



## CAPITAL TESTING AND CERTIFICATION SERVICES

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# TEST REPORT

**Test Method:** CAN/ULC-S102.2:2018-REV1, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies

**Rendered To:** AHF Products  
3840 Hempland Rd, P.O. Box 566  
Mountville, PA 17554

**Product Description:** Armstrong Natralis Vinyl Sheet (Homogeneous) with S-995 Adhesive

**Report Number:** T-17055

**Original Issue Date:** 05/24/2023

**Test Date:** 05/19/2023

**Pages:** 9



TL-224

The observations and test results in this report are relevant only to the sample(s) tested. Capital Testing and Certification Services (herein referred to as Capital Testing) does not verify information that is provided by the client. This test report in no way constitutes or implies product certification, approval or endorsement by Capital Testing. Capital Testing assumes no liability to any party, other than to the Client in accordance with the terms and conditions agreement, for any loss, expense or damage occasioned by the use of this report. This report, the Capital Testing name or any of its marks, shall not be used for the sale or advertisement of the tested material. This report shall not be reproduced, except in full, or modified in any way.



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### I. SCOPE

This test report contains the results from a specimen tested in accordance with CAN/ULC-S102.2, *Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies*. The results of CAN/ULC-S102.2 testing are commonly used by building code officials and regulatory agencies to determine whether interior finish materials are suitable for their intended application.

### II. TEST SPECIMENS

Test specimens should be representative of the material which the test is intended to examine. All test specimens should be approximately 10mm narrower than the interior width of the tunnel and  $7315 \pm 15$  mm in length. The maximum allowable thickness is 65mm. The test specimen can be provided in a continuous, unbroken length or multiple sections that will be butted together. Prior to testing, the specimens are conditioned to a constant mass in an environment that is held at  $23 \pm 3$  °C ( $73.4 \pm 5.4$  °F) and  $50 \pm 5\%$  relative humidity.

TEST SPECIMEN INFORMATION	
Product Description	Armstrong Natralis Vinyl Sheet (Homogeneous) with S-995 Adhesive; Nominal Thickness: 2mm; Installed with S-995 adhesive on 1/4-inch thick cement board, using U-notch trowel, 1/32-inch deep, 1/16-inch wide, 1/32-inch apart. *
Samples Selected By	Client
Date Received	04/27/2023
Conditioning Time (days)	10
Specimen Size (in.)	17-1/2 x 96
Continuous / Sectioned	Sectioned
Number of Sections	3
Avg. Total Weight (lbs.)	86.1
Average Thickness (in.)	0.328
Color	White
Exposed Surface	Smooth surface
Mounting Method	Sample material was mounted onto a 1/4" cement board substrate by Capital Testing using S-995 adhesive. The adhesive was applied to the substrate and set for 15 minutes before the sample material was laid on top of it. A 100 lb. roller was used to smooth out and create a better adhesion between the sample material and cement board.

\* Information provided by the Client



### III. PROCEDURE

The tunnel is preheated to  $85 \pm 5 \text{ }^\circ\text{C}$  ( $185 \pm 9 \text{ }^\circ\text{F}$ ) as measured by a thermocouple embedded in the backwall of the furnace at 7090 mm (23.3 ft) from the centerline of the burner. The tunnel is then cooled to  $40 \pm 3 \text{ }^\circ\text{C}$  ( $104 \pm 5.4 \text{ }^\circ\text{F}$ ) as measured by a thermocouple embedded in the backwall of the furnace at 4000 mm (13.1 ft) downstream of the centerline of the burner.

After the tunnel has cooled to the required temperature range, the tunnel lid is lifted, and the test specimen is placed on the ledges of the tunnel. The specimen is mounted in a ceiling orientation with the side that will be exposed to the flame facing downward. A 6 mm (0.25 in.) fiber-cement board is placed on the backside of the specimens to protect the tunnel lid during testing.

Once the sample has been loaded into the test chamber, the lid is lowered, and a  $1.2 \pm 0.025 \text{ m/s}$  ( $236.2 \pm 4.9 \text{ ft/min}$ ) airflow is established. The test specimen is preheated for approximately 2 minutes prior to applying the 90-kW burner. The burner is positioned at the front end of the tunnel. It has two ports that point downward at a  $45^\circ$  angle toward the face of the specimen. An air ramp is placed at the front end of the specimen to reduce air eddies and to prevent low density material from being blown away from the burner.

After the 2-minute preheat, the burner is ignited, and it remains on for the duration of the 10-minute test. The flame is tracked by an observer, referred to as the Reader, as it progresses down the length of the tunnel. Smoke density is measured with the use of the photometer system on the exhaust duct. Temperature data is recorded throughout the test by a thermocouple probe that is 7000 mm (23 ft) from the centerline of the burner and approximately 25mm (1 in.) below the upper ledges of the tunnel.

### IV. CALCULATION OF RESULTS

In CAN/ULC-S102 testing, test results for individual burns are reported as Flame Spread Value (FSV) and Smoke Developed Value (SDV). The average indices, that are derived from a minimum of three individual burns, are reported as Flame Spread Rating (FSR) and Smoke Developed Classification (SDC).

The Flame Spread Value is derived by plotting the flame spread distance versus time. Only progressive flame spread is plotted. The total area ( $A_T$ ) under the flame spread distance-time plot is determined by ignoring any flame front recession. The calculation of FSV is described below:

$$\text{When } A_T \leq 29.7 \text{ m}\cdot\text{min:} \quad \text{FSI} = 1.85 * A_T$$

$$\text{When } A_T > 29.7 \text{ m}\cdot\text{min:} \quad \text{FSI} = 1640 / (59.4 - A_T)$$

The Smoke Developed Value is derived by plotting the photoelectric cell readings versus time. The area under the curve for the tested material is then divided by the area under the curve for select-grade red oak flooring. The resulting value is then multiplied by 100.

The Flame Spread Rating is determined by averaging a minimum of three individual Flame Spread Values and rounding that average to the nearest multiple of 5. The Smoke Developed Classification is determined by averaging a minimum of three individual Smoke Developed Values and rounding that average to the nearest multiple of 5.



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**V. DISCUSSION**

**CAN/ULC-S102.2 Standard Language and Disclaimers**

The following language was taken directly from the CAN/ULC-S102.2 standard. It has been included for information purposes.

*Smoke Developed Value (SDV) and Flame Spread Value (FSV) are recorded in this test. However, there is not necessarily a relationship between these two measurements. – CAN/ULC-S102.2:2018-REV1, Section 1.4*

*This method defines the relative surface burning characteristics under specified test conditions. Although the procedure is applicable to materials, products and assemblies used in building construction for development of comparative surface spread of flame data, test results may not reflect the relative surface burning characteristics of tested materials under all building fire conditions. – CAN/ULC-S102.2:2018-REV1, Section 3.1*

*The “fire hazard” of any material in the light of present knowledge cannot be evaluated on the basis of any one test. A body of tests, each measuring one or more characteristics of a material, product, or assembly, may be needed for full assessment. These assessments are intended as aids to those who have the responsibility for determining acceptable levels of potential hazard. The overall fire hazard of a material as it is to be used can only be determined by an analysis of its behavior under several test conditions in addition to further analysis which includes consideration of building construction, occupancy, location and fire protection features. – CAN/ULC-S102.2:2018-REV1, Section 3.2*

**VI. TEST RESULTS**

FLAME SPREAD RATING (FSR)	SMOKE DEVELOPED CLASSIFICATION (SDC)
<b>25</b>	<b>70</b>

Test Start Date	05/19/2023
Test End Date	05/19/2023
Equipment Operator	Chris Kaiser
Flame Spread Reader	Chris Palumbo

	Burn #1	Burn #2	Burn #3
Ignition Time (s)	40	38	42
Flame Spread Value (FSV)	26.930	16.305	30.753
Smoke Developed Value (SDV)	63.4	56.0	86.9
Maximum Temperature (°C)	371.8	354.4	373.1
Maximum Temperature (°F)	701.2	670.0	703.6
Time to Maximum Temperature (min)	5.23	4.187	4.20
Maximum Flame Spread Distance (m)	2.57	1.30 **	2.38
Maximum Flame Spread Distance (ft)	8.43	4.30 **	7.81
Time to Maximum FS Distance (min)	5.15	9.64 **	6.12



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### VII. OBSERVATIONS

#### **During Test**

All burns: None.

#### **After Test**

Burn 1: Charring of the sample material to 12'. Blistering of the sample material surface to 19'. Discoloration of the sample material surface to 24'. The sample material continued to burn after the test was concluded and the burner was extinguished.

Burn 2: Charring of the sample material to 8'. Blistering of the sample material surface to 16'. Discoloration of the sample material surface to 24'. The sample material continued to burn after the test was concluded and the burner was extinguished.

Burn 3: Charring of the sample material to 14'. Blistering of the sample material surface to 21'. Discoloration of the sample material surface to 24'. The sample material continued to burn after the test was concluded and the burner was extinguished.

Note: Reported observation distances are relative to the entire length of the test specimen.

### VIII. REMARKS

The average weights and thicknesses reported include the sample material, adhesive, and cement board backer.

\*\* Due to electrical noise the maximum burn length and time to the maximum burn length for burn 2 was incorrectly recorded. The correct maximum distance is 1.29 meters (4.23 feet) and time to the maximum distance is 4.00 minutes (240 seconds).

Testing arranged by HMTX Industries on behalf of AHF Products.



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## IX. GRAPHS AND INDIVIDUAL BURN DATA

Test Method  Project #  Date  Time (Test Start)  Test No.

Specimen ID

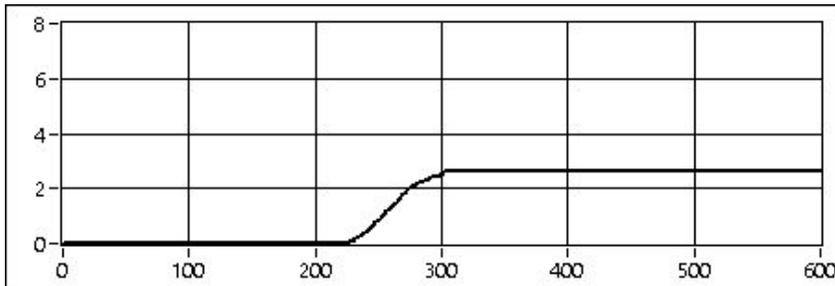
Specimen Description

Mounting Procedure

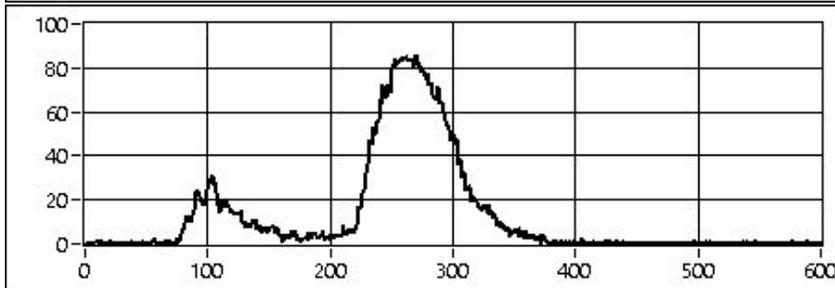
Fuel (CF)  Time to 980F (min)  Max Temp (F)  Time to Max Temp (min)

FS Area  Maximum FS  MAX FS Time (min)

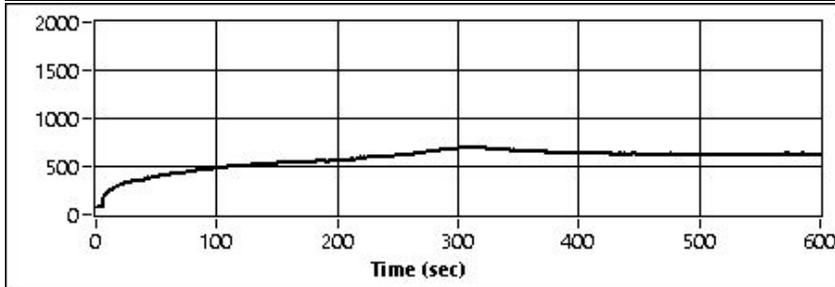
Smoke Area (%A min)  Calibration Smoke Area  Raw SD  Raw FSI



FI Spread



Smoke (%A)



23 ft Temp

Final FSI  Final SD

Test Room Temperature (°F): 73.7

Test Room Humidity (%RH): 46.7

**Note: Distances on this page are reported in meters.**



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Test Method  Project #  Date  Time (Test Start)  Test No.

Specimen ID

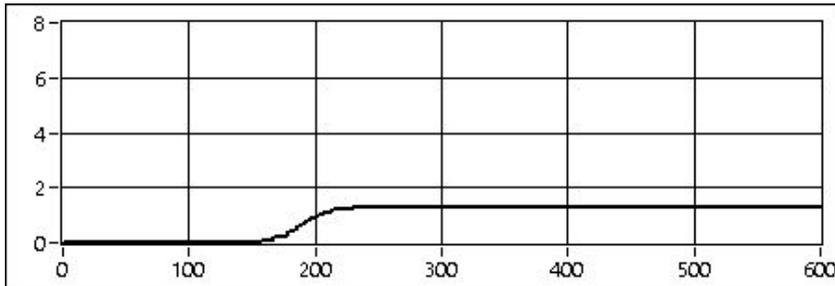
Specimen Description

Mounting Procedure

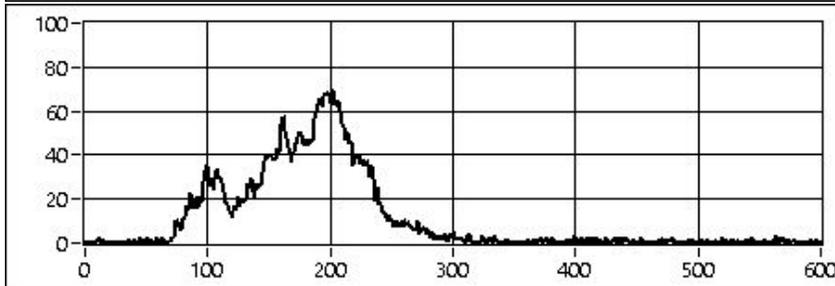
Fuel (CF)  Time to 980F (min)  Max Temp (F)  Time to Max Temp (min)

FS Area  Maximum FS  MAX FS Time (min)

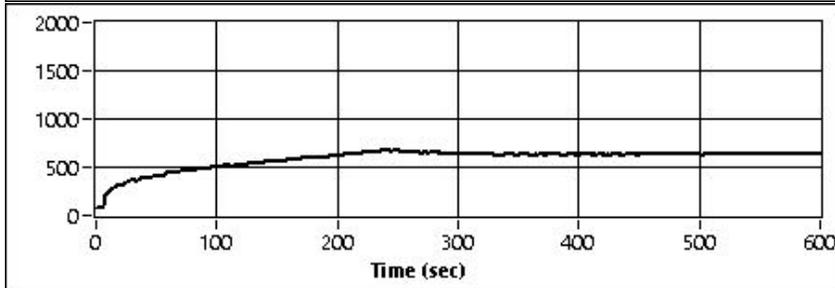
Smoke Area (%A min)  Calibration Smoke Area  Raw SD  Raw FSI



FI Spread



Smoke (%A)



23 ft Temp

Final FSI  Final SD

Test Room Temperature (°F): 72.5

Test Room Humidity (%RH): 48.0

**Note: Distances on this page are reported in meters.**



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Test Method  Project #  Date  Time (Test Start)  Test No.

Specimen ID

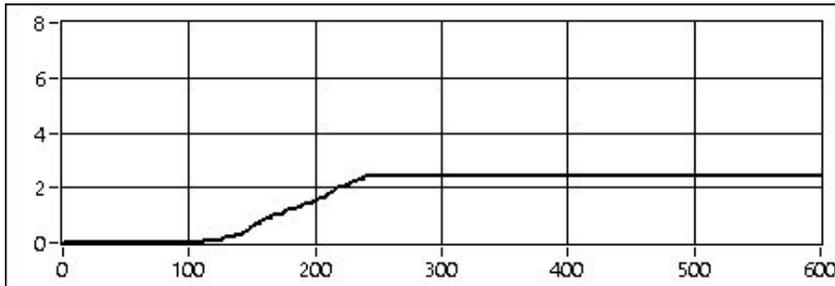
Specimen Description

Mounting Procedure

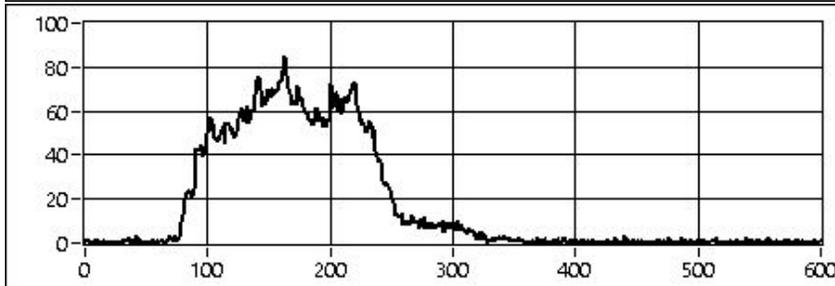
Fuel (CF)  Time to 980F (min)  Max Temp (F)  Time to Max Temp (min)

FS Area  Maximum FS  MAX FS Time (min)

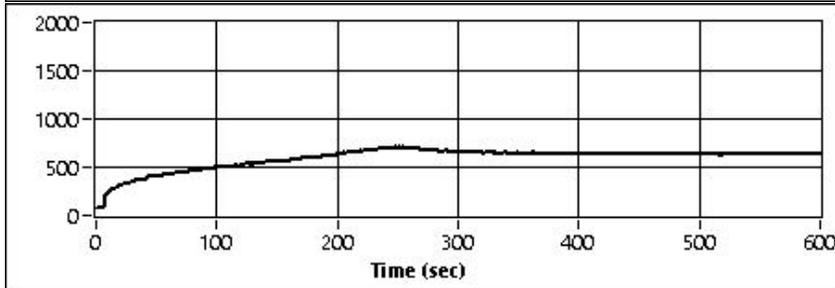
Smoke Area (%A min)  Calibration Smoke Area  Raw SD  Raw FSI



FI Spread



Smoke (%A)



23 ft Temp

Final FSI  Final SD

Test Room Temperature (°F): 73.2

Test Room Humidity (%RH): 46.5

**Note: Distances on this page are reported in meters.**



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**X. AUTHORIZED SIGNATURES**

**Report Written By:**

Chris Kaiser  
Lab Technician II

05/24/2023

Date

**Reviewed and Approved By:**

Chris Palumbo  
Sr. Manager of Product Testing

05/24/2023

Date

**XI. REVISION HISTORY**

Revision Number	Date	Summary
0	05/24/2023	Original Report Issued

**XII. ACCREDITATION**

Capital Testing and Certification Services is an ISO/IEC 17025 accredited testing laboratory whose scope includes CAN/ULC S102.2. Accrediting Body: International Accreditation Service, Inc. (IAS). Testing Laboratory TL-224.