# CONSTRUCTION MATERIALS

TECHNOLOGIES

## LABORATORY TEST REPORT

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

**Attention:** Adam Mazzella

| | | | |
|---|---|---|---|
| **Product Names:** | **SMI 1.5" SnapLock 550 Standing Seam** | **Manufacturer:** | Sheffield Metals International |
| **Project No.:** | SHMI-004-02-02 | **Source:** | Sheffield Metals International |
| **Date Received:** | Dec. 28, 2017 | **Date Tested:** | Dec. 28, 2017 and Jan. 10, 2018 |

**Purpose:** Determine the uplift resistance of the SMI 1.5" SnapLock 550 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" SL 550 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" SL 550: Min. 0.029" 3105 H24M aluminum alloy ($F_y$ = 23.1 ksi) preformed, snap-together, 1.5" standing seam panels; 15" wide installed coverage; Profile drawing is contained in Appendix B.

Clips: 1-5/8" high x 2-1/8" wide x 3.5" long, 20 ga. galvanized steel, single-piece clip; Clip drawing is contained in Appendix B.







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**Deck Descriptions:**

| | |
|---|---|
| Insulation: **(Specimen 1 only)** | 1" thick polyisocyanurate board, loose-laid over deck |
| Deck: | 22 ga. Type B steel deck attached to ASTM A36 structural steel supports (0.25" thick top flange) spaced 5-ft o.c. with #12-24 HWH, DP5 screws at each flute. Deck laps stitched 18" o.c. with 1/4" x 7/8" HWH screws |
| Specimen Sealing: | Polyethylene film placed under the metal roof panels; tape[1] |

[1]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" SnapLock 550 Standing Seam | Clips spaced 18" o.c and secured to deck with two (2) #14-13 x 3" PH, DP1 screws per clip. Perimeter secured 6" o.c. with #14-13 x 3" PH, DP1 screws. | 135 | Panels disengaged |
| 2 | SMI 1.5" SnapLock 550 Standing Seam | Clips spaced 18" o.c and secured to deck with two (2) #14-13 x 3" PH, DP1 screws per clip. Perimeter secured 6" o.c. with #14-13 x 3" PH, DP1 screws. | 135 | Panels disengaged |



**Classification:**

Specimen No. 1 and No. 2 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 | 9 | NA |
| Rev 1 | 03/06/2018 | 9 | Updated panel description |






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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.) 1 | 2 | 3 | 4 | Result |
| 5 | 0.0 | 16.2 | 0.113 | 0.367 | 0.124 | 0.278 | PASS |
| 5 | 13.8 | 16.2 | 0.550 | 0.913 | 0.009 | 0.807 | PASS |
| 60 | 13.8 | 8.1-27.7[1] | 0.556 | 0.863 | 0.477 | 0.877 | PASS |
| 5 | 0.0 | 24.2 | 0.500 | 0.789 | 0.427 | 0.701 | PASS |
| 5 | 20.8 | 24.2 | 0.664 | 1.104 | 0.609 | 0.962 | PASS |
| | | Permanent Set | 0.004 | 0.007 | 0.010 | 0.005 | PASS |
| | | | | | | | |
| **Class 60 Loading Sequence (UL 580)** | | | | | | | |
| Duration (min) | Positive Pressure (psf) | Negative Pressure (psf) | Max Deflection Under Load (in.) 1 | 2 | 3 | 4 | Result |
| 5 | 0.0 | 32.3 | 0.571 | 0.928 | 0.504 | 0.812 | PASS |
| 5 | 27.7 | 32.3 | 0.774 | 1.299 | 0.730 | 1.137 | PASS |
| 60 | 27.7 | 16.2-55.4[1] | 0.694 | 1.148 | 0.613 | 1.067 | PASS |
| 5 | 0.0 | 40.4 | 0.579 | 1.096 | 0.528 | 0.905 | PASS |
| 5 | 34.6 | 40.4 | 0.771 | 1.322 | 0.749 | 1.197 | PASS |
| | | Permanent Set | 0.011 | 0.006 | 0.020 | 0.015 | PASS |
| | | | | | | | |
| **Class 90 Loading Sequence (UL 580)** | | | | | | | |
| Duration (min) | Positive Pressure (psf) | Negative Pressure (psf) | Max Deflection Under Load (in.) 1 | 2 | 3 | 4 | Result |
| 5 | 0.0 | 48.5 | 0.579 | 1.061 | 0.566 | 0.938 | PASS |
| 5 | 41.5 | 48.5 | 0.815 | 1.389 | 0.841 | 1.360 | PASS |
| 60 | 41.5 | 24.2-48.5[1] | 0.584 | 1.128 | 0.625 | 1.047 | PASS |
| 5 | 0.0 | 56.5 | 0.582 | 1.171 | 0.508 | 1.062 | PASS |
| 5 | 48.5 | 56.5 | 0.763 | 1.388 | 0.823 | 1.467 | PASS |
| | | Permanent Set | 0.018 | 0.011 | 0.029 | 0.023 | 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 | 0.786 | 1.588 | 0.833 | 1.492 | PASS |
| 1 | 135 | 0.84 | 1.605 | 0.876 | 1.527 | PASS |
| 1 | 150 | | | | | PANEL DISENGAGED; FAIL AT 0 SEC |







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Specimen No. 2 (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 | 0.119 | 0.364 | 0.130 | 0.266 | PASS |
| 5 | 13.8 | 16.2 | 0.590 | 0.979 | 0.563 | 0.799 | PASS |
| 60 | 13.8 | 8.1-27.7[1] | 0.607 | 0.954 | 0.541 | 0.869 | PASS |
| 5 | 0.0 | 24.2 | 0.555 | 0.780 | 0.475 | 0.699 | PASS |
| 5 | 20.8 | 24.2 | 0.751 | 1.056 | 0.699 | 0.935 | PASS |
| | | Permanent Set | 0.009 | 0.008 | 0.017 | 0.009 | 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 | 0.659 | 0.922 | 0.617 | 0.878 | PASS |
| 5 | 27.7 | 32.3 | 0.851 | 1.282 | 0.784 | 1.178 | PASS |
| 60 | 27.7 | 16.2-55.4[1] | 0.739 | 1.143 | 0.673 | 1.161 | PASS |
| 5 | 0.0 | 40.4 | 0.604 | 1.080 | 0.839 | 1.086 | PASS |
| 5 | 34.6 | 40.4 | 0.876 | 1.368 | 0.825 | 1.315 | PASS |
| | | Permanent Set | 0.056 | 0.022 | 0.035 | 0.033 | 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 | 0.663 | 1.072 | 0.709 | 1.078 | PASS |
| 5 | 41.5 | 48.5 | 0.897 | 1.388 | 0.905 | 1.335 | PASS |
| 60 | 41.5 | 24.2-48.5[1] | 0.735 | 1.188 | 0.825 | 1.211 | PASS |
| 5 | 0.0 | 56.5 | 0.735 | 1.186 | 0.730 | 1.211 | PASS |
| 5 | 48.5 | 56.5 | 1.045 | 1.468 | 0.963 | 1.427 | PASS |
| | | Permanent Set | 0.067 | 0.048 | 0.039 | 0.049 | PASS |

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







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Specimen No. 2 (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 | 1.095 | 1.512 | 1.03 | 1.477 | PASS |
| 1 | 135 | 1.207 | 1.584 | 1.143 | 1.587 | PASS |
| 1 | 150 | | | | | PANEL DISENGAGED; FAIL AT 0 SEC |

ASTM E 8 Tensile Properties for SMI 1.5" SL 550

| Specimen | Width (in) | Thickness (in) | Gage Length (in) | Yield Strength (ksi) | Tensile Strength (ksi) | Elongation at Break (%) |
|---|---|---|---|---|---|---|
| 1 | 0.490 | 0.032 | 2 | 23.3 | 26.1 | 14.3 |
| 2 | 0.489 | 0.032 | 2 | 23.2 | 25.9 | 13.8 |
| 3 | 0.490 | 0.032 | 2 | 23.5 | 26.3 | 13.2 |
| 4 | 0.491 | 0.032 | 2 | 23.8 | 26.5 | 14.2 |
| 5 | 0.490 | 0.032 | 2 | 23.5 | 26.1 | 13.0 |
| **Average** | | | | **23.5** | **26.2** | **13.7** |
| **St.Dev.** | | | | **0.2** | **0.2** | **0.6** |







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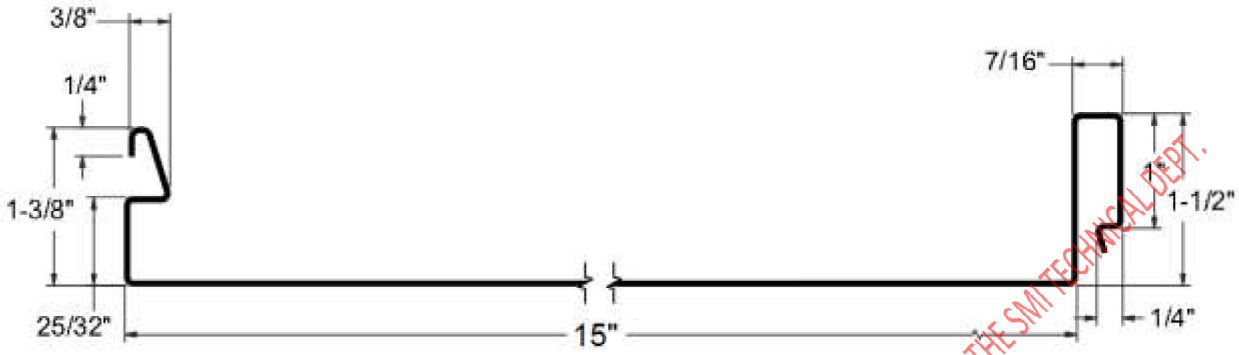
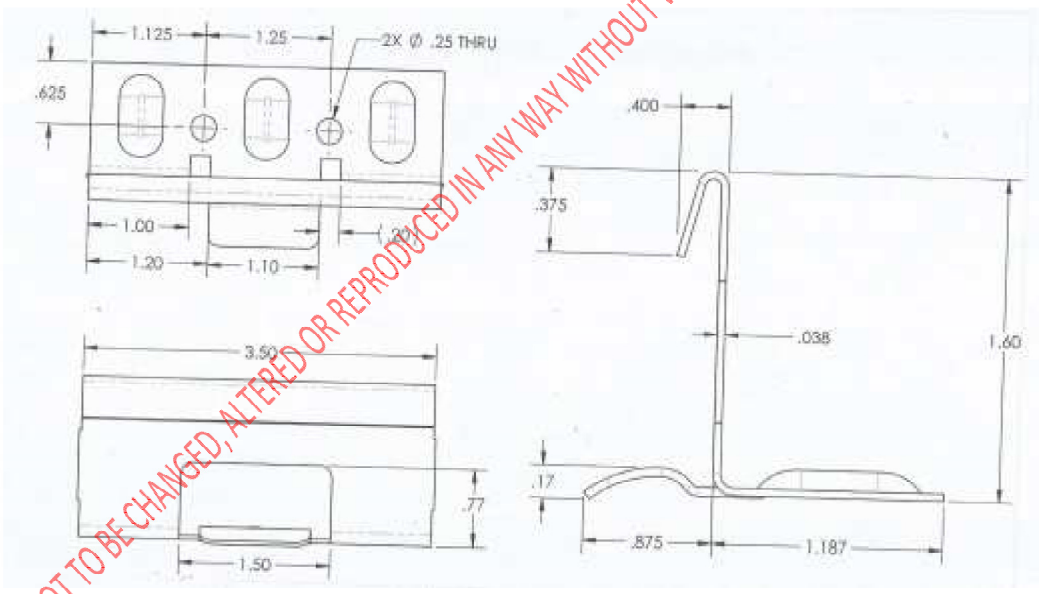



**SMI 1.5" SnapLock 550 Standing Seam Panel Profile**




**SMI 1.5" SnapLock 550 Clip**

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

**Specimen No. 2 Photograph – After Testing**



**END OF REPORT**

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