



# HURRICANE TEST LABORATORY, INC.

Windows • Doors • Store-Fronts • Curtain Walls • Shutters • EIFS • Metal Building Systems

## STRUCTURAL TEST REPORT - WALL PANEL

Test Date: 08/13/98

Job Tracking #: 0168-0808-98

Specimen #: 2

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### CUSTOMER INFORMATION

**1.0 NAME OF APPLICANT:** ThermaSteel Construction Products  
609 Rock Road  
Radford, VA 24141

**2.0 CONTACT PERSON:** Gerald B. Colliflower

**3.0 HTL NOTIFICATION #:** HTL 98072

**4.0 HTL LAB CERTIFICATION #:** 98-0127.02

### PRODUCT DESCRIPTION

#### 5.0 DESCRIPTION OF TESTED UNITS:

**5.1 Model Designation:** ThermaSteel Hurricane Panel.

**5.2 Overall Size:** 96-in. (w) x 96-in. (h) [Stud Wall Assembly]

**5.3 General Description:** Each sample consisted of two (2), 48-in. X 96-in. Wall panels - that were mechanically attached to each other along their long dimension. The panels were secured into the provided opening via two (2), 5-1/2-in. X 3/4-in. X 18 Ga. galvanized (ASTM G90) tracks - one at the top and the other at the bottom. Each individual wall panel consisted of three primary components:

- Exterior Metal Frame
- Interior Metal Frame
- Modified Expanded Polystyrene (EPS) Infill

Following is a brief description of each of the primary components used in the fabrication of each individual wall panel.

**5.3.1 Exterior Metal Frame:** The metal frame used on the exterior of each panel was fabricated from three (3), 3-1/2-in. X 3/4-in. X 24 Ga. galvanized (ASTM G90) "C" channel studs one (1), 4-1/4-in. X 3/4-in. X 24 Ga. galvanized (ASTM G90) (2), "L" angle stud and two (2), 2-3/4in x 3/4-in. X 24 Ga. galvanized (ASTM G90) "END" angles - one (1) at the top and one (1) at the bottom. Intermediate vertical studs contained in this exterior wall frame were located 16-in. on center. There were two (2) additional 3-1/2-in. X 3/4-in. X 24 Ga. galvanized (ASTM G90) filler "C" channel studs inserted between each intermediate vertical stud. These filler studs were located such that the clear distance between adjacent studs was a maximum of 1-in. Each vertical stud was secured to the top and bottom "END" angle member using one (1), #8 x 1/2-in. Pan Head, Phillips Drive, self-drilling screw, self tapping screw. It should be noted that all of the vertical members used in this exterior frame were oriented with their broader dimension parallel to the exterior surface of the wall panel.

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11/12/98

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**5.3.2 Interior Metal Frame:** The metal frame used on the interior of each panel was fabricated from three (3), 3-1/2-in. X 3/4-in. x 24 Ga. galvanized (ASTM G90) "C" channel studs, one (1), 4-1/4-in. X 3/4-in. X 24 Ga. galvanized (ASTM G90) "L" angle stud and two (2), 2-3/4-in. X 3/4-in. X 24 Ga. galvanized (ASTM G90) "END" angles - one (1) at the top and one (1) at the bottom. Intermediate vertical studs contained in this exterior wall frame were located 16-in. on center. Each vertical stud was secured to the top and bottom "END" angle member using one (1), #8 x 1/2-in. Pan Head, Phillips Drive, self-drilling, self tapping screw. It should be noted that all of the vertical members used in this interior frame were oriented with their broader dimension parallel to the exterior surface of the wall panel.

**5.3.3 Modified Expanded Polystyrene (EPS) Installation:** The void between the interior and exterior metal frames in each wall panel was filled with Modified Expandable Polystyrene produced by a variety of manufacturers such as ARCO Chemical Company. The EPS used herein had a nominal density of 1.0 pcf.

### 6.0 SPECIMEN CONSTRUCTION:

**6.1 Individual Composite Wall Panel Assembly:** The exterior and interior steel stud frames were coated with SLOCUM V-4917 cross linked heat activated adhesive and then loaded into a clam shell mold and held in place with permanent magnets. Please note that the adhesive was applied on all surfaces of the interior and exterior frame that come in contact with the EPS. Pre-Expanded Polystyrene beads are injected into the mold to fill all voids and thereby form the profile of the shiplapped panel. Live steam is then injected into the mold which causes the EPS to expand further and fill all the voids and bond to itself and the steel - thereby creating a composite structural panel. Water is then injected into the mold to cool the composite panel and air is used to eject the panel from the mold. It should be noted that the resulting structural panel has a complete thermal break between the interior and exterior steel frames.

**6.2 Adjacent Wall Panel Attachment:** Each wall panel was attached to the other via a ship lap. The panels were also mechanically fastened to each other at this ship lap joint using a single row of #8 x 1/2-in. Pan Head, Phillips Drive, self-drilling, self tapping screws located 1-in. from the top and bottom of each panel and 12-in. on center thereafter.

**6.3 Wall Panel Installation:** Each wall panel was attached to the top and bottom metal tracks using a single row of #8 x 1/2-in. Pan Head, Phillips Drive, self-drilling, self tapping screws located 1-in. from each end of each panel and 16-in. on center thereafter. This row of fasteners was utilized on the interior and exterior side of each wall panel.

## TEST RESULTS

### 7.0 TEST SEQUENCE:

- a. Air infiltration test at 1.57 psf.
- b. Air infiltration test at 6.24 psf.
- c. Uniform static load test at 50% of positive test pressure.
- d. Uniform static load test at positive design pressure.
- e. Water infiltration test at 15% psf.
- f. Uniform static load test at 100% of positive test pressure.
- g. Uniform static load test at 50% of negative test pressure.
- h. Uniform static load test at negative design pressure.
- i. Uniform static load test at 100% of negative test pressure.

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## 8.0 AIR INFILTRATION TEST RESULTS

### 8.1 TEST DATA:

Test Pressure (psf)	q (ft <sup>3</sup> /min)	q <sub>A</sub> (ft <sup>3</sup> /min)
1.57	5.53	0.09
6.24	9.40	0.15

q = Measured Air Leakage

q = Air Leakage Per unit length of Specimen

**8.2 REMARKS:** The air infiltration measured through this specimen fell within the allowable limits for this type of product. As such, this sample was found to satisfy the requirements of Metro-Dade County Protocol PA 202.

## 9.0 WATER LEAKAGE TEST RESULTS:

### 9.1 TEST CONDITIONS:

Test Pressure (0.15P<sub>d</sub>) = 9.00 psf  
Test Duration = 15.00 min.  
Spray Rate = 5.0 gal/(ft<sup>2</sup>\*hr)

**9.2 REMARKS:** At the conclusion of the test duration, there was no moisture detected inside the specimen. This specimen was found to satisfy the requirements of Metro-Dade County Protocol PA 202.

## 10.0 UNIFORM STATIC LOAD TEST RESULTS:

### 10.1 Test Load (P<sub>t</sub>) COMPUTATION:

Manufacturer Specified Design Pressures:

Inward Acting Design Pressure (P<sub>d</sub>)<sub>in</sub> = 60.00 psf  
Outward Acting Design Pressure (P<sub>d</sub>)<sub>out</sub> = 60.00 psf

Conversion to Equivalent Test Load:

Inward Acting Test Load (P<sub>t</sub>)<sub>in</sub> = (P<sub>d</sub>)<sub>in</sub> = 90.00 psf  
Outward Acting Test Load (P<sub>t</sub>)<sub>out</sub> = (P<sub>d</sub>)<sub>out</sub> = 90.00 psf

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