

TEST REPORT

Permeance Evaluation of an
AIR BARRIER MATERIAL
“Spray Applied Liquid Rubber”
Performed in Accordance with ASTM E2178
“Standard Test Method for Air Permeance of Building Materials”

Report No. L05-442-1583

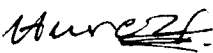
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Prepared for:
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- This report does not constitute certification of the test product. The reported test results refer only to the specimen tested. No representation is made that other samples of similar design will feature like performance.
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1. INTRODUCTION

Canadian Building Envelope Science and Technology (CAN-BEST) was retained by Lafarge Materials & Construction Inc. to carry out air permeance tests on a spray-applied coating material.

The Client intends to demonstrate the air tightness properties of their coating material for air barrier applications as specified in the 1995 edition of National Building Code of Canada (NBCC). Furthermore, the Client wishes to provide a general comparison with the published air permeance rates of recognized air barrier materials as listed by the Canadian Construction Materials Centre (CCMC), National Research Council Canada (NRCC).

Several test samples were prepared and submitted by the Client. They comprised a single-coat spray-on material applied onto a 35 mm thick Expanded Polystyrene (EPS) panel. EPS was chosen as a test substrate for its relatively high rate of air permeability and structural rigidity.

This report covers specific tests carried out on a limited number of specimens of specific dimensions, configuration and construction details. Product performance is affected by variations in its dimensions, assembly details and installation method. The reader is advised to ensure product conformity with all the details of the test sample described in the following section.

2. OBJECTIVE

The objective of this evaluation is to determine the air permeance rating of the submitted test samples, and to compare its performance with commercially available and recognized air barrier materials

3. SAMPLE DESCRIPTION

Designation: "Spray Applied Liquid Rubber"

Type: As per Client's submission, the material is an elastomeric bituminous coating material which is mixed in the sprayer and immediately applied.

Appearance: When sprayed onto the EPS substrate, the material appears as a thin staining layer with a uniform black colour. It remains slightly adhesive after curing.

4. EVALUATION PROCEDURE

Testing was conducted in general accordance with the procedures outlined in ASTM E2178 "Standard Test Method for Air Permeance of Building Materials."

In the standard test method, a 1 m x 1 m panel incorporating the test material is sealed to a rigid, airtight chamber, and negative pressure is drawn, through the chamber, across the test material. The rate of airflow required to establish at least five levels of pressure differential, between the chamber and the surrounding environment, is measured. The measured rate of airflow is then corrected to standard conditions (20°C and 101.325 kPa) and charted against pressure differential. A curve fit is made against the data and, from the curve fit, the permeance (airflow per unit area) at a 75 Pascal (Pa) pressure differential is calculated as a final result.

The above standard procedure was modified for increased measurement resolution as follows:

- Testing was performed on paired samples instead of singles, and three standard air permeance tests were performed on a total of six panels.
- Each test area comprised two 1.20 m x 1.15 m panels; a 138 % increase in area over the standard test size.

5. SAMPLE PREPARATION

A total of six coated EPS test panels and two non-coated EPS control panels were supplied by the Client for the evaluation. Each test panel was uniformly coated on one side only with the test material.

Date of coating application: July 1, 2005 (as per Client)

Design wet thickness: 2 mm (as per Client)

Curing: At Client's, two weeks at 25-28°C and 50-60% RH (as per Client)
At CAN-BEST, one week at 25°C and 50% RH ambient conditions

The panels were delivered to CAN-BEST on July 13, 2005 and tested between July 18 and 20.

6. TEST RESULTS & DISCUSSION

Detailed airflow measurements and calculated permeance for each test pair are presented in Table 1 and demonstrated graphically in Figures 1 and 2. The following is a summary of results:

<i>Test Sample</i>	<i>Air Permeance L/(s.m²) at 75 Pa Pressure Differential</i>
Pair 1	0.0003
Pair 2:	0.0004
Pair 3	0.0004
Average	0.0004

As shown in Figure 2, the test coating displayed a much lower rate of air permeance than 0.02 L/(s.m²), the maximum permeance rate allowed by NBCC¹.

As published by the Canadian Construction Materials Centre (CCMC), air barrier materials that are recognized in Canada exhibit air permeance levels in the range of 0.0001 to 0.004 L/(s.m²)². The average permeance of 0.0004 L/(s.m²) of the test coating is deemed to be among the lowest listed permeance levels for these commercially available and recognized air barrier materials.

7. CONCLUSION

Based on the results obtained, the tested coating has an average permeance of **0.0004 L/(s.m²)** at a 75 Pa pressure differential. The test coating meets the air permeance criteria specified in NBCC-1995, and it ranks among the lowest permeance rates of commercially available air barrier materials that are recognized by CCMC.

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¹ Maximum permeance is given in the National Building Code of Canada 1995, Part 5 Section 4.1.2.

² Individual evaluations can be viewed through the Registry of Product Evaluations on the CCMC website:
<http://irc.nrc-cnrc.gc.ca/ccmc>

Table (1): Corrected Airflow Rates and Calculated Permeance

	Sample Pair 1			Sample Pair 2			Sample Pair 3		
	Pressure (Pa)	Airflow L/s	Permeance L/(s.m ²)	Pressure (Pa)	Airflow L/s	Permeance L/(s.m ²)	Pressure (Pa)	Airflow L/s	Permeance L/(s.m ²)
	140	0.0014	0.0005	76	0.0014	0.0005	119	0.0014	0.0005
	311	0.0028	0.0011	198	0.0028	0.0011	234	0.0028	0.0011
	503	0.0042	0.0016	306	0.0042	0.0016	382	0.0042	0.0016
	712	0.0056	0.0021	473	0.0057	0.0021	657	0.0056	0.0021
				687	0.0071	0.0027	946	0.0071	0.0027
Surface Area (m ²):	2.642			2.642			2.642		
Curve Fit Equation:	$Flow = a \times pressure^2 + b \times pressure$								
<i>a</i>	-2.794E-09			-9.04516E-09			-5.979E-09		
<i>b</i>	9.861E-06			1.644E-05			1.298E-05		
Flowrate at 75 Pa (L/s):	0.0007			0.0012			0.0009		
Permeance at 75 Pa (L/s.m ²):	0.0003			0.0004			0.0004		
Average:	0.0004								



Figure 1: Measured Air Flow Rate (Corrected to Standard Conditions)

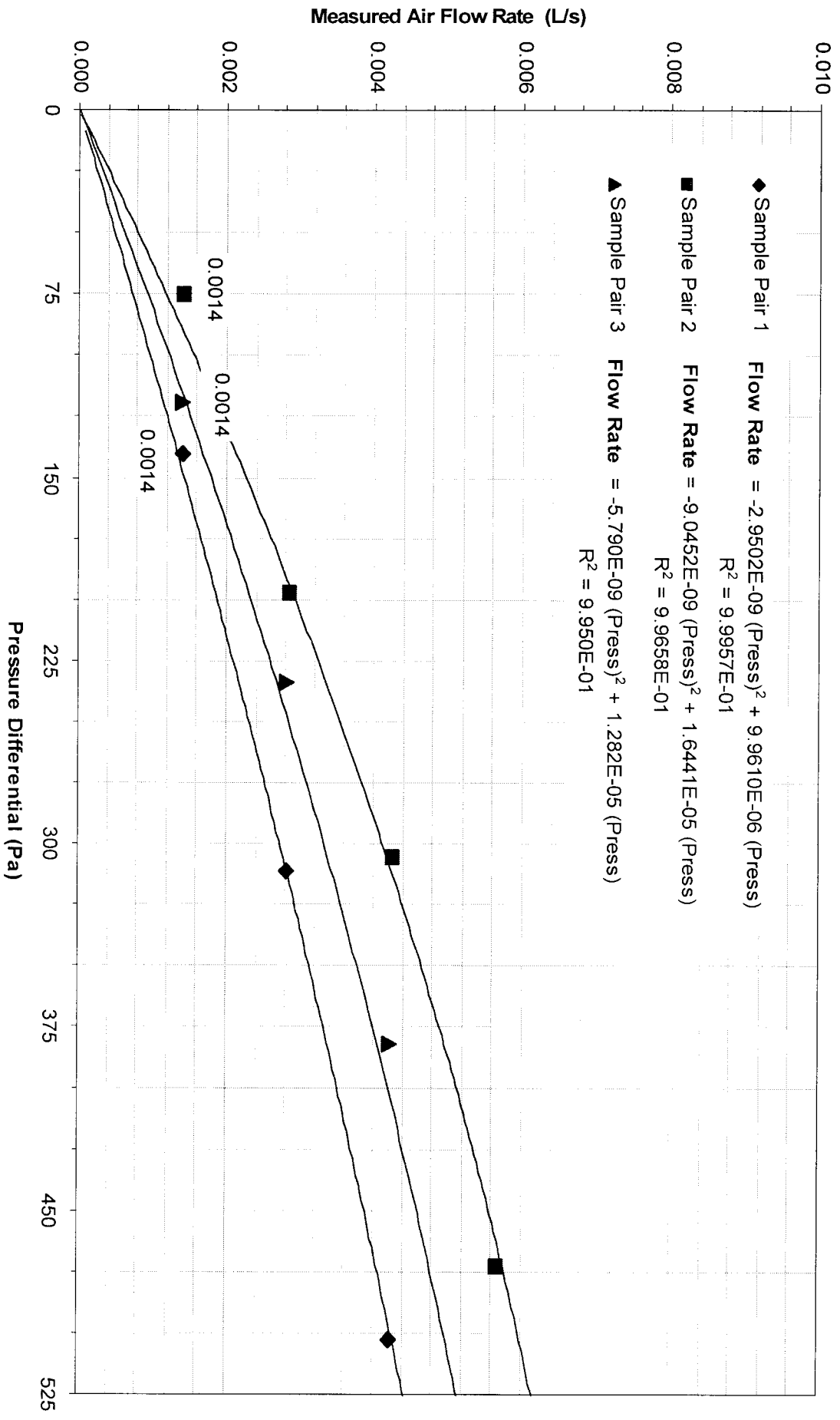


Figure 2: Air Permeance

