

<b>Tested For:</b> Rebecca Johnson	<b>Phone:</b> (651) 282-4485	<b>Received:</b> 1/26/2021
3M Company	<b>Fax:</b>	<b>Completed:</b> 2/26/2021
3M Center Bldg 230-BE-16	<b>Mobile:</b>	<b>Code:</b> A5
Maplewood, MN 55144	<b>PO#:</b> 3501090188	<b>Test Report:</b> 3-42295-5
USA	<b>Email:</b>	

**Key Test:** ISO 5659-2

1198

**Client's Identification:**

Lot No.: LA-D100-2874-7. Style: DP8610NS. Composition: 2K Acrylic Adhesive. Product End Use: Rail Applications for Structural Adhesive. Adhesive sandwiched between 2 pieces of 1 mm thick Aluminum panels. Adhesive thickness 0.4 mm.

Test Category: Smoke Density      Specifier: Eurorail      LE 2015; V 6/17      PC: 24H      /rb

**TEST PERFORMED:** ISO 5659-2 - Determination of Optical Density by a Single Chamber Method [LE 2017; V 2/19] --

As cited by EN 45545-2 Railway applications - Fire protection on Railway vehicles - Part 2: Requirements for fire behaviour of material and components

**APPROXIMATE THICKNESS/DIAMETER OF MATERIAL** (as measured by SGS North America): 2.5 mm

**IGNITION SCENARIO:**  25 kW with piloted ignition      [CODE 599(3S); 685(6S)]  
 50 kW without piloted ignition      [CODE 599(3S); 685(6S)]

Flat Specimen: 75 mm x 75 mm  
 Cylindrical Specimen: 75 mm lengths vertically grouped to form the 75 mm x 75 mm test specimens

**BRIEF DESCRIPTION OF TEST:** The 75 mm x 75 mm test specimen is held inside a metal specimen holder frame. The exposed face of the specimen measures 65 mm x 65 mm. The framed specimen is placed inside the test chamber in a horizontal configuration. A radiant heater sits 1" above the face of the test specimen. The heater is optionally set at 2 different flux values: 25 kW or 50 kW. A 30 mm flame is introduced to the face of the test specimen in the 25-kW option. The test chamber is equipped with a light beam and a photodetector that measures the amount of light transmitted. As the test specimen burns or decomposes, there will be an accumulation of smoke in the chamber. The photodetector measures the smoke obscuration which is then converted to a smoke density value. Smoke density values are reported at 4 minutes and 10 minutes. VOF4 is a calculated value based on results recorded at 1, 2, 3, and 4 minutes into the test. IF the MAXIMUM Specific Optical Density value of any individual specimen exceeds by 50% the lowest MAXIMUM Specific Optical Density value of any other specimen, an additional three specimens are tested. If this does not occur, "NR" (not required) is entered for Specimens 4, 5, and 6.

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**RESULTS:**

☒ 25 kW/m <sup>2</sup> with Pilot Flame			☒ 25 kW/m <sup>2</sup> with Pilot Flame		
<u>Specimen #</u>	<u>[Ds(4)]</u>	<u>VOF4</u>		<u>[Ds max (10)]</u>	
1	1.2	2		1.8	
2	0.7	1		2.0	
3	1.2	3		2.0	
4	NR	NR		NR	
5	NR	NR		NR	
6	NR	NR		NR	
Avg:	1.0	2.0		1.9	

  

☒ 50 kW/m <sup>2</sup> without Pilot Flame			☒ 50 kW/m <sup>2</sup> without Pilot Flame		
<u>Specimen #</u>	<u>[Ds(4)]</u>	<u>VOF4</u>		<u>[Ds max (10)]</u>	
1	0.7	1.0		5.0	
2	1.2	2.0		4.5	
3	1.6	4.0		5.5	
4	NR	NR		NR	
5	NR	NR		NR	
6	NR	NR		NR	
Avg:	1.2	2.3		5.0	

**CORRECTION FACTOR:** At the conclusion of each test, combustion particles are removed from the glass protecting the photodetector. The corrected value in parentheses are used to recognize the slight change in light obscuration.

**ABBREVIATIONS WHICH MAY BE USED:** NR = Not required to be tested.

**REMARKS:** None.

**CLASSIFICATION CRITERIA AND CONCLUSION:** The reader is referred to the "Summary of EN 45545-2 Hazard Levels" contained elsewhere in this report to determine the hazard level based on the results contained in this report. To achieve a "Complete Hazard Level Certification", other fire tests are required.

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

  
\_\_\_\_\_  
AUTHORIZED SIGNATURE  
SGS NORTH AMERICA  
/jab

*Bobby Brown*

MAR 19 2021

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5659-2 25 kW with Pilot Flame

R Set	Hazard Level	Ds (Max)
R5	HL1	300
	HL2	250
	HL3	200
R8, R9, R23	HL1	-
	HL2	600
	HL3	300
R10, R22	HL1	600
	HL2	300
	HL3	150
R20	HL1	200
	HL2	200
	HL3	200
R21	HL1	300
	HL2	300
	HL3	200

50 kW Without Pilot Flame

R Set	Hazard Level	Ds (4) Maximum	VOF4
R1, R2, R6, R11, R12	HL1	600	1200
	HL2	300	600
	HL3	150	300
R3	HL1	-	-
	HL2	480	960
	HL3	240	480
R7, R17		<u>Ds (10) Maximum</u>	
	HL1	-	NI
	HL2	600	NI
	HL3	300	NI

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EXPLANATION: The "-" is also taken directly from EN 45545-2 and is unexplained by EN 45545-2. Practically, a product that falls within the maximum values for either HL2 or HL3 should automatically qualify for a lower hazard level.

ABBREVIATION USED: NI = Not indicated.

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