TEST REPORT

Intertek

REPORT NUMBER: 3139154COQ-001
ORIGINAL ISSUE DATE: January 28, 2008

EVALUATION CENTER
Intertek Testing Services NA Ltd.
1500 Brigantine Drive
Coquitlam, B.C. V3K 7C1

RENDERED TO

R & D Services, Inc.
102 Mill Drive
Cookeville, TN 38501

PRODUCT EVALUATED: "Applegate Stabilized Cellulose Insulation"
EVALUATION PROPERTY: Surface Burning Characteristics

Report of testing "Applegate Stabilized Cellulose Insulation" for compliance with the applicable requirements of the following criteria: CAN/ULC S102.2-07, *Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials and Assemblies.* Tested for CCMC Evaluation Purposes.

1 Table of Contents

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted testing for R & D Services, Inc. to evaluate the surface burning characteristics of "Applegate Stabilized Cellulose Insulation". Testing was conducted in accordance with the standard methods of CAN/ULC S102.2-07, *Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials and Assemblies*. The purpose of the testing was for the CCMC evaluation purposes.

This evaluation began January 23, 2008 and was completed January 23, 2008.

3 Test Samples

3.1. SAMPLE SELECTION

The client advised that the cellulose that was tested is Applegate Insulation stabilized cellulose produced at the Applegate Insulation facility in Bloomer, Wisconsin. Twenty 30-pound bags of Applegate stabilized cellulose were selected off the production line on October 8, 2007. The bags were randomly selected by pulling every sixth bag from the production line. Each bag was selected, marked, and dated by Ron Graves of R & D Services, Inc. Three bags of marked cellulose were shipped to Intertek on November 13, 2007. They were identified as 1028071011-8,9,10.

R & D Services, Inc. is an accredited testing facility in Cookeville, Tennessee. They are accredited by NVLAP under the US Department of Commerce (NVLAP Code 200265-0).

The sample materials were received at the Intertek Evaluation Center on November 19, 2007.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

Upon receipt of the samples at the Intertek Coquitlam laboratory they were placed in a conditioning room where they remained in an atmosphere of 23 ± 3°C (73.4 ± 5°F) and 50 ± 5% relative humidity.

The test samples consisted of loose fill cellulose fiber insulation and were grey in color. The sample material was labeled as "Applegate Stabilized Cellulose Insulation". The samples were prepared by blowing the insulation into wooden trays, each measuring 8ft. long by 17 in. wide by 2 in. deep, at a density of 1.7 lb/ft^3. This density is slightly higher than the maximum suggested density on the packaging.

For each trial run, three 8 ft. long trays were dumped onto the floor of the flame spread tunnel, side by side, to form the required 24 ft. sample length. The samples were then screed to achieve a relatively level surface. A layer of 6mm reinforced cement board was placed on the upper ledge of the tunnel, the tunnel lid was lowered into place, and the samples were then tested in accordance with CAN/ULC S102.2-07.

4 Testing and Evaluation Methods

4.1. TEST STANDARD

The results of the tests are expressed by indexes, which compare the characteristics of the sample under tests relative to that of select grade red oak flooring and asbestos-cement board.

(A) Flame Spread Classification:

This index relates to the rate of progression of a flame along a sample in the 25 foot tunnel. A natural gas flame is applied to the front of the sample at the start of the test and drawn along the sample by a draft kept constant for the duration of the test. An observer notes the progression of the flame front relative to time.

The test apparatus is calibrated such that the flame front for red oak flooring passes out the end of the tunnel in five minutes, thirty seconds (plus or minus 15 seconds).

Calculations: (CAN/ULC S102.2-07)

According to the test standard, the flame spread classification is equal to $\frac{5363}{195 - A_T}$ when A_t is the total area beneath the flame spread curve, if this area exceeds 97.5 minute feet. If the area beneath the curve is less than or equal to 97.5 minute feet the classification becomes 0.564 x A_t.

(B) Smoke Developed:

A photocell is used to measure the amount of light, which is obscured by the smoke passing down the tunnel duct. When the smoke from a burning sample obscures the light beam, the output from the photocell decreases. This decrease with time is recorded and compared to the results obtained for red oak, which is defined to be 100.

Calculations:

$$\text{Unrounded Smoke Developed Index} = \frac{10{,}000 - SmokeIntegration}{1076} x100$$

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

(A) Flame Spread

The resultant flame spread classifications are as follows:
(classification rounded to nearest 5)

"Applegate Stabilized Cellulose Insulation"	Flame Spread	Flame Spread Classification
Run 1	22	45
Run 2	19	
Run 3	89	

(B) Smoke Developed

The areas beneath the smoke developed curve and the related classifications are as follows:
(classification rounded to nearest 5)

"Applegate Stabilized Cellulose Insulation"	Smoke Developed	Smoked Developed Classification
Run 1	1	0
Run 2	1	
Run 3	1	

(C) Observations

During the test the sample material quickly ignited, with a small amount of flaming traveling along the surface of the sample until it reached the maximum flame spread. After reaching this point, the surface burning quickly went out leaving a thin layer of char.

6 Conclusion

The samples of "Applegate Stabilized Cellulose Insulation", submitted by R & D Services, Inc., exhibited the following flame spread characteristics when tested in accordance with CAN/ULC S102.2-07, *Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials and Assemblies,* and in accordance with the requirements of the CCMC Technical Guide.

A series of three test runs of each material was conducted to conform to the requirements of the National Building Code of Canada.

These samples have been tested for CCMC Evaluation Purposes.

Sample Material	Flame Spread Classification	Smoke Developed Classification
"Applegate Stabilized Cellulose Insulation"	45	0

The conclusions of this test 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.

INTERTEK TESTING SERVICES NA LTD.

Tested and Reported by:

Scott Leduc, EIT
Technician – Construction Products Testing

Reviewed by:

Michael van Geyn, A.Sc.T.
Manager – Fire Testing & Technical Programs

SL/bjm

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APPENDIX A

DATA SHEETS

CAN/ULC S102.2-07 DATA SHEETS
Run 1

Canadian ULCS 102.2

Client: R and D Services Inc
Date: 1/23/2007
Project Number: 3139154
Test Number: 1
Operator: Scott Leduc

Specimen ID: Blown in cellulose insulation. 1.7 PCF.

TEST RESULTS

FLAMESPREAD INDEX: 20

SMOKE DEVELOPED INDEX: 0

SPECIMEN DATA . . .

Time to Ignition (sec): 1
Time to Max FS (sec): 45
Maximum FS (mm): 1257 1
Time to 527 C (sec): Never Reached
Time to End of Tunnel (sec): Never Reached
Max Temperature (C): 333
Time to Max Temperature (sec): 565
Total Fuel Burned (cubic metres): 47 80

FS*Time Area (M*min): 12.1
Smoke Area (%A*min): 1.5
Unrounded FSI: 22 4

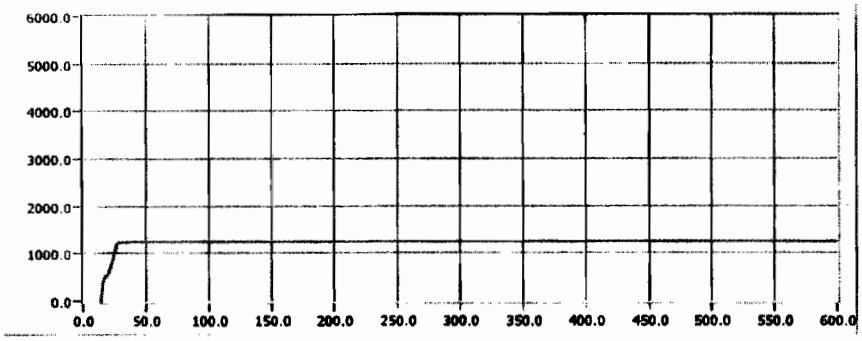
CALIBRATION DATA . . .

Time to Ignition of Last Red Oak (Sec): 46 0
Red Oak Smoke Area (%A*min): 107.6

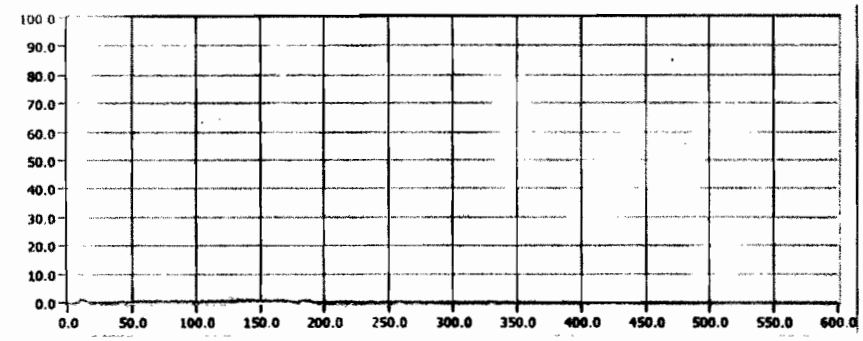
CAN/ULC S102.2-07 DATA SHEETS
Run 1

Project No: 3139154

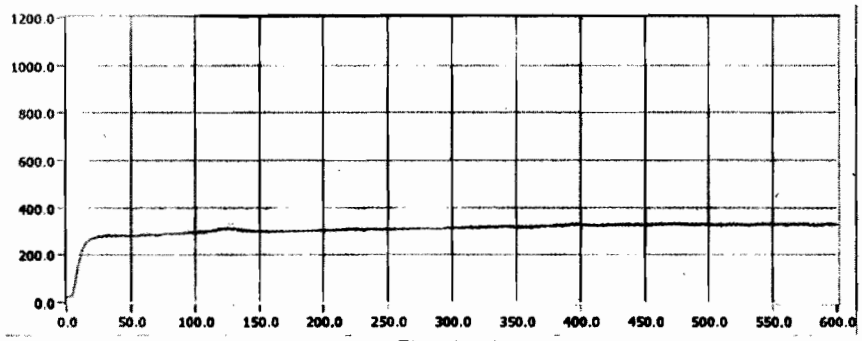
FLAME SPREAD (MM)



Smoke (%A)



Temperature (°C)



Time (sec)

600

CAN/ULC S102.2-07 DATA SHEETS
Run 2

Canadian ULCS 102.2

Client: R and D Services
Date 1/23/2008
Project Number: 3139154
Test Number: 2
Operator Scott Leduc

Specimen ID: Blown in cellulose insulation 1.7 PCF.

TEST RESULTS

FLAMESPREAD INDEX: 20

SMOKE DEVELOPED INDEX: 0

SPECIMEN DATA . . .

Time to Ignition (sec): 1
Time to Max FS (sec): 25
Maximum FS (mm): 1030.9
Time to 527 C (sec): Never Reached
Time to End of Tunnel (sec): Never Reached
Max Temperature (C): 335
Time to Max Temperature (sec): 591
Total Fuel Burned (cubic metres): 47.60

FS*Time Area (M*min): 10.0
Smoke Area (%A*min): 1.4
Unrounded FSI: 18.5

CALIBRATION DATA . . .

Time to Ignition of Last Red Oak (Sec): 46.0
Red Oak Smoke Area (%A*min). 107.6

CAN/ULC S102.2-07 DATA SHEETS
Run 2

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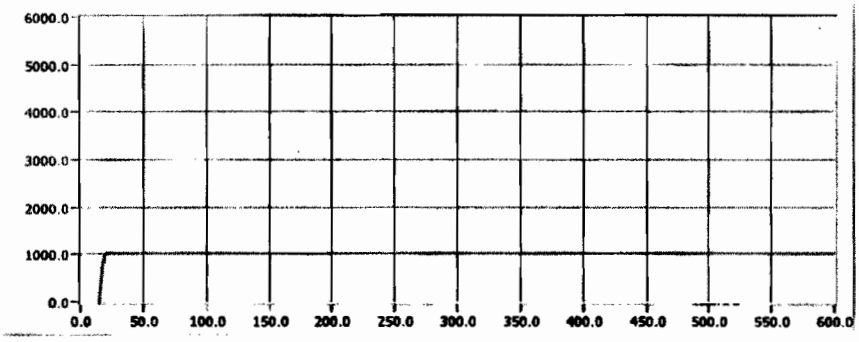
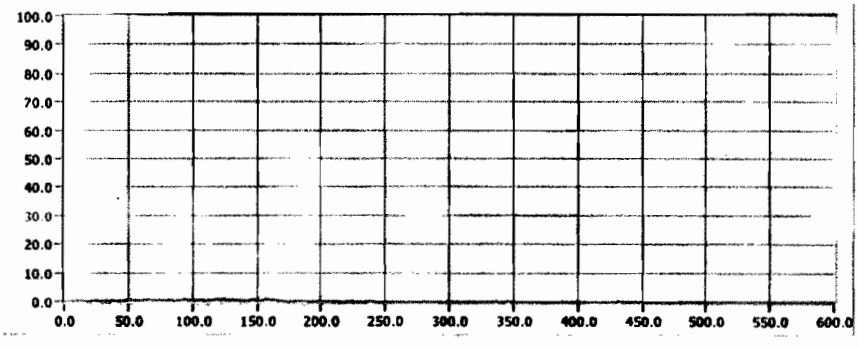
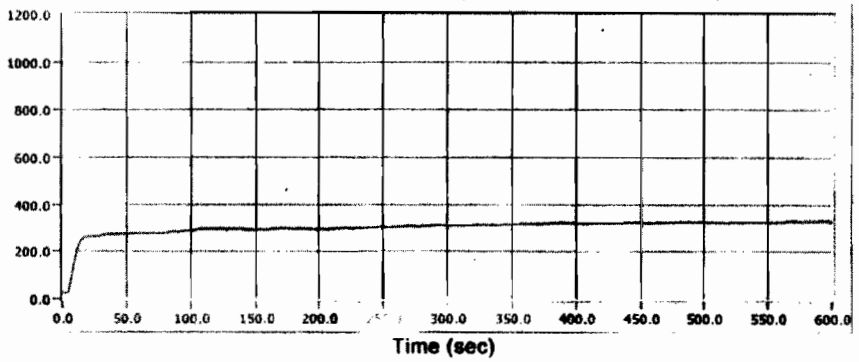
FLAME SPREAD (MM)



Smoke (%A)



Temperature (°C)



Time (sec)

600

CAN/ULC S102.2-07 DATA SHEETS
Run 3

Canadian ULCS 102.2

Client: R and D Services Inc.
Date: 1/23/2008
Project Number: 3139154
Test Number: 3
Operator: Scott Leduc

Specimen ID: Blown in cellulose insulation. 1.7 PCF.

TEST RESULTS

FLAMESPREAD INDEX: 90

SMOKE DEVELOPED INDEX: 0

SPECIMEN DATA . . .

Time to Ignition (sec):	1
Time to Max FS (sec):	161
Maximum FS (mm):	4853.7
Time to 527 C (sec):	Never Reached
Time to End of Tunnel (sec):	Never Reached
Max Temperature (C):	346
Time to Max Temperature (sec):	100
Total Fuel Burned (cubic metres):	47.70
FS*Time Area (M*min):	40.9
Smoke Area (%A*min):	1.4
Unrounded FSI:	88.5

CALIBRATION DATA . . .

Time to Ignition of Last Red Oak (Sec):	46.0
Red Oak Smoke Area (%A*min):	107.6

CAN/ULC S102.2-07 DATA SHEETS
Run 3

Project No: 3139154

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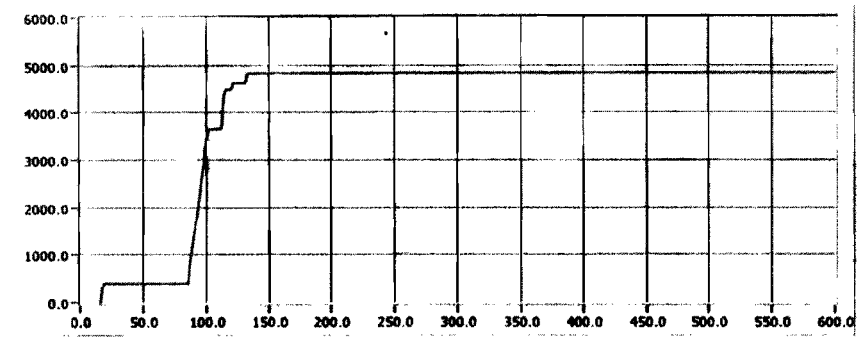
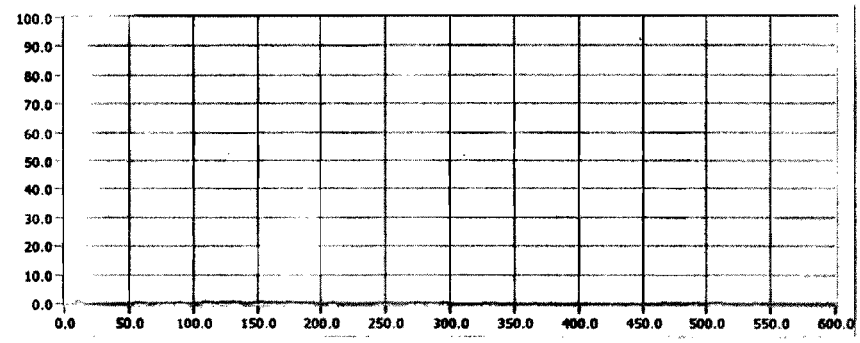
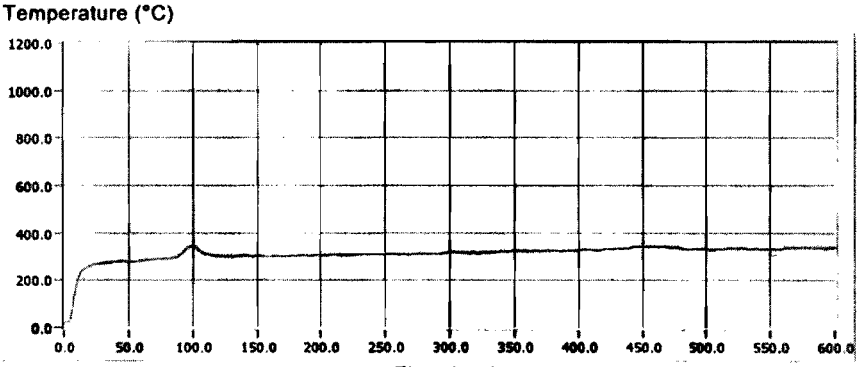
FLAME SPREAD (MM)



Smoke (%A)



Temperature (°C)



Time (sec)

600

REVISION SUMMARY

DATE	PAGE	SUMMARY
January 28, 2008	--	Original Issue Date