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ASTM E 662 Rate of Smoke Generation of "EPDM 35 FST"

A Report To:	**Caoutchouc Pro-flex Inc.** 212 des Alouettes St-Alphonse de Granby, Québec, Canada J0E 2A0
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Submitted by:	Element Fire Testing
Report No.	19-002-485 3 Pages + Appendix
Date:	July 24, 2019

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 Pro-Flex Inc. reference Purchase Order No. AC-006147 dated July 12, 2019.

SAMPLE IDENTIFICATION Element sample identification number: 19-002-S0485

Rubber compound, identified as:
"EPDM 35 FST".

TEST RESULTS

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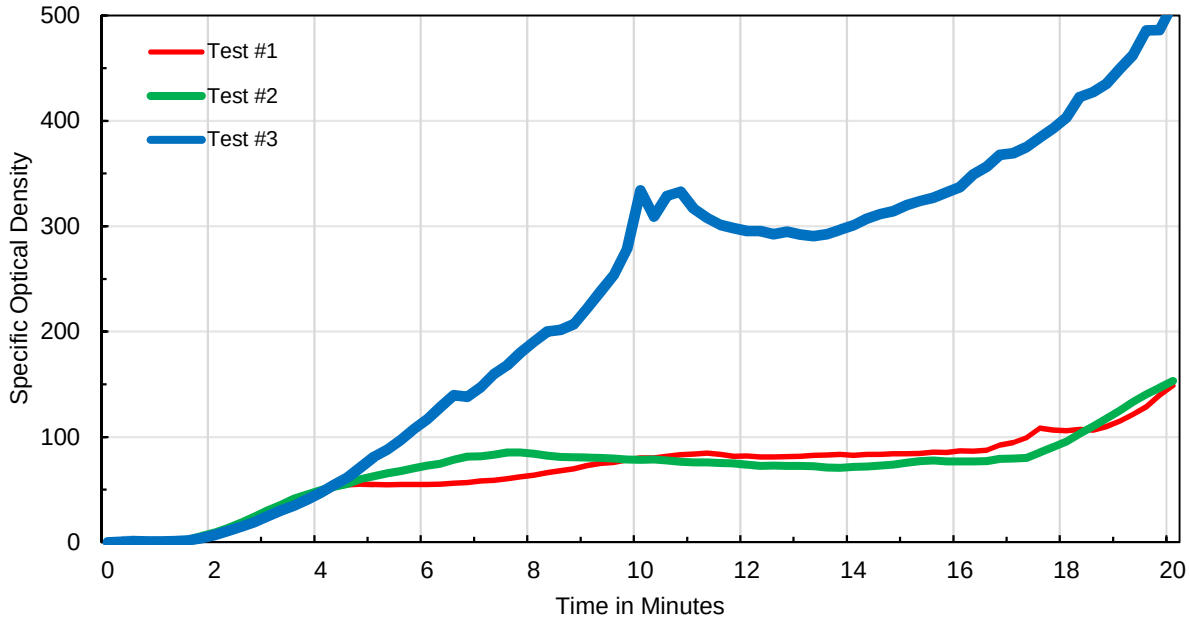
Specific Optical density of Smoke Generated by Solid Materials

Chart 1. Flaming Mode



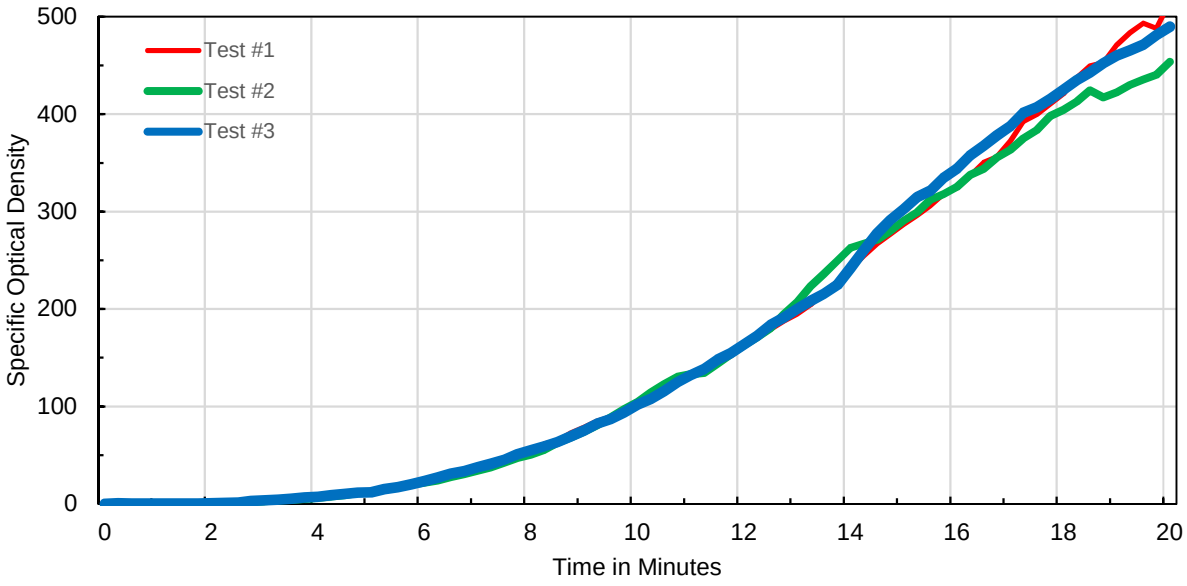
Room Relative Humidity: 44%	Test Duration: 20 min.	Chamber Wall Temp: 35°C

Flaming Mode	Test	#1	#2	#3	Average	Specified Maxima	Result
Specific Optical Density at 1.5 minutes		1	2	2	2	100	Pass
Specific Optical Density at 4.0 minutes		48	50	47	48	200	Pass
Maximum Specific Optical Density		149	153	511	271	-	-
Maximum Corrected Optical Density		139	145	490	258	-	-

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

Specific Optical density of Smoke Generated by Solid Materials

Chart 2. Non-Flaming Mode



Room Relative Humidity: 44%	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		0	0	1	1	100	Pass
Specific Optical Density at 4.0 minutes		6	6	7	7	200	Pass
Maximum Specific Optical Density		516	454	490	486	-	-
Maximum Corrected Optical Density		511	446	485	481	-	-

Observations

In the flaming mode, ignition was observed at the point of flame impingement increasing to full ignition in 600 seconds. Visible smoke production, surface spalling & charring were also observed. In the non-flaming mode, visible smoke was observed and was followed by surface spalling and charring.

CONCLUSIONS

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

Note: This is an uncontrolled electronic copy of the report. Signatures are on file with the original.

Mel Garces,
Senior Technologist.

Ian Smith,
Technical Manager.

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.