CAPITAL TESTING AND CERTIFICATION SERVICES
42777 Trade West Drive • Sterling, VA 20166
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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: Camira Transport Fabrics Ltd.
The Watermill, Wheatley Park
Mirfield, West Yorkshire, WF14 8HE
United Kingdom

Product Description: Rhino

Report Number: S-2326

Original Issue Date: 11/09/2021

Test Date: 11/04/2021

Pages: 6

IAS ACCREDITED Testing Laboratory
TL-224

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^3 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^2 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	Rhino - coated fabric / vinyl*
Specimen Description / Mounting Method	Batch: A01202* Type: Vinyl fabric; Manufacturer: Camira; Shape: Square; Surface Characteristics: Woven Texture. Sample material was mounted onto millboard with standard staples positioned horizontally in the center of the sample and the center of the four quadrants of the sample in accordance to ASTM E662-21a section 8.3.2.5.
Orientation(s) Tested	Orientation screening not performed
Color	HRUP01*
Samples Selected by	Client
Specimens Prepared by	Capital Testing
Date Received	09/24/2021
Conditioning Time (days)	34

* Information provided by the Client

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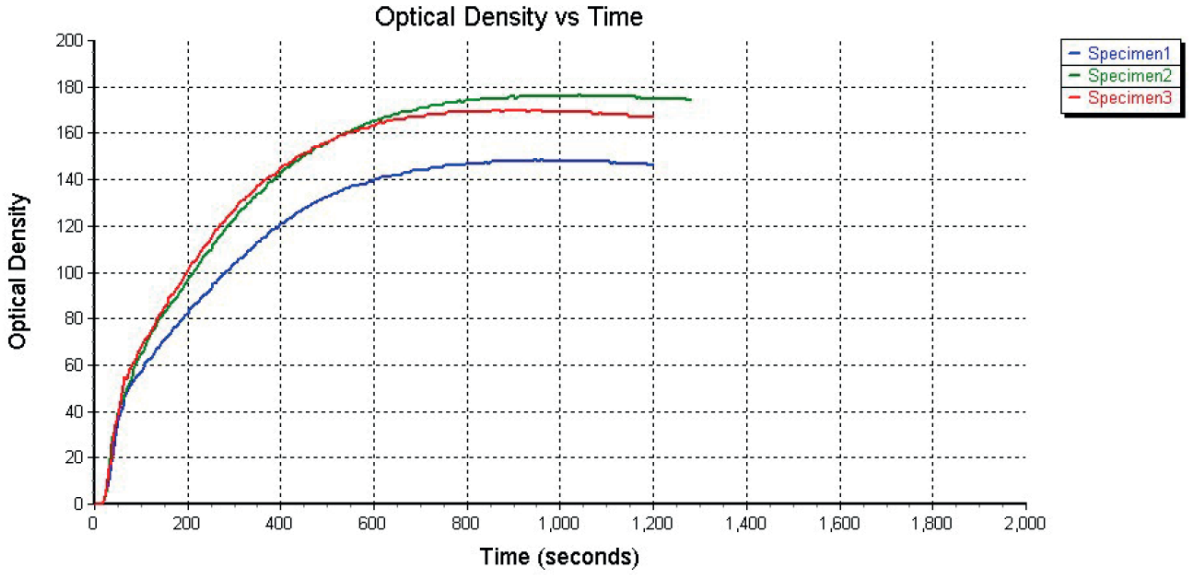
IV. NON-FLAMING MODE DATA AND RESULTS

NON-FLAMING MODE

	Unit	Specimen 1	Specimen 2	Specimen 3	Average
Test Room Temperature	°F	71.3	70.8	71.3	71.1
Test Room Humidity	%RH	37.6	38.3	36.5	37.5
Chamber Backwall Temperature	°F	96.8	97.9	97.3	97.3
Length	in	2.979	2.972	2.972	2.974
Width	in	2.995	2.990	3.000	2.995
Thickness	in	0.043	0.038	0.042	0.041
Weight	g	4.08	4.10	4.11	4.10
Ds (1.5)	-	55	61	63	**60**
Ds (4.0)	-	91	108	112	**104**
Dm	-	149	177	170	**165**
Dm (corr)	-	127	153	155	**145**
t_{Dm}	sec	945	1040	860	948
Exposure Time	sec	1200	1200	1200	1200

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_{Dm} = time to maximum specific optical density



V. NON-FLAMING MODE OBSERVATIONS

Specimen 1: Blistering and expansion of the sample material towards the furnace starting at 31 seconds into the test.
Specimen 2: Blistering and expansion of the sample material towards the furnace starting at 26 seconds into the test.
Specimen 3: Blistering and expansion of the sample material towards the furnace starting at 32 seconds into the test.

All Specimens: No significant particulate matter or soot accumulations observed during testing.

Smoke Color: ☐ White ☒ Grey ☐ Black ☐ Other_____

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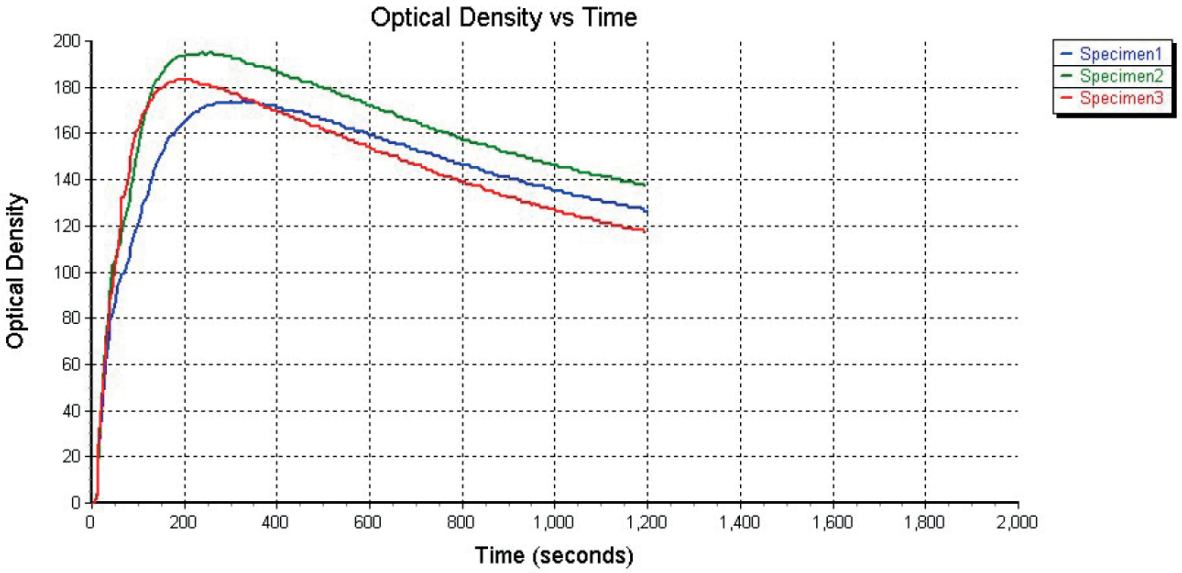
VI. FLAMING MODE DATA AND RESULTS

FLAMING MODE

	Unit	Specimen 1	Specimen 2	Specimen 3	Average
Test Room Temperature	°F	71.6	71.4	71.6	71.5
Test Room Humidity	%RH	35.7	34.7	37.7	36.0
Chamber Backwall Temperature	°F	96.6	97.7	97.7	97.3
Length	in	2.987	2.997	2.996	2.993
Width	in	2.995	2.987	2.998	2.993
Thickness	in	0.041	0.042	0.041	0.041
Weight	g	4.08	4.10	4.11	4.10
Ds (1.5)	-	115	141	156	**137**
Ds (4.0)	-	171	195	181	**182**
Dm	-	174	195	183	**184**
Dm (corr)	-	148	174	165	**162**
t_{Dm}	sec	300	235	205	247
Exposure Time	sec	1200	1200	1200	1200

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_{Dm} = time to maximum specific optical density



VII. FLAMING MODE OBSERVATIONS

All Specimens: Immediate ignition at the start of each test burn. No significant particulate matter or soot accumulations observed during testing.

Smoke Color: ☐ White ☒ Grey ☐ Black ☐ Other_____

VIII. REMARKS

Weights and thicknesses recorded only include the sample material and not the millboard and staples used for mounting.

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 Dm (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 Dm values were more uniform. Therefore, it is required that both Dm and Dm (corr) be reported.

X. AUTHORIZED SIGNATURES

Report Written by:

2021.11.09 08:46:52 -05'00'

Christopher Kaiser
Laboratory Technician II

11/09/2021
Date

Reviewed and Approved by:

2021.11.09 15:38:57 -05'00'

Chris Palumbo
Sr. Manager of Product Testing

11/09/2021
Date

XI. REVISION HISTORY

Revision Number	Date	Summary
0	11/09/2021	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

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Received:02/09/2018	Completed:02/14/2018	Letter: X1	JB	P.O.#:	Test Report #:	3-24485-1-
Client's Identification	Style: Rhino. Color: Blue. Product End Use: Transport Upholstery.					

Tested For: **Katy Longstaff**
Camira Fabrics Ltd.
Meltham Mills, HD9-4AY
Huddersfield UK, ENGLAND

Key Test: FAA 12-sec.Vert FAR 25.853(a) (Textiles) 120
Tel: 011 44 1924 481368 **Ext:**
Fax:

Test Category: 12sec Specifier:FAA LE 2017; V 10/17 PC:24H DL/jd
Vertical/Textiles NTR 04/16

TEST PERFORMED: Vertical Test (12 seconds flame application) as per FAR Part 25, Appendix F, Part I(b)(4)

RESULTS ARE REPORTED: [x] Initially; [ ] After laundering; [ ] After dry cleaning

PRODUCT CATEGORY: Textiles

REFERENCE: For Certain Textile Products Used in Compartment Interiors Transport Category, Airplanes: FAR 25.853(a) and Appendix F Part I(a)(1)(ii) [previously FAR 25.853(b)]

RESULTS:

	Specimen #	Afterflame (seconds)	Drip Burn (seconds)	Burn Length (inches)
Machine:	1	2.1	0	3.8
	2	7.1	0	3.2
	3	6.5	0	4.3
	Avg	5.2	0	3.8
Cross Machine:	4	3.0	0	3.8
	5	8.1	0	3.4
	6	3.2	0	3.4
	Avg	4.8	0	3.5

Burn Length Defined: Burn length is the distance from the original edge to the farthest evidence of damage to the test specimen due to flame impingement, including areas of partial or complete consumption, charring, or embrittlement, but not including areas sooted, stained, warped, or discolored, nor areas where material has shrunk or melted away from the heat source.

CONCLUSION: Based on the above Results and the Acceptance Criteria on page 2, the item tested:

[x] Complies; [ ] Does not comply

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Client's Identification	Style: Rhino. Color: Blue. Product End Use: Transport Upholstery.					

Tested For: **Katy Longstaff**
Camira Fabrics Ltd.
Meltham Mills, HD9-4AY
Huddersfield UK, ENGLAND

Key Test: FAA 12-sec.Vert FAR 25.853(a) (Textiles) 120
Tel: 011 44 1924 481368 **Ext:**
Fax:

REMARKS: None.

ACCEPTANCE CRITERIA:

Afterflame	-	15.0 seconds maximum average
Drip Burn	-	5.0 seconds maximum average
Burn Length	-	8.0" maximum average

CERTIFICATION: I certify that the above results were obtained after testing specimens in accordance with the procedures and equipment specified above.

AUTHORIZED SIGNATURE
GOVMARK
/jb

Phyllis Pettit

FEB 2 7 2018

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e-mail: testing@govmark.com

Received:02/09/2018	Completed:02/14/2018	Letter: X		P.O.#:	Test Report #:	3-24485-2-
Client's Identification	Bank fee for test reports 3-24485-0 and 3-24485-1.					

Tested For: **Katy Longstaff**
Camira Fabrics Ltd,
Meltham Mills, HD9-4AY
Huddersfield UK, ENGLAND

Key Test: Bank fee for wire transfer 25

Tel: 011 44 1924 481368 **Ext:**
Fax:

Bank fee for processing incoming wire transfer of funds

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