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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

Sample Identification	Effective "R" Value	
	°F·ft²·h/Btu	m²·K/W
Coat of Silence	**0.41**	0.07

SAMPLE IDENTIFICATION

The sample was identified as a coated piece of drywall material measuring 12" x 12" x ¾" in size. 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 directions (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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TEST METHOD Continued

Test Method	Test Method Title	Deviations from and/or Parameters to Method
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
Netzsch Heat Flow Meter - HFM 436/3/1ER, S/N 606000788, ID PT163-003, calibrated 11/11/11, due 11/11/12
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 I

UNCALIBRATED TEST EQUIPMENT

Neslab Chiller, Model RTE-100, S/N 89CML91040-7

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TEST RESULTS

SAMPLE PROPERTIES:	Units	Coat of Silence + SRM 1453 I	SRM 1453 I	Coat of Silence
Thickness	cm	3.273	1.363	1.910
	inches	1.289	0.537	0.752
Density	kg/m^3	755.86	n/a	755.86
	pcf	47.19	n/a	47.19
Mass Change During Conditioning	Initial, g	1379.32	n/a	1379.32
	Prior to test, g	1380.57	n/a	1380.57
	% of cond. mass	0.09	n/a	0.09
Mass Change During Testing	Prior to test, g	1380.57	n/a	1380.57
	After test, g	1379.51	n/a	1379.51
	% of cond. Mass	-0.08	n/a	-0.08
TEST CONDITIONS:				
Temperature Gradient	K/m	850.07	2027.44	850.07
	°F/in	38.87	92.69	38.87
Mean Temperature	°C	24.02	24.17	24.02
	°F	75.24	75.51	75.24
Temperature Range	°C	27.82	27.63	27.82
	°F	50.08	49.73	50.08
Test Time	hr:min:sec	1:27:21	0:10:47	1:27:21
RESULTS:				
Heat Flux	W/m^2	611	718	4106
	$Btu/(h \cdot ft^2)$	27	32	183
Thermal Conductivity	W/m·K	0.067	0.033	0.264
	$Btu \cdot in/(h \cdot ft^2 \cdot °F)$	0.466	0.228	1.830
Thermal Conductance	$W/m^2 \cdot K$	2.056	2.415	13.818
	$Btu/(h \cdot ft^2 \cdot °F)$	0.362	0.425	2.433
Thermal Resistivity	m·K/W	14.9	30.4	3.8
	$°F \cdot ft^2 \cdot h/Btu/in$	2.14	4.38	0.55
Thermal Resistance, "R" Value	**$m^2 \cdot K/W$**	0.49	0.41	**0.07**
	$°F \cdot ft^2 \cdot h/Btu$	2.76	2.35	**0.41**

Estimated uncertainty is ±5% or less.

Respectfully submitted,

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Reviewed By,

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