

**ASTM E1680 & ASTM E 1646  
TEST REPORT**

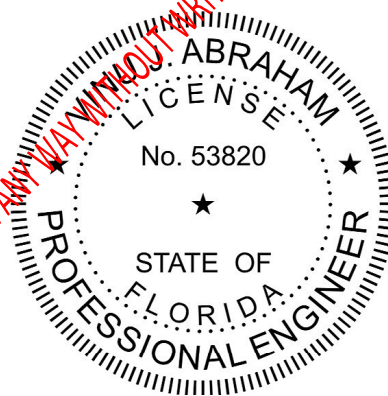
**Rendered to:**

**SHEFFIELD METALS INTERNATIONAL**

**MODEL DESIGNATION: SMI 1-1/2" Mechanical Seam over B-Deck  
PRODUCT TYPE: Standing Seam Roof System (24 Ga. Steel)**

**This report contains in its entirety:**

**Cover Page:** 1 page  
**Report Body:** 6 pages



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<b>Report No.:</b>	B5170.05-450-18
<b>Test Date:</b>	1/16/12
<b>Report Date:</b>	3/2/12
<b>Test Report Retention End Date:</b>	3/2/16

## Sheffield Metals International

SMI 1-1/2" Mechanical Seam over B-Deck (ASTM E1680 & ASTM E 1646)  
Test Report #: B5170.05-450-18

### 1.0 MANUFACTURER'S IDENTIFICATION

- 1.1 Name of Applicant: Sheffield Metals International  
5467 Evergreen Parkway  
Sheffield Village, OH 44054  
Voice: 904.413.7425
- 1.2 Contact Person: Jim Mitchell

### 2.0 LABORATORY IDENTIFICATION

- 2.1 -Test Notification #: N/A
- 2.2 -Lab Certifications: Miami-Dade County (05-1014.01); Florida Building Code (TST1527); IAS (TL-244); AAMA; WDMA; Keystone Certifications; Texas Department of Insurance

### 3.0 SCOPE OF WORK

- 3.1 Introduction: Sheffield Metals International retained Architectural Testing, Inc. (ATI) to conduct air infiltration and water penetration testing on their SMI 1-1/2" Mechanical Seam over B-Deck System per the requirements of ASTM.
- 3.2 Report Information: Table 1 provides the test date for this specimen.

Table 1: Specimen Test Date

Mock-Up	Specimen #	Test Date
SMI 1-1/2" Mechanical Seam over B-Deck	2A	1/16/2012

### 4.0 PRODUCT IDENTIFICATION

- 4.1 Product Type: Standing Seam Roof System
- 4.2 Model Designation: SMI 1-1/2" Mechanical Seam over B-Deck
- 4.3 Overall Size: 69" (wide) x 113" (long) – roof frame
- 4.4 General Description: This specimen consisted of a 69" x 113" roof frame sheathed with a single layer of 22 ga. B-deck installed into A36 steel. This was followed by a single layer each of felt paper and moisture/fire barrier. The roofing panels were fastened over the moisture/fire barrier.
- 4.5 Sample Source: Sheffield Metals International provided the test specimen.

## 5.0 COMPONENT DESCRIPTION

### 5.1 B-Deck Details:

Table 2 provides the details of the B-Deck.

Table 2: B-Deck Details

Item	Description
22 ga. B-Deck	Each B-Deck panel was fabricated from 22 ga. (thickness = 0.030") ASTM A653, SS GRD33 steel and had a G60 galvanized coating applied to it. Each finished B-Deck panel was 36" (wide) x 120" (long) and featured 6 ribs that were each 3-1/2" (w) and 1-1/2" (h).

### 5.2 Accessories:

Table 3 provides a description of the accessories used in the test specimen.

Table 3: Accessories

Item	Description
Felt paper	30# Asphalt saturated organic paper (ASTM D226) meeting type II requirements
Moisture/fire barrier	VersaShield®

### 5.3 Metal Roof System:

Table 4 provides the metal roof system components used in the test specimen.

Table 4: Metal Roof System Components

Item	Overall Cross-Section	Material	Coil Width	Description
Mechanical Seam Panel	Please see part drawing labeled "SMI 1 1/2 Mechanical Seam Profile" for dimensions	24 ga. steel	20"	Each panel had an effective covering width of 16". Each finished roof panel was 111" (long) and featured two (2), 1-1/2" vertical legs (one w/return flap).
Clip Assembly (Butterfly Base 1-1/2" - Part # 1126602)	1.000" x 1.250" x 4.500" (long)	22 ga. G-90 galvanized steel	N/A	Each expansion-type butterfly panel clip consisted of a "base" and a "tab" that were each fabricated from two different thicknesses of steel. Each clip "base" had two holes capable of accommodating #12 pancake head screws.
Clip Assembly (Butterfly Tab 1-1/2" - Part # 1103095)	5.000" (long) x 0.910" (tall) with two return flaps that were 0.400" (wide)	24 ga. G-90 galvanized steel	N/A	

## 6.0 SPECIMEN CONSTRUCTION

Table 5 provides the specimen construction.

Table 5: Specimen Construction

Location	Description
B-deck to roof frame	The B-deck panels were mechanically attached to the steel frame members using #12 x 1-1/4" self-drilling SMS spaced at 6" on center. The B-deck panels were not attached at the perimeter. Adjacent panels were mechanically attached to one another at the overlap locations using #12 x 1-1/4" self-drilling SMS spaced at 6" on center.
Felt paper	A single layer of felt paper with 4" laps was tacked in place across the top of the B-deck and was secured when the metal roofing was installed.
Moisture/fire barrier	A single layer of VersaShield® with 4" laps was tacked in place across the top of the felt paper and was secured when the metal roofing was installed.
Roof panel	Each finished roof panel featured an inside leg and an outside leg. These legs were overlapped around a butterfly clip base/tab assembly. These clip assemblies were spaced 7" from each panel end and at 18" on center thereafter. Each clip was mechanically attached to the B-deck substrate using two (2) #12 x 1" Weather Gard® self-drilling pancake head screws. The legs were then mechanically seamed 180 degrees.
Partial panel cut edges	The partial panel cut edges at the perimeter of the roof panel assembly were attached to the B-deck substrate using groups of two (2), #12 x 1" Weather Gard® self-drilling pancake head screws spaced at 6" on center (two [2] fasteners in group were spaced 2" apart).
Panel ends	The panel ends at the perimeter of the roof panel assembly were attached to the B-deck substrate using a single row of #12 x 1" Weather Gard® self-drilling pancake head screws spaced at 6" on center.

## 7.0 TEST RESULT SUMMARY

Table 6 provides a summary of the test results for all tests conducted per ASTM E 1680 and ASTM E 1646. The temperature during testing was 68°F.

Table 6: Summary of Test Results

Specimen #	Test Method	Test Conditions	Conclusion
2A	Air Leakage Test (ASTM E 1680)	+1.57/-1.57 psf	N/A
	Water Penetration Test (ASTM E 1646)	12.00 psf	PASS



## 8.0 TEST SEQUENCE

Table 7 provides the test sequence for the specimen.

Table 7: Test Sequence

Specimen # 2A	
1.	Air Leakage Test - Preloads
a.	Positive Preload
b.	Negative Preload
c.	Positive Preload
d.	Negative Preload
e.	Positive Preload
f.	Negative Preload
2.	Air Leakage Test - Air Infiltration
3.	Air Leakage Test - Air Exfiltration
4.	Water Penetration Test

## 9.0 TEST RESULTS

### 9.1 Air Leakage Test

#### 9.1.1 Preload Pressures

Table 8 provides the pressure differences exerted across the test specimen during the preloads.

Table 8: Preload Pressures

	Test Pressure (psf)
Positive	45.88
Negative	45.88
Positive	45.88
Negative	45.88
Positive	45.88
Negative	45.88

#### 9.1.2 Results

Table 9 provides the results for the air leakage test.

Table 9: Air Leakage Test Results

	Test Pressure (psf)	Measured (cfm/ft <sup>2</sup> )
Air infiltration	+1.57	0.03
Air exfiltration	-1.57	0.09



9.2 Water Penetration Test

9.2.1 Results

Table 10 provides the results for the water penetration test.

Table 10: Water Penetration Test Results

Test Pressure (psf)	Spray Rate (gph/ft <sup>2</sup> )	Test Duration (minutes)	Ponded Water Depth (in.)	Conclusion
12.00	5.0	15.00	0.75	Pass

9.2.2 Conclusion

ATI observed zero (0) water infiltration through the test specimen; as such, this test specimen satisfies the requirements of ASTM E 1646.

**10.0 CERTIFICATION AND DISCLAIMER STATEMENT**

All tests performed on this test specimen were conducted in accordance with the specifications of the applicable codes, standards and test methods listed below by ATI. ATI does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products tested at ATI. ATI is not owned, operated or controlled by any company manufacturing or distributing products it tests. This report is only intended for the use of the entity named in Section 1.0 of this report. Detailed assembly drawings showing panel/clip thicknesses, panel/clip profiles, accessories, fasteners and all other applicable layouts are on file and have been compared to the test specimen submitted. ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by ATI for the entire test record retention period.

If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen can be made. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report may not be reproduced, except in full, without the written approval of ATI.

**11.0 APPLICABLE CODES, STANDARDS, AND TEST METHODS**

ASTM E 1680 – Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems  
ASTM E 1646 – Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference

**12.0 WITNESSES (ALL OR PARTIAL)**

Vin J. Abraham, P.E.	Vice President – Southeast Region	ATI
Jeff McGovern	Director – Regional Operations	ATI
Kristin Norville, E.I.	Operations Engineer	ATI
Veron Wickham	Technician	ATI
John Spallina	Technician	ATI



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ENGINEER OF RECORD

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3/2/2012

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3/2/2012