

Exova | Transmission thermique | 2014

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Rapport 14-06-M0326 complet, daté du 30 septembre 2014, extrait du recueil BLC. Les résultats concernent l'éprouvette et les conditions décrites. Les noms commerciaux des constituants, lorsqu'ils sont présents dans le texte, sont masqués.

Complete report 14-06-M0326, September 30, 2014, extracted from the BLC compilation. Results concern the specimen and stated conditions. Constituent trade names, where present in text, are redacted.



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**EVALUATION OF LOW DENSITY CONCRETE
FOR THERMAL TRANSMISSION PROPERTIES
IN ACCORDANCE WITH ASTM C518 – 10**

A Report to:

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Date:

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1.0 INTRODUCTION

At the request of *Ministère des Transports du Québec*, Exova was retained to evaluate low density concrete material for thermal transmission properties in accordance with ASTM C518 – 10.

Upon receipt, the sample was assigned the following Exova Sample No.:

Client Sample Identification	Exova Sample No.
Low Density Concrete Specimen Size: 300 mm x 300 mm x 75 mm (nominal)	14-06-M0326



Figure 1 – Detail of sample 14-06-M0326 with machined top surface.

2.0 PROCEDURE

The sample was tested in accordance with the following test method:

Test Description	Test Method
Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus Two specimens were put end to end for testing	ASTM C518 – 10

In order to facilitate full contact of the heat flow meter plates, Exova machined the top surface of the concrete to achieve flat and parallel surfaces.

Specimen Dimensions: 300 mm × 300 mm × 75 mm (nominal)

Equipment: LaserComp FOX314 Heat Flow Meter, MII# B13096

Measurement: Mitutoyo Digital Calipers, MII# B04807
Digital Balance, MII# B12518

Test Conditions: Mean Temperature 24°C
 $\Delta T = 22^\circ\text{C}$

Sample Orientation: Horizontal

Test Date: 2014-09-29

3.0 RESULTS

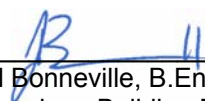
A summary of test results is presented in Table 1. SI units are the primary units of measure.

Table 1 – Thermal Transmission Properties ASTM C518 – 10 Exova Sample No.: 14-06-M0326				
Description	Results			
	Value	SI Units	Value	Imperial Units
Measured Length	301.27	mm	11.861	in
Measured Width	303.53	mm	11.950	in
Test Thickness	71.450	mm	2.813	in
Measured Mass	3527.52	g	7.777	lb
Density	539.89	kg/m ³	33.701	lb/ft ³
Upper Surface Temperature	13.02	°C	55.44	°F
Lower Surface Temperature	35.02	°C	95.04	°F
Temperature Differential	22.00	°C	39.60	°F
Mean Temperature	24.02	°C	75.24	°F
Rate of Heat Flux	52.07	W/m ²	16.50	BTU/h·ft ²
Thermal Conductance	2.37	W/m ² ·K	0.42	BTU/h·ft ² ·°F
Thermal Resistance	0.42	K·m ² /W	2.40	°F·ft ² ·h/BTU
Thermal Conductivity	0.16910	W/m·K	1.173	BTU·in/h·ft ² ·°F
Thermal Resistivity	5.914	K·m/W	0.853	°F·ft ² ·h/BTU·in

4.0 CONCLUSION

The sample submitted by *Ministère des Transports du Québec* identified as “lightweight concrete” was tested in accordance with ASTM C518 – 10 and as described in this report. The sample was measured to have a thermal resistivity of 0.42 K·m²/W (2.40 °F·ft²·h/BTU) at a thickness of 71 mm (2.8 in.).

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