JOHNS MANVILLE TECHNICAL CENTER
Fire Testing Laboratory
March 24, 2011

Subject;
ASTM E84 Surface Burning Characteristics

For;

Bob Freedman
Flatiron Panel Products
1216 Commerce Ct. Unit #4
Lafayette, CO 80026

Submitted by:
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NVLAP LAB CODE 100425-0

REPORT NUMBER: F-11-026
DATE: March 24, 2011

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Introduction

Aluminum Honeycomb panels were submitted by B. Freedman, and were tested for flame spread and smoke development in accordance with ASTM test method E84 - 10a “Standard Test Method for Surface Burning Characteristics of Building Materials.” The testing of the samples was performed by D. Sandoval and W. Sanborn on March 22, 2011 at the Johns Manville Technical Center located at 10100 West Ute Avenue, Littleton, Colorado.

Sample Description

Aluminum Honeycomb Panel Details
Panel Sample - .500” x 22” x 25’ Aluminum Honeycomb Panel
   1. Face Sheets -.040” 5052-H32 Aluminum
   2. Core – 3/8” Cell, .420” height 3003 Aluminum Commercial Grade Honeycomb Core, .003” Foil.
   3. Adhesive – 2 Part Epoxy, Room Temperature Cure

Test Method


ASTM E84 Section 7.0 Calibration - Select red grade oak sample was tested on February 3, 2011 and documented in Fire Test Report # F-11-011CAL.
Section 7.1 Fiber Cement Board (1/4” thick) was placed in position on the underside of the lid.
Section 7.2 Tunnel draft: 0.15 inches of H2O
Section 7.3 Main draft: 0.055 and 0.100 inches of H2O
   Air Velocity: 240 ± 5 ft/minute
Section 7.4 Conditions of the test room are maintained at 73.4 ± 5 degrees F and 50% rH

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Section 7.8  Time for flame to reach the end of the red oak specimen 19.2 ft. may not exceed .5 min ± 15 seconds. The results of the testing were a flame spread index of 91.4 and a smoke developed index of 106.5. This occurred at 5.3 minutes for this calibration which is within the 5 minute and 30 second requirement ± 15 seconds. These values were calculated in accordance with the test method by calculating the area under the curves for both flame spread and photocell measurement systems. Another criteria used for determining when the flame has reached the end point is when the thermocouple at 23 feet reaches 980° F. This occurred at 5.2 minutes during this calibration which is outside the specification.

*Exception to the method – Section 5.1.8.3 The exhaust system is to be insulated with at least 2 inches of high temperature mineral composite material from the exhaust end of the fire chamber to the photometer location. Due to recent checks of the duct system, 2 sections of the exhaust are not insulated at this time.

Test Procedure

Test Specimen Mounting:
The underside of the lid was covered with 1/4 inch cement board held in place with binder clips. Five (5) self supporting samples measuring 23.5” x 60” butted together at the ends and mounted below the lid of the tunnel.

Specimen Testing - Using the same settings used for the red oak calibration standard, the preheat sequence was completed, the samples loaded into the tunnel and the test was run monitoring the distance that the flame front travels across the specimen.

Results

The results of these tests are given below. The test method requires that flame spread must be reported by rounding to the nearest multiple of 5. The method also requires that smoke development also be reported rounding to the nearest multiple of 5 unless the smoke development index is 200 or more, which would round smoke development to the nearest 50 points. Data from the test is shown in the results table included in this report.

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**Results Summary: Aluminum Honeycomb Panel**

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Test Side</th>
<th>Test Support Materials</th>
<th>Construction Materials</th>
<th>Flame Spread Index</th>
<th>Smoke Developed Index</th>
<th>Rounded Values Flame/Smoke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Burn Test 1</td>
<td>Aluminum</td>
<td>Self supporting</td>
<td>Aluminum Honeycomb Panels</td>
<td>11.2</td>
<td>12.5</td>
<td>10/15</td>
</tr>
</tbody>
</table>

**Rating: (For Reference Only)**


The classifications are as follows:
Class A Interior Wall & Ceiling Finish:
- Flame Spread: 0-25
- Smoke Developed: 0-450

Class B Interior Wall & Ceiling Finish:
- Flame Spread: 26-75
- Smoke Developed: 0-450

Class C Interior Wall & Ceiling Finish:
- Flame Spread: 76-200
- Smoke Developed: 0-450

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**Results Table 1:**

<table>
<thead>
<tr>
<th>ASTM E84 Tunnel Test</th>
<th>Surface Burning Characteristics in a 25 Foot Tunnel Furnace</th>
</tr>
</thead>
</table>

| Johns Manville Technical Center | Test Number: 4M28073 |
| Fire Test Laboratory | Test Duration: 10.00 minutes |
| 10100 W. I-70 Ave. | Tested: 3/22/2011 |
| Littleton, CO 80127 | 2:11 PM |

- **Material Description:**
  - Aluminum Honeycomb Panel

- **Mounting Method:**
  - Self-supporting

- **Test Operation:**
  - Volume of Gas Used: 660 cu ft
  - Gas Burning Rate: 5.9 cfm
  - Max Surface Flame Spread: 2.2 ft
  - Flame Spread Index: 11.2
  - Smoke Density Index: 12.5

- **Flame Spread vs. Time**

- **Light Absorption vs. Time**

- **Tunnel Temperature vs. Time**

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