



CONSTRUCTION MATERIALS

TECHNOLOGIES

LABORATORY TEST REPORT

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

Attention: Adam Mazzella

Product Names: SMI 2.0" Mechanical Seam Standing Seam	Manufacturer: Sheffield Metals International
Project No.: SHMI-002-02-01	Source: Sheffield Metals International
Date Received: Nov. 14, 2017	Date Tested: Dec. 20, 2017

Purpose: Determine the uplift resistance of SMI 2.0" 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 2.0" Mechanical Seam Standing Seam 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 2.0" MS: Min. 0.038" 3105 H22 aluminum alloy ($F_y = 17.6$ ksi) preformed, 180° mechanical standing seam panels; 16" wide installed coverage; Profile drawing is contained in Appendix B.

Clips: Two-piece galvanized steel clip; 2.5" long x 22 ga. expansion top; 6" long x 18 ga. base. Clip drawing is contained in Appendix B.

SHMI-002-02-01.2 PRI-CMT Accreditations: AAMA; CRRC; IAS; LA-DBS; Miami-Dade; State of Florida; UL
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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; tape¹

¹It 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 2.0" 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.	150	Clip Failure

Classification:

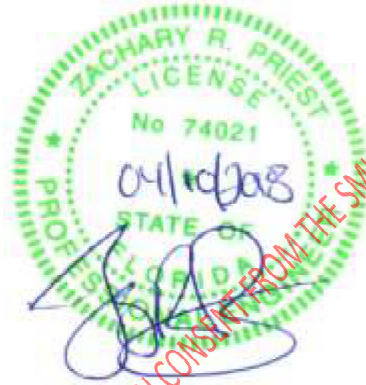
Specimen No. 1 installed as described herein meets **Class 90** requirements.

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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	02/12/2018	8	NA
Rev 1	03/06/2018	8	Updated tensile properties
Rev 2	04/10/2018	8	Updated clip information

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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	0.124	0.230	0.212	0.277	PASS	
5	13.8	16.2	0.232	0.449	0.373	0.379	PASS	
60	13.8	8.1-27.7 ¹	0.205	0.433	0.352	0.370	PASS	
5	0.0	24.2	0.152	0.255	0.656	0.319	PASS	
5	20.8	24.2	0.276	0.502	0.420	0.447	PASS	
Permanent Set			0.015	0.013	0.018	0.015	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	0.283	0.292	0.362	PASS	
5	27.7	32.3	0.327	0.550	0.468	0.508	PASS	
60	27.7	16.2-55.4 ¹	0.409	0.888	0.503	0.716	PASS	
5	0.0	40.4	0.373	0.715	0.451	0.614	PASS	
5	34.6	40.4	0.523	1.017	0.701	1.074	PASS	
Permanent Set			0.022	0.024	0.025	0.022	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	0.438	0.845	0.554	0.876	PASS	
5	41.5	48.5	0.616	1.161	0.841	1.177	PASS	
60	41.5	24.2-48.5 ¹	0.544	1.013	0.706	0.988	PASS	
5	0.0	56.5	0.521	0.887	0.609	0.916	PASS	
5	48.5	56.5	0.630	1.210	0.859	1.049	PASS	
Permanent Set			0.027	0.026	0.031	0.026	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	0.796	1.415	1.13	1.167	PASS
1	135	0.865	1.489	1.191	1.246	PASS
1	150	0.928	1.573	1.285	1.302	PASS
	165					FAIL @ 0 SEC

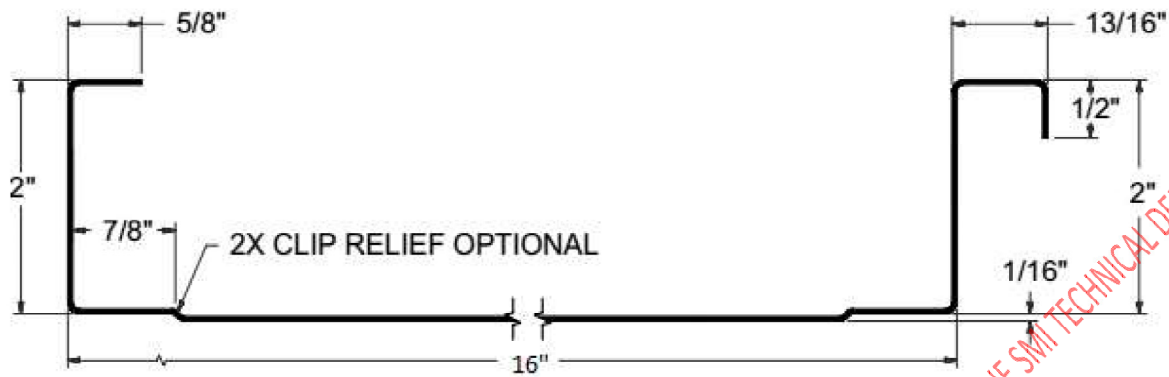
ASTM E 8 Tensile Properties for SMI 2.0" Mechanical Seam Standing Seam

Specimen	Width (in)	Thickness (in)	Gage Length (in)	Yield Strength (ksi)	Tensile Strength (ksi)	Elongation at Break (%)
1	0.476	0.040	2	18.7	24.5	13.9
2	0.476	0.041	2	19.5	24.0	14.0
3	0.475	0.041	2	19.5	23.8	13.2
5	0.475	0.043	2	17.6	19.6	13.1
Average				18.8	23.9	13.5
St.Dev.				0.9	2.8	0.4

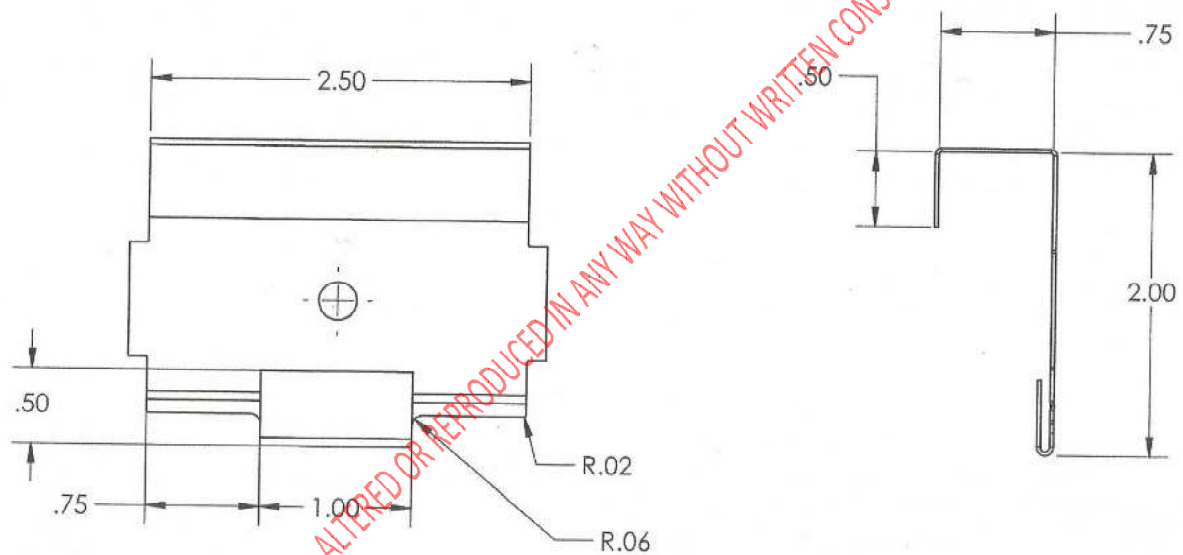
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SMI 2.0" Mechanical Seam Standing Seam Panel Profile

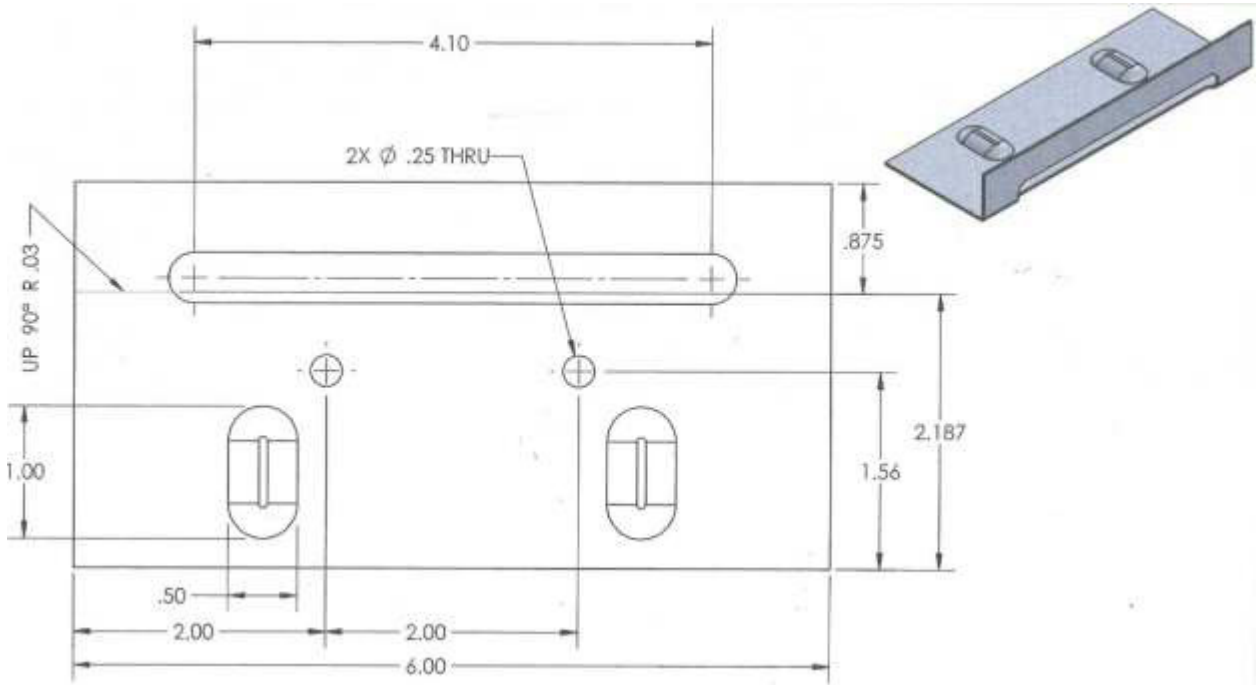


SMI 2.0" MS Articulating Expansion Top

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SMI 2.0" MS Clip Base (18 ga. galvanized steel)

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Specimen No. 1 Photograph – After Testing

END OF REPORT

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