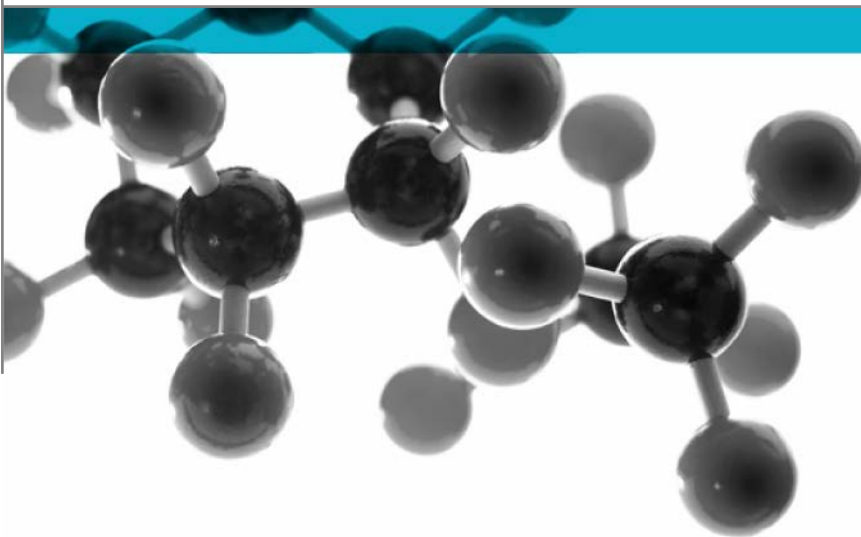


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BS 476: Part 7: 1997



Method For Classification Of The Surface Spread Of Flame Of Products

A Report To: Smyth Composites Ltd

Document Reference: 399478

Date: 31st May 2018

Issue No.: 1

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the surface spread of flame classification of the following product when tested in accordance with BS 476: Part 7: 1997.

Generic Description	Product reference	Thickness	Weight per unit area or density
Flame retardant grade GRP laminate with grit coating	"Gritplate"	4.2mm	6kg/m ²
Individual components used to manufacture composite:			
Grit coating	"1-1.5"	Not stated	1.8kg/m ²
Resin	"Bufa Firestop S810"	Not stated	Not stated
Glass reinforcement	"Dong Yu CSM"	Not stated	2 x 450g/m ²
Please see page 5 of this test report for the full description of the product tested			


Test Sponsor Smyth Composites Ltd, Unit 10, Panmure Industrial Estate, Carnoustie, Angus DD7 7NP

Test Results: **Class 1**


An uncertainty of measurement estimation has been conducted in relation to the distance travelled by the flame front and the findings are as detailed on page 8.

Date of Test 18th May 2018

Signatories



Responsible Officer
T. Mort *
Senior Technical Officer



Authorised
S. Deeming *
Business Unit Head

* For and on behalf of **Exova Warringtonfire**.

Report Issued: 31st May 2018

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Test Details

Purpose of test	To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 7: 1997, "Fire tests on building materials and structures, method for classification of the surface spread of flame of products". This test was therefore performed in accordance with the procedure specified in BS 476: Part 7: 1997 and this report should be read in conjunction with that British Standard.
Scope of test	BS 476: Part 7: 1997 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, and a classification system based on the rate and extent of flame spread. It provides data suitable for comparing the performances of essentially flat materials, composites, or assemblies, which are used primarily as the exposed surfaces of walls or ceilings.
Fire test study group/EGOLF	Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.
Instruction to test	The test was conducted on the 18 th May 2018 at the request of Smyth Composites Ltd, the sponsor of the test.
Provision of test specimens	The specimens were supplied by the sponsor of the test. Exova Warringtonfire was not involved in any selection or sampling procedure.
Conditioning of specimens	The specimens were received on the 4 th May 2018 and were conditioned to constant mass at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ prior to testing.
Form in which the specimens were tested	Material - Single substance or uniformly dispersed mixture, e.g. metal, stone, timber, concrete, mineral fibre, polymers. Each specimen was tested in direct contact with a nominally 12mm thick non-combustible backing board.
Exposed face	The grit face of the specimens was exposed to the heating conditions of the test.

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 **Exova Warringtonfire**. All values quoted are nominal, unless tolerances are given.

Generic type		Flame retardant grade GRP laminate with grit coating	
Product reference		"Gritplate"	
Name of manufacturer		Smyth Composites	
Colour		"Grey"	
Thickness		4.2mm (stated by sponsor) 4.15mm (determined by Exova Warringtonfire)	
Weight per unit area		6kg/m ² (stated by sponsor) 6.14kg/m ² (determined by Exova Warringtonfire)	
Grit	Generic type	Fused alumina	
	Product reference	"1-1.5"	
	Name of manufacturer	See Note 1 below	
	Colour	"White"	
	Application rate	1.8kg/m ²	
	Application method	Chicken feed	
	Flame retardant details	See Note 2 below	
Moulded sheet	Resin	Generic type	Unsaturated polyester resin
		Product reference	"Bufa Firestop S810"
		Name of manufacturer	Bufa Composite Systems
		Specific gravity/density	See Note 2 below
		Flame retardant details	See Note 2 below
	Glass reinforcement	Generic type	Powder bound CSM
		Product reference	"Dong Yu CSM"
		Number of layers	Two
		Weight per unit area of each layer	450g/m ²
		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)		1.5% catalyst (curox). 8 hours room temperature overnight, then 6-7 hours in a heated Platon press at 60-70°C	
Brief description of manufacturing process		Hand lay up	

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

Note 2. The sponsor of the test was unable to provide this information.

Test Results

Results and observations

The test results for the individual specimens, together with observations made during the test and comments on any difficulties encountered during the test are given in Appendix 1.

Classification

In accordance with the class definitions given in BS 476: Part 7: 1997; the specimens tested are classified as Class 1.

An uncertainty of measurement estimation has been conducted in relation to the distance travelled by the flame front and the findings are as detailed on page 8.

Criteria for classification

If the prefix 'D' or suffix 'R' or 'Y' is included in the classification, this indicates that the results should be treated with caution. An explanation of the reason for the prefix and suffixes is given in Appendix 2, together with the classification limits specified in the Standard.

Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of 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 product in the form in which they were 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.

Validity

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. 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.

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Appendix 1 – Test Results

SPECIMEN No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	50	50	50	50	50	50
Distance (mm)	Time to travel to indicated distance (minutes : seconds)					
75						
165						
190						
215						
240						
265						
290						
375						
455						
500						
525						
600						
675						
710						
750						
785						
825						
Time to reach maximum distance travelled	1:00	1:00	1:00	1:00	1:00	1:00
Maximum distance travelled in 10 minutes (mm)	50	50	50	50	50	50

Note: Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the Standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

Observations made during test and comments on any difficulties encountered during the test:

In the case of each specimen tested, flash flaming was observed from the second minute of the test, extending up to a maximum distance of 175mm.

In the case of specimens 2,3,4,5 & 6, transitory flaming was observed across the face of the sample from the third minute of the test, extending up to a maximum distance of 240mm.

**Uncertainty of
 measurement**

Specimen No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	±3	±3	±3	±3	±3	±3
Maximum distance travelled in 10 minutes (mm)	±3	±3	±3	±3	±3	±3

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.

Appendix 2 – Classification Criteria

Classification of spread of flame

Classification	Spread of Flame at 1.5 min		Final Spread of Flame	
	Limit (mm)	Limit for one specimen (mm)	Limit (mm)	Limit for one specimen (mm)
Class 1	165	165 + 25	165	165 + 25
Class 2	215	215 + 25	455	455 + 45
Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits for class 3			

Explanation of prefix and suffixes which may be added to the classification

1. A suffix R is added to the classification if more than six specimens are required in order to obtain six valid test results (e.g. class 2R).
2. A prefix D is added to the classification of any product which does not comply with the surface characteristics specified in the Standard and has therefore been tested in a modified form (e.g. class D3).
3. A suffix Y is added to the classification if any softening and/or other behaviour that may affect the flame spread occurs (e.g. class 3Y).

For example, a classification of D3RY could be achieved indicating (a) a modified surface has been used; (b) a class 3 result has been obtained; (c) additional specimens have been used to obtain 6 valid results and; (d) softening and/or other behaviour has occurred which is considered to have affected the test result.

Revision History

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Reason for Revision:	

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