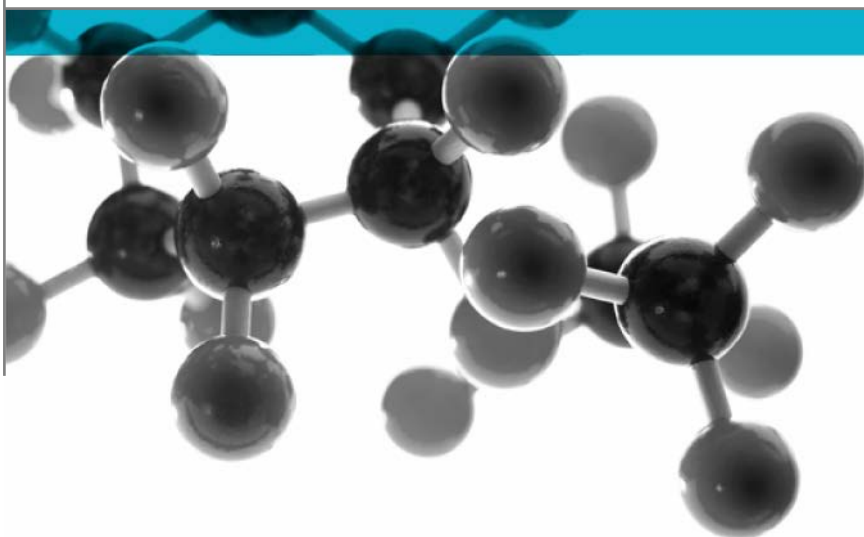


BS 476: Part 6: 1989+A1:2009



Method Of Test For Fire Propagation For Products

A Report To: Teal & Mackrill Ltd

Document Reference: 406687

Date: 2nd January 2019

Issue No.: 2

Page 1



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
Water based 2-pack polyurethane coating applied to a 'Glasroc F' multiboard	"WB101 Anti-Graffiti Coating Clear / Anti-Graffiti Lacquer Clear Glaze"	6.57mm*	6.38kg/m ² *
Individual components used to manufacture composite:			
Polyurethane	"WB101/T"	95μ	1.15
Substrate	"Glasroc F Multiboard"	6mm	6.0kg/m ²
*determined by Warringtonfire			
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor Teal and Mackrill Ltd, Lockwood Street, Hull, HU2 0HN

Test Results:



Fire propagation index, I	=	1.8
Sub index, i ₁	=	0.2
Sub index, i ₂	=	1.1
Sub index, i ₃	=	0.5

An uncertainty of measurement estimation has been conducted in relation to the fire propagation index, I and the sub index, i₁. The findings are as detailed in Annex A of this report.

Date of Test 20th November 2018

Reason for revision This document replaces issue 1 (dated 22nd November 2018) of the same number which has been withdrawn. The incorrect product description information was added to the test report

Signatories

	
Responsible Officer C. Jacques * Senior Technical Officer	Authorised T. Mort * Senior Technical Officer

* For and on behalf of [Warringtonfire](#).

Report Issued: 2nd January 2019

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Author: C Jacques
Client: Teal and Mackrill Ltd

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Test Details

Purpose of test	<p>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".</p> <p>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.</p>
Scope of test	<p>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.</p>
Fire test study group/EGOLF	<p>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.</p>
Instruction to test	<p>The test was conducted on the 15th November 2018 at the request of Teal and Mackrill Ltd, the sponsor of the test.</p>
Provision of test specimens	<p>The specimens were supplied by the sponsor of the test. Warringtonfire was not involved in any selection or sampling procedure.</p>
Conditioning of specimens	<p>The specimens for testing to BS 476: Part 6: 1989+A1: 2009 together with the specimens for testing to BS 476: Part 7: 1997 were received on the 2nd November 2018.</p> <p>Prior to the tests, all of the specimens were conditioned to constant mass at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$. One specimen from the total sample submitted for test was selected for constant mass verification.</p>
Form in which the specimens were tested	<p>Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials. Each specimen was tested in direct contact with a nominally 12mm thick non-combustible backing board.</p>
Exposed face	<p>The coated face of the specimens was exposed to the heating conditions of the test.</p>

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		Water based 2-pack polyurethane coating applied to a 'Glasroc F' multiboard
Product reference of coating system		"WB101 Anti-Graffiti Coating Clear / Anti-Graffiti Lacquer Clear Glaze"
Overall thickness		6.57mm(determined by Warringtonfire)
Overall weight per unit area		6.38kg/m ² (determined by Warringtonfire)
Coating (test face)	Generic type	Polyurethane
	Product reference	"WB101/T"
	Name of manufacturer	Teal & Mackrill Ltd
	Colour	"Clear"
	Number of coats	Three
	Application thickness per coat	95 microns (dry film thickness)
	Application method	Brush
	Specific gravity	1.15
	Flame retardant details	See Note 1 below
	Curing process per coat	16 hours chemical cure
Substrate	Product reference	"Glasroc F Multiboard"
	Generic type	Gypsum incorporating fibre glass immediately below the surface
	Name of manufacturer	British Gypsum
	Thickness	6mm
	Weight per unit area	6.0kg/m ²
Brief description of manufacturing process of coating		See Note 2 below

Note 1. The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the component.

Note 2. The sponsor of the test 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	=	1.8
Sub index, i_1	=	0.2
Sub index, i_2	=	1.1
Sub index, i_3	=	0.5

An uncertainty of measurement estimation has been conducted in relation to the fire propagation index, I and the sub index, i_1 . The findings are as detailed in Annex A of this report.

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 : 20-Nov-18**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	15	14	0.20	0.32
1.00	22	22	0.00	
1.50	27	28	0.00	
2.00	32	31	0.05	
2.50	36	35	0.04	
3.00	40	39	0.03	
4.00	70	67	0.08	1.08
5.00	118	107	0.22	
6.00	144	135	0.15	
7.00	168	157	0.16	
8.00	182	174	0.10	
9.00	207	188	0.21	
10.00	217	200	0.17	
12.00	230	215	0.13	0.44
14.00	241	230	0.08	
16.00	252	239	0.08	
18.00	259	245	0.08	
20.00	267	252	0.08	
Total Index of Performance S			=	1.84

SubIndex s1 0.32**SubIndex s2 1.08****SubIndex s3 0.44****Index of Performance S 1.84**

Table 2

Laboratory Record Sheet**FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009****Specimen No. : 2****Date : 20-Nov-18**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	13	13	0.00	0.07
1.00	19	19	0.00	
1.50	23	24	0.00	
2.00	28	28	0.00	
2.50	33	32	0.04	
3.00	37	36	0.03	
4.00	67	67	0.00	0.30
5.00	110	102	0.16	
6.00	137	135	0.03	
7.00	158	157	0.01	
8.00	176	173	0.04	
9.00	192	189	0.03	
10.00	202	200	0.02	
12.00	224	218	0.05	0.28
14.00	238	232	0.04	
16.00	249	238	0.07	
18.00	255	245	0.06	
20.00	261	248	0.07	
Total Index of Performance S			=	0.65

SubIndex s1 0.07**SubIndex s2 0.30****SubIndex s3 0.28****Index of Performance S 0.65**

Table 3

Laboratory Record Sheet**FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009****Specimen No. : 3****Date : 20-Nov-18**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	13	13	0.00	0.16
1.00	20	20	0.00	
1.50	25	26	0.00	
2.00	31	30	0.05	
2.50	35	33	0.08	
3.00	39	38	0.03	
4.00	77	67	0.25	2.00
5.00	124	108	0.32	
6.00	147	138	0.15	
7.00	168	159	0.13	
8.00	221	176	0.56	
9.00	219	189	0.33	
10.00	226	200	0.26	
12.00	236	217	0.16	0.66
14.00	248	227	0.15	
16.00	257	233	0.15	
18.00	260	241	0.11	
20.00	266	247	0.10	
Total Index of Performance S			=	2.83

SubIndex s1 0.16**SubIndex s2 2.00****SubIndex s3 0.66****Index of Performance S 2.83**

Annex A

Uncertainty of measurement

Specimen No.	1	2	3	Average
Fire propagation index, I	+ 0.76	+ 0.76	+ 0.76	+0.76
	-0.26	-0.11	-0.17	-0.18
Sub index i_1	+ 0.75	+ 0.75	+ 0.75	+0.75
	-0.21	-0.05	-0.10	-0.12

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.

Revision History

Issue No : 2	Re-issue Date: 2nd January 2019
Revised By: C Jacques	Approved By: T Mort
Reason for Revision: This document replaces issue 1 (dated 22 nd November 2018) of the same number which has been withdrawn. The incorrect product description information was added to the test report	

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