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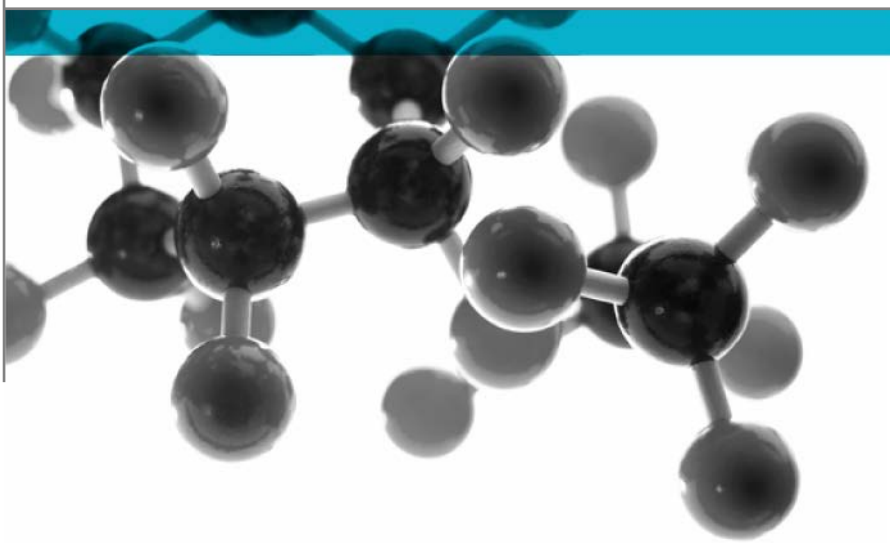
ISO 5658-2:2006+A1:2011



Reaction to Fire Tests – Spread of Flame - Lateral Spread of flame test on Building and Transport Products in Vertical Configuration

A Report To: Smyth Composites Ltd

Document Reference: 422291

Date: 21st January 2020

Issue No.: 1

Executive Summary

Objective To determine the performance of the following product when tested in accordance with ISO 5658-2:2006+A1:2011

Generic Description		Product reference	Thickness	Weight per unit area
Coated fibre reinforced phenolic resin sheet		"Phenclad"	3.5mm	3.4kg/m^2
Individual components used to manufacture composite:				
Coating		"AE 265/8"	Unable to provide	Unable to provide
Moulded sheet	Phenolic resin	"Cellobond"	Not applicable	Not applicable
	Fibre reinforcement	"Dong Yu"	Not applicable	2 x 600g/m^2
Please see pages 5, 6 & 7 of this test report for the full description of the product tested				

Test Sponsor Smyth Composites Ltd, Panmure Industrial Estate, Carnoustic, Angus, DD7 7NP

Summary of Test Results:

Parameter	Units	Specimen Number			Average
		1	2	3	
Heat for Sustained Burning (Q_{sb})	MJm^{-2}	5.46	10.72	10.38	8.86
Critical flux at Extinguishment (CFE)	kW/m^2 (±4%)	43.50	39.10	39.10	40.57
Flaming droplets with sustained flaming (>10s)	N/A	No	No	No	N/A

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Date of Test 18th December 2020

Signatories

	
Responsible Officer T. Kinder * Senior Technical Officer	Authorised T. Mort * Senior Technical Officer

* For and on behalf of Warringtonfire.

Report Issued: 21st January 2020

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CONTENTS **PAGE NO.**

Test Details

Introduction

A test has been conducted in accordance with the procedure specified in ISO 5658-2:2006+A1:2011 Reaction to Fire Tests – Spread of Flame – Part 2: Lateral Spread on Building and Transport Products in Vertical Configuration on the specimens detailed in this report. The test was conducted using an impinging propane flame. It is advised that this report is read in conjunction with the aforementioned document.

Scope of test

ISO 5658-2:2006+A1:2011 specifies a method of test for measuring the lateral spread of flame along the surface of a specimen of a product orientated in the vertical position. It provides data suitable for comparing the performance of essentially flat materials, composites or assemblies, which are used primarily as the exposed surfaces of walls.

Instruction to test

The test was conducted on the 18th December 2019 at the request of Smyth Composites Ltd, the sponsor of the test.

Conditioning of specimens

The specimens were received on the 2nd December 2019.

Prior to test the specimens were conditioned to constant mass at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5%.

Exposed face

The smooth face of the specimens was exposed to the radiant heat of the test when the specimens were mounted in the test position.

Condition of specimen edges

Coated layered product with coating applied to test face only, not applied to edges.

Photograph of specimen

Substrate

The specimens were tested with a 12mm thick calcium silicate based backing board present.

Provision of test specimens

The specimens were supplied by the sponsor of the test. Warringtonfire was not involved in any selection or sampling procedure.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. This information has not been independently verified by Warringtonfire**.** All values quoted are nominal, unless tolerances are given.

General description			Coated fibre reinforced phenolic resin sheet
Product reference			"Phenclad"
Name of manufacturer			Smyth Composites
Colour			"White"
Thickness			3.5mm (stated by sponsor) 3.83mm (determined by Warringtonfire)
Weight per unit area			3.4kg/m^2 (stated by sponsor) 4.77kg/m^2 (determined by Warringtonfire)
Moulded sheet	Coating	Generic type	2 pack polyurethane
		Product reference	"AE 265/8"
		Name of manufacturer	"Trimite"
		Number of layers	**See Note 1 Below**
		Specific gravity	**See Note 1 Below**
		Application method	Spray
		Colour reference	"Ral 9010" "White" (observed by Warringtonfire)
		Flame retardant details	**See Note 1 Below**
	Resin	Generic type	Phenolic
		Product reference	"Cellobond"
		Name of manufacturer	Hexion
		Specific gravity/density	**See Note 1 Below**
		Flame retardant details	**See Note 2 Below**
	Glass reinforcement	Generic type	Powder bound chopped strand matt
		Product reference	"Dong Yu"
		Number of layers	2
		Weight per unit area of each layer	600g/m^2
		Configuration of glass reinforcement	**See Note 1 Below**
		Name of manufacturer	Dong Yu
	Resin to glass ratio (by weight)		2.7:1
	Percentage glass reinforcement (by weight)		27%
	Curing process (duration and temperature)		2 hours at 90^{o}C
Brief description of manufacturing process			Hand lay

Note 1: The sponsor of the test was unable to provide this information.

Note 2: The sponsor of the test has confirmed that no flame retardants were used in the production of this component.

Test Results

Applicability of test results

The test results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimens of the manufactured product in the form in which they are tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimens which were tested.

The test results relating to the spread of flame parameters for the individual specimens together with observations made during the test and comments on any difficulties encountered during the test are given in Table 1.

Test results

A total of three specimens were tested and the following results were obtained

Parameter	Units	Specimen Number			Average
		1	2	3	
Heat for Sustained Burning (Q_{sb})	MJm^{-2}	5.46	10.72	10.38	8.86
Critical flux at Extinguishment (CFE)	kW/m^2 (±4%)	43.50	39.10	39.10	40.57
Flaming droplets with sustained flaming (>10s)	N/A	No	No	No	N/A

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Validity

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The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. Where this report is used to confirm compliance for use on European rolling stock as per the Technical Specification for Interoperability (LOC&PAS TSI (Commission Regulation (EU) No. 1302/2014)), all tests must have been conducted within the last 5 years or the test reports must have been reviewed within the last five years. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

Appendix 1 – Observations during test

Specimen No:	1		Heat for Sustained Burning (MJ/m^2)	2		Heat for Sustained Burning (MJ/m^2)	3		Heat for Sustained Burning (MJ/m^2)
Time to Ignition: (min:sec)	00:02			03:31			03:02		
Time to Travel	min	sec		min	sec		min	sec	
50mm	01	24	4.24	03	34	10.81	03	21	10.15
100mm	01	56	5.74	03	44	11.09	03	40	10.89
150mm	01	56	5.46	03	51	10.88	03	45	10.60
200mm	02	51	7.37	04	05	10.56	03	56	10.17
250mm									
300mm									
350mm									
400mm									
450 mm									
500mm									
550mm									
600mm									
650mm									
700mm									
750mm									
800mm									
Duration of Test (min:sec)	16:37			16:18			16:29		
Final Travel (mm)	200			240			240		
C.F.E. (kw/m^2)	43.50			39.10			39.10		

OBSERVATIONS:

In the case of all the specimens tested, blistering was observed throughout the duration of the test.

Revision History

Issue No :	Re - Issue Date :
Revised By:	Approved By:
Reason for Revision:	

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Revised By:	Approved By:
Reason for Revision:	