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

PREPARED FOR:

Armstrong World Industries, Inc. Innovation Center

Lancaster, PA

TEST NUMBER: S-2083

Sample A - Luxury Vinyl Tile Flooring

Date of Issue:
1/4/2016

ACCREDITED
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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/ft2 sec. (2.5W/cm2) 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 ft3 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.

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

Test Number: S-2083	Test Date: 12/31/15

Report Prepared For:	Armstrong World Industries, Inc. Innovation Center Lancaster, PA
Material Tested:	Sample A - Luxury Vinyl Tile Flooring

Sample Information:

Detailed Product Description:	Armstrong Luxury Vinyl Tile Flooring - Glue Down Product [Vivero(Good, Better, Best), Parallel 6i, Parallel 12i, and Parallel 20i]
Sample Preparation:	The manufacturer adhered the samples to 1/2" cement board with Armstrong S-288 Adhesive.

Sample Selection By:	Manufacturer	Sample Color:	Grey
Number of Specimens:	6	Conditioning Days:	9

Test Conditions:

Radiometer Reading (mV):	7.72	Irradiance (W/cm2):	2.5
Furnace Temp. (°F):	1431	Specimen Holder Used:	Trough

Test Data (Non- Flaming Exposure Mode):

	Burn 1	Burn 2	Burn 3	Average
Thickness (in.):	0.524	0.509	0.516	0.516
Weight (g):	103.85	102.16	102.27	102.76
Chamber Pressure:	3	3	3	3
Chamber Temp. (°F):	96	96	95	96
Smoke Color:	Grey	Grey	Grey	Grey
90 Second Ds:	0	1	0	**0**
4 Minute Ds:	85	85	97	**89**
Max Dm:	404	432	414	417
Time to Max Dm (minutes):	18.92	19.38	17.83	18.71
Corrected Dm:	396	429	410	**412**

Test Data (Flaming Exposure Mode):

	Burn 1	Burn 2	Burn 3	Average
Thickness (in.):	0.520	0.509	0.527	0.519
Weight (g):	101.93	101.50	103.01	102.15
Chamber Pressure:	3	3	3	3
Chamber Temp. (°F):	95	94	96	95
Smoke Color:	Grey	Grey	Grey	Grey
90 Second Ds:	49	46	15	**37**
4 Minute Ds:	234	225	212	**224**
Max Dm:	315	290	254	286
Time to Max Dm (minutes):	14.89	14.82	19.98	16.56
Corrected Dm:	299	277	239	**272**

Observations:	None.	
Remarks:	Weights and thicknesses include 1/2" cement board backer.	
Test Operator	CK	Note: Ds = Specific Optical Density; Dm = Max Specific Optical Density

Report Prepared By:

Manager of Fire Testing – Engineer

Report Reviewed By:

Director – HPVA Laboratories