FOAM CONTROL EPS

EPS No. 1018

Subject: **Long Term Performance of EPS - 30 Year Old Field Samples**

Date: **February 2009 (Revised February 2015)**

The R-value of insulation over a service life of 50 years is a critical factor to consider when specifying an insulation product today. Insulation should be selected and designed based upon its warranted R-value at an age of at least 50 years old to ensure that energy savings calculations can be relied upon for the life of the structure.

Foam-Control EPS is manufactured by a process in which the R-value for the insulation is stable for the life of the product. Foam-Control EPS is warranted to maintain its R-value for 50 years.

Some foam plastic insulation board manufacturers provide an estimate of thermal resistance due to the fact that their products outgas blowing agents and as a result lose R-value over time. The test procedure used by these manufacturers for estimating R-value is often called LTTR or long term thermal resistance. LTTR provides an estimate of R-value after 5 years and not the future R-value. Therefore, **it is essential to specify the actual R-value of an insulation after 50 years of service life**. Also, you must specify that the insulation manufacturer provide a copy of their warranty to ensure they warrant of the R-value of their insulation for 50 years.

In the fall of 2008, a church school in Fond du Lac, Wisconsin was re-roofed to replace an aging 30 year old roof membrane. EPS was used for insulation at the time of the original installation. Random samples of the 30 year old EPS were selected and sent to a third party independent test laboratory to determine the R-value of the EPS that was removed from the building.

EPS Properties				
	Density lb/ft³	R-Value @ 75 °F °F.ft².h/Btu	Compressive Strength @ 10% strain, psi	Flexural Strength, psi
30 Year Old FOAM CONTROL 100 Samples	0.91	4.0	11.2	32.5
ASTM C578 Type I min. Requirement	0.90	3.6	10.0	25.0

Independent testing has confirmed that Foam-Control 100, even after working on a roof for 30 years, still maintains its original claimed R-value. The R-value of the 30 year old Foam-Control 100 exceeds the minimum R-value requirement of ASTM C578. Other foam board insulations which lose blowing agents over time would not be able to meet their LTTR R-value after 30 years.

In addition to R-value, the 30 year old Foam-Control 100 samples were tested to determine their compressive and flexural strength. Again, the 30 year old Foam-Control 100 samples exceeded the minimum physical properties stated in the ASTM C578 standard.

A copy of the Thermal Resistance Testing of the Foam-Control 100 (Type I EPS) Insulation from Stork Testing is attached to this bulletin.

AFM CORPORATION FOAM CONTROL

Foam-Control EPS products are manufactured by AFM Corporation licensees.

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THERMAL RESISTANCE TESTING OF TYPE I EPS INSULATION

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The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

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THERMAL RESISTANCE TESTING OF TYPE I EPS INSULATION

INTRODUCTION:

This report presents the results of Thermal Resistance Tests conducted on samples of Type I EPS Insulation. The testing was authorized by Dr. Todd Bergstrom of AFM Corporation on October 1, 2008. The testing and data analysis were completed on October 6, 2008.

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

SUMMARY OF RESULTS:

Thermal Resistance

Sample	R Value
# 1	3.96
# 2	3.94

SAMPLE IDENTIFICATION:

The samples were identified as Type I EPS supplied by M.W. Tighe Roofing of Fond du Lac, Wisconsin. The samples were reported to be removed from Sacred Heart Catholic School of Fond du Lac, Wisconsin on September 17, 2008. The material was reported to be installed originally during 1978.

TEST METHOD:

The specimen was 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 C518-04, "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus" as a procedural guide. The specimen was placed in a Netzsch Heat Flow Meter; model HFM 436/3/1 ER. Steady-state heat flux measurements were made at a mean temperature of approximately 75°F using a hot face temperature of approximately 100°F and a cold face temperature of approximately 50°F. 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.

Test Method	Test Method Title	Deviations from Method
ASTM C518-04	Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus	None

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CALIBRATED TEST EQUIPMENT:

Netzsch Heat Flow Meter, model HFM 436/3/1 ER, S# 284A-1107-606000788, calibrated 12/07
Mitutoyo Calipers, model 505-645-50, ID MM160-008, calibrated 9/08
Mitutoyo Digimatic Indicator, MM160-083, calibrated 11/07
Sartorious Balance, MM170-004, calibrated 7/08

UNCALIBRATED TEST EQUIPMENT:

Neslab Chiller, model RTE-110, S# 89CML91040-7

TEST DATA:

Parameter	Sample # 1	Sample #2
Thickness, in	1.031	1.021
Density lbs/ft^3	0.91	0.91
TEST CONDITIONS:		
Temperature Gradient °F/in	48.27	48.59
Mean Temperature, °F	74.95	74.08
Temperature Range, °F	49.75	49.63
RESULTS:		
Thermal Conductivity, Btu·in/(h·ft²·°F)	0.260	0.260
Thermal Conductance, Btu/(h·ft²·°F)	0.253	0.254
Thermal Resistivity, °F·ft²·h/Btu/in	3.84	3.85
Thermal Resistance, °F·ft²·h/Btu	3.96	3.94

REMARKS:

The test materials will be retained for 14 days from the date of this report and then discarded unless we receive written notification requesting otherwise.

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