



# CONSTRUCTION MATERIALS

## TECHNOLOGIES

### LABORATORY TEST REPORT

**Report for:** Sheffield Metals International  
5467 Evergreen Parkway  
Sheffield Village, OH 44054

**Attention:** Adam Mazzella

<b>Product Names:</b> SMI 1.5 Mechanical Seam Standing Seam	<b>Manufacturer:</b> Sheffield Metals International
<b>Project No.:</b> SHMI-005-02-01.1	<b>Source:</b> Sheffield Metals International
<b>Date Received:</b> Dec. 4, 2017	<b>Date Tested:</b> Dec. 26, 2017

**Purpose:** Determine the uplift resistance of SMI 1.5 Mechanical Seam Standing Seam panels in accordance with **UL 580-06 Test for Uplift Resistance of Roof Assemblies** and **UL 1897-04 & -12 Uplift Tests for Roof Covering Systems**.

**Test Methods:** Testing was completed as described in UL 580-06 *Test for Uplift Resistance of Roof Assemblies* and UL 1897-04 & -12 *Uplift Tests for Roof Covering Systems*. Specimens were tested to the loading schedule as described in UL 580, and where applicable, incrementally loaded in accordance with UL 1897 until failure.

**Sampling:** SMI 1.5 MS panels, clips and fasteners were supplied by Sheffield Metals International. All other materials were provided by PRI Construction Materials Technologies LLC and purchased through local distribution.

**Panel Description:** SMI 1.5 MS: Min. 0.029" 3105 H24M aluminum alloy ( $F_y = 22.9$  ksi) preformed, 180° mechanical standing seam panels; 16" wide installed coverage; Profile drawing is contained in Appendix B.

Clips: Two-piece galvanized steel clip; 1.75" long x 24 ga. expansion top; 6" long x 18 ga. base. Clip drawing is contained in Appendix B.

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**Deck Descriptions: (All tests)**

Underlayment: ASTM D 226 Type II. Underlayment installed with minimum 4 in. side-lap and 6 in. end-laps and fastened using 12 ga., 1-1/4" ring shank nails and 32 ga., 1-5/8" tin caps spaced 6" o.c. in the laps and two staggered rows 12" o.c. in the field.

Deck: 15/32" APA span rated CDX plywood installed over No. 2 lumber supports spaced 24" o.c. Decking attached with 0.113" x 2-3/8" ring shank nails spaced 6" o.c. along the perimeter and intermediate supports.

Specimen Sealing: Polyethylene film placed under the metal roof panels; tape<sup>1</sup>

<sup>1</sup>It is the judgment of the test engineer that the film and tape used to seal the specimen against air leakage did not influence the results of the test.

**Results:**

Test data are contained in Appendix A. Installation details are shown in Appendix B. Photographs of specimens after testing are contained in Appendix C.

Table 1. Summary of Test Results

Specimen No.	Panel	Attachment	Passing Uplift Pressure (psf)	Failure Mode
1	SMI 1.5 Mechanical Seam Standing Seam	Clips spaced 16" o.c and secured to deck with two (2) #10-13 x 1" PH woodscrews. Perimeter secured 6" o.c. with #10-14 x 1.5" HWH woodscrews with 0.5" O.D. sealing washers.	135	Fastener Withdrawal


**Classification:**

Specimen No. 1 installed as described herein meets **Class 90** requirements.

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**Statement of Attestation:**

Testing was conducted in accordance with **UL 580-06 Test for Uplift Resistance of Roof Assemblies and UL 1897-04 & -12 Uplift Tests for Roof Covering Systems**. The test results and interpretations presented herein are representative of the materials supplied by the client.

Signed:   
Zachary Priest, P.E.  
Director



**Report Issue History:**

Issue #	Date	Pages	Revision Description (if applicable)
Original	01/18/2018	7	NA
Rev. 1	02/12/2018	8	updated tables and photos and panel name

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Specimen No. 1 (UL 580 Load Schedule)

Class 30 Loading Sequence (UL 580)								
Duration (min)	Positive Pressure (psf)	Negative Pressure (psf)	Max Deflection Under Load (in.)				Result	
			1	2	3	4		
5	0.0	16.2	0.094	0.560	0.103	0.606	PASS	
5	13.8	16.2	0.211	0.895	0.223	0.937	PASS	
60	13.8	8.1-27.7 <sup>1</sup>	0.141	0.900	0.163	0.927	PASS	
5	0.0	24.2	0.122	0.866	0.139	0.902	PASS	
5	20.8	24.2	0.242	1.193	0.253	1.265	PASS	
Permanent Set			0.031	0.360	0.055	0.363	PASS	
Class 60 Loading Sequence (UL 580)								
Duration (min)	Positive Pressure (psf)	Negative Pressure (psf)	Max Deflection Under Load (in.)				Result	
			1	2	3	4		
5	0.0	32.3	0.181	1.035	0.189	0.982	PASS	
5	27.7	32.3	0.330	1.408	0.349	1.498	PASS	
60	27.7	16.2-55.4 <sup>1</sup>	0.346	1.332	0.311	1.387	PASS	
5	0.0	40.4	0.299	1.210	0.245	1.255	PASS	
5	34.6	40.4	0.429	1.476	0.356	1.543	PASS	
Permanent Set			0.101	0.425	0.063	0.487	PASS	
Class 90 Loading Sequence (UL 580)								
Duration (min)	Positive Pressure (psf)	Negative Pressure (psf)	Max Deflection Under Load (in.)				Result	
			1	2	3	4		
5	0.0	48.5	0.345	1.309	0.286	1.367	PASS	
5	41.5	48.5	0.506	1.476	0.390	1.543	PASS	
60	41.5	24.2-48.5 <sup>1</sup>	0.491	1.337	0.409	1.382	PASS	
5	0.0	56.5	0.450	1.140	0.344	1.253	PASS	
5	48.5	56.5	0.641	1.476	0.523	1.546	PASS	
Permanent Set			0.108	0.436	0.069	0.496	PASS	

Notes: 1) Oscillation frequency is 10±2 sec per cycle

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Specimen No. 1 (UL 1897 Load Schedule)

Ultimate Loading Sequence (UL 1897)						
Duration (min)	Combine Test Pressure (psf)	Max Deflection Under Load (in.)				Result
		1	2	3	4	
1	120	0.741	1.477	0.683	1.519	PASS
1	135	0.747	1.543	0.689	1.588	PASS
1	150					FAIL @ 0 SEC

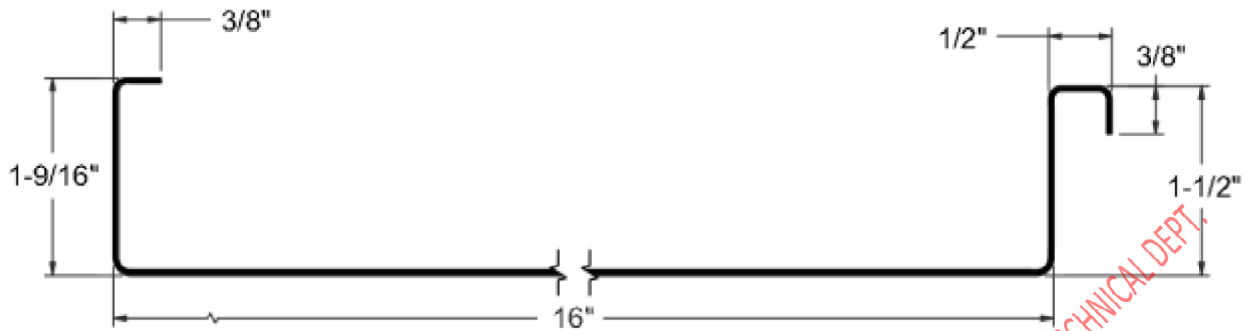
ASTM E 8 Tensile Properties for 0.032" Aluminum SMI 1.5 Mechanical Seam Standing Seam

Specimen	Width (in)	Thickness (in)	Gage Length (in)	Yield Strength (ksi)	Tensile Strength (ksi)	Elongation at Break (%)
1	0.475	0.033	2	21.7	25.2	11.9
2	0.476	0.033	2	22.4	25.4	11.1
3	0.476	0.033	2	22.2	25.7	12.1
4	0.476	0.032	2	22.5	26.0	11.8
5	0.476	0.032	2	22.8	25.9	11.5
<b>Average</b>				<b>22.3</b>	<b>25.6</b>	<b>11.7</b>
<b>St.Dev.</b>				<b>0.4</b>	<b>0.3</b>	<b>0.4</b>

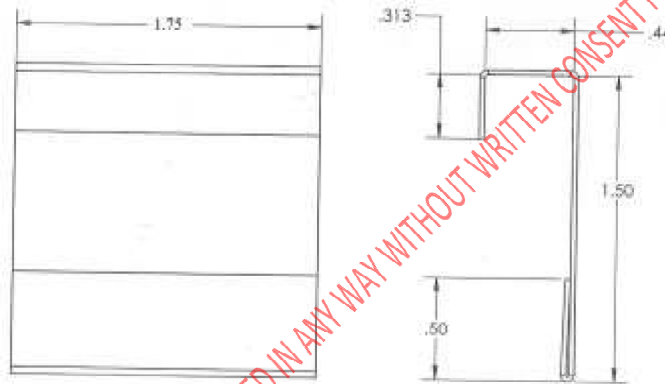
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**SMI 1.5 Mechanical Seam Standing Seam Panel Profile**



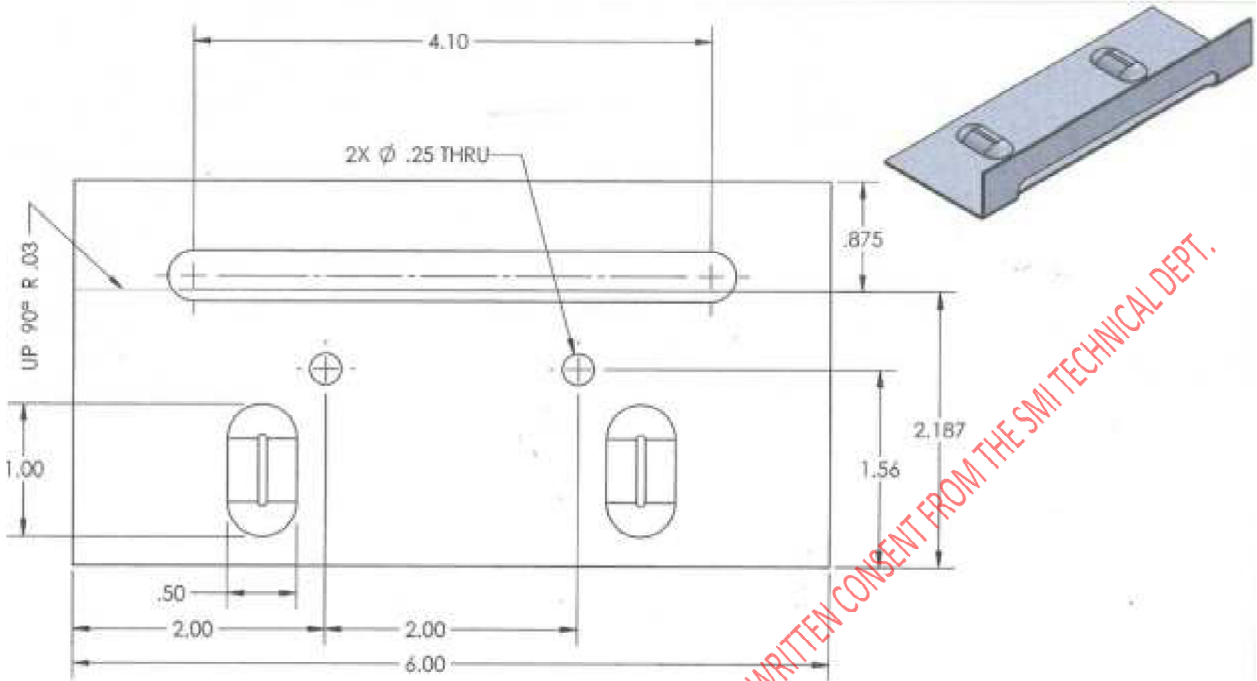
**SMI 1.5 MS Articulating Expansion Top (Top component of Clip; 24 ga. galv. steel)**

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**SMI 1.5 MS Clip Base (18 ga. galvanized steel)**

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**Specimen No. 1 Photograph – After Testing**

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**END OF REPORT**

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