



HPVA Laboratories  
1825 Michael Faraday Drive, Reston, VA 20190-5350  
PHONE 703-435-2900 FAX 703-435-2537



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.

Report On  
Smoke Density Characteristics  
As Determined By  
ASTM E 662 Test Method

PREPARED FOR:  
**Armstrong Flooring Inc.**  
Lancaster, PA  
TEST NUMBER: S-2109R  
Armstrong Commercial Vinyl Composition Tile (VCT)

Date of Issue:  
4/20/2016

Date of Revision:  
4/11/2017





**I. INTRODUCTION**

The following Scope, Summary of Test Method, Test Specimens, and Specimen Conditioning sections are abridged from the Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials ASTM E662.

**II. SCOPE**

This fire-test response standard covers determination of the specific optical density of smoke generated by solid materials and assemblies mounted in the vertical position in thicknesses up to and including one inch. The test is based on the attenuation of a light beam by smoke accumulating within a closed chamber due to nonflaming pyrolytic decomposition and flaming combustion. Results are expressed in terms of specific optical density which is derived from a geometrical factor and the measured optical density, a measurement characteristic of the concentration of smoke.

The test is intended for use in research and development and not as a basis for ratings for regulatory purposes. At the present time, no means are provided for predicting the density of smoke which may be generated by the materials exposed to heat and flame under other fire conditions.

**III. SUMMARY OF TEST METHOD**

This method employs an electrically-heated radiant energy source mounted within an insulated ceramic tube and positioned so as to produce an irradiance level of 2.2 BTU/ft<sup>2</sup> sec. (2.5W/cm<sup>2</sup>) averaged over the central 1.5 inch diameter area of a vertically mounted specimen facing the radiant heater. The nominal 3 by 3 inch specimen is mounted within a holder which exposes an area measuring 2 9/16 by 2 9/16 inch. The holder can accommodate specimens up to one inch thick. This exposure provides the nonflaming condition of the test.

For the flaming condition, a six-tube burner is used to apply a row of air-propane flamelets across the lower edge of the exposed specimen area and into the specimen holder trough. The application of flame in addition to the specified irradiance level from the heating element constitutes the flaming combustion exposure.

The test specimens are exposed to the flaming and nonflaming conditions within a closed 18 ft<sup>3</sup> chamber. A photometric system with a 36 inch vertical light path measures the decrease in light transmission as smoke accumulates.

**IV. TEST SPECIMENS**

The test specimens are 3 by 3 +/- .03 inch by the intended installation thickness up to and including 1 inch thickness. Materials in thicknesses in excess of 1 inch are sliced to 1 inch and the original (uncut) surface tested. Multi-layer materials thicker than 1 inch with surface facings of different materials are sliced to 1 inch thickness, and each original (uncut) surface tested separately, if both surface facings are exposed to fire.

**V. SPECIMEN CONDITIONING**

Specimens are predried for 24 hours at 140 ± 5°F (60 ± 3°C) and then conditioned to equilibrium (constant weight) at an ambient temperature of 73 ± 5°F (23 ± 3°C) and a relative humidity of 50 ± 5 percent.



**Report on Smoke Density Characteristics as Determined by:  
 ASTM E 662 Test Method**

<b>Test Number: S-2109R</b>	<b>Test Date: 04/19/16</b>
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<b>Report Prepared For:</b>	<b>Armstrong Flooring Inc. Lancaster, PA</b>
<b>Material Tested:</b>	<b>Armstrong Commercial Vinyl Composition Tile (VCT)</b>

**Sample Information:**

<b>Detailed Product Description:</b>	Exact Product Tested: Raffia Stream, Pattern #55911, Lot D068A. Product Lines with Similar Construction: Raffia, ChromaSpin, Stonetex, Arteffects, Companion Square, Imperial Texture Rave, Imperial Texture, Imperial Texture Classics, MultiColor, Feature Tile/Strips, SDT, Safety Zone, Civic Square, and Crown Texture.		
<b>Sample Preparation:</b>	The material was adhered to a 1/4" cement board backer using Armstrong S-515 adhesive. Samples were selected and prepared by Armstrong.		
<b>Sample Selection By:</b>	Manufacturer	<b>Sample Color:</b>	Grey
<b>Number of Specimens:</b>	6	<b>Conditioning Days:</b>	8

**Test Conditions:**

<b>Radiometer Reading (mV):</b>	7.71	<b>Irradiance (W/cm2):</b>	2.5
<b>Furnace Temp. (°F):</b>	1416	<b>Specimen Holder Used:</b>	Trough

**Test Data (Non-Flaming Exposure Mode):**

	Burn 1	Burn 2	Burn 3	Average
<b>Thickness (in.):</b>	0.391	0.390	0.387	0.389
<b>Weight (g):</b>	84.10	84.83	85.15	84.69
<b>Chamber Pressure:</b>	3	3	3	3
<b>Chamber Temp. (°F):</b>	95	98	96	96
<b>Smoke Color:</b>	Grey	Grey	Grey	Grey
<b>90 Second Ds:</b>	1	2	1	<u>1</u>
<b>4 Minute Ds:</b>	107	125	84	<u>105</u>
<b>Max Dm:</b>	307	320	314	314
<b>Time to Max Dm (minutes):</b>	14.30	14.66	13.78	14.25
<b>Corrected Dm:</b>	303	315	302	<u>307</u>

**Test Data (Flaming Exposure Mode):**

	Burn 1	Burn 2	Burn 3	Average
<b>Thickness (in.):</b>	0.390	0.389	0.390	0.390
<b>Weight (g):</b>	84.05	84.67	85.52	84.75
<b>Chamber Pressure:</b>	3	3	3	3
<b>Chamber Temp. (°F):</b>	97	97	98	97
<b>Smoke Color:</b>	Grey	Grey	Grey	Grey
<b>90 Second Ds:</b>	26	22	17	<u>22</u>
<b>4 Minute Ds:</b>	231	232	215	<u>226</u>
<b>Max Dm:</b>	315	320	311	315
<b>Time to Max Dm (minutes):</b>	11.12	12.34	11.45	11.64
<b>Corrected Dm:</b>	307	311	302	<u>307</u>

<b>Observations:</b>	The material expanded toward the head source during both the flaming and non-flaming mode.
<b>Remarks:</b>	Weights and thicknesses include the 1/4" cement board backer. Revision 02/14/17: Armstrong Flooring changed to Armstrong Flooring Inc. Revision 04/11/17: "Crown Texture" was added to the list of products with similar construction.
<b>Test Operator</b>	CP <span style="float: right;">Note: Ds = Specific Optical Density; Dm = Max Specific Optical Density</span>

Report Prepared By: \_\_\_\_\_ Report Reviewed By: \_\_\_\_\_

  
 Manager of Fire Testing – Engineer

  
 Director – HPVA Laboratories

This is a factual report of the results obtained from laboratory tests of sample products. The results may be applied only to the products tested and should not be construed as applicable to other similar products of the manufacturer. The HPVA does not verify the description of the materials and products when the description is provided by the client. This report is not a recommendation or a disapprobation by the HPVA of the material or product tested. While this report may be used for obtaining product acceptance, it may not be used in advertising.