



“The test report attached verifies the fire performance for Armstrong Linoleum Flooring. The product tested is representative of, but may not be identical to the product you are purchasing. Changes in product formulation that occur for a variety of reasons may cause fluctuations in results. The above referenced data is representative of the current formulation of these products. Specifications and interpretation of fire test methods are subject to ongoing development. To assure that the information continues to be current, it is suggested that you request product certification for a specific project. The certification will reference the current applicable independent laboratory test reports.”

Exova
2305 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. Advising. Assuring.

ELECTRONIC DRAFT COPY

**CAN/ULC-S102.2 Surface Burning Characteristics
of "2.5 mm Linoleum with NATURCote"**

A Report To: **Armstrong World Industries, Inc.**
Innovation Center, B19
2500 Columbia Avenue
Lancaster, PA 17604
USA

Phone: (717) 396-5354
Email: TCErisman@Armstrong.com

Attention: Thomas C. Erisman

Submitted by: Fire Testing

Report No. 09-002-711(B)
6 Pages

Date: October 5, 2009

ACCREDITATION Standards Council of Canada, Registration #1.

SPECIFICATIONS OF ORDER

Determine the Flame Spread and Smoke Developed Classifications based upon triplicate testing conducted in accordance with CAN/ULC-S102.2-07, as per your Purchase Order No. 4502265578 and our Quotation No. 09-002-7230 dated September 11, 2009.

SAMPLE IDENTIFICATION

Linoleum flooring material identified as: "2.5 mm Linoleum with NATURCote (Marmorette, Linorette, Colorette, Granette, Uni-Walton) bonded to Tunnel board with Armstrong S-780 Adhesive".

(Exova sample identification number 09-002-S0711-2)

TEST PROCEDURE

The method, designated as CAN/ULC-S102.2-07, "Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials", is designed to determine the relative 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

The flooring material was supplied adhered to an inorganic substrate (by client) and each sample consisted of 6 sections of material, each approximately 1219 mm in length by 445 mm in width by 12 mm in thickness. The sections were butted together to form the requisite specimen lengths. Prior to testing, the samples were conditioned at a temperature of $23 \pm 3^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$.

The testing was performed on: Test #1: 2009-09-30 Test #2: 2009-10-01 Test #3: 2009-10-01

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 15 seconds. Flame spread distance versus time is plotted, ignoring any flame front recessions. Calculations are based on comparison with flame spread characteristics of select red oak, determined in calibration trials and arbitrarily established as 100. If the area under the curve (A) is less than or equal to 29.7 m²-min, FSV = 1.85-A; if greater, FSV = 1640/(59.4-A). The Smoke Developed Value is determined by comparing the area under the obscuration curve for the test sample to that of inorganic reinforced cement board and red oak, established as 0 and 100, respectively.

TEST RESULTS

| <u>SAMPLE</u> | | <u>FSV</u> | <u>SDV</u> |
|----------------------------------|----------|------------|------------|
| "2.5 mm Linoleum with NATURCote" | Test #1 | 103 | 402 |
| | Test #2 | 101 | 388 |
| | Test #3 | <u>100</u> | <u>198</u> |
| | Average: | 101 | 329 |

Rounded Average Flame Spread Rating (FSR): **100**

Rounded Average Smoke Developed Classification (SDC): **330**

Observations of Burning Characteristics

- In all three tests, the sample surfaces began to blister before ignition between approximately 1.25 and 1.5 minutes after exposure to the test flame.
- The flame fronts advanced to maximum distances of 6 m (end point) at approximately 3.0, 3.25, and 3.25 minutes into each respective test.
- Smoke Developed and temperature were also recorded during the tests (see accompanying charts).

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

Robert A. Carleton,
Fire Testing.

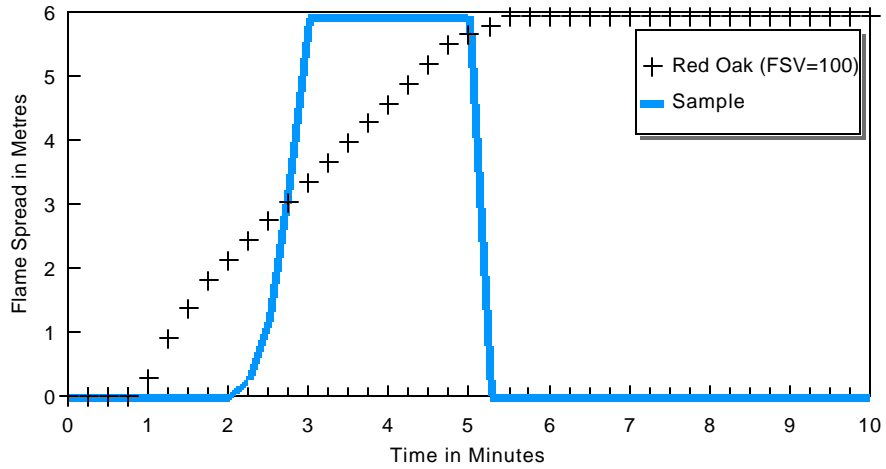
Ian Smith,
Fire Testing.

Note: This report and service are covered under Exova Canada Inc. Standard Terms and Conditions of Contract which may be found on the Exova website (www.exova.com), or by calling 1-866-263-9268.

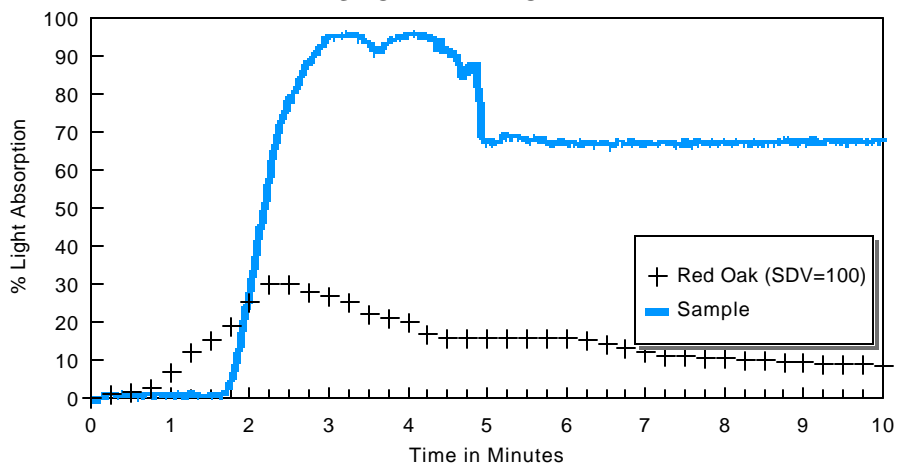
Sample: "2.5 mm Linoleum with NATURCote"

Test #1 of 3

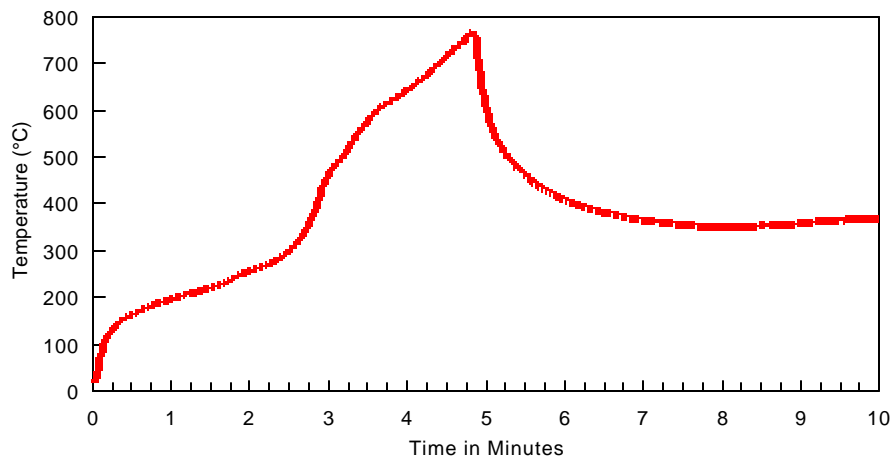
FLAME SPREAD



SMOKE DEVELOPED



TEMPERATURE



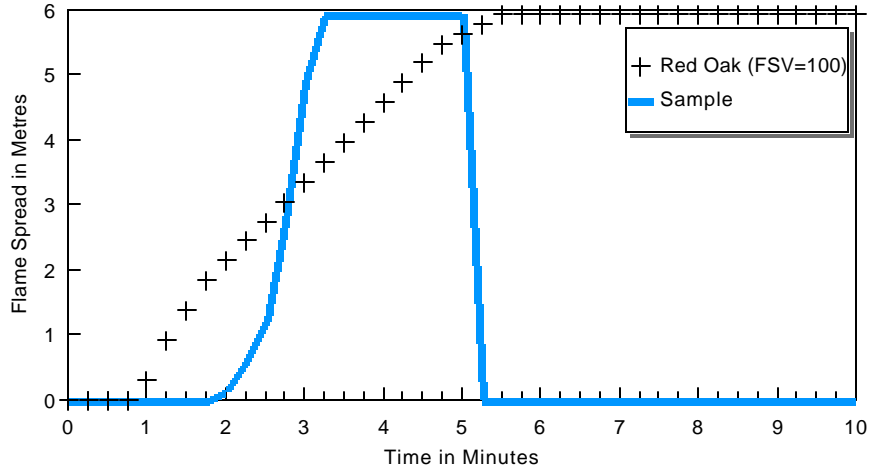
FSV
103

SDV
402

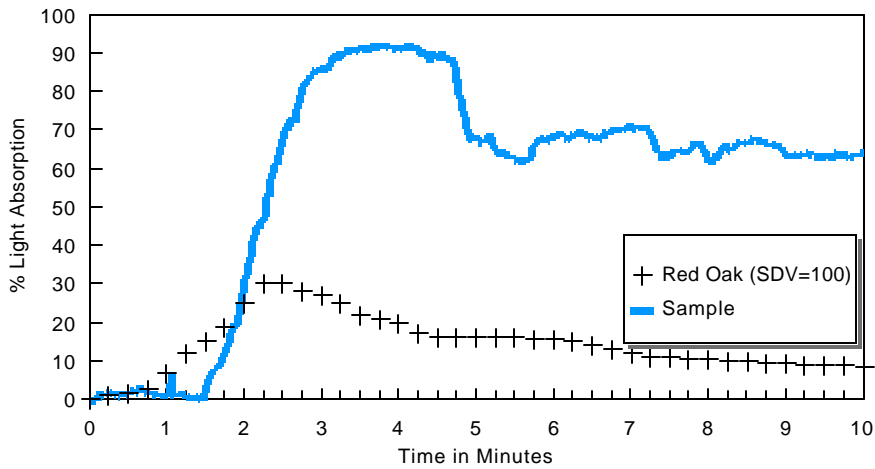
Sample: "2.5 mm Linoleum with NATURCote"

Test #2 of 3

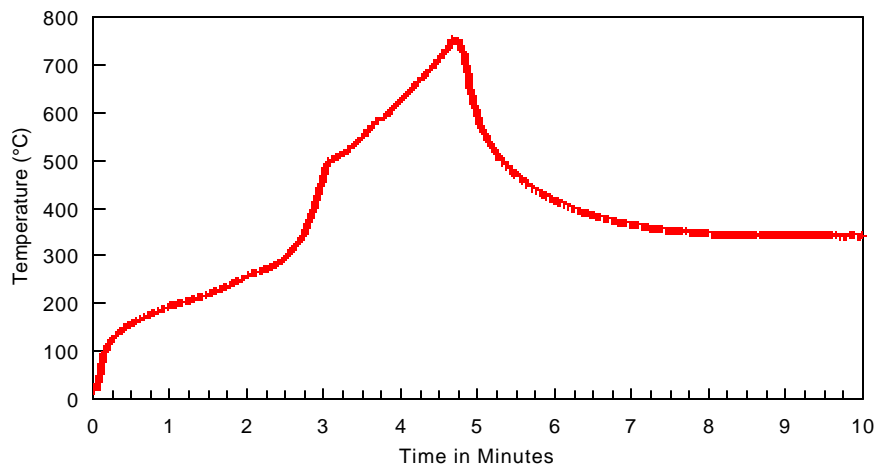
FLAME SPREAD



SMOKE DEVELOPED



TEMPERATURE



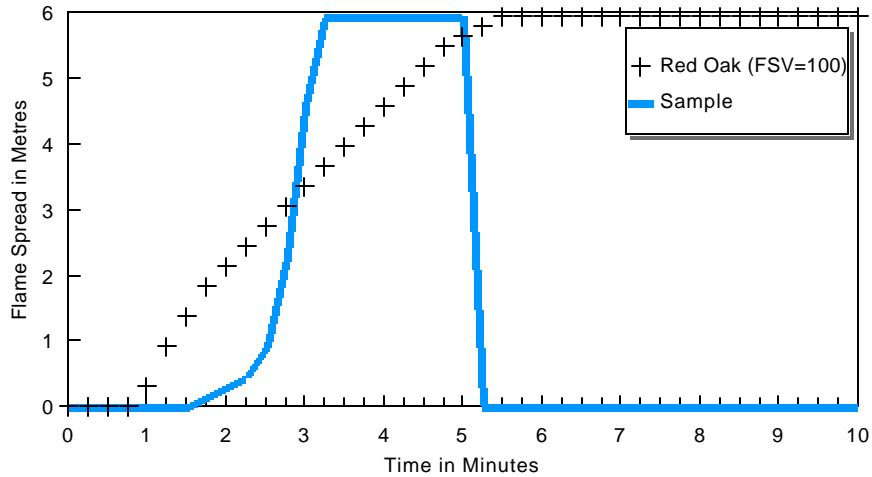
FSV
101

SDV
388

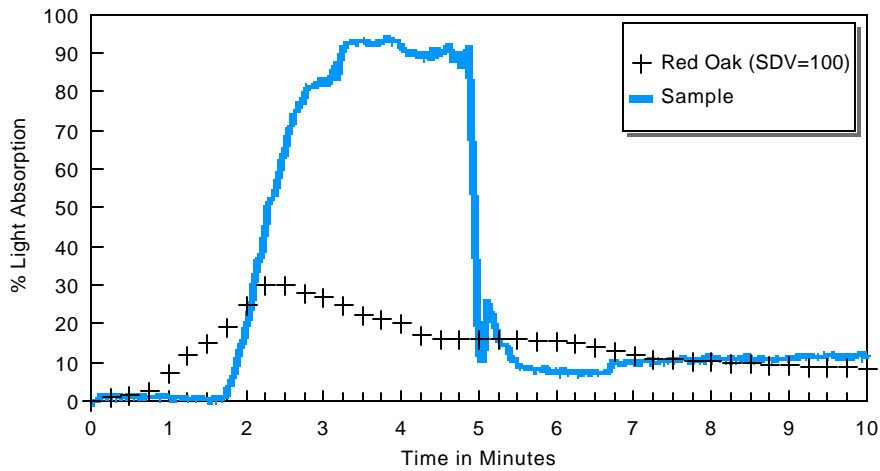
Sample: "2.5 mm Linoleum with NATURCote"

Test #3 of 3

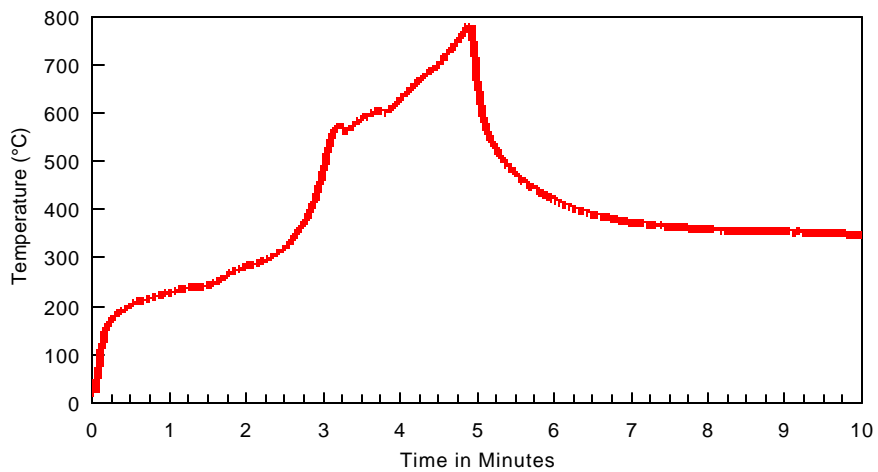
FLAME SPREAD



SMOKE DEVELOPED



TEMPERATURE



FSV
100

SDV
198