

Evaluation Report "Double-Lock Zee-Lock Panel" Metal Roof Assembly

Manufacturer:
Berridge Manufacturing Company

**1720 Maury Road
Houston, TX 77026
(800) 231-8127**

for

Florida Product Approval

FL 11159.1 R8

Florida Building Code 8th Edition (2023)

Method: 1 - D

Category: Roofing

Sub - Category: Metal Roofing

Product: "Double-Lock 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. 23-542-ZL-S4W-ER

(Revises Report No. 20-227-ZL-S4W-ER, FL11159.1 R8)

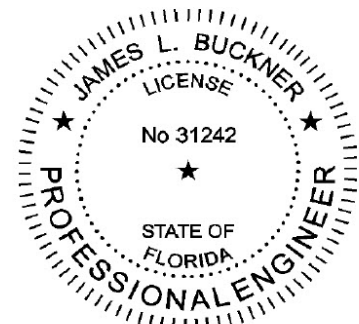
Date: 09/26/2023

Contents:

Evaluation Report

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



James L. Buckner, P.E.

FL31242

Date: 2023.09.26 15:25:27
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CBUCK, Inc. dba CBUCK Engineering

Phone: (561) 491-9927 · Email: cbuck@cbuckinc.net · Website: www.cbuckinc.net

Business: 1374 Community Dr., Jupiter, FL 33458

Manufacturer:	Berridge Manufacturing Company 1720 Maury Road Houston, TX 77026 (800) 231-8127 www.berridge.com										
Product Name:	Double-Lock Zee-Lock										
Product Category:	Roofing										
Product Sub-Category	Metal Roofing										
Compliance Method:	State Product Approval Rule 61G20-3.005 (1) (d)										
Product/System Description:	Double-Lock Zee-Lock Standing Seam Roof Panel 2" Rib Height, 16" wide, 24 gauge Steel roof panel restrained by panel clips, fastened into Plywood Deck.										
Product Assembly as Evaluated:	Refer to Page 4 of this report for product assembly components/materials & standards: <table><tr><td>1. Roof Panel</td><td>"Zee-Lock"</td></tr><tr><td>2. Panel Clip</td><td>"Floating Zee-Clip", "Zee-Clip" or "Zee-Rib"</td></tr><tr><td>3. Fasteners</td><td>#12 or #14 per Table A</td></tr><tr><td>4. Underlayment:</td><td>Per Page 5</td></tr><tr><td>5. Insulation (Optional):</td><td>Rigid Insulation Board (3" thick)</td></tr></table>	1. Roof Panel	"Zee-Lock"	2. Panel Clip	"Floating Zee-Clip", "Zee-Clip" or "Zee-Rib"	3. Fasteners	#12 or #14 per Table A	4. Underlayment:	Per Page 5	5. Insulation (Optional):	Rigid Insulation Board (3" thick)
1. Roof Panel	"Zee-Lock"										
2. Panel Clip	"Floating Zee-Clip", "Zee-Clip" or "Zee-Rib"										
3. Fasteners	#12 or #14 per Table A										
4. Underlayment:	Per Page 5										
5. Insulation (Optional):	Rigid Insulation Board (3" thick)										
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 or greater plywood,• or Wood plank (min. specific gravity of 0.42)										
Slope:	Material and application shall be in compliance with FBC Section 1507.1.1 and in accordance with applicable code sections and 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 1897-15 – *Uplift test for roof covering systems*
- 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 1897-15 adopted by the Florida Building Code 8th Edition (2023).
- Code Compliance:** The product(s) described herein have demonstrated compliance with the performance standards listed above as referenced in the Florida Building Code 8th Edition (2023).
- 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 CBUGK 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 61G20-3.0005 (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:

Material: Steel
Thickness: 24 gauge (min.)
Panel Width: 16" (max.) Coverage
Rib Height: 2"
Yield Strength: 40 ksi min.
Steel Grade: 40
Corrosion Resistance: In compliance with FBC Section 1507.4.3:

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

Roof Panel Clips:

Material: Steel
Thickness: 24 Gauge
Yield Strength: 40 ksi min.
Corrosion Resistance: Per FBC Section 1506.7

PICK ONE OF THE FOLLOWING:

CLIP TYPE 1:

Type:
Overall Dimensions:

Berridge "Floating Zee-Clip"

Two-Piece, low, floating clip
2.31" (tall) x 1.5"(wide) x 4.3" (long)

Clip Top Piece

Material: Galvanized Steel
Thickness: 20 Gauge
Yield Strength: 40 ksi min.
Dimensions: 2.23"(tall) x 0.5"(wide) x 4.3" (long)

Clip Bottom Piece

Material: Galvanized Steel
Thickness: 16 Gauge
Yield Strength: 40 ksi min.
Dimensions: 0.56"(tall) x 1.15"(wide) x 2" (long)

CLIP TYPE 2:

Type:
Dimensions:

Berridge "Zee-Rib"

One-Piece, continuous fixed clip
2"(tall) x 1-3/8"(wide) x continuous (w/panel length)

CLIP TYPE 3:

Type:
Dimensions:

Berridge "Zee-Clip"

One-Piece, fixed clip
2"(tall) x 1-3/8"(wide) x 3-1/2" (long)

Fastener:

Corrosion Resistance: Per FBC Section 1506.6 and 1507.4.4
Standard: Per FBC Section 1506.6 and ANSI/ASME B18.6.1

Type 1:

Size: #14 - 10 x 2"

Type 2:

Size: Low Profile Pancake Head Wood Screw
#12 - 11 x 1"

Components & Materials: Underlayment:
(by Others)

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 report.)

- Clip Spacing or Fastener Spacing Along Continuous Clip (along the length of the panel): **Refer to "TABLE A" 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"					
"Double Lock Zee-Lock, 24 ga. Steel attached to Wood Deck"					
ALLOWABLE LOADS					
METHOD	Clip Spacing	Panel Clip Type	Fastener	# Fasteners per Clip	Design Pressure (ASD)
1	24"	Floating Zee-Clip	#14	2	- 101 PSF
2	12"	Floating Zee-Clip	#14	2	- 131 PSF
3	24"	Zee-Clip	#12	2	- 101 PSF
4	12"	Zee-Clip	#12	2	- 138.5 PSF
5	16"	Zee-Rib	#12	1	- 101 PSF
6	8"	Zee-Rib	#12	1	- 174.25 PSF
• Allowable design pressure(s) for allowable stress design (ASD).					

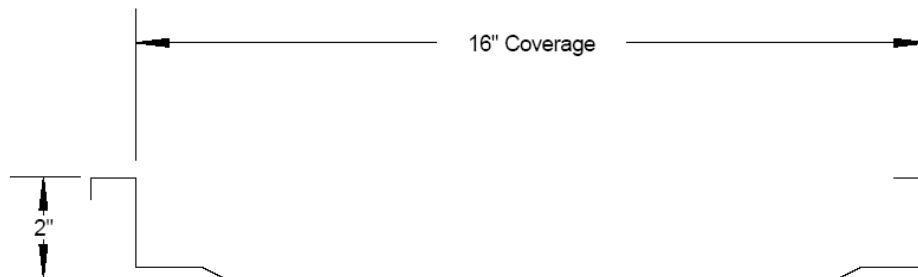
Install the "Double-Lock Zee-Lock" roof panel assembly in compliance with the installation method listed in this report and applicable code sections of FBC 8th Edition (2023). The installation method described herein is in accordance with the scope of this evaluation report. Refer to manufacturer’s installation instructions as a supplemental guide for attachment.

Referenced Data:

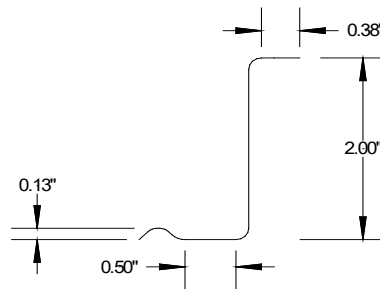
1. TAS 125-03 Uplift Test (Per UL580-94 and UL 1897-98)
By Force Engineering & Testing Inc., Inc. (TST ID: 5328)
 - Report # 49-0008T07A-C, Report Date: 2/16/07,
Test Specimen(s) # A-B (Method 5), #C (Method 6)
2. TAS 125-03 Uplift Test (Per UL580-94 and UL 1897-98)
By Force Engineering & Testing Inc., Inc. (TST ID: 5328)
Report # 49-0275T-13A,B, Report Date: 1/13/14
Test Specimen(s) # A (Method 3), #B (Method 4)
3. TAS 125-03 Uplift Test (Per UL580-06 and UL 1897-04)
By Force Engineering & Testing Inc., Inc. (TST ID: 5328)
 - Report # 49-0060T, 16C,D Report Date: 5/12/16,
Test Specimen(s) # C (Method 1), #D (Method 2)
4. Quality Assurance
UL, LLC (FBC Organization #: QUA 9625)
5. Equivalency of Test Standard Certification
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)
6. Certification of Independence
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)
7. Engineering Analysis
By James L. Buckner, P.E. @ CBUCK Engineering

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

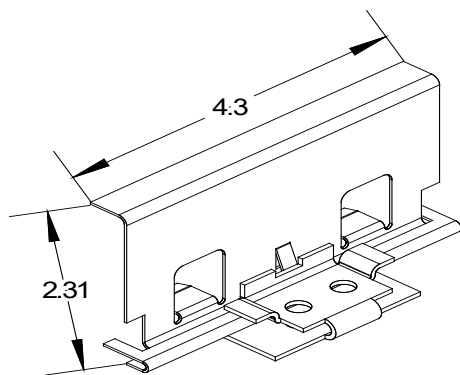
Drawings



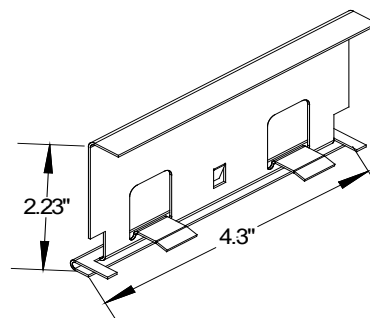
Typical Panel Profile



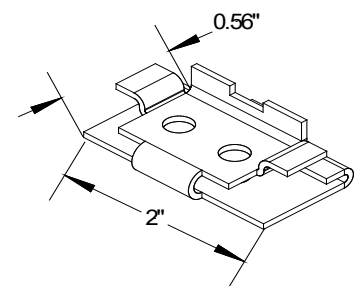
Continuous "Zee-Rib" or "Zee-Clip" Panel Clip Profile Side View



Fully Assembled



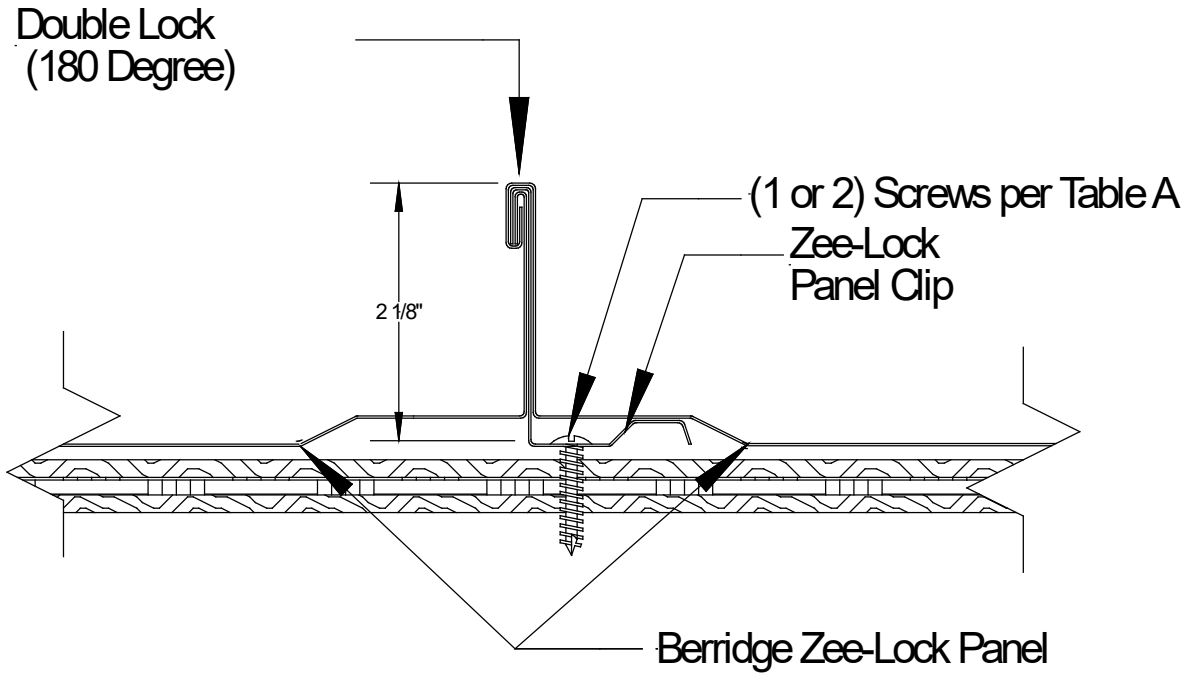
Floating Upper Section



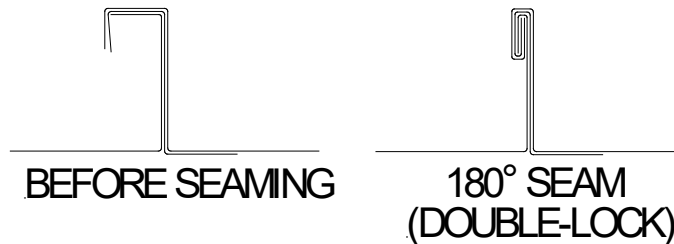
Floating Lower Section

Berridge Two-Piece Floating Zee-Clip Typical Clip Profile

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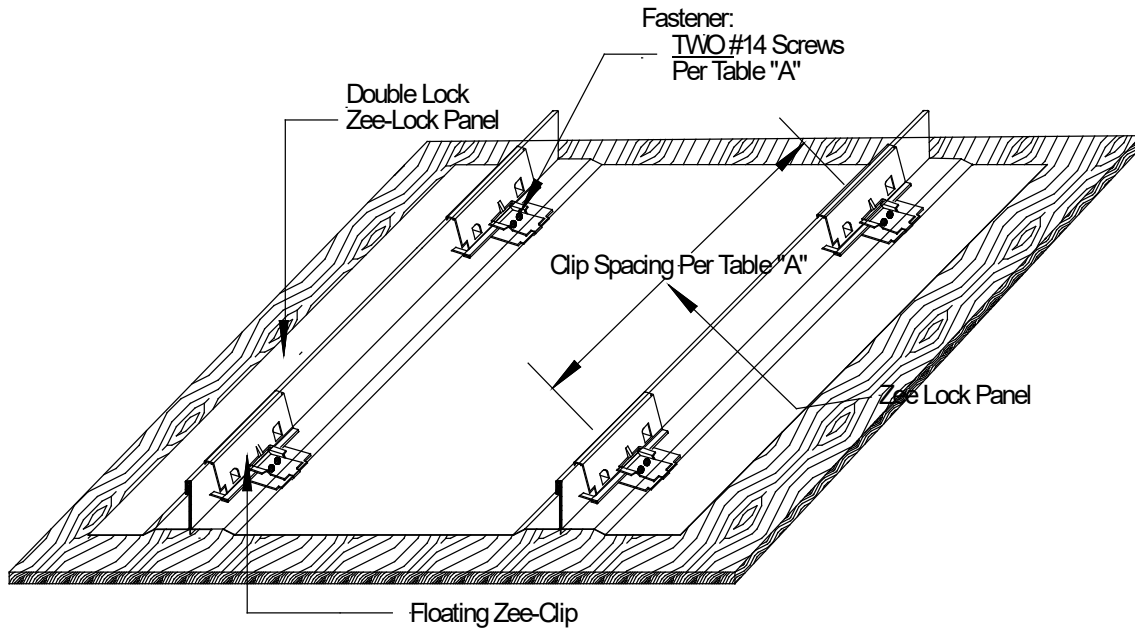


Typical Assembly Profile View

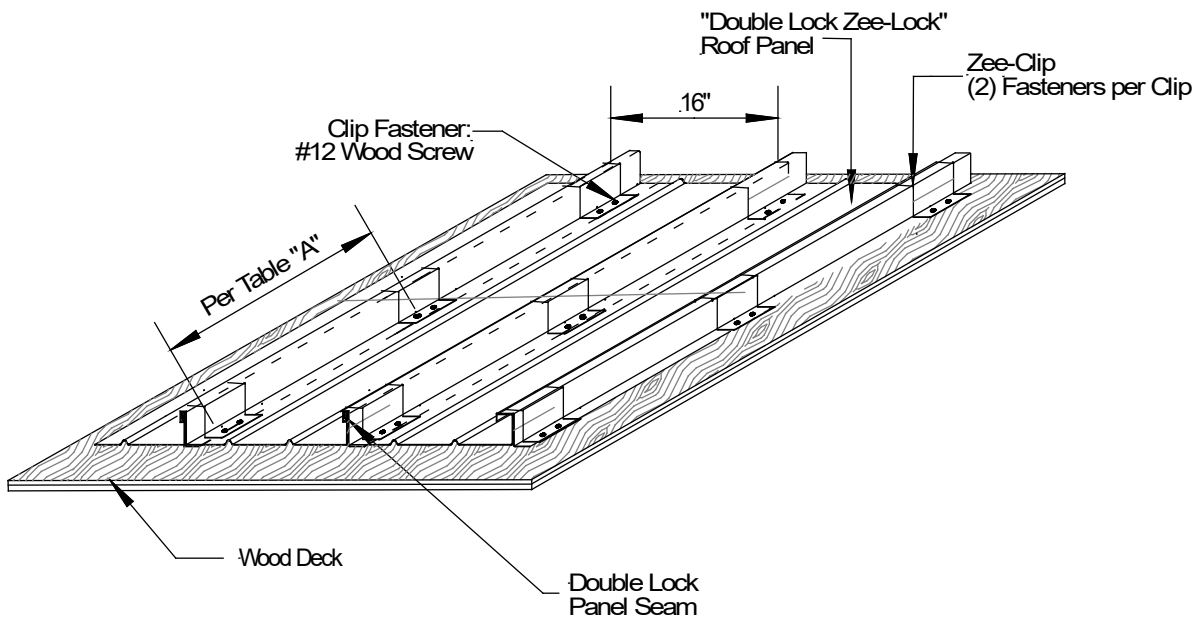


Typical Panel Seams

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

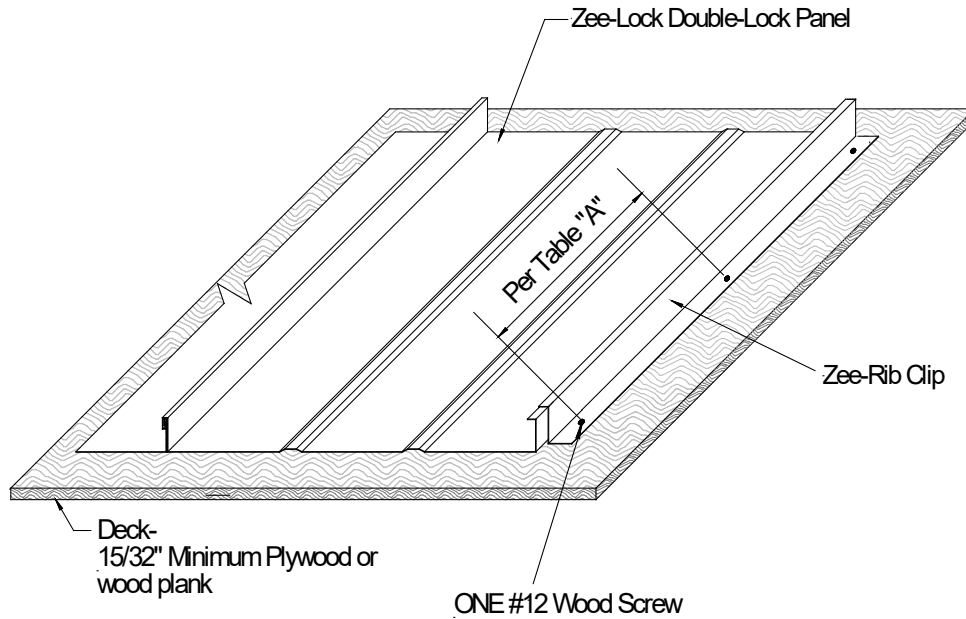


Typical Roof Assembly with Floating Zee-Clip
Isometric View



Typical Roof Assembly with Zee-Clips
Isometric View

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



**Typical Roof Assembly with Continuous Zee-Rib Clip
 Isometric View**

TABLE "A"					
"Double Lock Zee-Lock, 24 ga. Steel attached to Wood Deck"					
ALLOWABLE LOADS					
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3	24"	Zee-Clip	#12	2	- 101 PSF
4	12"	Zee-Clip	#12	2	- 138.5 PSF
5	16"	Zee-Rib	#12	1	- 101 PSF
6	8"	Zee-Rib	#12	1	- 174.25 PSF