QAI LABORATORIES
CERTIFICATION TESTING INSPECTION

8385 White Oak Avenue
Rancho Cucamonga, CA 91730
909.483.0250 ph. | 909.483.0336 fx.

**CLIENT:** Craig Oberg
**Sealed N' Safe**
320 West 100 North
Ephraim, Utah 84627

| **Test Report No: RJ0477-B-1** | **Date: March 2, 2010** |
|---|---|

**SAMPLE ID:** The test samples, identified by client as the *"Sealed N' Safe" (R) Thermal Block System*, is a two component product consisting of *the "Sealed N' Safe" (R) Thermal Blocks* and *"Sealed N' Safe" (R) Fastener* for use in metal roof insulation assemblies with light-gage steel supports, fiberglass insulation and corrugated metal roof panels.

**TEST OBJECTIVE:** Since there are currently no published or recognized test standards for testing the subject thermal block system, recognized test methods for similar end use of the product were utilized and adapted to determine the system resistance to water infiltration as component parts to a conventional metal roof insulation assembly. The main objective of this testing is to evaluate the proprietary fastener's resistance to water infiltration at their placement locations using the test method referenced below.

**SAMPLING DETAIL:** Components of the test specimen assemblies were delivered by client and three test assemblies were constructed under QAI witness at QAI's facility in California on January 28, 2010.

**TESTING PERIOD:** February 24 through 25, 2010.

**AUTHORIZATION:** Signed Work Order by Craig Oberg on QAI job ticket, dated December 2, 2009.

**TEST PROCEDURE:** Testing was conducted using the general guidelines of ASTM E331 (Modified), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*, with modifications to the procedure to include higher static differential test pressure and longer test duration as noted in the subsequent pages of this report.

**FINDINGS:** Based on the results of the testing, all assemblies as described and tested endured the two-hour water resistance test without any leakage at the underside of the roof panels.

Details of the test results are presented in the subsequent pages of the report.

**Prepared By**

**Andrew Tan, P.E.**
Manager - Construction Materials

CHRISTOPHER W.C. BOWNESS ★ LICENSE ★ No 64748 ★ 3-4-10 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

**Signed for and on behalf of QAI Laboratories, Inc.**

**Chris Bowness, P.E.**
General Manager

## REPORT OF TEST

### Sample Description

The thermal block system consisted a 1-inch thick, 5-inch wide by 6-ft long (manufactured length) blocks made of polyurethane foam injected between two 24-gage steel facings, and a proprietary fastener, #12 by 2-inch long hex-head self-drilling screw with an integrated rubber and steel washer used to attach metal roof panels through the blocks and into the light gage steel purlin members.

### Test Assembly Details

Three test assemblies, approximately 4 feet by 8 feet, were constructed using the thermal block system described above and metal roofing components consisting of corrugated metal roof panels, 4-inch thick fiberglass insulation blanket, 16-gage steel "Zee" purlins (flange width of 3 inches, section height of 8 inches), and #12 by $1^{5}/_{8}$-inch long pancake head self drilling screws to fastened each end of the thermal block to the purlins prior to roof panel installation. The roof panels were 26-gage and measured 36 inches wide with four 1¼-inch ribs spaced at 12 inches on center.

Each test assembly consisted of two 4-ft long purlins spaced at 32 inches on center. Thermal blocks were set directly on top and fastened to each purlin using two #12 pancake head screws, one screw at each end of the block. Test Assemblies A and B consisted of one continuous 4-ft length thermal block over each purlin whereas Test Assembly C consisted of two 24-inch thermal block sections over each purlin (thus, a total of four pancake head screws were used to fastened the two blocks over each purlin). The 4-inch thick insulation blanket, cut to approximately 12 inches wide by 4 feet long, were placed on top of each thermal block prior to roof panel installation. Each test assembly consisted of one full width and a 12-inch wide roof panels (i.e., thus one seam running along the 8-ft length), and the panels are fastened (also at the seam) through the insulation and thermal blocks and into the support purlins with the proprietary #12 hex head screws spaced at approximately 12 inches on center along the purlins.

### Test Set-up and Procedure

After construction of each test assembly, each was enclosed to create a 4 feet by 8 feet test chamber. All top and bottom edges of the chamber were sealed for air tightness, only exposing the top of the roof panels. In addition to the opening space under the roof panel ribs between each purlin, two holes of approximately 1 inch in diameter were drilled through the web of each purlin to ensure equalization throughout the test chamber. The holes in web of the purlin in no way affected the test result since this is not a structural test.

Each test assembly was positioned horizontally with a 1:12 slope, which is the minimum slope that is reflective field installation. A spray rack, calibrated to the required water output in accordance with ASTM E331 prior to testing, was positioned over test assembly at the required distance per the standard. Refer to Figure 1 below for the test set-up.

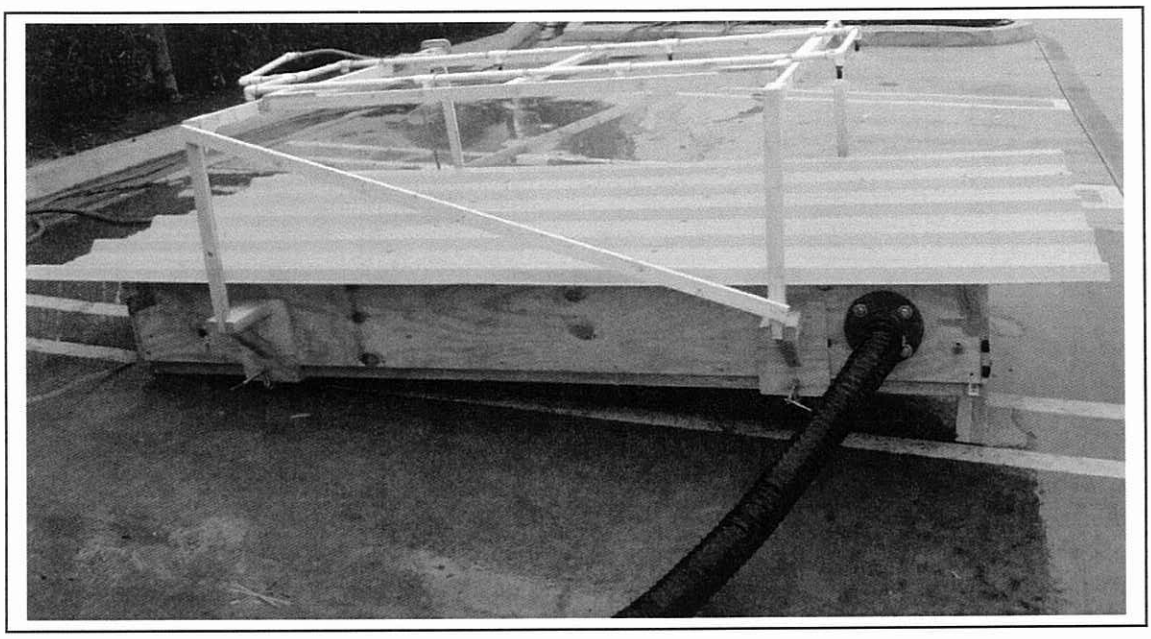

**Figure 1**

Testing was conducted using the general guidelines of ASTM E331, with modifications to the static test pressure differential and test duration which were 6.24 psf and 2 hours, respectively. This test pressure and duration are referenced in Chapter 14 of the 2006 International Building Code for exterior wall envelope, which is the more stringent requirement than E331 or other published standards for similar product end use.

## Test Results

Each test assembly was then inspected by disassembly of the roof panels to determine any water leakage underneath the panels and inside the test chamber immediately after completion of the 2-hour test period. Results indicated that there was no water intrusion or leakage for any of the three test assemblies.

*****End of Report*****