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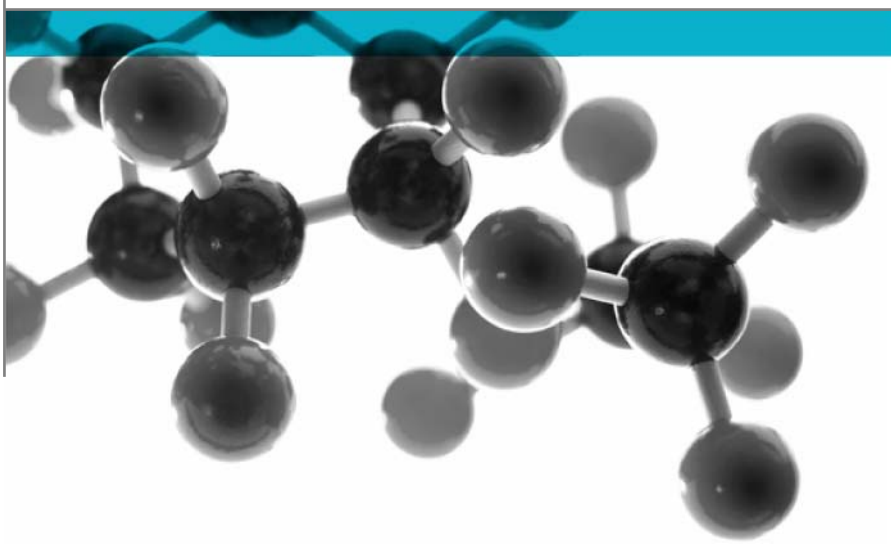
BS 476: Part 6: 1989+A1:2009



Method Of Test For
Fire Propagation For Products

A Report To: Büfa Composite Systems GmbH & Co.KG

Document Reference: 337714

Date: 7th March 2014

Issue No.: 1

Testing
Advising
Assuring

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UKAS TESTING
0249

Executive Summary

Objective To determine the performance of the following product when tested in accordance with BS 476: Part 6: 1989+A1: 2009.

Generic Description		Product reference	Thickness	Weight per unit area / specific gravity
Flame retardant grade glass reinforced plastic (GRP) panels		"BÜFA®-Firestop S 810"	3mm	4.4 kg/m^2 *
Individual components used to manufacture composite:				
Moulded sheet	Resin	"BÜFA®-Firestop S 810"	Not stated	1.5
	Fibre reinforcement	Unwilling to provide	Not stated	3 x 450g/m^2
***Determined by Exova Warringtonfire**				
Please see page 5 of this test report for the full description of the product tested				

Test Sponsor Büfa Composite Systems GmbH & Co.KG, Hohe Looge 2-8, 26180 Rastede, Germany.

Test Results:

Fire propagation index, I	**=**	**9.1**
Sub index, i_1	**=**	**1.2**
Sub index, i_2	**=**	**6.7**
Sub index, i_3	**=**	**1.2**

Date of Test 25th & 26th February 2014

Signatories

Responsible Officer I. White * Testing Officer	Authorised S. Deeming * Operations Manager

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

Report Issued: 7th March 2014

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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 6: 1989+A1: 2009, "Fire tests on building materials and structures, method for fire propagation for products".

The test was performed in accordance with the procedure specified in BS 476: Part 6: 1989+A1: 2009, and this report should be read in conjunction with that British Standard.

Scope of test

BS 476: Part 6: 1989+A1: 2009 specifies a method of test, the result being expressed as a fire propagation index, that provides a comparative measure of the contribution to the growth of fire made by an essentially flat material, composite or assembly. It is primarily intended for the assessment of the performance of internal wall and ceiling linings.

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 25th & 26th February 2014 at the request of Büfa Composite Systems GmbH & Co.KG, 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 6th February 2014 and were conditioned to constant mass at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5% prior to testing.

Form in which the specimens were tested

Assembly - Fabrication of materials and/or composites that can contain air gaps. Each specimen was placed over 25mm thick by 20mm wide calcium silicate based spacers positioned around its perimeter and mounted onto a backing board so that a 25mm enclosed air gap was provided between the unexposed face of the specimen and the backing board.

Exposed face

The smooth 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. All values quoted are nominal, unless tolerances are given.

General description of overall product			Flame retardant grade glass reinforced plastic (GRP) panels
Overall product reference			"BÜFA®-Firestop S 810"
Name of manufacturer of overall product			BÜFA Composite Systems GmbH & Co.KG
Colour			"White"
Overall thickness			3 mm (stated by sponsor) 2.4 mm (determined by **Exova Warringtonfire**)
Overall weight per unit area			4.4 kg/m^2 (determined by **Exova Warringtonfire**)
Moulded sheet	Resin	Generic type	Flame retardant grade unsaturated polyester resin
		Product reference	"BÜFA®-Firestop S 810"
		Name of manufacturer	BÜFA Composite Systems GmbH & Co.KG
		Specific gravity	1.5
		Flame retardant details	**See Note 1 below**
	Fibre reinforcement	Generic type	Emulsion bound chopped strand mat
		Product reference	**See Note 1 below**
		Number of layers	3
		Weight per unit area of each layer	450 g/m²
		Configuration of glass reinforcement	**See Note 1 below**
		Name of manufacturer	**See Note 1 below**
	Resin to glass ratio (by weight)		2:1
	Percentage glass reinforcement (by weight)		33 %
	Curing process (duration and temperature)		Curing system: 2 % Curox M 312 (based on resin weight) Curing conditions: Cure overnight at room temperature - followed by 6 hours elevated temperature post cure at 70°C
Brief description of manufacturing process			Hand lay-up

Note 1 - The sponsor was unwilling to provide this information.

Test Results

Results

A total of three specimens were tested. The laboratory record sheet relating to each of the test specimens is appended to this report (refer to Tables 1, 2 and 3).

Throughout the test on each specimen careful observation was made of the product's behaviour within the apparatus and special note was taken of any of the phenomena listed in clause 9.2 of the Standard. None of the listed phenomena was observed and the test results on all three specimens tested were valid.

The following test results were obtained for the product.

Fire propagation index, I	**=**	**9.1**
Sub index, i_1	**=**	**1.2**
Sub index, i_2	**=**	**6.7**
Sub index, i_3	**=**	**1.2**

NOTE: If a suffix 'R' is included in the above fire propagation index, I, then this indicates that the results should be treated with caution.

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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Table 1

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

Specimen No. : 1 **Date : 25-Feb-14**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	**11**	**12**	**0.00**	
1.00	**17**	**18**	**0.00**	
1.50	**25**	**22**	**0.20**	
2.00	**31**	**26**	**0.25**	
2.50	**38**	**30**	**0.32**	
3.00	**44**	**34**	**0.33**	**1.10**
4.00	**77**	**65**	**0.30**	
5.00	**140**	**99**	**0.82**	
6.00	**186**	**126**	**1.00**	
7.00	**223**	**148**	**1.07**	
8.00	**260**	**165**	**1.19**	
9.00	**286**	**178**	**1.20**	
10.00	**280**	**191**	**0.89**	**6.47**
12.00	**260**	**205**	**0.46**	
14.00	**256**	**215**	**0.29**	
16.00	**263**	**225**	**0.24**	
18.00	**265**	**230**	**0.19**	
20.00	**266**	**232**	**0.17**	**1.35**
Total Index of Performance S			**=**	**8.93**

SubIndex s1 **1.10**

SubIndex s2 **6.47**

SubIndex s3 **1.35**

Index of Performance S **8.93**

Table 2

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

Specimen No. : 2 **Date : 25-Feb-14**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	12	12	0.00	
1.00	18	18	0.00	
1.50	25	22	0.20	
2.00	32	26	0.30	
2.50	39	30	0.36	
3.00	45	34	0.37	1.23
4.00	85	65	0.50	
5.00	151	99	1.04	
6.00	194	126	1.13	
7.00	224	148	1.09	
8.00	250	165	1.06	
9.00	268	178	1.00	
10.00	266	191	0.75	6.57
12.00	254	205	0.41	
14.00	249	215	0.24	
16.00	247	225	0.14	
18.00	245	230	0.08	
20.00	245	232	0.07	0.94
Total Index of Performance S			**=**	**8.74**

SubIndex s1 **1.23**

SubIndex s2 **6.57**

SubIndex s3 **0.94**

Index of Performance S **8.74**

Table 3

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

Specimen No. : 3 **Date : 26-Feb-14**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	12	12	0.00	
1.00	18	18	0.00	
1.50	26	22	0.27	
2.00	34	26	0.40	
2.50	39	30	0.36	
3.00	45	34	0.37	1.39
4.00	80	65	0.38	
5.00	149	99	1.00	
6.00	190	126	1.07	
7.00	227	148	1.13	
8.00	260	165	1.19	
9.00	283	178	1.17	
10.00	281	191	0.90	6.82
12.00	263	205	0.48	
14.00	256	215	0.29	
16.00	258	225	0.21	
18.00	259	230	0.16	
20.00	260	232	0.14	1.28
Total Index of Performance S			**=**	**9.50**

SubIndex s1 **1.39**

SubIndex s2 **6.82**

SubIndex s3 **1.28**

Index of Performance S **9.50**

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:	