

February 16, 2017

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Letter Report No. 102735284TOR-001LR1  
Project No. G102735284  
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**Subject: Hammerglass Material – ASTM C518 Test Report**

The following summarizes testing of Hammerglass product supplied by 7370858 Manitoba Inc. for thermal transmission properties of insulation material. Testing was conducted in accordance with the standard methods of ASTM C518-15 “Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus”. Three (3) samples were tested, consisting of stacking four (4) specimens measuring 11.8 mm thickness each to a total height of 47.5 mm. **Method Deviation;** Mineral wool was used as a verification specimen in the absence of a verification material with similar thermal resistance properties and density to Hammerglass material.

The sample material arrived at the Intertek laboratory in Mississauga, Ontario on December 20, 2016 from the Intertek-Coquitlam laboratory. Testing was performed on December 28, 2016.

Sample Conditioning: 88hrs at 23±3°C and 50±5%RH

Thermal Resistance Test Results for insulation materials (Average of three specimens)				
Sample	Sample Test Thickness	Mean Test Temperature	Thermal Resistance, at 1 in. (25mm)	Thermal Conductivity
Hammerglass 12mm	1.87 in. (47.51 mm)	74.4 °F (23.6 °C)	0.709 °F·ft <sup>2</sup> ·h/Btu (0.123 K·m <sup>2</sup> /W)	1.410 Btu·in./h·ft <sup>2</sup> ·°F (0.203 W/m·K)


<sup>1</sup> Note: Presented R-Value is corrected for a 25 mm material thickness.

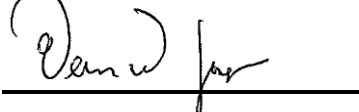
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The conclusions of this letter report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

Reported by: Daniel Dubecky  
Title: Technician  
Building Products

Reviewed by: Vern Jones  
Title: Senior Technologist  
Building Products

Signature: 

Signature: 

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**Test:**  
**Date:**  
**Client:**  
**Product:**  
**Test Method(s):**

**Thermal Transmission Properties**  
28-Dec-2016  
7370858 Manitoba Inc.  
**PRODUCT NAME**  
ASTM C518-15 Test Method For Steady State Thermal Transmission Properties by Means of the Heat Flow Meter

**Project No:** G102735284  
**Eng/Tech:** D. Dubeckyj  
**Reviewer:** V. Jones

**Conditioning:** 88 hours at a temperature of 23 ± 3°C and relative humidity of 50 ± 5%  
**Equipment:** Netsch Heat Flow Meter 280-01-1237 Cal. Due. March 10, 2017  
Vermier 280-01-0909 Cal. Due Jan 28, 2017  
Scale 280-01-0075 Cal. Due Feb. 2, 2017  
Conditioning Chamber 280-01-1201 Cal. Due Sept 22, 2017  
Tape Measure 280-01-1227 Cal. Due Aug 16, 2017

**Avg Thermal Resistance at 1" (25mm)**

0.709	°F·ft <sup>2</sup> ·h/Btu at 1"
0.123	K·m <sup>2</sup> /W at 25mm

**Avg Thermal Conductivity**

1.410	Btu·in./h·ft <sup>2</sup> ·°F
0.203	W/m·K

			Test Date: 28-Dec-2016				Calibration File: 1450D211				Specimen ID: Specimen 1				Specimen ID: Specimen 2				Specimen ID: Specimen 3			
			SI	IMPERIAL	SI	IMPERIAL	SI	IMPERIAL	SI	IMPERIAL	SI	IMPERIAL	SI	IMPERIAL	SI	IMPERIAL	SI	IMPERIAL				
Density	kg/m <sup>3</sup>	lbs/ft <sup>3</sup>			156.39	9.76			1192.99	74.48			1196.68	74.71			1195.18	74.61				
Thickness	mm	in.	1.0184	25.87	1.02		1.8693	47.48	1.87		1.8698	47.49	1.87		1.8723	47.56	1.87					
Upper Plate (Top)	°C	°F	94.36	34.64	94.36		93.46	34.14	93.46		93.52	34.18	93.52		93.44	34.13	93.44					
Lower Plate (Tip)	°C	°F	54.38	12.43	54.38		55.36	12.98	55.36		55.39	12.99	55.39		55.36	12.98	55.36					
Differential (Tdelta)	°C	°F	39.98	22.21	39.98		38.10	21.17	38.10		38.13	21.18	38.13		38.08	21.16	38.08					
Mean temp (Tm(ulp))	°C	°F	74.37	23.54	74.37		74.41	23.56	74.41		74.46	23.59	74.46		74.40	23.56	74.40					
Rate Heat Flux	W/m <sup>2</sup>	Btu/h·ft <sup>2</sup>		28.140	8.926			90.862	28.815			91.328	28.972			89.740	28.454					
Conductance	W/m <sup>2</sup> ·K	Btu/h·ft <sup>2</sup> ·°F		1.267	0.223			4.292	0.756			4.312	0.760			4.241	0.747					
Thermal Resistance	K·m <sup>2</sup> /W	°F·ft <sup>2</sup> ·h/Btu	0.78919	4.478945	0.789	4.479	0.232977	1.32223	0.233	1.322	0.2319	1.316119	0.232	1.316	0.23581	1.338308	0.236	1.338				
Thermal Conductivity	W/m·K	Btu·in./h·ft <sup>2</sup> ·°F	0.032829	0.227607	0.033	0.228	0.203773	1.412778	0.204	1.413	0.204814	1.419993	0.205	1.420	0.201612	1.397794	0.202	1.398				
Resistivity	K·m/W	°F·ft <sup>2</sup> ·h/Btu·in.		30.461	4.394			4.907	0.708			4.882	0.704			4.960	0.715					
Resistance at 25 mm	K·m <sup>2</sup> /W	°F·ft <sup>2</sup> ·h/Btu		0.763	4.329			0.123	0.696			0.122	0.693			0.124	0.704					
Calibr. Panel Conductivity				0.0329	0.228																	
Percent Error	%	%		-0.2	-0.2																	
			Verification Check: OK																			