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# CAN/ULC-S102 Surface Burning Characteristics of "Digitally Printed Aluminum Siding" Coated Aluminum

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|---|---|
| A Report To: | **DiZal inc.**<br>1020 rue Bouvier, Suite 400<br>Québec, QC<br>G2K 0K9 |
| Phone: | 418-520-6954 |
| Attention:<br>E-mail: | Louis-André Gaudreau, Ing.<br>louisandre@dizal.ca |
| Submitted by: | Exova Warringtonfire North America |
| Report No. | 16-002-517(B)<br>6 Pages |
| Date: | September 23, 2016 |

**ACCREDITATION** To ISO/IEC 17025 for a defined Scope of Testing by the International Accreditation Service

**SPECIFICATIONS OF ORDER**

Determine the Flame Spread Rating and Smoke Developed Classification based upon triplicate testing conducted in accordance with CAN/ULC-S102-10, as per DiZal inc. reference Purchase Order No. 218R1 and Exova Warringtonfire North America Quotation No. 16-002-418420RV2 dated September 7, 2016.

**SAMPLE IDENTIFICATION** (Exova sample identification number 16-002-S0517)

Coated aluminum 6" (152 mm) profile material, approximately 2 mm in thickness, descrfibed as, "Aluminum, primer, ink jet printed texture and clear", identified as:
"Digitally Printed Aluminum Siding"

**TEST PROCEDURE**

The method, designated as CAN/ULC-S102-10, "Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies", is designed to determine the relative surface burning characteristics of materials under specific test conditions. Results of less than three identical specimens are expressed in terms of Flame Spread Value (FSV) and Smoke Developed Value (SDV). Results of three or more replicate tests on identical samples produce average values expressed as Flame Spread Rating (FSR) and Smoke Developed Classification (SDC).

Although the procedure is applicable to materials, products and assemblies used in building construction for development of comparative surface spread of flame data, the test results may not reflect the relative surface burning characteristics of tested materials under all building fire conditions.

**SAMPLE PREPARATION**

Each test specimen consisted of a total of 6 sections of material, each approximately 2 mm in thickness by 171 mm in width by 3658 mm in length. The sections were supported on 6 mm diameter steel rods placed across the width of the tunnel, and spaced at nominal 610 mm intervals. The sections were butted together side-by-side and end-to-end to form the requisite specimen area (3 wide and 2 long). Prior to testing, each specimen was conditioned to constant mass at a temperature of 23 ± 3°C and a relative humidity of 50 ± 5%. In all cases during testing, the coated (coloured) surface was exposed to the test flame.

The testing was performed on: Test #1: 2016-09-15 Test #2: 2016-09-15 Test #3: 2016-09-15

**SUMMARY OF TEST PROCEDURE**

The tunnel is preheated to 85°C, as measured by the backwall-embedded thermocouple located 7090 mm downstream of the burner ports, and allowed to cool to 40°C, as measured by the backwall-embedded thermocouple located 4000 mm from the burners. At this time the tunnel lid is raised and the test sample is placed along the ledges of the tunnel so as to form a continuous ceiling 7315 mm long, 305 mm above the floor. The lid is then lowered into place.

**SUMMARY OF TEST PROCEDURE (continued)**

Upon ignition of the gas burners, the flame spread distance is observed and recorded every second. Flame spread distance versus time is plotted. Calculations ignore all flame front recessions and the Flame Spread Values (FSV) are determined by calculating the total area under the curve for each test sample. If the total area under the curve (AT) is less than or equal to 29.7 m·min, FSV = 1.85·AT; if greater, FSV = 1640/(59.4-AT).

Smoke Developed Values (SDV) are determined by comparing the area under the obscuration curve for each test sample to that of inorganic reinforced cement board and red oak, established as 0 and 100, respectively. Each Smoke Developed Value is determined by dividing the total area under the obscuration curve by that of red oak and multiplying by 100.

**TEST RESULTS**

| SAMPLE | | Flame Spread Value (FSV) | Smoke Developed Value (SDV) |
|---|---|---|---|
| "Digitally Printed Aluminum Siding" | Test #1 | 2 | 9 |
| | Test #2 | 2 | 6 |
| | Test #3 | 5 | 4 |
| | Average: | 3 | 6 |

Rounded Average Flame Spread Rating (FSR): **5**

Rounded Average Smoke Developed Classification (SDC): **5**

**Observations of Burning Characteristics**

- The specimens ignited approximately 52 to 60 seconds after exposure to the test flame. Surface blistering and delamination was observed. Partial collapse in the test burner impingement area was also observed.
- The flame fronts advanced to maximum distances of 0.1, 0.1 and 0.3 metres at approximately 87, 80, and 75 seconds into each respective test.

***Note: This is an uncontrolled electronic copy of the report. Signatures are on file with the original.***

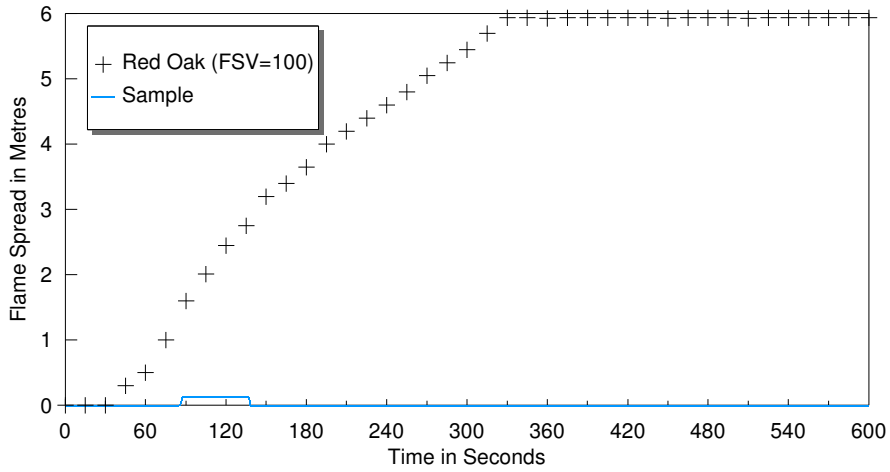
Robert A. Carleton,
Technologist.

Ian Smith,
Technical Manager.

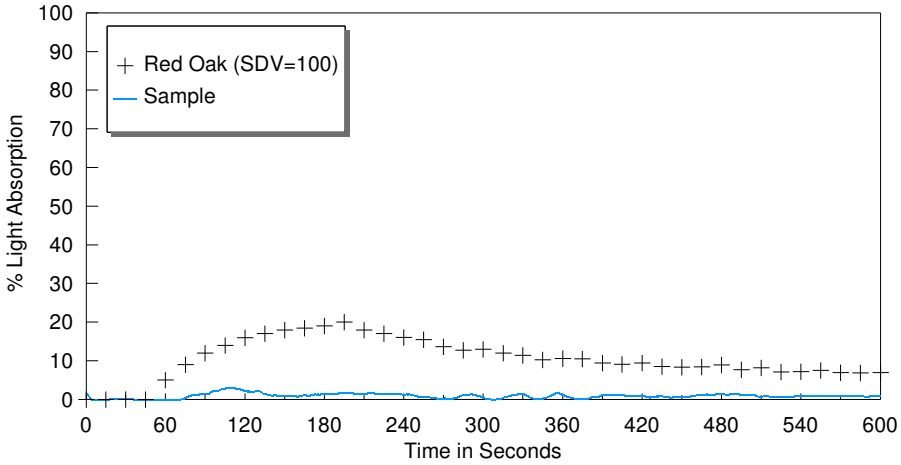
Sample: "Digitally Printed Aluminum Siding"

**Test #1 of 3**

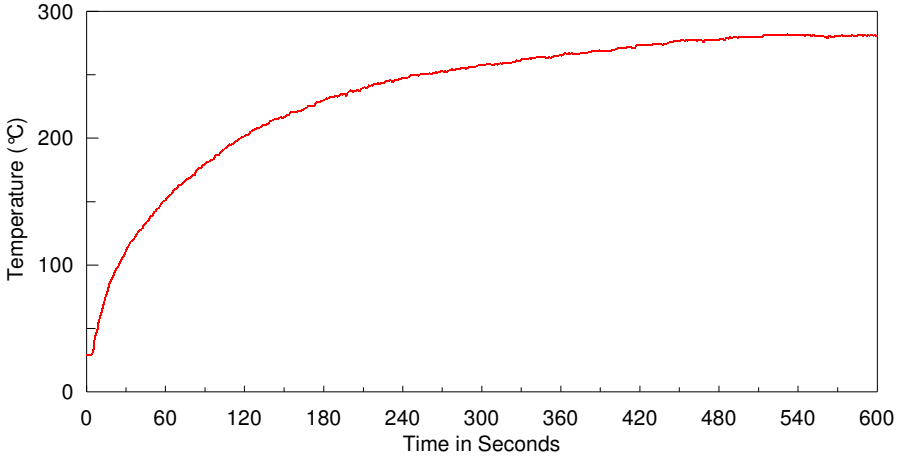
**FLAME SPREAD**




**SMOKE DEVELOPED**




**TEMPERATURE**

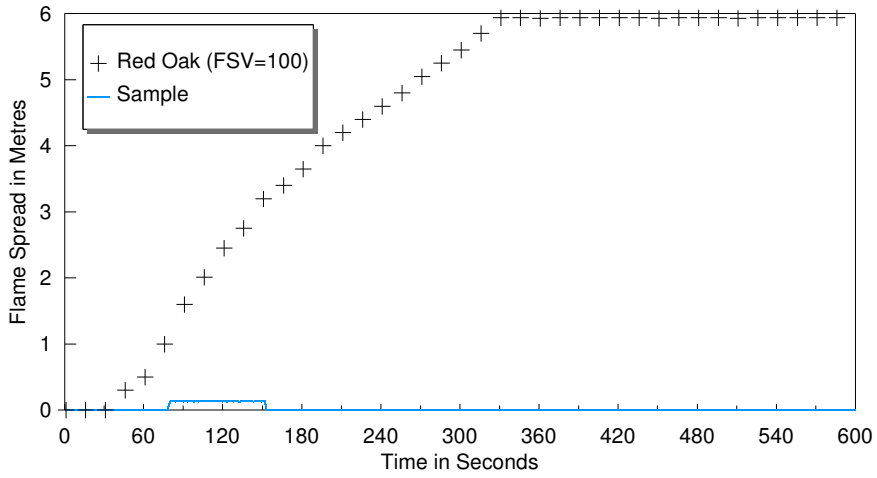



| FSV | SDV | Max. Temp. (°C) |
|---|---|---|
| 2 | 9 | 282 |

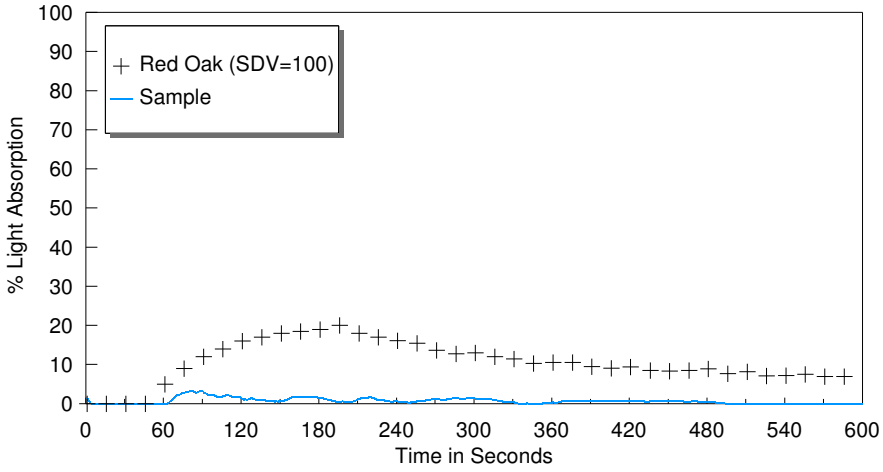
Sample: "Digitally Printed Aluminum Siding"

**Test #2 of 3**

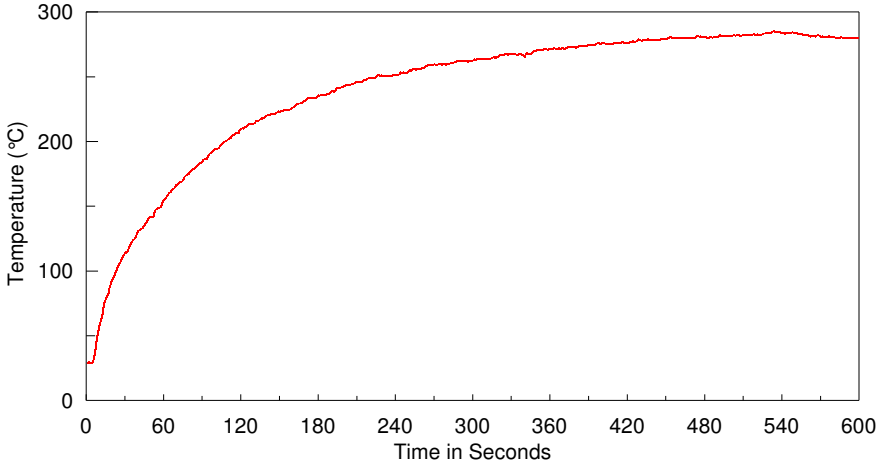
**FLAME SPREAD**




**SMOKE DEVELOPED**




**TEMPERATURE**

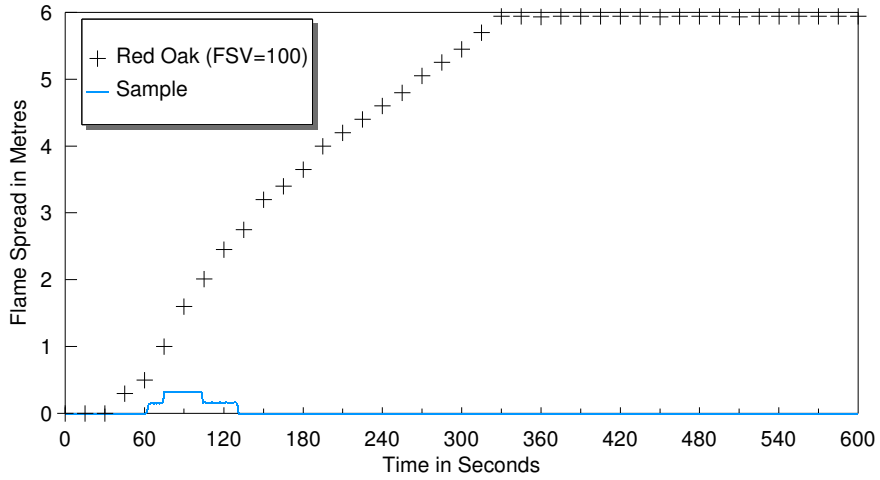



| FSV | SDV | Max. Temp. (°C) |
|---|---|---|
| 2 | 6 | 285 |

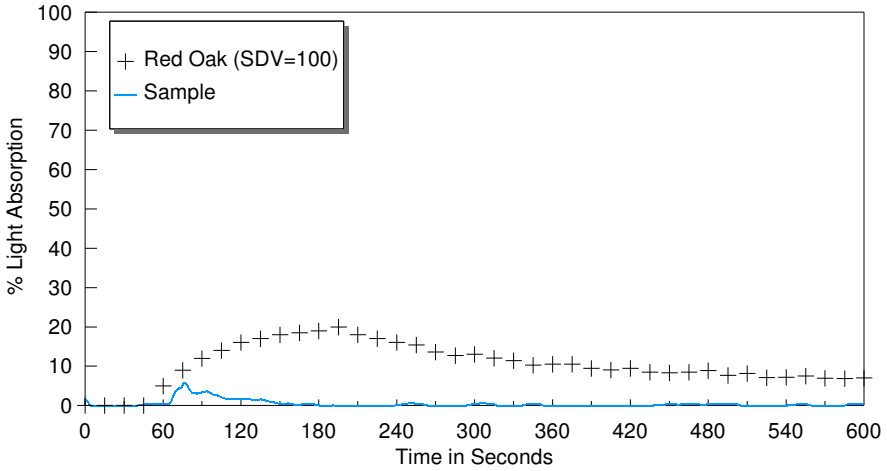
Sample: "Digitally Printed Aluminum Siding"

**Test #3 of 3**

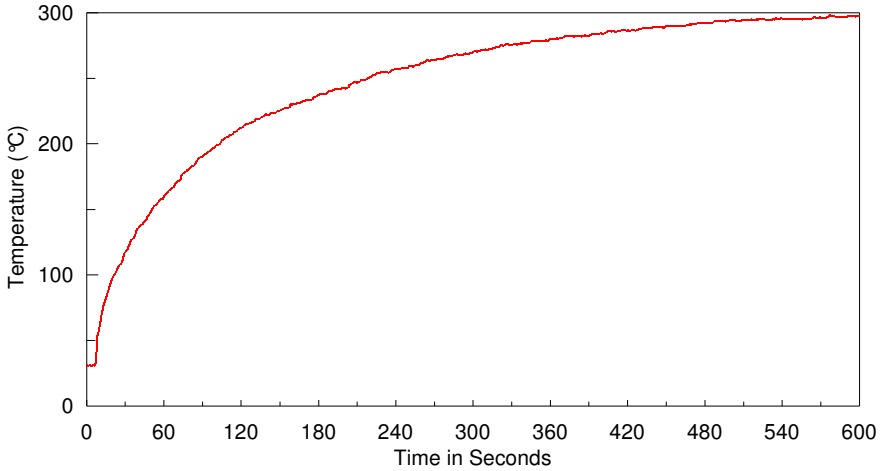
**FLAME SPREAD**




**SMOKE DEVELOPED**




**TEMPERATURE**




| FSV | SDV | Max. Temp. (°C) |
|---|---|---|
| 5 | 4 | 298 |

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# Determination of Non-Combustibility of "Uncoated Aluminum Siding"

| | |
|---|---|
| A Report To: | **Dizal Inc.**<br>4000 Jean-Marchand, local 108<br>Québec, Québec, Canada<br>G2C 1Y6 |
| Phone: | +1 (418) 520-6954 |
| Attention: | Louis-André Gaudreau |
| E-mail: | louisandre@dizal.com |
| Submitted by: | Exova Warringtonfire North America |
| Report No. | 18-002-123<br>3 Pages |
| Date: | March 6, 2018 |

**ACCREDITATION** To ISO/IEC 17025 for a defined Scope of Testing by the International Accreditation Service

**SPECIFICATIONS OF ORDER**

Test for non-combustibility in accordance with CAN/ULC-S114-05 "Standard Method of Test for Determination of Non-Combustibility in Building Materials", as per Exova Warringtonfire North America Quotation No. 18-002-547378 accepted March 1, 2018.

**SAMPLE IDENTIFICATION**

Aluminum siding material, identified as "Uncoated Aluminum Siding".

(Exova sample identification number 18-002-S0123)

**SUMMARY OF TEST PROCEDURE**

A specimen of known mass, measuring 50 mm long, 38 mm wide and 38 mm thick, is placed inside an electrically heated tube furnace stabilized at 750°C. A material is considered to be non-combustible if it meets all the following criteria:

A) The mean of the maximum temperature rise for the three (or more) specimens of the sample during the test does not exceed 36 Celsius degrees; and

B) There is no flaming of any of the three (or more) specimens during the last 14.5 minutes of the test; and

Note: Any surface flash, transitory flaming or sustained flaming constitutes flaming for the purposes of this requirement.

C) The maximum weight loss of any of the three (or more) specimens during the test does not exceed 20 percent.

**SAMPLE PREPARATION**

The material was received in pre-cut samples measuring approximately 38 mm by 38 mm by 1.5 mm and 30 pieces were stacked and wire-bound to make up the requisite test specimens. The test specimens were dried at a temperature of 60 ± 3°C for a 24 h to 48 h period and allowed to cool to room temperature in a dry atmosphere prior to testing.

**TEST RESULTS**

**CAN/ULC-S114-05**

Standard Method of Test for Determination

of Non-Combustibility in Building Materials

| Trial | Maximum Temperature Rise (C°) | Flaming During Last 14.5 min.? | Specimen Initial Weight(g) | Specimen Final Weight (g) | **Percent Weight Loss** |
|---|---|---|---|---|---|
| 1 | ** | No | 189.20 | 189.19 | **0.01** |
| 2 | ** | No | 186.48 | 186.47 | **0.01** |
| 3 | ** | No | 186.90 | 186.89 | **0.01** |
| Mean: | ** | | | | |
| Maxima Specified by CAN/ULC-S114: | 36 (mean) | No | | | **20.0** (individual) |

** The temperature never exceeded the initial stabilized furnace temperature.

**OBSERVATIONS**

In all cases, no ignition was observed.

**CONCLUSIONS**

The aluminum siding identified in this report meets all of the specified criteria and therefore can be classified "Non-combustible", as defined by CAN/ULC-S114.

Mel Garces,
Senior Technologist.

Ian Smith,
Technical Manager.

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