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Testing. calibrating. advising

ASTM E 662 Rate of Smoke Generation of "RADICI RADIFLAM AF9117GY"

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Submitted by:	Exova Fire Testing
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ACCREDITATION To ISO/IEC 17025 for a defined Scope of Testing by the International Accreditation Service

SPECIFICATIONS OF ORDER

Determine rate of smoke generation according to ASTM E 662, as per Exova Quotation No. 18-002-585,437RV2 dated January 3, 2019.

SAMPLE IDENTIFICATION Exova sample identification number: 19-002-S0020-2

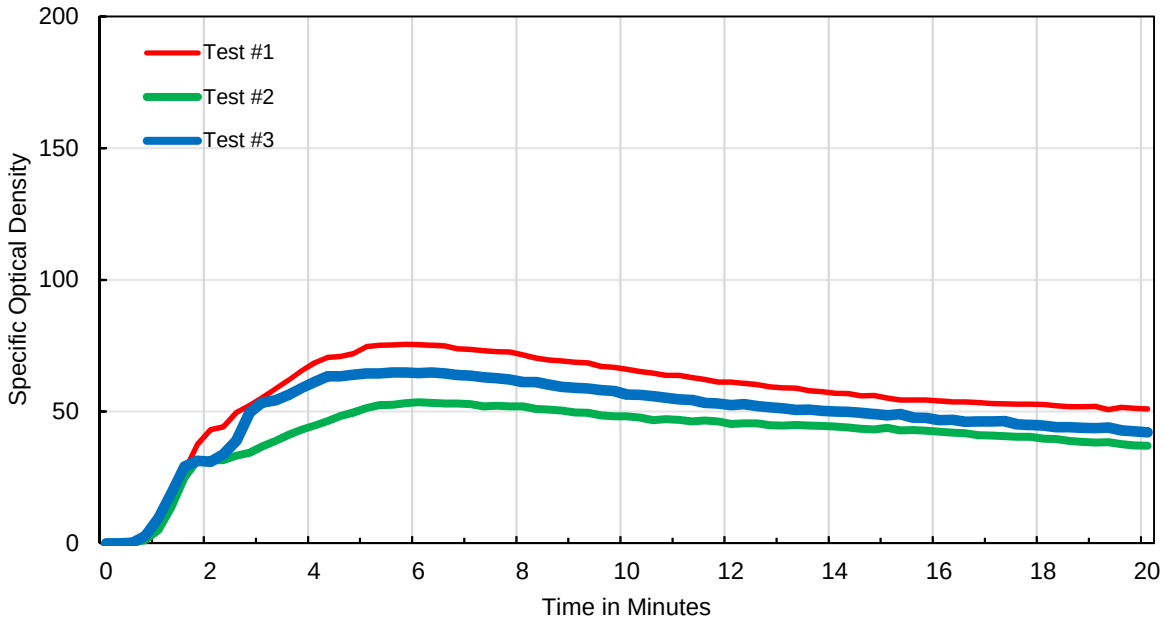
Plastic material, nominally 1.5 mm in thickness, described as, "Polyamide 66", and identified as: "RADICI RADIFLAM AF9117GY"

TEST RESULTS

ASTM E 662-18

Specific Optical density of Smoke Generated by Solid Materials

Chart 1. Flaming Mode



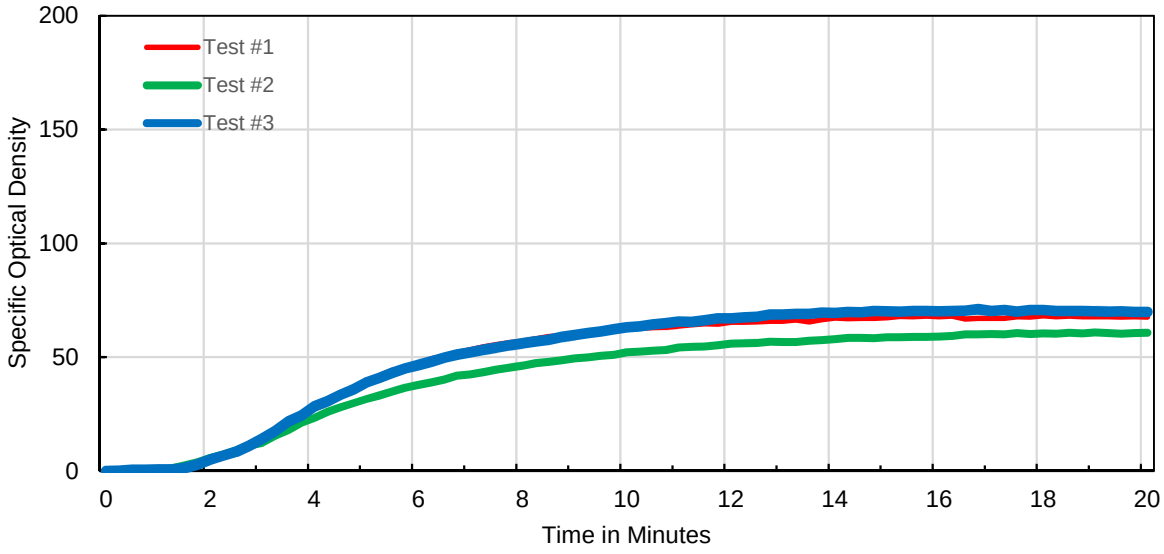
Room Relative Humidity: 25%	Test Duration: 20 min.	Chamber Wall Temp: 35°C

Flaming Mode	Test	#1	#2	#3	Average	Specified Maxima	Result
Specific Optical Density at 1.5 minutes		27	25	29	27	100	Pass
Specific Optical Density at 4.0 minutes		68	45	61	58	200	Pass
Maximum Specific Optical Density		76	54	65	65	-	-
Maximum Corrected Optical Density		67	49	58	58	-	-

TEST RESULTS (continued) **ASTM E 662-18**

Specific Optical density of Smoke Generated by Solid Materials

Chart 2. Non-Flaming Mode



Room Relative Humidity: 25%	Test Duration: 20 min.	Chamber Wall Temp: 35°C

Non-Flaming Mode	Test	#1	#2	#3	Average	Specified Maxima	Result
Specific Optical Density at 1.5 minutes		2	2	1	2	100	Pass
Specific Optical Density at 4.0 minutes		27	23	28	26	200	Pass
Maximum Specific Optical Density		68	61	71	67	-	-
Maximum Corrected Optical Density		66	59	68	64	-	-

Observations

In the flaming mode, ignition was initially observed at the point of flame impingement increasing to full ignition within 90 seconds. Material melting, visible smoke and charring were also observed. In the non-flaming mode, visible smoke production, surface blistering, intumescing & charring were observed.

CONCLUSIONS

The polyamide material identified in this report meets The Federal Railroad Administration requirements as they pertain to rate of smoke generation (ASTM E 662).

Mel Garces,
Senior Technologist.

Ian Smith,
Technical Manager.

Note: This report and service are covered under Exova Canada Inc. Standard Terms and Conditions of Contract which may be found on the Exova website (www.exova.com), or by calling 1-866-263-9268.

APPENDIX

(1 Page)

Summary of Test Procedure

ASTM E 662-18

Specific Optical Density of Smoke Generated by Solid Materials

This method of test covers a procedure for measuring the smoke generated by solid materials and assemblies in thickness up to and including 1 inch (25.4 mm). Measurement is made of the attenuation of a light beam by smoke (suspended solid or liquid particles) accumulating within a closed chamber due to nonflaming pyrolytic decomposition and flaming combustion. Results are expressed in terms of specific optical density (Ds), which is derived from a geometrical factor and the measured optical density (absorbance).

As specified, the test samples are pre-dried for 24 hours at 60°C. Section 9.1 of ASTM E 662-18 states to then condition the specimens to "equilibrium (constant weight)" but does not specify a definition or procedure with respect to establishing the "constant weight". Therefore, prior to testing, the specimens are then conditioned for a minimum period of 24 hours at 50 ± 5% relative humidity and 23 ± 3°C.

Three specimens, 3" square, are exposed to each mode of combustion. Prior to test initiation, the chamber wall temperature is established in the range of 33 to 37° C. The % light transmittance during the course of the combustion is recorded. These data are used to express the quantity of smoke in the form of Specific Optical Density based on the following formula, which assumes the applicability of Bouguer's law:

$$Ds = (V/AL)\cdot\log(100/T) = G\cdot\log(100/T) = 132\cdot\log(100/T)$$

Where: Ds = Specific Optical Density
T = % Transmittance
V = Chamber Volume (18 ft^3)
A = Exposed Area of the Sample (0.0456 ft^2)
L = Length of Light Path in Chamber (3.0 ft)
G = Geometric Factor

Among the parameters normally reported are:

$Ds_{1.5}$ = specific optical density after 1.5 minutes

$Ds_{4.0}$ = specific optical density after 4.0 minutes

D_m = maximum specific optical density at any time during the 20 minute test

D_m (corr) = Dm corrected for incidental deposits on the optical surfaces

Transit authorities generally specify a maximum $Ds_{1.5}$ of 100 and a maximum $Ds_{4.0}$ of 200 in either flaming or non-flaming test mode.