TEST REPORT

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EVALUATION CENTER
Intertek Testing Services NA Inc.
8431 Murphy Drive
Middleton, WI 53562

RENDERED TO
TEMP-COAT Brand Products LLC
301 W Airline Highway # 100
LA Place, LA 70068

PRODUCT EVALUATED: TEMP-COAT 101
EVALUATION PROPERTY: IMO FTP Code part 2 Smoke and Toxicity Test

Report of Testing TEMP-COAT 101 for compliance with the applicable requirements of the following criteria: IMO FTP Code part 2 Smoke and Toxicity Test

1 Table of Contents

2 Introduction

Intertek Testing Services NA (Intertek) has conducted testing for TEMP-COAT Brand Products LLC, on TEMP-COAT 101 to evaluate smoke density and smoke toxicity. Testing was conducted in accordance with and following the standard methods of Part 2 of Annex 1 of the IMO FTP Code (1998). This evaluation was conducted on April 4, 2010.

3 Test Samples

3.1. SAMPLE SELECTION

The samples were received directly from the client. Samples were received at the Intertek Middleton Evaluation Center on April 1, 2011 in good condition.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The TEMP-COAT 101 (Batch# TC 10322A) specimens were prepared by the client. TEMP-COAT 101 specimens were comprised of a white lightweight viscous material added to a test substrate of BNZ 20-105, Marinite "M" calcium silicate board product of BNZ Material, Inc. to a nominal thickness of 70 +/- 5 MILS. Overall dimensions measured about 2-15/16 x 2-15/16 x 0.55 inch. See Appendix A for coating information of the specimens run. A total of 15 specimens were provided and were labeled 1-15.

Samples were preconditioned at 23 +/- 2 ℃ and 50 + /- 10 % humidity for minimum of 24 hours prior to testing. Constant weighs were reached with two consecutive measurements at intervals of 24 hours. The weights do not differ by more than 0.1% of the mass of the test specimen or 0.1g, whichever is greater.

4 Testing and Evaluation Methods

The equipment and methods described in Sections 4.1 to 4.3 were followed for this evaluation.

4.1. Overview

This test method employs an electrically heated radiant energy source mounted within an insulated cone and positioned so as to produce an irradiance level of 25 kW/m^2 and 50 kW/m^2 averaged over the central 1.5-in. (38.1-mm) diameter area of a horizontally mounted specimen facing the radiant heater. The nominal 75 by 75 mm specimen is mounted within a holder which exposes an area measuring 65 by 65 mm. The holder is able to accommodate specimens up to 25 mm thick. This exposure provides the non-flaming conditions of the test.

For the flaming condition, a burner is used to apply a single flame burner that has a flame length of 30 mm +/- 5 mm and is positioned horizontally 10 mm above the top face of the specimen. The color of the flame was blue with a yellow tip. A small spark ignition device is used. Propane with 95% purity was used with flow rates and pressure in accordance with the standard.

The test specimens are exposed to the flaming and non-flaming conditions within a closed chamber. A photometric system with a vertical light path is used to measure 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.

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.

4.2. Instrumentation

The test chamber (Newport Scientific, Inc) (ID# 1150) is composed of laminated panels that provided inside dimensions of 36 by 24 by 36 in. (914 by 610 by 914 mm) for width, depth, and height, respectively. The interior surfaces consist of porcelain enameled metal, resistant to chemical attack and corrosion, and 2 sealed windows accommodate a vertical photometric system. When all openings are closed, the chamber is capable of developing and maintaining positive pressure during test periods.

An electric cone furnace is used to provide a constant irradiance on the specimen surface. The furnace is located 305 mm from the back of the chamber, and 305 mm from the right wall. The furnace control system maintains the required irradiance level at 25 kW/m^2 or 50 kW/m^2, under steady-state condition with the chamber door closed. The control system consists of an autotransformer and a voltmeter for monitoring the electrical input. Specimen holders expose a 65 by 65 mm specimen area. For the flaming exposure test, a burner is used. A flux meter is used to standardize the output of the radiant heat furnace.

The photometric system consists of a light source and photodetector, oriented vertically to reduce measurement variations resulting from stratification of the smoke generated by materials under test. The light source is an incandescent lamp operated at a fixed voltage in a circuit powered by a constant voltage transformer. The light source is mounted in a sealed box and provides a collimated light beam passing vertically through the chamber. The light source is maintained at an operating voltage required to provide a brightness temperature of 2200°K. The photodetector is a photomultiplier tube, with an S-4 spectral sensitivity response and a dark current less than 10^{-9} A. A set of nine gelatin compensating filters varying from 0.1 to 0.9 neutral density are mounted one or more as required in the optical measuring system to correct for differences in the luminous sensitivity of the photomultiplier tube. These filters also provide correction for light source or photomultiplier aging and reduction in light transmission, through

discolored or abraded optical windows. A light-tight box is located directly opposite the light source and holds the photodetector housing and the associated optics. A glass window is used to isolate the photodetector and its optics from the chamber atmosphere. In addition to the above compensating filter, a neutral density range extender filter permitting the system to measure to Optical Density is mounted below the photodetector.

4.3. IMO FTP Code part 2 Smoke Density and Toxicity

Three tests are conducted under flaming exposure at 25 kW/m^2 and three tests each under non-flaming exposure 25 kW/m^2 and 50 kW/m^2 on each material (total of nine specimens). For each of the individual specimens, if for no apparent reason, the value of Ds max for any individual specimen differs from the average value for the set of three specimens of which it is part by more than 50% of that average, an additional set of three specimens are tested for the same sample in the same mode and the average of all six results obtained is recorded. Even under the same test condition, one specimen may burn with flaming while the other may not burn with flaming. This would be considered an apparent reason for a >50% difference from the average.

Once the system has reached steady-state conditions, the photometer readouts are adjusted. Before positioning the test specimen, the chamber is flushed with the door and exhaust and inlet vents open for about 2 min. The exhaust vent and blower is then closed. The specimen holder is placed on the bar support and pushed into position in front of the furnace (with burner in position for flaming exposure). The chamber door is closed while simultaneously starting the recorder. The inlet vent is closed completely when the photometer indicates the presence of smoke. All observations pertinent to the burning and smoke generating properties of the material under test are recorded. The tests are run for at least 10 minutes. If the minimum light transmittance value has not been reached during the 10-minute exposure, the test is continued for another 10-minute period. If transmittance falls below 0.01 %, the chamber window is covered with a stainless shield to avoid possible light-scattering effects from room light. The burner is extinguished on flaming exposures and the chamber was cleared of smoke 1 min after terminating the test.

The specific optical density, *Ds*, is calculated as follows and recorded at least every 5 seconds:

$Ds = G \log10 (I_0/I)$

$G = V/AL$
V = volume of the closed chamber, ft3 (or m3)
A = exposed area of the specimen, ft2 (or m2)
L = length of the light path through the smoke, ft (or m)
I_0 = light intensity before the test
L = light intensity during the test (after absorption by the smoke)

Dm (Density Maximum) is recorded
$Dm = Average\ Ds_{max}$

The chamber is cleaned with isopropyl alcohol (NH3 if previous sample contained acidic gases) and gas line is flushed. Nitrogen is pumped through the line to evaporate any water condensation. The chamber is aired to clear any fumes from the cleaning solutions.

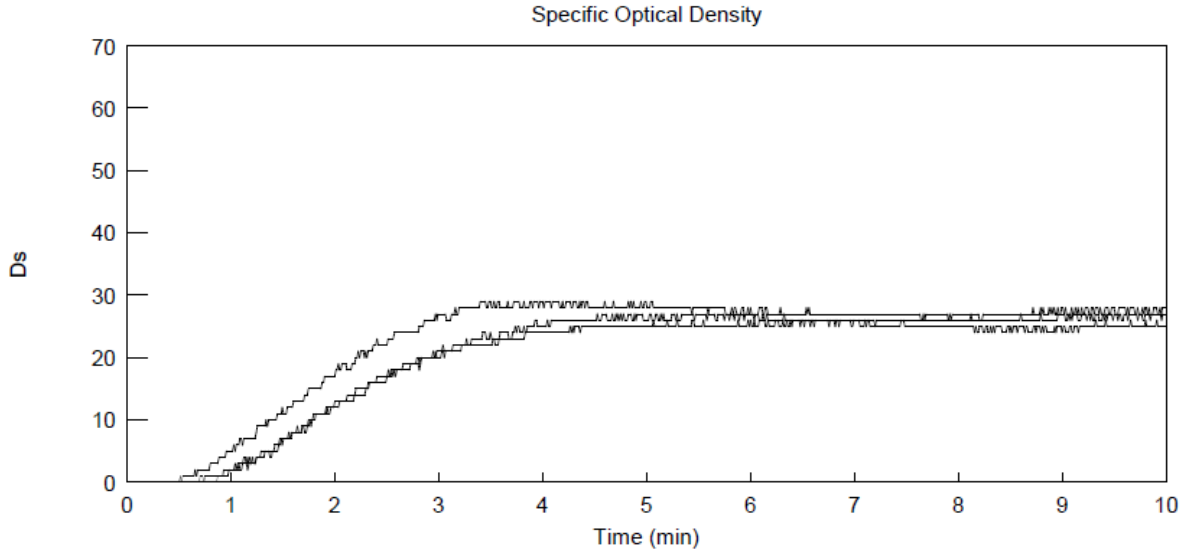
The chamber and the gas line is heated. The gas pump is started.

Before positioning the test specimen, the chamber is flushed with the door, and exhaust and inlet vents open for about 2 min. The exhaust vent and blower are then closed. Once the system reaches steady-state conditions, the baseline for the FTIR readings is run. The Bruker Tensor 27 (ID#1046) is used. The chamber door is closed. The specimen holder is placed on the holder support and shutter is opened (with burner in position for flaming exposure). The inlet vent is closed completely when the photometer indicates the presence of smoke. All observations pertinent to the burning and smoke generating properties of the material under test are recorded. The sampling of the fumes is made during the second and third specimen at each test condition, from the geometric center of the chamber within 3 minutes of the maximum specified optical density of the smoke being reached. The test is run for a period of at least 10 minutes. If the minimum light transmittance value has not been reached during the 10 minute exposure, the test is continued for a further 10 minute period. One minute after the run has completed the chamber vents are opened. The FTIR data is then processed and analyzed.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

25kW/m^2 No pilot flame: Specimens numbers #1-3 was used for testing



Summary

Run	Specimen #	Ds @ 1.5 min	Ds @ 4 min	Max Ds (first 4 min)	Max Ds Time (first 4 min)	Max Ds	Max Ds Time
1	Specimen 1	6.0	25.0	26.0	3:55.8	27.0	4:31.7
2	Specimen 2	12.0	29.0	29.0	3:24.1	29.0	3:24.1
3	Specimen 3	7.0	24.0	24.0	3:50.1	27.0	8:07.4
Avg.		8.3	26.0	26.3		27.7	

Avg Backwall Temp: 117.9 Fahrenheit Min Backwall Te mp: 112.4 Fahrenheit Max Backwall Temp: 120.9 Fahr enheit

Average Ds_{max} for 25kW/m^2 without a pilot flame is 27.7

Smoke Toxicity for 25kW/m^2 Radiant No Pilot Test Specimen 2 and 3

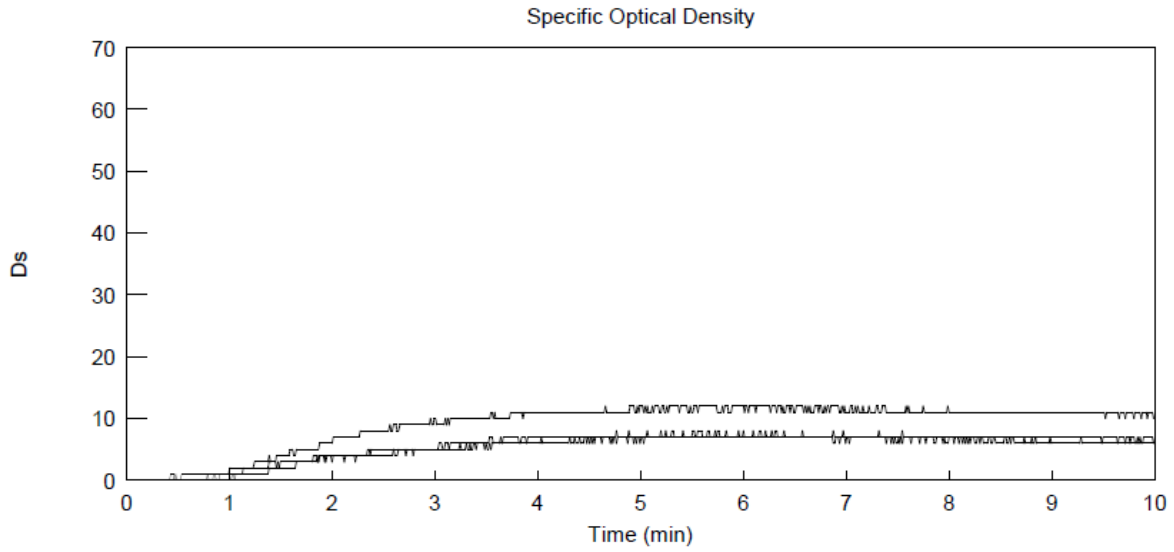
Gas Compound	Specimen 2 Maximum Observed (ppm)	Specimen 3 Maximum Observed (ppm)	Analysis Detection Limits (ppm)	Critical Concentrations (ppm)
Carbon Monoxide	94	144	20	1450
Oxides of Nitrogen	None observed	None observed	10	350
Sulfur Dioxide	None observed	None observed	5	120
Hydrogen Chloride	88	61	10	600
Hydrogen Fluoride	None observed	None observed	20	600
Hydrogen Bromide	None observed	None observed	25	600
Hydrogen Cyanide	None observed	None observed	7	140

Observations:

All three specimens produced similar results for the 25kW/m^2 Radiant No Pilot Testing.

About 0:20 White smoke started
About 0:30 Browning of the whole surface started

25kW/m^2 with pilot flame: Specimens numbers #4-6 was used for testing



Summary

Run	Specimen #	Ds @ 1.5 min	Ds @ 4 min	Max Ds (first 4 min)	Max Ds Time (first 4 min)	Max Ds	Max Ds Time
1	Specimen 1	4.0	11.0	11.0	3:32.7	12.0	4:39.6
2	Specimen 2	2.0	6.0	6.0	3:14.8	7.0	4:02.2
3	Specimen 3	3.0	7.0	7.0	3:32.0	8.0	4:46.1
Avg.		3.0	8.0	8.0		9.0	

Avg Backwall Temp: 121.1 °Fahrenheit Min Backwall Te mp: 114.3 °Fahrenheit Max Backwall Temp: 124.2 °Fahr enheit

Average Ds_{max} for 25kW/m^2 with a Pilot Flame is 9.0

Smoke Toxicity for 25kW/m^2 with Pilot Flame Test Sample 2 and 3

Gas Compound	Specimen 2 Maximum Observed (ppm)	Specimen 3 Maximum Observed (ppm)	Analysis Detection Limits (ppm)	Critical Concentrations (ppm)
Carbon Monoxide	156	160	20	1450
Oxides of Nitrogen	None observed	None observed	10	350
Sulfur Dioxide	None observed	None observed	5	120
Hydrogen Chloride	88	92	10	600
Hydrogen Fluoride	None observed	None observed	20	600
Hydrogen Bromide	None observed	None observed	25	600
Hydrogen Cyanide	None observed	None observed	7	140

Observations for 25kW/m^2 with Pilot Flame:

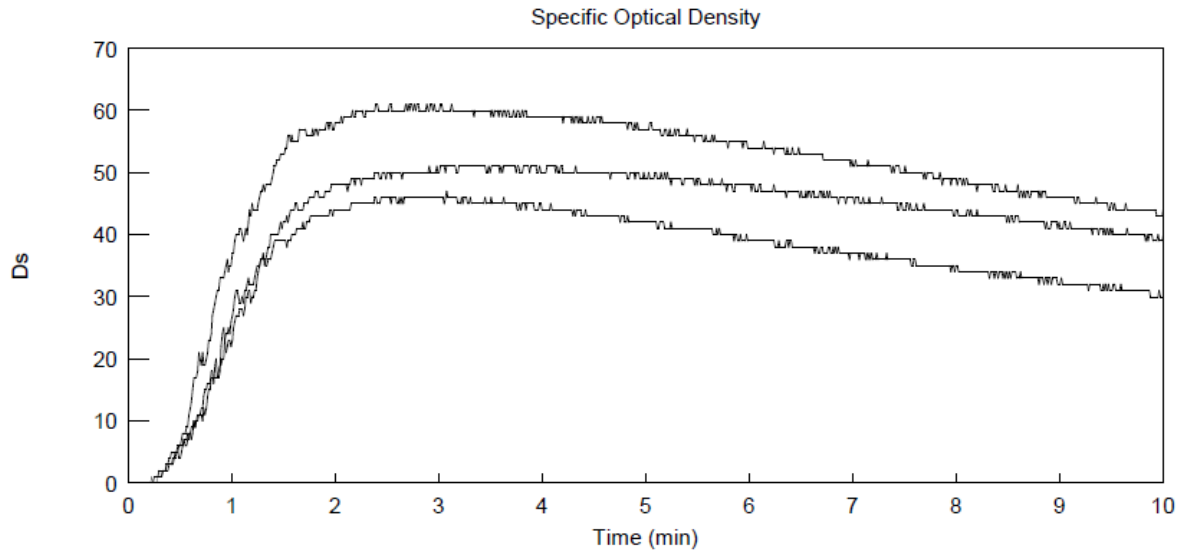
Specimen 4

About 0:20	White smoke started
About 0:30	Browning of the whole surface started
About 2:00	Ignition with orange flames
About 2:10	Orange flames 1-2" above the cone furnace
About 3:00	Flames out

Specimen 5 and 6

About 0:10	White smoke started
About 0:30	Browning of the whole surface started
About 1:30	Ignition with orange flames
About 1:40	Orange flames 1-2" above the cone furnace
About 2:30	Flames out

Radiant 50kW/m^2 : Specimens numbers #7-9 was used for testing



Summary

Run	Specimen #	Ds @ 1.5 min	Ds @ 4 min	Max Ds (first 4 min)	Max Ds Time (first 4 min)	Max Ds	Max Ds Time
1	Specimen 1	39.0	44.0	47.0	3:04.7	47.0	3:04.7
2	Specimen 2	42.0	50.0	51.0	2:54.7	51.0	2:54.7
3	Specimen	53.0	59.0	61.0	2:23.8	61.0	2:23.8
Avg.		44.7	51.0	53.0		53.0	

Avg Backwall Temp: 143.1 Fahrenheit Min Backwall Te mp: 133.7 Fahrenheit Max Backwall Temp: 147.3 Fahr enheit

Average Ds_{max} for 50kW/m^2 with a Pilot Flame is 53.0

Smoke Toxicity for 50kW/m^2 Radiant No Pilot Flame Test

Gas Compound	Specimen 2 Maximum Observed (ppm)	Specimen 3 Maximum Observed (ppm)	Analysis Detection Limits (ppm)	Critical Concentrations (ppm)
Carbon Monoxide	406	403	20	1450
Oxides of Nitrogen	None observed	None observed	10	350
Sulfur Dioxide	None observed	None observed	5	120
Hydrogen Chloride	127	128	10	600
Hydrogen Fluoride	None observed	None observed	20	600
Hydrogen Bromide	None observed	None observed	25	600
Hydrogen Cyanide	None observed	None observed	7	140

Observations for 50kW/m^2 Radiant No Pilot Flame

All three test specimens behaved similarly.

About 0:05 White smoke started
About 0:10 Browning of the whole surface started

5.2. EXAMINATION OF RESULTS

The observations of the burn for each sample were as follows:

- At 25kW/m^2 without the pilot flame, produced an average maximum of the Dm (Ds_{max}) that did not exceed 200 for material used as surface of bulkheads, lining or ceiling, and a Dm (Ds_{max}) that did not exceed 500 for material used as floor covering. The gas concentration measured at each test condition did not exceed the test limits
- At 25kW/m^2 with the pilot flame, produced an average maximum of the Dm (Ds_{max}) did not exceed 200 for material used as surface of bulkheads, lining or ceiling, and a Dm (Ds_{max}) that did not exceed 500 for material used as floor covering. The gas concentration measured at each test condition did not exceed the test limits
- At 50kW/m^2 without the pilot flame, produced an average maximum of the Dm (Ds_{max}) did not exceed 200 for material used as surface of bulkheads, lining or ceiling, and a Dm (Ds_{max}) that did not exceed 500 for material used as floor covering. The gas concentration measured at each test condition did not exceed the test limits

6 Conclusion

Intertek Testing Services NA (Intertek) has conducted testing for TEMP-COAT Brand Products LLC on TEMP-COAT 101 to evaluate smoke density and toxicity production characteristics. Testing was conducted in accordance with and following the standard method IMO FTP Code part 2.

The TEMP-COAT 101 met the requirements of IMO FTP Code part 2 for a surface finish used on bulkheads, lining or ceiling, as well as floor coverings.

Please note; this report does not represent authorization for the use of any Intertek certification mark.

INTERTEK TESTING SERVICES NA

Reported by:

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Reviewed by:

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7 Appendix A

Note: The information in appendix A was provided to the analyst to report. The total thicknesses of the specimens were measured to assure accuracy of the values reported.

Specimen #	Thickness in thousands of an inch
1	68
2	65
3	70
4	70
5	68
6	70
7	68
8	70
9	68

REVISION SUMMARY

DATE	SUMMARY
4/7/2011	Original date of report