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Test Report No: ICL/H18/9166

BS 6853: 1999 Annex B, Clause B.2
Code Of Practice For Fire Precautions
In The Design And Construction Of Passenger Carrying Trains.
Determination of weighted summation of toxic fume, R
B.2 Area based test method.

Sponsored by:

Tensid UK Limited
Unit 1 Craven Court, Canada Road,
Byfleet, KT14 7JL

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1. Introduction

Tests were undertaken on a specimen of composite materials. The test was conducted in accordance with the procedures called up in Annex B.2 of BS 6853: 1999 "Code of practice for fire precautions in the design and construction of passenger carrying trains - Determination of weighted summation of toxic fume, R and this report should be read in conjunction with this test standard.

BS 6853: 1999 Annex B.2 details a test procedure, the results being expressed as R value, for the measurement of toxic fumes generated under the conditions of test carried out in apparatus detailed in BS ISO 5659-2. The test is carried out at 25kW/m² with pilot flame.

A single smoke emission only test was carried out and the time at which 85 % of the peak smoke emission is reached, (or the value at 20 min if no maximum is reached), was determined.

Toxic fume emission testing was then carried out in triplicate. The sampling of evolved gases was undertaken at time at which 85% of Ds max of first specimen was recorded.

The results are used to determine compliance with the criteria given in BS 6853: 1999 Table 1,2,3,4,5,6,9, 10, and 12.

2. Product Description

The description of the specimen given below has been prepared from information provided by the sponsor of the test. All values quoted are as supplied by the sponsor of the test and are nominal values, unless tolerances are given.

The product was a two part paint referenced "L F P L i n e M a r k i n g P a i n t" consisting of Part a as base and Part B as an activator.

The sponsor of the test stated that the rate of application is 4 to 5m²/litre on one face of a 5mm thick inert board. The sponsor of the test has supplied Technical data / safety sheets relating to the product and these are held on our file relating to this investigation.

3. Conditioning of Test Specimens

The specimens were received 3rd April 2018

The specimens were conditioned at $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ in accordance with the requirements given in BS ISO 5659-2.

4. Date of Test

The test was performed on 18th April 2018

5. Test Procedure

The test was performed in accordance with the procedures called up in BS 6853: 1999 Annex B, Clause B.2. and this report should be read in conjunction with this standard.

The painted face (Yellow)cover was exposed to the heating conditions of the test.

6. Test Results

The test results relate only to the behaviour of the specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential smoke hazard of the product in use. Uncertainty measurement has not been taken into account when presenting the test results.

Table 1: Test results amount detected

Gas	Amount detected (ppm)		
	Run 2	Run 3	Run 4
Carbon dioxide, CO ₂	3000	3000	3000
Carbon Monoxide, CO	10	10	10
Hydrogen Fluoride, HF	ND	ND	ND
Hydrogen Chloride, HCl	ND	ND	ND
Hydrogen Bromide, HBr	ND	ND	ND
Hydrogen Cyanide, HCN	ND	ND	ND
Nitrous Fumes, NO _x	ND	ND	ND
Sulphur Dioxide, SO ₂	ND	ND	ND

where ND = not detected

Calculation of index:

Individual index , $r = C_x / f_x$

Where: C_x is the emission in gm^{-2}

f_x is the reference value in gm^{-2}

r_x is the individual r index

$$R \text{ value}, r = \sum r$$

Table 2: BS 6853:1999 reference values

Gas	Reference value, $f(\text{gm}^{-2})$
Carbon Dioxide, CO_2	14000
Carbon Monoxide, CO	280
Hydrogen Fluoride, HF	4.9
Hydrogen Chloride, HCl	15
Hydrogen Bromide, HBr	20
Hydrogen Cyanide, HCN	11
Nitrous Fumes, NO_x	7.6
Sulphur Dioxide	53

Table 3: R value calculation

Gas	Run 2		Run 3		Run 4	
	C_x	r	C_x	r	C_x	r
Carbon dioxide, CO_2	473.859	0.034	473.859	0.034	473.859	0.034
Carbon Monoxide, CO	1.005	0.004	1.005	0.004	1.005	0.004
Hydrogen Fluoride, HF	ND	-	ND	-	ND	-
Hydrogen Chloride, HCl	ND	-	ND	-	ND	-
Hydrogen Bromide, HBr	ND	-	ND	-	ND	-
Hydrogen Cyanide, HCN	ND	-	ND	-	ND	-
Nitrous Fumes, NO_x	ND	-	ND	-	ND	-
Sulphur Dioxide, SO_2						
R value		0.037		0.037		0.037

where ND = not detected

Average R value : 0.037

7. Conclusion

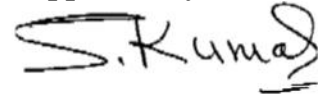
The sample described in this report, when tested in accordance with BS 6853: 1999 Annex B.2, achieved an R value of 0.037

Prepared by

A handwritten signature in black ink, appearing to read "C. B. Chong", with a horizontal line extending from the end of the signature.

**C. B. Chong
Fire Scientist**

Approved by

A handwritten signature in black ink, appearing to read "S. Kumar", with a horizontal line extending from the end of the signature.

**S. Kumar
Technical Manager**

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