

Evaluation Report "5V Crimp" & "Millennium-V" Metal Roof Assembly

Manufacturer:
Millennium Metals, Inc.

**10200 Eastport Road
Jacksonville, FL 32218**

(877) 358-7663

for

Florida Product Approval

FL 5211.1 R8

Florida Building Code 7th Edition (2020)

Per Rule 61G20-3

Method: 1 - D

Category: Roofing

Sub - Category: Metal Roofing

Product: "5V Crimp" & "Millennium-V"

Material: Steel

Panel Thickness: 26 gauge (Minimum)

Panel Width: 24"

Support: Wood Deck

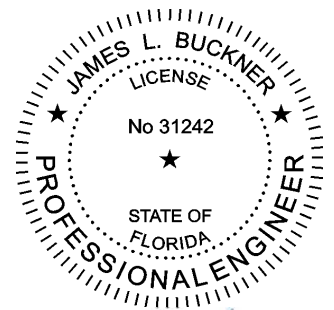
This item has been electronically signed and sealed by James L. Buckner, P.E., on this date using a Digital Signature. Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

Prepared by:

James L. Buckner, P.E., SECB
Florida Professional Engineer # 31242
Florida Evaluation ANE ID: 1916
Report No. 20-224-5V-S6W-ER
Date: 10 / 11 / 2020

Contents:

Evaluation Report Pages 1 – 8



A handwritten signature in blue ink, appearing to read "James L. Buckner".

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| | |
|---------------------------------------|--|
| Manufacturer: | Millennium Metals, Inc. |
| Product Name: | “5V Crimp” & “Millennium-V” |
| Product Category: | Roofing |
| Product Sub-Category | Metal Roofing |
| Compliance Method: | State Product Approval Rule 61G20-3.005 (1) (d) |
| Product/System Description: | “5V Crimp” & “Millennium-V” 26 gauge (Minimum Thickness) Steel roof panel mechanically attached to Plywood Deck with screws. |
| Product Assembly as Evaluated: | Refer to Page 4 of this report for product assembly components/materials & standards: <ol style="list-style-type: none">1. Roof Panel2. Fasteners3. Underlayment4. Insulation (Optional) |
| Support: | Type: Wood Deck (Design of support and its attachment to support framing is outside the scope of this evaluation.) Description: <ul style="list-style-type: none">• 15/32 (min.) or 19/32” (min.) or greater plywood,• or Wood plank (min. specific gravity of 0.42) |
| Slope: | Minimum slope shall be in compliance with FBC Chapter 15 Section 1507.4.2, applicable code sections and in accordance with manufacturer’s recommendations. |
| Performance: | Wind Uplift Resistance: <ul style="list-style-type: none">• Design Uplift Pressure: Refer to Table A (Refer to “Table A” attachment details herein) |

- Performance Standards:** The product described herein has demonstrated compliance with:
- UL580-06 – *Test for Uplift Resistance of Roof Assemblies*
 - UL 1897-12 – *Uplift test for roof covering systems*
 - TAS 125-03 – *Standard Requirements for Metal Roofing Systems*
- Standards Equivalency:**
- The UL 580-94 standard version used to test the evaluated product assembly is equivalent to UL580-06 standard version adopted by the Florida Building Code 7th Edition (2020).
 - The UL 1897-98 standard version used to test the evaluated product assembly is equivalent to UL1897-12 standard version adopted by the Florida Building Code 7th Edition (2020).
- Code Compliance:** The product described herein has demonstrated compliance with the performance standards listed above as referenced in the Florida Building Code 7th Edition (2020).
- Evaluation Report Scope:** This product evaluation is limited to compliance with the structural requirements of the Florida Building Code, as related to the scope section to Florida Product Approval Rule 61G20-3.001.
- Limitations and Conditions of Use:**
- Scope of “Limitations and Conditions of Use” for this evaluation:
This evaluation report for “Optional Statewide Approval” contains technical documentation, specifications and installation method(s) which include “Limitations and Conditions of Use” throughout the report in accordance with Rule 61G20-3.005. Per Rule 61G20-3.004, the Florida Building Commission is the authority to approve products under “Optional Statewide Approval”.
 - Option for application outside “Limitations and Conditions of Use”
Rule 61G20-3.005(1)(e) allows engineering analysis for “project specific approval by the local authorities having jurisdiction in accordance with the alternate methods and materials authorized in the Code”. Any modification of the product as evaluated in this report and approved by the Florida Building Commission is outside the scope of this evaluation and will be the responsibility of others.
 - This report is a building code product evaluation per FLPE rule (FAC) 61G15-36 to comply with Florida product approval rule (FAC) 61G20-3. This evaluation report is part of the Florida Building Commission approval for the listed code related criteria. This report by James Buckner, P.E. and CBUG Engineering is not a design certification of code compliance construction submittal documentation, per FBC section 107, for any individual structure, site specific or permit design.
 - All metal components and fasteners shall be corrosion resistant in accordance with applicable sections of FBC, including but limited to Sections 1504.3.2, 1506.6 and 1507.4.4.
 - Design of support system is outside the scope of this report.
 - Fire Classification is outside the scope of Rule 61G20-3, and is therefore not included in this evaluation.
 - This evaluation report does not evaluate the use of this product for use in the High Velocity Hurricane Zone code section. (Dade & Broward Counties)
- Quality Assurance:** The manufacturer has demonstrated compliance of roof panel products in accordance with the Florida Building Code and Rule 61G20-3.005 (3) for manufacturing under a quality assurance program audited by an approved quality assurance entity through **Keystone Certifications, Inc.** (FBC Organization #: QUA 1824).

**Components/Materials
(by Manufacturer):**

Roof Panel:

Product Identification: "5V Crimp" & "Millennium-V"
Material: Steel
Thickness: 26 gauge (min.)
Panel Width: 24" (max.) Coverage
Rib Height: 7/16"
Yield Strength: 40 ksi min.
Corrosion Resistance: In compliance with FBC Section 1507.4.3:

- ASTM A792 coated, or
- ASTM A653 G90 galvanized steel

Fastener A:

Type: Hex-Head Wood Screw with WSW
Size: #9 (× length to meet min. penetration through deck)
Penetration Through: 3/16" min. through wood deck
Corrosion Resistance: Per FBC Section 1506.6 and 1507.4.4
Standard: Per ANSI/ASME B18.6.4

Fastener B:

Type: Hex-Head Wood Screw with WSW
Size: #10 (× length to meet min. penetration through deck)
Penetration Through: 3/16" min. through wood deck
Corrosion Resistance: Per FBC Section 1506.6 and 1507.4.4
Standard: Per ANSI/ASME B18.6.4

**Components/Materials
(by Others):**

Underlayment:

Material and application shall be in compliance with FBC Section 1507.1.1 and in accordance with applicable code sections and manufacturer's recommendations.

Insulation (Optional):

Type: Rigid Insulation Board
Thickness: 3" (max.)
Properties:
Density: 2.25 pcf (lbs/ft³) min.
Or Compressive Strength: 20 psi min.

Insulation Notes:

- Rigid Insulation shall meet minimum density OR compressive strength.
- Insulation shall comply with FBC Section 1508. When insulation is incorporated, fastener length shall conform to penetrate thru bottom of support a minimum of 3/16".

Installation:

Installation Method:

(Refer to "TABLE A" below and drawings at the end of this evaluation report.)

- Fastener spacing: **Refer to Table "A" Below**
(along the length of the panel)
- Row Spacing: **Refer to Table "A" Below**
(along the row, across the panel profile)
- Rib Interlock: Lapped
- Minimum fastener penetration thru bottom of support, 3/16".
- For panel construction at the end of panels, refer to manufacturer's instructions and any site specific design.

| TABLE "A" ALLOWABLE LOADS | | | | |
|--|--------------------|----------------------------------|-------------------|--------------------|
| | METHOD 1: | METHOD 2: | METHOD 3: | METHOD 4: |
| * Design Pressure: | - 112.5 PSF | - 113.75 PSF | - 45 PSF | - 93.75 PSF |
| Deck Thickness: | 19/32" | 15/32" | 15/32" | 15/32" |
| Fastener Size: | #9 | #9 | #10 | #10 |
| Row Spacing: | 12" | 12" | 24" | 12" |
| Fastener Spacing: | 12" | 6" | 12" | 12" |
| Fastener Location: | Corrugation Peaks | Corrugation Peaks & between ribs | Corrugation Peaks | Corrugation Peaks |
| Refer to Drawing #: | A-1 & A-2 | B-1 & B-2 | A-1 & A-2 | A-1 & A-2 |
| * Allowable design pressure for allowable stress design (ASD) with a margin of safety of 2 to 1. | | | | |

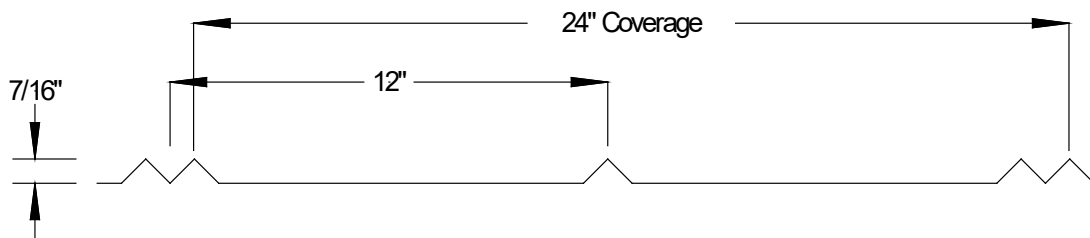
Install the "5V Crimp or Millennium V" roof panel assembly in compliance with the installation method listed in this report and applicable code sections of FBC 7th Edition (2020). The installation method described herein is in accordance with the scope of this evaluation report. Refer to manufacturer's installation instructions as a supplemental guide for attachment.

Referenced Data:

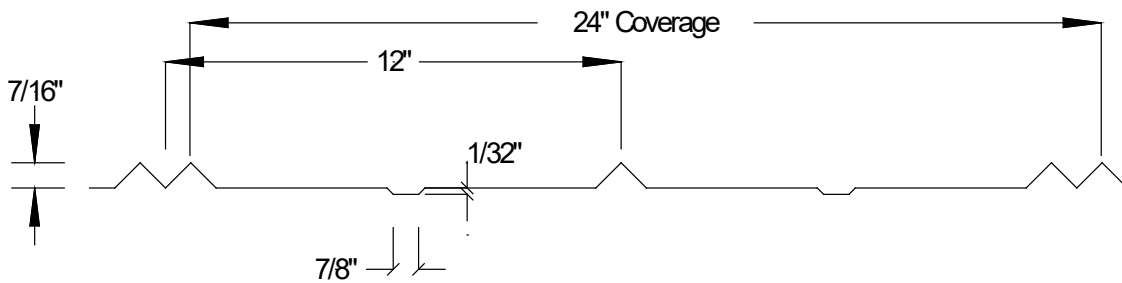
1. UL580-94 & UL 1897-98 Uplift Test
By Hurricane Test Laboratory, LLC (FBC Organization #TST ID: 1527)
Report #: 0232-0801-00, Report Date: 9/8/00, Specimens #2-4
0232-0910-05, Report Date: 11/18/05, Specimen #1
2. UL580-06 & UL 1897-12 Uplift Test
By Intertek/Architectural Testing, Inc (FBC Organization #TST ID: 1527)
Report #: H3985.01-450-44 R0,
3. Quality Assurance
By Keystone Certifications, Inc. (QUA ID: 1824)
Millennium Metals Licensee # 423
4. Equivalency of Test Standard Certification
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)
5. Certification of Independence
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)

Installation Method Millennium Metals "5V Crimp" & "Millennium-V" Roof Panel Attached to Wood Deck

Profile Drawings



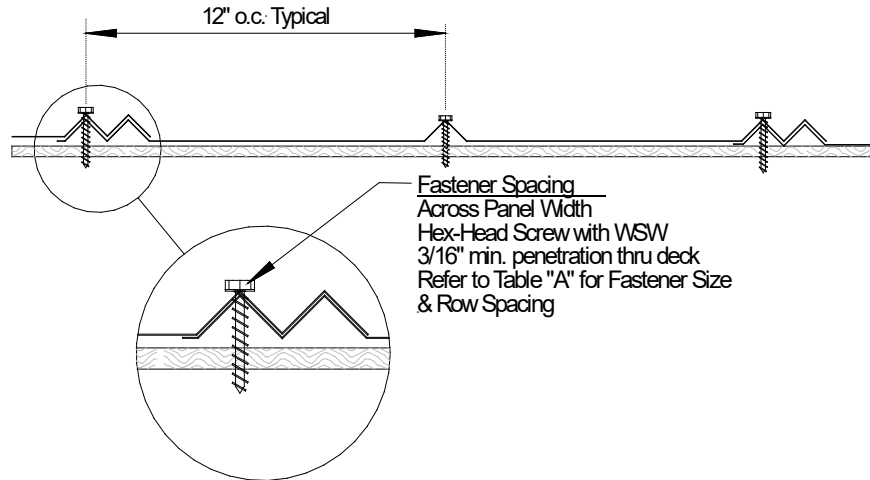
"5V-Crimp" Typical Panel Profile View (Not To Scale)



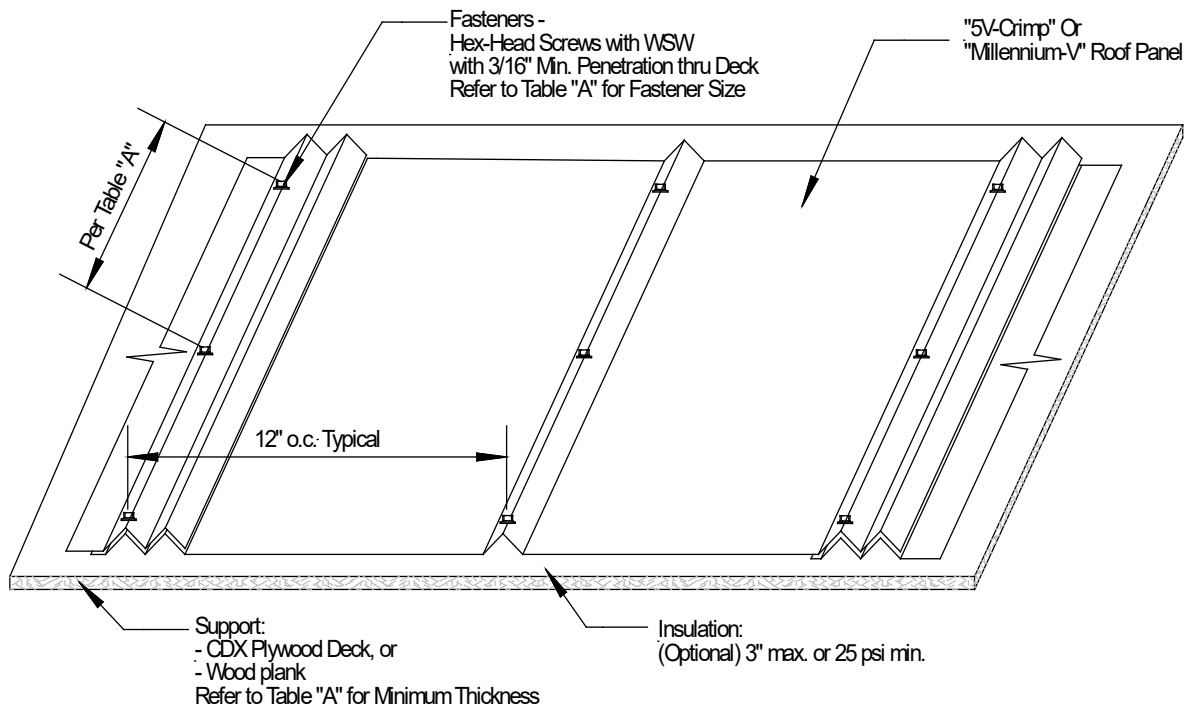
"Millennium-V" Typical Panel Profile View (Not To Scale)

| TABLE "A" | | | | |
|--|-------------------|----------------------------------|-------------------|-------------------|
| ALLOWABLE LOADS | | | | |
| | METHOD 1: | METHOD 2: | METHOD 3: | METHOD 4: |
| * Design Pressure: | - 112.5 PSF | - 113.75 PSF | - 45 PSF | - 93.75 PSF |
| Deck Thickness: | 19/32" | 15/32" | 15/32" | 15/32" |
| Fastener Size: | #9 Min. | #9 Min. | #10 Min. | #10 Min. |
| Row Spacing: | 12" | 12" | 24" | 12" |
| Fastener Spacing: | 12" | 6" | 12" | 12" |
| Fastener Location: | Corrugation Peaks | Corrugation Peaks & between ribs | Corrugation Peaks | Corrugation Peaks |
| Refer to Drawing #: | A-1 & A-2 | B-1 & B-2 | A-1 & A-2 | A-1 & A-2 |
| * Allowable design pressure for allowable stress design (ASD) with a margin of safety of 2 to 1. | | | | |

Installation Method Millennium Metals "5V Crimp" & "Millennium-V" Roof Panel Attached to Wood Deck

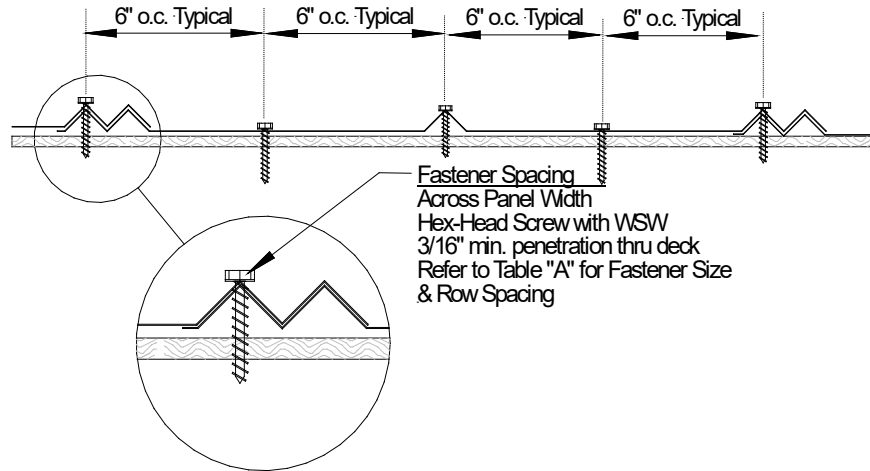


Drawing A-1
Typical Assembly Profile View (Not To Scale)
(Attachment METHOD 1, METHOD 3 & METHOD 4 Per Table "A")

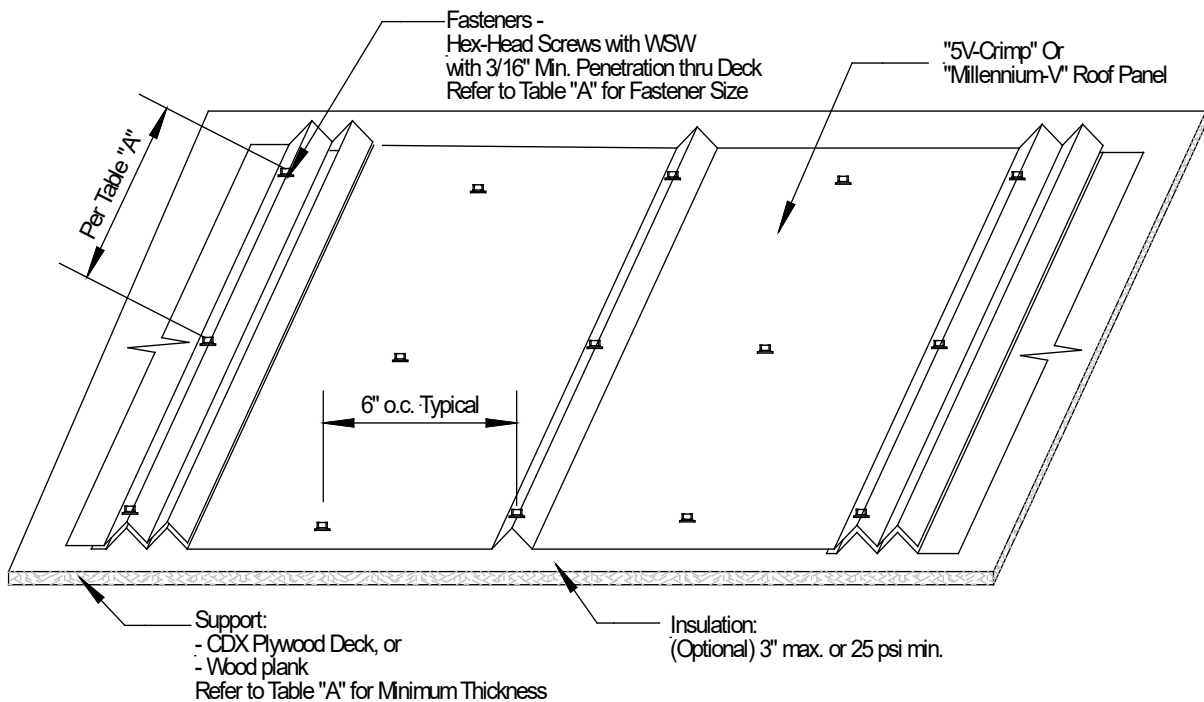


Drawing A-2
Typical Assembly Isometric View (Not To Scale)
(Attachment METHOD 1, METHOD 3 & METHOD 4 Per Table "A")

Installation Method Millennium Metals "5V Crimp" & "Millennium-V" Roof Panel Attached to Wood Deck



Drawing B-1
Typical Assembly Profile View (Not To Scale)
(Attachment METHOD 2 Per Table "A")



Drawing B-2
Typical Assembly Isometric View (Not To Scale)
(Attachment METHOD 2 Per Table "A")