



“The test report attached verifies the fire performance for Armstrong Sheet 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.”

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**CAN/ULC-S102.2 Surface Burning Characteristics
of "Armstrong Cushion Residential/Light Commercial"**

A Report To: **Armstrong World Industries**
2500 Columbia Avenue, P.O. Box 3001
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USA

Phone: 717-396-5007
Email: blaukhuff@armstrong.com

Attention: Barbara Laukhuff

Submitted by: Fire Testing

Report No. 10-002-678(B)
6 Pages

Date: October 12, 2010



“The test report attached verifies the fire performance for Armstrong Sheet 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.”

ACCREDITATION To ISO/IEC 17025 for a defined Scope of Testing by the Standards Council of Canada

SPECIFICATIONS OF ORDER

Determine the Flame Spread and Smoke Developed Classifications based upon triplicate testing conducted in accordance with CAN/ULC-S102.2-10, as per your Purchase Order No. 4502467509 and our Quotation No. 10-002-9110 dated September 21, 2010.

SAMPLE IDENTIFICATION (Exova sample identification number 10-002-S0678-2)

PVC sheet flooring material, identified as "Armstrong Cushion Vinyl Residential/Light Commercial Sheet Flooring (Abode, Duality)".

TEST PROCEDURE

The method, designated as CAN/ULC-S102.2-10, "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

Each sample consisted of 6 sections of material, each approximately 445 mm in width by 1219 mm in length. The samples were supplied pre-adhered to a "Tunnel Board" cement board substrate using Armstrong S-288 adhesive. For each test, the sections were butted together to form the requisite specimen length. Prior to testing, each sample was 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: 2010-10-06 Test #2: 2010-10-06 Test #3: 2010-10-06

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 floor of the tunnel so as to form a continuous surface and then the lid is lowered.

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 m·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>
"Armstrong Cushion Vinyl Residential/Light Commercial"	Test #1	239	476
	Test #2	189	403
	Test #3	<u>200</u>	<u>429</u>
	Average:	209	436
	Rounded Average Flame Spread Rating (FSR):	210	
	Rounded Average Smoke Developed Classification (SDC):	435	

Observations of Burning Characteristics

- Each sample ignited approximately 0.25 minutes after exposure to the test flame.
- All three flame fronts propagated to a maximum distance of 6 metres (end point) at approximately 1.75, 2, and 1.75 minutes into each respective test. Smoldering was also observed after flame front recession.
- 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.

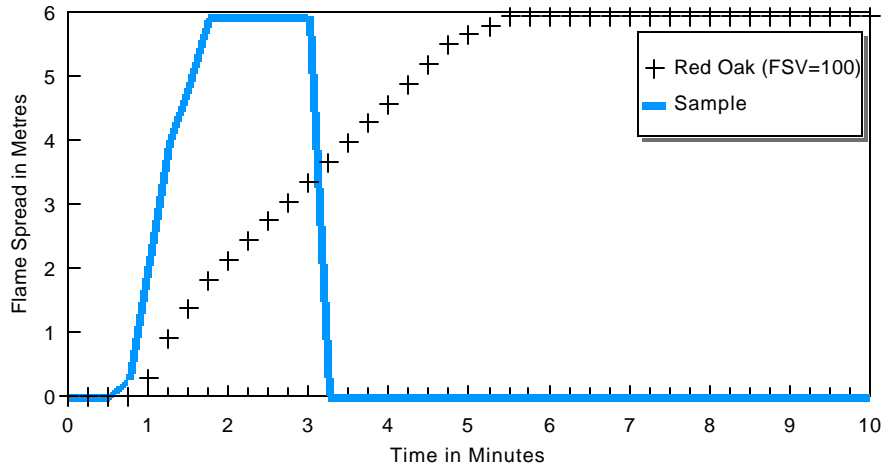
Ian Smith,
Fire Testing.

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.

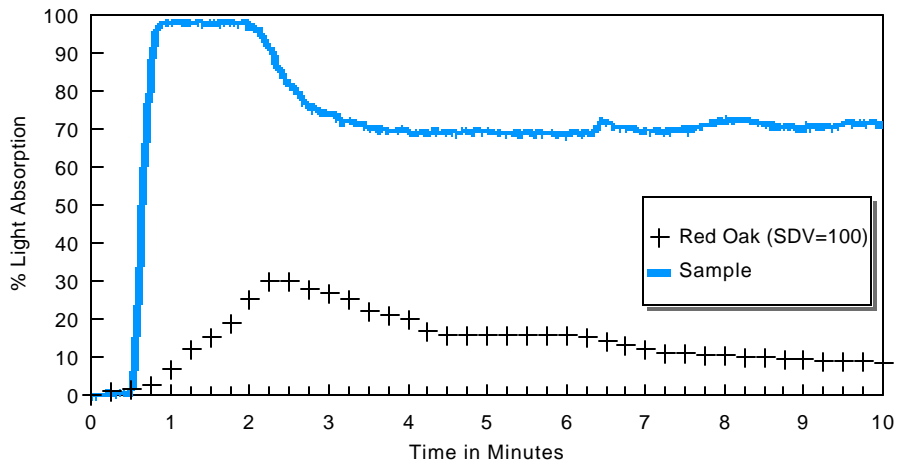
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Test #1 of 3

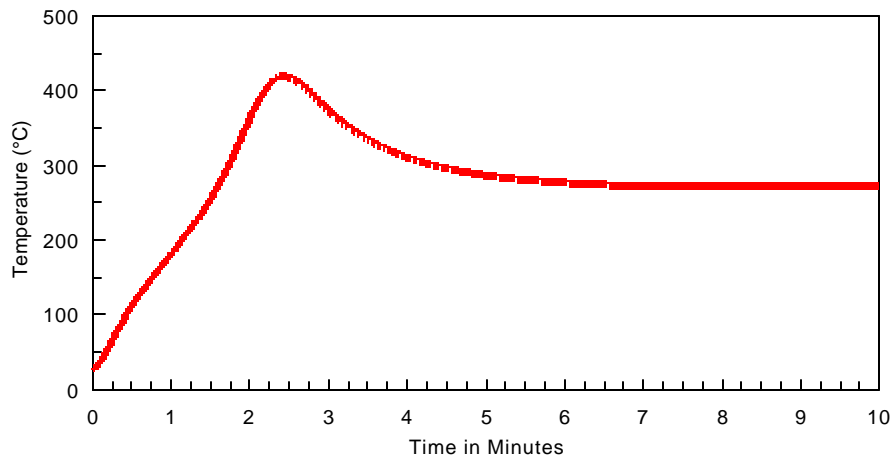
FLAME SPREAD



SMOKE DEVELOPED



TEMPERATURE



FSV
239

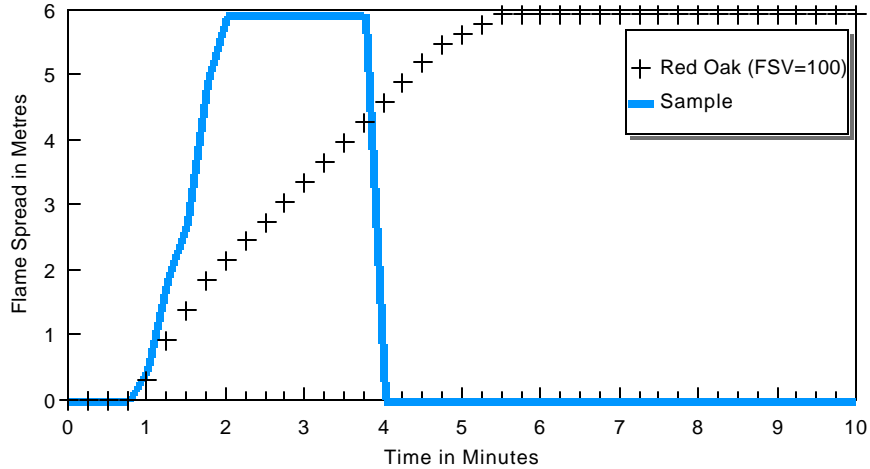
SDV
476

Max. Temp. (°C)
421.8

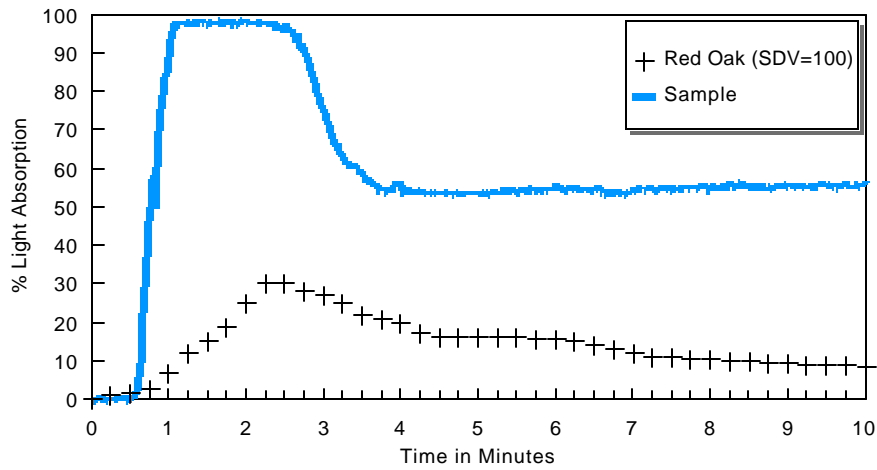
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Test #2 of 3

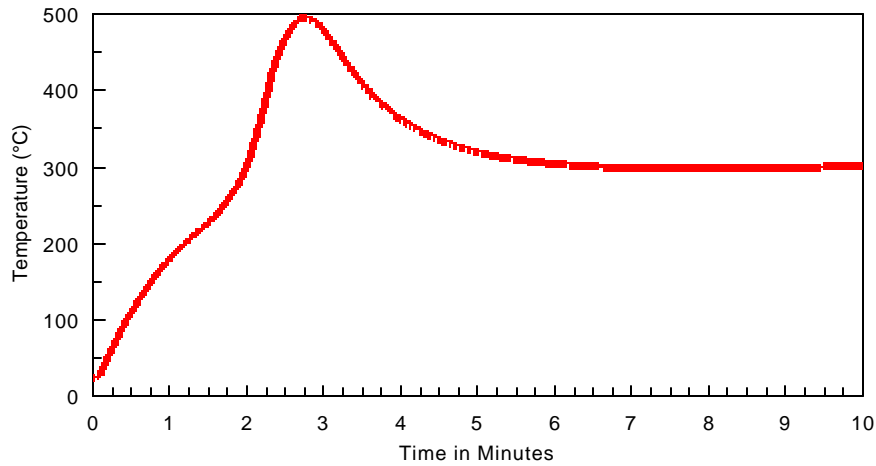
FLAME SPREAD



SMOKE DEVELOPED



TEMPERATURE



FSV
189

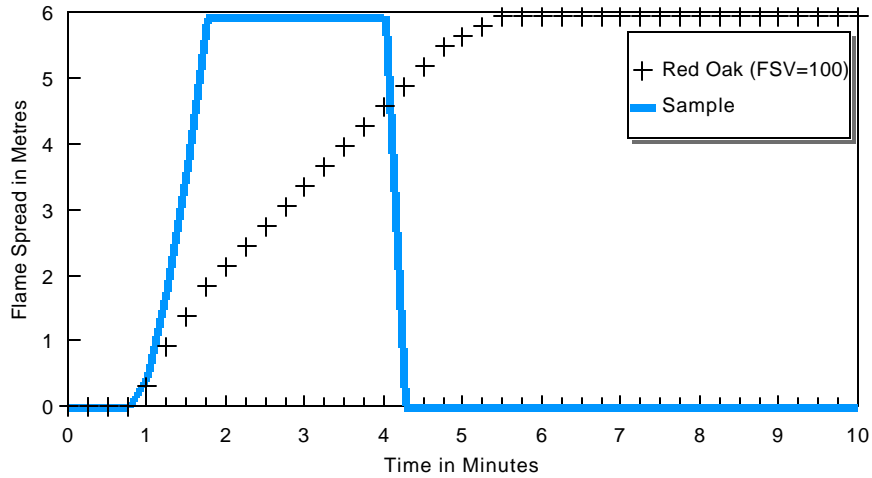
SDV
403

Max. Temp. (°C)
498.2

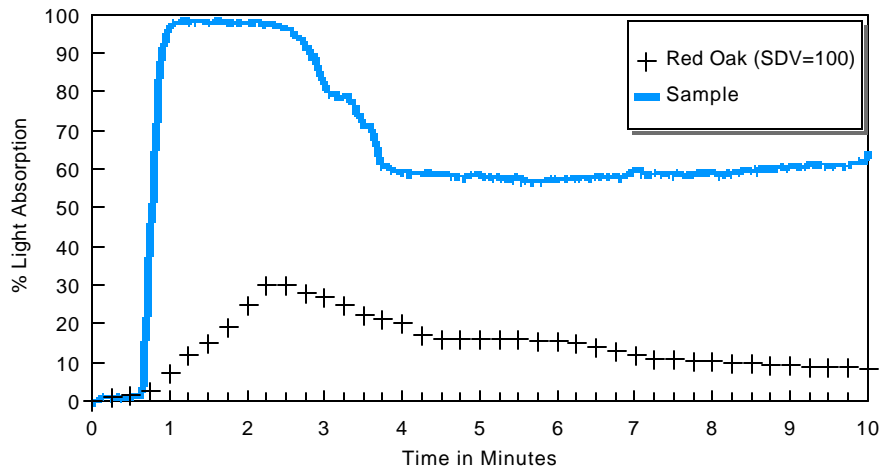
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Test #3 of 3

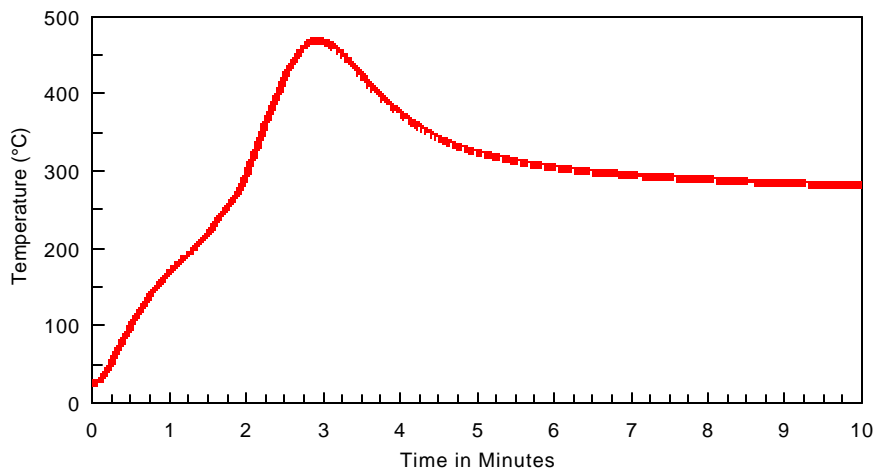
FLAME SPREAD



SMOKE DEVELOPED



TEMPERATURE



FSV
200

SDV
429

Max. Temp. (°C)
471.3