

MID AMERICA TESTING LABORATORY, INC.

10525 SIGNAL HILL DRIVE • CATAWISSA, MISSOURI 63015
(636) 257-4722 • FAX (636) 257-5425

DATE OF REPORT: November 14, 2016
LOCATION OF TEST: St. Louis, Missouri
DATES OF TESTING: October 28, 2016 & November 8, 2016
PROJECT NAME: Webster ISB Mock-Up
PROJECT NUMBER: 16052F
CLIENT: Webster University

The following were present for all or portions of the set up and testing.

Mr. Craig A. Miller Sr.	Webster University
Mr. Jim Ward	Webster University
Ms. Kathy Williams	KWA
Mr. Scott Klingsick	KWA
Mr. Jeff Fisher	Paric Corporation
Mr. Jason Szachnieski	Paric Corporation
Mr. Steve Ray	Paric Corporation
Mr. Devin Gates	Paric Corporation
Mr. Kelvin Patel	Cannon Design
Mr. George Crow	Heitmann & Associates
Mr. Ryan Fennwald	Heitmann & Associates
Mr. James Marks	Heitmann & Associates
Mr. Travis Swisshelm	Mid America Testing Laboratory
Mr. Steve Corio	Mid America Testing Laboratory
Mr. Tyler Pierce	Mid America Testing Laboratory
Mr. Rick Heitmann	Mid America Testing Laboratory

INTRODUCTION

As requested, Mid America Testing Laboratory visited the above referenced project to perform ASTM E 783 static air infiltration, ASTM E 1105 static water infiltration the free-standing mock-up. The mock-up comprised of three (3) punched window openings, rain screen panels and masonry. The overall mock-up measured a nominal 26'-6" wide, including the 9'-4" 90 degree return wall X a nominal 9'-1" tall.

The configuration and mock-up details can be found in the Universe mock-up drawings sheets E1, S1, and D1-D4 and the NGG drawings M01, M05, M06, M10-M23.

Chambers were built on the interior side of the mock-up for the pressurization tests. The chambers were constructed of wood framing, and then covered in clear vinyl. The vinyl was stapled and sealed to the framing with foam tape and duct tape sealing to the perimeter of the entire perimeter of the mock-up.

A combination of blowers and flow meters were used to maintain the static pressure and read the air flow required by the specification. The pressure was monitored with a 0-4" magnehelic manometer tapped into the chamber.

Water coverage was accomplished on the exterior with a calibrated portable PVC spray rack with spray nozzles manufactured by Spraying Systems, Inc. The nozzles were spaced on a uniform grid located at 15" from the test specimen creating five (5) gallons per hour per square foot.

PRELIMINARY TESTING

Prior to the installation of the panels and masonry, the primary air and water barriers were subjected to testing. The results of that testing can be found in the October 17, 2016 test report issued by the testing laboratory.

The initial round of testing could not be completed due to issues with excess and extraneous air infiltration. This was primarily at the parapet detail of the bump out panel section as the transition of marrying the primary air barrier behind the panel and under the parapet cap back to the interior board was not completed.

The window openings were subjected to testing as plastic could be removed from those opening with leaving plastic covering the panels and masonry allowing the laboratory to obtain pressure.

These tests were considered preliminary and would be repeated when the entire assembly could be subjected to testing.

Both windows on elevation 1 which included the window with the sloped roof line as well as the window in the panel punch out section passed the air infiltration test. The window in the bump out did have water infiltration noted at the sill perimeter and at the top opposite corner.

The leaks were believed to be from lack of sealant at the shear block and frame to aluminum closure seal.

The window in the return masonry opening could not be subjected to air infiltration due to the extraneous air flow. It was subjected to static water infiltration which yielded no leakage.

REMEDIAL ACTIONS

Paric agreed to bring back in the appropriate parties to remove, modify and complete the parapet at the bump out panel section and as closely as possible duplicate the details. Portions of the back side of the parapet would be cut off to allow access to the transition details of the adjoining section.

NGG was going to reseal the shear blocks and flashing from the exterior. Further they agreed to cut ½" weep slots in the bottom of the vertical pressure plate seals. These were previously sealed which would allow any water getting behind the pressure plate to be trapped.

It was noted by the Architect and Consultant that both the primary and secondary seals at the exterior had been installed on the mock-up windows. However, weeps had not been installed in the secondary seal which would allow water to be trapped between the two (2) lines of sealant. Since weeps were going to be installed for the project, NGG agreed to put weep tubes in the secondary line of sealant to duplicate the project installation. These were installed prior to the final round of testing.

TESTING

All testing was conducted in substantial accordance with procedures provided by the project specifications, and client. The test procedures, pressures and allowables were discussed with the participants prior to starting the testing. Industry standards were followed utilizing the specified ASTM and AAMA standards as outlined below.

Testing was started at 10:15 a.m. with overcast skies and light rain fall. The temperature was 54 degrees Fahrenheit at the start of the testing.

The exterior of the mock-up was covered in visqueen the previous day to allow for air infiltration testing without the wall being wet.

Due to the size and configuration of the mock-up as well as limitations with water pressure, three (3) separate water tests were required to fully test the entire mock-up façade.

1. **STATIC AIR INFILTRATION** (ASTM E783) at 6.24 PSF (50 MPH wind and 1.2" H₂O). Air infiltration shall not exceed .09 CFM per square foot for fixed wall area.

ALLOWED: .09 CFM per square foot or 25.3 CFM gross leakage for the fixed wall system.

RESULTS: .08 CFM per square foot or 22.5 CFM gross leakage for the fixed window.

The above results constitute an acceptable performance.

NOTE: The air infiltration reading above references the entire mock-up. The windows were separated from the panels and masonry during the testing. All three (3) window openings were within their individual allowables. The panel section was 1.9 CFM over based on its square footage, but that was believed to be caused by the non-job transitions between the sections at the roof parapet.

2. **STATIC WATER INFILTRATION** (ASTM E1105) at 10.0 PSF (63.3 MPH wind and 1.92" H₂O) with a water spray rate of five (5) gallons per hour per square foot for fifteen (15) minutes.

ALLOWED: No uncontrolled water infiltration to the room side.

RESULTS: **Section 1**, incorporating elevation 1 with the sloped parapet, panels, window and masonry transition showed signs of water infiltration below the sill of the window. Water was noted at ten (10) minutes into the test and continued to grow throughout the remainder of the testing. No other infiltration was noted

The above result constitutes an unacceptable performance.

Section 2, also elevation 1 but incorporating the bump out panel section with a single window

opening. No water infiltration was noted during the testing.

The above result constitutes an acceptable performance.

Section 3, was on elevation 2 incorporating the masonry and a single window opening. No water infiltration was noted during the testing.

The above result constitutes an acceptable performance.

SUMMARY

As can be determined by this report, after remediation of the parapet and modifications to the windows the specimen as installed met the performance requirements of the specifications for static air infiltration. There was an issue noted during the water infiltration testing. Further, during the removal of the chamber, approximately one (1) hour after completion of testing of section 2 above, a small amount of water was noted below the sill of the window.

Participants referenced in the test report are welcome to a copy of this test report if so desired by the laboratory's client.

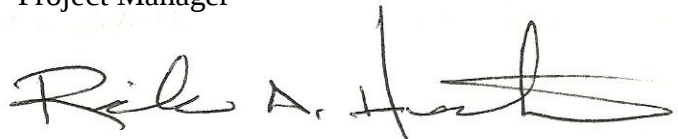
Should you have any questions regarding the information contained in this document, please feel free to contact the laboratory.

Respectfully Submitted,

MID AMERICA TESTING LABORATORY



Tyler Pierce
Project Manager



Rick A. Heitmann
President