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ASTM E 662 Rate of Smoke Generation of "Moniflex as manufactured by Isoflex AB"

A Report To: **Ciucevich**
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Attention: Robert Ciucevich

Submitted By: Fire Testing

Report No. 11-002-682(B)(Revision 1)
3 pages + appendix

Date: October 15, 2013

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 our Proposal# 11-006-08128 RV1-S accepted September 22, 2011.

Note: This report supersedes 11-002-682(B) issued November 28, 2011. It is revised herein by request to reference the sample thickness in the identification section of the report.

IDENTIFICATION

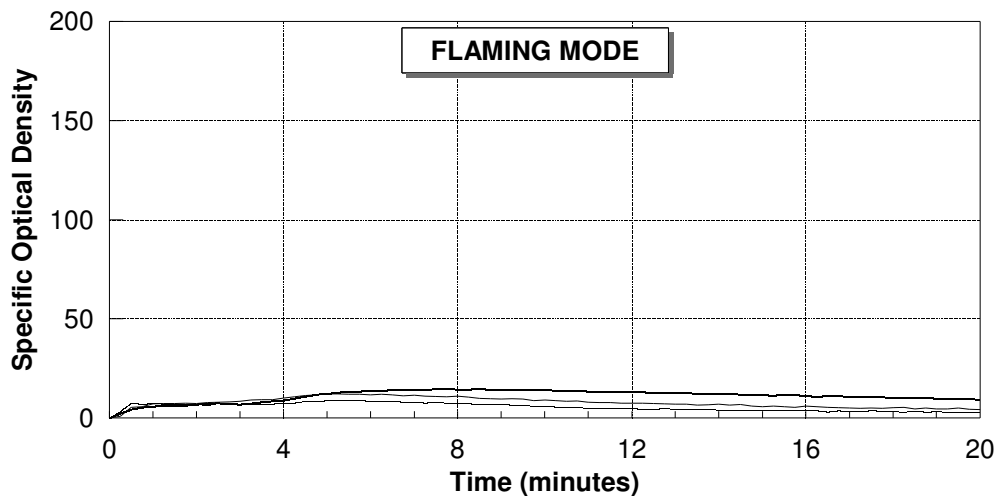
Cellulose based insulation material, approximately 20 mm in thickness, identified as "Moniflex as manufactured by Isoflex AB".

(Exova sample identification number 11-002-S0682)

TEST RESULTS

ASTM E 662-09

Specific Optical Density of Smoke Generated by Solid Materials

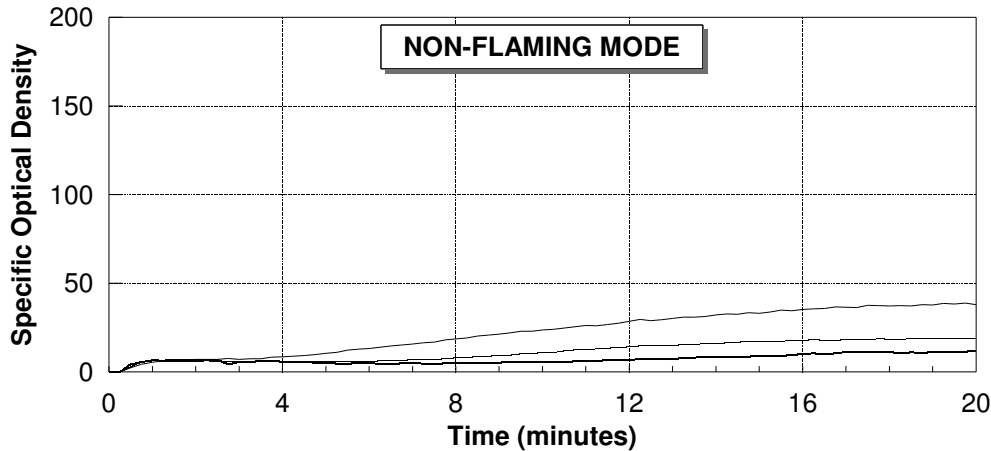


Relative Room Humidity: 32%	Test Duration: 20 min.			Chamber Wall Temp: 35°C		
Flaming Mode	Test	#1	#2	#3	Average	Specified Maxima
Specific Optical Density at 1.5 minutes		6	8	7	7	100
Specific Optical Density at 4.0 minutes		9	8	10	9	200
Maximum Specific Optical Density		15	9	12	12	-
Maximum Corrected Optical Density		15	8	12	12	-

TEST RESULTS (continued)

ASTM E 662-09

Specific Optical Density of Smoke Generated by Solid Materials



Relative Room Humidity: 32%	Test Duration: 20 min.			Chamber Wall Temp: 35 °C		
Non-Flaming Mode	Test	#1	#2	#3	Average	Specified Maxima
Specific Optical Density at 1.5 minutes		7	7	7	7	100
Specific Optical Density at 4.0 minutes		7	7	9	7	200
Maximum Specific Optical Density		12	19	39	23	-
Maximum Corrected Optical Density		12	19	38	23	-

Observations

In the flaming mode, sample melts, ignition of the material was observed at approximately 120 seconds into the test. Minimal visible smoke production was observed. In the non-flaming, melting of the materials was observed with minimal visible smoke observed.

CONCLUSIONS

The cellulose based insulation material 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 electronic copy of the report. Signatures are on file with the original report.

Mel Garces,
Fire Testing.

Ian Smith,
Fire Testing.

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)

Summaries of Test Procedures

ASTM E 662-09Specific 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).

Specimens are dried for 24 hours at 60 °C and conditioned to equilibrium at 50% RH and 23 °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:

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

Where: Ds = Specific Optical Density

T = % Transmittance

V = Chamber Volume (18 ft³)

A = Exposed Area of the Sample (0.0456 ft²)

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
Dm	- maximum specific optical density at any time during the 20 minute test
Dm	
(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.