



## EVALUATION REPORT

## FLORIDA BUILDING CODE, 7<sup>TH</sup> EDITION (2020)

**Manufacturer:** TRI COUNTY METALS  
301 SE 16<sup>th</sup> Street  
Trenton, FL 32693  
(877) 766-3309  
[www.tricountymetals.com](http://www.tricountymetals.com)

*Issued April 15, 2022*

**Manufacturing Locations:** Trenton, FL

**Quality Assurance:** Keystone Certifications, Inc. (QUA1824)

## SCOPE

**Category:** Roofing  
**Subcategory:** Metal Roofing  
**Code Edition:** Florida Building Code, 7<sup>th</sup> Edition (2020)  
**Code Sections:** 1504.3, 1504.3.2  
**Properties:** Wind Resistance

## REFERENCES


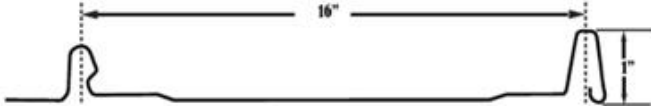

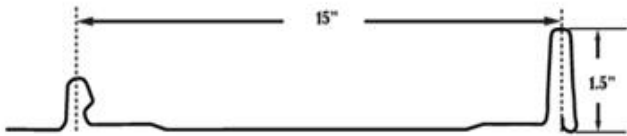
| <u>Entity</u>                                     | <u>Report No.</u> | <u>Standard</u> | <u>Year</u> |
|---|-------------------|-----------------|-------------|
| PRI Construction Materials Technologies (TST5878) | 945T0002          | ASTM B 117      | 2016        |
| PRI Construction Materials Technologies (TST5878) | 945T0004          | ASTM G 155      | 2013        |
| PRI Construction Materials Technologies (TST5878) | 1272T0002         | ASTM B 117      | 2016        |
|   |                   | TAS 110         | 2000        |
| PRI Construction Materials Technologies (TST5878) | 1272T0003         | ASTM B 117      | 2016        |
|   |                   | TAS 110         | 2000        |
| PRI Construction Materials Technologies (TST5878) | 1272T0005         | ASTM G 155      | 2013        |
|   |                   | TAS 110         | 2000        |
| PRI Construction Materials Technologies (TST5878) | 1272T0006         | ASTM G 155      | 2013        |
|   |                   | TAS 110         | 2000        |
| PRI Construction Materials Technologies (TST5878) | 1930T0001         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
| PRI Construction Materials Technologies (TST5878) | 1930T0002         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
| PRI Construction Materials Technologies (TST5878) | 1930T0003         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
| PRI Construction Materials Technologies (TST5878) | 1930T0004         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
| PRI Construction Materials Technologies (TST5878) | 1930T0009         | FM 4471         | 1992        |
| PRI Construction Materials Technologies (TST5878) | 1930T0010         | ASTM B 117      | 2016        |
|   |                   | TAS 110         | 2000        |
| PRI Construction Materials Technologies (TST5878) | 1930T0011         | ASTM G 155      | 2013        |
|   |                   | TAS 110         | 2000        |
| PRI Construction Materials Technologies (TST5878) | 1930T0013         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
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| PRI Construction Materials Technologies (TST5878) | 1930T0015         | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |




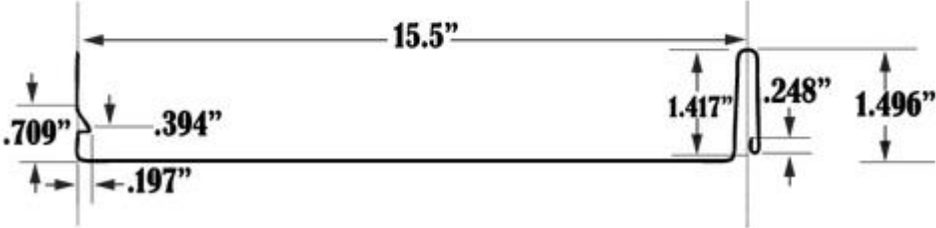

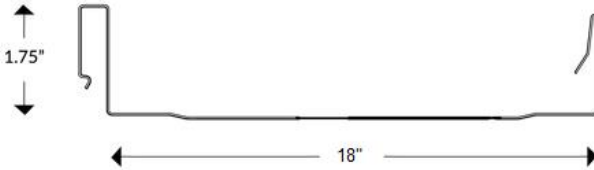
| <u>Entity</u>                                     | <u>Report No.</u> | <u>Standard</u> | <u>Year</u> |
|---|-------------------|-----------------|-------------|
| PRI Construction Materials Technologies (TST5878) | 1930T0016         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
| PRI Construction Materials Technologies (TST5878) | 1930T0017         | ASTM E 1592     | 2005(2012)  |
| PRI Construction Materials Technologies (TST5878) | 1930T0018         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
| PRI Construction Materials Technologies (TST5878) | 1930T0019         | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
|   |                   | TAS 125         | 2003        |
| PRI Construction Materials Technologies (TST5878) | 1930T0020         | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
|   |                   | TAS 125         | 2003        |
| PRI Construction Materials Technologies (TST5878) | 1930T0026         | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
|   |                   | TAS 125         | 2003        |
| PRI Construction Materials Technologies (TST5878) | 1930T0027         | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
|   |                   | TAS 125         | 2003        |
| PRI Construction Materials Technologies (TST5878) | 1930T0028         | ASTM C 794      | 2001        |
| PRI Construction Materials Technologies (TST5878) | 1930T0031         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |
| PRI Construction Materials Technologies (TST5878) | 1930T0032         | TAS 125         | 2003        |
|   |                   | UL 580          | 2006        |
|   |                   | UL 1897         | 2012        |





## PRODUCT DESCRIPTION

|  |                     |  |
|--|---------------------|--|
| TCM-LOK 1 in.  | <b>Profile:</b>     | 1 in. snap lock seam; Max.16 in. coverage  |
|  | <b>Description:</b> | Non-structural, snap lock standing seam roof panel with 7/8 in. slotted nail strip   |
|  | <b>Material:</b>    | Min. 24ga ASTM A792 AZ50 steel coated with Fluropon® or WeatherXL or A792 AZ55 steel ( $F_y$ = min. 50 ksi); or<br>Min. 0.032 in. ASTM B209, 3105 H22 aluminum coated with Fluropon® ( $F_y$ = min. 25 ksi); Shall conform with FBC Section 1507.4.3 |
| <br>    |                     |  |
| TCM-LOK 1.5 in.  | <b>Profile:</b>     | 1.5 in. snap lock seam; Max. 15 in. coverage   |
|  | <b>Description:</b> | Non-structural, snap lock standing seam roof panel with 7/8 in. slotted nail strip   |
|  | <b>Material:</b>    | Min. 24 ga. ASTM A792 AZ50 steel coated with Fluropon® or WeatherXL or A792 AZ55 steel ( $F_y$ = min. 50 ksi); Shall conform with FBC Section 1507.4.3   |
| <br> |                     |  |

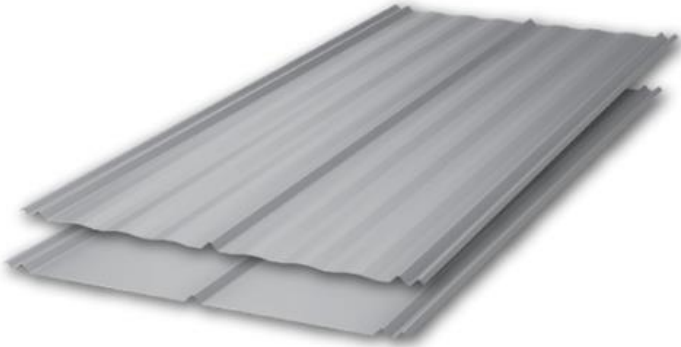
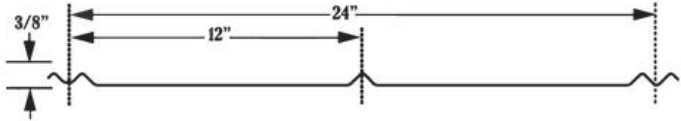

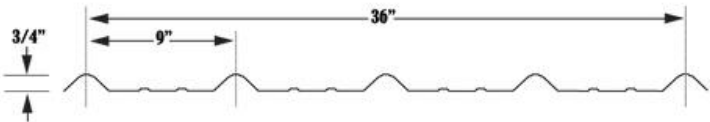


|             |  |  |
|-------------|--|--|
| 1.5 SL-LOK  | <b>Profile:</b>  | 1.5 in. snap lock seam; Max. 15.5 in. coverage   |
|             | <b>Description:</b>  | Non-structural, snap lock standing seam roof panel   |
|             | <b>Material:</b>   | Min. 24 ga. ASTM A792 AZ55 steel ( $F_y$ = min. 50 ksi); Shall conform with FBC Section 1507.4.3   |
|             | <br>    |  |
| 1.75 SS-LOK | <b>Profile:</b>  | 1.75 in. snap lock standing seam; Max. 18 in. coverage   |
|             | <b>Description:</b>  | Non-structural, snap lock standing seam roof panel   |
|             | <b>Material:</b>   | Min. 24 ga. A792 AZ55 steel ( $F_y$ = min. 50 ksi); Min. 0.040 in. ASTM B209, 3104 H22 aluminum coated with Fluoropon® ( $F_y$ = min. 25 ksi); Shall conform with FBC Section 1507.4.3 |
|             | <br> |  |



|            |                     |   |
|------------|---------------------|---|
| 1.5 MS-LOK | <b>Profile:</b>     | 1.5 in. mechanical seam; Max. 16 in. coverage   |
|            | <b>Description:</b> | Non-structural, standing seam roof panel; 180° double lock mechanical seam                  |
|            | <b>Material:</b>    | Min. 24 ga. A792 AZ55 steel ( $F_y$ = min. 50 ksi); Shall conform with FBC Section 1507.4.3 |
|            |                     |           |
| 2 MS-LOK   | <b>Profile:</b>     | 2 in. mechanical seam; Max. 18.75 in. coverage  |
|            | <b>Description:</b> | Non-structural, standing seam roof panel; 180° double lock mechanical seam                  |
|            | <b>Material:</b>    | Min. 24 ga. A792 AZ50 steel ( $F_y$ = min. 50 ksi); Shall conform with FBC Section 1507.4.3 |
|            |                     |          |



|  |                     |  |
|--|---------------------|--|
| 5V   | <b>Profile:</b>     | 3/8 in. ribs at 12 in. o.c.; 24 in. coverage   |
|  | <b>Description:</b> | Non-structural, through fastened roof panel  |
|  | <b>Material:</b>    | Min. 26 ga. ASTM A653 G90, ASTM A792 AZ50 steel coated with Fluropon® or WeatherXL or A792 AZ55 steel ( $F_y$ = min. 50 or 80 ksi); or Min. 0.032 in. ASTM B209, 3105 H22 aluminum coated with Fluropon® ( $F_y$ = min. 27 ksi); Shall conform with FBC Section 1507.4.3 |
| <br>     |                     |  |
| Ultra Rib  | <b>Profile:</b>     | 3/4 in. ribs at 9 in. o.c.; 36 in. coverage  |
|  | <b>Description:</b> | Non-structural, through fastened roof panel  |
|  | <b>Material:</b>    | Min. 29 ga. ASTM A653 G90, ASTM A792 AZ50 steel coated with Fluropon® or WeatherXL or A792 AZ55 steel ( $F_y$ = min. 80 ksi); Shall conform with FBC Section 1507.4.3  |
| <br> |                     |  |

## LIMITATIONS

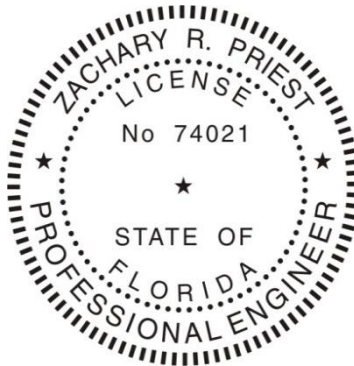
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1. This report is not for use in the HVHZ.
2. Fire classification is not within the scope of this evaluation.
3. The roof deck, wood battens and their attachment shall be designed by others to meet the minimum design loads established for components and cladding and in accordance with FBC requirements.
4. Roof slope shall be in accordance with FBC Section 1507.4.2
5. Reroofing shall be in accordance with Section 1511.
6. Installation of the evaluated products shall comply with this report, the FBC, and the manufacturer's published application instructions. Where discrepancies exist between these sources, the more restrictive and FBC compliant installation detail shall prevail.
7. All products listed in this report shall be manufactured under a quality assurance program in compliance with Rule 61G20-3.

## COMPLIANCE STATEMENT

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The products evaluated herein by Zachary R. Priest, P.E. have demonstrated compliance with the Florida Building Code, 7<sup>th</sup> Edition (2020) as evidenced in the referenced documents submitted by the named manufacturer.



**This item has been  
digitally signed and  
sealed by Zachary R.  
Priest, PE, on 4/15/2022.**

**Printed copies of this  
document are not  
considered signed and  
sealed and the signature  
must be verified on any  
electronic copies.**

Zachary R. Priest, P.E.  
Florida Registration No. 74021  
Organization No. ANE9641

## CERTIFICATION OF INDEPENDENCE

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CREEK Technical Services, LLC does not have, nor will it acquire, a financial interest in any company manufacturing or distributing products under this evaluation.

CREEK Technical Services, LLC is not owned, operated, or controlled by any company manufacturing or distributing products under this evaluation.

Zachary R. Priest, P.E. does not have, nor will acquire, a financial interest in any company manufacturing or distributing products under this evaluation.

Zachary R. Priest, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.

## APPENDICES

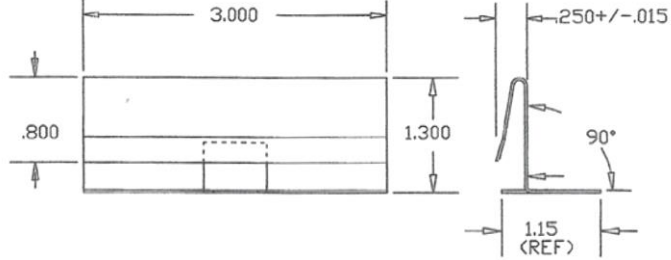
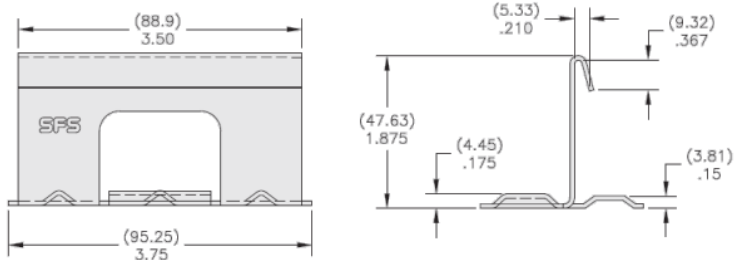
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- 1) APPENDIX A – Installation (3 pages)
- 2) APPENDIX B – Approved Roof Systems (6 pages)
- 3) APPENDIX C – Design Wind Loads (4 pages)

**APPENDIX A**
**INSTALLATION**

*Note - Refer to the [APPROVED ROOF SYSTEMS](#) section of this report for specific installation details of a selected system.*

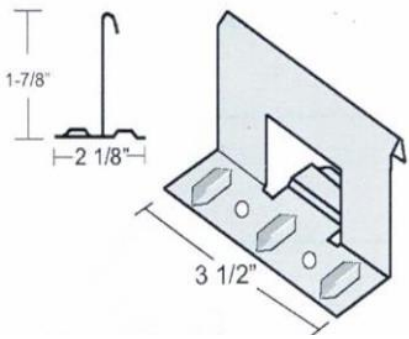
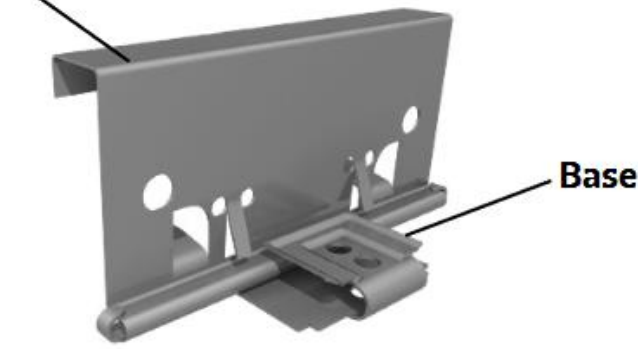
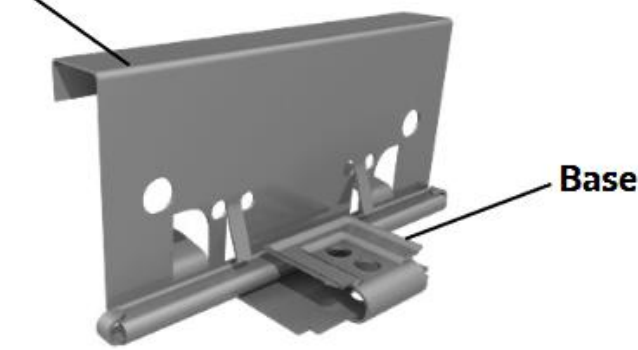
Unless otherwise specified in this report the following installation details shall be met for the named products:

| Component | Product  | Installation Detail   |
|-----------|--|---|
| Fasteners | #10-12 Pancake Type A screw                          | Shall penetrate through the sheathing a minimum 3/8 in. Shall be corrosion resistant in accordance with FBC section 1507.4.4.   |
|           | #10-9 PanclipSS MTW low profile head wood screw      |   |
|           | #10-9 Panclip MTW low profile head wood screw        |   |
|           | #9-15 Woodgrip HWH wood screw with sealing washer    |   |
|           | #9-15 Evergrip HWH wood screw with sealing washer    |   |
|           | #12-8 Woodgrip XG HWH wood screw with sealing washer |   |
| Clips     | 1.5 in. DM SL Clip                                   | 24 ga. Direct Metals Inc Snaplock HD 450HD Clip, 1-1/4" – 1-1/2" Utility Snaplock Clip, 1.3 in. tall with 3 in. base<br> |
|           | 1.75 in. SFS SL Clip                                 | 18 ga. SFS 1-3/4 in. Snap Lock Clip; 1.875 in. tall with 3.75 in. base<br>  |



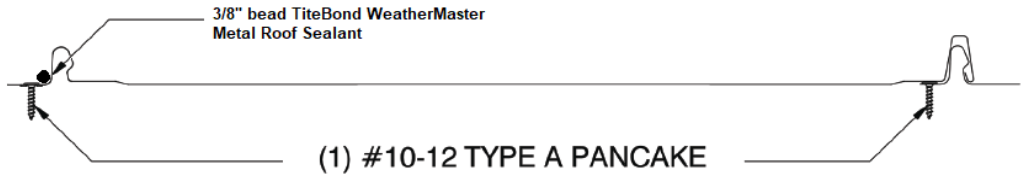
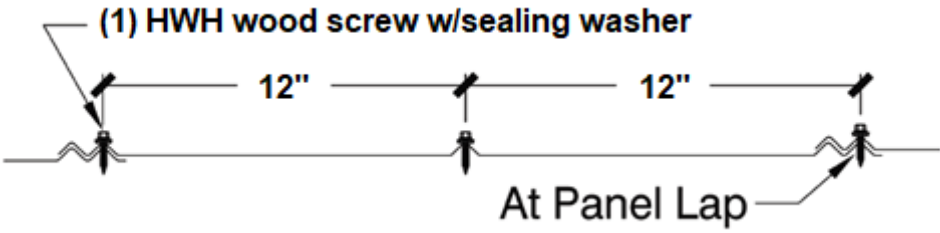
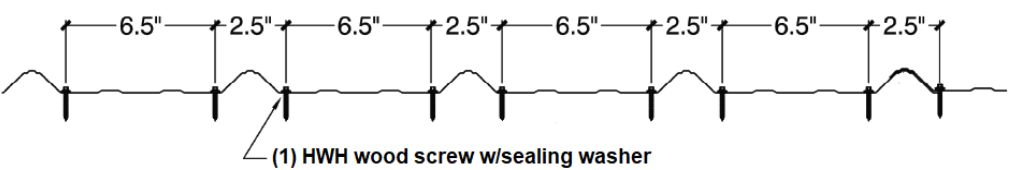
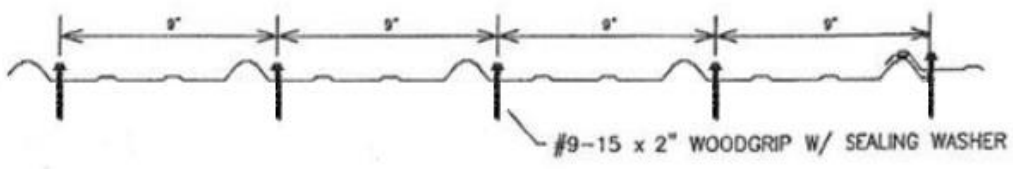


**APPENDIX A**

| Component      | Product                                   | Installation Detail   |
|----------------|---|---|
| Clips – Cont'd | 1.75 in. DM SL Clip                       | <p>18 ga. Direct Metals Inc 1-3/4 in. Snap Lock Clip; 1-7/8 in. tall with 3-1/2 in. base</p>    |
|                | 1.5 in. ML Clip                           | <p>1-1/2 in. 1-piece expansion clip; 22 ga. vertical tab; 16 ga. base; 4.5 in. long</p> <p><b>Vertical Tab</b></p>  <p><b>Base</b></p> |
|                | 2 in. ML Clip                             | <p>2 in. 1-piece expansion clip; 22 ga. vertical tab; 16 ga. base; 4.5 in. long</p> <p><b>Vertical Tab</b></p>  <p><b>Base</b></p>    |
| Seam Sealants  | TiteBond Weathermaster Metal Roof Sealant | Shall be applied in 1/4 in.- 5/16 in. continuous beads on the male rib along the seam   |
|                | Geocel 2300                               |   |
|                | Novaflex Metal Roof Sealant               |   |



**APPENDIX A**

| Fastening Details |  |
|-------------------|--|
| Nomenclature      | Attachment   |
| TCM-LOK           |  <p>3/8" bead TiteBond WeatherMaster Metal Roof Sealant</p> <p>(1) #10-12 TYPE A PANCAKE</p> |
| 5V                |  <p>(1) HWH wood screw w/sealing washer</p> <p>12" 12"</p> <p>At Panel Lap</p>               |
| Ultra Rib         |  <p>6.5" 2.5" 6.5" 2.5" 6.5" 2.5" 6.5" 2.5"</p> <p>(1) HWH wood screw w/sealing washer</p>  |
| Ultra Rib 2       |  <p>9" 9" 9" 9"</p> <p>#9-15 x 2" WOODGRIP W/ SEALING WASHER</p>                           |

**APPROVED ROOF SYSTEMS**

The following notes shall be observed when using the assembly tables below.

1. Maximum Design Pressure (*MDP*) was calculated using a 2:1 margin of safety per FBC Section 1504.9.
2. Refer to [LIMITATIONS](#) and sections of this evaluation when using the table(s) below.
3. Refer to [INSTALLATION](#) section of this report for installation detail when the information is not explicitly stated for the selected assembly.
4. The on-center (o.c.) spacing given is the maximum allowable attachment spacing for the rated system.
5. Unless otherwise specified, Wood Deck shall be designed by others in accordance with FBC requirements and shall be minimum 15/32 in. thick APA Span-Rated plywood sheathing at maximum 24 in. span.
6. No. 2 SYP wood battens used over solidly sheathed decks shall be installed parallel to the eave and 90 degrees to the roof trusses/rafters. Wood battens shall be located under each fastener row. Panel fasteners shall be installed through the battens and into the roof deck. Battens may be secured in place prior to fastening the roof panels.
7. For metal roofing installed over open framing, rational analysis shall be conducted by a qualified design professional in accordance with Section 2210.1.1.2 and Chapter 16. Maximum Design Pressures listed below are established based on uniform static loading in accordance with Section 1504.3.2 and ASTM E 1592.

| Roof System Numbers and Definitions |  |
|-------------------------------------|--|
| <a href="#">L1-AI-W-#</a>           | Min. 0.032 Al TCM-LOK 1 in. over Wood Deck (New or Existing)         |
| <a href="#">L1-S-W-#</a>            | Min. 24ga. steel TCM-LOK 1 in. over Wood Deck (New or Existing)      |
| <a href="#">L1.5-S-W-#</a>          | Min. 24ga. steel TCM-LOK 1.5 in. over Wood Deck (New or Existing)    |
| <a href="#">SLLOK-W-#</a>           | Min. 24ga. steel 1.5 SL-LOK over Wood Deck (New or Existing)         |
| <a href="#">SS-AI-W-#</a>           | Min. 0.040 Al 1.75 SS-LOK over Wood Deck (New or Existing)           |
| <a href="#">SS-S-W-#</a>            | Min. 24ga. steel 1.75 SS-LOK over Wood Deck (New or Existing)        |
| <a href="#">1.5MS-W-#</a>           | Min. 24ga. steel 1.5 MS-LOK over Wood Deck (New or Existing)         |
| <a href="#">2MS-W-#</a>             | Min. 24ga. steel 2 MS-LOK over Wood Deck (New or Existing)           |
| <a href="#">5V-AI-W-#</a>           | Min. 0.032 Al 5V over Wood Deck (New or Existing)                    |
| <a href="#">5V-S-W-#</a>            | Min. 26ga. steel 5V over Wood Deck (New or Existing)                 |
| <a href="#">RIB-W-#</a>             | Min. 29ga and 26ga. steel Ultra Rib over Wood Deck (New or Existing) |
| <a href="#">RIB-#</a>               | Min. 29ga. steel Ultra Rib over Open Framing (New or Existing)       |

| Approved Systems for Min. 0.032 Al 1 in. TCM-LOK over Wood Deck (New or Existing) |                        |  |                     |  |  |                  |
|---|------------------------|--|---------------------|--|--|------------------|
| System No.  | Deck                   | Fire Barrier                             | Underlayment        | Roof Panel   | Panel Attachment   | <i>MDP</i> (psf) |
| L1-AI-W-1   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 0.032 Al<br>TCM-LOK 1 in.<br>Max. 16 in. coverage | TCM-LOK attachment with #10-12 Pancake Type A screws spaced 5-1/4 in. o.c.;<br>Seam Sealant (see <a href="#">INSTALLATION</a> for list of allowable products) applied to male rib. | <b>-110</b>      |

**APPENDIX B**

| Approved Systems for Min. 24ga. steel TCM-LOK 1 in. over Wood Deck (New or Existing) |                        |  |                     |   |  |               |
|--|------------------------|--|---------------------|---|--|---------------|
| System No.   | Deck                   | Fire Barrier                             | Underlayment        | Roof Panel  | Panel Attachment   | MDP (psf)     |
| L1-S-W-1   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 24ga. steel<br>TCM-LOK 1 in.<br>Max. 16 in. coverage | TCM-LOK attachment with #10-12 Pancake Type A screws spaced 5-1/4 in. o.c.;<br>Seam Sealant (see <a href="#">INSTALLATION</a> for list of allowable products) applied to male rib. | <b>-142.5</b> |

| Approved Systems for Min. 24ga. steel TCM-LOK 1.5 in. over Wood Deck (New or Existing) |                        |  |                     |   |  |               |
|--|------------------------|--|---------------------|---|--|---------------|
| System No.   | Deck                   | Fire Barrier                             | Underlayment        | Roof Panel  | Panel Attachment   | MDP (psf)     |
| L1.5-S-W-1   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 24ga. steel<br>TCM-LOK 1.5 in.<br>Max. 15 in. coverage | TCM-LOK attachment with #10-12 Pancake Type A screws spaced 5-1/4 in. o.c.;<br>Seam Sealant (see <a href="#">INSTALLATION</a> for list of allowable products) applied to male rib. | <b>-122.5</b> |

| Approved Systems for Min. 24ga. steel 1.5 SL-LOK over Wood Deck (New or Existing) |                        |  |                     |  |  |            |
|---|------------------------|--|---------------------|--|--|------------|
| System No.  | Deck                   | Fire Barrier                             | Underlayment        | Roof Panel   | Panel Attachment   | MDP (psf)  |
| SLLOK-W-1   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 24ga. steel<br>1.5 SL-LOK<br>Max. 15.5 in. coverage | 1.5 in. SL Clips spaced 12 in. o.c. at the panel seam secured with two (2) #10-12 Pancake Type A screws per clip | <b>-75</b> |
| SLLOK-W-2   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 24ga. steel<br>1.5 SL-LOK<br>Max. 15.5 in. coverage | 1.5 in. SL Clips spaced 6 in. o.c. at the panel seam secured with two (2) #10-12 Pancake Type A screws per clip  | <b>-90</b> |

**APPENDIX B**

| Approved Systems for Min. 0.040 Al 1.75 SS-LOK over Wood Deck (New or Existing) |                        |  |                     |  |  |             |
|---|------------------------|--|---------------------|--|--|-------------|
| System No.  | Deck                   | Fire Barrier                             | Underlayment        | Roof Panel   | Panel Attachment   | MDP (psf)   |
| SS-AI-W-1   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 0.040 Al<br>1.75 SS-LOK<br>Max. 16 in. coverage | 1.75 in. SFS SL Clips spaced 16 in. o.c. at the panel seam secured with two (2) #10-9 PanclipSS MTW low profile head screws per clip | <b>-90</b>  |
| SS-AI-W-2   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 0.040 Al<br>1.75 SS-LOK<br>Max. 16 in. coverage | 1.75 in. SFS SL Clips spaced 6 in. o.c. at the panel seam secured with two (2) #10-9 PanclipSS MTW low profile head screws per clip  | <b>-120</b> |

| Approved Systems for Min. 24ga. steel 1.75 SS-LOK over Wood Deck (New or Existing) |                        |  |                     |   |  |             |
|--|------------------------|--|---------------------|---|--|-------------|
| System No.   | Deck                   | Fire Barrier                             | Underlayment        | Roof Panel  | Panel Attachment   | MDP (psf)   |
| SS-S-W-1   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 24ga. steel<br>1.75 SS-LOK<br>Max. 18 in. coverage | 1.75 in. DM SL Clips spaced 18 in. o.c. at the panel seam secured with two (2) #10-12 Pancake Type A screws per clip | <b>-105</b> |

| Approved Systems for Min. 24ga. steel 1.5 MS-LOK over Wood Deck (New or Existing) |                        |  |                     |  |   |               |
|---|------------------------|--|---------------------|--|---|---------------|
| System No.  | Deck                   | Fire Barrier                             | Underlayment        | Roof Panel   | Panel Attachment  | MDP (psf)     |
| 1.5MS-W-1   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved fire barrier</i> | As required per FBC | Min. 24ga. steel<br>1.5 MS-LOK<br>Max. 16 in. coverage | 1.5 in. ML Clips spaced 16 in. o.c. at the panel seam secured with two (2) #10-9 x min. 1.5 in. Panclip MTW low profile screws per clip; Panels mechanically seamed with 180° double lock | <b>-142.5</b> |

**APPENDIX B**

| Approved Systems for Min. 24ga. steel 2 MS-LOK over Wood Deck (New or Existing) |                        |  |                     |   |   |                |
|---|------------------------|--|---------------------|---|---|----------------|
| System No.  | Deck                   | Fire Barrier                             | Underlayment        | Roof Panel  | Panel Attachment  | MDP (psf)      |
| 2MS-W-1   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 24ga. steel<br>2 MS-LOK<br>Max. 18.75 in. coverage | 2 in. ML Clips spaced 16 in. o.c. at the panel seam secured with two (2) #10-9 x min. 1.5 in. Panclip MTW low profile screws per clip; Panels mechanically seamed with 180° double lock | <b>-116.25</b> |
| 2MS-W-2   | Min. 15/32 CDX plywood | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 24ga. steel<br>2 MS-LOK<br>Max. 18.75 in. coverage | 2 in. ML Clips spaced 8 in. o.c. at the panel seam secured with two (2) #10-9 x min. 1.5 in. Panclip MTW low profile screws per clip; Panels mechanically seamed with 180° double lock  | <b>-120</b>    |

| Approved Systems for Min. 0.032 Al 5V Crimp over Wood Deck (New or Existing) |                        |                  |  |                     |  |   |           |
|--|------------------------|------------------|--|---------------------|--|---|-----------|
| System No.   | Deck                   | Battens (Note 6) | Fire Barrier                             | Underlayment        | Roof Panel                                     | Panel Attachment  | MDP (psf) |
| 5V-AI-W-1  | Min. 15/32 CDX plywood | -                | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 0.032 Al 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #9-15 Evergrip screws with sealing washers spaced 9 in. o.c. | -127.5    |
| 5V-AI-W-2  | Min. 15/32 CDX plywood | -                | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 0.032 Al 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #9-15 Evergrip screws with sealing washers spaced 6 in. o.c. | -150      |

**APPENDIX B**

| Approved Systems for Min. 26ga. steel 5V Crimp over Wood Deck (New or Existing) |                        |  |  |                     |  |   |                |
|---|------------------------|--|--|---------------------|--|---|----------------|
| System No.  | Deck                   | Battens (Note 6)                               | Fire Barrier                             | Underlayment        | Roof Panel   | Panel Attachment  | MDP (psf)      |
| 5V-S-W-1  | Min. 15/32 CDX plywood | -  | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel,<br>Grade 50 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #9-15 Woodgrip with sealing washers spaced 16 in. o.c.                             | <b>-67.5</b>   |
| 5V-S-W-2  | Min. 15/32 CDX plywood | OPTIONAL<br>No. 2 SYP min.<br>1x4 wood battens | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel,<br>Grade 80 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #12-8 Woodgrip XG screws with sealing washers spaced 16 in. o.c.                   | <b>-86.25</b>  |
| 5V-S-W-3  | Min. 15/32 CDX plywood | OPTIONAL<br>No. 2 SYP min.<br>1x4 wood battens | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel,<br>Grade 80 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #9-15 Woodgrip or #12-8 Woodgrip XG screws with sealing washers spaced 12 in. o.c. | <b>-90</b>     |
| 5V-S-W-4  | Min. 15/32 CDX plywood | -  | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel,<br>Grade 50 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #12-8 Woodgrip XG screws with sealing washers spaced 12 in. o.c.                   | <b>-101.25</b> |
| 5V-S-W-5  | Min. 15/32 CDX plywood | -  | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel,<br>Grade 50 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #9-15 Woodgrip or #12-8 Woodgrip XG screws with sealing washers spaced 6 in. o.c.  | <b>-120</b>    |
| 5V-S-W-6  | Min. 15/32 CDX plywood | OPTIONAL<br>No. 2 SYP min.<br>1x4 wood battens | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel,<br>Grade 80 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #12-8 Woodgrip XG screws with sealing washers spaced 9 in. o.c.                    | <b>-120</b>    |
| 5V-S-W-7  | Min. 15/32 CDX plywood | OPTIONAL<br>No. 2 SYP min.<br>1x4 wood battens | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel,<br>Grade 80 5V Crimp<br>Max. 24 in. coverage | 5V attachment with #9-15 Woodgrip or #12-8 Woodgrip XG screws with sealing washers spaced 6 in. o.c.  | <b>-135</b>    |

**APPENDIX B**

| Approved Systems for Min. 29ga. steel Ultra Rib over Wood Deck (New or Existing) |  |  |  |                     |  |   |                |
|--|--|--|--|---------------------|--|---|----------------|
| System No.   | Deck   | Battens (Note 6)                         | Fire Barrier                             | Underlayment        | Roof Panel   | Panel Attachment  | MDP (psf)      |
| RIB-W-1  | Min. 15/32 CDX plywood with<br>OPTIONAL single layer of asphalt shingles | No. 2 SYP min. 1x4 wood battens          | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 29ga. steel Ultra Rib<br>Max. 36 in. coverage | <i>Ultra Rib 2</i> attachment with #9-15 Woodgrip screws spaced 24 in. o.c  | <b>-67.5</b>   |
| RIB-W-2  | Min. 15/32 CDX plywood   | OPTIONAL No. 2 SYP min. 1x4 wood battens | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel Ultra Rib<br>Max. 36 in. coverage | <i>Ultra Rib</i> attachment with #12-8 Woodgrip XG screws spaced 24 in. o.c | <b>-116.25</b> |
| RIB-W-3  | Min. 15/32 CDX plywood   | OPTIONAL No. 2 SYP min. 1x4 wood battens | OPTIONAL<br><i>Approved</i> fire barrier | As required per FBC | Min. 26ga. steel Ultra Rib<br>Max. 36 in. coverage | <i>Ultra Rib</i> attachment with #9-15 Woodgrip screws spaced 12 in. o.c    | <b>-135</b>    |

| Approved Systems for Min. 29ga. steel Ultra Rib over Open Framing (New or Existing) – Note 7 |   |   |   |                     |
|--|---|---|---|---------------------|
| System No.   | Battens   | Roof Panel  | Panel Attachment  | MDP (psf)           |
| RIB-1  | No. 2 SYP 1x4 wood battens installed max. 24 in. o.c. with two (2) min. 3 in. x #9 wood screws placed at each batten and truss/rafter intersection. Roof trusses/rafters shall be spaced max. 24 in. o.c. and shall be 90 degrees to the battens. | Min. 29 ga. Ultra Rib<br>Max. 36 in. coverage with<br>Max. 2 in. overhang at eave | <i>Ultra Rib</i> attachment with #9-15 x 1.5 in. Woodgrip screws installed into each batten | <b>+45<br/>-105</b> |



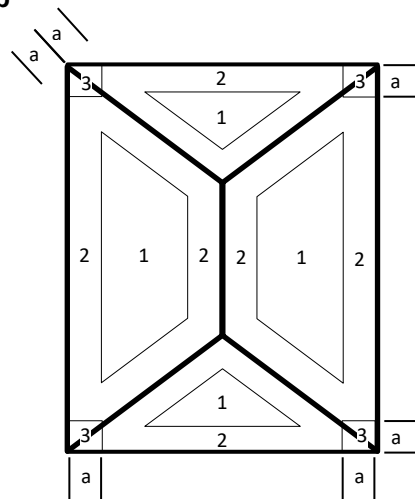
**APPENDIX C**
**DESIGN WIND LOADS**

The following tables provide design wind loads for components and cladding in accordance with Section 1609 of the FBC and ASCE 7-16 under the following provisions:

1. Wind speeds for risk category I, II, III, and IV buildings shall be as defined in Section 1609 of the FBC.
2. Exposure B, C and D shall be as defined in section 1609 of the FBC.
3. Design wind load provided only for gable/hip roofs with roof slopes between 2:12 and 12:12
4. All calculations are based on an effective wind area of 10-ft<sup>2</sup> or less.
5. Topographic factors such as escarpments or hills have been excluded from the analysis
6. Overhangs have been excluded from the analysis.
7. Wind directionality factor,  $K_d = 0.85$
8.  $V_{ult}$  is shown in the tables below. Design wind loads are calculated using  $V_{asd} = V_{ult} \sqrt{0.6}$  per 1609.3.1.
9. Zone 2 is inclusive of Zone 2e, Zone 2n, and Zone 2r
10. Zone 3 is inclusive of Zone 3e and Zone 3r
11. Projects with mean roof heights greater than 60-ft shall be evaluated by a licensed design professional
12. Zones 1, 2, and 3 shall be defined as shown below. Dimension "a" shall be 10% of the least horizontal dimension or (0.4 x *Mean Roof Height*), whichever is smaller, but not less than either 4% of the least horizontal dimension or 3ft

**Gable**

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 3 | 2 | 3 | 3 | 2 | 3 | a |
| 2 | 1 | 2 | 2 | 1 | 2 |   |
| 3 | 2 | 3 | 3 | 2 | 3 | a |
| a |   | a | a |   | a |   |

**Hip**


**APPENDIX C**

| Gable/Hip Roofs in <b>Exposure B</b> (Roof slope between 2:12 and 12:12) |      |                       |                        |       |       |        |        |        |        |        |        |
|--|------|-----------------------|------------------------|-------|-------|--------|--------|--------|--------|--------|--------|
| Building Type  | Zone | Mean Roof Height (ft) | Basic Wind Speed (mph) |       |       |        |        |        |        |        |        |
|  |      |                       | 120                    | 130   | 140   | 150    | 160    | 170    | 180    | 190    | 200    |
| Enclosed/<br>Partially Open  | 1    | 20                    | -25.4                  | -29.8 | -34.6 | -39.7  | -45.2  | -51.0  | -57.2  | -63.7  | -70.6  |
|  |      | 25                    | -27.5                  | -32.2 | -37.4 | -42.9  | -48.8  | -55.1  | -61.8  | -68.8  | -76.3  |
|  |      | 30                    | -28.7                  | -33.7 | -39.1 | -44.8  | -51.0  | -57.6  | -64.6  | -71.9  | -79.7  |
|  |      | 40                    | -31.2                  | -36.6 | -42.4 | -48.7  | -55.4  | -62.5  | -70.1  | -78.1  | -86.5  |
|  |      | 50                    | -33.2                  | -39.0 | -45.2 | -51.9  | -59.0  | -66.6  | -74.7  | -83.2  | -92.2  |
|  |      | 60                    | -34.8                  | -40.9 | -47.4 | -54.4  | -61.9  | -69.9  | -78.4  | -87.3  | -96.8  |
|  | 2    | 20                    | -37.1                  | -43.5 | -50.5 | -57.9  | -65.9  | -74.4  | -83.4  | -92.9  | -103.0 |
|  |      | 25                    | -40.1                  | -47.0 | -54.5 | -62.6  | -71.2  | -80.4  | -90.1  | -100.4 | -111.3 |
|  |      | 30                    | -41.9                  | -49.1 | -57.0 | -65.4  | -74.4  | -84.0  | -94.2  | -104.9 | -116.3 |
|  |      | 40                    | -45.4                  | -53.3 | -61.9 | -71.0  | -80.8  | -91.2  | -102.2 | -113.9 | -126.2 |
|  |      | 50                    | -48.4                  | -56.8 | -65.9 | -75.7  | -86.1  | -97.2  | -109.0 | -121.4 | -134.5 |
|  |      | 60                    | -50.8                  | -59.6 | -69.2 | -79.4  | -90.3  | -102.0 | -114.3 | -127.4 | -141.2 |
|  | 3    | 20                    | -44.1                  | -51.7 | -60.0 | -68.8  | -78.3  | -88.4  | -99.1  | -110.5 | -122.4 |
|  |      | 25                    | -47.6                  | -55.9 | -64.8 | -74.4  | -84.7  | -95.6  | -107.1 | -119.4 | -132.3 |
|  |      | 30                    | -49.8                  | -58.4 | -67.7 | -77.7  | -88.4  | -99.8  | -111.9 | -124.7 | -138.2 |
|  |      | 40                    | -54.0                  | -63.4 | -73.5 | -84.4  | -96.0  | -108.4 | -121.5 | -135.4 | -150.0 |
|  |      | 50                    | -57.6                  | -67.6 | -78.4 | -90.0  | -102.3 | -115.5 | -129.5 | -144.3 | -159.9 |
|  |      | 60                    | -60.4                  | -70.9 | -82.2 | -94.4  | -107.4 | -121.2 | -135.9 | -151.4 | -167.8 |
| Partially<br>Enclosed  | 1    | 20                    | -29.7                  | -34.9 | -40.5 | -46.5  | -52.8  | -59.7  | -66.9  | -74.5  | -82.6  |
|  |      | 25                    | -32.1                  | -37.7 | -43.7 | -50.2  | -57.1  | -64.5  | -72.3  | -80.5  | -89.2  |
|  |      | 30                    | -33.6                  | -39.4 | -45.7 | -52.4  | -59.7  | -67.4  | -75.5  | -84.1  | -93.2  |
|  |      | 40                    | -36.4                  | -42.8 | -49.6 | -56.9  | -64.8  | -73.1  | -82.0  | -91.3  | -101.2 |
|  |      | 50                    | -38.8                  | -45.6 | -52.9 | -60.7  | -69.0  | -77.9  | -87.4  | -97.4  | -107.9 |
|  |      | 60                    | -40.8                  | -47.8 | -55.5 | -63.7  | -72.4  | -81.8  | -91.7  | -102.2 | -113.2 |
|  | 2    | 20                    | -41.4                  | -48.6 | -56.3 | -64.7  | -73.6  | -83.1  | -93.1  | -103.7 | -115.0 |
|  |      | 25                    | -44.7                  | -52.5 | -60.9 | -69.9  | -79.5  | -89.8  | -100.6 | -112.1 | -124.2 |
|  |      | 30                    | -46.7                  | -54.8 | -63.6 | -73.0  | -83.1  | -93.8  | -105.1 | -117.1 | -129.8 |
|  |      | 40                    | -50.7                  | -59.5 | -69.0 | -79.3  | -90.2  | -101.8 | -114.1 | -127.2 | -140.9 |
|  |      | 50                    | -54.1                  | -63.4 | -73.6 | -84.5  | -96.1  | -108.5 | -121.6 | -135.5 | -150.2 |
|  |      | 60                    | -56.7                  | -66.6 | -77.2 | -88.6  | -100.9 | -113.9 | -127.6 | -142.2 | -157.6 |
|  | 3    | 20                    | -48.4                  | -56.8 | -65.8 | -75.6  | -86.0  | -97.1  | -108.8 | -121.3 | -134.4 |
|  |      | 25                    | -52.3                  | -61.4 | -71.2 | -81.7  | -92.9  | -104.9 | -117.6 | -131.1 | -145.2 |
|  |      | 30                    | -54.6                  | -64.1 | -74.3 | -85.3  | -97.1  | -109.6 | -122.9 | -136.9 | -151.7 |
|  |      | 40                    | -59.3                  | -69.6 | -80.7 | -92.7  | -105.4 | -119.0 | -133.4 | -148.7 | -164.7 |
|  |      | 50                    | -63.2                  | -74.2 | -86.0 | -98.8  | -112.4 | -126.8 | -142.2 | -158.4 | -175.6 |
|  |      | 60                    | -66.3                  | -77.8 | -90.3 | -103.6 | -117.9 | -133.1 | -149.2 | -166.3 | -184.2 |

**APPENDIX C**

| Gable/Hip Roofs in <b>Exposure C</b> (Roof slope between 2:12 and 12:12) |      |                       |                        |        |        |        |        |        |        |        |        |
|--|------|-----------------------|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Building Type  | Zone | Mean Roof Height (ft) | Basic Wind Speed (mph) |        |        |        |        |        |        |        |        |
|  |      |                       | 120                    | 130    | 140    | 150    | 160    | 170    | 180    | 190    | 200    |
| Enclosed/<br>Partially Open  | 1    | 20                    | -36.9                  | -43.3  | -50.2  | -57.6  | -65.6  | -74.0  | -83.0  | -92.5  | -102.5 |
|  |      | 25                    | -38.5                  | -45.2  | -52.4  | -60.2  | -68.5  | -77.3  | -86.7  | -96.6  | -107.0 |
|  |      | 30                    | -40.2                  | -47.1  | -54.7  | -62.8  | -71.4  | -80.6  | -90.4  | -100.7 | -111.6 |
|  |      | 40                    | -42.6                  | -50.0  | -58.0  | -66.6  | -75.8  | -85.6  | -95.9  | -106.9 | -118.4 |
|  |      | 50                    | -44.7                  | -52.4  | -60.8  | -69.8  | -79.4  | -89.7  | -100.5 | -112.0 | -124.1 |
|  |      | 60                    | -46.3                  | -54.4  | -63.0  | -72.4  | -82.3  | -93.0  | -104.2 | -116.1 | -128.7 |
|  | 2    | 20                    | -53.8                  | -63.2  | -73.2  | -84.1  | -95.7  | -108.0 | -121.1 | -134.9 | -149.5 |
|  |      | 25                    | -56.2                  | -66.0  | -76.5  | -87.8  | -99.9  | -112.8 | -126.5 | -140.9 | -156.1 |
|  |      | 30                    | -58.6                  | -68.8  | -79.8  | -91.6  | -104.2 | -117.6 | -131.8 | -146.9 | -162.8 |
|  |      | 40                    | -62.2                  | -73.0  | -84.6  | -97.2  | -110.5 | -124.8 | -139.9 | -155.9 | -172.7 |
|  |      | 50                    | -65.2                  | -76.5  | -88.7  | -101.8 | -115.9 | -130.8 | -146.6 | -163.4 | -181.0 |
|  |      | 60                    | -67.6                  | -79.3  | -92.0  | -105.6 | -120.1 | -135.6 | -152.0 | -169.4 | -187.7 |
|  | 3    | 20                    | -64.0                  | -75.1  | -87.1  | -99.9  | -113.7 | -128.4 | -143.9 | -160.3 | -177.7 |
|  |      | 25                    | -66.8                  | -78.4  | -90.9  | -104.4 | -118.8 | -134.1 | -150.3 | -167.5 | -185.6 |
|  |      | 30                    | -69.7                  | -81.7  | -94.8  | -108.8 | -123.8 | -139.8 | -156.7 | -174.6 | -193.5 |
|  |      | 40                    | -73.9                  | -86.7  | -100.6 | -115.5 | -131.4 | -148.3 | -166.3 | -185.3 | -205.3 |
|  |      | 50                    | -77.5                  | -90.9  | -105.4 | -121.0 | -137.7 | -155.5 | -174.3 | -194.2 | -215.2 |
|  |      | 60                    | -80.3                  | -94.3  | -109.3 | -125.5 | -142.8 | -161.2 | -180.7 | -201.3 | -223.1 |
| Partially<br>Enclosed  | 1    | 20                    | -43.2                  | -50.6  | -58.7  | -67.4  | -76.7  | -86.6  | -97.1  | -108.2 | -119.9 |
|  |      | 25                    | -45.1                  | -52.9  | -61.3  | -70.4  | -80.1  | -90.4  | -101.4 | -113.0 | -125.2 |
|  |      | 30                    | -47.0                  | -55.1  | -64.0  | -73.4  | -83.5  | -94.3  | -105.7 | -117.8 | -130.5 |
|  |      | 40                    | -49.9                  | -58.5  | -67.9  | -77.9  | -88.6  | -100.1 | -112.2 | -125.0 | -138.5 |
|  |      | 50                    | -52.3                  | -61.3  | -71.1  | -81.7  | -92.9  | -104.9 | -117.6 | -131.0 | -145.2 |
|  |      | 60                    | -54.2                  | -63.6  | -73.7  | -84.7  | -96.3  | -108.7 | -121.9 | -135.8 | -150.5 |
|  | 2    | 20                    | -60.1                  | -70.5  | -81.8  | -93.9  | -106.8 | -120.6 | -135.2 | -150.6 | -166.9 |
|  |      | 25                    | -62.7                  | -73.6  | -85.4  | -98.0  | -111.5 | -125.9 | -141.2 | -157.3 | -174.3 |
|  |      | 30                    | -65.4                  | -76.8  | -89.0  | -102.2 | -116.3 | -131.3 | -147.2 | -164.0 | -181.7 |
|  |      | 40                    | -69.4                  | -81.5  | -94.5  | -108.5 | -123.4 | -139.3 | -156.2 | -174.0 | -192.8 |
|  |      | 50                    | -72.8                  | -85.4  | -99.0  | -113.7 | -129.3 | -146.0 | -163.7 | -182.4 | -202.1 |
|  |      | 60                    | -75.4                  | -88.5  | -102.7 | -117.8 | -134.1 | -151.4 | -169.7 | -189.1 | -209.5 |
|  | 3    | 20                    | -70.2                  | -82.4  | -95.6  | -109.7 | -124.8 | -140.9 | -158.0 | -176.0 | -195.1 |
|  |      | 25                    | -73.3                  | -86.1  | -99.8  | -114.6 | -130.4 | -147.2 | -165.0 | -183.9 | -203.7 |
|  |      | 30                    | -76.5                  | -89.7  | -104.1 | -119.5 | -135.9 | -153.5 | -172.0 | -191.7 | -212.4 |
|  |      | 40                    | -81.1                  | -95.2  | -110.5 | -126.8 | -144.3 | -162.9 | -182.6 | -203.4 | -225.4 |
|  |      | 50                    | -85.0                  | -99.8  | -115.8 | -132.9 | -151.2 | -170.7 | -191.4 | -213.2 | -236.2 |
|  |      | 60                    | -88.2                  | -103.5 | -120.0 | -137.8 | -156.7 | -177.0 | -198.4 | -221.0 | -244.9 |

**APPENDIX C**

| Gable/Hip Roofs in <b>Exposure D</b> (Roof slope between 2:12 and 12:12) |      |                       |                        |        |        |        |        |        |        |        |        |
|--|------|-----------------------|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Building Type  | Zone | Mean Roof Height (ft) | Basic Wind Speed (mph) |        |        |        |        |        |        |        |        |
|  |      |                       | 120                    | 130    | 140    | 150    | 160    | 170    | 180    | 190    | 200    |
| Enclosed/<br>Partially Open  | 1    | 20                    | -44.3                  | -52.0  | -60.3  | -69.2  | -78.7  | -88.8  | -99.6  | -111.0 | -123.0 |
|  |      | 25                    | -45.9                  | -53.9  | -62.5  | -71.7  | -81.6  | -92.1  | -103.3 | -115.1 | -127.5 |
|  |      | 30                    | -47.5                  | -55.8  | -64.7  | -74.3  | -84.5  | -95.4  | -107.0 | -119.2 | -132.1 |
|  |      | 40                    | -50.0                  | -58.7  | -68.1  | -78.1  | -88.9  | -100.4 | -112.5 | -125.4 | -138.9 |
|  |      | 50                    | -52.1                  | -61.1  | -70.9  | -81.3  | -92.5  | -104.5 | -117.1 | -130.5 | -144.6 |
|  |      | 60                    | -53.7                  | -63.0  | -73.1  | -83.9  | -95.5  | -107.8 | -120.8 | -134.6 | -149.1 |
|  | 2    | 20                    | -64.6                  | -75.8  | -87.9  | -100.9 | -114.8 | -129.6 | -145.3 | -161.9 | -179.4 |
|  |      | 25                    | -67.0                  | -78.6  | -91.1  | -104.6 | -119.0 | -134.4 | -150.7 | -167.9 | -186.0 |
|  |      | 30                    | -69.4                  | -81.4  | -94.4  | -108.4 | -123.3 | -139.2 | -156.0 | -173.9 | -192.6 |
|  |      | 40                    | -72.9                  | -85.6  | -99.3  | -114.0 | -129.7 | -146.4 | -164.1 | -182.9 | -202.6 |
|  |      | 50                    | -75.9                  | -89.1  | -103.3 | -118.6 | -135.0 | -152.4 | -170.8 | -190.4 | -210.9 |
|  |      | 60                    | -78.3                  | -91.9  | -106.6 | -122.4 | -139.2 | -157.2 | -176.2 | -196.3 | -217.6 |
|  | 3    | 20                    | -76.8                  | -90.1  | -104.5 | -119.9 | -136.5 | -154.0 | -172.7 | -192.4 | -213.2 |
|  |      | 25                    | -79.6                  | -93.4  | -108.3 | -124.4 | -141.5 | -159.7 | -179.1 | -199.5 | -221.1 |
|  |      | 30                    | -82.4                  | -96.8  | -112.2 | -128.8 | -146.6 | -165.4 | -185.5 | -206.7 | -229.0 |
|  |      | 40                    | -86.7                  | -101.8 | -118.0 | -135.5 | -154.1 | -174.0 | -195.1 | -217.4 | -240.8 |
|  |      | 50                    | -90.3                  | -105.9 | -122.8 | -141.0 | -160.5 | -181.1 | -203.1 | -226.3 | -250.7 |
|  |      | 60                    | -93.1                  | -109.3 | -126.7 | -145.5 | -165.5 | -186.8 | -209.5 | -233.4 | -258.6 |
| Partially<br>Enclosed  | 1    | 20                    | -51.8                  | -60.8  | -70.5  | -80.9  | -92.1  | -103.9 | -116.5 | -129.8 | -143.8 |
|  |      | 25                    | -53.7                  | -63.0  | -73.1  | -83.9  | -95.5  | -107.8 | -120.8 | -134.6 | -149.2 |
|  |      | 30                    | -55.6                  | -65.3  | -75.7  | -86.9  | -98.9  | -111.6 | -125.1 | -139.4 | -154.5 |
|  |      | 40                    | -58.5                  | -68.7  | -79.6  | -91.4  | -104.0 | -117.4 | -131.6 | -146.6 | -162.5 |
|  |      | 50                    | -60.9                  | -71.5  | -82.9  | -95.1  | -108.2 | -122.2 | -137.0 | -152.6 | -169.1 |
|  |      | 60                    | -62.8                  | -73.7  | -85.5  | -98.1  | -111.7 | -126.0 | -141.3 | -157.5 | -174.5 |
|  | 2    | 20                    | -72.1                  | -84.6  | -98.1  | -112.6 | -128.2 | -144.7 | -162.2 | -180.7 | -200.2 |
|  |      | 25                    | -74.8                  | -87.7  | -101.7 | -116.8 | -132.9 | -150.0 | -168.2 | -187.4 | -207.6 |
|  |      | 30                    | -77.4                  | -90.9  | -105.4 | -121.0 | -137.6 | -155.4 | -174.2 | -194.1 | -215.1 |
|  |      | 40                    | -81.4                  | -95.6  | -110.8 | -127.2 | -144.8 | -163.4 | -183.2 | -204.1 | -226.2 |
|  |      | 50                    | -84.8                  | -99.5  | -115.4 | -132.4 | -150.7 | -170.1 | -190.7 | -212.5 | -235.5 |
|  |      | 60                    | -87.4                  | -102.6 | -119.0 | -136.6 | -155.4 | -175.5 | -196.7 | -219.2 | -242.9 |
|  | 3    | 20                    | -84.3                  | -98.9  | -114.7 | -131.7 | -149.8 | -169.1 | -189.6 | -211.3 | -234.1 |
|  |      | 25                    | -87.4                  | -102.6 | -118.9 | -136.5 | -155.4 | -175.4 | -196.6 | -219.1 | -242.7 |
|  |      | 30                    | -90.5                  | -106.2 | -123.2 | -141.4 | -160.9 | -181.6 | -203.6 | -226.9 | -251.4 |
|  |      | 40                    | -95.2                  | -111.7 | -129.6 | -148.7 | -169.2 | -191.0 | -214.2 | -238.6 | -264.4 |
|  |      | 50                    | -99.1                  | -116.3 | -134.9 | -154.8 | -176.2 | -198.9 | -223.0 | -248.4 | -275.2 |
|  |      | 60                    | -102.2                 | -120.0 | -139.1 | -159.7 | -181.7 | -205.1 | -230.0 | -256.2 | -283.9 |

**END OF REPORT**