

Exova
2395 Speakman Dr.
Mississauga
Ontario
Canada
L5K 1B3

T: +1 (905) 822-4111
F: +1 (905) 823-1446
E: sales@exova.com
W: www.exova.com



Testing, calibrating, advising.

**EVALUATION OF “BOREAL NATURE” MEDIUM DENSITY SPRAY APPLIED RIGID
POLYURETHANE FOAM IN ACCORDANCE WITH SELECT SECTIONS OF
CAN/ULC-S705.1-01 (INCLUDING AMENDMENTS 1, 2 AND 3)**

For:	Genyk 1701, 3e Avenue Grand-Mere, QC G9T 2W6
Attention:	Yves Rondeau Directeur Général / General Manager
Telephone:	819-691-5010
Email:	yvesrondeau@genyk.com
Proposal No.:	16-006-406628
Report No.:	16-06-P0086 4 pages, 5 appendices
Date:	July 12, 2016

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1.0 INTRODUCTION

At the request of *Genyk*, Exova was retained to evaluate the possible effects of a dye change for a spray foam system. The original material, tested in Exova Report: 14-06-M0353, Interim 1, was tested with a lilac coloured dye. In order to facilitate private labelling of the material, a green dye was substituted for the original dye. In order to confirm that the dye substitution did not have any detrimental effects on the performance of the system, the chemicals components were analyzed by the Exova Polymers lab for possible issues that could arise from a formulation change. The conclusion of the technical review stated that:

"Exova believes that the new colourants- [REDACTED] which belong to the same line of reactive liquid colourants available from [REDACTED] should be considered as an insignificant change to the formulation of this closed cell spray applied polyurethane foam system."

A copy of the full report on the colourant changes can be found in Appendix A of this report.

In addition to the technical review of the colourant, it was recommended that physical testing be done on the new formulation to ensure compliance with the standard. As such, a sample of medium density spray applied rigid polyurethane foam thermal insulation material was tested in accordance with select sections of CAN/ULC-S705.1-01 (Including Amendments 1, 2 and 3)¹, "*Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification.*"

1.1 Sampling Information

Liquid raw component materials were selected on March 23, 2016 at the *Genyk* facility in Grand-Mere, QC by a third party engineer. Images of sample selected drum labels are provided in Appendix B.

The following raw components were used to prepare samples for all testing:

- "A-2732" (component A, Isocyanate)
Lot no. 151001060
- "Boreal - Nature" (component B, resin)
Lot No. L-6058

¹ For the purposes of this report, "CAN/ULC-S705.1" is equivalent to "CAN/ULC-S705.1-01 (Including Amendments 1, 2, and 3)"

1.2 Sample Preparation & Identification

Sample preparation was performed in compliance with Clause 5.2 of CAN/ULC-S705.1-01 at the Genyk facility in Grand-Mere, QC and witnessed by an engineer. A detailed sample preparation report is provided in Appendix C

Client Sample Identification	Sample Preparation Report	Application Date
"Boreal - Nature" Medium density spray applied rigid polyurethane foam Colour "Lime Green"	16-006-406628	2016-03-23

The witnessed boards were signed and shipped directly from Genyk's facility to Exova's Mississauga lab for testing. The foam boards arrived attached to the HDPE substrates and were assigned the following sample ID.

Client Sample Identification	Exova Sample ID
"Boreal - Nature" Medium density spray applied rigid polyurethane foam Colour "Lime Green"	16-06-P0086

2.0 PROCEDURE

Testing was performed in accordance with the following test methods, with any modifications as provided by CAN/ULC-S705.1-01:

CAN/ULC-S705.1-01 Clause	Test Description	Test Method
5.5.2	Apparent Core Density	ASTM D1622-14
5.5.3	Compressive Strength	ASTM D1621-10
5.5.6	Open Cell Content Volume	ASTM D6226-15
5.5.7	Initial Thermal Resistance	ASTM C518-15
5.5.8	Long Term Thermal Resistance (LTTR)	CAN/ULC-S770-09

Details of sample sizes, test conditions and methods can be found in appendices D and E.

3.0 RESULTS

A summary of test results is presented in Table 1. Detailed results are presented in Appendix D and E. Please note that in some of the appended reports the sample identification may include differing sample numbers for inter-departmental use, however, all material is the same as identified Section 1.2 of this report.

Table 1 – Summary of Physical Properties and Requirements CAN/ULC-S705.1 Exova Sample No: 16-06-P0086			
Property	Requirement	Result	Comments
Apparent Core Density, kg/m³ [lb/ft³]	≥ 28	33.6 [2.10]	Pass
Compressive Strength, kPa	≥ 170	201	Pass
Open Cell Content, % by volume	≤ 8	1.23	Pass
Initial Thermal Resistance², m²-K/W 50 mm thick specimen	Declare	2.55	—
Long Term Thermal Resistance, m²-K/W 75 mm 50 mm 25 mm	— ≥ 2.00 (Type 2) —	3.10 2.03 —	— Pass Feb, 2017

² Specimens tested within 14 days after sample preparation

4.0 CONCLUSION


The material provided by *Genyk*, identified as "Boreal - Nature" medium density spray applied rigid polyurethane foam thermal insulation, meets the requirements specified by CAN/ULC-S705.1-01 for a Type 2 product when tested as described in this report.

It is the conclusion of Exova that the colourant package change has had no detrimental effects to the performance of the foam system and should be included for CCMC listing as a Type 2 foam system.

5.0 REVISION(S)

<u>Date</u>	<u>Rev. No.</u>	<u>Description</u>
2016-07-12	0	Original Report.

Reported by:



Joel Bonneville, B.Eng., Ext. 11591
Supervisor, Building Performance Centre
Products Testing Group

Approved by:



David Wren, P.Eng. Ext. 11250
Technical Manager, Building Performance Centre
Products Testing Group

ACCREDITATION

Unless otherwise specified, Exova Canada Inc. is ISO 17025 accredited to perform the testing described in this report. Accreditation is verified by International Accreditation Service (TL-407). Full scope listed online at iasonline.org/testing_laboratories

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