CBUCK Engineering

Specialty Structural Engineering

CBUCK, Inc. Certificate of Authorization #8064

Evaluation Report

"Zee-Lock"

With Continous Zee-Rib Clip

Metal Roof Assembly

Manufacturer:

Berridge Manufacturing Company

1720 Maury Road

Houston, TX 77026

(800) 231-8127

for

Florida Product Approval

FL 15471.1 R3

Florida Building Code 7th Edition (2020)

Method: **1 - D**

Category: **Roofing**

Sub - Category: **Metal Roofing**

Product:	Zee-Lock" Roof Panel
Material:	Steel
Panel Thickness:	24 gauge
Panel Width:	16"
Support:	Wood Deck

Prepared by:

James L. Buckner, P.E., S.E.C.B.

Florida Professional Engineer # 31242

Florida Evaluation ANE ID: 1916

Project Manager: Diana Galloway

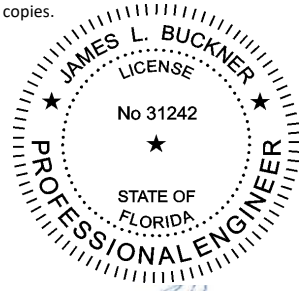
Report No. 20-227-ZL-S4W-HVHZ-ER

(Revises 17-128-ZL-S4W-HVHZ -ER)

Date: 09 / 17 / 20

Contents:

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.



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Manufacturer:
Berridge Manufacturing Company
1720 Maury Road
Houston, TX 77026
(800) 231-8127
www.berridge.com

Product Name:
"Zee-Lock"

Product Category:
Roofing

Product Sub-Category
Metal Roofing

Compliance Method:
State Product Approval Rule 61G20-3.005 (1) (d)

Product/System Description:
"Zee-Lock" Double Lock Standing Seam Roof Panel
2" Rib Height, 16" wide, 24 gauge Steel roof panel restrained by continuous "Zee-Rib" continuous panel clips, fastened into Plywood Deck.

Product Assembly as Evaluated:
Refer to Page 4 of this report for product assembly components/materials & standards:

1.	Roof Panel	"Zee-Lock"
2.	Panel Clip	"Zee-Rib" continuous clip
3.	Fasteners	#12
4.	Underlayment	Per manufacturer's guidelines
5.	Fire Barrier	Approved Fire Barrier Board

Support:
Type:
Wood Deck
(Design of support and its attachment to support framing is outside the scope of this evaluation.)
Description:
- 15/32 or greater plywood,
- or Wood plank (min. specific gravity of 0.42)

Slope:
2:12 or greater
Minimum slope shall comply with FBC 7th Edition (2020), HVHZ Section 1515.2.2 and in accordance with manufacturer's recommendations.

Performance:
Wind Uplift Resistance:
- Design Uplift Pressures:
  (Refer to "Table A" attachment details herein)

METHOD 1: - 101 PSF
METHOD 2: - 174.25 PSF

Wind Driven Rain: Results: **PASS**

Coated Metal Panel Testing
Accelerated Testing of Coating, 2000 hrs: Results: **PASS**
Salt Spray Testing of Coating, 1000 hrs: Results: **PASS**

Performance Standards:

The product described herein has demonstrated compliance with:

- **TAS 125-03** – *Standard Requirements for Metal Roofing Systems*
  - **UL580-06** – *Test for Uplift Resistance of Roof Assemblies*
  - **UL 1897-12** – *Uplift test for roof covering systems*
- **TAS 100-95** – *Test Procedure for Wind and Wind Driven Rain Resistance of Discontinuous Roof Systems*
- **ASTM G 23** – *Accelerated Testing of coating, 2000 hours*
- **ASTM B 117** – *Salt Spray Testing of coating, 1000 hours*

Standards Equivalency:

The UL 580-94 & UL 1897-98 standard version used to test the evaluated product assembly is equivalent with the prescribed standards in UL 580-06 & UL 1897-12 adopted by the Florida Building Code 7th Edition (2020).

Code Compliance:

The product described herein has demonstrated compliance with Florida Building Code 7th Edition (2020), Sections 1504.3.2 and 1518.9.1.

Evaluation Report Scope:

This product evaluation is limited to compliance of this product with the physical properties & structural wind load 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:

- <u>Scope of "Limitations and Conditions of Use" for this evaluation:</u>
  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".
- <u>Option for application outside "Limitations and Conditions of Use"</u>
  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 CBUCK 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. All roofing accessories shall comply with FBC Section 1517.6.
- The design pressures listed herein is applicable to all roof pressure zones. Rational analysis or extrapolation to enhance pressure is not permitted.
- Maximum panel lengths, valleys & panel accessories shall comply with Roofing Application Standard RAS 133 as applicable in HVHZ areas.
- Deck shall be in compliance with applicable building code.

- Fire Classification is outside the scope of Rule 61G20-3, and is therefore not included in this evaluation.
- All panels shall be permanently labeled with the manufacturer's name and/or logo. All clips shall be permanently labeled with the manufacturer's name and/or logo, and/or model.
- This evaluation report approves the product assembly as described in this report for use in the High Velocity Hurricane Zone (HVHZ) 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 61G20-3.0005 (3) for manufacturing under a quality assurance program audited by an approved quality assurance entity through **UL, LLC.** (FBC Organization #: QUA 9625).

Components & Materials (by Manufacturer):

Roof Panel:	"Zee-Lock"
Material:	Steel
Thickness:	24 gauge (0.0245")
Panel Width:	16" Coverage
Rib Height:	2"
Yield Strength:	51.9 ksi (As tested)
Steel Grade:	40
Corrosion Resistance:	In compliance with FBC Sections 1518.9 & 1507.4.3: • ASTM A792 coated, or • ASTM A653 G90 galvanized steel
Roof Panel Clips:	"Zee-Rib"
Type:	One-Piece, continuous fixed clip
Material:	Steel
Thickness:	24 Gauge (0.0245")
Dimensions:	2"(tall) x 1-3/8"(wide) x continuous (w/panel length)
Yield Strength:	51.9 ksi.
Corrosion Resistance:	Per FBC Sections 1517.6 & 1506.7
Fastener:	
Type:	Pancake-Head Wood Screw, Type A
Size :	#12 - 11 x 1" (or length to meet min. penetration)
Penetration thru Deck:	3/16" min.
Corrosion Resistance:	Per FBC Section 1506.6 and 1507.4.4
Standard:	Per FBC Section 1517.5

Underlayment: Non-HVHZ Areas:
Material and application shall be in compliance with FBC Section 1507.1.1 and in accordance with applicable code sections and manufacturer's recommendations.

Underlayment: HVHZ Areas:
One of the following per FBC 7th Edition (2020), Section 1518.4. Installation shall comply with FBC including Sections 1518.2, Section 1518.3 when applicable and in accordance with roof manufacturer's recommendations:

- Any HVHZ approved underlayment, installed in compliance with roof assembly

approval and underlayment approval
- Or one of the following as a minimum:
  (all with minimum 6" endlaps)
  - o Double layer - Compliant with ASTM D 226, Type I with a 19" headlap
  - o Single layer - Compliant with ASTM D 226, Type II with a 4" headlap
  - o Single layer - Compliant with ASTM D 2626 with with a 4" headlap

Components & Materials: (by Others)

Fire Barrier Board*:*
Any approved fire barrier with current HVHZ approval.
(Fire classification is outside the scope of this evaluation. Refer to current fire listings for installation of fire barrier & fire rating of this system.)

Installation:

Installation Method:
(Refer to **"TABLE A"** below and drawings at the end of this report.)

- Fastener Spacing Along Continuous Clip: **Refer to "TABLE A" Below**
  (along the length of the continuous clips and nominally within 3" from all ends)
- One (1) fastener at spacing below
- Rib Interlock: Mechanically seamed 180° (DOUBLE-LOCK)
- 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

	Clip Fastener Spacing:	Panel Seam	**Design Pressure**
METHOD 1	16"	Double Lock	**- 101 PSF**
METHOD 2	8"	Double Lock	**- 174.25 PSF**

- Allowable design pressure(s) for allowable stress design (ASD).
- Rational analysis or extrapolation to enhance pressure is not permitted.

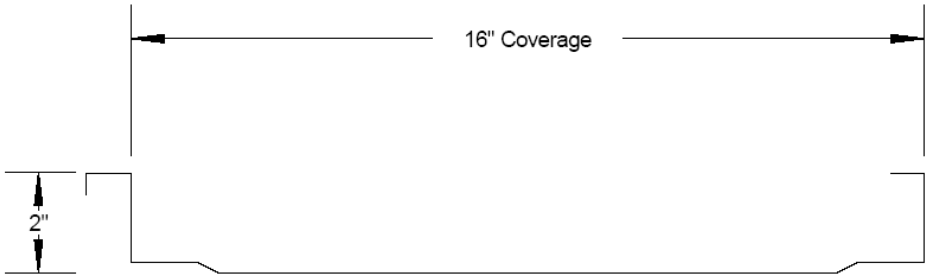
Install the "Zee-Lock" roof panel assembly in compliance with the installation method listed in this report, RAS 133 and applicable code sections of FBC 7th Edition (2020). The installation method described herein is in accordance with the scope of this evaluation report. Refer to manufacturer's installation instructions as a supplemental guide for attachment.

Referenced Data:

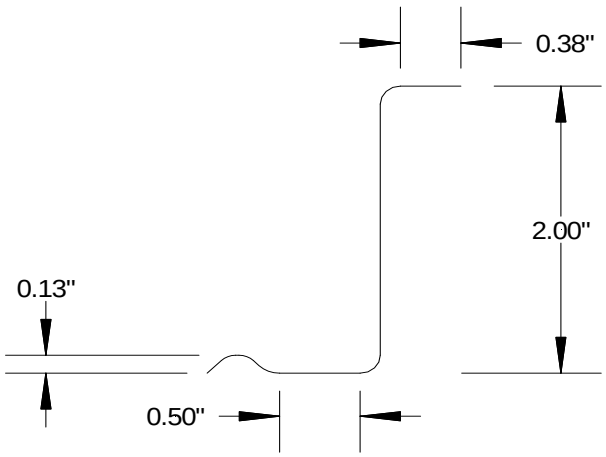
1. TAS 125-03 Uplift Test (Per UL580-94 and UL 1897-98)
   By Force Engineering & Testing Inc., Inc. (TST ID: 5328)
   - Report # 49-0008T07A-C, Report Date: 2/16/07, Test Specimen(s) # A-B
   - Report # 49-0008T07A-C, Report Date: 2/16/07,Test Specimen #C
2. TAS 100-95 Wind Driven Rain Test
   By PRI Construction Materials Technologies, LLC. (FBC Organization ID #TST: 5878)
   Report #BMC-006-02-01, Dated 8/23/07
3. ASTM G 23 Accelerated Weathering
   By Valspar Corporation
   Certified Laboratory Test Report, Dated 3/16/05
4. ASTM B 117 Salt Spray
   By Valspar Corporation
   Certified Laboratory Test Report, Dated 3/16/05
5. Quality Assurance
   By UL, LLC. (FBC Organization ID# QUA 9625)
6. Equivalency of Test Standard Certification
   By James L. Buckner, P.E. @ CBUCK Engineering
   (FBC Organization # ANE 1916)
7. Certification of Independence
   By James L. Buckner, P.E. @ CBUCK Engineering
   (FBC Organization # ANE 1916)
8. Engineering Analysis
   By CBUCK Engineering

Installation Method
Berridge Manufacturing Company
"Zee-Lock" (24 gauge Steel) Roof Panel attached to Wood Deck

Drawings

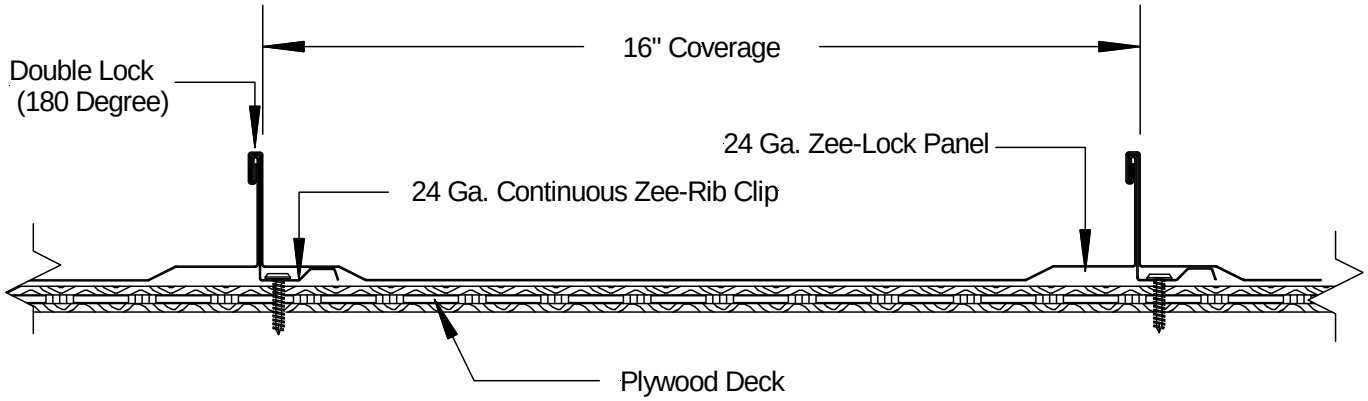


Typical Panel Profile



Continuous "Zee-Rib" Panel Clip
Profile Side View

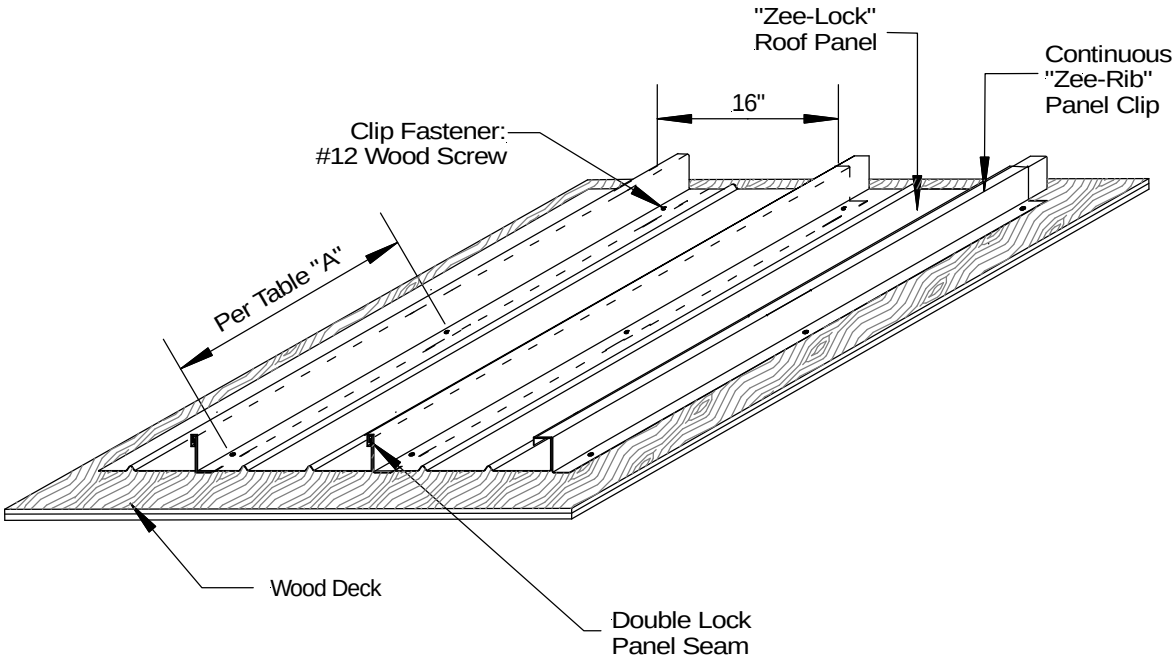
Installation Method
Berridge Manufacturing Company
"Zee-Lock" (24 gauge Steel) Roof Panel attached to Wood Deck



Typical Assembly Profile View
(Typical Fastening Pattern Across Width)

Typical Panel Seams

Installation Method
Berridge Manufacturing Company
"Zee-Lock" (24 gauge Steel) Roof Panel attached to Wood Deck



Typical Roof Assembly
Isometric View

Refer to Page 4-5 of this report for underlayment & barrier board.

TABLE "A"			
	Fastener Spacing	Panel Seam	**Design Pressure**
METHOD 1	16"	Double Lock	**- 101 PSF**
METHOD 2	8"	Double Lock	**- 174.25 PSF**
Rational analysis or extrapolation to enhance pressure is not permitted.			