 | -201 | -176 | -158 | -432                      | -432  | -412  | -354  | -310  | -279  | -536                      | -536  | -536  | -536  | -476  | -429  |
|   | <b>130</b>                   | X80       | -487                      | -447 | -409 | -377 | -330 | -297 | -767                      | -767  | -715  | -658  | -576  | -518  | -953                      | -953  | -953  | -953  | -884  | -796  |
|   |                              | X48       | -360                      | -335 | -307 | -272 | -238 | -214 | -522                      | -522  | -522  | -475  | -416  | -374  | -651                      | -651  | -651  | -651  | -639  | -575  |
|   |                              | 48-S      | -343                      | -323 | -279 | -240 | -210 | -189 | -470                      | -470  | -470  | -419  | -367  | -330  | -583                      | -583  | -583  | -583  | -563  | -507  |
|   | <b>140</b>                   | X80       | -574                      | -527 | -482 | -443 | -388 | -350 | -831                      | -831  | -831  | -770  | -674  | -607  | -1029                     | -1029 | -1029 | -1029 | -1029 | -927  |
|   |                              | X48       | -401                      | -395 | -361 | -320 | -280 | -253 | -568                      | -568  | -568  | -556  | -487  | -438  | -703                      | -703  | -703  | -703  | -703  | -670  |
|   |                              | 48-S      | -383                      | -381 | -329 | -283 | -247 | -223 | -509                      | -509  | -509  | -490  | -429  | -387  | -630                      | -630  | -630  | -630  | -630  | -591  |
|   | <b>150</b>                   | X80       | -651                      | -609 | -558 | -514 | -450 | -406 | -893                      | -893  | -893  | -888  | -778  | -700  | -1105                     | -1105 | -1105 | -1105 | -1105 | -1069 |
|   |                              | X48       | -443                      | -443 | -418 | -372 | -325 | -293 | -610                      | -610  | -610  | -610  | -562  | -506  | -755                      | -755  | -755  | -755  | -755  | -755  |
|   |                              | 48-S      | -415                      | -415 | -380 | -328 | -287 | -258 | -547                      | -547  | -547  | -547  | -496  | -446  | -676                      | -676  | -676  | -676  | -676  | -676  |
|   | <b>160</b>                   | X80       | -714                      | -690 | -635 | -591 | -517 | -466 | -956                      | -956  | -956  | -956  | -890  | -801  | -1182                     | -1182 | -1182 | -1182 | -1182 | -1182 |
|   |                              | X48       | -486                      | -486 | -475 | -425 | -374 | -336 | -653                      | -653  | -653  | -653  | -643  | -579  | -807                      | -807  | -807  | -807  | -807  | -807  |
|   |                              | 48-S      | -445                      | -445 | -428 | -376 | -330 | -297 | -585                      | -585  | -585  | -585  | -567  | -511  | -723                      | -723  | -723  | -723  | -723  | -723  |
|   | <b>170</b>                   | X80       | -775                      | -773 | -714 | -668 | -588 | -529 | -1018                     | -1018 | -1018 | -1018 | -1008 | -908  | -1258                     | -1258 | -1258 | -1258 | -1258 | -1258 |
|   |                              | X48       | -529                      | -529 | -529 | -476 | -425 | -382 | -695                      | -695  | -695  | -695  | -695  | -656  | -858                      | -858  | -858  | -858  | -858  | -858  |
|   |                              | 48-S      | -475                      | -475 | -475 | -421 | -374 | -337 | -623                      | -623  | -623  | -623  | -623  | -623  | -578                      | -769  | -769  | -769  | -769  | -769  |
|   | <b>180</b>                   | X80       | -824                      | -824 | -797 | -743 | -663 | -597 | -1080                     | -1080 | -1080 | -1080 | -1080 | -1022 | -1334                     | -1334 | -1334 | -1334 | -1334 | -1334 |
|   |                              | X48       | -563                      | -563 | -563 | -528 | -479 | -431 | -738                      | -738  | -738  | -738  | -738  | -738  | -910                      | -910  | -910  | -910  | -910  | -910  |
|   |                              | 48-S      | -505                      | -505 | -505 | -468 | -422 | -380 | -661                      | -661  | -661  | -661  | -661  | -661  | -651                      | -815  | -815  | -815  | -815  | -815  |
|   | <b>200</b>                   | X80       | -921                      | -921 | -921 | -899 | -819 | -744 | -1204                     | -1204 | -1204 | -1204 | -1204 | -1204 | -1485                     | -1485 | -1485 | -1485 | -1485 | -1485 |
|   |                              | X48       | -629                      | -629 | -629 | -629 | -582 | -538 | -822                      | -822  | -822  | -822  | -822  | -822  | -1013                     | -1013 | -1013 | -1013 | -1013 | -1013 |
|   |                              | 48-S      | -564                      | -564 | -564 | -564 | -516 | -474 | -737                      | -737  | -737  | -737  | -737  | -737  | -908                      | -908  | -908  | -908  | -908  | -908  |

**Table 1.3: Maximum Downforce (lb.) - Wind Exposure B Condition**

| Exposure<br><b>B</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|-----------------------|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
|                       |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|                       |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS 0° TO 7°</b> | <b>110</b>                   | X80       | 365                       | 472 | 616 | 742 | 848 | 942 | 365                       | 472 | 616 | 742 | 848 | 942 | 316                       | 445 | 616 | 742 | 848 | 942 |
|                       |                              | X48       | 273                       | 353 | 461 | 536 | 612 | 680 | 252                       | 353 | 461 | 536 | 612 | 680 | 216                       | 305 | 435 | 536 | 612 | 680 |
|                       |                              | 48-S      | 264                       | 341 | 420 | 473 | 540 | 600 | 240                       | 339 | 420 | 473 | 540 | 600 | 194                       | 273 | 389 | 473 | 540 | 600 |
|                       | <b>115</b>                   | X80       | 365                       | 472 | 616 | 742 | 848 | 942 | 359                       | 472 | 616 | 742 | 848 | 942 | 302                       | 425 | 607 | 742 | 848 | 942 |
|                       |                              | X48       | 273                       | 353 | 461 | 536 | 612 | 680 | 244                       | 344 | 461 | 536 | 612 | 680 | 207                       | 291 | 415 | 536 | 612 | 680 |
|                       |                              | 48-S      | 264                       | 341 | 420 | 473 | 540 | 600 | 230                       | 323 | 420 | 473 | 540 | 600 | 185                       | 260 | 372 | 473 | 540 | 600 |
|                       | <b>120</b>                   | X80       | 365                       | 472 | 616 | 742 | 848 | 942 | 348                       | 472 | 616 | 742 | 848 | 942 | 289                       | 407 | 581 | 742 | 848 | 942 |
|                       |                              | X48       | 273                       | 353 | 461 | 536 | 612 | 680 | 237                       | 333 | 461 | 536 | 612 | 680 | 198                       | 278 | 397 | 520 | 612 | 680 |
|                       |                              | 48-S      | 264                       | 341 | 420 | 473 | 540 | 600 | 219                       | 309 | 420 | 473 | 540 | 600 | 177                       | 249 | 356 | 466 | 540 | 600 |
|                       | <b>130</b>                   | X80       | 365                       | 472 | 616 | 742 | 848 | 942 | 329                       | 463 | 616 | 742 | 848 | 942 | 266                       | 375 | 535 | 700 | 848 | 942 |
|                       |                              | X48       | 270                       | 353 | 461 | 536 | 612 | 680 | 224                       | 315 | 450 | 536 | 612 | 680 | 182                       | 256 | 365 | 479 | 612 | 680 |
|                       |                              | 48-S      | 257                       | 341 | 420 | 473 | 540 | 600 | 202                       | 284 | 405 | 473 | 540 | 600 | 163                       | 229 | 327 | 429 | 540 | 600 |
|                       | <b>140</b>                   | X80       | 365                       | 472 | 616 | 742 | 848 | 942 | 304                       | 429 | 612 | 742 | 848 | 942 | 247                       | 347 | 496 | 649 | 847 | 942 |
|                       |                              | X48       | 255                       | 353 | 461 | 536 | 612 | 680 | 208                       | 293 | 418 | 536 | 612 | 680 | 169                       | 237 | 339 | 443 | 579 | 680 |
|                       |                              | 48-S      | 243                       | 341 | 420 | 473 | 540 | 600 | 186                       | 262 | 375 | 473 | 540 | 600 | 151                       | 213 | 303 | 397 | 518 | 600 |
|                       | <b>150</b>                   | X80       | 366                       | 476 | 620 | 742 | 848 | 942 | 290                       | 404 | 575 | 742 | 848 | 942 | 235                       | 328 | 466 | 605 | 789 | 942 |
|                       |                              | X48       | 249                       | 346 | 464 | 536 | 612 | 680 | 198                       | 276 | 393 | 510 | 612 | 680 | 161                       | 224 | 318 | 413 | 539 | 665 |
|                       |                              | 48-S      | 233                       | 325 | 422 | 473 | 540 | 600 | 178                       | 248 | 352 | 457 | 540 | 600 | 144                       | 201 | 285 | 370 | 483 | 596 |
|                       | <b>160</b>                   | X80       | 386                       | 496 | 638 | 764 | 848 | 942 | 300                       | 399 | 559 | 718 | 848 | 942 | 243                       | 324 | 453 | 583 | 739 | 911 |
|                       |                              | X48       | 262                       | 349 | 478 | 550 | 612 | 680 | 205                       | 273 | 382 | 491 | 612 | 680 | 166                       | 221 | 310 | 398 | 504 | 622 |
|                       |                              | 48-S      | 240                       | 320 | 431 | 487 | 540 | 600 | 184                       | 244 | 342 | 440 | 540 | 600 | 149                       | 198 | 277 | 357 | 452 | 557 |
|                       | <b>170</b>                   | X80       | 406                       | 517 | 658 | 785 | 848 | 942 | 311                       | 397 | 547 | 697 | 848 | 942 | 252                       | 322 | 444 | 566 | 695 | 857 |
|                       |                              | X48       | 277                       | 354 | 488 | 559 | 612 | 680 | 212                       | 271 | 374 | 476 | 585 | 680 | 172                       | 220 | 303 | 386 | 474 | 585 |
|                       |                              | 48-S      | 249                       | 318 | 438 | 495 | 540 | 600 | 190                       | 243 | 335 | 427 | 524 | 600 | 154                       | 197 | 271 | 346 | 425 | 524 |
|                       | <b>180</b>                   | X80       | 421                       | 518 | 679 | 800 | 862 | 942 | 323                       | 397 | 538 | 679 | 821 | 942 | 262                       | 322 | 437 | 552 | 667 | 809 |
|                       |                              | X48       | 288                       | 354 | 480 | 569 | 623 | 680 | 220                       | 271 | 367 | 464 | 561 | 680 | 179                       | 220 | 298 | 376 | 455 | 552 |
|                       |                              | 48-S      | 258                       | 317 | 430 | 504 | 549 | 600 | 197                       | 243 | 329 | 416 | 502 | 600 | 160                       | 197 | 267 | 337 | 408 | 494 |
|                       | <b>200</b>                   | X80       | 452                       | 520 | 686 | 831 | 903 | 955 | 347                       | 399 | 526 | 653 | 780 | 907 | 282                       | 324 | 428 | 531 | 634 | 737 |
|                       |                              | X48       | 309                       | 355 | 468 | 582 | 643 | 690 | 237                       | 272 | 359 | 446 | 533 | 619 | 192                       | 221 | 292 | 362 | 432 | 503 |
|                       |                              | 48-S      | 277                       | 318 | 420 | 521 | 569 | 609 | 212                       | 244 | 322 | 400 | 477 | 555 | 172                       | 198 | 261 | 324 | 388 | 451 |

| Table 1.4: Maximum Shear (lb.) - Wind Exposure B Condition |                              |           |                           |    |    |    |    |    |                           |    |    |    |    |    |                           |    |    |    |    |    |
|--|------------------------------|-----------|---------------------------|----|----|----|----|----|---------------------------|----|----|----|----|----|---------------------------|----|----|----|----|----|
| Exposure<br><b>B</b>                                       | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |    |    |    |    |    | Roof Wind Pressure Zone 2 |    |    |    |    |    | Roof Wind Pressure Zone 3 |    |    |    |    |    |
|  |                              |           | Roof Snow Load (psf)      |    |    |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    |
|  |                              |           | 0                         | 10 | 20 | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 |
| <b>ROOFS 0° TO 7°</b>                                      | <b>110</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 9                         | 36 | 59 | 78 | 89 | 99 | 8                         | 34 | 59 | 78 | 89 | 99 |
|  |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 6                         | 27 | 44 | 56 | 64 | 71 | 5                         | 23 | 42 | 56 | 64 | 71 |
|  |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 6                         | 26 | 40 | 50 | 57 | 63 | 5                         | 21 | 37 | 50 | 57 | 63 |
|  | <b>115</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 9                         | 36 | 59 | 78 | 89 | 99 | 7                         | 33 | 58 | 78 | 89 | 99 |
|  |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 6                         | 26 | 44 | 56 | 64 | 71 | 5                         | 22 | 40 | 56 | 64 | 71 |
|  |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 5                         | 25 | 40 | 50 | 57 | 63 | 4                         | 20 | 36 | 50 | 57 | 63 |
|  | <b>120</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 8                         | 36 | 59 | 78 | 89 | 99 | 7                         | 31 | 56 | 78 | 89 | 99 |
|  |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 6                         | 26 | 44 | 56 | 64 | 71 | 5                         | 21 | 38 | 55 | 64 | 71 |
|  |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 5                         | 24 | 40 | 50 | 57 | 63 | 4                         | 19 | 34 | 49 | 57 | 63 |
|  | <b>130</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 8                         | 36 | 59 | 78 | 89 | 99 | 6                         | 29 | 51 | 74 | 89 | 99 |
|  |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 5                         | 24 | 43 | 56 | 64 | 71 | 4                         | 20 | 35 | 50 | 64 | 71 |
|  |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 5                         | 22 | 39 | 50 | 57 | 63 | 4                         | 18 | 31 | 45 | 57 | 63 |
|  | <b>140</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 7                         | 33 | 59 | 78 | 89 | 99 | 6                         | 27 | 47 | 68 | 89 | 99 |
|  |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 5                         | 22 | 40 | 56 | 64 | 71 | 4                         | 18 | 32 | 47 | 61 | 71 |
|  |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 4                         | 20 | 36 | 50 | 57 | 63 | 4                         | 16 | 29 | 42 | 54 | 63 |
|  | <b>150</b>                   | X80       | 8                         | 36 | 59 | 78 | 89 | 99 | 7                         | 31 | 55 | 78 | 89 | 99 | 5                         | 25 | 44 | 64 | 83 | 99 |
|  |                              | X48       | 6                         | 26 | 44 | 56 | 64 | 71 | 5                         | 21 | 37 | 54 | 64 | 71 | 4                         | 17 | 30 | 43 | 57 | 70 |
|  |                              | 48-S      | 5                         | 25 | 40 | 50 | 57 | 63 | 4                         | 19 | 33 | 48 | 57 | 63 | 3                         | 15 | 27 | 39 | 51 | 63 |
|  | <b>160</b>                   | X80       | 8                         | 36 | 58 | 78 | 89 | 99 | 6                         | 29 | 51 | 73 | 89 | 99 | 5                         | 23 | 41 | 60 | 78 | 96 |
|  |                              | X48       | 6                         | 25 | 44 | 56 | 64 | 71 | 4                         | 20 | 35 | 50 | 64 | 71 | 3                         | 16 | 28 | 41 | 53 | 65 |
|  |                              | 48-S      | 5                         | 23 | 39 | 50 | 57 | 63 | 4                         | 18 | 31 | 45 | 57 | 63 | 3                         | 14 | 25 | 36 | 48 | 59 |
|  | <b>170</b>                   | X80       | 8                         | 35 | 58 | 78 | 89 | 99 | 6                         | 27 | 48 | 69 | 89 | 99 | 5                         | 22 | 39 | 56 | 73 | 90 |
|  |                              | X48       | 5                         | 24 | 43 | 55 | 64 | 71 | 4                         | 18 | 33 | 47 | 61 | 71 | 3                         | 15 | 27 | 38 | 50 | 61 |
|  |                              | 48-S      | 5                         | 22 | 38 | 49 | 57 | 63 | 4                         | 16 | 29 | 42 | 55 | 63 | 3                         | 13 | 24 | 34 | 45 | 55 |
| <b>180</b>   | X80                          | 7         | 33                        | 57 | 77 | 89 | 99 | 6  | 25                        | 45 | 65 | 85 | 99 | 5  | 21                        | 37 | 53 | 69 | 85 |    |
|  | X48                          | 5         | 23                        | 40 | 54 | 64 | 71 | 4  | 17                        | 31 | 44 | 58 | 71 | 3  | 14                        | 25 | 36 | 47 | 58 |    |
|  | 48-S                         | 4         | 20                        | 36 | 48 | 57 | 63 | 3  | 16                        | 28 | 40 | 52 | 63 | 3  | 13                        | 22 | 32 | 42 | 52 |    |
| <b>200</b>   | X80                          | 7         | 30                        | 53 | 74 | 88 | 99 | 5  | 23                        | 41 | 58 | 76 | 94 | 4  | 19                        | 33 | 47 | 62 | 76 |    |
|  | X48                          | 4         | 20                        | 36 | 52 | 63 | 71 | 3  | 16                        | 28 | 40 | 52 | 64 | 3  | 13                        | 23 | 32 | 42 | 52 |    |
|  | 48-S                         | 4         | 18                        | 32 | 47 | 56 | 63 | 3  | 14                        | 25 | 36 | 47 | 57 | 2  | 11                        | 20 | 29 | 38 | 47 |    |

| Table 1.5: Maximum Span Length (in.) - Wind Exposure C Condition |                              |           |                           |     |     |    |    |    |                           |     |     |    |    |    |                           |    |    |    |    |    |
|--|------------------------------|-----------|---------------------------|-----|-----|----|----|----|---------------------------|-----|-----|----|----|----|---------------------------|----|----|----|----|----|
| Exposure<br><b>C</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |    |    |    | Roof Wind Pressure Zone 2 |     |     |    |    |    | Roof Wind Pressure Zone 3 |    |    |    |    |    |
|  |                              |           | Roof Snow Load (psf)      |     |     |    |    |    | Roof Snow Load (psf)      |     |     |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    |
|  |                              |           | 0                         | 10  | 20  | 30 | 40 | 50 | 0                         | 10  | 20  | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 |
| <b>ROOFS 0° TO 7°</b>  | <b>110</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 115                       | 115 | 108 | 99 | 87 | 78 | 93                        | 93 | 93 | 93 | 87 | 78 |
|  |                              | X48       | 94                        | 88  | 81  | 72 | 63 | 56 | 79                        | 79  | 79  | 72 | 63 | 56 | 64                        | 64 | 64 | 64 | 63 | 56 |
|  |                              | 48-S      | 90                        | 85  | 73  | 63 | 55 | 50 | 71                        | 71  | 71  | 63 | 55 | 50 | 57                        | 57 | 57 | 57 | 55 | 50 |
|  | <b>115</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 110                       | 110 | 108 | 99 | 87 | 78 | 89                        | 89 | 89 | 89 | 87 | 78 |
|  |                              | X48       | 92                        | 88  | 81  | 72 | 63 | 56 | 75                        | 75  | 75  | 72 | 63 | 56 | 61                        | 61 | 61 | 61 | 61 | 56 |
|  |                              | 48-S      | 87                        | 85  | 73  | 63 | 55 | 50 | 67                        | 67  | 67  | 63 | 55 | 50 | 55                        | 55 | 55 | 55 | 55 | 50 |
|  | <b>120</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 105                       | 105 | 105 | 99 | 87 | 78 | 85                        | 85 | 85 | 85 | 85 | 78 |
|  |                              | X48       | 89                        | 88  | 81  | 72 | 63 | 56 | 72                        | 72  | 72  | 72 | 63 | 56 | 58                        | 58 | 58 | 58 | 58 | 56 |
|  |                              | 48-S      | 85                        | 85  | 73  | 63 | 55 | 50 | 65                        | 65  | 65  | 63 | 55 | 50 | 52                        | 52 | 52 | 52 | 52 | 50 |
|  | <b>130</b>                   | X80       | 123                       | 117 | 107 | 99 | 87 | 78 | 97                        | 97  | 97  | 97 | 87 | 78 | 79                        | 79 | 79 | 79 | 79 | 78 |
|  |                              | X48       | 84                        | 84  | 80  | 72 | 63 | 56 | 66                        | 66  | 66  | 66 | 63 | 56 | 54                        | 54 | 54 | 54 | 54 | 54 |
|  |                              | 48-S      | 78                        | 78  | 73  | 63 | 55 | 50 | 59                        | 59  | 59  | 59 | 55 | 50 | 48                        | 48 | 48 | 48 | 48 | 48 |
|  | <b>140</b>                   | X80       | 117                       | 115 | 106 | 99 | 87 | 78 | 90                        | 90  | 90  | 90 | 87 | 78 | 73                        | 73 | 73 | 73 | 73 | 73 |
|  |                              | X48       | 79                        | 79  | 79  | 71 | 63 | 56 | 61                        | 61  | 61  | 61 | 61 | 56 | 50                        | 50 | 50 | 50 | 50 | 50 |
|  |                              | 48-S      | 72                        | 72  | 71  | 63 | 55 | 50 | 55                        | 55  | 55  | 55 | 55 | 50 | 45                        | 45 | 45 | 45 | 45 | 45 |
|  | <b>150</b>                   | X80       | 109                       | 109 | 104 | 97 | 87 | 78 | 84                        | 84  | 84  | 84 | 84 | 78 | 68                        | 68 | 68 | 68 | 68 | 68 |
|  |                              | X48       | 75                        | 75  | 75  | 69 | 63 | 56 | 57                        | 57  | 57  | 57 | 57 | 56 | 46                        | 46 | 46 | 46 | 46 | 46 |
|  |                              | 48-S      | 67                        | 67  | 67  | 61 | 55 | 50 | 51                        | 51  | 51  | 51 | 51 | 50 | 42                        | 42 | 42 | 42 | 42 | 42 |
|  | <b>160</b>                   | X80       | 102                       | 102 | 102 | 96 | 87 | 78 | 78                        | 78  | 78  | 78 | 78 | 78 | 64                        | 64 | 64 | 64 | 64 | 64 |
|  |                              | X48       | 70                        | 70  | 70  | 68 | 62 | 56 | 54                        | 54  | 54  | 54 | 54 | 54 | 43                        | 43 | 43 | 43 | 43 | 43 |
|  |                              | 48-S      | 63                        | 63  | 63  | 60 | 55 | 50 | 48                        | 48  | 48  | 48 | 48 | 48 | 39                        | 39 | 39 | 39 | 39 | 39 |
|  | <b>170</b>                   | X80       | 96                        | 96  | 96  | 94 | 86 | 78 | 74                        | 74  | 74  | 74 | 74 | 74 | 60                        | 60 | 60 | 60 | 60 | 60 |
|  |                              | X48       | 66                        | 66  | 66  | 66 | 61 | 56 | 50                        | 50  | 50  | 50 | 50 | 50 | 41                        | 41 | 41 | 41 | 41 | 41 |
|  |                              | 48-S      | 59                        | 59  | 59  | 59 | 54 | 50 | 45                        | 45  | 45  | 45 | 45 | 45 | 37                        | 37 | 37 | 37 | 37 | 37 |
| <b>180</b>   | X80                          | 91        | 91                        | 91  | 91  | 84 | 78 | 70 | 70                        | 70  | 70  | 70 | 70 | 57 | 57                        | 57 | 57 | 57 | 57 |    |
|  | X48                          | 62        | 62                        | 62  | 62  | 60 | 56 | 47 | 47                        | 47  | 47  | 47 | 47 | 39 | 39                        | 39 | 39 | 39 | 39 |    |
|  | 48-S                         | 55        | 55                        | 55  | 55  | 53 | 49 | 43 | 43                        | 43  | 43  | 43 | 43 | 35 | 35                        | 35 | 35 | 35 | 35 |    |
| <b>200</b>   | X80                          | 81        | 81                        | 81  | 81  | 81 | 76 | 62 | 62                        | 62  | 62  | 62 | 62 | 51 | 51                        | 51 | 51 | 51 | 51 |    |
|  | X48                          | 55        | 55                        | 55  | 55  | 55 | 54 | 43 | 43                        | 43  | 43  | 43 | 43 | 35 | 35                        | 35 | 35 | 35 | 35 |    |
|  | 48-S                         | 50        | 50                        | 50  | 50  | 50 | 48 | 38 | 38                        | 38  | 38  | 38 | 38 | 31 | 31                        | 31 | 31 | 31 | 31 |    |



| Table 1.6: Maximum Uplift (lb.) - Wind Exposure C Condition |                              |           |                           |       |       |       |       |       |                           |       |       |       |       |       |                           |       |       |       |       |       |
|---|------------------------------|-----------|---------------------------|-------|-------|-------|-------|-------|---------------------------|-------|-------|-------|-------|-------|---------------------------|-------|-------|-------|-------|-------|
| Exposure<br><b>C</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |       |       |       |       |       | Roof Wind Pressure Zone 2 |       |       |       |       |       | Roof Wind Pressure Zone 3 |       |       |       |       |       |
|   |                              |           | Roof Snow Load (psf)      |       |       |       |       |       | Roof Snow Load (psf)      |       |       |       |       |       | Roof Snow Load (psf)      |       |       |       |       |       |
|   |                              |           | 0                         | 10    | 20    | 30    | 40    | 50    | 0                         | 10    | 20    | 30    | 40    | 50    | 0                         | 10    | 20    | 30    | 40    | 50    |
| <b>ROOFS 0° TO 7° -</b>                                     | <b>110</b>                   | X80       | -489                      | -449  | -411  | -378  | -331  | -298  | -768                      | -768  | -716  | -659  | -577  | -520  | -954                      | -954  | -954  | -954  | -886  | -798  |
|   |                              | X48       | -361                      | -337  | -308  | -273  | -239  | -215  | -523                      | -523  | -523  | -476  | -417  | -375  | -652                      | -652  | -652  | -652  | -640  | -576  |
|   |                              | 48-S      | -344                      | -325  | -280  | -241  | -211  | -190  | -471                      | -471  | -471  | -420  | -368  | -331  | -584                      | -584  | -584  | -584  | -565  | -509  |
|   | <b>115</b>                   | X80       | -539                      | -495  | -453  | -416  | -365  | -328  | -805                      | -805  | -787  | -724  | -634  | -571  | -999                      | -999  | -999  | -999  | -972  | -875  |
|   |                              | X48       | -385                      | -371  | -339  | -301  | -263  | -237  | -551                      | -551  | -551  | -523  | -458  | -412  | -683                      | -683  | -683  | -683  | -683  | -632  |
|   |                              | 48-S      | -367                      | -358  | -309  | -265  | -232  | -209  | -493                      | -493  | -493  | -461  | -404  | -364  | -611                      | -611  | -611  | -611  | -611  | -557  |
|   | <b>120</b>                   | X80       | -591                      | -542  | -496  | -457  | -400  | -360  | -843                      | -843  | -843  | -793  | -694  | -625  | -1044                     | -1044 | -1044 | -1044 | -1044 | -955  |
|   |                              | X48       | -409                      | -406  | -372  | -330  | -289  | -260  | -577                      | -577  | -577  | -573  | -501  | -451  | -713                      | -713  | -713  | -713  | -713  | -690  |
|   |                              | 48-S      | -390                      | -390  | -338  | -291  | -255  | -229  | -516                      | -516  | -516  | -505  | -442  | -398  | -639                      | -639  | -639  | -639  | -639  | -608  |
|   | <b>130</b>                   | X80       | -675                      | -639  | -586  | -543  | -475  | -428  | -917                      | -917  | -917  | -917  | -820  | -738  | -1135                     | -1135 | -1135 | -1135 | -1135 | -1126 |
|   |                              | X48       | -459                      | -459  | -439  | -392  | -343  | -309  | -627                      | -627  | -627  | -627  | -592  | -533  | -775                      | -775  | -775  | -775  | -775  | -775  |
|   |                              | 48-S      | -427                      | -427  | -398  | -346  | -303  | -272  | -561                      | -561  | -561  | -561  | -522  | -470  | -694                      | -694  | -694  | -694  | -694  | -694  |
|   | <b>140</b>                   | X80       | -750                      | -737  | -679  | -636  | -557  | -501  | -991                      | -991  | -991  | -991  | -957  | -861  | -1224                     | -1224 | -1224 | -1224 | -1224 | -1224 |
|   |                              | X48       | -510                      | -510  | -509  | -454  | -402  | -362  | -677                      | -677  | -677  | -677  | -677  | -622  | -836                      | -836  | -836  | -836  | -836  | -836  |
|   |                              | 48-S      | -462                      | -462  | -456  | -402  | -355  | -319  | -607                      | -607  | -607  | -607  | -607  | -549  | -749                      | -749  | -749  | -749  | -749  | -749  |
|   | <b>150</b>                   | X80       | -812                      | -812  | -776  | -724  | -644  | -580  | -1065                     | -1065 | -1065 | -1065 | -1065 | -992  | -1314                     | -1314 | -1314 | -1314 | -1314 | -1314 |
|   |                              | X48       | -555                      | -555  | -555  | -515  | -465  | -419  | -727                      | -727  | -727  | -727  | -727  | -717  | -897                      | -897  | -897  | -897  | -897  | -897  |
|   |                              | 48-S      | -497                      | -497  | -497  | -456  | -410  | -369  | -651                      | -651  | -651  | -651  | -651  | -632  | -804                      | -804  | -804  | -804  | -804  | -804  |
|   | <b>160</b>                   | X80       | -870                      | -870  | -870  | -816  | -738  | -664  | -1139                     | -1139 | -1139 | -1139 | -1139 | -1134 | -1404                     | -1404 | -1404 | -1404 | -1404 | -1404 |
|   |                              | X48       | -594                      | -594  | -594  | -579  | -527  | -480  | -777                      | -777  | -777  | -777  | -777  | -777  | -958                      | -958  | -958  | -958  | -958  | -958  |
|   |                              | 48-S      | -532                      | -532  | -532  | -513  | -467  | -423  | -696                      | -696  | -696  | -696  | -696  | -696  | -859                      | -859  | -859  | -859  | -859  | -859  |
|   | <b>170</b>                   | X80       | -926                      | -926  | -926  | -909  | -827  | -753  | -1212                     | -1212 | -1212 | -1212 | -1212 | -1212 | -1494                     | -1494 | -1494 | -1494 | -1494 | -1494 |
|   |                              | X48       | -633                      | -633  | -633  | -633  | -588  | -544  | -827                      | -827  | -827  | -827  | -827  | -827  | -1019                     | -1019 | -1019 | -1019 | -1019 | -1019 |
|   |                              | 48-S      | -567                      | -567  | -567  | -567  | -521  | -480  | -741                      | -741  | -741  | -741  | -741  | -741  | -913                      | -913  | -913  | -913  | -913  | -913  |
| <b>180</b>  | X80                          | -984      | -984                      | -984  | -984  | -917  | -848  | -1285 | -1285                     | -1285 | -1285 | -1285 | -1285 | -1583 | -1583                     | -1583 | -1583 | -1583 | -1583 |       |
|   | X48                          | -672      | -672                      | -672  | -672  | -652  | -605  | -877  | -877                      | -877  | -877  | -877  | -877  | -1080 | -1080                     | -1080 | -1080 | -1080 | -1080 |       |
|   | 48-S                         | -602      | -602                      | -602  | -602  | -578  | -536  | -786  | -786                      | -786  | -786  | -786  | -786  | -968  | -968                      | -968  | -968  | -968  | -968  |       |
| <b>200</b>  | X80                          | -1098     | -1098                     | -1098 | -1098 | -1098 | -1028 | -1431 | -1431                     | -1431 | -1431 | -1431 | -1431 | -1762 | -1762                     | -1762 | -1762 | -1762 | -1762 |       |
|   | X48                          | -749      | -749                      | -749  | -749  | -749  | -730  | -976  | -976                      | -976  | -976  | -976  | -976  | -1202 | -1202                     | -1202 | -1202 | -1202 | -1202 |       |
|   | 48-S                         | -671      | -671                      | -671  | -671  | -671  | -647  | -875  | -875                      | -875  | -875  | -875  | -875  | -1077 | -1077                     | -1077 | -1077 | -1077 | -1077 |       |

Table 1.7: Maximum Downforce (lb.) - Wind Exposure C Condition

| Exposure<br><b>C</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |      |     |     | Roof Wind Pressure Zone 2 |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|-----------------------|------------------------------|-----------|---------------------------|-----|-----|-----|------|-----|-----|---------------------------|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
|                       |                              |           | Roof Snow Load (psf)      |     |     |     |      |     |     | Roof Snow Load (psf)      |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|                       |                              |           | 0                         | 10  | 20  | 30  | 40   | 50  | 0   | 10                        | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS 0° TO 7°</b> | <b>110</b>                   | X80       | 365                       | 472 | 616 | 742 | 848  | 942 | 329 | 463                       | 616 | 742 | 848 | 942 | 266                       | 374 | 534 | 699 | 848 | 942 |
|                       |                              | X48       | 269                       | 353 | 461 | 536 | 612  | 680 | 224 | 315                       | 449 | 536 | 612 | 680 | 182                       | 256 | 365 | 478 | 612 | 680 |
|                       |                              | 48-S      | 257                       | 341 | 420 | 473 | 540  | 600 | 201 | 283                       | 405 | 473 | 540 | 600 | 163                       | 229 | 327 | 428 | 540 | 600 |
|                       | <b>115</b>                   | X80       | 365                       | 472 | 616 | 742 | 848  | 942 | 314 | 442                       | 616 | 742 | 848 | 942 | 254                       | 358 | 510 | 668 | 848 | 942 |
|                       |                              | X48       | 261                       | 353 | 461 | 536 | 612  | 680 | 215 | 302                       | 431 | 536 | 612 | 680 | 173                       | 244 | 349 | 456 | 596 | 680 |
|                       |                              | 48-S      | 249                       | 341 | 420 | 473 | 540  | 600 | 192 | 271                       | 386 | 473 | 540 | 600 | 155                       | 219 | 312 | 409 | 534 | 600 |
|                       | <b>120</b>                   | X80       | 365                       | 472 | 616 | 742 | 848  | 942 | 300 | 422                       | 603 | 742 | 848 | 942 | 243                       | 342 | 489 | 640 | 835 | 942 |
|                       |                              | X48       | 253                       | 353 | 461 | 536 | 612  | 680 | 205 | 289                       | 412 | 536 | 612 | 680 | 166                       | 234 | 334 | 437 | 570 | 680 |
|                       |                              | 48-S      | 241                       | 339 | 420 | 473 | 540  | 600 | 184 | 259                       | 369 | 473 | 540 | 600 | 149                       | 209 | 299 | 392 | 511 | 600 |
|                       | <b>130</b>                   | X80       | 374                       | 484 | 627 | 750 | 848  | 942 | 294 | 403                       | 569 | 735 | 848 | 942 | 239                       | 326 | 461 | 596 | 769 | 942 |
|                       |                              | X48       | 254                       | 348 | 470 | 542 | 612  | 680 | 201 | 275                       | 389 | 502 | 612 | 680 | 163                       | 223 | 315 | 407 | 525 | 648 |
|                       |                              | 48-S      | 236                       | 323 | 425 | 478 | 540  | 600 | 180 | 246                       | 348 | 450 | 540 | 600 | 146                       | 200 | 282 | 364 | 470 | 580 |
|                       | <b>140</b>                   | X80       | 397                       | 508 | 649 | 778 | 848  | 942 | 306 | 398                       | 552 | 705 | 848 | 942 | 248                       | 323 | 448 | 573 | 713 | 880 |
|                       |                              | X48       | 270                       | 352 | 486 | 555 | 612  | 680 | 209 | 272                       | 377 | 482 | 600 | 680 | 169                       | 220 | 306 | 391 | 487 | 601 |
|                       |                              | 48-S      | 245                       | 318 | 436 | 491 | 540  | 600 | 187 | 243                       | 338 | 432 | 538 | 600 | 152                       | 197 | 274 | 350 | 436 | 538 |
|                       | <b>150</b>                   | X80       | 418                       | 519 | 674 | 796 | 857  | 942 | 320 | 397                       | 541 | 684 | 828 | 942 | 260                       | 323 | 439 | 556 | 672 | 820 |
|                       |                              | X48       | 286                       | 355 | 483 | 566 | 619  | 680 | 219 | 271                       | 369 | 467 | 565 | 680 | 178                       | 220 | 300 | 379 | 459 | 560 |
|                       |                              | 48-S      | 256                       | 318 | 432 | 502 | 546  | 600 | 196 | 243                       | 331 | 419 | 506 | 600 | 159                       | 197 | 268 | 340 | 411 | 502 |
|                       | <b>160</b>                   | X80       | 434                       | 517 | 692 | 814 | 884  | 942 | 333 | 397                       | 531 | 665 | 800 | 942 | 271                       | 322 | 431 | 541 | 650 | 768 |
|                       |                              | X48       | 297                       | 354 | 473 | 578 | 632  | 680 | 227 | 271                       | 363 | 454 | 546 | 646 | 185                       | 220 | 294 | 369 | 443 | 524 |
|                       |                              | 48-S      | 266                       | 317 | 424 | 512 | 560  | 600 | 204 | 243                       | 325 | 407 | 489 | 578 | 166                       | 197 | 264 | 331 | 397 | 470 |
|                       | <b>170</b>                   | X80       | 453                       | 520 | 684 | 832 | 905  | 957 | 347 | 399                       | 525 | 651 | 778 | 904 | 282                       | 324 | 427 | 529 | 632 | 734 |
|                       |                              | X48       | 309                       | 355 | 467 | 580 | 644  | 691 | 237 | 272                       | 358 | 445 | 531 | 617 | 193                       | 221 | 291 | 361 | 431 | 501 |
|                       |                              | 48-S      | 277                       | 318 | 419 | 519 | 570  | 610 | 213 | 244                       | 321 | 398 | 476 | 553 | 173                       | 198 | 261 | 323 | 386 | 449 |
| <b>180</b>            | X80                          | 472       | 524                       | 679 | 834 | 923 | 986  | 363 | 402 | 521                       | 641 | 760 | 879 | 295 | 327                       | 424 | 521 | 617 | 714 |     |
|                       | X48                          | 323       | 358                       | 464 | 570 | 656 | 704  | 247 | 275 | 356                       | 437 | 518 | 600 | 201 | 223                       | 289 | 355 | 421 | 487 |     |
|                       | 48-S                         | 289       | 321                       | 416 | 510 | 581 | 623  | 222 | 246 | 319                       | 392 | 465 | 537 | 180 | 200                       | 259 | 318 | 377 | 437 |     |
| <b>200</b>            | X80                          | 512       | 536                       | 675 | 815 | 954 | 1024 | 393 | 412 | 519                       | 626 | 733 | 840 | 320 | 335                       | 422 | 509 | 596 | 683 |     |
|                       | X48                          | 349       | 366                       | 461 | 556 | 651 | 727  | 268 | 281 | 354                       | 427 | 500 | 573 | 218 | 229                       | 288 | 347 | 407 | 466 |     |
|                       | 48-S                         | 313       | 328                       | 413 | 498 | 583 | 645  | 241 | 252 | 317                       | 383 | 448 | 514 | 196 | 205                       | 258 | 311 | 365 | 418 |     |

| Table 1.8: Maximum Shear (lb.) - Wind Exposure C Condition |                              |           |                           |    |    |    |    |    |                           |    |    |    |    |    |                           |    |    |    |    |    |
|--|------------------------------|-----------|---------------------------|----|----|----|----|----|---------------------------|----|----|----|----|----|---------------------------|----|----|----|----|----|
| Exposure<br><b>C</b>                                       | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |    |    |    |    |    | Roof Wind Pressure Zone 2 |    |    |    |    |    | Roof Wind Pressure Zone 3 |    |    |    |    |    |
|  |                              |           | Roof Snow Load (psf)      |    |    |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    |
|  |                              |           | 0                         | 10 | 20 | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 |
| <b>ROOFS 0° TO 7°</b>                                      | <b>110</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 8                         | 36 | 59 | 78 | 89 | 99 | 6                         | 29 | 51 | 74 | 89 | 99 |
|  |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 5                         | 24 | 43 | 56 | 64 | 71 | 4                         | 20 | 35 | 50 | 64 | 71 |
|  |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 5                         | 22 | 39 | 50 | 57 | 63 | 4                         | 18 | 31 | 45 | 57 | 63 |
|  | <b>115</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 7                         | 34 | 59 | 78 | 89 | 99 | 6                         | 27 | 49 | 70 | 89 | 99 |
|  |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 5                         | 23 | 41 | 56 | 64 | 71 | 4                         | 19 | 33 | 48 | 63 | 71 |
|  |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 5                         | 21 | 37 | 50 | 57 | 63 | 4                         | 17 | 30 | 43 | 56 | 63 |
|  | <b>120</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 7                         | 32 | 58 | 78 | 89 | 99 | 6                         | 26 | 47 | 67 | 88 | 99 |
|  |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 5                         | 22 | 39 | 56 | 64 | 71 | 4                         | 18 | 32 | 46 | 60 | 71 |
|  |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 4                         | 20 | 35 | 50 | 57 | 63 | 4                         | 16 | 29 | 41 | 54 | 63 |
|  | <b>130</b>                   | X80       | 8                         | 36 | 59 | 78 | 89 | 99 | 7                         | 30 | 53 | 76 | 89 | 99 | 5                         | 24 | 43 | 62 | 81 | 99 |
|  |                              | X48       | 6                         | 26 | 44 | 56 | 64 | 71 | 4                         | 20 | 36 | 52 | 64 | 71 | 4                         | 17 | 29 | 42 | 55 | 68 |
|  |                              | 48-S      | 5                         | 24 | 40 | 50 | 57 | 63 | 4                         | 18 | 33 | 47 | 57 | 63 | 3                         | 15 | 26 | 38 | 49 | 61 |
|  | <b>140</b>                   | X80       | 8                         | 35 | 58 | 78 | 89 | 99 | 6                         | 28 | 49 | 71 | 89 | 99 | 5                         | 22 | 40 | 57 | 75 | 92 |
|  |                              | X48       | 5                         | 24 | 43 | 56 | 64 | 71 | 4                         | 19 | 34 | 48 | 63 | 71 | 3                         | 15 | 27 | 39 | 51 | 63 |
|  |                              | 48-S      | 5                         | 22 | 39 | 49 | 57 | 63 | 4                         | 17 | 30 | 43 | 57 | 63 | 3                         | 14 | 24 | 35 | 46 | 57 |
|  | <b>150</b>                   | X80       | 7                         | 34 | 57 | 77 | 89 | 99 | 6                         | 26 | 46 | 66 | 86 | 99 | 5                         | 21 | 37 | 54 | 70 | 86 |
|  |                              | X48       | 5                         | 23 | 41 | 55 | 64 | 71 | 4                         | 18 | 31 | 45 | 59 | 71 | 3                         | 14 | 25 | 37 | 48 | 59 |
|  |                              | 48-S      | 5                         | 21 | 37 | 48 | 57 | 63 | 3                         | 16 | 28 | 40 | 53 | 63 | 3                         | 13 | 23 | 33 | 43 | 53 |
|  | <b>160</b>                   | X80       | 7                         | 31 | 56 | 76 | 89 | 99 | 5                         | 24 | 43 | 62 | 81 | 99 | 4                         | 20 | 35 | 50 | 65 | 81 |
|  |                              | X48       | 5                         | 21 | 38 | 54 | 64 | 71 | 4                         | 16 | 29 | 42 | 55 | 68 | 3                         | 13 | 24 | 34 | 45 | 55 |
|  |                              | 48-S      | 4                         | 19 | 34 | 48 | 56 | 63 | 3                         | 15 | 26 | 38 | 49 | 61 | 3                         | 12 | 21 | 31 | 40 | 49 |
|  | <b>170</b>                   | X80       | 6                         | 30 | 53 | 74 | 88 | 99 | 5                         | 23 | 40 | 58 | 76 | 93 | 4                         | 18 | 33 | 47 | 62 | 76 |
|  |                              | X48       | 4                         | 20 | 36 | 52 | 63 | 71 | 3                         | 15 | 28 | 40 | 52 | 64 | 3                         | 13 | 22 | 32 | 42 | 52 |
|  |                              | 48-S      | 4                         | 18 | 32 | 46 | 56 | 63 | 3                         | 14 | 25 | 36 | 46 | 57 | 2                         | 11 | 20 | 29 | 38 | 46 |
| <b>180</b>   | X80                          | 6         | 28                        | 50 | 71 | 87 | 99 | 5  | 21                        | 38 | 55 | 71 | 88 | 4  | 17                        | 31 | 45 | 58 | 72 |    |
|  | X48                          | 4         | 19                        | 34 | 49 | 62 | 71 | 3  | 15                        | 26 | 37 | 49 | 60 | 3  | 12                        | 21 | 30 | 40 | 49 |    |
|  | 48-S                         | 4         | 17                        | 30 | 44 | 55 | 63 | 3  | 13                        | 23 | 33 | 44 | 54 | 2  | 11                        | 19 | 27 | 36 | 44 |    |
| <b>200</b>   | X80                          | 5         | 25                        | 45 | 64 | 84 | 97 | 4  | 19                        | 34 | 49 | 64 | 79 | 3  | 16                        | 28 | 40 | 52 | 64 |    |
|  | X48                          | 4         | 17                        | 30 | 44 | 57 | 69 | 3  | 13                        | 23 | 34 | 44 | 54 | 2  | 11                        | 19 | 27 | 36 | 44 |    |
|  | 48-S                         | 3         | 15                        | 27 | 39 | 51 | 61 | 3  | 12                        | 21 | 30 | 39 | 48 | 2  | 10                        | 17 | 24 | 32 | 39 |    |

| Table 1.9: Maximum Span Length - Wind Exposure D Condition |                              |           |                           |     |     |    |    |    |                           |     |     |    |    |    |                           |    |    |    |    |    |
|--|------------------------------|-----------|---------------------------|-----|-----|----|----|----|---------------------------|-----|-----|----|----|----|---------------------------|----|----|----|----|----|
| Exposure<br><b>D</b>                                       | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |    |    |    | Roof Wind Pressure Zone 2 |     |     |    |    |    | Roof Wind Pressure Zone 3 |    |    |    |    |    |
|  |                              |           | Roof Snow Load (psf)      |     |     |    |    |    | Roof Snow Load (psf)      |     |     |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    |
|  |                              |           | 0                         | 10  | 20  | 30 | 40 | 50 | 0                         | 10  | 20  | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 |
| <b>ROOFS 0° TO 7°</b>                                      | <b>110</b>                   | X80       | 128                       | 118 | 108 | 99 | 87 | 78 | 106                       | 106 | 106 | 99 | 87 | 78 | 86                        | 86 | 86 | 86 | 86 | 78 |
|  |                              | X48       | 89                        | 88  | 81  | 72 | 63 | 56 | 72                        | 72  | 72  | 72 | 63 | 56 | 58                        | 58 | 58 | 58 | 58 | 56 |
|  |                              | 48-S      | 85                        | 85  | 73  | 63 | 55 | 50 | 65                        | 65  | 65  | 63 | 55 | 50 | 52                        | 52 | 52 | 52 | 52 | 50 |
|  | <b>115</b>                   | X80       | 127                       | 118 | 108 | 99 | 87 | 78 | 101                       | 101 | 101 | 99 | 87 | 78 | 82                        | 82 | 82 | 82 | 82 | 78 |
|  |                              | X48       | 86                        | 86  | 81  | 72 | 63 | 56 | 69                        | 69  | 69  | 69 | 63 | 56 | 56                        | 56 | 56 | 56 | 56 | 56 |
|  |                              | 48-S      | 81                        | 81  | 73  | 63 | 55 | 50 | 62                        | 62  | 62  | 62 | 55 | 50 | 50                        | 50 | 50 | 50 | 50 | 50 |
|  | <b>120</b>                   | X80       | 123                       | 117 | 107 | 99 | 87 | 78 | 96                        | 96  | 96  | 96 | 87 | 78 | 78                        | 78 | 78 | 78 | 78 | 78 |
|  |                              | X48       | 83                        | 83  | 80  | 72 | 63 | 56 | 66                        | 66  | 66  | 66 | 63 | 56 | 53                        | 53 | 53 | 53 | 53 | 53 |
|  |                              | 48-S      | 77                        | 77  | 73  | 63 | 55 | 50 | 59                        | 59  | 59  | 59 | 55 | 50 | 48                        | 48 | 48 | 48 | 48 | 48 |
|  | <b>130</b>                   | X80       | 116                       | 114 | 106 | 99 | 87 | 78 | 89                        | 89  | 89  | 89 | 87 | 78 | 72                        | 72 | 72 | 72 | 72 | 72 |
|  |                              | X48       | 79                        | 79  | 79  | 70 | 63 | 56 | 61                        | 61  | 61  | 61 | 61 | 56 | 49                        | 49 | 49 | 49 | 49 | 49 |
|  |                              | 48-S      | 71                        | 71  | 71  | 62 | 55 | 50 | 54                        | 54  | 54  | 54 | 54 | 50 | 44                        | 44 | 44 | 44 | 44 | 44 |
|  | <b>140</b>                   | X80       | 107                       | 107 | 104 | 97 | 87 | 78 | 82                        | 82  | 82  | 82 | 82 | 78 | 67                        | 67 | 67 | 67 | 67 | 67 |
|  |                              | X48       | 73                        | 73  | 73  | 69 | 63 | 56 | 56                        | 56  | 56  | 56 | 56 | 56 | 46                        | 46 | 46 | 46 | 46 | 46 |
|  |                              | 48-S      | 66                        | 66  | 66  | 61 | 55 | 50 | 50                        | 50  | 50  | 50 | 50 | 50 | 41                        | 41 | 41 | 41 | 41 | 41 |
|  | <b>150</b>                   | X80       | 100                       | 100 | 100 | 95 | 87 | 78 | 77                        | 77  | 77  | 77 | 77 | 77 | 62                        | 62 | 62 | 62 | 62 | 62 |
|  |                              | X48       | 68                        | 68  | 68  | 68 | 62 | 56 | 52                        | 52  | 52  | 52 | 52 | 52 | 43                        | 43 | 43 | 43 | 43 | 43 |
|  |                              | 48-S      | 61                        | 61  | 61  | 60 | 55 | 50 | 47                        | 47  | 47  | 47 | 47 | 47 | 38                        | 38 | 38 | 38 | 38 | 38 |
|  | <b>160</b>                   | X80       | 94                        | 94  | 94  | 93 | 85 | 78 | 72                        | 72  | 72  | 72 | 72 | 72 | 58                        | 58 | 58 | 58 | 58 | 58 |
|  |                              | X48       | 64                        | 64  | 64  | 64 | 61 | 56 | 49                        | 49  | 49  | 49 | 49 | 49 | 40                        | 40 | 40 | 40 | 40 | 40 |
|  |                              | 48-S      | 57                        | 57  | 57  | 57 | 54 | 50 | 44                        | 44  | 44  | 44 | 44 | 44 | 36                        | 36 | 36 | 36 | 36 | 36 |
|  | <b>170</b>                   | X80       | 88                        | 88  | 88  | 88 | 84 | 78 | 68                        | 68  | 68  | 68 | 68 | 68 | 55                        | 55 | 55 | 55 | 55 | 55 |
|  |                              | X48       | 60                        | 60  | 60  | 60 | 60 | 55 | 46                        | 46  | 46  | 46 | 46 | 46 | 37                        | 37 | 37 | 37 | 37 | 37 |
|  |                              | 48-S      | 54                        | 54  | 54  | 54 | 53 | 49 | 41                        | 41  | 41  | 41 | 41 | 41 | 34                        | 34 | 34 | 34 | 34 | 34 |
| <b>180</b>   | X80                          | 83        | 83                        | 83  | 83  | 82 | 77 | 64 | 64                        | 64  | 64  | 64 | 64 | 52 | 52                        | 52 | 52 | 52 | 52 |    |
|  | X48                          | 57        | 57                        | 57  | 57  | 57 | 54 | 44 | 44                        | 44  | 44  | 44 | 44 | 35 | 35                        | 35 | 35 | 35 | 35 |    |
|  | 48-S                         | 51        | 51                        | 51  | 51  | 51 | 48 | 39 | 39                        | 39  | 39  | 39 | 39 | 32 | 32                        | 32 | 32 | 32 | 32 |    |
| <b>200</b>   | X80                          | 75        | 75                        | 75  | 75  | 75 | 74 | 57 | 57                        | 57  | 57  | 57 | 57 | 47 | 47                        | 47 | 47 | 47 | 47 |    |
|  | X48                          | 51        | 51                        | 51  | 51  | 51 | 51 | 39 | 39                        | 39  | 39  | 39 | 39 | 32 | 32                        | 32 | 32 | 32 | 32 |    |
|  | 48-S                         | 46        | 46                        | 46  | 46  | 46 | 46 | 35 | 35                        | 35  | 35  | 35 | 35 | 29 | 29                        | 29 | 29 | 29 | 29 |    |

| Table 1.10: Maximum Uplift (lb.) - Wind Exposure D Condition |                              |           |                           |       |       |       |       |       |                           |       |       |       |       |       |                           |       |       |       |       |       |
|--|------------------------------|-----------|---------------------------|-------|-------|-------|-------|-------|---------------------------|-------|-------|-------|-------|-------|---------------------------|-------|-------|-------|-------|-------|
| Exposure<br><b>D</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |       |       |       |       |       | Roof Wind Pressure Zone 2 |       |       |       |       |       | Roof Wind Pressure Zone 3 |       |       |       |       |       |
|  |                              |           | Roof Snow Load (psf)      |       |       |       |       |       | Roof Snow Load (psf)      |       |       |       |       |       | Roof Snow Load (psf)      |       |       |       |       |       |
|  |                              |           | 0                         | 10    | 20    | 30    | 40    | 50    | 0                         | 10    | 20    | 30    | 40    | 50    | 0                         | 10    | 20    | 30    | 40    | 50    |
| <b>ROOFS 0° TO 7°</b>  | <b>110</b>                   | X80       | -590                      | -541  | -495  | -456  | -399  | -359  | -841                      | -841  | -841  | -789  | -690  | -622  | -1043                     | -1043 | -1043 | -1043 | -1043 | -952  |
|  |                              | X48       | -409                      | -405  | -371  | -329  | -288  | -259  | -575                      | -575  | -575  | -570  | -499  | -449  | -712                      | -712  | -712  | -712  | -712  | -688  |
|  |                              | 48-S      | -390                      | -390  | -338  | -290  | -254  | -229  | -515                      | -515  | -515  | -502  | -440  | -396  | -638                      | -638  | -638  | -638  | -638  | -607  |
|  | <b>115</b>                   | X80       | -640                      | -595  | -544  | -501  | -439  | -395  | -881                      | -881  | -881  | -866  | -758  | -682  | -1092                     | -1092 | -1092 | -1092 | -1092 | -1043 |
|  |                              | X48       | -435                      | -435  | -408  | -362  | -317  | -285  | -603                      | -603  | -603  | -603  | -547  | -493  | -745                      | -745  | -745  | -745  | -745  | -745  |
|  |                              | 48-S      | -410                      | -410  | -371  | -319  | -279  | -252  | -540                      | -540  | -540  | -540  | -483  | -435  | -668                      | -668  | -668  | -668  | -668  | -665  |
|  | <b>120</b>                   | X80       | -680                      | -646  | -592  | -548  | -480  | -432  | -922                      | -922  | -922  | -922  | -829  | -747  | -1140                     | -1140 | -1140 | -1140 | -1140 | -1138 |
|  |                              | X48       | -462                      | -462  | -444  | -396  | -347  | -312  | -630                      | -630  | -630  | -630  | -599  | -539  | -779                      | -779  | -779  | -779  | -779  | -779  |
|  |                              | 48-S      | -429                      | -429  | -402  | -349  | -306  | -275  | -565                      | -565  | -565  | -565  | -528  | -476  | -698                      | -698  | -698  | -698  | -698  | -698  |
|  | <b>130</b>                   | X80       | -762                      | -751  | -693  | -649  | -569  | -513  | -1002                     | -1002 | -1002 | -1002 | -978  | -881  | -1239                     | -1239 | -1239 | -1239 | -1239 | -1239 |
|  |                              | X48       | -518                      | -518  | -518  | -462  | -411  | -370  | -685                      | -685  | -685  | -685  | -685  | -636  | -846                      | -846  | -846  | -846  | -846  | -846  |
|  |                              | 48-S      | -467                      | -467  | -465  | -409  | -363  | -327  | -613                      | -613  | -613  | -613  | -613  | -561  | -758                      | -758  | -758  | -758  | -758  | -758  |
|  | <b>140</b>                   | X80       | -826                      | -826  | -801  | -747  | -667  | -600  | -1083                     | -1083 | -1083 | -1083 | -1083 | -1027 | -1336                     | -1336 | -1336 | -1336 | -1336 | -1336 |
|  |                              | X48       | -565                      | -565  | -565  | -531  | -481  | -434  | -740                      | -740  | -740  | -740  | -740  | -740  | -912                      | -912  | -912  | -912  | -912  | -912  |
|  |                              | 48-S      | -506                      | -506  | -506  | -471  | -425  | -382  | -663                      | -663  | -663  | -663  | -663  | -654  | -817                      | -817  | -817  | -817  | -817  | -817  |
|  | <b>150</b>                   | X80       | -888                      | -888  | -888  | -846  | -768  | -693  | -1163                     | -1163 | -1163 | -1163 | -1163 | -1163 | -1434                     | -1434 | -1434 | -1434 | -1434 | -1434 |
|  |                              | X48       | -607                      | -607  | -607  | -600  | -547  | -501  | -794                      | -794  | -794  | -794  | -794  | -794  | -978                      | -978  | -978  | -978  | -978  | -978  |
|  |                              | 48-S      | -544                      | -544  | -544  | -532  | -485  | -442  | -711                      | -711  | -711  | -711  | -711  | -711  | -877                      | -877  | -877  | -877  | -877  | -877  |
|  | <b>160</b>                   | X80       | -951                      | -951  | -951  | -950  | -866  | -793  | -1243                     | -1243 | -1243 | -1243 | -1243 | -1243 | -1532                     | -1532 | -1532 | -1532 | -1532 | -1532 |
|  |                              | X48       | -650                      | -650  | -650  | -650  | -616  | -571  | -848                      | -848  | -848  | -848  | -848  | -848  | -1045                     | -1045 | -1045 | -1045 | -1045 | -1045 |
|  |                              | 48-S      | -582                      | -582  | -582  | -582  | -545  | -505  | -760                      | -760  | -760  | -760  | -760  | -760  | -936                      | -936  | -936  | -936  | -936  | -936  |
|  | <b>170</b>                   | X80       | -1013                     | -1013 | -1013 | -1013 | -965  | -894  | -1322                     | -1322 | -1322 | -1322 | -1322 | -1322 | -1629                     | -1629 | -1629 | -1629 | -1629 | -1629 |
|  |                              | X48       | -692                      | -692  | -692  | -692  | -685  | -637  | -902                      | -902  | -902  | -902  | -902  | -902  | -1111                     | -1111 | -1111 | -1111 | -1111 | -1111 |
|  |                              | 48-S      | -620                      | -620  | -620  | -620  | -607  | -564  | -809                      | -809  | -809  | -809  | -809  | -809  | -996                      | -996  | -996  | -996  | -996  | -996  |
| <b>180</b>   | X80                          | -1075     | -1075                     | -1075 | -1075 | -1067 | -992  | -1402 | -1402                     | -1402 | -1402 | -1402 | -1402 | -1726 | -1726                     | -1726 | -1726 | -1726 | -1726 |       |
|  | X48                          | -734      | -734                      | -734  | -734  | -734  | -705  | -957  | -957                      | -957  | -957  | -957  | -957  | -1177 | -1177                     | -1177 | -1177 | -1177 | -1177 |       |
|  | 48-S                         | -657      | -657                      | -657  | -657  | -657  | -625  | -857  | -857                      | -857  | -857  | -857  | -857  | -1055 | -1055                     | -1055 | -1055 | -1055 | -1055 |       |
| <b>200</b>   | X80                          | -1198     | -1198                     | -1198 | -1198 | -1198 | -1195 | -1561 | -1561                     | -1561 | -1561 | -1561 | -1561 | -1921 | -1921                     | -1921 | -1921 | -1921 | -1921 |       |
|  | X48                          | -818      | -818                      | -818  | -818  | -818  | -818  | -1065 | -1065                     | -1065 | -1065 | -1065 | -1065 | -1310 | -1310                     | -1310 | -1310 | -1310 | -1310 |       |
|  | 48-S                         | -733      | -733                      | -733  | -733  | -733  | -733  | -954  | -954                      | -954  | -954  | -954  | -954  | -1174 | -1174                     | -1174 | -1174 | -1174 | -1174 |       |

| Table 1.11: Maximum Downforce (lb.) - Wind Exposure D Condition |                              |           |                           |     |     |     |      |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|------|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>D</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |      |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |      |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40   | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS 0° TO 7°</b>   | <b>110</b>                   | X80       | 365                       | 472 | 616 | 742 | 848  | 942 | 301                       | 423 | 604 | 742 | 848 | 942 | 244                       | 343 | 489 | 641 | 836 | 942 |
|   |                              | X48       | 253                       | 353 | 461 | 536 | 612  | 680 | 206                       | 290 | 413 | 536 | 612 | 680 | 166                       | 234 | 334 | 438 | 571 | 680 |
|   |                              | 48-S      | 241                       | 340 | 420 | 473 | 540  | 600 | 184                       | 259 | 370 | 473 | 540 | 600 | 149                       | 210 | 299 | 392 | 512 | 600 |
|   | <b>115</b>                   | X80       | 362                       | 473 | 617 | 742 | 848  | 942 | 289                       | 405 | 578 | 742 | 848 | 942 | 234                       | 328 | 468 | 612 | 799 | 942 |
|   |                              | X48       | 246                       | 346 | 462 | 536 | 612  | 680 | 197                       | 277 | 395 | 517 | 612 | 680 | 160                       | 224 | 320 | 418 | 546 | 673 |
|   |                              | 48-S      | 232                       | 326 | 420 | 473 | 540  | 600 | 177                       | 248 | 354 | 463 | 540 | 600 | 143                       | 201 | 287 | 375 | 489 | 600 |
|   | <b>120</b>                   | X80       | 374                       | 485 | 628 | 751 | 848  | 942 | 294                       | 401 | 566 | 731 | 848 | 942 | 238                       | 325 | 459 | 593 | 765 | 942 |
|   |                              | X48       | 254                       | 347 | 470 | 542 | 612  | 680 | 201                       | 274 | 387 | 500 | 612 | 680 | 163                       | 222 | 314 | 405 | 522 | 644 |
|   |                              | 48-S      | 236                       | 322 | 426 | 479 | 540  | 600 | 180                       | 245 | 347 | 448 | 540 | 600 | 146                       | 199 | 281 | 363 | 468 | 577 |
|   | <b>130</b>                   | X80       | 403                       | 513 | 654 | 782 | 848  | 942 | 309                       | 398 | 551 | 703 | 848 | 942 | 251                       | 323 | 447 | 570 | 705 | 870 |
|   |                              | X48       | 274                       | 354 | 489 | 557 | 612  | 680 | 211                       | 272 | 376 | 480 | 594 | 680 | 171                       | 221 | 305 | 389 | 481 | 594 |
|   |                              | 48-S      | 248                       | 319 | 438 | 493 | 540  | 600 | 189                       | 244 | 337 | 430 | 532 | 600 | 153                       | 198 | 273 | 349 | 431 | 532 |
|   | <b>140</b>                   | X80       | 421                       | 517 | 679 | 800 | 863  | 942 | 322                       | 396 | 537 | 678 | 819 | 942 | 262                       | 322 | 436 | 551 | 666 | 807 |
|   |                              | X48       | 288                       | 353 | 479 | 569 | 623  | 680 | 220                       | 270 | 367 | 463 | 559 | 678 | 179                       | 220 | 298 | 376 | 454 | 551 |
|   |                              | 48-S      | 258                       | 317 | 429 | 504 | 550  | 600 | 197                       | 242 | 329 | 415 | 501 | 600 | 160                       | 197 | 267 | 337 | 407 | 493 |
|   | <b>150</b>                   | X80       | 442                       | 519 | 691 | 820 | 894  | 942 | 339                       | 398 | 530 | 661 | 793 | 926 | 276                       | 324 | 430 | 537 | 644 | 752 |
|   |                              | X48       | 302                       | 355 | 472 | 582 | 636  | 680 | 232                       | 272 | 362 | 451 | 541 | 632 | 188                       | 221 | 294 | 367 | 439 | 513 |
|   |                              | 48-S      | 271                       | 318 | 423 | 516 | 564  | 600 | 207                       | 244 | 324 | 404 | 485 | 566 | 168                       | 198 | 263 | 328 | 394 | 460 |
|   | <b>160</b>                   | X80       | 461                       | 521 | 681 | 841 | 912  | 969 | 354                       | 400 | 523 | 646 | 769 | 892 | 287                       | 325 | 425 | 525 | 625 | 725 |
|   |                              | X48       | 315                       | 356 | 465 | 575 | 649  | 697 | 241                       | 273 | 357 | 441 | 525 | 609 | 196                       | 222 | 290 | 358 | 427 | 495 |
|   |                              | 48-S      | 282                       | 319 | 417 | 515 | 575  | 617 | 216                       | 245 | 320 | 395 | 470 | 546 | 176                       | 199 | 260 | 321 | 382 | 443 |
|   | <b>170</b>                   | X80       | 481                       | 526 | 677 | 827 | 932  | 997 | 370                       | 404 | 520 | 636 | 751 | 867 | 301                       | 328 | 422 | 517 | 611 | 705 |
|   |                              | X48       | 329                       | 359 | 462 | 565 | 662  | 710 | 252                       | 276 | 355 | 434 | 513 | 592 | 205                       | 224 | 288 | 352 | 417 | 481 |
|   |                              | 48-S      | 295                       | 322 | 414 | 506 | 586  | 628 | 226                       | 247 | 318 | 389 | 459 | 530 | 184                       | 201 | 258 | 316 | 373 | 431 |
| <b>180</b>  | X80                          | 503       | 533                       | 675 | 817 | 953 | 1016 | 387 | 410                       | 519 | 628 | 737 | 847 | 315 | 333                       | 422 | 511 | 600 | 688 |     |
|   | X48                          | 344       | 364                       | 461 | 558 | 655 | 722  | 264 | 279                       | 354 | 429 | 503 | 578 | 215 | 227                       | 288 | 348 | 409 | 470 |     |
|   | 48-S                         | 308       | 326                       | 413 | 500 | 587 | 640  | 236 | 250                       | 317 | 384 | 451 | 518 | 192 | 204                       | 258 | 312 | 367 | 421 |     |
| <b>200</b>  | X80                          | 547       | 550                       | 678 | 805 | 933 | 1057 | 421 | 423                       | 522 | 620 | 718 | 816 | 343 | 344                       | 424 | 504 | 584 | 664 |     |
|   | X48                          | 374       | 376                       | 463 | 550 | 637 | 724  | 287 | 289                       | 356 | 423 | 490 | 557 | 234 | 235                       | 289 | 344 | 398 | 453 |     |
|   | 48-S                         | 335       | 336                       | 415 | 493 | 571 | 649  | 257 | 259                       | 319 | 379 | 439 | 499 | 209 | 210                       | 259 | 308 | 357 | 406 |     |

| Table 1.12: Maximum Shear (lb.) - Wind Exposure D Condition |                              |           |                           |    |    |    |    |    |                           |    |    |    |    |    |                           |    |    |    |    |    |
|---|------------------------------|-----------|---------------------------|----|----|----|----|----|---------------------------|----|----|----|----|----|---------------------------|----|----|----|----|----|
| Exposure<br><b>D</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |    |    |    |    |    | Roof Wind Pressure Zone 2 |    |    |    |    |    | Roof Wind Pressure Zone 3 |    |    |    |    |    |
|   |                              |           | Roof Snow Load (psf)      |    |    |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    |
|   |                              |           | 0                         | 10 | 20 | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 |
| <b>ROOFS 0° TO 7°</b>                                       | <b>110</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 7                         | 32 | 58 | 78 | 89 | 99 | 6                         | 26 | 47 | 67 | 88 | 99 |
|   |                              | X48       | 6                         | 27 | 44 | 56 | 64 | 71 | 5                         | 22 | 40 | 56 | 64 | 71 | 4                         | 18 | 32 | 46 | 60 | 71 |
|   |                              | 48-S      | 6                         | 26 | 40 | 50 | 57 | 63 | 4                         | 20 | 35 | 50 | 57 | 63 | 4                         | 16 | 29 | 41 | 54 | 63 |
|   | <b>115</b>                   | X80       | 9                         | 36 | 59 | 78 | 89 | 99 | 7                         | 31 | 55 | 78 | 89 | 99 | 6                         | 25 | 45 | 64 | 84 | 99 |
|   |                              | X48       | 6                         | 26 | 44 | 56 | 64 | 71 | 5                         | 21 | 38 | 54 | 64 | 71 | 4                         | 17 | 31 | 44 | 57 | 71 |
|   |                              | 48-S      | 5                         | 25 | 40 | 50 | 57 | 63 | 4                         | 19 | 34 | 49 | 57 | 63 | 3                         | 15 | 27 | 39 | 51 | 63 |
|   | <b>120</b>                   | X80       | 8                         | 36 | 59 | 78 | 89 | 99 | 7                         | 30 | 53 | 76 | 89 | 99 | 5                         | 24 | 43 | 62 | 80 | 99 |
|   |                              | X48       | 6                         | 26 | 44 | 56 | 64 | 71 | 4                         | 20 | 36 | 52 | 64 | 71 | 4                         | 16 | 29 | 42 | 55 | 68 |
|   |                              | 48-S      | 5                         | 24 | 40 | 50 | 57 | 63 | 4                         | 18 | 32 | 47 | 57 | 63 | 3                         | 15 | 26 | 38 | 49 | 61 |
|   | <b>130</b>                   | X80       | 8                         | 35 | 58 | 78 | 89 | 99 | 6                         | 27 | 49 | 70 | 89 | 99 | 5                         | 22 | 39 | 57 | 74 | 91 |
|   |                              | X48       | 5                         | 24 | 43 | 55 | 64 | 71 | 4                         | 19 | 33 | 48 | 62 | 71 | 3                         | 15 | 27 | 39 | 51 | 62 |
|   |                              | 48-S      | 5                         | 22 | 39 | 49 | 57 | 63 | 4                         | 17 | 30 | 43 | 56 | 63 | 3                         | 14 | 24 | 35 | 45 | 56 |
|   | <b>140</b>                   | X80       | 7                         | 33 | 57 | 77 | 89 | 99 | 6                         | 25 | 45 | 65 | 85 | 99 | 5                         | 21 | 37 | 53 | 69 | 85 |
|   |                              | X48       | 5                         | 23 | 40 | 54 | 64 | 71 | 4                         | 17 | 31 | 44 | 58 | 71 | 3                         | 14 | 25 | 36 | 47 | 58 |
|   |                              | 48-S      | 4                         | 20 | 36 | 48 | 57 | 63 | 3                         | 15 | 28 | 40 | 52 | 63 | 3                         | 13 | 22 | 32 | 42 | 52 |
|   | <b>150</b>                   | X80       | 7                         | 31 | 55 | 75 | 89 | 99 | 5                         | 24 | 42 | 60 | 79 | 97 | 4                         | 19 | 34 | 49 | 64 | 79 |
|   |                              | X48       | 5                         | 21 | 37 | 53 | 63 | 71 | 4                         | 16 | 29 | 41 | 54 | 66 | 3                         | 13 | 23 | 34 | 44 | 54 |
|   |                              | 48-S      | 4                         | 19 | 34 | 47 | 56 | 63 | 3                         | 14 | 26 | 37 | 48 | 60 | 3                         | 12 | 21 | 30 | 39 | 48 |
|   | <b>160</b>                   | X80       | 6                         | 29 | 51 | 74 | 88 | 99 | 5                         | 22 | 39 | 57 | 74 | 91 | 4                         | 18 | 32 | 46 | 60 | 74 |
|   |                              | X48       | 4                         | 20 | 35 | 50 | 62 | 71 | 3                         | 15 | 27 | 39 | 50 | 62 | 3                         | 12 | 22 | 31 | 41 | 51 |
|   |                              | 48-S      | 4                         | 18 | 31 | 45 | 55 | 63 | 3                         | 14 | 24 | 35 | 45 | 56 | 2                         | 11 | 20 | 28 | 37 | 45 |
|   | <b>170</b>                   | X80       | 6                         | 27 | 48 | 69 | 86 | 99 | 5                         | 21 | 37 | 53 | 69 | 86 | 4                         | 17 | 30 | 43 | 56 | 70 |
|   |                              | X48       | 4                         | 18 | 33 | 47 | 61 | 70 | 3                         | 14 | 25 | 36 | 47 | 58 | 3                         | 12 | 21 | 30 | 39 | 48 |
|   |                              | 48-S      | 4                         | 17 | 29 | 42 | 54 | 62 | 3                         | 13 | 23 | 33 | 42 | 52 | 2                         | 10 | 18 | 26 | 35 | 43 |
| <b>180</b>  | X80                          | 6         | 26                        | 45 | 65 | 85 | 97 | 4  | 20                        | 35 | 50 | 66 | 81 | 4  | 16                        | 28 | 41 | 53 | 66 |    |
|   | X48                          | 4         | 17                        | 31 | 45 | 58 | 69 | 3  | 13                        | 24 | 34 | 45 | 55 | 2  | 11                        | 19 | 28 | 36 | 45 |    |
|   | 48-S                         | 3         | 16                        | 28 | 40 | 52 | 61 | 3  | 12                        | 21 | 31 | 40 | 49 | 2  | 10                        | 17 | 25 | 33 | 40 |    |
| <b>200</b>  | X80                          | 5         | 23                        | 41 | 59 | 77 | 94 | 4  | 18                        | 31 | 45 | 59 | 73 | 3  | 14                        | 26 | 37 | 48 | 59 |    |
|   | X48                          | 3         | 16                        | 28 | 40 | 52 | 64 | 3  | 12                        | 21 | 31 | 40 | 50 | 2  | 10                        | 17 | 25 | 33 | 40 |    |
|   | 48-S                         | 3         | 14                        | 25 | 36 | 47 | 58 | 2  | 11                        | 19 | 28 | 36 | 44 | 2  | 9                         | 16 | 22 | 29 | 36 |    |

| Table 1.13: Maximum Span Length (in.) - Wind Exposure B Condition |                              |           |                           |     |    |    |    |    |                           |     |    |    |    |    |                           |     |    |    |    |    |
|---|------------------------------|-----------|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|
| Exposure<br><b>B</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |    |    |    |    | Roof Wind Pressure Zone 2 |     |    |    |    |    | Roof Wind Pressure Zone 3 |     |    |    |    |    |
|   |                              |           | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    |
|   |                              |           | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 |
| <b>ROOFS &gt; 7° TO 27°</b>                                       | <b>110</b>                   | X80       | 129                       | 119 | 98 | 81 | 71 | 64 | 129                       | 119 | 98 | 81 | 71 | 64 | 113                       | 113 | 98 | 81 | 71 | 64 |
|   |                              | X48       | 96                        | 89  | 78 | 66 | 58 | 52 | 90                        | 89  | 78 | 66 | 58 | 52 | 78                        | 78  | 78 | 66 | 58 | 52 |
|   |                              | 48-S      | 93                        | 82  | 67 | 56 | 49 | 44 | 85                        | 82  | 67 | 56 | 49 | 44 | 70                        | 70  | 67 | 56 | 49 | 44 |
|   | <b>115</b>                   | X80       | 129                       | 119 | 98 | 81 | 71 | 64 | 128                       | 119 | 98 | 81 | 71 | 64 | 108                       | 108 | 98 | 81 | 71 | 64 |
|   |                              | X48       | 96                        | 89  | 78 | 66 | 58 | 52 | 87                        | 87  | 78 | 66 | 58 | 52 | 75                        | 75  | 75 | 66 | 58 | 52 |
|   |                              | 48-S      | 93                        | 82  | 67 | 56 | 49 | 44 | 81                        | 81  | 67 | 56 | 49 | 44 | 67                        | 67  | 67 | 56 | 49 | 44 |
|   | <b>120</b>                   | X80       | 129                       | 119 | 98 | 81 | 71 | 64 | 124                       | 119 | 98 | 81 | 71 | 64 | 103                       | 103 | 98 | 81 | 71 | 64 |
|   |                              | X48       | 96                        | 89  | 78 | 66 | 58 | 52 | 85                        | 85  | 78 | 66 | 58 | 52 | 71                        | 71  | 71 | 66 | 58 | 52 |
|   |                              | 48-S      | 93                        | 82  | 67 | 56 | 49 | 44 | 78                        | 78  | 67 | 56 | 49 | 44 | 64                        | 64  | 64 | 56 | 49 | 44 |
|   | <b>130</b>                   | X80       | 127                       | 118 | 98 | 81 | 71 | 64 | 116                       | 116 | 98 | 81 | 71 | 64 | 95                        | 95  | 95 | 81 | 71 | 64 |
|   |                              | X48       | 95                        | 88  | 77 | 66 | 58 | 52 | 80                        | 80  | 77 | 66 | 58 | 52 | 66                        | 66  | 66 | 66 | 58 | 52 |
|   |                              | 48-S      | 91                        | 81  | 67 | 56 | 49 | 44 | 72                        | 72  | 67 | 56 | 49 | 44 | 59                        | 59  | 59 | 56 | 49 | 44 |
|   | <b>140</b>                   | X80       | 123                       | 116 | 97 | 81 | 71 | 64 | 108                       | 108 | 97 | 81 | 71 | 64 | 89                        | 89  | 89 | 81 | 71 | 64 |
|   |                              | X48       | 92                        | 87  | 76 | 66 | 58 | 52 | 74                        | 74  | 74 | 66 | 58 | 52 | 61                        | 61  | 61 | 61 | 58 | 52 |
|   |                              | 48-S      | 88                        | 79  | 65 | 56 | 49 | 44 | 66                        | 66  | 65 | 56 | 49 | 44 | 54                        | 54  | 54 | 54 | 49 | 44 |
|   | <b>150</b>                   | X80       | 119                       | 114 | 96 | 81 | 71 | 64 | 101                       | 101 | 96 | 81 | 71 | 64 | 83                        | 83  | 83 | 81 | 71 | 64 |
|   |                              | X48       | 88                        | 85  | 74 | 66 | 58 | 52 | 69                        | 69  | 69 | 66 | 58 | 52 | 57                        | 57  | 57 | 57 | 57 | 52 |
|   |                              | 48-S      | 82                        | 77  | 64 | 56 | 49 | 44 | 62                        | 62  | 62 | 56 | 49 | 44 | 51                        | 51  | 51 | 51 | 49 | 44 |
|   | <b>160</b>                   | X80       | 116                       | 112 | 94 | 81 | 71 | 64 | 94                        | 94  | 94 | 81 | 71 | 64 | 78                        | 78  | 78 | 78 | 71 | 64 |
|   |                              | X48       | 84                        | 84  | 73 | 64 | 58 | 52 | 65                        | 65  | 65 | 64 | 58 | 52 | 53                        | 53  | 53 | 53 | 53 | 52 |
|   |                              | 48-S      | 77                        | 74  | 63 | 56 | 49 | 44 | 58                        | 58  | 58 | 56 | 49 | 44 | 48                        | 48  | 48 | 48 | 48 | 44 |
|   | <b>170</b>                   | X80       | 113                       | 110 | 93 | 81 | 71 | 64 | 89                        | 89  | 89 | 81 | 71 | 64 | 73                        | 73  | 73 | 73 | 71 | 64 |
|   |                              | X48       | 80                        | 80  | 71 | 63 | 58 | 52 | 61                        | 61  | 61 | 61 | 58 | 52 | 50                        | 50  | 50 | 50 | 50 | 50 |
|   |                              | 48-S      | 72                        | 72  | 62 | 55 | 49 | 44 | 55                        | 55  | 55 | 55 | 49 | 44 | 45                        | 45  | 45 | 45 | 45 | 44 |
|   | <b>180</b>                   | X80       | 110                       | 108 | 91 | 80 | 71 | 64 | 84                        | 84  | 84 | 80 | 71 | 64 | 69                        | 69  | 69 | 69 | 69 | 64 |
|   |                              | X48       | 76                        | 76  | 70 | 62 | 57 | 52 | 58                        | 58  | 58 | 58 | 57 | 52 | 47                        | 47  | 47 | 47 | 47 | 47 |
|   |                              | 48-S      | 68                        | 68  | 60 | 54 | 49 | 44 | 51                        | 51  | 51 | 51 | 49 | 44 | 42                        | 42  | 42 | 42 | 42 | 42 |
|   | <b>200</b>                   | X80       | 99                        | 99  | 88 | 78 | 71 | 64 | 75                        | 75  | 75 | 75 | 71 | 64 | 62                        | 62  | 62 | 62 | 62 | 62 |
|   |                              | X48       | 69                        | 69  | 66 | 60 | 55 | 51 | 52                        | 52  | 52 | 52 | 52 | 51 | 42                        | 42  | 42 | 42 | 42 | 42 |
|   |                              | 48-S      | 61                        | 61  | 58 | 52 | 48 | 44 | 46                        | 46  | 46 | 46 | 46 | 44 | 38                        | 38  | 38 | 38 | 38 | 38 |



| Table 1.14: Maximum Uplift (lb.) - Wind Exposure B Condition |                              |           |                           |      |      |      |      |      |                           |       |       |       |       |      |                           |       |       |       |       |       |
|--|------------------------------|-----------|---------------------------|------|------|------|------|------|---------------------------|-------|-------|-------|-------|------|---------------------------|-------|-------|-------|-------|-------|
| Exposure<br><b>B</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |      |      |      |      |      | Roof Wind Pressure Zone 2 |       |       |       |       |      | Roof Wind Pressure Zone 3 |       |       |       |       |       |
|  |                              |           | Roof Snow Load (psf)      |      |      |      |      |      | Roof Snow Load (psf)      |       |       |       |       |      | Roof Snow Load (psf)      |       |       |       |       |       |
|  |                              |           | 0                         | 10   | 20   | 30   | 40   | 50   | 0                         | 10    | 20    | 30    | 40    | 50   | 0                         | 10    | 20    | 30    | 40    | 50    |
| <b>ROOFS &gt; 7° TO 27°</b>                                  | <b>110</b>                   | X80       | -308                      | -285 | -233 | -195 | -170 | -153 | -571                      | -528  | -433  | -361  | -316  | -284 | -757                      | -757  | -656  | -547  | -479  | -431  |
|  |                              | X48       | -231                      | -213 | -187 | -159 | -139 | -125 | -398                      | -396  | -347  | -294  | -257  | -232 | -524                      | -524  | -524  | -446  | -390  | -351  |
|  |                              | 48-S      | -223                      | -196 | -161 | -135 | -118 | -106 | -377                      | -364  | -298  | -250  | -219  | -197 | -468                      | -468  | -453  | -379  | -331  | -298  |
|  | <b>115</b>                   | X80       | -342                      | -316 | -259 | -216 | -189 | -170 | -624                      | -581  | -476  | -397  | -347  | -313 | -795                      | -795  | -719  | -600  | -525  | -473  |
|  |                              | X48       | -256                      | -237 | -208 | -176 | -154 | -139 | -424                      | -424  | -382  | -323  | -283  | -255 | -549                      | -549  | -549  | -489  | -428  | -385  |
|  |                              | 48-S      | -247                      | -218 | -179 | -149 | -131 | -118 | -396                      | -396  | -328  | -274  | -240  | -216 | -490                      | -490  | -490  | -415  | -363  | -327  |
|  | <b>120</b>                   | X80       | -375                      | -347 | -285 | -237 | -208 | -187 | -663                      | -637  | -522  | -435  | -381  | -343 | -833                      | -833  | -787  | -656  | -574  | -517  |
|  |                              | X48       | -281                      | -260 | -228 | -193 | -169 | -152 | -451                      | -451  | -418  | -354  | -310  | -279 | -575                      | -575  | -575  | -534  | -468  | -421  |
|  |                              | 48-S      | -271                      | -239 | -196 | -164 | -144 | -129 | -416                      | -416  | -360  | -301  | -263  | -237 | -513                      | -513  | -513  | -454  | -397  | -358  |
|  | <b>130</b>                   | X80       | -440                      | -411 | -340 | -283 | -248 | -223 | -733                      | -733  | -617  | -515  | -450  | -406 | -908                      | -908  | -908  | -775  | -678  | -611  |
|  |                              | X48       | -330                      | -308 | -269 | -231 | -202 | -182 | -505                      | -505  | -489  | -419  | -367  | -330 | -625                      | -625  | -625  | -625  | -553  | -498  |
|  |                              | 48-S      | -318                      | -281 | -232 | -196 | -172 | -155 | -453                      | -453  | -421  | -356  | -312  | -281 | -559                      | -559  | -559  | -536  | -469  | -423  |
|  | <b>140</b>                   | X80       | -503                      | -475 | -400 | -334 | -292 | -263 | -796                      | -796  | -721  | -602  | -527  | -475 | -983                      | -983  | -983  | -904  | -791  | -713  |
|  |                              | X48       | -377                      | -356 | -311 | -272 | -238 | -214 | -550                      | -550  | -550  | -491  | -429  | -387 | -676                      | -676  | -676  | -676  | -645  | -581  |
|  |                              | 48-S      | -361                      | -322 | -268 | -231 | -202 | -182 | -491                      | -491  | -484  | -417  | -365  | -328 | -605                      | -605  | -605  | -605  | -548  | -493  |
|  | <b>150</b>                   | X80       | -566                      | -541 | -455 | -387 | -338 | -305 | -858                      | -858  | -819  | -695  | -609  | -548 | -1057                     | -1057 | -1057 | -1042 | -912  | -821  |
|  |                              | X48       | -417                      | -405 | -353 | -311 | -276 | -248 | -592                      | -592  | -592  | -559  | -496  | -446 | -727                      | -727  | -727  | -727  | -727  | -669  |
|  |                              | 48-S      | -391                      | -363 | -305 | -268 | -234 | -211 | -529                      | -529  | -529  | -481  | -421  | -379 | -650                      | -650  | -650  | -650  | -631  | -568  |
|  | <b>160</b>                   | X80       | -632                      | -610 | -514 | -444 | -389 | -350 | -920                      | -920  | -920  | -795  | -696  | -627 | -1131                     | -1131 | -1131 | -1131 | -1041 | -937  |
|  |                              | X48       | -457                      | -457 | -396 | -351 | -317 | -285 | -634                      | -634  | -634  | -629  | -567  | -511 | -777                      | -777  | -777  | -777  | -777  | -764  |
|  |                              | 48-S      | -420                      | -405 | -343 | -302 | -269 | -242 | -566                      | -566  | -566  | -542  | -482  | -434 | -695                      | -695  | -695  | -695  | -695  | -649  |
|  | <b>170</b>                   | X80       | -701                      | -683 | -575 | -505 | -443 | -398 | -981                      | -981  | -981  | -900  | -788  | -710 | -1206                     | -1206 | -1206 | -1206 | -1179 | -1061 |
|  |                              | X48       | -499                      | -499 | -442 | -393 | -357 | -325 | -675                      | -675  | -675  | -675  | -637  | -578 | -827                      | -827  | -827  | -827  | -827  | -827  |
|  |                              | 48-S      | -449                      | -449 | -382 | -339 | -306 | -276 | -603                      | -603  | -603  | -603  | -546  | -491 | -740                      | -740  | -740  | -740  | -740  | -734  |
|  | <b>180</b>                   | X80       | -770                      | -754 | -637 | -562 | -499 | -449 | -1043                     | -1043 | -1043 | -1000 | -888  | -799 | -1279                     | -1279 | -1279 | -1279 | -1279 | -1192 |
|  |                              | X48       | -535                      | -535 | -487 | -435 | -397 | -366 | -717                      | -717  | -717  | -717  | -707  | -651 | -877                      | -877  | -877  | -877  | -877  | -877  |
|  |                              | 48-S      | -478                      | -478 | -422 | -376 | -342 | -311 | -641                      | -641  | -641  | -641  | -609  | -553 | -785                      | -785  | -785  | -785  | -785  | -785  |
|  | <b>200</b>                   | X80       | -868                      | -868 | -767 | -681 | -620 | -560 | -1164                     | -1164 | -1164 | -1164 | -1096 | -991 | -1426                     | -1426 | -1426 | -1426 | -1426 | -1426 |
|  |                              | X48       | -599                      | -599 | -580 | -523 | -481 | -447 | -799                      | -799  | -799  | -799  | -799  | -790 | -976                      | -976  | -976  | -976  | -976  | -976  |
|  |                              | 48-S      | -535                      | -535 | -505 | -453 | -415 | -385 | -715                      | -715  | -715  | -715  | -715  | -680 | -874                      | -874  | -874  | -874  | -874  | -874  |

| Table 1.15: Maximum Downforce (lb.) - Wind Exposure B Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>B</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt; 7° TO 27°</b>                                     | <b>110</b>                   | X80       | 359                       | 453 | 524 | 564 | 635 | 706 | 359                       | 453 | 524 | 564 | 635 | 706 | 315                       | 429 | 524 | 564 | 635 | 706 |
|   |                              | X48       | 269                       | 339 | 420 | 459 | 518 | 575 | 251                       | 339 | 420 | 459 | 518 | 575 | 218                       | 296 | 418 | 459 | 518 | 575 |
|   |                              | 48-S      | 260                       | 312 | 361 | 390 | 440 | 488 | 238                       | 312 | 361 | 390 | 440 | 488 | 194                       | 265 | 361 | 390 | 440 | 488 |
|   | <b>115</b>                   | X80       | 359                       | 453 | 524 | 564 | 635 | 706 | 358                       | 453 | 524 | 564 | 635 | 706 | 301                       | 410 | 524 | 564 | 635 | 706 |
|   |                              | X48       | 269                       | 339 | 420 | 459 | 518 | 575 | 243                       | 331 | 420 | 459 | 518 | 575 | 208                       | 283 | 400 | 459 | 518 | 575 |
|   |                              | 48-S      | 260                       | 312 | 361 | 390 | 440 | 488 | 227                       | 309 | 361 | 390 | 440 | 488 | 186                       | 253 | 357 | 390 | 440 | 488 |
|   | <b>120</b>                   | X80       | 359                       | 453 | 524 | 564 | 635 | 706 | 347                       | 453 | 524 | 564 | 635 | 706 | 289                       | 393 | 524 | 564 | 635 | 706 |
|   |                              | X48       | 269                       | 339 | 420 | 459 | 518 | 575 | 236                       | 321 | 420 | 459 | 518 | 575 | 199                       | 271 | 383 | 459 | 518 | 575 |
|   |                              | 48-S      | 260                       | 312 | 361 | 390 | 440 | 488 | 217                       | 296 | 361 | 390 | 440 | 488 | 178                       | 242 | 342 | 390 | 440 | 488 |
|   | <b>130</b>                   | X80       | 379                       | 467 | 539 | 576 | 635 | 706 | 348                       | 459 | 539 | 576 | 635 | 706 | 286                       | 377 | 526 | 576 | 635 | 706 |
|   |                              | X48       | 284                       | 350 | 427 | 470 | 518 | 575 | 240                       | 316 | 427 | 470 | 518 | 575 | 197                       | 260 | 363 | 465 | 518 | 575 |
|   |                              | 48-S      | 274                       | 320 | 368 | 399 | 440 | 488 | 215                       | 284 | 368 | 399 | 440 | 488 | 176                       | 232 | 324 | 399 | 440 | 488 |
|   | <b>140</b>                   | X80       | 415                       | 492 | 566 | 600 | 637 | 706 | 364                       | 457 | 566 | 600 | 637 | 706 | 300                       | 376 | 514 | 600 | 637 | 706 |
|   |                              | X48       | 311                       | 369 | 441 | 489 | 519 | 575 | 252                       | 316 | 432 | 489 | 519 | 575 | 206                       | 259 | 354 | 449 | 519 | 575 |
|   |                              | 48-S      | 298                       | 334 | 380 | 415 | 441 | 488 | 225                       | 282 | 380 | 415 | 441 | 488 | 184                       | 231 | 316 | 401 | 441 | 488 |
|   | <b>150</b>                   | X80       | 453                       | 519 | 587 | 625 | 659 | 706 | 382                       | 458 | 587 | 625 | 659 | 706 | 314                       | 377 | 506 | 625 | 659 | 706 |
|   |                              | X48       | 334                       | 389 | 455 | 503 | 537 | 575 | 263                       | 316 | 424 | 503 | 537 | 575 | 216                       | 259 | 347 | 436 | 525 | 575 |
|   |                              | 48-S      | 313                       | 349 | 393 | 433 | 456 | 488 | 235                       | 282 | 379 | 433 | 456 | 488 | 193                       | 231 | 311 | 390 | 456 | 488 |
|   | <b>160</b>                   | X80       | 492                       | 547 | 608 | 652 | 682 | 715 | 399                       | 460 | 608 | 652 | 682 | 715 | 328                       | 379 | 500 | 621 | 682 | 715 |
|   |                              | X48       | 356                       | 410 | 469 | 516 | 556 | 582 | 275                       | 317 | 418 | 516 | 556 | 582 | 225                       | 260 | 343 | 426 | 509 | 582 |
|   |                              | 48-S      | 327                       | 363 | 406 | 444 | 472 | 494 | 246                       | 283 | 374 | 444 | 472 | 494 | 202                       | 233 | 307 | 381 | 455 | 494 |
|   | <b>170</b>                   | X80       | 533                       | 577 | 631 | 681 | 708 | 738 | 419                       | 466 | 604 | 681 | 708 | 738 | 344                       | 383 | 497 | 610 | 708 | 738 |
|   |                              | X48       | 379                       | 422 | 484 | 530 | 572 | 601 | 288                       | 320 | 416 | 511 | 572 | 601 | 236                       | 262 | 341 | 419 | 497 | 575 |
|   |                              | 48-S      | 342                       | 379 | 419 | 457 | 490 | 511 | 258                       | 286 | 372 | 457 | 490 | 511 | 211                       | 235 | 305 | 375 | 445 | 511 |
| <b>180</b>  | X80                          | 575       | 606                       | 654 | 702 | 735 | 762 | 437 | 471                       | 601 | 702 | 735 | 762 | 359 | 387                       | 495 | 602 | 710 | 762 |     |
|   | X48                          | 399       | 430                       | 500 | 544 | 585 | 621 | 300 | 323                       | 413 | 503 | 585 | 621 | 246 | 265                       | 339 | 413 | 486 | 560 |     |
|   | 48-S                         | 356       | 384                       | 433 | 470 | 504 | 527 | 269 | 289                       | 370 | 450 | 504 | 527 | 220 | 237                       | 303 | 369 | 435 | 501 |     |
| <b>200</b>  | X80                          | 627       | 640                       | 702 | 746 | 789 | 814 | 475 | 485                       | 603 | 721 | 789 | 814 | 391 | 399                       | 496 | 593 | 689 | 786 |     |
|   | X48                          | 432       | 441                       | 532 | 573 | 612 | 649 | 326 | 333                       | 414 | 495 | 575 | 649 | 268 | 273                       | 339 | 406 | 472 | 538 |     |
|   | 48-S                         | 386       | 394                       | 463 | 496 | 528 | 559 | 292 | 298                       | 370 | 443 | 515 | 559 | 240 | 245                       | 304 | 363 | 423 | 482 |     |

| Table 1.16: Maximum Shear (lb.) - Wind Exposure B Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>B</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt;7° TO 27°</b>                                  | <b>110</b>                   | X80       | 35                        | 148 | 216 | 259 | 296 | 329 | 35                        | 148 | 216 | 259 | 296 | 329 | 31                        | 140 | 216 | 259 | 296 | 329 |
|   |                              | X48       | 26                        | 111 | 173 | 211 | 241 | 268 | 25                        | 111 | 173 | 211 | 241 | 268 | 21                        | 97  | 173 | 211 | 241 | 268 |
|   |                              | 48-S      | 25                        | 102 | 149 | 180 | 205 | 228 | 23                        | 102 | 149 | 180 | 205 | 228 | 19                        | 87  | 149 | 180 | 205 | 228 |
|   | <b>115</b>                   | X80       | 35                        | 148 | 216 | 259 | 296 | 329 | 35                        | 148 | 216 | 259 | 296 | 329 | 30                        | 134 | 216 | 259 | 296 | 329 |
|   |                              | X48       | 26                        | 111 | 173 | 211 | 241 | 268 | 24                        | 108 | 173 | 211 | 241 | 268 | 20                        | 93  | 165 | 211 | 241 | 268 |
|   |                              | 48-S      | 25                        | 102 | 149 | 180 | 205 | 228 | 22                        | 101 | 149 | 180 | 205 | 228 | 18                        | 83  | 147 | 180 | 205 | 228 |
|   | <b>120</b>                   | X80       | 35                        | 148 | 216 | 259 | 296 | 329 | 34                        | 148 | 216 | 259 | 296 | 329 | 28                        | 129 | 216 | 259 | 296 | 329 |
|   |                              | X48       | 26                        | 111 | 173 | 211 | 241 | 268 | 23                        | 105 | 173 | 211 | 241 | 268 | 20                        | 89  | 158 | 211 | 241 | 268 |
|   |                              | 48-S      | 25                        | 102 | 149 | 180 | 205 | 228 | 21                        | 97  | 149 | 180 | 205 | 228 | 17                        | 79  | 141 | 180 | 205 | 228 |
|   | <b>130</b>                   | X80       | 35                        | 147 | 216 | 259 | 296 | 329 | 32                        | 144 | 216 | 259 | 296 | 329 | 26                        | 119 | 211 | 259 | 296 | 329 |
|   |                              | X48       | 26                        | 110 | 172 | 211 | 241 | 268 | 22                        | 99  | 172 | 211 | 241 | 268 | 18                        | 82  | 146 | 209 | 241 | 268 |
|   |                              | 48-S      | 25                        | 101 | 148 | 180 | 205 | 228 | 20                        | 89  | 148 | 180 | 205 | 228 | 16                        | 73  | 130 | 180 | 205 | 228 |
|   | <b>140</b>                   | X80       | 34                        | 144 | 216 | 259 | 296 | 329 | 29                        | 134 | 216 | 259 | 296 | 329 | 24                        | 110 | 196 | 259 | 296 | 329 |
|   |                              | X48       | 25                        | 108 | 168 | 211 | 241 | 268 | 20                        | 93  | 165 | 211 | 241 | 268 | 17                        | 76  | 135 | 194 | 241 | 268 |
|   |                              | 48-S      | 24                        | 98  | 145 | 180 | 205 | 228 | 18                        | 83  | 145 | 180 | 205 | 228 | 15                        | 68  | 121 | 174 | 205 | 228 |
|   | <b>150</b>                   | X80       | 33                        | 142 | 212 | 259 | 296 | 329 | 27                        | 125 | 212 | 259 | 296 | 329 | 23                        | 103 | 183 | 259 | 296 | 329 |
|   |                              | X48       | 24                        | 106 | 165 | 209 | 241 | 268 | 19                        | 86  | 154 | 209 | 241 | 268 | 16                        | 71  | 126 | 181 | 236 | 268 |
|   |                              | 48-S      | 23                        | 95  | 142 | 180 | 205 | 228 | 17                        | 77  | 137 | 180 | 205 | 228 | 14                        | 63  | 112 | 162 | 205 | 228 |
|   | <b>160</b>                   | X80       | 32                        | 139 | 209 | 259 | 296 | 329 | 26                        | 117 | 209 | 259 | 296 | 329 | 21                        | 96  | 172 | 247 | 296 | 329 |
|   |                              | X48       | 23                        | 104 | 161 | 205 | 241 | 268 | 18                        | 81  | 144 | 205 | 241 | 268 | 15                        | 66  | 118 | 169 | 221 | 268 |
|   |                              | 48-S      | 21                        | 93  | 139 | 177 | 205 | 228 | 16                        | 72  | 128 | 177 | 205 | 228 | 13                        | 59  | 105 | 152 | 198 | 228 |
|   | <b>170</b>                   | X80       | 31                        | 137 | 205 | 259 | 296 | 329 | 24                        | 110 | 196 | 259 | 296 | 329 | 20                        | 91  | 162 | 232 | 296 | 329 |
|   |                              | X48       | 22                        | 100 | 158 | 202 | 239 | 268 | 17                        | 76  | 135 | 194 | 239 | 268 | 14                        | 62  | 111 | 159 | 208 | 256 |
|   |                              | 48-S      | 20                        | 90  | 136 | 174 | 205 | 228 | 15                        | 68  | 121 | 174 | 205 | 228 | 12                        | 56  | 99  | 143 | 186 | 228 |
| <b>180</b>  | X80                          | 30        | 134                       | 202 | 256 | 296 | 329 | 23  | 104                       | 185 | 256 | 296 | 329 | 19  | 86                        | 153 | 219 | 286 | 329 |     |
|   | X48                          | 21        | 95                        | 154 | 198 | 236 | 268 | 16  | 72                        | 127 | 183 | 236 | 268 | 13  | 59                        | 105 | 150 | 196 | 242 |     |
|   | 48-S                         | 19        | 85                        | 134 | 171 | 203 | 228 | 14  | 64                        | 114 | 164 | 203 | 228 | 12  | 53                        | 94  | 135 | 176 | 217 |     |
| <b>200</b>  | X80                          | 27        | 124                       | 195 | 249 | 295 | 329 | 21  | 94                        | 167 | 240 | 295 | 329 | 17  | 77                        | 137 | 197 | 258 | 318 |     |
|   | X48                          | 19        | 85                        | 147 | 191 | 229 | 262 | 14  | 64                        | 115 | 165 | 215 | 262 | 12  | 53                        | 94  | 135 | 176 | 218 |     |
|   | 48-S                         | 17        | 76                        | 128 | 165 | 197 | 226 | 13  | 58                        | 103 | 147 | 192 | 226 | 10  | 47                        | 84  | 121 | 158 | 195 |     |

| Table 1.17: Maximum Span Length (in.) - Wind Exposure C Condition |                              |           |                           |     |    |    |    |    |                           |     |    |    |    |    |                           |    |    |    |    |    |
|---|------------------------------|-----------|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|---------------------------|----|----|----|----|----|
| Exposure<br><b>C</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |    |    |    |    | Roof Wind Pressure Zone 2 |     |    |    |    |    | Roof Wind Pressure Zone 3 |    |    |    |    |    |
|   |                              |           | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    |
|   |                              |           | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 |
| <b>ROOFS &gt; 7° TO 27°</b>                                       | <b>110</b>                   | X80       | 127                       | 118 | 98 | 81 | 71 | 64 | 116                       | 116 | 98 | 81 | 71 | 64 | 95                        | 95 | 95 | 81 | 71 | 64 |
|   |                              | X48       | 95                        | 88  | 77 | 66 | 58 | 52 | 80                        | 80  | 77 | 66 | 58 | 52 | 66                        | 66 | 66 | 66 | 58 | 52 |
|   |                              | 48-S      | 91                        | 81  | 67 | 56 | 49 | 44 | 72                        | 72  | 67 | 56 | 49 | 44 | 59                        | 59 | 59 | 56 | 49 | 44 |
|   | <b>115</b>                   | X80       | 124                       | 117 | 98 | 81 | 71 | 64 | 111                       | 111 | 98 | 81 | 71 | 64 | 91                        | 91 | 91 | 81 | 71 | 64 |
|   |                              | X48       | 93                        | 87  | 77 | 66 | 58 | 52 | 77                        | 77  | 77 | 66 | 58 | 52 | 63                        | 63 | 63 | 63 | 58 | 52 |
|   |                              | 48-S      | 90                        | 80  | 66 | 56 | 49 | 44 | 68                        | 68  | 66 | 56 | 49 | 44 | 56                        | 56 | 56 | 56 | 49 | 44 |
|   | <b>120</b>                   | X80       | 122                       | 116 | 97 | 81 | 71 | 64 | 106                       | 106 | 97 | 81 | 71 | 64 | 87                        | 87 | 87 | 81 | 71 | 64 |
|   |                              | X48       | 91                        | 87  | 76 | 66 | 58 | 52 | 73                        | 73  | 73 | 66 | 58 | 52 | 60                        | 60 | 60 | 60 | 58 | 52 |
|   |                              | 48-S      | 87                        | 78  | 65 | 56 | 49 | 44 | 66                        | 66  | 65 | 56 | 49 | 44 | 54                        | 54 | 54 | 54 | 49 | 44 |
|   | <b>130</b>                   | X80       | 118                       | 113 | 95 | 81 | 71 | 64 | 98                        | 98  | 95 | 81 | 71 | 64 | 81                        | 81 | 81 | 81 | 71 | 64 |
|   |                              | X48       | 86                        | 85  | 74 | 65 | 58 | 52 | 68                        | 68  | 68 | 65 | 58 | 52 | 55                        | 55 | 55 | 55 | 55 | 52 |
|   |                              | 48-S      | 80                        | 76  | 64 | 56 | 49 | 44 | 60                        | 60  | 60 | 56 | 49 | 44 | 50                        | 50 | 50 | 50 | 49 | 44 |
|   | <b>140</b>                   | X80       | 114                       | 111 | 93 | 81 | 71 | 64 | 91                        | 91  | 91 | 81 | 71 | 64 | 75                        | 75 | 75 | 75 | 71 | 64 |
|   |                              | X48       | 82                        | 82  | 72 | 64 | 58 | 52 | 63                        | 63  | 63 | 63 | 58 | 52 | 51                        | 51 | 51 | 51 | 51 | 51 |
|   |                              | 48-S      | 74                        | 73  | 62 | 55 | 49 | 44 | 56                        | 56  | 56 | 55 | 49 | 44 | 46                        | 46 | 46 | 46 | 46 | 44 |
|   | <b>150</b>                   | X80       | 111                       | 109 | 92 | 81 | 71 | 64 | 85                        | 85  | 85 | 81 | 71 | 64 | 70                        | 70 | 70 | 70 | 70 | 64 |
|   |                              | X48       | 78                        | 78  | 70 | 62 | 57 | 52 | 58                        | 58  | 58 | 58 | 57 | 52 | 48                        | 48 | 48 | 48 | 48 | 48 |
|   |                              | 48-S      | 69                        | 69  | 61 | 54 | 49 | 44 | 52                        | 52  | 52 | 52 | 49 | 44 | 43                        | 43 | 43 | 43 | 43 | 43 |
|   | <b>160</b>                   | X80       | 105                       | 105 | 90 | 79 | 71 | 64 | 80                        | 80  | 80 | 79 | 71 | 64 | 66                        | 66 | 66 | 66 | 66 | 64 |
|   |                              | X48       | 73                        | 73  | 68 | 61 | 56 | 52 | 55                        | 55  | 55 | 55 | 55 | 52 | 45                        | 45 | 45 | 45 | 45 | 45 |
|   |                              | 48-S      | 65                        | 65  | 59 | 53 | 48 | 44 | 49                        | 49  | 49 | 49 | 48 | 44 | 40                        | 40 | 40 | 40 | 40 | 40 |
|   | <b>170</b>                   | X80       | 99                        | 99  | 88 | 78 | 71 | 64 | 75                        | 75  | 75 | 75 | 71 | 64 | 62                        | 62 | 62 | 62 | 62 | 62 |
|   |                              | X48       | 68                        | 68  | 66 | 60 | 55 | 51 | 51                        | 51  | 51 | 51 | 51 | 51 | 42                        | 42 | 42 | 42 | 42 | 42 |
|   |                              | 48-S      | 61                        | 61  | 58 | 52 | 47 | 44 | 46                        | 46  | 46 | 46 | 46 | 44 | 38                        | 38 | 38 | 38 | 38 | 38 |
|   | <b>180</b>                   | X80       | 93                        | 93  | 86 | 77 | 70 | 64 | 71                        | 71  | 71 | 71 | 70 | 64 | 58                        | 58 | 58 | 58 | 58 | 58 |
|   |                              | X48       | 64                        | 64  | 64 | 59 | 54 | 50 | 49                        | 49  | 49 | 49 | 49 | 49 | 40                        | 40 | 40 | 40 | 40 | 40 |
|   |                              | 48-S      | 58                        | 58  | 56 | 51 | 47 | 43 | 43                        | 43  | 43 | 43 | 43 | 43 | 36                        | 36 | 36 | 36 | 36 | 36 |
|   | <b>200</b>                   | X80       | 84                        | 84  | 82 | 74 | 68 | 63 | 64                        | 64  | 64 | 64 | 64 | 63 | 52                        | 52 | 52 | 52 | 52 | 52 |
|   |                              | X48       | 58                        | 58  | 58 | 56 | 52 | 49 | 44                        | 44  | 44 | 44 | 44 | 44 | 36                        | 36 | 36 | 36 | 36 | 36 |
|   |                              | 48-S      | 52                        | 52  | 52 | 49 | 45 | 42 | 39                        | 39  | 39 | 39 | 39 | 39 | 32                        | 32 | 32 | 32 | 32 | 32 |

| Table 1.18: Maximum Uplift (lb.) - Wind Exposure C Condition |                              |           |                           |       |       |      |      |      |                           |       |       |       |       |       |                           |       |       |       |       |       |
|--|------------------------------|-----------|---------------------------|-------|-------|------|------|------|---------------------------|-------|-------|-------|-------|-------|---------------------------|-------|-------|-------|-------|-------|
| Exposure<br><b>C</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |       |       |      |      |      | Roof Wind Pressure Zone 2 |       |       |       |       |       | Roof Wind Pressure Zone 3 |       |       |       |       |       |
|  |                              |           | Roof Snow Load (psf)      |       |       |      |      |      | Roof Snow Load (psf)      |       |       |       |       |       | Roof Snow Load (psf)      |       |       |       |       |       |
|  |                              |           | 0                         | 10    | 20    | 30   | 40   | 50   | 0                         | 10    | 20    | 30    | 40    | 50    | 0                         | 10    | 20    | 30    | 40    | 50    |
| <b>ROOFS &gt; 7° TO 27°</b>                                  | <b>110</b>                   | X80       | -441                      | -412  | -341  | -284 | -249 | -224 | -735                      | -735  | -619  | -517  | -452  | -407  | -909                      | -909  | -909  | -777  | -681  | -613  |
|  |                              | X48       | -330                      | -308  | -270  | -231 | -203 | -182 | -506                      | -506  | -491  | -421  | -368  | -332  | -626                      | -626  | -626  | -626  | -554  | -499  |
|  |                              | 48-S      | -319                      | -282  | -233  | -197 | -172 | -155 | -454                      | -454  | -423  | -357  | -313  | -282  | -560                      | -560  | -560  | -538  | -471  | -424  |
|  | <b>115</b>                   | X80       | -479                      | -450  | -376  | -314 | -275 | -247 | -772                      | -772  | -680  | -567  | -496  | -447  | -953                      | -953  | -953  | -851  | -745  | -671  |
|  |                              | X48       | -358                      | -337  | -295  | -256 | -224 | -202 | -533                      | -533  | -532  | -462  | -404  | -364  | -656                      | -656  | -656  | -656  | -607  | -547  |
|  |                              | 48-S      | -346                      | -306  | -254  | -217 | -190 | -171 | -476                      | -476  | -459  | -392  | -343  | -309  | -586                      | -586  | -586  | -586  | -516  | -464  |
|  | <b>120</b>                   | X80       | -515                      | -488  | -410  | -344 | -301 | -271 | -809                      | -809  | -740  | -620  | -543  | -489  | -997                      | -997  | -997  | -930  | -814  | -733  |
|  |                              | X48       | -386                      | -365  | -319  | -280 | -245 | -221 | -559                      | -559  | -559  | -505  | -442  | -398  | -686                      | -686  | -686  | -686  | -663  | -597  |
|  |                              | 48-S      | -368                      | -330  | -275  | -238 | -208 | -187 | -499                      | -499  | -496  | -429  | -376  | -338  | -613                      | -613  | -613  | -613  | -563  | -507  |
|  | <b>130</b>                   | X80       | -591                      | -567  | -478  | -408 | -357 | -322 | -881                      | -881  | -856  | -732  | -641  | -577  | -1085                     | -1085 | -1085 | -1085 | -960  | -864  |
|  |                              | X48       | -433                      | -425  | -369  | -326 | -291 | -262 | -607                      | -607  | -607  | -585  | -522  | -470  | -745                      | -745  | -745  | -745  | -745  | -704  |
|  |                              | 48-S      | -402                      | -379  | -319  | -281 | -247 | -223 | -543                      | -543  | -543  | -503  | -443  | -399  | -667                      | -667  | -667  | -667  | -664  | -598  |
|  | <b>140</b>                   | X80       | -672                      | -652  | -549  | -479 | -419 | -377 | -955                      | -955  | -955  | -854  | -748  | -673  | -1174                     | -1174 | -1174 | -1174 | -1118 | -1007 |
|  |                              | X48       | -481                      | -481  | -422  | -375 | -341 | -308 | -657                      | -657  | -657  | -657  | -608  | -549  | -805                      | -805  | -805  | -805  | -805  | -805  |
|  |                              | 48-S      | -437                      | -430  | -366  | -323 | -290 | -261 | -587                      | -587  | -587  | -577  | -518  | -466  | -720                      | -720  | -720  | -720  | -720  | -697  |
|  | <b>150</b>                   | X80       | -752                      | -736  | -621  | -547 | -484 | -436 | -1027                     | -1027 | -1027 | -975  | -862  | -776  | -1261                     | -1261 | -1261 | -1261 | -1261 | -1159 |
|  |                              | X48       | -527                      | -527  | -475  | -424 | -387 | -355 | -706                      | -706  | -706  | -706  | -689  | -632  | -864                      | -864  | -864  | -864  | -864  | -864  |
|  |                              | 48-S      | -470                      | -470  | -412  | -366 | -333 | -301 | -631                      | -631  | -631  | -631  | -593  | -537  | -774                      | -774  | -774  | -774  | -774  | -774  |
|  | <b>160</b>                   | X80       | -817                      | -817  | -696  | -616 | -554 | -499 | -1100                     | -1100 | -1100 | -1095 | -985  | -886  | -1348                     | -1348 | -1348 | -1348 | -1348 | -1321 |
|  |                              | X48       | -564                      | -564  | -530  | -475 | -435 | -403 | -755                      | -755  | -755  | -755  | -755  | -717  | -923                      | -923  | -923  | -923  | -923  | -923  |
|  |                              | 48-S      | -504                      | -504  | -460  | -411 | -375 | -345 | -675                      | -675  | -675  | -675  | -666  | -613  | -826                      | -826  | -826  | -826  | -826  | -826  |
|  | <b>170</b>                   | X80       | -873                      | -873  | -774  | -688 | -626 | -567 | -1171                     | -1171 | -1171 | -1171 | -1107 | -1003 | -1435                     | -1435 | -1435 | -1435 | -1435 | -1435 |
|  |                              | X48       | -602                      | -602  | -586  | -528 | -485 | -451 | -804                      | -804  | -804  | -804  | -804  | -798  | -982                      | -982  | -982  | -982  | -982  | -982  |
|  |                              | 48-S      | -538                      | -538  | -509  | -458 | -419 | -389 | -719                      | -719  | -719  | -719  | -719  | -687  | -880                      | -880  | -880  | -880  | -880  | -880  |
|  | <b>180</b>                   | X80       | -928                      | -928  | -852  | -761 | -694 | -638 | -1244                     | -1244 | -1244 | -1244 | -1227 | -1128 | -1522                     | -1522 | -1522 | -1522 | -1522 | -1522 |
|  |                              | X48       | -639                      | -639  | -639  | -581 | -536 | -499 | -853                      | -853  | -853  | -853  | -853  | -853  | -1041                     | -1041 | -1041 | -1041 | -1041 | -1041 |
|  |                              | 48-S      | -571                      | -571  | -559  | -504 | -463 | -431 | -763                      | -763  | -763  | -763  | -763  | -762  | -932                      | -932  | -932  | -932  | -932  | -932  |
|  | <b>200</b>                   | X80       | -1039                     | -1039 | -1014 | -913 | -838 | -779 | -1387                     | -1387 | -1387 | -1387 | -1387 | -1370 | -1695                     | -1695 | -1695 | -1695 | -1695 | -1695 |
|  |                              | X48       | -714                      | -714  | -714  | -692 | -642 | -601 | -949                      | -949  | -949  | -949  | -949  | -949  | -1159                     | -1159 | -1159 | -1159 | -1159 | -1159 |
|  |                              | 48-S      | -639                      | -639  | -639  | -602 | -556 | -520 | -850                      | -850  | -850  | -850  | -850  | -850  | -1038                     | -1038 | -1038 | -1038 | -1038 | -1038 |

| Table 1.19: Maximum Downforce (lb.) - Wind Exposure C Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>C</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt; 7° TO 27°</b>                                     | <b>110</b>                   | X80       | 379                       | 467 | 539 | 576 | 635 | 706 | 347                       | 458 | 539 | 576 | 635 | 706 | 286                       | 377 | 526 | 576 | 635 | 706 |
|   |                              | X48       | 284                       | 350 | 427 | 470 | 518 | 575 | 239                       | 316 | 427 | 470 | 518 | 575 | 197                       | 260 | 362 | 465 | 518 | 575 |
|   |                              | 48-S      | 274                       | 320 | 368 | 399 | 440 | 488 | 215                       | 283 | 368 | 399 | 440 | 488 | 176                       | 232 | 324 | 399 | 440 | 488 |
|   | <b>115</b>                   | X80       | 401                       | 482 | 556 | 591 | 635 | 706 | 358                       | 458 | 556 | 591 | 635 | 706 | 294                       | 377 | 519 | 591 | 635 | 706 |
|   |                              | X48       | 300                       | 361 | 435 | 481 | 518 | 575 | 248                       | 317 | 435 | 481 | 518 | 575 | 203                       | 259 | 357 | 455 | 518 | 575 |
|   |                              | 48-S      | 290                       | 328 | 375 | 409 | 440 | 488 | 221                       | 283 | 375 | 409 | 440 | 488 | 181                       | 232 | 319 | 407 | 440 | 488 |
|   | <b>120</b>                   | X80       | 422                       | 497 | 570 | 605 | 641 | 706 | 367                       | 457 | 570 | 605 | 641 | 706 | 302                       | 376 | 512 | 605 | 641 | 706 |
|   |                              | X48       | 316                       | 373 | 443 | 493 | 522 | 575 | 254                       | 316 | 430 | 493 | 522 | 575 | 208                       | 259 | 352 | 446 | 522 | 575 |
|   |                              | 48-S      | 302                       | 337 | 382 | 418 | 443 | 488 | 227                       | 282 | 382 | 418 | 443 | 488 | 186                       | 231 | 315 | 399 | 443 | 488 |
|   | <b>130</b>                   | X80       | 468                       | 530 | 595 | 635 | 668 | 706 | 389                       | 459 | 595 | 635 | 668 | 706 | 320                       | 377 | 503 | 629 | 668 | 706 |
|   |                              | X48       | 342                       | 397 | 460 | 508 | 544 | 575 | 268                       | 316 | 422 | 508 | 544 | 575 | 219                       | 259 | 346 | 432 | 518 | 575 |
|   |                              | 48-S      | 318                       | 354 | 397 | 437 | 462 | 488 | 239                       | 283 | 377 | 437 | 462 | 488 | 196                       | 232 | 309 | 386 | 462 | 488 |
|   | <b>140</b>                   | X80       | 515                       | 564 | 621 | 668 | 696 | 727 | 410                       | 463 | 605 | 668 | 696 | 727 | 337                       | 381 | 497 | 614 | 696 | 727 |
|   |                              | X48       | 368                       | 416 | 477 | 524 | 566 | 593 | 282                       | 318 | 416 | 514 | 566 | 593 | 231                       | 261 | 341 | 421 | 502 | 582 |
|   |                              | 48-S      | 334                       | 372 | 413 | 451 | 482 | 503 | 252                       | 285 | 372 | 451 | 482 | 503 | 207                       | 234 | 305 | 377 | 449 | 503 |
|   | <b>150</b>                   | X80       | 563                       | 599 | 648 | 697 | 727 | 755 | 432                       | 469 | 601 | 697 | 727 | 755 | 355                       | 385 | 495 | 604 | 713 | 755 |
|   |                              | X48       | 394                       | 428 | 495 | 540 | 581 | 615 | 297                       | 322 | 413 | 505 | 581 | 615 | 243                       | 264 | 339 | 414 | 488 | 563 |
|   |                              | 48-S      | 352                       | 382 | 430 | 466 | 501 | 523 | 265                       | 288 | 370 | 451 | 501 | 523 | 218                       | 236 | 303 | 370 | 437 | 504 |
|   | <b>160</b>                   | X80       | 599                       | 629 | 676 | 722 | 760 | 785 | 454                       | 476 | 601 | 722 | 760 | 785 | 373                       | 392 | 494 | 596 | 699 | 785 |
|   |                              | X48       | 414                       | 434 | 514 | 557 | 597 | 635 | 312                       | 327 | 412 | 498 | 583 | 635 | 256                       | 268 | 338 | 408 | 478 | 548 |
|   |                              | 48-S      | 370                       | 388 | 446 | 482 | 515 | 543 | 279                       | 293 | 369 | 445 | 515 | 543 | 229                       | 240 | 303 | 366 | 428 | 491 |
|   | <b>170</b>                   | X80       | 630                       | 642 | 705 | 749 | 792 | 817 | 478                       | 486 | 604 | 721 | 792 | 817 | 393                       | 400 | 496 | 592 | 689 | 785 |
|   |                              | X48       | 435                       | 442 | 534 | 575 | 614 | 650 | 328                       | 334 | 414 | 494 | 575 | 650 | 269                       | 274 | 340 | 406 | 471 | 537 |
|   |                              | 48-S      | 388                       | 395 | 464 | 498 | 530 | 560 | 293                       | 299 | 370 | 442 | 514 | 560 | 241                       | 245 | 304 | 363 | 422 | 481 |
| <b>180</b>  | X80                          | 661       | 661                       | 735 | 776 | 817 | 851 | 500 | 500                       | 607 | 717 | 817 | 851 | 412 | 412                       | 499 | 590 | 681 | 772 |     |
|   | X48                          | 455       | 455                       | 552 | 593 | 631 | 666 | 343 | 343                       | 416 | 492 | 567 | 643 | 282 | 282                       | 341 | 404 | 466 | 528 |     |
|   | 48-S                         | 407       | 407                       | 482 | 514 | 545 | 575 | 307 | 307                       | 372 | 440 | 508 | 575 | 252 | 252                       | 306 | 361 | 417 | 473 |     |
| <b>200</b>  | X80                          | 722       | 722                       | 796 | 833 | 870 | 907 | 548 | 548                       | 619 | 718 | 818 | 907 | 450 | 450                       | 509 | 591 | 673 | 754 |     |
|   | X48                          | 496       | 496                       | 561 | 631 | 666 | 700 | 375 | 375                       | 424 | 492 | 560 | 628 | 308 | 308                       | 348 | 404 | 460 | 516 |     |
|   | 48-S                         | 444       | 444                       | 502 | 549 | 577 | 605 | 336 | 336                       | 379 | 440 | 501 | 562 | 276 | 276                       | 312 | 362 | 412 | 462 |     |

| Table 1.20: Maximum Shear (lb.) - Wind Exposure C Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>C</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt; 7° TO 27°</b>                                 | <b>110</b>                   | X80       | 35                        | 147 | 216 | 259 | 296 | 329 | 32                        | 144 | 216 | 259 | 296 | 329 | 26                        | 119 | 211 | 259 | 296 | 329 |
|   |                              | X48       | 26                        | 110 | 172 | 211 | 241 | 268 | 22                        | 99  | 172 | 211 | 241 | 268 | 18                        | 82  | 145 | 209 | 241 | 268 |
|   |                              | 48-S      | 25                        | 101 | 148 | 180 | 205 | 228 | 20                        | 89  | 148 | 180 | 205 | 228 | 16                        | 73  | 130 | 180 | 205 | 228 |
|   | <b>115</b>                   | X80       | 34                        | 145 | 216 | 259 | 296 | 329 | 30                        | 138 | 216 | 259 | 296 | 329 | 25                        | 113 | 202 | 259 | 296 | 329 |
|   |                              | X48       | 25                        | 109 | 169 | 211 | 241 | 268 | 21                        | 95  | 169 | 211 | 241 | 268 | 17                        | 78  | 139 | 200 | 241 | 268 |
|   |                              | 48-S      | 25                        | 99  | 146 | 180 | 205 | 228 | 19                        | 85  | 146 | 180 | 205 | 228 | 15                        | 70  | 124 | 179 | 205 | 228 |
|   | <b>120</b>                   | X80       | 33                        | 144 | 215 | 259 | 296 | 329 | 29                        | 132 | 215 | 259 | 296 | 329 | 24                        | 109 | 193 | 259 | 296 | 329 |
|   |                              | X48       | 25                        | 108 | 167 | 211 | 241 | 268 | 20                        | 91  | 162 | 211 | 241 | 268 | 16                        | 75  | 133 | 191 | 241 | 268 |
|   |                              | 48-S      | 24                        | 97  | 144 | 180 | 205 | 228 | 18                        | 81  | 144 | 180 | 205 | 228 | 15                        | 67  | 119 | 171 | 205 | 228 |
|   | <b>130</b>                   | X80       | 32                        | 141 | 211 | 259 | 296 | 329 | 27                        | 122 | 211 | 259 | 296 | 329 | 22                        | 100 | 179 | 257 | 296 | 329 |
|   |                              | X48       | 24                        | 105 | 163 | 207 | 241 | 268 | 18                        | 84  | 150 | 207 | 241 | 268 | 15                        | 69  | 123 | 176 | 230 | 268 |
|   |                              | 48-S      | 22                        | 94  | 141 | 178 | 205 | 228 | 17                        | 75  | 134 | 178 | 205 | 228 | 14                        | 62  | 110 | 158 | 205 | 228 |
|   | <b>140</b>                   | X80       | 31                        | 138 | 207 | 259 | 296 | 329 | 25                        | 113 | 202 | 259 | 296 | 329 | 20                        | 93  | 166 | 238 | 296 | 329 |
|   |                              | X48       | 22                        | 102 | 159 | 203 | 241 | 268 | 17                        | 78  | 139 | 200 | 241 | 268 | 14                        | 64  | 114 | 164 | 213 | 263 |
|   |                              | 48-S      | 20                        | 91  | 138 | 175 | 205 | 228 | 15                        | 70  | 124 | 175 | 205 | 228 | 13                        | 57  | 102 | 146 | 191 | 228 |
|   | <b>150</b>                   | X80       | 30                        | 135 | 203 | 257 | 296 | 329 | 23                        | 106 | 188 | 257 | 296 | 329 | 19                        | 87  | 155 | 222 | 290 | 329 |
|   |                              | X48       | 21                        | 97  | 155 | 199 | 237 | 268 | 16                        | 73  | 129 | 186 | 237 | 268 | 13                        | 60  | 106 | 153 | 199 | 245 |
|   |                              | 48-S      | 19                        | 86  | 134 | 172 | 204 | 228 | 14                        | 65  | 116 | 166 | 204 | 228 | 12                        | 53  | 95  | 136 | 178 | 220 |
|   | <b>160</b>                   | X80       | 29                        | 131 | 198 | 253 | 296 | 329 | 22                        | 99  | 176 | 253 | 296 | 329 | 18                        | 81  | 145 | 209 | 272 | 329 |
|   |                              | X48       | 20                        | 90  | 151 | 195 | 233 | 266 | 15                        | 68  | 121 | 174 | 227 | 266 | 12                        | 56  | 99  | 143 | 186 | 230 |
|   |                              | 48-S      | 18                        | 81  | 131 | 168 | 201 | 228 | 13                        | 61  | 108 | 156 | 201 | 228 | 11                        | 50  | 89  | 128 | 167 | 206 |
|   | <b>170</b>                   | X80       | 27                        | 123 | 194 | 248 | 295 | 329 | 21                        | 93  | 166 | 239 | 295 | 329 | 17                        | 77  | 137 | 196 | 256 | 316 |
|   |                              | X48       | 19                        | 85  | 147 | 191 | 228 | 262 | 14                        | 64  | 114 | 164 | 214 | 262 | 12                        | 52  | 93  | 134 | 175 | 216 |
|   |                              | 48-S      | 17                        | 76  | 128 | 165 | 197 | 226 | 13                        | 57  | 102 | 147 | 191 | 226 | 10                        | 47  | 84  | 120 | 157 | 194 |
|   | <b>180</b>                   | X80       | 26                        | 116 | 190 | 244 | 290 | 329 | 19                        | 88  | 157 | 225 | 290 | 329 | 16                        | 72  | 129 | 185 | 242 | 298 |
|   |                              | X48       | 18                        | 80  | 143 | 186 | 224 | 258 | 13                        | 60  | 107 | 155 | 202 | 249 | 11                        | 50  | 88  | 127 | 166 | 204 |
|   |                              | 48-S      | 16                        | 72  | 125 | 162 | 194 | 222 | 12                        | 54  | 96  | 138 | 180 | 222 | 10                        | 44  | 79  | 114 | 148 | 183 |
|   | <b>200</b>                   | X80       | 23                        | 105 | 182 | 235 | 282 | 323 | 17                        | 79  | 141 | 203 | 265 | 323 | 14                        | 65  | 116 | 167 | 218 | 269 |
|   |                              | X48       | 16                        | 72  | 128 | 178 | 216 | 249 | 12                        | 54  | 97  | 139 | 181 | 224 | 10                        | 45  | 79  | 114 | 149 | 184 |
|   |                              | 48-S      | 14                        | 64  | 114 | 155 | 187 | 215 | 11                        | 49  | 87  | 124 | 162 | 200 | 9                         | 40  | 71  | 102 | 133 | 164 |

| Table 1.21: Maximum Span Length - Wind Exposure D Condition |                              |           |                           |     |    |    |    |    |                           |     |    |    |    |    |                           |    |    |    |    |    |
|---|------------------------------|-----------|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|---------------------------|----|----|----|----|----|
| Exposure<br><b>D</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |    |    |    |    | Roof Wind Pressure Zone 2 |     |    |    |    |    | Roof Wind Pressure Zone 3 |    |    |    |    |    |
|   |                              |           | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |    |    |    |    |    |
|   |                              |           | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10 | 20 | 30 | 40 | 50 |
| <b>ROOFS &gt; 7° TO 27°</b>                                 | <b>110</b>                   | X80       | 122                       | 116 | 97 | 81 | 71 | 64 | 106                       | 106 | 97 | 81 | 71 | 64 | 87                        | 87 | 87 | 81 | 71 | 64 |
|   |                              | X48       | 92                        | 87  | 76 | 66 | 58 | 52 | 73                        | 73  | 73 | 66 | 58 | 52 | 60                        | 60 | 60 | 60 | 58 | 52 |
|   |                              | 48-S      | 87                        | 78  | 65 | 56 | 49 | 44 | 66                        | 66  | 65 | 56 | 49 | 44 | 54                        | 54 | 54 | 54 | 49 | 44 |
|   | <b>115</b>                   | X80       | 120                       | 114 | 96 | 81 | 71 | 64 | 102                       | 102 | 96 | 81 | 71 | 64 | 84                        | 84 | 84 | 81 | 71 | 64 |
|   |                              | X48       | 89                        | 86  | 75 | 66 | 58 | 52 | 70                        | 70  | 70 | 66 | 58 | 52 | 58                        | 58 | 58 | 58 | 58 | 52 |
|   |                              | 48-S      | 83                        | 77  | 64 | 56 | 49 | 44 | 63                        | 63  | 63 | 56 | 49 | 44 | 51                        | 51 | 51 | 51 | 49 | 44 |
|   | <b>120</b>                   | X80       | 118                       | 113 | 95 | 81 | 71 | 64 | 98                        | 98  | 95 | 81 | 71 | 64 | 80                        | 80 | 80 | 80 | 71 | 64 |
|   |                              | X48       | 86                        | 85  | 74 | 65 | 58 | 52 | 67                        | 67  | 67 | 65 | 58 | 52 | 55                        | 55 | 55 | 55 | 55 | 52 |
|   |                              | 48-S      | 80                        | 76  | 64 | 56 | 49 | 44 | 60                        | 60  | 60 | 56 | 49 | 44 | 49                        | 49 | 49 | 49 | 49 | 44 |
|   | <b>130</b>                   | X80       | 114                       | 111 | 93 | 81 | 71 | 64 | 90                        | 90  | 90 | 81 | 71 | 64 | 74                        | 74 | 74 | 74 | 71 | 64 |
|   |                              | X48       | 81                        | 81  | 72 | 64 | 58 | 52 | 62                        | 62  | 62 | 62 | 58 | 52 | 51                        | 51 | 51 | 51 | 51 | 51 |
|   |                              | 48-S      | 74                        | 73  | 62 | 55 | 49 | 44 | 55                        | 55  | 55 | 55 | 49 | 44 | 45                        | 45 | 45 | 45 | 45 | 44 |
|   | <b>140</b>                   | X80       | 110                       | 108 | 91 | 80 | 71 | 64 | 84                        | 84  | 84 | 80 | 71 | 64 | 69                        | 69 | 69 | 69 | 69 | 64 |
|   |                              | X48       | 76                        | 76  | 70 | 62 | 57 | 52 | 57                        | 57  | 57 | 57 | 57 | 52 | 47                        | 47 | 47 | 47 | 47 | 47 |
|   |                              | 48-S      | 68                        | 68  | 60 | 54 | 49 | 44 | 51                        | 51  | 51 | 51 | 49 | 44 | 42                        | 42 | 42 | 42 | 42 | 42 |
|   | <b>150</b>                   | X80       | 103                       | 103 | 89 | 79 | 71 | 64 | 78                        | 78  | 78 | 78 | 71 | 64 | 64                        | 64 | 64 | 64 | 64 | 64 |
|   |                              | X48       | 71                        | 71  | 68 | 61 | 56 | 52 | 54                        | 54  | 54 | 54 | 54 | 52 | 44                        | 44 | 44 | 44 | 44 | 44 |
|   |                              | 48-S      | 64                        | 64  | 59 | 53 | 48 | 44 | 48                        | 48  | 48 | 48 | 48 | 44 | 39                        | 39 | 39 | 39 | 39 | 39 |
|   | <b>160</b>                   | X80       | 97                        | 97  | 87 | 77 | 70 | 64 | 73                        | 73  | 73 | 73 | 70 | 64 | 60                        | 60 | 60 | 60 | 60 | 60 |
|   |                              | X48       | 67                        | 67  | 66 | 59 | 55 | 51 | 50                        | 50  | 50 | 50 | 50 | 50 | 41                        | 41 | 41 | 41 | 41 | 41 |
|   |                              | 48-S      | 59                        | 59  | 57 | 51 | 47 | 44 | 45                        | 45  | 45 | 45 | 45 | 44 | 37                        | 37 | 37 | 37 | 37 | 37 |
|   | <b>170</b>                   | X80       | 91                        | 91  | 85 | 76 | 69 | 64 | 69                        | 69  | 69 | 69 | 69 | 64 | 57                        | 57 | 57 | 57 | 57 | 57 |
|   |                              | X48       | 63                        | 63  | 63 | 58 | 53 | 50 | 47                        | 47  | 47 | 47 | 47 | 47 | 39                        | 39 | 39 | 39 | 39 | 39 |
|   |                              | 48-S      | 56                        | 56  | 56 | 50 | 46 | 43 | 42                        | 42  | 42 | 42 | 42 | 42 | 35                        | 35 | 35 | 35 | 35 | 35 |
|   | <b>180</b>                   | X80       | 86                        | 86  | 83 | 74 | 68 | 63 | 65                        | 65  | 65 | 65 | 65 | 63 | 53                        | 53 | 53 | 53 | 53 | 53 |
|   |                              | X48       | 59                        | 59  | 59 | 56 | 52 | 49 | 45                        | 45  | 45 | 45 | 45 | 45 | 37                        | 37 | 37 | 37 | 37 | 37 |
|   |                              | 48-S      | 53                        | 53  | 53 | 49 | 45 | 42 | 40                        | 40  | 40 | 40 | 40 | 40 | 33                        | 33 | 33 | 33 | 33 | 33 |
|   | <b>200</b>                   | X80       | 77                        | 77  | 77 | 72 | 66 | 61 | 59                        | 59  | 59 | 59 | 59 | 59 | 48                        | 48 | 48 | 48 | 48 | 48 |
|   |                              | X48       | 53                        | 53  | 53 | 53 | 50 | 47 | 40                        | 40  | 40 | 40 | 40 | 40 | 33                        | 33 | 33 | 33 | 33 | 33 |
|   |                              | 48-S      | 47                        | 47  | 47 | 47 | 44 | 41 | 36                        | 36  | 36 | 36 | 36 | 36 | 29                        | 29 | 29 | 29 | 29 | 29 |



| Table 1.22: Maximum Uplift (lb.) - Wind Exposure D Condition |                              |           |                           |       |       |       |      |      |                           |       |       |       |       |       |                           |       |       |       |       |       |
|--|------------------------------|-----------|---------------------------|-------|-------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|---------------------------|-------|-------|-------|-------|-------|
| Exposure<br><b>D</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |       |       |       |      |      | Roof Wind Pressure Zone 2 |       |       |       |       |       | Roof Wind Pressure Zone 3 |       |       |       |       |       |
|  |                              |           | Roof Snow Load (psf)      |       |       |       |      |      | Roof Snow Load (psf)      |       |       |       |       |       | Roof Snow Load (psf)      |       |       |       |       |       |
|  |                              |           | 0                         | 10    | 20    | 30    | 40   | 50   | 0                         | 10    | 20    | 30    | 40    | 50    | 0                         | 10    | 20    | 30    | 40    | 50    |
| <b>ROOFS &gt;7° TO 27°</b>                                   | <b>110</b>                   | X80       | -513                      | -486  | -408  | -342  | -299 | -270 | -807                      | -807  | -738  | -618  | -541  | -487  | -996                      | -996  | -996  | -927  | -812  | -731  |
|  |                              | X48       | -384                      | -364  | -318  | -279  | -244 | -220 | -557                      | -557  | -557  | -503  | -441  | -397  | -685                      | -685  | -685  | -685  | -661  | -595  |
|  |                              | 48-S      | -367                      | -329  | -274  | -237  | -207 | -187 | -498                      | -498  | -495  | -428  | -374  | -337  | -612                      | -612  | -612  | -612  | -562  | -506  |
|  | <b>115</b>                   | X80       | -556                      | -530  | -446  | -377  | -330 | -298 | -847                      | -847  | -800  | -677  | -593  | -534  | -1043                     | -1043 | -1043 | -1015 | -888  | -800  |
|  |                              | X48       | -411                      | -397  | -346  | -305  | -269 | -242 | -584                      | -584  | -584  | -547  | -483  | -435  | -717                      | -717  | -717  | -717  | -717  | -652  |
|  |                              | 48-S      | -386                      | -356  | -298  | -261  | -229 | -206 | -522                      | -522  | -522  | -469  | -410  | -369  | -641                      | -641  | -641  | -641  | -615  | -553  |
|  | <b>120</b>                   | X80       | -597                      | -573  | -483  | -413  | -361 | -325 | -887                      | -887  | -866  | -741  | -649  | -584  | -1091                     | -1091 | -1091 | -1091 | -970  | -873  |
|  |                              | X48       | -436                      | -429  | -373  | -330  | -294 | -265 | -611                      | -611  | -611  | -591  | -528  | -476  | -749                      | -749  | -749  | -749  | -749  | -711  |
|  |                              | 48-S      | -405                      | -383  | -322  | -284  | -250 | -225 | -546                      | -546  | -546  | -509  | -449  | -404  | -670                      | -670  | -670  | -670  | -670  | -604  |
|  | <b>130</b>                   | X80       | -683                      | -664  | -559  | -489  | -428 | -386 | -966                      | -966  | -966  | -873  | -764  | -688  | -1187                     | -1187 | -1187 | -1187 | -1143 | -1029 |
|  |                              | X48       | -488                      | -488  | -430  | -382  | -347 | -314 | -664                      | -664  | -664  | -664  | -620  | -561  | -814                      | -814  | -814  | -814  | -814  | -814  |
|  |                              | 48-S      | -442                      | -437  | -372  | -329  | -296 | -267 | -594                      | -594  | -594  | -588  | -529  | -476  | -728                      | -728  | -728  | -728  | -728  | -712  |
|  | <b>140</b>                   | X80       | -775                      | -758  | -641  | -565  | -502 | -452 | -1045                     | -1045 | -1045 | -1004 | -892  | -803  | -1282                     | -1282 | -1282 | -1282 | -1282 | -1198 |
|  |                              | X48       | -536                      | -536  | -489  | -437  | -399 | -368 | -718                      | -718  | -718  | -718  | -709  | -654  | -879                      | -879  | -879  | -879  | -879  | -879  |
|  |                              | 48-S      | -479                      | -479  | -424  | -378  | -344 | -313 | -642                      | -642  | -642  | -642  | -611  | -555  | -787                      | -787  | -787  | -787  | -787  | -787  |
|  | <b>150</b>                   | X80       | -836                      | -836  | -722  | -640  | -578 | -521 | -1124                     | -1124 | -1124 | -1124 | -1027 | -925  | -1377                     | -1377 | -1377 | -1377 | -1377 | -1377 |
|  |                              | X48       | -577                      | -577  | -548  | -493  | -451 | -419 | -771                      | -771  | -771  | -771  | -771  | -744  | -943                      | -943  | -943  | -943  | -943  | -943  |
|  |                              | 48-S      | -515                      | -515  | -476  | -426  | -389 | -360 | -690                      | -690  | -690  | -690  | -690  | -640  | -844                      | -844  | -844  | -844  | -844  | -844  |
|  | <b>160</b>                   | X80       | -896                      | -896  | -806  | -718  | -654 | -596 | -1202                     | -1202 | -1202 | -1202 | -1158 | -1055 | -1472                     | -1472 | -1472 | -1472 | -1472 | -1472 |
|  |                              | X48       | -617                      | -617  | -609  | -550  | -506 | -471 | -824                      | -824  | -824  | -824  | -824  | -824  | -1007                     | -1007 | -1007 | -1007 | -1007 | -1007 |
|  |                              | 48-S      | -552                      | -552  | -530  | -477  | -437 | -406 | -738                      | -738  | -738  | -738  | -738  | -719  | -902                      | -902  | -902  | -902  | -902  | -902  |
|  | <b>170</b>                   | X80       | -957                      | -957  | -893  | -800  | -730 | -676 | -1280                     | -1280 | -1280 | -1280 | -1280 | -1193 | -1566                     | -1566 | -1566 | -1566 | -1566 | -1566 |
|  |                              | X48       | -659                      | -659  | -659  | -610  | -563 | -525 | -877                      | -877  | -877  | -877  | -877  | -877  | -1071                     | -1071 | -1071 | -1071 | -1071 | -1071 |
|  |                              | 48-S      | -589                      | -589  | -585  | -529  | -487 | -453 | -785                      | -785  | -785  | -785  | -785  | -785  | -959                      | -959  | -959  | -959  | -959  | -959  |
|  | <b>180</b>                   | X80       | -1016                     | -1016 | -980  | -881  | -808 | -750 | -1358                     | -1358 | -1358 | -1358 | -1358 | -1323 | -1660                     | -1660 | -1660 | -1660 | -1660 | -1660 |
|  |                              | X48       | -699                      | -699  | -699  | -669  | -619 | -580 | -930                      | -930  | -930  | -930  | -930  | -930  | -1135                     | -1135 | -1135 | -1135 | -1135 | -1135 |
|  |                              | 48-S      | -625                      | -625  | -625  | -581  | -537 | -501 | -833                      | -833  | -833  | -833  | -833  | -833  | -1017                     | -1017 | -1017 | -1017 | -1017 | -1017 |
|  | <b>200</b>                   | X80       | -1136                     | -1136 | -1136 | -1053 | -971 | -905 | -1514                     | -1514 | -1514 | -1514 | -1514 | -1514 | -1849                     | -1849 | -1849 | -1849 | -1849 | -1849 |
|  |                              | X48       | -780                      | -780  | -780  | -780  | -738 | -694 | -1036                     | -1036 | -1036 | -1036 | -1036 | -1036 | -1263                     | -1263 | -1263 | -1263 | -1263 | -1263 |
|  |                              | 48-S      | -698                      | -698  | -698  | -690  | -641 | -601 | -927                      | -927  | -927  | -927  | -927  | -927  | -1132                     | -1132 | -1132 | -1132 | -1132 | -1132 |

| Table 1.23: Maximum Downforce (lb.) - Wind Exposure D Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>D</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt; 7° TO 27°</b>                                     | <b>110</b>                   | X80       | 421                       | 496 | 569 | 604 | 640 | 706 | 367                       | 457 | 569 | 604 | 640 | 706 | 301                       | 375 | 512 | 604 | 640 | 706 |
|   |                              | X48       | 315                       | 372 | 443 | 492 | 521 | 575 | 253                       | 315 | 430 | 492 | 521 | 575 | 207                       | 258 | 352 | 446 | 521 | 575 |
|   |                              | 48-S      | 301                       | 336 | 382 | 418 | 443 | 488 | 226                       | 282 | 382 | 418 | 443 | 488 | 185                       | 231 | 315 | 399 | 443 | 488 |
|   | <b>115</b>                   | X80       | 446                       | 514 | 583 | 621 | 655 | 706 | 379                       | 458 | 583 | 621 | 655 | 706 | 311                       | 377 | 507 | 621 | 655 | 706 |
|   |                              | X48       | 330                       | 385 | 452 | 501 | 533 | 575 | 261                       | 316 | 426 | 501 | 533 | 575 | 214                       | 259 | 349 | 438 | 528 | 575 |
|   |                              | 48-S      | 310                       | 346 | 390 | 429 | 453 | 488 | 233                       | 282 | 380 | 429 | 453 | 488 | 191                       | 231 | 312 | 392 | 453 | 488 |
|   | <b>120</b>                   | X80       | 470                       | 532 | 596 | 637 | 669 | 706 | 390                       | 459 | 596 | 637 | 669 | 706 | 320                       | 377 | 503 | 628 | 669 | 706 |
|   |                              | X48       | 343                       | 398 | 461 | 509 | 545 | 575 | 268                       | 316 | 421 | 509 | 545 | 575 | 220                       | 259 | 345 | 431 | 517 | 575 |
|   |                              | 48-S      | 319                       | 355 | 398 | 438 | 463 | 488 | 240                       | 283 | 376 | 438 | 463 | 488 | 197                       | 232 | 309 | 386 | 463 | 488 |
|   | <b>130</b>                   | X80       | 522                       | 569 | 625 | 674 | 701 | 731 | 413                       | 464 | 604 | 674 | 701 | 731 | 340                       | 381 | 497 | 613 | 701 | 731 |
|   |                              | X48       | 373                       | 418 | 480 | 526 | 569 | 596 | 284                       | 319 | 416 | 513 | 569 | 596 | 233                       | 262 | 341 | 420 | 499 | 579 |
|   |                              | 48-S      | 337                       | 375 | 416 | 454 | 485 | 506 | 254                       | 285 | 372 | 454 | 485 | 506 | 209                       | 234 | 305 | 376 | 447 | 506 |
|   | <b>140</b>                   | X80       | 576                       | 606 | 655 | 703 | 735 | 762 | 437                       | 471 | 601 | 703 | 735 | 762 | 359                       | 387 | 494 | 602 | 709 | 762 |
|   |                              | X48       | 399                       | 429 | 500 | 544 | 585 | 621 | 300                       | 323 | 413 | 503 | 585 | 621 | 246                       | 265 | 339 | 412 | 486 | 559 |
|   |                              | 48-S      | 356                       | 383 | 434 | 470 | 504 | 527 | 269                       | 289 | 369 | 450 | 504 | 527 | 220                       | 237 | 303 | 369 | 435 | 501 |
|   | <b>150</b>                   | X80       | 610                       | 633 | 685 | 731 | 772 | 795 | 462                       | 479 | 601 | 723 | 772 | 795 | 379                       | 394 | 494 | 594 | 695 | 795 |
|   |                              | X48       | 421                       | 437 | 520 | 563 | 602 | 640 | 317                       | 329 | 413 | 496 | 580 | 640 | 260                       | 270 | 339 | 407 | 476 | 544 |
|   |                              | 48-S      | 376                       | 390 | 452 | 487 | 520 | 550 | 283                       | 294 | 369 | 444 | 519 | 550 | 233                       | 242 | 303 | 364 | 426 | 487 |
|   | <b>160</b>                   | X80       | 642                       | 646 | 717 | 760 | 802 | 831 | 486                       | 490 | 604 | 718 | 802 | 831 | 400                       | 403 | 497 | 590 | 684 | 778 |
|   |                              | X48       | 442                       | 445 | 542 | 582 | 621 | 657 | 333                       | 336 | 414 | 492 | 571 | 649 | 274                       | 276 | 340 | 404 | 468 | 533 |
|   |                              | 48-S      | 395                       | 398 | 471 | 504 | 536 | 566 | 298                       | 300 | 371 | 441 | 511 | 566 | 245                       | 247 | 304 | 362 | 419 | 477 |
|   | <b>170</b>                   | X80       | 677                       | 677 | 751 | 790 | 830 | 869 | 513                       | 513 | 610 | 717 | 825 | 869 | 422                       | 422 | 501 | 590 | 678 | 766 |
|   |                              | X48       | 466                       | 466 | 553 | 603 | 640 | 675 | 351                       | 351 | 418 | 492 | 565 | 639 | 288                       | 288 | 343 | 403 | 464 | 524 |
|   |                              | 48-S      | 416                       | 416 | 492 | 523 | 553 | 582 | 315                       | 315 | 374 | 440 | 506 | 572 | 258                       | 258 | 307 | 361 | 415 | 469 |
| <b>180</b>  | X80                          | 710       | 710                       | 784 | 821 | 859 | 896 | 538 | 538                       | 616 | 717 | 819 | 896 | 442 | 442                       | 506 | 590 | 673 | 757 |     |
|   | X48                          | 488       | 488                       | 559 | 623 | 659 | 693 | 368 | 368                       | 422 | 491 | 561 | 630 | 302 | 302                       | 346 | 403 | 460 | 518 |     |
|   | 48-S                         | 436       | 436                       | 500 | 542 | 571 | 599 | 330 | 330                       | 378 | 440 | 502 | 564 | 271 | 271                       | 310 | 361 | 412 | 464 |     |
| <b>200</b>  | X80                          | 778       | 778                       | 836 | 886 | 920 | 954 | 590 | 590                       | 634 | 725 | 816 | 908 | 485 | 485                       | 521 | 596 | 671 | 746 |     |
|   | X48                          | 534       | 534                       | 574 | 656 | 699 | 731 | 404 | 404                       | 434 | 496 | 559 | 621 | 331 | 331                       | 356 | 407 | 459 | 510 |     |
|   | 48-S                         | 478       | 478                       | 513 | 581 | 607 | 634 | 361 | 361                       | 388 | 444 | 500 | 556 | 297 | 297                       | 319 | 365 | 411 | 457 |     |

| Table 1.24: Maximum Shear (lb.) - Wind Exposure D Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>D</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt;7° TO 27°</b>                                  | <b>110</b>                   | X80       | 33                        | 144 | 215 | 259 | 296 | 329 | 29                        | 132 | 215 | 259 | 296 | 329 | 24                        | 109 | 194 | 259 | 296 | 329 |
|   |                              | X48       | 25                        | 108 | 168 | 211 | 241 | 268 | 20                        | 91  | 163 | 211 | 241 | 268 | 16                        | 75  | 133 | 192 | 241 | 268 |
|   |                              | 48-S      | 24                        | 97  | 144 | 180 | 205 | 228 | 18                        | 82  | 144 | 180 | 205 | 228 | 15                        | 67  | 119 | 171 | 205 | 228 |
|   | <b>115</b>                   | X80       | 33                        | 142 | 213 | 259 | 296 | 329 | 28                        | 127 | 213 | 259 | 296 | 329 | 23                        | 104 | 185 | 259 | 296 | 329 |
|   |                              | X48       | 24                        | 107 | 165 | 209 | 241 | 268 | 19                        | 87  | 156 | 209 | 241 | 268 | 16                        | 72  | 127 | 183 | 239 | 268 |
|   |                              | 48-S      | 23                        | 96  | 143 | 180 | 205 | 228 | 17                        | 78  | 139 | 180 | 205 | 228 | 14                        | 64  | 114 | 164 | 205 | 228 |
|   | <b>120</b>                   | X80       | 32                        | 141 | 211 | 259 | 296 | 329 | 27                        | 121 | 211 | 259 | 296 | 329 | 22                        | 100 | 178 | 256 | 296 | 329 |
|   |                              | X48       | 24                        | 105 | 163 | 207 | 241 | 268 | 18                        | 84  | 149 | 207 | 241 | 268 | 15                        | 69  | 122 | 175 | 229 | 268 |
|   |                              | 48-S      | 22                        | 94  | 141 | 178 | 205 | 228 | 16                        | 75  | 133 | 178 | 205 | 228 | 13                        | 61  | 109 | 157 | 205 | 228 |
|   | <b>130</b>                   | X80       | 31                        | 137 | 206 | 259 | 296 | 329 | 25                        | 112 | 199 | 259 | 296 | 329 | 20                        | 92  | 164 | 236 | 296 | 329 |
|   |                              | X48       | 22                        | 101 | 158 | 203 | 240 | 268 | 17                        | 77  | 137 | 197 | 240 | 268 | 14                        | 63  | 112 | 162 | 211 | 260 |
|   |                              | 48-S      | 20                        | 91  | 137 | 175 | 205 | 228 | 15                        | 69  | 123 | 175 | 205 | 228 | 12                        | 57  | 101 | 145 | 189 | 228 |
|   | <b>140</b>                   | X80       | 30                        | 134 | 202 | 256 | 296 | 329 | 23                        | 104 | 185 | 256 | 296 | 329 | 19                        | 86  | 152 | 219 | 286 | 329 |
|   |                              | X48       | 21                        | 95  | 154 | 198 | 236 | 268 | 16                        | 71  | 127 | 183 | 236 | 268 | 13                        | 59  | 104 | 150 | 196 | 241 |
|   |                              | 48-S      | 19                        | 85  | 134 | 171 | 203 | 228 | 14                        | 64  | 114 | 164 | 203 | 228 | 12                        | 52  | 93  | 134 | 175 | 216 |
|   | <b>150</b>                   | X80       | 28                        | 128 | 197 | 251 | 296 | 329 | 21                        | 97  | 173 | 249 | 296 | 329 | 18                        | 80  | 142 | 204 | 267 | 329 |
|   |                              | X48       | 19                        | 88  | 150 | 193 | 231 | 265 | 15                        | 67  | 119 | 171 | 223 | 265 | 12                        | 55  | 97  | 140 | 183 | 225 |
|   |                              | 48-S      | 17                        | 79  | 130 | 167 | 199 | 228 | 13                        | 60  | 106 | 153 | 199 | 228 | 11                        | 49  | 87  | 125 | 163 | 202 |
|   | <b>160</b>                   | X80       | 26                        | 120 | 192 | 247 | 293 | 329 | 20                        | 91  | 162 | 233 | 293 | 329 | 16                        | 75  | 133 | 192 | 250 | 308 |
|   |                              | X48       | 18                        | 83  | 145 | 189 | 227 | 260 | 14                        | 62  | 111 | 160 | 208 | 257 | 11                        | 51  | 91  | 131 | 171 | 211 |
|   |                              | 48-S      | 16                        | 74  | 126 | 164 | 196 | 224 | 12                        | 56  | 99  | 143 | 187 | 224 | 10                        | 46  | 82  | 117 | 153 | 189 |
|   | <b>170</b>                   | X80       | 25                        | 113 | 188 | 242 | 288 | 329 | 19                        | 86  | 152 | 219 | 286 | 329 | 15                        | 70  | 125 | 180 | 235 | 290 |
|   |                              | X48       | 17                        | 78  | 138 | 184 | 222 | 256 | 13                        | 59  | 105 | 150 | 196 | 242 | 11                        | 48  | 86  | 123 | 161 | 199 |
|   |                              | 48-S      | 15                        | 70  | 123 | 160 | 192 | 221 | 12                        | 53  | 94  | 135 | 176 | 217 | 9                         | 43  | 77  | 110 | 144 | 178 |
| <b>180</b>  | X80                          | 23        | 107                       | 183 | 237 | 283 | 325 | 18  | 81                        | 144 | 207 | 270 | 325 | 15  | 67                        | 118 | 170 | 222 | 274 |     |
|   | X48                          | 16        | 73                        | 131 | 180 | 217 | 251 | 12  | 55                        | 99  | 142 | 185 | 228 | 10  | 45                        | 81  | 116 | 152 | 187 |     |
|   | 48-S                         | 14        | 66                        | 117 | 156 | 188 | 217 | 11  | 50                        | 88  | 127 | 166 | 204 | 9   | 41                        | 73  | 104 | 136 | 168 |     |
| <b>200</b>  | X80                          | 21        | 96                        | 171 | 228 | 274 | 315 | 16  | 73                        | 130 | 186 | 243 | 300 | 13  | 60                        | 107 | 153 | 200 | 247 |     |
|   | X48                          | 14        | 66                        | 117 | 169 | 208 | 242 | 11  | 50                        | 89  | 128 | 166 | 205 | 9   | 41                        | 73  | 105 | 137 | 169 |     |
|   | 48-S                         | 13        | 59                        | 105 | 149 | 181 | 209 | 10  | 45                        | 79  | 114 | 149 | 184 | 8   | 37                        | 65  | 94  | 122 | 151 |     |

| Table 1.25: Maximum Span Length (in.) - Wind Exposure B Condition |                              |           |                           |     |    |    |    |    |                           |     |    |    |    |    |                           |     |    |    |    |    |
|---|------------------------------|-----------|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|
| Exposure<br><b>B</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |    |    |    |    | Roof Wind Pressure Zone 2 |     |    |    |    |    | Roof Wind Pressure Zone 3 |     |    |    |    |    |
|   |                              |           | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    |
|   |                              |           | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 |
| <b>ROOFS &gt;27° TO 45°</b>                                       | <b>110</b>                   | X80       | 124                       | 114 | 92 | 77 | 67 | 60 | 124                       | 114 | 92 | 77 | 67 | 60 | 124                       | 114 | 92 | 77 | 67 | 60 |
|   |                              | X48       | 93                        | 88  | 75 | 65 | 57 | 52 | 93                        | 88  | 75 | 65 | 57 | 52 | 93                        | 88  | 75 | 65 | 57 | 52 |
|   |                              | 48-S      | 89                        | 77  | 64 | 55 | 48 | 43 | 89                        | 77  | 64 | 55 | 48 | 43 | 89                        | 77  | 64 | 55 | 48 | 43 |
|   | <b>115</b>                   | X80       | 121                       | 113 | 92 | 77 | 67 | 60 | 121                       | 113 | 92 | 77 | 67 | 60 | 121                       | 113 | 92 | 77 | 67 | 60 |
|   |                              | X48       | 91                        | 87  | 74 | 65 | 57 | 52 | 91                        | 87  | 74 | 65 | 57 | 52 | 91                        | 87  | 74 | 65 | 57 | 52 |
|   |                              | 48-S      | 88                        | 76  | 63 | 55 | 48 | 43 | 88                        | 76  | 63 | 55 | 48 | 43 | 88                        | 76  | 63 | 55 | 48 | 43 |
|   | <b>120</b>                   | X80       | 119                       | 111 | 91 | 77 | 67 | 60 | 119                       | 111 | 91 | 77 | 67 | 60 | 119                       | 111 | 91 | 77 | 67 | 60 |
|   |                              | X48       | 89                        | 86  | 73 | 65 | 57 | 52 | 89                        | 86  | 73 | 65 | 57 | 52 | 89                        | 86  | 73 | 65 | 57 | 52 |
|   |                              | 48-S      | 86                        | 75  | 63 | 55 | 48 | 43 | 86                        | 75  | 63 | 55 | 48 | 43 | 86                        | 75  | 63 | 55 | 48 | 43 |
|   | <b>130</b>                   | X80       | 115                       | 108 | 90 | 77 | 67 | 60 | 115                       | 108 | 90 | 77 | 67 | 60 | 115                       | 108 | 90 | 77 | 67 | 60 |
|   |                              | X48       | 86                        | 84  | 71 | 63 | 57 | 52 | 86                        | 84  | 71 | 63 | 57 | 52 | 86                        | 84  | 71 | 63 | 57 | 52 |
|   |                              | 48-S      | 83                        | 72  | 61 | 54 | 48 | 43 | 83                        | 72  | 61 | 54 | 48 | 43 | 83                        | 72  | 61 | 54 | 48 | 43 |
|   | <b>140</b>                   | X80       | 111                       | 105 | 88 | 77 | 67 | 60 | 111                       | 105 | 88 | 77 | 67 | 60 | 111                       | 105 | 88 | 77 | 67 | 60 |
|   |                              | X48       | 83                        | 81  | 69 | 62 | 56 | 52 | 83                        | 81  | 69 | 62 | 56 | 52 | 83                        | 81  | 69 | 62 | 56 | 52 |
|   |                              | 48-S      | 79                        | 70  | 60 | 53 | 48 | 43 | 77                        | 70  | 60 | 53 | 48 | 43 | 77                        | 70  | 60 | 53 | 48 | 43 |
|   | <b>150</b>                   | X80       | 108                       | 102 | 86 | 76 | 67 | 60 | 108                       | 102 | 86 | 76 | 67 | 60 | 108                       | 102 | 86 | 76 | 67 | 60 |
|   |                              | X48       | 81                        | 78  | 68 | 61 | 55 | 51 | 80                        | 78  | 68 | 61 | 55 | 51 | 80                        | 78  | 68 | 61 | 55 | 51 |
|   |                              | 48-S      | 74                        | 68  | 58 | 52 | 47 | 43 | 72                        | 68  | 58 | 52 | 47 | 43 | 72                        | 68  | 58 | 52 | 47 | 43 |
|   | <b>160</b>                   | X80       | 105                       | 99  | 84 | 75 | 67 | 60 | 105                       | 99  | 84 | 75 | 67 | 60 | 105                       | 99  | 84 | 75 | 67 | 60 |
|   |                              | X48       | 79                        | 75  | 66 | 59 | 54 | 51 | 76                        | 75  | 66 | 59 | 54 | 51 | 76                        | 75  | 66 | 59 | 54 | 51 |
|   |                              | 48-S      | 70                        | 65  | 57 | 51 | 46 | 43 | 67                        | 65  | 57 | 51 | 46 | 43 | 67                        | 65  | 57 | 51 | 46 | 43 |
|   | <b>170</b>                   | X80       | 102                       | 96  | 82 | 73 | 67 | 60 | 102                       | 96  | 82 | 73 | 67 | 60 | 102                       | 96  | 82 | 73 | 67 | 60 |
|   |                              | X48       | 75                        | 72  | 64 | 58 | 53 | 50 | 71                        | 71  | 64 | 58 | 53 | 50 | 71                        | 71  | 64 | 58 | 53 | 50 |
|   |                              | 48-S      | 67                        | 63  | 55 | 50 | 46 | 42 | 63                        | 63  | 55 | 50 | 46 | 42 | 63                        | 63  | 55 | 50 | 46 | 42 |
|   | <b>180</b>                   | X80       | 99                        | 93  | 81 | 72 | 66 | 60 | 97                        | 93  | 81 | 72 | 66 | 60 | 97                        | 93  | 81 | 72 | 66 | 60 |
|   |                              | X48       | 71                        | 70  | 62 | 57 | 52 | 49 | 67                        | 67  | 62 | 57 | 52 | 49 | 67                        | 67  | 62 | 57 | 52 | 49 |
|   |                              | 48-S      | 64                        | 61  | 54 | 49 | 45 | 42 | 60                        | 60  | 54 | 49 | 45 | 42 | 60                        | 60  | 54 | 49 | 45 | 42 |
|   | <b>200</b>                   | X80       | 93                        | 88  | 77 | 69 | 64 | 59 | 87                        | 87  | 77 | 69 | 64 | 59 | 87                        | 87  | 77 | 69 | 64 | 59 |
|   |                              | X48       | 65                        | 65  | 59 | 54 | 50 | 47 | 60                        | 60  | 59 | 54 | 50 | 47 | 60                        | 60  | 59 | 54 | 50 | 47 |
|   |                              | 48-S      | 58                        | 57  | 51 | 47 | 43 | 40 | 54                        | 54  | 51 | 47 | 43 | 40 | 54                        | 54  | 51 | 47 | 43 | 40 |

| Table 1.26: Maximum Uplift (lb.) - Wind Exposure B Condition |                              |           |                           |      |      |      |      |      |                           |      |      |      |      |      |                           |      |      |      |      |      |
|--|------------------------------|-----------|---------------------------|------|------|------|------|------|---------------------------|------|------|------|------|------|---------------------------|------|------|------|------|------|
| Exposure<br><b>B</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |      |      |      |      |      | Roof Wind Pressure Zone 2 |      |      |      |      |      | Roof Wind Pressure Zone 3 |      |      |      |      |      |
|  |                              |           | Roof Snow Load (psf)      |      |      |      |      |      | Roof Snow Load (psf)      |      |      |      |      |      | Roof Snow Load (psf)      |      |      |      |      |      |
|  |                              |           | 0                         | 10   | 20   | 30   | 40   | 50   | 0                         | 10   | 20   | 30   | 40   | 50   | 0                         | 10   | 20   | 30   | 40   | 50   |
| <b>ROOFS &gt;27° TO 45°</b>                                  | <b>110</b>                   | X80       | -332                      | -307 | -247 | -206 | -180 | -162 | -396                      | -366 | -294 | -245 | -215 | -193 | -396                      | -366 | -294 | -245 | -215 | -193 |
|  |                              | X48       | -249                      | -237 | -202 | -176 | -154 | -138 | -296                      | -282 | -241 | -209 | -183 | -165 | -296                      | -282 | -241 | -209 | -183 | -165 |
|  |                              | 48-S      | -240                      | -208 | -172 | -147 | -129 | -116 | -286                      | -248 | -205 | -175 | -153 | -138 | -286                      | -248 | -205 | -175 | -153 | -138 |
|  | <b>115</b>                   | X80       | -360                      | -334 | -272 | -227 | -199 | -179 | -426                      | -396 | -323 | -269 | -236 | -212 | -426                      | -396 | -323 | -269 | -236 | -212 |
|  |                              | X48       | -269                      | -258 | -220 | -193 | -170 | -153 | -319                      | -306 | -261 | -229 | -201 | -181 | -319                      | -306 | -261 | -229 | -201 | -181 |
|  |                              | 48-S      | -260                      | -225 | -188 | -162 | -142 | -128 | -308                      | -267 | -223 | -192 | -168 | -151 | -308                      | -267 | -223 | -192 | -168 | -151 |
|  | <b>120</b>                   | X80       | -388                      | -362 | -297 | -249 | -218 | -196 | -460                      | -429 | -353 | -296 | -259 | -233 | -460                      | -429 | -353 | -296 | -259 | -233 |
|  |                              | X48       | -290                      | -280 | -239 | -210 | -186 | -168 | -345                      | -332 | -283 | -249 | -221 | -199 | -345                      | -332 | -283 | -249 | -221 | -199 |
|  |                              | 48-S      | -280                      | -243 | -204 | -178 | -156 | -140 | -332                      | -289 | -242 | -211 | -185 | -166 | -332                      | -289 | -242 | -211 | -185 | -166 |
|  | <b>130</b>                   | X80       | -446                      | -419 | -347 | -297 | -260 | -234 | -528                      | -496 | -411 | -352 | -308 | -277 | -528                      | -496 | -411 | -352 | -308 | -277 |
|  |                              | X48       | -334                      | -324 | -277 | -245 | -222 | -199 | -396                      | -384 | -328 | -290 | -263 | -236 | -396                      | -384 | -328 | -290 | -263 | -236 |
|  |                              | 48-S      | -322                      | -280 | -237 | -209 | -185 | -167 | -381                      | -332 | -280 | -247 | -219 | -198 | -381                      | -332 | -280 | -247 | -219 | -198 |
|  | <b>140</b>                   | X80       | -507                      | -477 | -399 | -349 | -305 | -275 | -597                      | -563 | -471 | -411 | -360 | -324 | -597                      | -563 | -471 | -411 | -360 | -324 |
|  |                              | X48       | -379                      | -367 | -316 | -282 | -257 | -234 | -447                      | -432 | -372 | -332 | -302 | -276 | -447                      | -432 | -372 | -332 | -302 | -276 |
|  |                              | 48-S      | -358                      | -318 | -271 | -240 | -217 | -196 | -414                      | -374 | -319 | -283 | -256 | -231 | -414                      | -374 | -319 | -283 | -256 | -231 |
|  | <b>150</b>                   | X80       | -569                      | -537 | -453 | -399 | -353 | -318 | -670                      | -633 | -534 | -470 | -416 | -375 | -670                      | -633 | -534 | -470 | -416 | -375 |
|  |                              | X48       | -426                      | -409 | -356 | -319 | -292 | -270 | -498                      | -482 | -419 | -376 | -344 | -318 | -498                      | -482 | -419 | -376 | -344 | -318 |
|  |                              | 48-S      | -391                      | -355 | -306 | -273 | -248 | -227 | -446                      | -419 | -360 | -321 | -293 | -267 | -446                      | -419 | -360 | -321 | -293 | -267 |
|  | <b>160</b>                   | X80       | -633                      | -598 | -509 | -450 | -405 | -365 | -746                      | -704 | -599 | -530 | -477 | -430 | -746                      | -704 | -599 | -530 | -477 | -430 |
|  |                              | X48       | -474                      | -452 | -397 | -358 | -328 | -305 | -538                      | -533 | -467 | -421 | -387 | -359 | -538                      | -533 | -467 | -421 | -387 | -359 |
|  |                              | 48-S      | -425                      | -394 | -342 | -306 | -280 | -259 | -479                      | -464 | -403 | -361 | -330 | -306 | -479                      | -464 | -403 | -361 | -330 | -306 |
|  | <b>170</b>                   | X80       | -699                      | -658 | -564 | -502 | -457 | -414 | -822                      | -775 | -664 | -591 | -537 | -487 | -822                      | -775 | -664 | -591 | -537 | -487 |
|  |                              | X48       | -514                      | -495 | -437 | -396 | -365 | -340 | -573                      | -573 | -515 | -467 | -430 | -400 | -573                      | -573 | -515 | -467 | -430 | -400 |
|  |                              | 48-S      | -457                      | -431 | -378 | -340 | -312 | -290 | -511                      | -508 | -445 | -400 | -367 | -341 | -511                      | -508 | -445 | -400 | -367 | -341 |
| <b>180</b>   | X80                          | -767      | -720                      | -622 | -556 | -507 | -466 | -880 | -847                      | -732 | -654 | -597 | -549 | -880 | -847                      | -732 | -654 | -597 | -549 |      |
|  | X48                          | -551      | -538                      | -479 | -436 | -403 | -377 | -609 | -609                      | -564 | -514 | -475 | -443 | -609 | -609                      | -564 | -514 | -475 | -443 |      |
|  | 48-S                         | -490      | -470                      | -415 | -375 | -345 | -322 | -544 | -544                      | -488 | -442 | -406 | -378 | -544 | -544                      | -488 | -442 | -406 | -378 |      |
| <b>200</b>   | X80                          | -893      | -844                      | -740 | -667 | -612 | -569 | -986 | -986                      | -870 | -784 | -720 | -669 | -986 | -986                      | -870 | -784 | -720 | -669 |      |
|  | X48                          | -623      | -623                      | -564 | -518 | -482 | -452 | -680 | -680                      | -662 | -609 | -566 | -531 | -680 | -680                      | -662 | -609 | -566 | -531 |      |
|  | 48-S                         | -555      | -547                      | -489 | -447 | -414 | -387 | -608 | -608                      | -575 | -525 | -486 | -455 | -608 | -608                      | -575 | -525 | -486 | -455 |      |

| Table 1.27: Maximum Downforce (lb.) - Wind Exposure B Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>B</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt;27° TO 45°</b>                                     | <b>110</b>                   | X80       | 405                       | 457 | 497 | 523 | 552 | 601 | 405                       | 457 | 497 | 523 | 552 | 601 | 405                       | 457 | 497 | 523 | 552 | 601 |
|   |                              | X48       | 303                       | 353 | 407 | 446 | 471 | 512 | 303                       | 353 | 407 | 446 | 471 | 512 | 303                       | 353 | 407 | 446 | 471 | 512 |
|   |                              | 48-S      | 293                       | 310 | 347 | 373 | 394 | 428 | 293                       | 310 | 347 | 373 | 394 | 428 | 293                       | 310 | 347 | 373 | 394 | 428 |
|   | <b>115</b>                   | X80       | 429                       | 473 | 515 | 538 | 566 | 601 | 429                       | 473 | 515 | 538 | 566 | 601 | 429                       | 473 | 515 | 538 | 566 | 601 |
|   |                              | X48       | 321                       | 365 | 417 | 458 | 482 | 512 | 321                       | 365 | 417 | 458 | 482 | 512 | 321                       | 365 | 417 | 458 | 482 | 512 |
|   |                              | 48-S      | 310                       | 319 | 355 | 383 | 403 | 428 | 310                       | 319 | 355 | 383 | 403 | 428 | 310                       | 319 | 355 | 383 | 403 | 428 |
|   | <b>120</b>                   | X80       | 453                       | 489 | 530 | 553 | 579 | 606 | 453                       | 489 | 530 | 553 | 579 | 606 | 453                       | 489 | 530 | 553 | 579 | 606 |
|   |                              | X48       | 339                       | 378 | 426 | 466 | 494 | 517 | 339                       | 378 | 426 | 466 | 494 | 517 | 339                       | 378 | 426 | 466 | 494 | 517 |
|   |                              | 48-S      | 327                       | 329 | 363 | 394 | 413 | 432 | 327                       | 329 | 363 | 394 | 413 | 432 | 327                       | 329 | 363 | 394 | 413 | 432 |
|   | <b>130</b>                   | X80       | 502                       | 521 | 558 | 585 | 607 | 632 | 502                       | 521 | 558 | 585 | 607 | 632 | 502                       | 521 | 558 | 585 | 607 | 632 |
|   |                              | X48       | 376                       | 403 | 445 | 484 | 518 | 539 | 376                       | 403 | 445 | 484 | 518 | 539 | 376                       | 403 | 445 | 484 | 518 | 539 |
|   |                              | 48-S      | 363                       | 348 | 381 | 412 | 433 | 450 | 363                       | 348 | 381 | 412 | 433 | 450 | 363                       | 348 | 381 | 412 | 433 | 450 |
|   | <b>140</b>                   | X80       | 555                       | 554 | 588 | 621 | 638 | 660 | 555                       | 554 | 588 | 621 | 638 | 660 | 555                       | 554 | 588 | 621 | 638 | 660 |
|   |                              | X48       | 416                       | 426 | 465 | 502 | 537 | 563 | 416                       | 426 | 465 | 502 | 537 | 563 | 416                       | 426 | 465 | 502 | 537 | 563 |
|   |                              | 48-S      | 392                       | 369 | 399 | 428 | 455 | 470 | 385                       | 369 | 399 | 428 | 455 | 470 | 385                       | 369 | 399 | 428 | 455 | 470 |
|   | <b>150</b>                   | X80       | 608                       | 588 | 618 | 651 | 671 | 689 | 608                       | 588 | 618 | 651 | 671 | 689 | 608                       | 588 | 618 | 651 | 671 | 689 |
|   |                              | X48       | 456                       | 448 | 485 | 520 | 554 | 586 | 453                       | 448 | 485 | 520 | 554 | 586 | 453                       | 448 | 485 | 520 | 554 | 586 |
|   |                              | 48-S      | 418                       | 389 | 417 | 445 | 472 | 491 | 405                       | 389 | 417 | 445 | 472 | 491 | 405                       | 389 | 417 | 445 | 472 | 491 |
|   | <b>160</b>                   | X80       | 664                       | 627 | 649 | 680 | 706 | 721 | 664                       | 627 | 649 | 680 | 706 | 721 | 664                       | 627 | 649 | 680 | 706 | 721 |
|   |                              | X48       | 498                       | 475 | 506 | 540 | 572 | 603 | 479                       | 475 | 506 | 540 | 572 | 603 | 479                       | 475 | 506 | 540 | 572 | 603 |
|   |                              | 48-S      | 446                       | 413 | 436 | 463 | 488 | 513 | 427                       | 413 | 436 | 463 | 488 | 513 | 427                       | 413 | 436 | 463 | 488 | 513 |
|   | <b>170</b>                   | X80       | 723                       | 681 | 682 | 710 | 740 | 756 | 723                       | 681 | 682 | 710 | 740 | 756 | 723                       | 681 | 682 | 710 | 740 | 756 |
|   |                              | X48       | 532                       | 512 | 528 | 560 | 591 | 621 | 504                       | 504 | 528 | 560 | 591 | 621 | 504                       | 504 | 528 | 560 | 591 | 621 |
|   |                              | 48-S      | 473                       | 446 | 456 | 481 | 505 | 529 | 450                       | 446 | 456 | 481 | 505 | 529 | 450                       | 446 | 456 | 481 | 505 | 529 |
| <b>180</b>  | X80                          | 783       | 735                       | 715 | 740 | 768 | 791 | 764 | 735                       | 715 | 740 | 768 | 791 | 764 | 735                       | 715 | 740 | 768 | 791 |     |
|   | X48                          | 562       | 549                       | 550 | 581 | 611 | 639 | 528 | 528                       | 550 | 581 | 611 | 639 | 528 | 528                       | 550 | 581 | 611 | 639 |     |
|   | 48-S                         | 500       | 479                       | 476 | 500 | 523 | 546 | 472 | 472                       | 476 | 500 | 523 | 546 | 472 | 472                       | 476 | 500 | 523 | 546 |     |
| <b>200</b>  | X80                          | 893       | 845                       | 784 | 804 | 828 | 853 | 840 | 840                       | 784 | 804 | 828 | 853 | 840 | 840                       | 784 | 804 | 828 | 853 |     |
|   | X48                          | 623       | 623                       | 596 | 624 | 651 | 678 | 579 | 579                       | 596 | 624 | 651 | 678 | 579 | 579                       | 596 | 624 | 651 | 678 |     |
|   | 48-S                         | 555       | 547                       | 518 | 539 | 560 | 581 | 518 | 518                       | 518 | 539 | 560 | 581 | 518 | 518                       | 518 | 539 | 560 | 581 |     |

| Table 1.28: Maximum Shear (lb.) - Wind Exposure B Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>B</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt;27° TO 45°</b>                                 | <b>110</b>                   | X80       | 46                        | 193 | 276 | 331 | 379 | 420 | 46                        | 193 | 276 | 331 | 379 | 420 | 46                        | 193 | 276 | 331 | 379 | 420 |
|   |                              | X48       | 34                        | 149 | 226 | 283 | 323 | 359 | 34                        | 149 | 226 | 283 | 323 | 359 | 34                        | 149 | 226 | 283 | 323 | 359 |
|   |                              | 48-S      | 33                        | 131 | 193 | 236 | 270 | 300 | 33                        | 131 | 193 | 236 | 270 | 300 | 33                        | 131 | 193 | 236 | 270 | 300 |
|   | <b>115</b>                   | X80       | 45                        | 190 | 276 | 331 | 379 | 420 | 45                        | 190 | 276 | 331 | 379 | 420 | 45                        | 190 | 276 | 331 | 379 | 420 |
|   |                              | X48       | 34                        | 147 | 223 | 282 | 323 | 359 | 34                        | 147 | 223 | 282 | 323 | 359 | 34                        | 147 | 223 | 282 | 323 | 359 |
|   |                              | 48-S      | 33                        | 129 | 190 | 236 | 270 | 300 | 33                        | 129 | 190 | 236 | 270 | 300 | 33                        | 129 | 190 | 236 | 270 | 300 |
|   | <b>120</b>                   | X80       | 44                        | 188 | 275 | 331 | 379 | 420 | 44                        | 188 | 275 | 331 | 379 | 420 | 44                        | 188 | 275 | 331 | 379 | 420 |
|   |                              | X48       | 33                        | 145 | 221 | 279 | 323 | 359 | 33                        | 145 | 221 | 279 | 323 | 359 | 33                        | 145 | 221 | 279 | 323 | 359 |
|   |                              | 48-S      | 32                        | 126 | 188 | 236 | 270 | 300 | 32                        | 126 | 188 | 236 | 270 | 300 | 32                        | 126 | 188 | 236 | 270 | 300 |
|   | <b>130</b>                   | X80       | 43                        | 183 | 270 | 331 | 379 | 420 | 43                        | 183 | 270 | 331 | 379 | 420 | 43                        | 183 | 270 | 331 | 379 | 420 |
|   |                              | X48       | 32                        | 141 | 215 | 274 | 323 | 359 | 32                        | 141 | 215 | 274 | 323 | 359 | 32                        | 141 | 215 | 274 | 323 | 359 |
|   |                              | 48-S      | 31                        | 122 | 184 | 233 | 270 | 300 | 31                        | 122 | 184 | 233 | 270 | 300 | 31                        | 122 | 184 | 233 | 270 | 300 |
|   | <b>140</b>                   | X80       | 41                        | 177 | 264 | 331 | 379 | 420 | 41                        | 177 | 264 | 331 | 379 | 420 | 41                        | 177 | 264 | 331 | 379 | 420 |
|   |                              | X48       | 31                        | 136 | 209 | 268 | 318 | 359 | 31                        | 136 | 209 | 268 | 318 | 359 | 31                        | 136 | 209 | 268 | 318 | 359 |
|   |                              | 48-S      | 29                        | 118 | 179 | 228 | 270 | 300 | 29                        | 118 | 179 | 228 | 270 | 300 | 29                        | 118 | 179 | 228 | 270 | 300 |
|   | <b>150</b>                   | X80       | 40                        | 172 | 259 | 328 | 379 | 420 | 40                        | 172 | 259 | 328 | 379 | 420 | 40                        | 172 | 259 | 328 | 379 | 420 |
|   |                              | X48       | 30                        | 131 | 203 | 262 | 313 | 357 | 30                        | 131 | 203 | 262 | 313 | 357 | 30                        | 131 | 203 | 262 | 313 | 357 |
|   |                              | 48-S      | 28                        | 114 | 175 | 224 | 266 | 300 | 27                        | 114 | 175 | 224 | 266 | 300 | 27                        | 114 | 175 | 224 | 266 | 300 |
|   | <b>160</b>                   | X80       | 39                        | 167 | 253 | 322 | 379 | 420 | 39                        | 167 | 253 | 322 | 379 | 420 | 39                        | 167 | 253 | 322 | 379 | 420 |
|   |                              | X48       | 29                        | 127 | 198 | 256 | 307 | 351 | 28                        | 127 | 198 | 256 | 307 | 351 | 28                        | 127 | 198 | 256 | 307 | 351 |
|   |                              | 48-S      | 26                        | 110 | 170 | 219 | 262 | 299 | 25                        | 110 | 170 | 219 | 262 | 299 | 25                        | 110 | 170 | 219 | 262 | 299 |
|   | <b>170</b>                   | X80       | 38                        | 162 | 248 | 317 | 376 | 420 | 38                        | 162 | 248 | 317 | 376 | 420 | 38                        | 162 | 248 | 317 | 376 | 420 |
|   |                              | X48       | 28                        | 122 | 192 | 250 | 301 | 346 | 26                        | 120 | 192 | 250 | 301 | 346 | 26                        | 120 | 192 | 250 | 301 | 346 |
|   |                              | 48-S      | 25                        | 106 | 166 | 215 | 257 | 294 | 24                        | 106 | 166 | 215 | 257 | 294 | 24                        | 106 | 166 | 215 | 257 | 294 |
| <b>180</b>  | X80                          | 37        | 158                       | 242 | 311 | 371 | 420 | 36  | 158                       | 242 | 311 | 371 | 420 | 36  | 158                       | 242 | 311 | 371 | 420 |     |
|   | X48                          | 26        | 118                       | 187 | 244 | 295 | 340 | 25  | 113                       | 187 | 244 | 295 | 340 | 25  | 113                       | 187 | 244 | 295 | 340 |     |
|   | 48-S                         | 24        | 103                       | 162 | 210 | 252 | 290 | 22  | 101                       | 162 | 210 | 252 | 290 | 22  | 101                       | 162 | 210 | 252 | 290 |     |
| <b>200</b>  | X80                          | 34        | 148                       | 232 | 300 | 360 | 412 | 32  | 148                       | 232 | 300 | 360 | 412 | 32  | 148                       | 232 | 300 | 360 | 412 |     |
|   | X48                          | 24        | 109                       | 176 | 233 | 283 | 328 | 22  | 102                       | 176 | 233 | 283 | 328 | 22  | 102                       | 176 | 233 | 283 | 328 |     |
|   | 48-S                         | 21        | 96                        | 153 | 201 | 243 | 281 | 20  | 91                        | 153 | 201 | 243 | 281 | 20  | 91                        | 153 | 201 | 243 | 281 |     |

| Table 1.29: Maximum Span Length (in.) - Wind Exposure C Condition |                              |           |                           |     |    |    |    |    |                           |     |    |    |    |    |                           |     |    |    |    |    |
|---|------------------------------|-----------|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|
| Exposure<br><b>C</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |    |    |    |    | Roof Wind Pressure Zone 2 |     |    |    |    |    | Roof Wind Pressure Zone 3 |     |    |    |    |    |
|   |                              |           | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    |
|   |                              |           | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 |
| <b>ROOFS &gt;27° TO 45°</b>                                       | <b>110</b>                   | X80       | 115                       | 108 | 90 | 77 | 67 | 60 | 115                       | 108 | 90 | 77 | 67 | 60 | 115                       | 108 | 90 | 77 | 67 | 60 |
|   |                              | X48       | 86                        | 84  | 71 | 63 | 57 | 52 | 86                        | 84  | 71 | 63 | 57 | 52 | 86                        | 84  | 71 | 63 | 57 | 52 |
|   |                              | 48-S      | 83                        | 72  | 61 | 54 | 48 | 43 | 83                        | 72  | 61 | 54 | 48 | 43 | 83                        | 72  | 61 | 54 | 48 | 43 |
|   | <b>115</b>                   | X80       | 113                       | 106 | 89 | 77 | 67 | 60 | 113                       | 106 | 89 | 77 | 67 | 60 | 113                       | 106 | 89 | 77 | 67 | 60 |
|   |                              | X48       | 85                        | 82  | 70 | 62 | 57 | 52 | 85                        | 82  | 70 | 62 | 57 | 52 | 85                        | 82  | 70 | 62 | 57 | 52 |
|   |                              | 48-S      | 81                        | 71  | 60 | 53 | 48 | 43 | 79                        | 71  | 60 | 53 | 48 | 43 | 79                        | 71  | 60 | 53 | 48 | 43 |
|   | <b>120</b>                   | X80       | 111                       | 104 | 88 | 77 | 67 | 60 | 111                       | 104 | 88 | 77 | 67 | 60 | 111                       | 104 | 88 | 77 | 67 | 60 |
|   |                              | X48       | 83                        | 80  | 69 | 62 | 56 | 52 | 83                        | 80  | 69 | 62 | 56 | 52 | 83                        | 80  | 69 | 62 | 56 | 52 |
|   |                              | 48-S      | 78                        | 69  | 59 | 53 | 48 | 43 | 76                        | 69  | 59 | 53 | 48 | 43 | 76                        | 69  | 59 | 53 | 48 | 43 |
|   | <b>130</b>                   | X80       | 107                       | 101 | 85 | 75 | 67 | 60 | 107                       | 101 | 85 | 75 | 67 | 60 | 107                       | 101 | 85 | 75 | 67 | 60 |
|   |                              | X48       | 80                        | 77  | 67 | 60 | 55 | 51 | 79                        | 77  | 67 | 60 | 55 | 51 | 79                        | 77  | 67 | 60 | 55 | 51 |
|   |                              | 48-S      | 73                        | 67  | 58 | 51 | 47 | 43 | 70                        | 67  | 58 | 51 | 47 | 43 | 70                        | 67  | 58 | 51 | 47 | 43 |
|   | <b>140</b>                   | X80       | 103                       | 97  | 83 | 74 | 67 | 60 | 103                       | 97  | 83 | 74 | 67 | 60 | 103                       | 97  | 83 | 74 | 67 | 60 |
|   |                              | X48       | 77                        | 73  | 65 | 58 | 54 | 50 | 73                        | 73  | 65 | 58 | 54 | 50 | 73                        | 73  | 65 | 58 | 54 | 50 |
|   |                              | 48-S      | 68                        | 64  | 56 | 50 | 46 | 43 | 65                        | 64  | 56 | 50 | 46 | 43 | 65                        | 64  | 56 | 50 | 46 | 43 |
|   | <b>150</b>                   | X80       | 100                       | 94  | 81 | 72 | 66 | 60 | 98                        | 94  | 81 | 72 | 66 | 60 | 98                        | 94  | 81 | 72 | 66 | 60 |
|   |                              | X48       | 72                        | 70  | 63 | 57 | 53 | 49 | 68                        | 68  | 63 | 57 | 53 | 49 | 68                        | 68  | 63 | 57 | 53 | 49 |
|   |                              | 48-S      | 64                        | 61  | 54 | 49 | 45 | 42 | 61                        | 61  | 54 | 49 | 45 | 42 | 61                        | 61  | 54 | 49 | 45 | 42 |
|   | <b>160</b>                   | X80       | 97                        | 91  | 79 | 71 | 65 | 60 | 92                        | 91  | 79 | 71 | 65 | 60 | 92                        | 91  | 79 | 71 | 65 | 60 |
|   |                              | X48       | 68                        | 67  | 61 | 55 | 51 | 48 | 64                        | 64  | 61 | 55 | 51 | 48 | 64                        | 64  | 61 | 55 | 51 | 48 |
|   |                              | 48-S      | 61                        | 59  | 52 | 48 | 44 | 41 | 57                        | 57  | 52 | 48 | 44 | 41 | 57                        | 57  | 52 | 48 | 44 | 41 |
|   | <b>170</b>                   | X80       | 92                        | 88  | 77 | 69 | 64 | 59 | 87                        | 87  | 77 | 69 | 64 | 59 | 87                        | 87  | 77 | 69 | 64 | 59 |
|   |                              | X48       | 65                        | 65  | 59 | 54 | 50 | 47 | 60                        | 60  | 59 | 54 | 50 | 47 | 60                        | 60  | 59 | 54 | 50 | 47 |
|   |                              | 48-S      | 57                        | 57  | 51 | 46 | 43 | 40 | 54                        | 54  | 51 | 46 | 43 | 40 | 54                        | 54  | 51 | 46 | 43 | 40 |
|   | <b>180</b>                   | X80       | 88                        | 85  | 75 | 68 | 62 | 58 | 82                        | 82  | 75 | 68 | 62 | 58 | 82                        | 82  | 75 | 68 | 62 | 58 |
|   |                              | X48       | 61                        | 61  | 57 | 52 | 49 | 46 | 57                        | 57  | 57 | 52 | 49 | 46 | 57                        | 57  | 57 | 52 | 49 | 46 |
|   |                              | 48-S      | 55                        | 55  | 49 | 45 | 42 | 39 | 51                        | 51  | 49 | 45 | 42 | 39 | 51                        | 51  | 49 | 45 | 42 | 39 |
|   | <b>200</b>                   | X80       | 80                        | 79  | 71 | 65 | 60 | 56 | 74                        | 74  | 71 | 65 | 60 | 56 | 74                        | 74  | 71 | 65 | 60 | 56 |
|   |                              | X48       | 55                        | 55  | 53 | 49 | 46 | 44 | 51                        | 51  | 51 | 49 | 46 | 44 | 51                        | 51  | 51 | 49 | 46 | 44 |
|   |                              | 48-S      | 49                        | 49  | 46 | 43 | 40 | 38 | 45                        | 45  | 45 | 43 | 40 | 38 | 45                        | 45  | 45 | 43 | 40 | 38 |



| Table 1.30: Maximum Uplift (lb.) - Wind Exposure C Condition |                              |           |                           |       |      |      |      |      |                           |       |       |       |      |      |                           |       |       |       |      |      |
|--|------------------------------|-----------|---------------------------|-------|------|------|------|------|---------------------------|-------|-------|-------|------|------|---------------------------|-------|-------|-------|------|------|
| Exposure<br><b>C</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |       |      |      |      |      | Roof Wind Pressure Zone 2 |       |       |       |      |      | Roof Wind Pressure Zone 3 |       |       |       |      |      |
|  |                              |           | Roof Snow Load (psf)      |       |      |      |      |      | Roof Snow Load (psf)      |       |       |       |      |      | Roof Snow Load (psf)      |       |       |       |      |      |
|  |                              |           | 0                         | 10    | 20   | 30   | 40   | 50   | 0                         | 10    | 20    | 30    | 40   | 50   | 0                         | 10    | 20    | 30    | 40   | 50   |
| <b>ROOFS &gt;27° TO 45°</b>                                  | <b>110</b>                   | X80       | -448                      | -420  | -349 | -298 | -261 | -235 | -530                      | -497  | -412  | -353  | -309 | -278 | -530                      | -497  | -412  | -353  | -309 | -278 |
|  |                              | X48       | -335                      | -326  | -278 | -246 | -223 | -200 | -397                      | -385  | -329  | -291  | -263 | -237 | -397                      | -385  | -329  | -291  | -263 | -237 |
|  |                              | 48-S      | -324                      | -281  | -238 | -210 | -186 | -167 | -382                      | -333  | -281  | -248  | -220 | -198 | -382                      | -333  | -281  | -248  | -220 | -198 |
|  | <b>115</b>                   | X80       | -482                      | -454  | -378 | -328 | -287 | -258 | -569                      | -536  | -447  | -387  | -339 | -305 | -569                      | -536  | -447  | -387  | -339 | -305 |
|  |                              | X48       | -361                      | -350  | -300 | -267 | -243 | -220 | -426                      | -413  | -354  | -315  | -287 | -260 | -426                      | -413  | -354  | -315  | -287 | -260 |
|  |                              | 48-S      | -344                      | -303  | -257 | -228 | -204 | -184 | -401                      | -357  | -304  | -269  | -241 | -217 | -401                      | -357  | -304  | -269  | -241 | -217 |
|  | <b>120</b>                   | X80       | -518                      | -489  | -409 | -359 | -314 | -283 | -612                      | -577  | -484  | -424  | -371 | -334 | -612                      | -577  | -484  | -424  | -371 | -334 |
|  |                              | X48       | -388                      | -375  | -323 | -289 | -263 | -241 | -459                      | -443  | -382  | -341  | -311 | -285 | -459                      | -443  | -382  | -341  | -311 | -285 |
|  |                              | 48-S      | -364                      | -325  | -278 | -246 | -224 | -202 | -421                      | -384  | -328  | -291  | -264 | -238 | -421                      | -384  | -328  | -291  | -264 | -238 |
|  | <b>130</b>                   | X80       | -593                      | -559  | -474 | -418 | -372 | -335 | -700                      | -661  | -559  | -494  | -440 | -396 | -700                      | -661  | -559  | -494  | -440 | -396 |
|  |                              | X48       | -444                      | -425  | -371 | -333 | -305 | -283 | -515                      | -502  | -438  | -394  | -360 | -334 | -515                      | -502  | -438  | -394  | -360 | -334 |
|  |                              | 48-S      | -404                      | -369  | -319 | -285 | -260 | -239 | -459                      | -436  | -377  | -337  | -307 | -282 | -459                      | -436  | -377  | -337  | -307 | -282 |
|  | <b>140</b>                   | X80       | -670                      | -632  | -540 | -480 | -436 | -392 | -788                      | -743  | -635  | -564  | -512 | -461 | -788                      | -743  | -635  | -564  | -512 | -461 |
|  |                              | X48       | -499                      | -476  | -420 | -380 | -349 | -325 | -557                      | -557  | -493  | -446  | -410 | -382 | -557                      | -557  | -493  | -446  | -410 | -382 |
|  |                              | 48-S      | -443                      | -415  | -362 | -325 | -298 | -277 | -497                      | -488  | -426  | -383  | -350 | -325 | -497                      | -488  | -426  | -383  | -350 | -325 |
|  | <b>150</b>                   | X80       | -750                      | -705  | -608 | -543 | -494 | -453 | -866                      | -828  | -714  | -637  | -581 | -532 | -866                      | -828  | -714  | -637  | -581 | -532 |
|  |                              | X48       | -542                      | -527  | -469 | -426 | -394 | -368 | -600                      | -600  | -551  | -501  | -463 | -432 | -600                      | -600  | -551  | -501  | -463 | -432 |
|  |                              | 48-S      | -482                      | -460  | -406 | -367 | -337 | -314 | -535                      | -535  | -476  | -431  | -396 | -368 | -535                      | -535  | -476  | -431  | -396 | -368 |
|  | <b>160</b>                   | X80       | -832                      | -779  | -677 | -608 | -556 | -515 | -930                      | -915  | -796  | -714  | -653 | -606 | -930                      | -915  | -796  | -714  | -653 | -606 |
|  |                              | X48       | -585                      | -579  | -519 | -475 | -440 | -412 | -642                      | -642  | -610  | -558  | -517 | -484 | -642                      | -642  | -610  | -558  | -517 | -484 |
|  |                              | 48-S      | -521                      | -506  | -450 | -409 | -377 | -352 | -574                      | -574  | -529  | -480  | -443 | -414 | -574                      | -574  | -529  | -480  | -443 | -414 |
|  | <b>170</b>                   | X80       | -898                      | -851  | -747 | -674 | -618 | -575 | -992                      | -992  | -878  | -791  | -726 | -675 | -992                      | -992  | -878  | -791  | -726 | -675 |
|  |                              | X48       | -627                      | -627  | -568 | -522 | -486 | -457 | -684                      | -684  | -668  | -614  | -571 | -536 | -684                      | -684  | -668  | -614  | -571 | -536 |
|  |                              | 48-S      | -558                      | -551  | -494 | -451 | -418 | -391 | -611                      | -611  | -580  | -530  | -491 | -459 | -611                      | -611  | -580  | -530  | -491 | -459 |
|  | <b>180</b>                   | X80       | -962                      | -926  | -819 | -742 | -683 | -636 | -1054                     | -1054 | -962  | -871  | -802 | -748 | -1054                     | -1054 | -962  | -871  | -802 | -748 |
|  |                              | X48       | -669                      | -669  | -619 | -572 | -534 | -503 | -726                      | -726  | -726  | -672  | -627 | -591 | -726                      | -726  | -726  | -672  | -627 | -591 |
|  |                              | 48-S      | -597                      | -597  | -538 | -494 | -460 | -431 | -649                      | -649  | -633  | -581  | -540 | -507 | -649                      | -649  | -633  | -581  | -540 | -507 |
|  | <b>200</b>                   | X80       | -1085                     | -1074 | -963 | -881 | -816 | -764 | -1178                     | -1178 | -1130 | -1033 | -958 | -897 | -1178                     | -1178 | -1130 | -1033 | -958 | -897 |
|  |                              | X48       | -747                      | -747  | -720 | -671 | -631 | -597 | -810                      | -810  | -810  | -787  | -740 | -701 | -810                      | -810  | -810  | -787  | -740 | -701 |
|  |                              | 48-S      | -668                      | -668  | -628 | -582 | -545 | -514 | -725                      | -725  | -725  | -683  | -640 | -604 | -725                      | -725  | -725  | -683  | -640 | -604 |

| Table 1.31: Maximum Downforce (lb.) - Wind Exposure C Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>C</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt;27° TO 45°</b>                                     | <b>110</b>                   | X80       | 503                       | 521 | 559 | 586 | 608 | 632 | 503                       | 521 | 559 | 586 | 608 | 632 | 503                       | 521 | 559 | 586 | 608 | 632 |
|   |                              | X48       | 377                       | 404 | 445 | 484 | 518 | 539 | 377                       | 404 | 445 | 484 | 518 | 539 | 377                       | 404 | 445 | 484 | 518 | 539 |
|   |                              | 48-S      | 364                       | 349 | 381 | 412 | 433 | 451 | 363                       | 349 | 381 | 412 | 433 | 451 | 363                       | 349 | 381 | 412 | 433 | 451 |
|   | <b>115</b>                   | X80       | 534                       | 541 | 576 | 607 | 626 | 649 | 534                       | 541 | 576 | 607 | 626 | 649 | 534                       | 541 | 576 | 607 | 626 | 649 |
|   |                              | X48       | 400                       | 417 | 457 | 495 | 530 | 553 | 400                       | 417 | 457 | 495 | 530 | 553 | 400                       | 417 | 457 | 495 | 530 | 553 |
|   |                              | 48-S      | 381                       | 361 | 392 | 422 | 446 | 463 | 376                       | 361 | 392 | 422 | 446 | 463 | 376                       | 361 | 392 | 422 | 446 | 463 |
|   | <b>120</b>                   | X80       | 565                       | 561 | 593 | 628 | 645 | 666 | 565                       | 561 | 593 | 628 | 645 | 666 | 565                       | 561 | 593 | 628 | 645 | 666 |
|   |                              | X48       | 423                       | 430 | 469 | 505 | 540 | 568 | 423                       | 430 | 469 | 505 | 540 | 568 | 423                       | 430 | 469 | 505 | 540 | 568 |
|   |                              | 48-S      | 397                       | 373 | 402 | 431 | 459 | 474 | 388                       | 373 | 402 | 431 | 459 | 474 | 388                       | 373 | 402 | 431 | 459 | 474 |
|   | <b>130</b>                   | X80       | 630                       | 601 | 630 | 662 | 684 | 701 | 630                       | 601 | 630 | 662 | 684 | 701 | 630                       | 601 | 630 | 662 | 684 | 701 |
|   |                              | X48       | 472                       | 457 | 493 | 528 | 561 | 592 | 464                       | 457 | 493 | 528 | 561 | 592 | 464                       | 457 | 493 | 528 | 561 | 592 |
|   |                              | 48-S      | 429                       | 397 | 424 | 452 | 478 | 500 | 413                       | 397 | 424 | 452 | 478 | 500 | 413                       | 397 | 424 | 452 | 478 | 500 |
|   | <b>140</b>                   | X80       | 698                       | 658 | 668 | 697 | 728 | 741 | 698                       | 658 | 668 | 697 | 728 | 741 | 698                       | 658 | 668 | 697 | 728 | 741 |
|   |                              | X48       | 519                       | 496 | 519 | 552 | 583 | 613 | 494                       | 494 | 519 | 552 | 583 | 613 | 494                       | 494 | 519 | 552 | 583 | 613 |
|   |                              | 48-S      | 461                       | 432 | 448 | 473 | 498 | 522 | 441                       | 432 | 448 | 473 | 498 | 522 | 441                       | 432 | 448 | 473 | 498 | 522 |
|   | <b>150</b>                   | X80       | 767                       | 721 | 706 | 732 | 760 | 782 | 754                       | 721 | 706 | 732 | 760 | 782 | 754                       | 721 | 706 | 732 | 760 | 782 |
|   |                              | X48       | 554                       | 540 | 545 | 576 | 606 | 634 | 522                       | 522 | 545 | 576 | 606 | 634 | 522                       | 522 | 545 | 576 | 606 | 634 |
|   |                              | 48-S      | 493                       | 471 | 471 | 495 | 518 | 541 | 466                       | 466 | 471 | 495 | 518 | 541 | 466                       | 466 | 471 | 495 | 518 | 541 |
|   | <b>160</b>                   | X80       | 840                       | 785 | 746 | 769 | 795 | 822 | 798                       | 785 | 746 | 769 | 795 | 822 | 798                       | 785 | 746 | 769 | 795 | 822 |
|   |                              | X48       | 590                       | 584 | 571 | 601 | 629 | 657 | 551                       | 551 | 571 | 601 | 629 | 657 | 551                       | 551 | 571 | 601 | 629 | 657 |
|   |                              | 48-S      | 525                       | 511 | 495 | 517 | 540 | 561 | 492                       | 492 | 495 | 517 | 540 | 561 | 492                       | 492 | 495 | 517 | 540 | 561 |
|   | <b>170</b>                   | X80       | 898                       | 851 | 787 | 808 | 831 | 856 | 844                       | 844 | 787 | 808 | 831 | 856 | 844                       | 844 | 787 | 808 | 831 | 856 |
|   |                              | X48       | 627                       | 627 | 599 | 627 | 654 | 680 | 582                       | 582 | 599 | 627 | 654 | 680 | 582                       | 582 | 599 | 627 | 654 | 680 |
|   |                              | 48-S      | 558                       | 551 | 520 | 541 | 562 | 583 | 520                       | 520 | 520 | 541 | 562 | 583 | 520                       | 520 | 520 | 541 | 562 | 583 |
| <b>180</b>  | X80                          | 951       | 916                       | 829 | 847 | 868 | 891 | 888 | 888                       | 829 | 847 | 868 | 891 | 888 | 888                       | 829 | 847 | 868 | 891 |     |
|   | X48                          | 662       | 662                       | 626 | 653 | 678 | 704 | 612 | 612                       | 626 | 653 | 678 | 704 | 612 | 612                       | 626 | 653 | 678 | 704 |     |
|   | 48-S                         | 590       | 590                       | 545 | 564 | 584 | 604 | 547 | 547                       | 545 | 564 | 584 | 604 | 547 | 547                       | 545 | 564 | 584 | 604 |     |
| <b>200</b>  | X80                          | 1059      | 1048                      | 940 | 928 | 945 | 964 | 980 | 980                       | 940 | 928 | 945 | 964 | 980 | 980                       | 940 | 928 | 945 | 964 |     |
|   | X48                          | 729       | 729                       | 702 | 707 | 730 | 754 | 674 | 674                       | 674 | 707 | 730 | 754 | 674 | 674                       | 674 | 707 | 730 | 754 |     |
|   | 48-S                         | 652       | 652                       | 613 | 614 | 631 | 649 | 603 | 603                       | 603 | 614 | 631 | 649 | 603 | 603                       | 603 | 614 | 631 | 649 |     |

| Table 1.32: Maximum Shear (lb.) - Wind Exposure C Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>C</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt;27° TO 45°</b>                                 | <b>110</b>                   | X80       | 43                        | 183 | 269 | 331 | 379 | 420 | 43                        | 183 | 269 | 331 | 379 | 420 | 43                        | 183 | 269 | 331 | 379 | 420 |
|   |                              | X48       | 32                        | 141 | 215 | 274 | 323 | 359 | 32                        | 141 | 215 | 274 | 323 | 359 | 32                        | 141 | 215 | 274 | 323 | 359 |
|   |                              | 48-S      | 31                        | 122 | 184 | 233 | 270 | 300 | 31                        | 122 | 184 | 233 | 270 | 300 | 31                        | 122 | 184 | 233 | 270 | 300 |
|   | <b>115</b>                   | X80       | 42                        | 179 | 266 | 331 | 379 | 420 | 42                        | 179 | 266 | 331 | 379 | 420 | 42                        | 179 | 266 | 331 | 379 | 420 |
|   |                              | X48       | 31                        | 138 | 211 | 270 | 321 | 359 | 31                        | 138 | 211 | 270 | 321 | 359 | 31                        | 138 | 211 | 270 | 321 | 359 |
|   |                              | 48-S      | 30                        | 120 | 181 | 230 | 270 | 300 | 29                        | 120 | 181 | 230 | 270 | 300 | 29                        | 120 | 181 | 230 | 270 | 300 |
|   | <b>120</b>                   | X80       | 41                        | 176 | 263 | 331 | 379 | 420 | 41                        | 176 | 263 | 331 | 379 | 420 | 41                        | 176 | 263 | 331 | 379 | 420 |
|   |                              | X48       | 31                        | 135 | 208 | 267 | 317 | 359 | 31                        | 135 | 208 | 267 | 317 | 359 | 31                        | 135 | 208 | 267 | 317 | 359 |
|   |                              | 48-S      | 29                        | 117 | 178 | 228 | 270 | 300 | 28                        | 117 | 178 | 228 | 270 | 300 | 28                        | 117 | 178 | 228 | 270 | 300 |
|   | <b>130</b>                   | X80       | 40                        | 170 | 257 | 326 | 379 | 420 | 40                        | 170 | 257 | 326 | 379 | 420 | 40                        | 170 | 257 | 326 | 379 | 420 |
|   |                              | X48       | 30                        | 129 | 201 | 260 | 310 | 355 | 29                        | 129 | 201 | 260 | 310 | 355 | 29                        | 129 | 201 | 260 | 310 | 355 |
|   |                              | 48-S      | 27                        | 112 | 173 | 222 | 264 | 300 | 26                        | 112 | 173 | 222 | 264 | 300 | 26                        | 112 | 173 | 222 | 264 | 300 |
|   | <b>140</b>                   | X80       | 38                        | 164 | 250 | 319 | 378 | 420 | 38                        | 164 | 250 | 319 | 378 | 420 | 38                        | 164 | 250 | 319 | 378 | 420 |
|   |                              | X48       | 28                        | 124 | 194 | 253 | 303 | 348 | 27                        | 123 | 194 | 253 | 303 | 348 | 27                        | 123 | 194 | 253 | 303 | 348 |
|   |                              | 48-S      | 25                        | 108 | 168 | 217 | 259 | 296 | 24                        | 108 | 168 | 217 | 259 | 296 | 24                        | 108 | 168 | 217 | 259 | 296 |
|   | <b>150</b>                   | X80       | 37                        | 159 | 244 | 313 | 372 | 420 | 37                        | 159 | 244 | 313 | 372 | 420 | 37                        | 159 | 244 | 313 | 372 | 420 |
|   |                              | X48       | 27                        | 119 | 188 | 246 | 296 | 341 | 25                        | 115 | 188 | 246 | 296 | 341 | 25                        | 115 | 188 | 246 | 296 | 341 |
|   |                              | 48-S      | 24                        | 104 | 163 | 211 | 254 | 291 | 23                        | 103 | 163 | 211 | 254 | 291 | 23                        | 103 | 163 | 211 | 254 | 291 |
|   | <b>160</b>                   | X80       | 36                        | 153 | 237 | 306 | 366 | 418 | 34                        | 153 | 237 | 306 | 366 | 418 | 34                        | 153 | 237 | 306 | 366 | 418 |
|   |                              | X48       | 25                        | 114 | 182 | 239 | 289 | 334 | 24                        | 108 | 182 | 239 | 289 | 334 | 24                        | 108 | 182 | 239 | 289 | 334 |
|   |                              | 48-S      | 23                        | 100 | 158 | 206 | 248 | 286 | 21                        | 96  | 158 | 206 | 248 | 286 | 21                        | 96  | 158 | 206 | 248 | 286 |
|   | <b>170</b>                   | X80       | 34                        | 148 | 231 | 300 | 359 | 412 | 32                        | 147 | 231 | 300 | 359 | 412 | 32                        | 147 | 231 | 300 | 359 | 412 |
|   |                              | X48       | 24                        | 109 | 176 | 233 | 282 | 327 | 22                        | 101 | 176 | 233 | 282 | 327 | 22                        | 101 | 176 | 233 | 282 | 327 |
|   |                              | 48-S      | 21                        | 96  | 153 | 201 | 243 | 280 | 20                        | 90  | 153 | 201 | 243 | 280 | 20                        | 90  | 153 | 201 | 243 | 280 |
| <b>180</b>  | X80                          | 33        | 143                       | 225 | 293 | 352 | 405 | 30  | 139                       | 225 | 293 | 352 | 405 | 30  | 139                       | 225 | 293 | 352 | 405 |     |
|   | X48                          | 23        | 103                       | 170 | 226 | 276 | 320 | 21  | 96                        | 170 | 226 | 276 | 320 | 21  | 96                        | 170 | 226 | 276 | 320 |     |
|   | 48-S                         | 20        | 92                        | 148 | 196 | 237 | 275 | 19  | 85                        | 148 | 196 | 237 | 275 | 19  | 85                        | 148 | 196 | 237 | 275 |     |
| <b>200</b>  | X80                          | 30        | 134                       | 213 | 281 | 339 | 392 | 27  | 125                       | 213 | 281 | 339 | 392 | 27  | 125                       | 213 | 281 | 339 | 392 |     |
|   | X48                          | 20        | 93                        | 159 | 214 | 262 | 306 | 19  | 86                        | 153 | 214 | 262 | 306 | 19  | 86                        | 153 | 214 | 262 | 306 |     |
|   | 48-S                         | 18        | 83                        | 139 | 186 | 227 | 264 | 17  | 77                        | 137 | 186 | 227 | 264 | 17  | 77                        | 137 | 186 | 227 | 264 |     |

| Table 1.33: Maximum Span Length - Wind Exposure D Condition |                              |           |                           |     |    |    |    |    |                           |     |    |    |    |    |                           |     |    |    |    |    |
|---|------------------------------|-----------|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|---------------------------|-----|----|----|----|----|
| Exposure<br><b>D</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |    |    |    |    | Roof Wind Pressure Zone 2 |     |    |    |    |    | Roof Wind Pressure Zone 3 |     |    |    |    |    |
|   |                              |           | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    | Roof Snow Load (psf)      |     |    |    |    |    |
|   |                              |           | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 | 0                         | 10  | 20 | 30 | 40 | 50 |
| <b>ROOFS &gt;27° TO 45°</b>                                 | <b>110</b>                   | X80       | 111                       | 105 | 88 | 77 | 67 | 60 | 111                       | 105 | 88 | 77 | 67 | 60 | 111                       | 105 | 88 | 77 | 67 | 60 |
|   |                              | X48       | 83                        | 80  | 69 | 62 | 56 | 52 | 83                        | 80  | 69 | 62 | 56 | 52 | 83                        | 80  | 69 | 62 | 56 | 52 |
|   |                              | 48-S      | 78                        | 69  | 59 | 53 | 48 | 43 | 76                        | 69  | 59 | 53 | 48 | 43 | 76                        | 69  | 59 | 53 | 48 | 43 |
|   | <b>115</b>                   | X80       | 109                       | 103 | 86 | 76 | 67 | 60 | 109                       | 103 | 86 | 76 | 67 | 60 | 109                       | 103 | 86 | 76 | 67 | 60 |
|   |                              | X48       | 81                        | 78  | 68 | 61 | 56 | 51 | 81                        | 78  | 68 | 61 | 56 | 51 | 81                        | 78  | 68 | 61 | 56 | 51 |
|   |                              | 48-S      | 75                        | 68  | 58 | 52 | 47 | 43 | 73                        | 68  | 58 | 52 | 47 | 43 | 73                        | 68  | 58 | 52 | 47 | 43 |
|   | <b>120</b>                   | X80       | 107                       | 101 | 85 | 75 | 67 | 60 | 107                       | 101 | 85 | 75 | 67 | 60 | 107                       | 101 | 85 | 75 | 67 | 60 |
|   |                              | X48       | 80                        | 76  | 67 | 60 | 55 | 51 | 78                        | 76  | 67 | 60 | 55 | 51 | 78                        | 76  | 67 | 60 | 55 | 51 |
|   |                              | 48-S      | 72                        | 66  | 57 | 51 | 47 | 43 | 70                        | 66  | 57 | 51 | 47 | 43 | 70                        | 66  | 57 | 51 | 47 | 43 |
|   | <b>130</b>                   | X80       | 103                       | 97  | 83 | 74 | 67 | 60 | 103                       | 97  | 83 | 74 | 67 | 60 | 103                       | 97  | 83 | 74 | 67 | 60 |
|   |                              | X48       | 76                        | 73  | 64 | 58 | 54 | 50 | 72                        | 72  | 64 | 58 | 54 | 50 | 72                        | 72  | 64 | 58 | 54 | 50 |
|   |                              | 48-S      | 68                        | 64  | 56 | 50 | 46 | 42 | 64                        | 64  | 56 | 50 | 46 | 42 | 64                        | 64  | 56 | 50 | 46 | 42 |
|   | <b>140</b>                   | X80       | 99                        | 93  | 81 | 72 | 66 | 60 | 97                        | 93  | 81 | 72 | 66 | 60 | 97                        | 93  | 81 | 72 | 66 | 60 |
|   |                              | X48       | 71                        | 70  | 62 | 56 | 52 | 49 | 67                        | 67  | 62 | 56 | 52 | 49 | 67                        | 67  | 62 | 56 | 52 | 49 |
|   |                              | 48-S      | 63                        | 61  | 54 | 49 | 45 | 42 | 60                        | 60  | 54 | 49 | 45 | 42 | 60                        | 60  | 54 | 49 | 45 | 42 |
|   | <b>150</b>                   | X80       | 96                        | 90  | 78 | 70 | 64 | 60 | 90                        | 90  | 78 | 70 | 64 | 60 | 90                        | 90  | 78 | 70 | 64 | 60 |
|   |                              | X48       | 67                        | 67  | 60 | 55 | 51 | 48 | 62                        | 62  | 60 | 55 | 51 | 48 | 62                        | 62  | 60 | 55 | 51 | 48 |
|   |                              | 48-S      | 60                        | 58  | 52 | 47 | 44 | 41 | 56                        | 56  | 52 | 47 | 44 | 41 | 56                        | 56  | 52 | 47 | 44 | 41 |
|   | <b>160</b>                   | X80       | 91                        | 86  | 76 | 69 | 63 | 59 | 85                        | 85  | 76 | 69 | 63 | 59 | 85                        | 85  | 76 | 69 | 63 | 59 |
|   |                              | X48       | 63                        | 63  | 58 | 53 | 50 | 47 | 58                        | 58  | 53 | 50 | 47 | 58 | 58                        | 53  | 50 | 47 | 58 | 58 |
|   |                              | 48-S      | 56                        | 56  | 50 | 46 | 43 | 40 | 52                        | 52  | 50 | 46 | 43 | 40 | 52                        | 52  | 50 | 46 | 43 | 40 |
| <b>170</b>  | X80                          | 86        | 83                        | 74  | 67 | 62 | 58 | 80 | 80                        | 74  | 67 | 62 | 58 | 80 | 80                        | 74  | 67 | 62 | 58 |    |
|   | X48                          | 60        | 60                        | 56  | 52 | 48 | 45 | 55 | 55                        | 52  | 48 | 45 | 55 | 55 | 52                        | 48  | 45 | 55 | 55 |    |
|   | 48-S                         | 53        | 53                        | 48  | 45 | 42 | 39 | 49 | 49                        | 48  | 45 | 42 | 39 | 49 | 49                        | 48  | 45 | 42 | 39 |    |
| <b>180</b>  | X80                          | 82        | 80                        | 72  | 66 | 61 | 57 | 75 | 75                        | 72  | 66 | 61 | 57 | 75 | 75                        | 72  | 66 | 61 | 57 |    |
|   | X48                          | 56        | 56                        | 54  | 50 | 47 | 44 | 52 | 52                        | 52  | 50 | 47 | 44 | 52 | 52                        | 52  | 50 | 47 | 44 |    |
|   | 48-S                         | 50        | 50                        | 47  | 43 | 41 | 38 | 46 | 46                        | 46  | 43 | 41 | 38 | 46 | 46                        | 46  | 43 | 41 | 38 |    |
| <b>200</b>  | X80                          | 73        | 73                        | 68  | 62 | 58 | 55 | 68 | 68                        | 68  | 62 | 58 | 55 | 68 | 68                        | 68  | 62 | 58 | 55 |    |
|   | X48                          | 51        | 51                        | 50  | 47 | 44 | 42 | 47 | 47                        | 47  | 47 | 44 | 42 | 47 | 47                        | 47  | 47 | 44 | 42 |    |
|   | 48-S                         | 45        | 45                        | 44  | 41 | 39 | 37 | 42 | 42                        | 42  | 41 | 39 | 37 | 42 | 42                        | 42  | 41 | 39 | 37 |    |

| Table 1.34: Maximum Uplift (lb.) - Wind Exposure D Condition |                              |           |                           |       |       |       |      |      |                           |       |       |       |       |       |                           |       |       |       |       |       |
|--|------------------------------|-----------|---------------------------|-------|-------|-------|------|------|---------------------------|-------|-------|-------|-------|-------|---------------------------|-------|-------|-------|-------|-------|
| Exposure<br><b>D</b>   | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |       |       |       |      |      | Roof Wind Pressure Zone 2 |       |       |       |       |       | Roof Wind Pressure Zone 3 |       |       |       |       |       |
|  |                              |           | Roof Snow Load (psf)      |       |       |       |      |      | Roof Snow Load (psf)      |       |       |       |       |       | Roof Snow Load (psf)      |       |       |       |       |       |
|  |                              |           | 0                         | 10    | 20    | 30    | 40   | 50   | 0                         | 10    | 20    | 30    | 40    | 50    | 0                         | 10    | 20    | 30    | 40    | 50    |
| <b>ROOFS &gt;27° TO 45°</b>                                  | <b>110</b>                   | X80       | -518                      | -488  | -409  | -358  | -313 | -282 | -611                      | -577  | -483  | -423  | -370  | -333  | -611                      | -577  | -483  | -423  | -370  | -333  |
|  |                              | X48       | -388                      | -374  | -323  | -288  | -263 | -241 | -458                      | -442  | -382  | -340  | -310  | -284  | -458                      | -442  | -382  | -340  | -310  | -284  |
|  |                              | 48-S      | -364                      | -324  | -277  | -246  | -223 | -201 | -420                      | -383  | -327  | -291  | -264  | -238  | -420                      | -383  | -327  | -291  | -264  | -238  |
|  | <b>115</b>                   | X80       | -557                      | -526  | -443  | -390  | -344 | -310 | -656                      | -619  | -522  | -459  | -405  | -365  | -656                      | -619  | -522  | -459  | -405  | -365  |
|  |                              | X48       | -417                      | -401  | -348  | -312  | -285 | -264 | -490                      | -473  | -410  | -368  | -336  | -311  | -490                      | -473  | -410  | -368  | -336  | -311  |
|  |                              | 48-S      | -385                      | -348  | -299  | -267  | -243 | -221 | -440                      | -410  | -353  | -314  | -286  | -260  | -440                      | -410  | -353  | -314  | -286  | -260  |
|  | <b>120</b>                   | X80       | -598                      | -564  | -478  | -422  | -376 | -339 | -705                      | -665  | -564  | -498  | -444  | -400  | -705                      | -665  | -564  | -498  | -444  | -400  |
|  |                              | X48       | -448                      | -429  | -374  | -336  | -308 | -286 | -518                      | -506  | -441  | -397  | -363  | -337  | -518                      | -506  | -441  | -397  | -363  | -337  |
|  |                              | 48-S      | -406                      | -372  | -322  | -288  | -262 | -241 | -462                      | -439  | -380  | -339  | -310  | -285  | -462                      | -439  | -380  | -339  | -310  | -285  |
|  | <b>130</b>                   | X80       | -682                      | -643  | -550  | -489  | -444 | -401 | -804                      | -758  | -649  | -576  | -524  | -473  | -804                      | -758  | -649  | -576  | -524  | -473  |
|  |                              | X48       | -505                      | -484  | -427  | -386  | -356 | -331 | -565                      | -565  | -504  | -456  | -419  | -390  | -565                      | -565  | -504  | -456  | -419  | -390  |
|  |                              | 48-S      | -449                      | -422  | -369  | -331  | -304 | -282 | -504                      | -497  | -435  | -391  | -358  | -333  | -504                      | -497  | -435  | -391  | -358  | -333  |
|  | <b>140</b>                   | X80       | -770                      | -723  | -625  | -558  | -509 | -469 | -882                      | -848  | -734  | -656  | -598  | -550  | -882                      | -848  | -734  | -656  | -598  | -550  |
|  |                              | X48       | -552                      | -540  | -481  | -438  | -405 | -378 | -610                      | -610  | -565  | -514  | -475  | -444  | -610                      | -610  | -565  | -514  | -475  | -444  |
|  |                              | 48-S      | -491                      | -471  | -416  | -377  | -347 | -323 | -545                      | -545  | -489  | -442  | -407  | -379  | -545                      | -545  | -489  | -442  | -407  | -379  |
|  | <b>150</b>                   | X80       | -857                      | -803  | -701  | -630  | -576 | -535 | -950                      | -942  | -822  | -739  | -677  | -628  | -950                      | -942  | -822  | -739  | -677  | -628  |
|  |                              | X48       | -599                      | -595  | -535  | -490  | -455 | -427 | -656                      | -656  | -628  | -576  | -534  | -501  | -656                      | -656  | -628  | -576  | -534  | -501  |
|  |                              | 48-S      | -533                      | -521  | -464  | -423  | -391 | -365 | -586                      | -586  | -545  | -496  | -459  | -428  | -586                      | -586  | -545  | -496  | -459  | -428  |
|  | <b>160</b>                   | X80       | -926                      | -884  | -778  | -703  | -646 | -601 | -1019                     | -1019 | -914  | -826  | -759  | -706  | -1019                     | -1019 | -914  | -826  | -759  | -706  |
|  |                              | X48       | -645                      | -645  | -590  | -544  | -507 | -476 | -702                      | -702  | -693  | -639  | -595  | -560  | -702                      | -702  | -693  | -639  | -595  | -560  |
|  |                              | 48-S      | -575                      | -571  | -513  | -470  | -436 | -408 | -628                      | -628  | -603  | -552  | -512  | -480  | -628                      | -628  | -603  | -552  | -512  | -480  |
|  | <b>170</b>                   | X80       | -993                      | -963  | -855  | -777  | -716 | -668 | -1086                     | -1086 | -1004 | -912  | -841  | -785  | -1086                     | -1086 | -1004 | -912  | -841  | -785  |
|  |                              | X48       | -689                      | -689  | -644  | -597  | -558 | -527 | -748                      | -748  | -748  | -700  | -655  | -618  | -748                      | -748  | -748  | -700  | -655  | -618  |
|  |                              | 48-S      | -616                      | -616  | -561  | -517  | -481 | -452 | -668                      | -668  | -659  | -606  | -565  | -531  | -668                      | -668  | -659  | -606  | -565  | -531  |
|  | <b>180</b>                   | X80       | -1061                     | -1044 | -934  | -853  | -789 | -738 | -1154                     | -1154 | -1097 | -1001 | -927  | -867  | -1154                     | -1154 | -1097 | -1001 | -927  | -867  |
|  |                              | X48       | -732                      | -732  | -699  | -651  | -611 | -578 | -793                      | -793  | -793  | -764  | -718  | -679  | -793                      | -793  | -793  | -764  | -718  | -679  |
|  |                              | 48-S      | -654                      | -654  | -610  | -565  | -528 | -498 | -710                      | -710  | -710  | -663  | -620  | -584  | -710                      | -710  | -710  | -663  | -620  | -584  |
|  | <b>200</b>                   | X80       | -1187                     | -1187 | -1093 | -1007 | -939 | -883 | -1288                     | -1288 | -1282 | -1181 | -1101 | -1035 | -1288                     | -1288 | -1282 | -1181 | -1101 | -1035 |
|  |                              | X48       | -816                      | -816  | -809  | -760  | -719 | -683 | -884                      | -884  | -884  | -884  | -843  | -801  | -884                      | -884  | -884  | -884  | -843  | -801  |
|  |                              | 48-S      | -730                      | -730  | -709  | -662  | -623 | -590 | -791                      | -791  | -791  | -776  | -731  | -692  | -791                      | -791  | -791  | -776  | -731  | -692  |

| Table 1.35: Maximum Downforce (lb.) - Wind Exposure D Condition |                              |           |                           |      |      |      |      |      |                           |      |      |      |      |      |                           |      |      |      |      |      |
|---|------------------------------|-----------|---------------------------|------|------|------|------|------|---------------------------|------|------|------|------|------|---------------------------|------|------|------|------|------|
| Exposure<br><b>D</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |      |      |      |      |      | Roof Wind Pressure Zone 2 |      |      |      |      |      | Roof Wind Pressure Zone 3 |      |      |      |      |      |
|   |                              |           | Roof Snow Load (psf)      |      |      |      |      |      | Roof Snow Load (psf)      |      |      |      |      |      | Roof Snow Load (psf)      |      |      |      |      |      |
|   |                              |           | 0                         | 10   | 20   | 30   | 40   | 50   | 0                         | 10   | 20   | 30   | 40   | 50   | 0                         | 10   | 20   | 30   | 40   | 50   |
| <b>ROOFS &gt;27° TO 45°</b>                                     | <b>110</b>                   | X80       | 563                       | 560  | 593  | 627  | 644  | 665  | 563                       | 560  | 593  | 627  | 644  | 665  | 563                       | 560  | 593  | 627  | 644  | 665  |
|   |                              | X48       | 422                       | 430  | 468  | 505  | 539  | 567  | 422                       | 430  | 468  | 505  | 539  | 567  | 422                       | 430  | 468  | 505  | 539  | 567  |
|   |                              | 48-S      | 396                       | 372  | 402  | 431  | 459  | 474  | 387                       | 372  | 402  | 431  | 459  | 474  | 387                       | 372  | 402  | 431  | 459  | 474  |
|   | <b>115</b>                   | X80       | 599                       | 582  | 613  | 647  | 665  | 684  | 599                       | 582  | 613  | 647  | 665  | 684  | 599                       | 582  | 613  | 647  | 665  | 684  |
|   |                              | X48       | 449                       | 445  | 482  | 517  | 551  | 583  | 447                       | 445  | 482  | 517  | 551  | 583  | 447                       | 445  | 482  | 517  | 551  | 583  |
|   |                              | 48-S      | 414                       | 386  | 414  | 442  | 469  | 488  | 402                       | 386  | 414  | 442  | 469  | 488  | 402                       | 386  | 414  | 442  | 469  | 488  |
|   | <b>120</b>                   | X80       | 634                       | 604  | 632  | 664  | 687  | 704  | 634                       | 604  | 632  | 664  | 687  | 704  | 634                       | 604  | 632  | 664  | 687  | 704  |
|   |                              | X48       | 475                       | 459  | 495  | 529  | 562  | 594  | 466                       | 459  | 495  | 529  | 562  | 594  | 466                       | 459  | 495  | 529  | 562  | 594  |
|   |                              | 48-S      | 431                       | 399  | 426  | 453  | 479  | 502  | 415                       | 399  | 426  | 453  | 479  | 502  | 415                       | 399  | 426  | 453  | 479  | 502  |
|   | <b>130</b>                   | X80       | 708                       | 667  | 673  | 702  | 732  | 747  | 708                       | 667  | 673  | 702  | 732  | 747  | 708                       | 667  | 673  | 702  | 732  | 747  |
|   |                              | X48       | 524                       | 503  | 523  | 555  | 586  | 616  | 497                       | 497  | 523  | 555  | 586  | 616  | 497                       | 497  | 523  | 555  | 586  | 616  |
|   |                              | 48-S      | 466                       | 438  | 451  | 476  | 501  | 525  | 443                       | 438  | 451  | 476  | 501  | 525  | 443                       | 438  | 451  | 476  | 501  | 525  |
|   | <b>140</b>                   | X80       | 786                       | 738  | 716  | 742  | 769  | 793  | 767                       | 738  | 716  | 742  | 769  | 793  | 767                       | 738  | 716  | 742  | 769  | 793  |
|   |                              | X48       | 564                       | 551  | 552  | 582  | 612  | 640  | 530                       | 530  | 552  | 582  | 612  | 640  | 530                       | 530  | 552  | 582  | 612  | 640  |
|   |                              | 48-S      | 502                       | 481  | 477  | 501  | 524  | 547  | 474                       | 474  | 477  | 501  | 524  | 547  | 474                       | 474  | 477  | 501  | 524  | 547  |
|   | <b>150</b>                   | X80       | 862                       | 807  | 760  | 782  | 807  | 833  | 814                       | 807  | 760  | 782  | 807  | 833  | 814                       | 807  | 760  | 782  | 807  | 833  |
|   |                              | X48       | 602                       | 598  | 580  | 609  | 637  | 664  | 562                       | 562  | 580  | 609  | 637  | 664  | 562                       | 562  | 580  | 609  | 637  | 664  |
|   |                              | 48-S      | 536                       | 524  | 503  | 525  | 547  | 568  | 502                       | 502  | 503  | 525  | 547  | 568  | 502                       | 502  | 503  | 525  | 547  | 568  |
|   | <b>160</b>                   | X80       | 920                       | 878  | 804  | 824  | 846  | 870  | 862                       | 862  | 804  | 824  | 846  | 870  | 862                       | 862  | 804  | 824  | 846  | 870  |
|   |                              | X48       | 641                       | 641  | 610  | 637  | 664  | 690  | 594                       | 594  | 610  | 637  | 664  | 690  | 594                       | 594  | 610  | 637  | 664  | 690  |
|   |                              | 48-S      | 571                       | 567  | 530  | 551  | 571  | 591  | 531                       | 531  | 530  | 551  | 571  | 591  | 531                       | 531  | 530  | 551  | 571  | 591  |
|   | <b>170</b>                   | X80       | 979                       | 950  | 851  | 867  | 887  | 909  | 912                       | 912  | 851  | 867  | 887  | 909  | 912                       | 912  | 851  | 867  | 887  | 909  |
|   |                              | X48       | 680                       | 680  | 641  | 666  | 692  | 716  | 628                       | 628  | 634  | 666  | 692  | 716  | 628                       | 628  | 634  | 666  | 692  | 716  |
|   |                              | 48-S      | 607                       | 607  | 558  | 577  | 596  | 615  | 562                       | 562  | 558  | 577  | 596  | 615  | 562                       | 562  | 558  | 577  | 596  | 615  |
|   | <b>180</b>                   | X80       | 1037                      | 1021 | 913  | 911  | 929  | 949  | 960                       | 960  | 913  | 911  | 929  | 949  | 960                       | 960  | 913  | 911  | 929  | 949  |
|   |                              | X48       | 715                       | 715  | 684  | 696  | 719  | 743  | 661                       | 661  | 661  | 696  | 719  | 743  | 661                       | 661  | 661  | 696  | 719  | 743  |
|   |                              | 48-S      | 639                       | 639  | 597  | 603  | 621  | 639  | 591                       | 591  | 591  | 603  | 621  | 639  | 591                       | 591  | 591  | 603  | 621  | 639  |
|   | <b>200</b>                   | X80       | 1147                      | 1147 | 1056 | 1002 | 1016 | 1032 | 1061                      | 1061 | 1056 | 1002 | 1016 | 1032 | 1061                      | 1061 | 1056 | 1002 | 1016 | 1032 |
|   |                              | X48       | 788                       | 788  | 782  | 756  | 778  | 799  | 729                       | 729  | 729  | 750  | 778  | 799  | 729                       | 729  | 729  | 750  | 778  | 799  |
|   |                              | 48-S      | 705                       | 705  | 685  | 658  | 674  | 690  | 652                       | 652  | 652  | 658  | 674  | 690  | 652                       | 652  | 652  | 658  | 674  | 690  |

| Table 1.36: Maximum Shear (lb.) - Wind Exposure D Condition |                              |           |                           |     |     |     |     |     |                           |     |     |     |     |     |                           |     |     |     |     |     |
|---|------------------------------|-----------|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|---------------------------|-----|-----|-----|-----|-----|
| Exposure<br><b>D</b>  | Ultimate Wind Speed, V (mph) | Rail Type | Roof Wind Pressure Zone 1 |     |     |     |     |     | Roof Wind Pressure Zone 2 |     |     |     |     |     | Roof Wind Pressure Zone 3 |     |     |     |     |     |
|   |                              |           | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     | Roof Snow Load (psf)      |     |     |     |     |     |
|   |                              |           | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  | 0                         | 10  | 20  | 30  | 40  | 50  |
| <b>ROOFS &gt;27° TO 45°</b>                                 | <b>110</b>                   | X80       | 41                        | 176 | 263 | 331 | 379 | 420 | 41                        | 176 | 263 | 331 | 379 | 420 | 41                        | 176 | 263 | 331 | 379 | 420 |
|   |                              | X48       | 31                        | 135 | 208 | 267 | 317 | 359 | 31                        | 135 | 208 | 267 | 317 | 359 | 31                        | 135 | 208 | 267 | 317 | 359 |
|   |                              | 48-S      | 29                        | 117 | 178 | 228 | 270 | 300 | 28                        | 117 | 178 | 228 | 270 | 300 | 28                        | 117 | 178 | 228 | 270 | 300 |
|   | <b>115</b>                   | X80       | 40                        | 173 | 260 | 329 | 379 | 420 | 40                        | 173 | 260 | 329 | 379 | 420 | 40                        | 173 | 260 | 329 | 379 | 420 |
|   |                              | X48       | 30                        | 132 | 204 | 263 | 314 | 358 | 30                        | 132 | 204 | 263 | 314 | 358 | 30                        | 132 | 204 | 263 | 314 | 358 |
|   |                              | 48-S      | 28                        | 115 | 175 | 225 | 267 | 300 | 27                        | 115 | 175 | 225 | 267 | 300 | 27                        | 115 | 175 | 225 | 267 | 300 |
|   | <b>120</b>                   | X80       | 40                        | 170 | 256 | 325 | 379 | 420 | 40                        | 170 | 256 | 325 | 379 | 420 | 40                        | 170 | 256 | 325 | 379 | 420 |
|   |                              | X48       | 30                        | 129 | 201 | 259 | 310 | 355 | 29                        | 129 | 201 | 259 | 310 | 355 | 29                        | 129 | 201 | 259 | 310 | 355 |
|   |                              | 48-S      | 27                        | 112 | 173 | 222 | 264 | 300 | 26                        | 112 | 173 | 222 | 264 | 300 | 26                        | 112 | 173 | 222 | 264 | 300 |
|   | <b>130</b>                   | X80       | 38                        | 164 | 249 | 318 | 377 | 420 | 38                        | 164 | 249 | 318 | 377 | 420 | 38                        | 164 | 249 | 318 | 377 | 420 |
|   |                              | X48       | 28                        | 123 | 193 | 252 | 302 | 347 | 27                        | 122 | 193 | 252 | 302 | 347 | 27                        | 122 | 193 | 252 | 302 | 347 |
|   |                              | 48-S      | 25                        | 107 | 167 | 216 | 258 | 296 | 24                        | 107 | 167 | 216 | 258 | 296 | 24                        | 107 | 167 | 216 | 258 | 296 |
|   | <b>140</b>                   | X80       | 37                        | 157 | 242 | 311 | 370 | 420 | 36                        | 157 | 242 | 311 | 370 | 420 | 36                        | 157 | 242 | 311 | 370 | 420 |
|   |                              | X48       | 26                        | 118 | 186 | 244 | 294 | 339 | 25                        | 113 | 186 | 244 | 294 | 339 | 25                        | 113 | 186 | 244 | 294 | 339 |
|   |                              | 48-S      | 24                        | 103 | 161 | 210 | 252 | 290 | 22                        | 101 | 161 | 210 | 252 | 290 | 22                        | 101 | 161 | 210 | 252 | 290 |
|   | <b>150</b>                   | X80       | 36                        | 152 | 235 | 304 | 363 | 416 | 34                        | 152 | 235 | 304 | 363 | 416 | 34                        | 152 | 235 | 304 | 363 | 416 |
|   |                              | X48       | 25                        | 112 | 180 | 237 | 287 | 332 | 23                        | 105 | 180 | 237 | 287 | 332 | 23                        | 105 | 180 | 237 | 287 | 332 |
|   |                              | 48-S      | 22                        | 98  | 156 | 204 | 246 | 284 | 21                        | 94  | 156 | 204 | 246 | 284 | 21                        | 94  | 156 | 204 | 246 | 284 |
|   | <b>160</b>                   | X80       | 34                        | 146 | 229 | 297 | 356 | 409 | 31                        | 143 | 229 | 297 | 356 | 409 | 31                        | 143 | 229 | 297 | 356 | 409 |
|   |                              | X48       | 23                        | 107 | 173 | 230 | 280 | 324 | 22                        | 99  | 173 | 230 | 280 | 324 | 22                        | 99  | 173 | 230 | 280 | 324 |
|   |                              | 48-S      | 21                        | 94  | 151 | 199 | 240 | 278 | 19                        | 88  | 151 | 199 | 240 | 278 | 19                        | 88  | 151 | 199 | 240 | 278 |
|   | <b>170</b>                   | X80       | 32                        | 140 | 222 | 290 | 349 | 402 | 30                        | 135 | 222 | 290 | 349 | 402 | 30                        | 135 | 222 | 290 | 349 | 402 |
|   |                              | X48       | 22                        | 101 | 167 | 223 | 272 | 316 | 20                        | 93  | 165 | 223 | 272 | 316 | 20                        | 93  | 165 | 223 | 272 | 316 |
|   |                              | 48-S      | 20                        | 90  | 146 | 193 | 234 | 272 | 18                        | 83  | 146 | 193 | 234 | 272 | 18                        | 83  | 146 | 193 | 234 | 272 |
| <b>180</b>  | X80                          | 30        | 135                       | 216 | 283 | 342 | 395 | 28  | 127                       | 216 | 283 | 342 | 395 | 28  | 127                       | 216 | 283 | 342 | 395 |     |
|   | X48                          | 21        | 95                        | 162 | 216 | 265 | 309 | 19  | 88                        | 156 | 216 | 265 | 309 | 19  | 88                        | 156 | 216 | 265 | 309 |     |
|   | 48-S                         | 19        | 85                        | 141 | 188 | 229 | 266 | 17  | 78                        | 140 | 188 | 229 | 266 | 17  | 78                        | 140 | 188 | 229 | 266 |     |
| <b>200</b>  | X80                          | 27        | 124                       | 203 | 270 | 328 | 380 | 25  | 115                       | 203 | 270 | 328 | 380 | 25  | 115                       | 203 | 270 | 328 | 380 |     |
|   | X48                          | 19        | 85                        | 151 | 203 | 251 | 294 | 17  | 79                        | 140 | 202 | 251 | 294 | 17  | 79                        | 140 | 202 | 251 | 294 |     |
|   | 48-S                         | 17        | 76                        | 132 | 177 | 218 | 254 | 15  | 71                        | 126 | 177 | 218 | 254 | 15  | 71                        | 126 | 177 | 218 | 254 |     |

| <b>Table 2.1: CrossRail Section Properties</b> |  |            |            |                    |
|--|--|------------|------------|--------------------|
|  | <b>48-S</b>  | <b>X48</b> | <b>X80</b> | <b>(unit)</b>      |
| Cross Sectional Area (A)                       | 0.5433   | 0.7130     | 0.7770     | (in <sup>2</sup> ) |
| Moments of Inertia:                            |  |            |            |                    |
| Vertical (Ix)                                  | 0.2183   | 0.2518     | 0.8000     | (in <sup>4</sup> ) |
| Horizontal (Iy)                                | 0.1614   | 0.2306     | 0.1970     | (in <sup>4</sup> ) |
| Section Moduli:                                |  |            |            |                    |
| Vertical (Sx)                                  | 0.2229   | 0.2457     | 0.5290     | (in <sup>3</sup> ) |
| Horizontal (Sy)                                | 0.1910   | 0.2966     | 0.2514     | (in <sup>3</sup> ) |
| Material:                                      | AL EN AW 6063-T66<br>AL 6005A-T61<br>AL 6005A-T5<br>AL 6005-T5<br>AL 6061-T6 |            |            |                    |
| Note:  | Material selection is region dependent.<br>Analysis based on worst-case.     |            |            |                    |