

Evaluation Report

"Zee-Lock Panel or Curved Zee-Lock Panel"

Metal Roof Assembly

Manufacturer:

Berridge Manufacturing Company

1720 Maury Road

Houston, TX 77026

(800) 231-8127

for

Florida Product Approval

FL 11159.2 R8

Florida Building Code 8th Edition (2023)

Method: 1 - D

Category: Roofing

Sub - Category: Metal Roofing

Product: "Zee-Lock" Roof Panel

Material: Steel

Panel Thickness: 24 gauge

Panel Width: 16"

Support: Steel Deck

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Prepared by:

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Florida Professional Engineer # 31242

Florida Evaluation ANE ID: 1916

Project Manager: Diana Galloway

Report No.23-542-ZL-S4S-ER

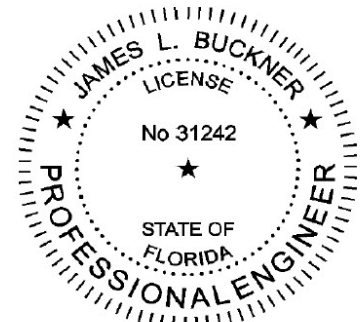
(Revises Report No. 20-227-ZL-S4S-ER, FL11159.2 R7)

Date: 09/26/2023

Contents:

Evaluation Report

Pages 1 – 12



James L. Buckner, P.E.

FL31242

Date: 2023.09.26 15:25:27
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Manufacturer:	Berridge Manufacturing Company 1720 Maury Road Houston, TX 77026 (800) 231-8127 www.berridge.com														
Product Name:	“Zee-Lock” or “Curved 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” or “Curved Zee-Lock” Standing Seam Roof Panel 2” Rib Height, 16” wide, 24 gauge Steel roof panel restrained by panel clips, fastened through optional rigid insulation into 22 gauge Steel 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-Rib” or “Zee-Clip”</td></tr><tr><td>3. Fasteners:</td><td>Per Page 5</td></tr><tr><td>4. Bearing Plate</td><td>Per Page 5</td></tr><tr><td>5. Underlayment:</td><td>Per Page 5</td></tr><tr><td>6. Insulation (Optional):</td><td>Per Page 5</td></tr></table>			1. Roof Panel:	“Zee-Lock”	2. Panel Clip:	“Floating Zee-Clip”, “Zee-Rib” or “Zee-Clip”	3. Fasteners:	Per Page 5	4. Bearing Plate	Per Page 5	5. Underlayment:	Per Page 5	6. Insulation (Optional):	Per Page 5
1. Roof Panel:	“Zee-Lock”														
2. Panel Clip:	“Floating Zee-Clip”, “Zee-Rib” or “Zee-Clip”														
3. Fasteners:	Per Page 5														
4. Bearing Plate	Per Page 5														
5. Underlayment:	Per Page 5														
6. Insulation (Optional):	Per Page 5														
Support:	Type: Steel Deck (Design of steel deck and its attachment to support framing is outside the scope of this evaluation.) Description: <ul style="list-style-type: none">• 22 gauge (min.) or 24 Gauge (min.)- Refer to Table “A”• Yield Strength: 40 ksi minimum														
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.														
Arched Min. Radius for Curved Panel:	20 Feet														
Performance:	Wind Uplift Resistance:	Refer to Table “A”													
	<ul style="list-style-type: none">• Design Uplift Pressure: (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*
 - TAS 125-03 – *Standard Requirements for Metal Roofing 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 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.
 - 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.

**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

Berridge "Zee-Lock"

Steel

24 gauge (min.)

16" (max.) Coverage

2"

40 ksi min.

40

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:

Steel

24 Gauge

40 ksi min.

Per FBC Section 1506.7

CLIP TYPE 1:

Berridge "Floating Zee-Clip"

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

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)

Galvanized Steel

20 Gauge

40 ksi min.

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)

Galvanized Steel

16 Gauge

40 ksi min.

0.56" (tall) x 1.15" (wide) x 2" (long)

CLIP TYPE 2:

Berridge "Zee-Rib"

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

One-Piece, continuous fixed clip

2" (tall) x 1-3/8" (wide) x continuous (w/panel length)

CLIP TYPE 3:

Berridge "Zee-Clip"

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

One-Piece, fixed clip

2" (tall) x 1-3/8" (wide) x 3-1/2" (long)

Fastener:

PICK ONE OF THE FOLLOWING:

FASTENER 1:

Size : #12 - 11 x 1" (or length to meet min. penetration)
w/3" steel disk per sheet when used w/insulation

Low Profile Self-Tapping Screw

#12 - 11 x 1" (or length to meet min. penetration)

w/3" steel disk per sheet when used w/insulation

Corrosion Resistance: Per FBC Section 1506.6 and 1507.4.4

Per FBC Section 1506.6 and 1507.4.4

Standard: Per FBC Section 1506.6

Per FBC Section 1506.6

FASTENER 2:

Size : #14 - 13 x 7", 9" (or length to meet min. penetration)
w/3" steel disk per sheet when used w/insulation

Low Profile Self-Tapping Screw w/3" steel disk per sheet

#14 - 13 x 7", 9" (or length to meet min. penetration)

w/3" steel disk per sheet when used w/insulation

Corrosion Resistance: Per FBC Section 1506.6 and 1507.4.4

Per FBC Section 1506.6 and 1507.4.4

Standard: Per FBC Section 1506.6

Per FBC Section 1506.6

Bearing Plate:

Material:	Galvanized Steel
Size:	6" x 6"
Thickness:	24 gauge
Yield Strength:	40 ksi min.

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:	4-6" (max.)
Properties:	
Density:	2.25 pcf (lbs/ft ³) 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 3/4"

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**
- # fasteners per Clip or attachment point: **Refer to "TABLE A" Below**
- Rib Interlock: **Refer to "TABLE A" Below**
Mechanically seamed 90° (SINGLE-LOCK) OR 180° (DOUBLE-LOCK)
- Assemblies with insulation include 3" steel disk per sheet.
- Minimum fastener penetration thru bottom of support, 3/4". (through bottom flute of steel deck)
- For panel construction at the end of panels, refer to manufacturer's instructions and any site specific design.

TABLE "A" "Zee-Lock, 24 ga. Steel attached to Steel Deck" ALLOWABLE LOADS							
	Deck Thickness	Clip or Fastener Spacing	Fastener	# Fasteners per Attachment	Panel Clip	Panel Seam	Design Pressure
1.	22 ga. (min.)	36"	#14 w/6" plate	2	Floating Zee-Clip	Double Lock	- 93.5 PSF
2.	22 ga. (min.)	12"	#14 w/6" plate	2	Floating Zee-Clip	Double Lock	- 200 PSF
3.	24 ga. (min.)	18"	#12 or #14	1	Zee-Rib	Single Lock	- 52.5 PSF
4.	24 ga (min.)	18"	#12 or #14	1	Zee-Rib	Double Lock	- 87.5 PSF
5.	22 ga. (min.)	16"	#14	1	Zee-Rib	Single Lock	- 101 PSF
6.	22 ga. (min.)	16"	#14	1	Zee-Rib	Double Lock	- 183.5 PSF
7.	22 ga. (min.)	24"	#14	2	Zee-Clip	Double Lock	- 108.5 PSF
8.	22 ga. (min.)	12"	#14	2	Zee-Clip	Double Lock	- 138.5 PSF
• Allowable design pressure(s) for allowable stress design (ASD).							

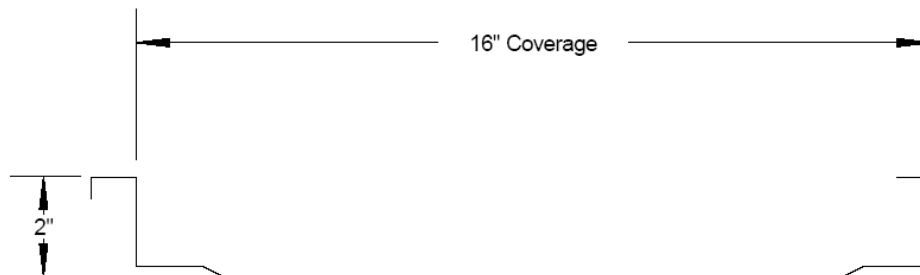
Install the "Zee-Lock" roof panel assembly in compliance with the installation method listed in this report and applicable code sections of FBC 8th Edition (2023). The installation method described herein is in accordance with the scope of this evaluation report. Refer to manufacturer's installation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

Referenced Data:

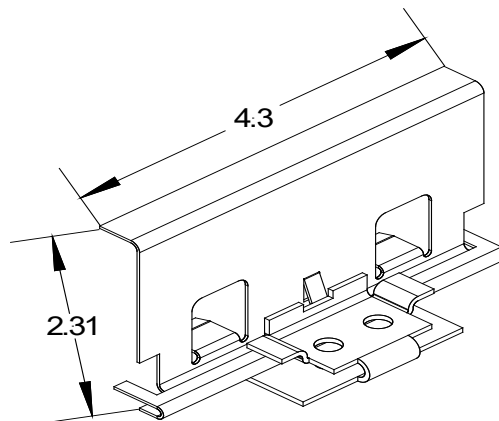
1. TAS 125-03 Uplift Test (Per UL580-06 and UL 1897-04)
By Force Engineering & Testing Inc., Inc. (TST ID: 5328)
 - Report # 49-0060T, 16A,B_R1, Report Date: 7/25/16, Test Specimen(s) # A (Method 2), #B (Method 1)
1. UL580-94 (with 1998 Revisions) Uplift Class 90
By Underwriter's Laboratories, Inc. (FBC Organization #CER ID: 1739)
UL File #TGKX.335
2. UL580-94 & TAS 125-95
By Underwriter's Laboratories, Inc. (FBC Organization #TST ID: 1740)
File R12005, Project 02RT7504, Test Assembly #1, Dated: 5/1/02
3. TAS 125-03 Uplift Test
By Force Engineering & Testing Inc. (FBC Organization ID# TST 5328)
Report # 49-0374T-08C, Dated 2/2/09
4. 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 #C
5. 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 #B
6. TAS 125-03 Uplift Test (Per UL580-06 and UL 1897-12)
By Force Engineering & Testing Inc., Inc. (TST ID: 5328)
 - Report # 49-0069T-19A, Report Date: 6/04/19
7. Quality Assurance
UL, LLC (FBC Organization #: QUA 9625)
8. Equivalency of Test Standard Certification
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)
9. Certification of Independence
By James L. Buckner, P.E. @ CBUCK Engineering
(FBC Organization # ANE 1916)
10. Engineering Analysis
By CBUCK Engineering

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

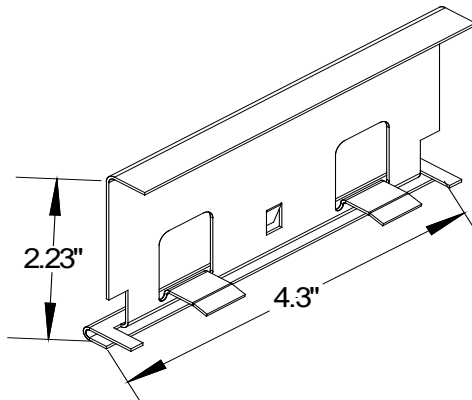
Drawings



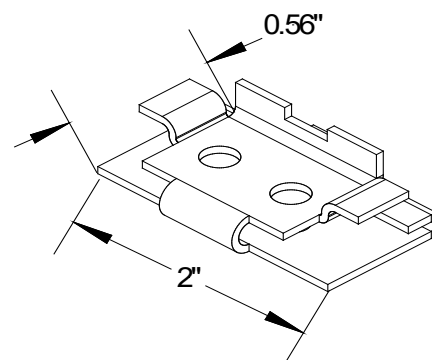
Berridge Zee-Lock Typical Panel Profile



Fully Assembled



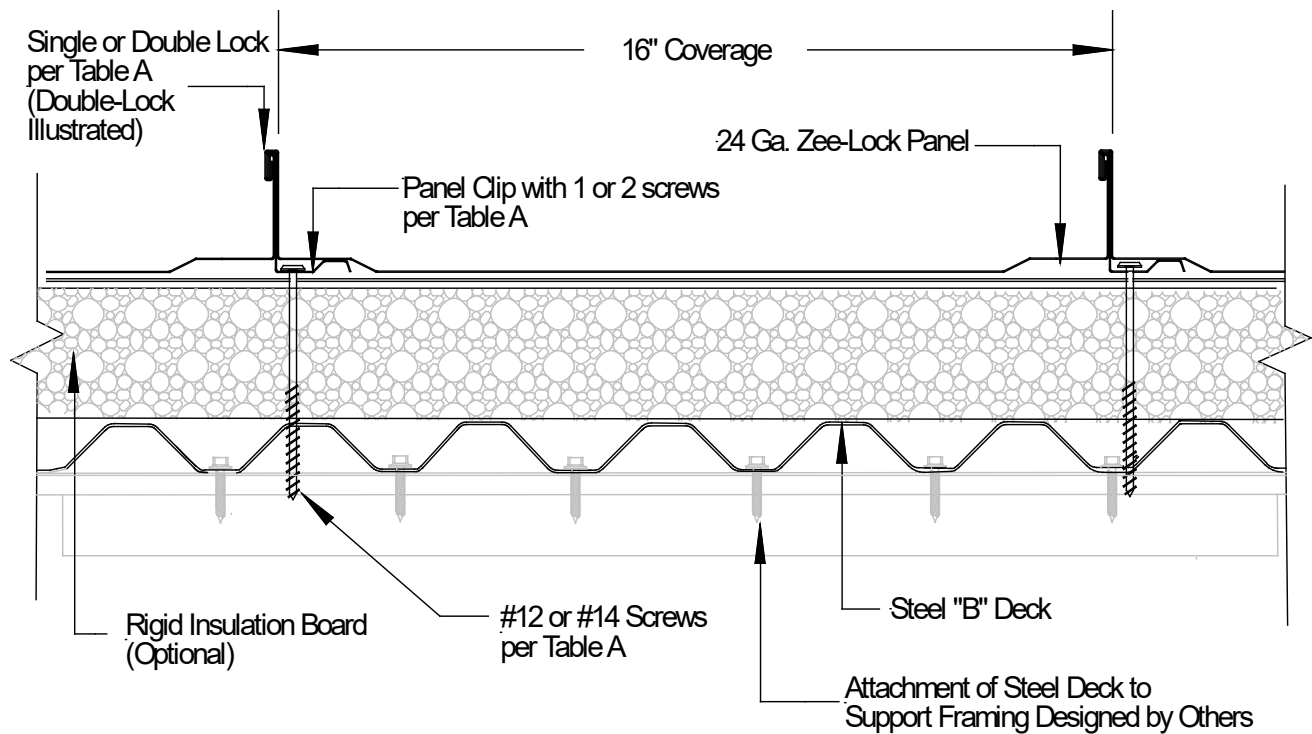
Floating Upper Section



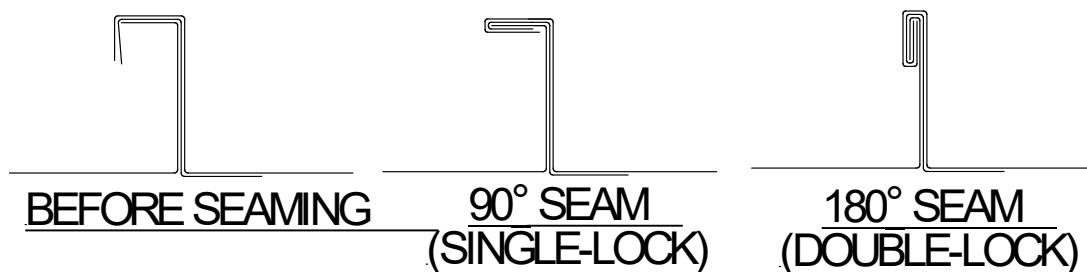
Floating Lower Section

Berridge Two-Piece Floating Zee-Clip Typical Clip Profile

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

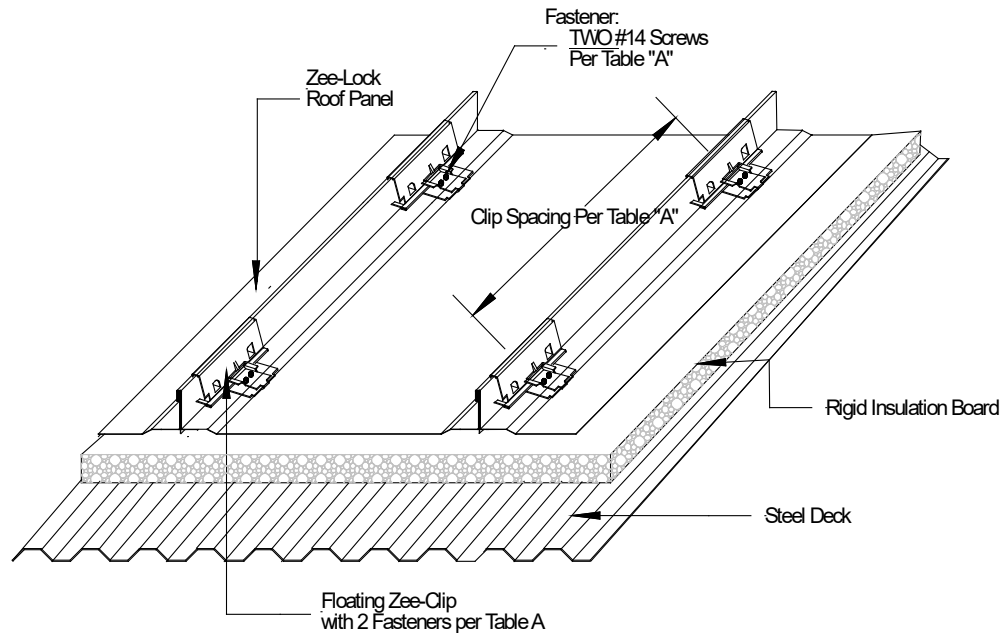


Typical Assembly Profile View
(Typical Fastening Pattern Across Width)

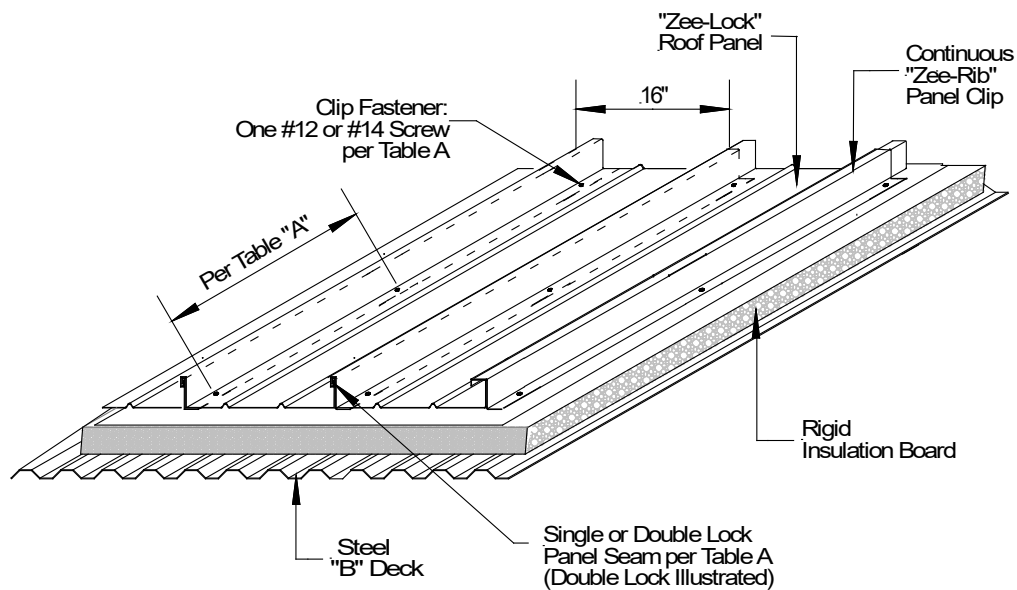


Typical Panel Seams

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

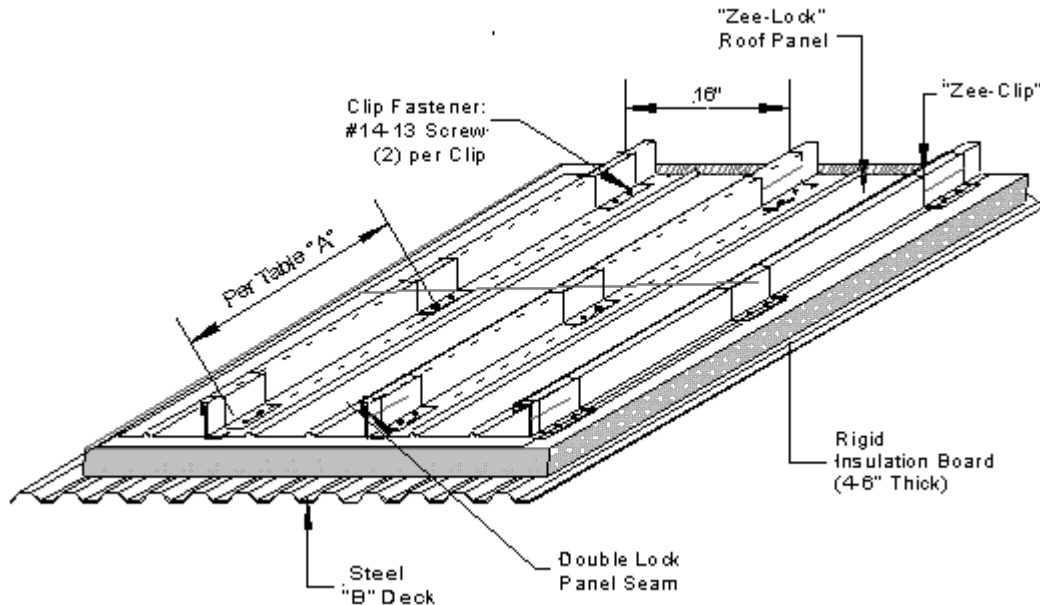


**"Zee-Lock" Panel Assembly with Floating Zee-Clip
Typical Isometric View**

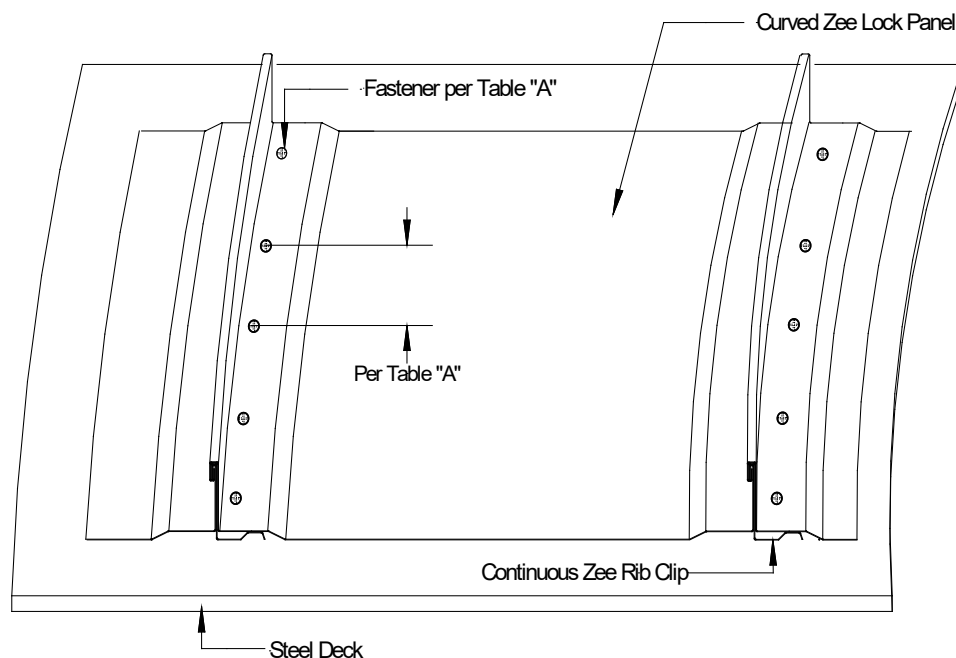


**"Zee-Lock" Panel attached to Steel Deck with Continuous Zee-Rib
Typical Assembly Isometric View**

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



**"Zee-Lock" Panel attached to Steel Deck with Zee-Clips
Typical Assembly Isometric View**



**Curved "Zee-Lock" Panel attached to Steel Deck (Illustrated with Continuous Zee-Rib)
Typical Assembly Top View**

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

TABLE “A” “Zee-Lock, 24 ga. Steel attached to Steel Deck” ALLOWABLE LOADS							
	Deck Thickness	Clip or Fastener Spacing	Fastener	# Fasteners per Attachment	Panel Clip	Panel Seam	Design Pressure
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2.	22 ga. (min.)	12”	#14 w/6” plate	2	Floating Zee-Clip	Double Lock	- 200 PSF
3.	24 ga. (min.)	18”	#12 or #14	1	Zee-Rib	Single Lock	- 52.5 PSF
4.	24 ga (min.)	18”	#12 or #14	1	Zee-Rib	Double Lock	- 87.5 PSF
5.	22 ga. (min.)	16”	#14	1	Zee-Rib	Single Lock	- 101 PSF
6.	22 ga. (min.)	16”	#14	1	Zee-Rib	Double Lock	- 183.5 PSF
7.	22 ga. (min.)	24”	#14	2	Zee-Clip	Double Lock	- 108.5 PSF
8.	22 ga. (min.)	12”	#14	2	Zee-Clip	Double Lock	- 138.5 PSF