



## CAPITAL TESTING AND CERTIFICATION SERVICES

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# TEST REPORT

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

**Rendered To:**

**Product Description:**

**Report Number:**

**Original Issue Date:**

**Test Date:**

**Pages:**



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. A vertical light path measures 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.

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. The nominal 3 in. by 3 in. specimen is mounted within a holder which exposes an area measuring 2.56 in. 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 %.

PRODUCT / SPECIMEN INFORMATION	
Material Description	
Specimen Description / Mounting Method	
Orientation(s) Tested	
Color	
Samples Selected by	
Specimens Prepared by	
Date Received	
Conditioning Time (days)	

\* 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
Test Room Temperature	°F				
Test Room Humidity	%RH				
Chamber Backwall Temperature	°F				
Length	in				
Width	in				
Thickness	in				
Weight	g				
Ds (1.5)	-				
Ds (4.0)	-				
Dm	-				
Dm (corr)	-				
t <sub>Dm</sub>	sec				
Exposure Time	sec				

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**

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



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**VI. FLAMING MODE DATA AND RESULTS**

**FLAMING MODE**

	Unit	Specimen 1	Specimen 2	Specimen 3	Average
Test Room Temperature	°F				
Test Room Humidity	%RH				
Chamber Backwall Temperature	°F				
Length	in				
Width	in				
Thickness	in				
Weight	g				
Ds (1.5)	-				
Ds (4.0)	-				
Dm	-				
Dm (corr)	-				
t <sub>Dm</sub>	sec				
Exposure Time	sec				

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**

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



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### VIII. REMARKS

### IX. DISCUSSION

#### Interpreting Results

The results of ASTM E662 testing are 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 E662-21 standard. It has been included for informational purposes.

ASTM E662-21, 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 E662-21, 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 E662-21, 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 E662-21, 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 E662-21, 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:**

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Date

**Reviewed and Approved by:**

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\_\_\_\_\_

Chris Palumbo  
Sr. Manager of Product Testing

Date

**XI. REVISION HISTORY**

Revision Number	Date	Summary
0		Original Report Issued

**ASTM E662 is covered under Capital Testing's ISO/IEC 17025 scope of accreditation.  
Accrediting Body: International Accreditation Service, Inc. (IAS)  
Testing Laboratory TL-224**