



## CAPITAL TESTING AND CERTIFICATION SERVICES

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# TEST REPORT

**Test Method:** ASTM E662-19, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

**Rendered To:**

**Product Description:**

**Report Number:**

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TL-224

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### I. SCOPE

This test 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. Measurement is made of the attenuation of a light beam by smoke accumulating within a closed chamber due to non-flaming 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.

### II. SUMMARY OF TEST METHOD

The testing is conducted in an 18 ft<sup>3</sup> chamber with a photometric system. The photometric system consists of a light source mounted at the bottom of the chamber and a photocell mounted at the top of the chamber. At the beginning of each testing day, the chamber is preheated and checked for airtightness.

An electrically heated radiant-energy source is positioned so as 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 facing 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. (65.1 by 65.1 mm). This exposure provides the non-flaming condition of the test.

For the flaming condition, the radiant energy source is utilized, and a six-tube burner is added to apply a row of equidistant flamelets 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. The photometric system with a vertical light path is used to measure the varying light transmission as smoke accumulates. The light transmittance measurements are used to calculate specific optical density of the smoke generated during the time period to reach the maximum value.



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**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. Then they are conditioned to equilibrium (constant weight) at an ambient temperature of 73 ± 5°F (23 ± 3°C) and a relative humidity of 50 ± 5 %.

TEST SPECIMEN INFORMATION	
Material Description	
Test Specimen Description / Mounting Method	
Color	
Samples Selected By	
Specimens Prepared By	
Date Received	
Conditioning Time (days)	

\* Information provided by the Client

INDIVIDUAL SPECIMEN DETAILS				
Specimen	Length (in)	Width (in)	Thickness (in)	Weight (g)
Non-Flaming 1				
Non-Flaming 2				
Non-Flaming 3				
<b>Non-Flaming AVG.</b>				
Specimen	Length (in)	Width (in)	Thickness (in)	Weight (g)
Flaming 1				
Flaming 2				
Flaming 3				
<b>Flaming AVG.</b>				



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**IV. TEST DATA**

TEST CONDITIONS				
Specimen	Test Room Temperature (°F)	Test Room Humidity (%RH)	Chamber Backwall Temp. (°F)	Exposure Time (min)
Non-Flaming 1				
Non-Flaming 2				
Non-Flaming 3				
Specimen	Test Room Temperature (°F)	Test Room Humidity (%RH)	Chamber Backwall Temp. (°F)	Exposure Time (min)
Flaming 1				
Flaming 2				
Flaming 3				

TEST RESULTS					
Specimen	D <sub>s</sub> (1.5)	D <sub>s</sub> (4.0)	D <sub>m</sub>	D <sub>m</sub> (corr)	t <sub>D<sub>m</sub></sub>
Non-Flaming 1					
Non-Flaming 2					
Non-Flaming 3					
<b>Non-Flaming AVG.</b>					
Specimen	D <sub>s</sub> (1.5)	D <sub>s</sub> (4.0)	D <sub>m</sub>	D <sub>m</sub> (corr)	t <sub>D<sub>m</sub></sub>
Flaming 1					
Flaming 2					
Flaming 3					
<b>Flaming AVG.</b>					

- D<sub>s</sub> (1.5) = specific optical density at 1.5 minutes
- D<sub>s</sub> (4.0) = specific optical density at 4 minutes
- D<sub>m</sub> = maximum specific optical density
- D<sub>m</sub> (corr) = corrected maximum specific optical density
- t<sub>D<sub>m</sub></sub> = time to maximum specific optical density (in minutes)



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**V. OBSERVATIONS**

**Non-Flaming**

**Flaming**

**VI. REMARKS**



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### VIII. DISCUSSION

#### ASTM E662 Standard Language and Disclaimers

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

*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 E662-19, Section 1.5*

*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 E662-19, Section 5.1*

*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 E662-19, Section 5.2*

*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 E662-19, Section 5.4*

*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 E662-19, Section 6.3*

#### 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 to determine the suitability of a material.



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**IX. AUTHORIZED SIGNATURES**

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Date

**Reviewed and Approved By:**

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Chris Palumbo  
Sr. Manager of Product Testing

Date

**X. REVISION HISTORY**

Revision Number	Date	Summary
0		Original Report Issued