



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: Camira Transport Fabrics Ltd.
The Watermill, Wheatley Park
Mirfield, West Yorkshire, WF14 8HE
United Kingdom

Product Description: TRACK (Q165) TRAIL (Q168)

Report Number: S-2365

Original Issue Date: 04/06/2022

Test Date: 03/16/2022

Pages: 6



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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 ft³ 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/cm² 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	TRACK (Q165) TRAIL (Q168); Manufacturer: Camira Transport Fabrics Ltd; Manufacturer Address: Camira Fabrics, Ltd., Meltham Mills, Meltham, HD9 4AY; Production Date: 03/03/2022; Lot Number: 463630; Product Type: Flat Woven Chenille; Composition: 100% Trevira CS® Flame Retardant Polyester*
Specimen Description / Mounting Method	Samples were cut by Capital Testing from sheets of fabric supplied by the client. The sample material was mounted in accordance with ASTM E662-21 section 8.3.2.5 where the samples are stapled onto 1/2" inorganic millboard using five standard sized staples, four of which are positioned horizontally on the center of the four quadrants of the sample and one is positioned horizontally in the center of the sample.
Orientation(s) Tested	N/A
Color	Hunt*
Samples Selected by	Client
Specimens Prepared by	Client
Date Received	03/07/2022
Conditioning Time (days)	6

* Information provided by the Client



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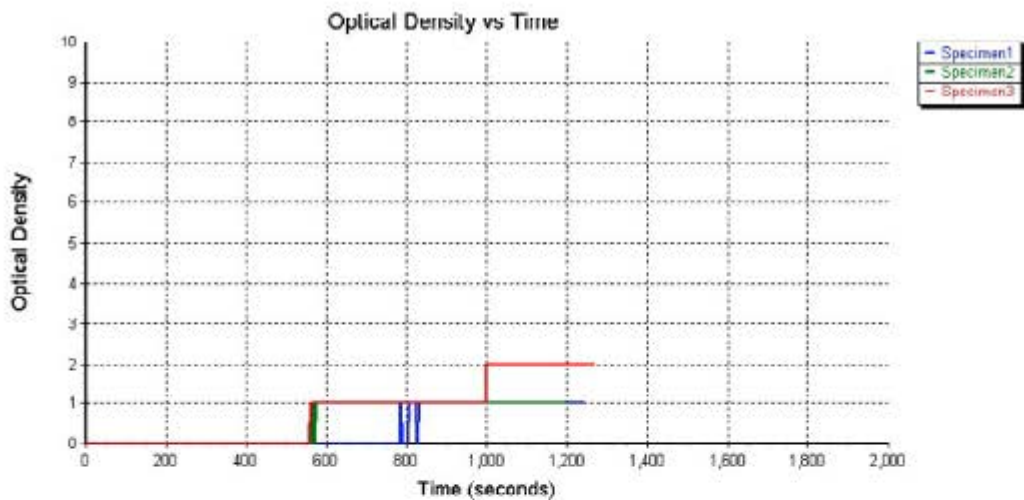
IV. NON-FLAMING MODE DATA AND RESULTS

NON-FLAMING MODE

	Unit	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Specimen 6	Average
Room Temp.	°F	70.4	70.8	71.2	N/A	N/A	N/A	70.8
Room Humidity	%RH	40.1	42.6	43.4	N/A	N/A	N/A	42.0
Chamber Temp.	°F	96.0	95.1	94.0	N/A	N/A	N/A	95.0
Exposure Time	sec	1200	1200	1200	N/A	N/A	N/A	1200
Length	in	2.995	3.000	2.996	N/A	N/A	N/A	2.997
Width	in	2.999	3.000	2.999	N/A	N/A	N/A	2.999
Thickness	in	0.061	0.064	0.063	N/A	N/A	N/A	0.063
Weight	g	2.92	2.95	2.97	N/A	N/A	N/A	2.95
Ds (1.5)	-	0	0	0	N/A	N/A	N/A	0
Ds (4.0)	-	0	0	0	N/A	N/A	N/A	0
Dm	-	1	1	2	N/A	N/A	N/A	1
Dm (corr)	-	1	1	2	N/A	N/A	N/A	1
t _{Dm}	sec	1080	1165	1195	N/A	N/A	N/A	1147

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

All burns: Complete melting of the sample material during the first 10 seconds of testing. The material melted into the sample holder trough.

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	Specimen 4	Specimen 5	Specimen 6	Average
Room Temp.	°F	72.1	72.5	72.6	73.1	73.1	73.1	72.8
Room Humidity	%RH	39.4	39.0	37.8	41.7	42.5	43.1	40.6
Chamber Temp.	°F	96.6	98.2	97.4	96.1	97.1	96.9	97.1
Exposure Time	sec	1200	1200	1200	1200	1200	1200	1200
Length	in	2.988	2.995	2.997	2.996	2.994	2.999	2.995
Width	in	2.999	2.997	2.999	2.997	2.999	3.000	2.999
Thickness	in	0.062	0.063	0.060	0.064	0.063	0.065	0.063
Weight	g	2.92	2.95	2.97	2.92	2.94	2.97	2.95
Ds (1.5)	-	35	25	36	38	33	44	35
Ds (4.0)	-	73	68	64	67	65	83	70
Dm	-	133	104	85	107	105	102	106
Dm (corr)	-	112	88	76	97	94	89	93
t _{om}	sec	880	810	670	795	845	485	748

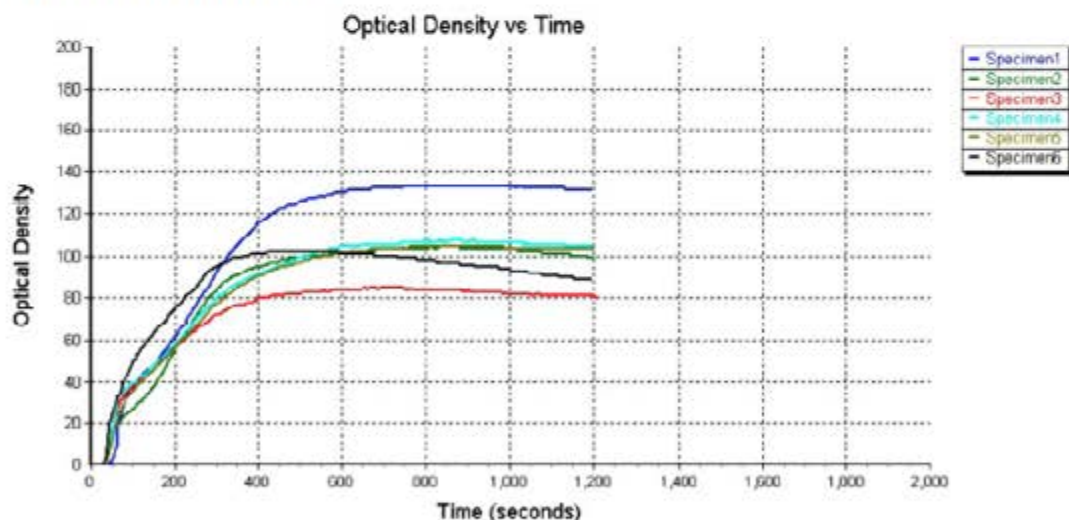
Ds (1.5) = specific optical density at 1.5 minutes

Ds (4.0) = specific optical density at 4 minutes

Dm = maximum specific optical density

Dm (corr) = corrected maximum specific optical density

t_{om} = time to maximum specific optical density



VII. FLAMING MODE OBSERVATIONS

All burns: Melting of the sample material during the first 10 seconds of testing, prior to ignition of the sample material from the pilot burner. Sustained ignition occurred on both the remaining material on the specimen face and the melted material in the specimen holder trough.

F1: Sample ignition at 37 seconds; F2: Sample ignition at 27 seconds; F3: Sample ignition at 30 seconds; F4: Sample ignition at 27 seconds; F5: Sample ignition at 25 seconds; F6: Sample ignition at 27 seconds.

Sample material that melted into the sample holder trough was able to be ignited by the pilot burner.

Smoke Color: ☐ White ☒ Grey ☐ Black ☐ Other: _____



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VIII. REMARKS

During the non-flaming mode testing, the sample material melted into the sample holder trough where it was protected from the radiant heat of the furnace. This resulted in low smoke density numbers.

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 E662-21a^e1, 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 E662-21a^e1, 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 E662-21a^e1, 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 E662-21a^e1, 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 E662-21a^e1, 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:


2022.04.06
15:24:53
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Christopher Kaiser
Laboratory Technician II

04/06/2022

Date

Reviewed and Approved by:


2022.04.07
13:22:32
-04'00'

Chris Palumbo
Sr. Manager of Product Testing

04/07/2022

Date

XI. REVISION HISTORY

Revision Number	Date	Summary
0	04/06/2022	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



CAPITAL TESTING AND CERTIFICATION SERVICES

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TEST REPORT

Test Method: ASTM E1354-17, Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter

Rendered To: Camira Transport Fabrics Ltd.
The Watermill, Wheatley Park
Mirfield, West Yorkshire, WF14 8HE
United Kingdom

Product Description: TRACK (Q165) TRAIL (Q168)

Report Number: CC 0094

Original Issue Date: 03/25/2022

Test Date: 03/18/2022

Pages: 6



TL-224

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I. SCOPE

This test method is used primarily to determine the heat evolved in, or contributed to, a fire involving products of the test material. Also included is a determination of the effective heat of combustion, mass loss rate, the time to sustained flaming, and smoke production. These properties are determined on small size specimens that are representative of those in the intended end use.

The method is based on the observation that, generally, the net heat of combustion is directly related to the amount of oxygen required for combustion. The relationship is that approximately 13.1×10^3 kJ of heat is released per 1 kg of oxygen consumed. Specimens in the test are burned in ambient air conditions, while being subjected to a predetermined initial test heat flux, which can be set from 0 to 100 kW/m². The test permits burning to occur either with or without spark ignition. The primary measurements are oxygen concentrations and exhaust gas flow rate. Additional measurements include the mass-loss rate of the specimen, the time to sustained flaming and smoke obscuration, or as required in the relevant material or performance standard.

II. PROCEDURE

After being conditioned at $23 \pm 3^\circ\text{C}$ and $50 \pm 5\%$ RH, each test specimen is weighed, and their thickness is measured. The specimens measure 100mm by 100mm with a maximum allowable thickness of 50mm. The specimens are wrapped around the bottom and the sides with the aluminum foil as per Section 8.1.1.

Once weighed and wrapped, the specimens are loaded into the sample holder. An additional retaining grid may be necessary to keep the material in place during testing. The specimen is then exposed to a conical shaped furnace. An external Ignitor may be used to ignite the specimen. The test is continued until one of the following occurs:

- Flaming or other signs of combustion cease.
- The average mass loss over a 1-min period has dropped below 150 g/m².
- The specimen mass has been consumed and the load cell has returned to the pre-test value (in grams).
- The oxygen concentration has returned to near the pretest value for 10 min (as evidenced by a heat release rate of below 5 kW/m²).
- Until 60 min have elapsed.

TEST SPECIMEN INFORMATION	
Product Description	TRACK (Q165) TRAIL (Q168). Manufacturer: Camira Transport Fabrics Ltd. Manufacturer Address: Camira Fabrics Ltd., Meltham Mills, Meltham, HD9, 4AY. Production Date: 03/03/2022. Lot Number: 463630. Product Type: Flat Woven Chenille. Composition: 100% Trevira CS® Flame Retardant Polyester.*
Samples Selected By	Client
Date Received	03/07/2022
Conditioning Time (Days)	11
Color	Hunt* - Purple and orange

* Information provided by the Client



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III. TEST SETUP

Test Operator:	VG
Specimen Preparation:	Specimens were prepared by Capital Testing.
Mounting Procedure:	Specimens were mounted horizontally. Retainer frames and retainer grids were used as specified by the client.
Heat Flux:	50 kW/m ²
Exhaust Flow Rate:	0.024 m ³ /s
Heater Distance:	25 mm
Exposed Face:	Purple face.
# Specimens Tested:	6
Criterion for End of Test:	Specimen 1: Flaming or other signs of combustion ceased (302 seconds). Specimen 2: Flaming or other signs of combustion ceased (130 seconds). Specimen 3: Flaming or other signs of combustion ceased (82 seconds). Specimen 4: Flaming or other signs of combustion ceased (145 seconds). Specimen 5: Flaming or other signs of combustion ceased (308 seconds). Specimen 6: Flaming or other signs of combustion ceased (134 seconds).



IV. TEST RESULTS

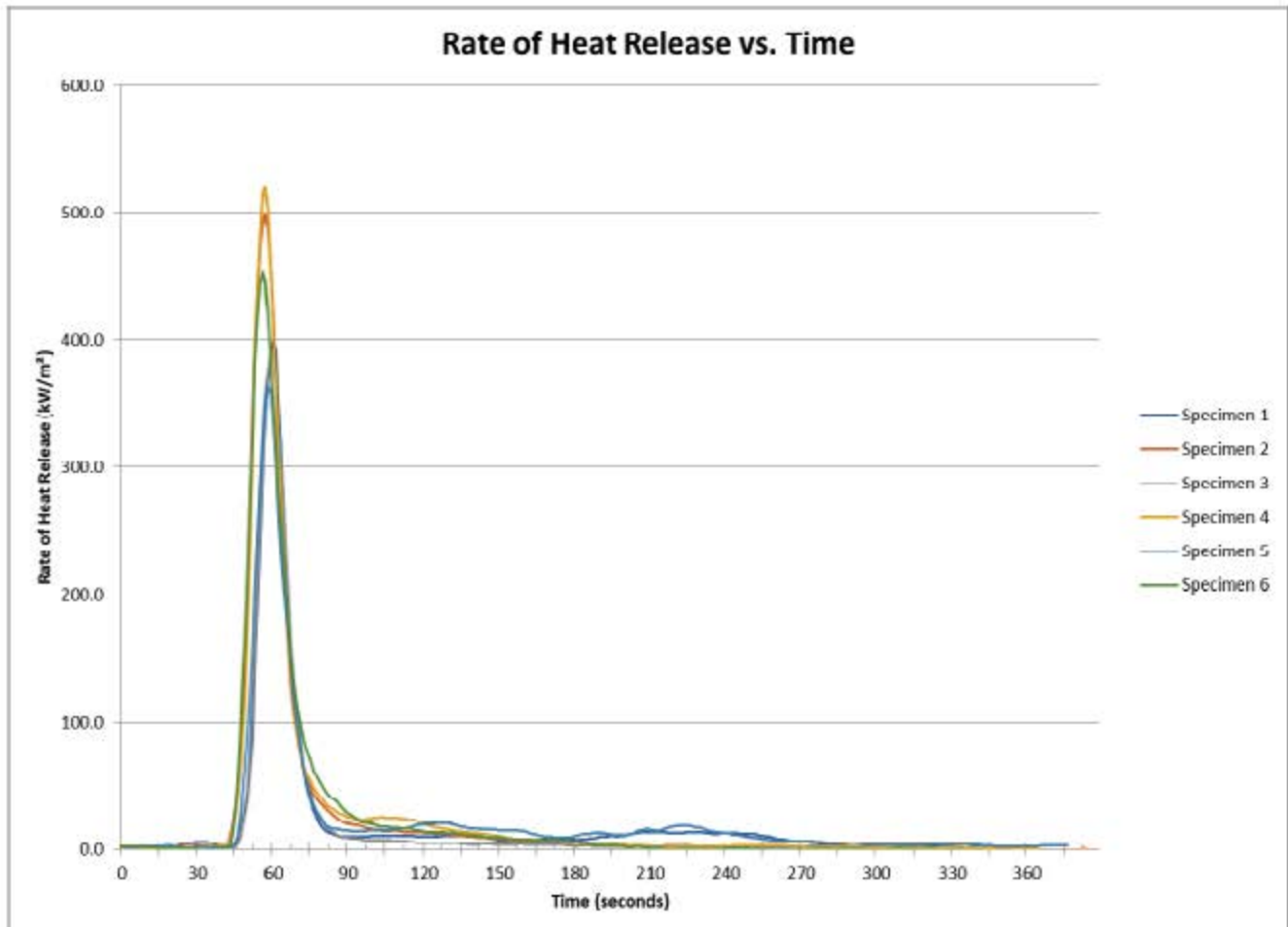
	Units	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Specimen 6	Avg
Thickness	Inches	0.0605	0.0595	0.0610	0.0610	0.0640	0.0620	0.0613
Time to Sustained Ignition	seconds	47.00	43.50	46.75	44.50	47.25	42.50	45.25
Peak Rate of Heat Release	kW/m ²	399.2	497.6	389.9	520.4	364.2	454.1	473.6
Time of Peak RHR	seconds	60	57	59	57	58	56	58
Average RHR Over 60 Seconds	kW/m ²	93.1	129.3	92.4	131.8	93.4	131.1	111.9
Average RHR Over 180 Seconds	kW/m ²	37.6	48.0	33.1	50.2	41.0	49.0	43.2
Average RHR Over 300 Seconds	kW/m ²	24.8	29.1	20.3	30.8	27.2	29.3	26.9
Total Heat Released	MJ/m ²	7.6	8.8	6.1	9.3	8.3	8.8	8.2
Avg Effective Heat of Combustion	MJ/kg	15.46	15.92	12.97	17.31	16.53	15.93	15.69
Initial Mass	grams	5.21	5.23	5.24	5.15	5.27	5.25	5.23
Final Mass	grams	0.30	-0.31	0.54	-0.25	0.23	-0.27	0.04
Sample Mass Loss	kg/m ²	0.49	0.55	0.47	0.54	0.50	0.55	0.52
Avg Mass Loss Rate (10% to 90%)	g/m ² s	2.3	4.4	1.9	6.3	2.3	6.0	3.9
Average SEA	m ² /kg	560.33	582.20	665.04	545.10	534.20	549.31	572.20
Time of Peak SEA	seconds	40	200	68	62	67	58	83
CO Yield	kg/kg	0.18152	0.30940	0.16268	0.35286	0.17103	0.33854	0.25267
CO ₂ Yield	kg/kg	1.56321	3.22214	1.18022	4.59223	1.61464	4.03434	2.70113
Flame Out Time	seconds	302	130	82	145	308	134	184

SEA = Specific Extinction Area

RHR = Rate of Heat Release



V. GRAPHS



VI. OBSERVATIONS

All: Shrank, melted, and bubbled prior to ignition. Foil wrappers partially consumed.

- 1: Smoked at 29 seconds. Edged flashed from 1:10 – flame out.
- 2: Smoked at 25 seconds. Edged flashed from 1:06 – flame out.
- 3: Smoked at 27 seconds. Edged flashed from 1:09 – flame out.
- 4: Smoked at 26 seconds. Edged flashed from 1:16 – flame out.
- 5: Smoked at 28 seconds. Edged flashed from 1:11 – flame out.
- 6: Smoked at 27 seconds. Edged flashed from 1:13 – flame out.

VII. REMARKS

Specimens 2 and 3 were more than 10% off from the average of the "Average RHR Over 180 Seconds" (39.6 for Specimens 1 – 3). 3 additional specimens were tested because of this.

Specimens 2, 4, and 6 had negative final masses due to partial foil consumption.



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VIII. AUTHORIZED SIGNATURES

Victoria Gastrock
Laboratory Technician I

03/25/2022

Date

Reviewed and Approved By:

Chris Palumbo
Sr. Manager of Product Testing

03/25/2022

Date

IX. REVISION HISTORY

Revision Number	Date	Summary
0	03/25/2022	Original Report Issued



CAPITAL TESTING AND CERTIFICATION SERVICES

42777 Trade West Drive, Sterling, VA 20166

Test Report on Smoke Toxicity
as determined by the
BSS 7239 Test Method

Prepared For:
Camira Transport Fabrics Ltd.
The Watermill, Wheatley Park
Mirfield, West Yorkshire, WF14 8HE
United Kingdom

Product Description:
TRACK (Q165) TRAIL (Q168)

Test Number:
S-2365 BSS

Date of Issue:
04/07/2022



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Introduction

This test method covers the determination of toxic gas generating characteristics of materials when tested in the National Bureau of Standards (NBS) Smoke Density Chamber. The test was conducted in accordance with Boeing Specification Support Standard BSS 7239 rev. A (1988), Test Method for Toxic Gas Generation by Materials on Combustion.

The following gases are measured by this test standard:

CO	Carbon Monoxide
HCl	Hydrogen Chloride
HCN	Hydrogen Cyanide
NO _x	Nitrogen Oxides (NO and NO ₂)
SO ₂	Sulfur Dioxide
HF	Hydrogen Fluoride

Procedure

Specimens are exposed to non-flaming and flaming conditions in an NBS smoke density chamber in accordance with ASTM E662 (BSS 7238), Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials. The 3" x 3" test specimens are exposed to a furnace with a radiant heat flux of 2.5 W/cm² in the non-flaming mode. The flaming mode utilizes the same furnace and adds multi-tip propane burner. The smoke generated during the ASTM E662 test is drawn from the NBS smoke density chamber and tested with Dräger short-term colorimetric detector tubes. The tubes change color when they detect the presence of the toxic gases that they are intended to measure. Gas sampling is initiated at 4 minutes into the test.



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Test Number: S-2365 BSS

Test Date: 03/16/2022

Test Operator: CK

Product Description: TRACK (Q165) TRAIL (Q168); Manufacturer: Camira Transport Fabrics Ltd; Manufacturer Address: Camira Fabrics, Ltd., Meltham Mills, Meltham, HD9 4AY; Production Date: 03/03/2022; Lot Number: 463630; Product Type: Flat Woven Chenille; Composition: 100% Trevira CS® Flame Retardant Polyester*

Manufacturer: Camira Transport Fabrics Ltd.

Test Results – Non-Flaming Mode

Toxic Gas Measured	PPM Run 1	Detector Tube/Stroke Count	PPM Run 2	Detector Tube/Stroke Count	Maximum PPM Reading
Carbon Monoxide (CO)	<10	10/b, n = 10	10	10/b, n = 10	10
Hydrogen Chloride (HCl)	<0.2	0.2/a, n = 10	<0.2	0.2/a, n = 10	<0.2
Hydrogen Cyanide (HCN)	<0.5	0.5/a, n = 10	<0.5	0.5/a, n = 10	<0.5
Nitrogen Oxides (NO _x)	<2	2/a, n = 10	<2	2/a, n = 10	<2
Sulfur Dioxide (SO ₂)	<0.5	0.5/a, n = 20	<0.5	0.5/a, n = 20	<0.5
Hydrogen Fluoride (HF)	<0.5	0.5/a, n = 10	<0.5	0.5/a, n = 10	<0.5

Test Results – Flaming-Mode

Toxic Gas Measured	PPM Run 1	Detector Tube/Stroke Count	PPM Run 2	Detector Tube/Stroke Count	Maximum PPM Reading
Carbon Monoxide (CO)	175	10/b, n = 10	500	10/b, n = 1	500
Hydrogen Chloride (HCl)	<0.2	0.2/a, n = 10	<0.2	0.2/a, n = 10	<0.2
Hydrogen Cyanide (HCN)	0.5	0.5/a, n = 10	0.5	0.5/a, n = 10	0.5
Nitrogen Oxides (NO _x)	2	2/a, n = 10	2	2/a, n = 10	2
Sulfur Dioxide (SO ₂)	<0.5	0.5/a, n = 20	<0.5	0.5/a, n = 20	<0.5
Hydrogen Fluoride (HF)	<0.5	0.5/a, n = 10	<0.5	0.5/a, n = 10	<0.5

Remarks: Test was run in tandem with SMP 800-C gas analysis. Gas sampling was done in the order described in SMP 800-C.

Chris Kalser
Laboratory Technician II -Fire

Chris Palumbo
Sr. Manager of Product Testing

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TEST REPORT

Test Method: 14 CFR Part 25, Appendix F, Part I – Vertical Flammability –
12 Second Exposure

Rendered To: Camira Transport Fabrics Ltd.
The Watermill, Wheatley Park
Mirfield, West Yorkshire, WF14 8HE
United Kingdom

Product Description: TRACK (Q165) TRAIL (Q168)

Report Number: V22-001

Original Issue Date: 03/25/2022

Test Date: 03/15/2022

Pages: 5



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I. SCOPE

This test report contains the results of a specimen tested in accordance with the vertical flammability test described in 14 CFR Part 25, Appendix F, Part I. This test method is often used to demonstrate compliance with FAR §25.853, FAR §25.855, FAR §29.853, Docket 90-A, and NFPA 130. It is basis of the Vertical Bunsen Burner Test described in Chapter 1 of the FAA Handbook, but the methods vary slightly in technical content.

II. SUMMARY OF TEST METHOD

Specimens are mounted vertically in a U-shaped frame with a minimum exposed area of 51 mm x 305mm (2 in. x 12 in.). The frame supports the specimen along the top and the side edges, with the unsupported bottom edge of the specimen being unfinished and/or unprotected. The gas flow and burner are adjusted such that the flame height is 38 mm (1.5 in.), the bottom edge of the specimen is 19 mm (0.75 in.) above the top of the burner, and the burner is centered along the bottom edge of the front face of specimen. The specimen is exposed to a flame with a minimum temperature of 843°C (1550°F) for 12 seconds. The flame time is then recorded, as well as drip flame time if applicable. Flame time is the measure of how long the material stays alight after the burner is extinguished. Drip flame time begins when a flaming drip hits the floor of the cabinet. If a drip reignites previous drips, the drip flame time is the sum of all drip flame times up to that point which occurred for that specimen. Otherwise, it is the maximum drip flame time. The burn length is recorded as the farthest evidence of damage due to combustion. This is defined as areas of partial consumption, charring, and embrittlement due to flame impingement. It does not include soot, staining, warping, discoloration, shrinking, or melting which occurred outside of areas of flame impingement.

III. TEST SPECIMENS

Test specimens are rectangular in shape with a width of 76 mm (3 in.) and a length of 330mm (13 in.), unless the actual size of the part is smaller in its real world application. The specimens will be cut from either a fabricated part as installed or cut from a section simulating the part. The edge to which the burner will be applied must not consist of a finished or protected edge. Laminated parts will not be separated into component layers for testing. Directional parts will be tested in the directions which differ the most (e.g., warp and fill for textiles). Specimen thickness is limited to 25 mm (1 in.) with the following exceptions: If the part is used in several thicknesses, the minimum thickness will be tested; Foam parts will have a maximum thickness of 13 mm (0.5 in.).

A minimum of three specimens must be tested. The specimens will be conditioned at $21^{\circ} \pm 3^{\circ}\text{C}$ ($70^{\circ} \pm 5^{\circ}\text{F}$) and 50% \pm 5% relative humidity for at least 24 hours. Specimens will be removed from the conditioning environment one at a time immediately prior to testing.

TEST SPECIMEN INFORMATION	
Product Description	TRACK (Q165) TRAIL (Q168). Manufacturer: Camira Transport Fabrics Ltd. Manufacturer Address: Camira Fabrics, Ltd., Meltham Mills, Meltham, HD9 4AY. Lot Number: 463630. Product Type: Flat Woven Chenille. Composition: 100% Trevira CS® Flame Retardant Polyester.*
Samples Selected By	Client
Date Received	03/07/2022
Conditioning Time (Days)	7
Color	Hunt* - Purple face, orange base

* Information provided by the Client



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IV. TEST RESULTS

Exposure Time (seconds): 12

Measured Flame Temperature (°F): 1620

Gas Pressure (psi): 2.5

LONGITUDINAL DIRECTION

Burn Number	Sample Weight (grams)	Sample Thickness (inches)	Flame Time (seconds)	Burn Length (inches)	Drip Flame Time (seconds)
1	12.87	0.0595	2.25	2.9	N/A
2	13.24	0.0585	0	3.2	N/A
3	12.77	0.0570	0	2.5	N/A
AVERAGE	12.96	0.0583	0.75	2.9	N/A

TRANSVERSE DIRECTION

Burn Number	Sample Weight (grams)	Sample Thickness (inches)	Flame Time (seconds)	Burn Length (inches)	Drip Flame Time (seconds)
1	12.97	0.0590	0	1.7	N/A
2	13.02	0.0580	0	1.4	N/A
3	12.86	0.0585	0	1.8	N/A
AVERAGE	12.95	0.0585	0	1.6	N/A

Flame Time The measure of how long the material stays alight after the burner is extinguished.

Drip Flame Time Initiated when a flaming droplet hits the floor of the cabinet. If a droplet reignites previous drips, the drip flame time is the sum of all drip flame times up to that point. Otherwise, it is the maximum drip flame time.

Burn Length The furthest evidence of damage due to combustion. This is defined as areas of partial consumption, charring, and embrittlement due to flame impingement. It does not include soot, staining, warping, discoloration, shrinking, or melting which occurred outside of areas of flame impingement.

V. OBSERVATIONS

All Transverse: Melted material dripped off of the specimens.

L1: Melted to 3.2 inches.

L2: Melted to 3.7 inches.

L3: Melted to 3.8 inches.

T1: Melted to 4.6 inches.

T2: Melted to 4.2 inches.

T3: Melted to 3.5 inches.



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VI. REMARKS

Longitudinal direction refers to the warp direction. Transverse direction refers to the fill direction.

VII. DISCUSSION

The following Pass/Fail criteria is contained in 14 CFR Part 25, Appendix F, Part I – Vertical Flammability and the FAA Handbook Chapter 1:

- I. The average flame time for all specimens tested will not exceed 15 seconds.
- II. The average drip flame time for all specimens tested will not exceed 5 seconds.
- III. The average burn length for all specimens tested will not exceed 203 mm (8 in.).

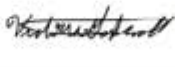
NFPA 130 and Docket 90-A reference the FAA vertical flammability test but have slightly differing Pass/Fail criteria. The performance criteria set forth by NFPA 130 and Docket 90-A follows:

- I. The average flame time for all specimens tested will not exceed 10 seconds.
- II. No flaming dripping will be allowed.
- III. The average burn length for all specimens tested will not exceed 152 mm (6 in.).

DNI – Did Not Ignite

NA – Not Applicable

VIII. AUTHORIZED SIGNATURES


 2022.03.25
15 03 06 -04'00'

Victoria Gastrock
Laboratory Technician I

03/25/2022

Date

Reviewed and Approved By:

 2022.03.25
15:07:39 -04'00'

Chris Palumbo
Sr. Manager of Product Testing

03/25/2022

Date



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IX. REVISION HISTORY

Revision Number	Date	Summary
0	03/25/2022	Original Report Issued



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TEST REPORT

Test Method: Bombardier SMP 800C, Toxic Gas Generation from Material Combustion,

Rendered To: Camira Transport Fabrics Ltd.
The Watermill, Wheatley Park
Mirfield, West Yorkshire, WF14 8HE
United Kingdom

Product Description: TRACK (Q165) TRAIL (Q168)

Report Number: S-2365 SMP

Original Issue Date: 04/07/2022

Test Date: 03/16/2022

Pages: 6

The observations and test results in this report are relevant only to the sample(s) tested. Capital Testing and Certification Services (herein referred to as Capital Testing) does not verify information that is provided by the client. This test report in no way constitutes or implies product certification, approval or endorsement by Capital Testing. Capital Testing assumes no liability to any party, other than to the Client in accordance with the terms and conditions agreement, for any loss, expense or damage occasioned by the use of this report. This report, the Capital Testing name or any of its marks, shall not be used for the sale or advertisement of the tested material. This report shall not be reproduced, except in full, or modified in any way.



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I. SCOPE

This test method covers the determination of toxic gas generating characteristics of materials when tested in the National Bureau of Standards (NBS) Smoke Density Chamber. The test was conducted in accordance with Bombardier SMP 800C, *Toxic Gas Generation from Material Combustion*.

The following gases are measured by this test standard:

Carbon Monoxide (CO)

Carbon Dioxide (CO₂)

Hydrochloric Acid (HCl)

Hydrocyanic Acid (HCN)

Hydrogen Fluoride (HF)

Nitrous Fumes (NO and NO₂)

Sulfur Dioxide (SO₂)

Hydrogen Bromide (HBr)

II. SUMMARY OF TEST METHOD

Specimens are exposed to non-flaming and flaming conditions in an NBS smoke density chamber in accordance with ASTM E662, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials. The 3 by 3 +0, -0.03 in. (76.2 by 76.2, +0, -0.8 mm) test specimens are exposed to a furnace with a radiant heat flux of 2.5 W/cm² in the non flaming mode. The flaming mode utilizes the same furnace and adds multi tip propane burner. The smoke generated during the ASTM E662 test is drawn from the NBS smoke density chamber and tested with Dräger short-term colorimetric detector tubes. The tubes change color when they detect the presence of the gases that they are intended to measure. Gas sampling is initiated at 4 minutes into the test. During the second run, gases are tested in reverse order. Weight loss is measured by obtaining the weight of the test sample prior to testing and after testing has concluded. Burning time is measured from the time the sample ignites until the time that there is no visible flaming on the face of the sample.

TEST SPECIMEN INFORMATION	
Product Description	TRACK (Q165) TRAIL (Q168); Manufacturer: Camira Transport Fabrics Ltd; Manufacturer Address: Camira Fabrics, Ltd., Meltham Mills, Meltham, HD9 4AY; Production Date: 03/03/2022; Lot Number: 463630; Product Type: Flat Woven Chenille; Composition: 100% Trevira CS® Flame Retardant Polyester*
ASTM E662 Test Number	S-2365
Test Operator	CK

* Information provided by the Client



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III. TEST RESULTS

NON-FLAMING MODE						
Toxic Gas Measured	PPM (Run 1)	Duration of Sampling (seconds)	PPM (Run 2)	Duration of Sampling (seconds)	Maximum PPM Reading	Specified Maxima
Carbon Monoxide (CO)	<10	287	10	303	10	3500
Carbon Dioxide (CO ₂)	400	367	600	289	600	90000
Hydrochloric Acid (HCl)	<0.2	165	<0.2	200	<0.2	100
Hydrocyanic Acid (HCN)	<0.5	238	<0.5	248	<0.5	100
Hydrogen Fluoride (HF)	<0.5	216	<0.5	229	<0.2	500
Nitrogen Fumes (NO _x)	<2	235	<2	244	<2	100
Sulfur Dioxide (SO ₂)	<0.5	484	<0.5	480	<0.5	100
Hydrogen Bromide * (HBr)	<50	328	<50	297	<50	100

* Dräger does not offer gas analysis tubes specifically for Hydrogen Bromide (HBr). See comment in Discussion section on page 5.

NON-FLAMING MODE					
Run number	Original Weight (g)	Residual Weight (g)	Weight Lost (g)	Ignition Time (seconds)	Burning Time (seconds)
1	2.92	0.51	2.41	DNI	DNI
2	2.95	0.63	2.32	DNI	DNI
3	2.97	0.49	2.48	DNI	DNI
Average	2.95	0.54	2.40	DNI	DNI

DNI – Did not Ignite



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FLAMING MODE						
Toxic Gas Measured	PPM (Run 1)	Duration of Sampling (seconds)	PPM (Run 2)	Duration of Sampling (seconds)	Maximum PPM Reading	Specified Maxima
Carbon Monoxide (CO)	175	315	500	77	500	3500
Carbon Dioxide (CO ₂)	5000	109	10000	63	10000	90000
Hydrochloric Acid (HCl)	<0.2	193	<0.2	197	<0.2	100
Hydrocyanic Acid (HCN)	0.5	252	0.5	260	0.5	100
Hydrogen Fluoride (HF)	<0.5	318	<0.5	246	<0.5	500
Nitrogen Fumes (NO _x)	2	243	2	257	2	100
Sulfur Dioxide (SO ₂)	<0.5	584	<0.5	529	<0.5	100
Hydrogen Bromide * (HBr)	<50	254	<50	208	<50	100

* Dräger does not offer gas analysis tubes specifically for Hydrogen Bromide (HBr). See comment in Discussion section on page 5.

FLAMING MODE					
Run number	Original Weight (g)	Residual Weight (g)	Weight Lost (g)	Ignition Time (seconds)	Burning Time (seconds)
1	2.92	0.02	2.90	37	49
2	2.95	0.04	2.91	27	44
3	2.97	0.04	2.93	30	52
Average	2.95	0.03	2.91	31	48

DNI – Did not Ignite



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IV. DISCUSSION

Capital Testing uses Dräger short term colorimetric tubes to measure toxic gases for SMP800C. Dräger does not produce a colorimetric tube that is specifically designed for measuring Hydrogen Bromide (HBr). Instead, they suggest measuring Hydrogen Bromide levels with their Hydrochloric Acid (HCl) tubes and applying a conversion factor that is dependent on which Hydrochloric Acid tube is used for sampling.

V. AUTHORIZED SIGNATURES

 2022.04.07 14:16:01 -04'00'	04/07/2022 _____ Date
Christopher Kaiser Laboratory Technician II	

Reviewed and Approved By:

 2022.04.07 14:25:25 -04'00'	04/07/2022 _____ Date
Chris Palumbo Sr. Manager of Product Testing	

VI. REVISION HISTORY

Revision Number	Date	Summary
0	04/07/2022	Original Report Issued



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VII. APPENDIX – FTIR ANALYSIS

The initial SMP 800-C testing, detailed in this report, was conducted using Dräger colorimetric pull tubes. A second test was performed using FTIR analysis. During the FTIR testing, 5 samples were pulled from the test chamber for a duration of approximately 30-seconds each. A total volume of 6 liters was pulled from the chamber when the 5 samples were taken. The samples were drawn from the chamber at 240, 480, 720, 960, and 1200 seconds.

FTIR Analysis Results – Non-Flaming Mode

Toxic Gas Measured	240s Sample PPM	480s Sample PPM	720s Sample PPM	960s Sample PPM	1200s Sample PPM	Maximum PPM	Time of Max Reading (s)
Carbon Monoxide	22.80	19.87	20.18	20.94	22.21	23	240
Carbon Dioxide	453.34	433.16	421.54	442.37	446.69	453	240
Hydrochloric Acid	ND	ND	ND	ND	ND	ND	N/A
Hydrocyanic Acid	ND	ND	ND	ND	ND	ND	N/A
Hydrogen Fluoride	ND	ND	ND	ND	ND	ND	N/A
Nitrous Fumes	ND	ND	ND	ND	ND	ND	N/A
Sulfur Dioxide	ND	ND	ND	ND	ND	ND	N/A
Hydrogen Bromide	ND	ND	ND	ND	ND	ND	N/A

ND = Not detected or low levels detected with low confidence

FTIR Analysis Results – Flaming Mode

Toxic Gas Measured	240s Sample PPM	480s Sample PPM	720s Sample PPM	960s Sample PPM	1200s Sample PPM	Maximum PPM	Time of Max Reading (s)
Carbon Monoxide	145.69	216.02	160.75	338.89	391.14	391	1200
Carbon Dioxide	2906.97	5168.81	2113.40	9411.11	11443.09	11443	1200
Hydrochloric Acid	ND	ND	ND	ND	ND	ND	N/A
Hydrocyanic Acid	ND	ND	ND	ND	ND	ND	N/A
Hydrogen Fluoride	ND	ND	ND	ND	ND	ND	N/A
Nitrous Fumes	ND	ND	ND	ND	ND	ND	N/A
Sulfur Dioxide	ND	ND	ND	ND	ND	ND	N/A
Hydrogen Bromide	ND	ND	ND	ND	ND	ND	N/A

ND = Not detected or low levels detected with low confidence