We Identify and S.T.O.P. Your Noise Problem

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Author: Briana Hinrichs
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Client Purchase Order Number: Check

Effective Thermal Resistance Testing of Coat of Silence

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INTRODUCTION

This report presents the results of Effective Thermal Resistance Tests conducted on a sample of coating material. The testing was authorized by Mr. John Finn on March 28, 2012. The testing and data analysis were completed on April 2, 2012.

The scope of our work was limited to conducting effective thermal resistance tests on the samples submitted and reporting the results.

OBJECTIVE

This testing measures the steady state thermal transmission through a specimen using a heat flow meter apparatus according to ASTM C518-10 "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus." This method is a comparative method using a standard reference material traceable to NIST to calibrate the heat flow meter apparatus and comparing results to that standard.

CONCLUSIONS

<table>
<thead>
<tr>
<th>Sample Identification</th>
<th>Effective &quot;R&quot; Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F-r²/h-Blu</td>
</tr>
<tr>
<td>Coat of Silence</td>
<td>0.41</td>
</tr>
</tbody>
</table>

SAMPLE IDENTIFICATION

The sample was identified as a coated piece of drywall material measuring 12" x 12" x 3/4" in also. The coating was identified as "Coat of Silence" by the customer.

TEST METHOD

The specimens were allowed to condition at standard laboratory conditions of 72 ± 4°F and 50 ± 5% relative humidity for at least 40 hours prior to testing. The thermal resistance testing was conducted using ASTM Standard C518-10, "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus" as a procedural guide. The specimens were placed in the heat flow meter in a horizontal position, and steady-state heat flux measurements were made at a mean temperature of approximately 75°F using a hot (top plate) face temperature of approximately 100°F and a cold face (bottom plate) temperature of approximately 50°F. The heat flux is in the downward direction (hot plate to cold plate). Specimen thermal resistance and thermal conductivity were determined by comparing the heat flux measurements of the specimen to measurements made on a known Standard Reference Material. Resistance values obtained from the Heat Flow Meter are best utilized for homogenous specimens.
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<table>
<thead>
<tr>
<th>Test Method</th>
<th>Test Method Title</th>
<th>Deviations from and/or Parameters to Method</th>
</tr>
</thead>
</table>
| ASTM C518-10, Used as a procedural guide as specimens were not homogenous. | Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus. | 1-Since the specimen was not homogenous the values stated are for Effective Resistivity for the specimen tested and may vary slightly for other specimens based upon the actual composition of each specimen.  
2-Density was measured by only applies to specific test specimen due to non-homogeneous and slightly irregular shape.  
3-The test sample was tested along with a Standard Reference Material (SRM). Resistance values are additive, therefore the Thermal Resistance may be calculated from the combination test. |

CALIBRATED TEST EQUIPMENT

- Honeywell Temp/RH Chart Recorder, S/N 7852 243000007, ID MM190-024, calibrated 8/11/11, due 8/11/12  
- Kanon 18” Calipers (Vernier), S/N 40190, ID MM160-004, calibrated 4/20/11, due 4/20/12  
- Mettler BB2400 Balance, S/N M18988, ID PT163-019, calibrated 7/12/11, due 7/12/12

STANDARD REFERENCE MATERIAL

- NIST SRM 1450c, high density fiberglass  
- SRM 1453

UNCALIBRATED TEST EQUIPMENT

- Nestab Chiller, Model RTE-100, S/N 99CML91040-7

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**TEST RESULTS**

<table>
<thead>
<tr>
<th>SAMPLE PROPERTIES:</th>
<th>Units</th>
<th>Coat of Silence SRM 1453 I</th>
<th>Coat of Silence SRM 1453 I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>cm</td>
<td>3.273</td>
<td>1.363</td>
</tr>
<tr>
<td></td>
<td>inches</td>
<td>1.289</td>
<td>0.537</td>
</tr>
<tr>
<td>Density</td>
<td>kg/m³</td>
<td>755.86</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>pcf</td>
<td>47.19</td>
<td>n/a</td>
</tr>
<tr>
<td>Mass Change During Conditioning</td>
<td>Initial, g</td>
<td>1379.32</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Prior to test, g</td>
<td>1380.57</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>% of cond. mass</td>
<td>0.69</td>
<td>n/a</td>
</tr>
<tr>
<td>Mass Change During Testing</td>
<td>% of cond. Mass</td>
<td>-0.08</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**TEST CONDITIONS:**

<table>
<thead>
<tr>
<th></th>
<th>Units</th>
<th>Coat of Silence SRM 1453 I</th>
<th>Coat of Silence SRM 1453 I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Gradient</td>
<td>K/m</td>
<td>850.07</td>
<td>2027.44</td>
</tr>
<tr>
<td></td>
<td>°F/in</td>
<td>38.87</td>
<td>92.69</td>
</tr>
<tr>
<td></td>
<td>°F</td>
<td>24.02</td>
<td>24.17</td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td>75.24</td>
<td>75.51</td>
</tr>
<tr>
<td></td>
<td>°F</td>
<td>27.82</td>
<td>27.63</td>
</tr>
<tr>
<td></td>
<td>°F</td>
<td>50.08</td>
<td>49.73</td>
</tr>
<tr>
<td></td>
<td>hr:min:sec</td>
<td>1:27:21</td>
<td>0:16:47</td>
</tr>
</tbody>
</table>

**RESULTS:**

<table>
<thead>
<tr>
<th></th>
<th>Units</th>
<th>Coat of Silence SRM 1453 I</th>
<th>Coat of Silence SRM 1453 I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Flux</td>
<td>W/m²</td>
<td>611</td>
<td>718</td>
</tr>
<tr>
<td></td>
<td>Btu/(h·ft²)</td>
<td>27</td>
<td>32</td>
</tr>
<tr>
<td>Thermal Conductivity</td>
<td>W/m·K</td>
<td>0.067</td>
<td>0.033</td>
</tr>
<tr>
<td></td>
<td>Btu·hr/(ft²·°F)</td>
<td>0.466</td>
<td>0.228</td>
</tr>
<tr>
<td>Thermal Conductance</td>
<td>W/m·K²</td>
<td>2.056</td>
<td>2.415</td>
</tr>
<tr>
<td></td>
<td>Btu·hr/(ft²·°F)</td>
<td>0.362</td>
<td>0.425</td>
</tr>
<tr>
<td>Thermal Resistivity</td>
<td>m·K/W</td>
<td>14.9</td>
<td>30.4</td>
</tr>
<tr>
<td>Thermal Resistance, &quot;R&quot; Value</td>
<td>m²·K/W</td>
<td>0.49</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td>°F·ft²·h/Btu</td>
<td>2.14</td>
<td>4.38</td>
</tr>
</tbody>
</table>

Estimated uncertainty is ±5% or less.

Respectfully submitted,

Briana Hinrichs
Testing Technician
Product Evaluation Department

Reviewed By,

William Stegeman
Advanced Materials Manager
Product Evaluation Department
P 651 659 7230

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