



## CAPITAL TESTING AND CERTIFICATION SERVICES

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# TEST REPORT

**Test Method:** ASTM E662-21ae1, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

**Rendered To:** AHF Products  
3840 Hempland Road  
Mountville, PA 17554  
USA

**Product Description:** SPC 5 mm (4mm + 1 mm IXPE) NACA

**Report Number:** S-2416

**Original Issue Date:** 11/07/2023

**Test Date:** 11/06/2023

**Pages:** 6



TL-224

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### I. SCOPE

This report contains the results from a specimen tested in accordance with ASTM E662, *Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials*. 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 1 inch.

### II. SUMMARY OF TEST METHOD

The testing is conducted in an 18 ft<sup>3</sup> chamber with a photometric system consisting of a light source mounted at the bottom of the chamber and a photocell mounted at the top of the chamber. Measurement is made of the attenuation of a light beam by smoke (suspended solid or liquid particles) accumulating within a closed chamber due to non-flaming pyrolytic decomposition and flaming combustion.

At the beginning of each testing day, the chamber is preheated and checked for airtightness. An electrically heated radiant-energy source is positioned to produce an irradiance level of 2.5 W/cm<sup>2</sup> averaged over the central 1.5 in. (38.1 mm) diameter area of a vertically mounted specimen that faces the radiant heater. The nominal 3 by 3 in. specimen is mounted within a holder which exposes an area measuring 2.56 by 2.56 in. This exposure provides the non-flaming mode of the test. For the flaming mode, the radiant energy source is utilized, and a six-tube multi-directional burner is added to apply a row of equidistant flames across the lower edge of the exposed specimen area and the trough on the specimen holder. The test specimens are exposed to the flaming and non-flaming conditions within a closed chamber for 20 minutes or until 3 minutes after the minimum light transmittance value has been reached.

### III. TEST SPECIMENS

Test specimens should be representative of the material or system which the test is intended to examine. The test specimens should be 3 by 3 +0, -0.03 in. (76.2 by 76.2, +0, -0.8 mm) by the intended installation thickness up to and including 1 in. (25.4 mm).

Prior to testing, the specimens are placed into a 140 ± 5°F (60 ± 3°C) oven for 24 hours. After 24 hours have elapsed, the specimens are conditioned to constant weight at an ambient temperature of 73 ± 5°F (23 ± 3°C) and a relative humidity of 50 ± 5 %.

TEST SPECIMEN INFORMATION	
Product Description	SPC 5mm (4mm + 1mm IXPE) NACA. (SKU) AR5LA100. Product Type: SPC Flooring. Rigid Core Flooring Lutea Zen Blissful Brindle.*  Flooring with attached cushion(black). Grey core. Artificial grain texture.
Specimen Description / Mounting Method	Shape: Square. Face: Wood pattern.  Specimens were wrapped in aluminum foil with the dull side facing the specimen and backed by ½" millboard.
Orientation(s) Tested	Vertical only
Color	Light brown
Samples Selected By	Client
Specimens Prepared By	Capital Testing
Date Received	10/06/2023
Conditioning Time (days)	20

\* Information provided by the Client



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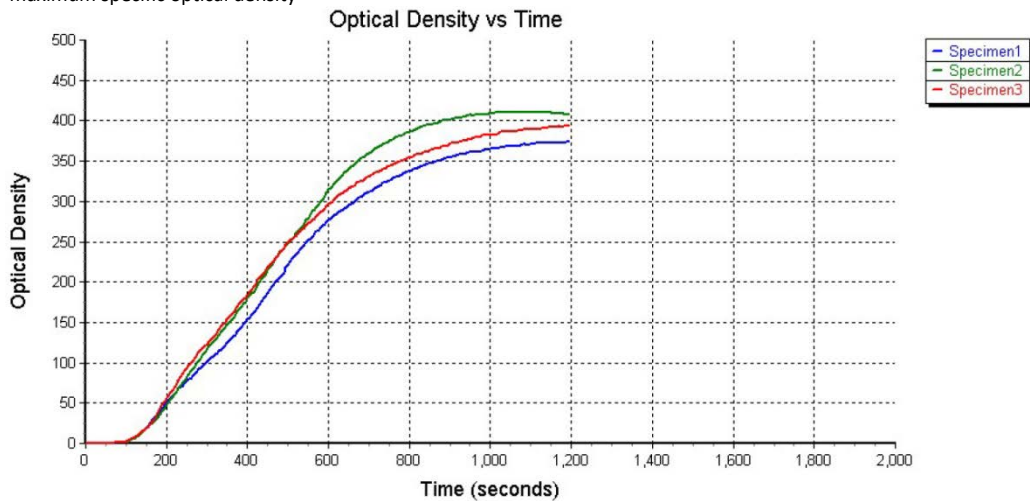
## IV. NON-FLAMING MODE DATA AND RESULTS

### NON-FLAMING MODE

	Unit	Specimen 1	Specimen 2	Specimen 3	Average
Room Temp.	°F	68.9	69.1	69.4	<b>69.1</b>
Room Humidity	%RH	44.4	43.8	44.0	<b>44.1</b>
Chamber Temp.	°F	94.5	97.3	98.0	<b>96.6</b>
Exposure Time	s	1200	1200	1200	<b>1200</b>
Length	in	2.997	3.000	2.995	<b>2.997</b>
Width	in	2.999	2.997	2.999	<b>2.998</b>
Thickness	in	0.201	0.202	0.201	<b>0.201</b>
Weight	g	42.18	42.85	42.29	<b>42.44</b>
Ds (1.5)	-	1	1	1	<b>1</b>
Ds (4.0)	-	72	75	87	<b>78</b>
Dm	-	374	411	393	<b>393</b>
Dm (corr)	-	358	399	383	<b>380</b>
t <sub>Dm</sub>	s	1185	1080	1195	<b>1153</b>

Ds (1.5) = specific optical density at 1.5 minutes  
 Ds (4.0) = specific optical density at 4 minutes  
 Dm = maximum specific optical density

Dm (corr) = corrected maximum specific optical density  
 t<sub>Dm</sub> = time to maximum specific optical density



## V. NON-FLAMING MODE OBSERVATIONS

All: Black, white, cracked, and warped convexly after testing. Greasy green and black residue in chamber.

- 1: Began smoking at 50s, blistering and expanding at 59s, and darkening at 82s. Viewing door closed at 673s.
- 2: Began smoking at 49s, blistering and expanding at 58s, and darkening at 80s. Viewing door closed at 589s.
- 3: Began smoking at 45s, blistering and expanding at 55s, and darkening at 77s. Viewing door closed at 619s.

Smoke Color:  White  Grey  Black  Other: \_\_\_\_\_



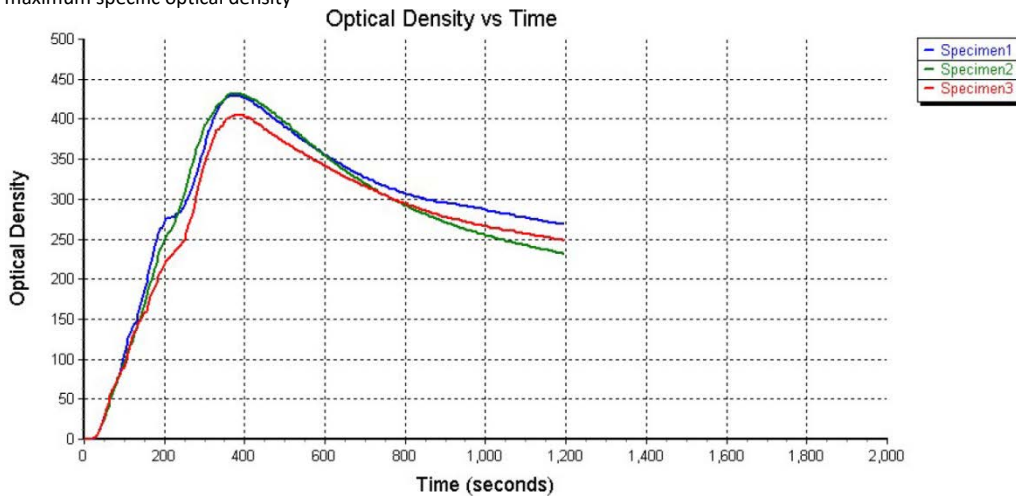
**VI. FLAMING MODE DATA AND RESULTS**

**FLAMING MODE**

	Unit	Specimen 1	Specimen 2	Specimen 3	Average
Room Temp.	°F	69.8	70.3	70.4	<b>70.2</b>
Room Humidity	%RH	43.6	42.2	41.4	<b>42.4</b>
Chamber Temp.	°F	94.0	93.7	97.9	<b>95.2</b>
Exposure Time	s	1200	1200	1200	<b>1200</b>
Length	in	2.997	3.000	2.999	<b>2.999</b>
Width	in	2.999	2.999	3.000	<b>2.999</b>
Thickness	in	0.201	0.202	0.202	<b>0.202</b>
Weight	g	42.18	42.85	42.32	<b>42.45</b>
Ds (1.5)	-	83	81	80	<b>81</b>
Ds (4.0)	-	285	292	242	<b>273</b>
Dm	-	429	432	406	<b>422</b>
Dm (corr)	-	398	398	370	<b>389</b>
t <sub>Dm</sub>	s	375	375	380	<b>377</b>

Ds (1.5) = specific optical density at 1.5 minutes  
 Ds (4.0) = specific optical density at 4 minutes  
 Dm = maximum specific optical density

Dm (corr) = corrected maximum specific optical density  
 t<sub>Dm</sub> = time to maximum specific optical density



**VII. FLAMING MODE OBSERVATIONS**

All: Teal flames near face. Black, grey, white, and warped convexly after testing.

- 1: Ignited at 3s. Began blistering and darkening at 15s. Shot smoke into furnace 78 – 87s. Viewing door closed at 254s.
- 2: Ignited at 4s. Began blistering and darkening at 12s. Shot smoke into furnace 70 – 84s. Viewing door closed at 247s.
- 3: Ignited at 4s. Began blistering and darkening at 11s. Shot smoke into furnace 82 – 91s. Viewing door closed at 284s.

Smoke Color:  White  Grey  Black  Other: \_\_\_\_\_



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### VIII. REMARKS

Orientation screening was not performed at the specification of the client.

All specimens were tested with the grain texture vertical.

### IX. DISCUSSION

#### Interpreting Results

ASTM E662 results are frequently used by code officials and regulatory agencies to determine whether a product is suitable for its intended application. The test standard itself does not establish specific performance criteria or contain a classification system. Check appropriate regulations and consult the authority having jurisdiction (AHJ) to determine the suitability of a material for the intended application.

#### ASTM E662 Standard Language and Disclaimers

The following language was taken directly from the ASTM E662 standard. It has been included for informational purposes.

ASTM E662-21ae1, Section 1.5 - This standard measures and describes the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of the materials, products or assemblies under actual fire conditions.

ASTM E662-21ae1, Section 5.1 - This test method provides a means for determining the specific optical density of the smoke generated by specimens of materials and assemblies under the specified exposure conditions. Values determined by this test are specific to the specimen or assembly in the form and thickness tested and are not to be considered inherent fundamental properties of the material tested. Thus, it is likely that closely repeatable or reproducible experimental results are not to be expected from tests of a given material when specimen thickness, density, or other variables are involved.

ASTM E662-21ae1, Section 5.2 - The photometric scale used to measure smoke by this test method is similar to the optical density scale for human vision. However, physiological aspects associated with vision are not measured by this test method. Correlation with measurements by other test methods has not been established.

ASTM E662-21ae1, Section 5.4 - The test method is of a complex nature and the data obtained are sensitive to variations which in other test methods might be considered to be insignificant.

ASTM E662-21ae1, Section 6.3 - The results of the test apply only to the thickness of the specimen as tested. There is no common mathematical formula to calculate the specific optical density of one thickness of a material when the specific optical density of another thickness of the same material is known.

ASTM E662-21ae1, Section 13 Note 6 - Prior to the adoption of this test method, it was customary to report the maximum smoke accumulated as  $D_m$  (corr), and for that reason it has been included as a part of the test report. Subsequently, a statistical analysis of the round-robin data upon which the precision statement is based, showed that the  $D_m$  values were more uniform. Therefore, it is required that both  $D_m$  and  $D_m$  (corr) be reported.



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**X. AUTHORIZED SIGNATURES**

**Report Written By:**

Victoria Gastrock  
Lab Technician I

11/07/2023

Date

**Reviewed and Approved By:**

Chris Palumbo  
Sr. Manager of Product Testing

11/07/2023

Date

**XI. REVISION HISTORY**

Revision Number	Date	Summary
0	11/07/2023	Original Report Issued

**XII. ACREDITATION**

Capital Testing and Certification Services is an ISO/IEC 17025 accredited testing laboratory whose scope includes ASTM E662. Accrediting Body: International Accreditation Service, Inc. (IAS). Testing Laboratory TL-224.