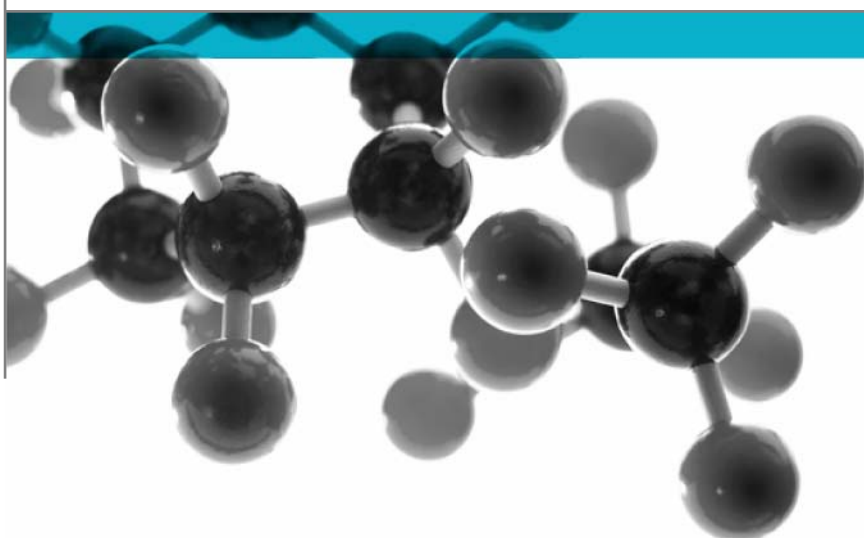


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BS 476 Part 3: 2004



External Fire Exposure Roof Test

A Report To: Colorplas Limited

Document Reference: 336034

Date: 24th February 2014

Issue No.: 2

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the fire performance of the following product when tested in accordance with BS 476: Part 3: 2004

Generic Description	Product reference	Thickness	Weight per unit area or specific gravity
Fire-retardant coating applied on a OSB3 deck	"RCFR113-DG"	18 – 20mm	11 – 12kg/m ²
Individual components used to manufacture composite:			
Coating	"RCFR113-DG"	500 – 600 microns	1.323
Laminating resin	Not stated	Not stated	1100kg/m ³
Glass fibre	Not stated	1mm	450g/m ²
OSB deck	"Sterling OSB3"	18mm	9kg/m ²
Please see page 5 & 6 of this test report for the full description of the product tested			

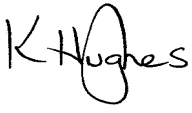
Test Sponsor Colorplas Limited, Crawford Street, Rochdale, Lancashire, OL16 5NU

Test Results In Accordance With The Designations Defined In BS 476: Part 3: 2004 The Test Specimens Are In Category "EXT.F.AB".


Date of Test: 17th December 2013

Reason for Revision: This document replaces Issue 1 (dated 12th February 2014) of the report which has been withdrawn. The sponsor has requested amendments to be made to the description tables in this Issue 2 report.

Signatories



Responsible Officer
K. Hughes *
Technical Officer



Authorised
S. Deeming*
Operations Manager

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

Report Issued: 24th February 2014

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Document No.: 336034

Page No.: 2 of 10

Author: K Hughes

Issue Date: 24th February 2014

Client: Colorplas Limited

Issue No.: 2



0249

CONTENTS	PAGE NO.
EXECUTIVE SUMMARY	2
SIGNATORIES	2
TEST DETAILS	4
DESCRIPTION OF TEST SPECIMENS	5
TEST RESULTS	7
TABLE 1	8
REVISION HISTORY	10



Test Details

Purpose of test	<p>To determine the performance of specimens of a roof construction when they are subjected to the conditions of the test specified in BS 476: Part 3: 2004, "British Standard Specification for Fire Tests on Building Materials and Structures - External Fire Exposure Roof Tests".</p> <p>The test was performed in accordance with the test procedures specified in BS 476: Part 3: 2004 and this report should be read in conjunction with that British Standard.</p>
Scope of test	<p>The tests are designed to enable measurement of:</p> <ul style="list-style-type: none"> a) capacity of a representative section of a roof to resist penetration by fire when the external surface is exposed to radiation and flame; and b) distance of the spread of flame on the outer surface of the roof covering under certain conditions. <p>Roofs are graded according to the angle at which they are tested, the time for which they resist penetration by fire and the distance of superficial spread of flame on their external surface.</p> <p>The test specimens are tested at an angle of 45° to the horizontal (sloping position) unless the roof construction is used at an angle of less than 10° to the horizontal, in which case the specimens are tested horizontally (flat position).</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 17th December 2013 at the request of Colorplas Limited, the sponsor of the test.</p>
Provision of test specimens	<p>The specimens were supplied by the sponsor of the test. Exova Warringtonfire was not involved in any selection or sampling procedure.</p>
Conditioning of specimens	<p>The specimens were received on the 6th December 2013. Prior to testing the specimens were conditioned to equilibrium in an atmosphere having a temperature of 23 ±2°C and a relative humidity of 45 to 55%.</p>
Orientation of specimens	<p>The specimens were tested in the flat position.</p>

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		Fire-retardant coating applied on a OSB3 deck	
Product reference of composite		"RCFR113-DG"	
Name of manufacturer of composite		Colorplas Ltd	
Overall thickness of composite		18-20mm (stated by sponsor) 18.45mm (determined by Exova Warringtonfire)	
Overall weight per unit area of composite		11-12kg/m ² (stated by sponsor) 11.61kg/m ² (determined by Exova Warringtonfire)	
Product reference of overall coating		"RCFR113-DG"	
Overall thickness of coating		0.5 – 0.6mm	
Overall weight per unit area of coating		600g/m ²	
Coating (test face)	Generic type	Unsaturated polyester resin fire retardant topcoat	
	Product reference	"RCFR113-DG"	
	Name of manufacturer	Colorplas Limited	
	Colour reference	"Dark Grey"	
	Number of coats	One	
	Thickness per coat	500 – 600 microns (wet film)	
	Specific gravity	1.323	
	Application method	Roller application	
	Flame retardant details	See Note 1 Below	
	Curing process per coat	Ambient temperature cure with MEKP catalyst	
Moulded sheet	Laminating resin	Generic type	Orthophthalic general purpose laminating resin
		Product reference	See Note 1 Below
		Name of manufacturer	See Note 1 Below
		Colour reference	"Translucent"
		Application rate	1kg/m ²
		Specific gravity	1100kg/m ³
		Application method	Hand lay-up
	Flame retardant details	See Note 2 Below	
	Glass fibre	Generic type	Emulsion bound glass fibre
		Product reference	See Note 1 Below
		Name of manufacturer	See Note 1 Below
		Colour reference	"White"
		Number of layers	One
		Weight per unit area	450g/m ²
Flame retardant details	See Note 2 Below		
Resin to glass ratio		2:1 (1mm thickness panel)	
Curing process per coat		Ambient temperature cure with MEKP catalyst	

Continued on next page

OSB deck	Generic type	Engineered wood based panel
	Product reference	"Sterling OSB3"
	Timber species	Mixed softwood
	Thickness	18mm
	Weight per unit area	9kg/m ²
	Name of manufacturer	See Note 1 Below
	Flame retardant details	See Note 2 Below
Brief description of manufacturing process		See Note 3 Below

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

Note 2: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the product / component.

Note 3: The sponsor was unable to provide this information.

Test Results

Results

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

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

The results of the tests on each of the specimens are given in Table 1.

In Accordance With The Designations Defined In BS 476: Part 3: 2004 The Test Specimens Are In Category "EXT.F.AB".

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

PRELIMINARY IGNITION TEST WITH BURNING BRANDS (STAGE 1)	Specimen No:		
		1	
Room temperature at start of test (°C)	26		
Time to fire penetration (if applicable) (min:sec)	Did not penetrate		
Duration of flaming after withdrawal of the test flame (if applicable) (min:sec)	0:15		
Maximum flame spread distance (if applicable) (mm)	Nil		

SPREAD OF FLAME TEST WITH BURNING BRANDS AND SUPPLEMENTARY RADIANT HEAT (STAGE 2)	Specimen No:		
	2	3	4
Room temperature at start of test (°C)	22	27	27
Duration of flaming after withdrawal of the test flame (if applicable) (min:sec)	13:09	16:00	17:02
Maximum flame spread distance (if applicable) (mm)	260	333	170
Additional observations:			
In the case of all three specimens, ignition occurred within the first minute, upon applying the brand.			
The average maximum spread of flame was 254mm.			

PENETRATION TEST WITH BURNING BRANDS, WIND AND SUPPLEMENTARY RADIANT HEAT (STAGE 3)	Specimen No:		
	5	6	7
Room temperature at start of test (°C)	27	28	28
Time to fire penetration (if applicable) (min:sec)	Did not penetrate	Did not penetrate	Did not penetrate
Additional observations:			
In the case of all three specimens, ignition occurred within the first minute upon applying the brand.			
In the case of all three specimens, no penetration occurred.			

Classification Of Specimens

The following is reproduced from Clause 4 of BS 476: Part 3: 2004.

4 Classification

4.1 Roof system

Roof systems shall be designated by the letters EXT.F or EXT.S to indicate whether the test results apply to a flat (horizontal) or an inclined roof system, respectively

4.2 Fire Resistance of roof system

4.2.1 Coding system

Roof systems subject to conditions of external fire shall be classified according to both the time of penetration and the distance of spread of flame along their external surface.

Each category designation shall consist of two letters, e.g. AA, AC, BB, these being determined as specified in 4.22 and 4.23

4.2.2 Fire penetration (first letter)

- A. Those specimens that have not been penetrated within one hour
- B. Those specimens that are penetrated in not less than 30 min.
- C. Those specimens that are penetrated in less than 30 min.
- D. Those specimens that are penetrated in the preliminary flame test

4.2.3 Spread of flame (second letter)

- A. Those specimens on which there is no spread of flame
- B. Those specimens on which the spread of flame is less than or equal to 533mm, with averaged results rounded up or down to the whole number, as normally practised
- C. Those specimens on which the spread of flame is greater than 533mm, with averaged results rounded up or down to the whole number, as normally practised
- D. Those specimens that continue to burn for five minutes after withdrawal of the test flame or spread more than 381mm across the region of burning in the preliminary test.

4.2.4 Suffix "X"

Attention shall be drawn to dripping from the underside of the specimen, any mechanical failure, and any development of holes, by adding a suffix "X" to the designation to denote that one or more of these took place during the test.

EXAMPLE 1 EXT.F.AA is a flat roofing system with one hour fire penetration resistance on which there was no spread of flame.

EXAMPLE 2 EXT.S.CCX is an inclined roofing system with less than 30 min fire penetration resistance, on which the spread of flame exceeded 533mm and further deterioration took place.

Revision History

Issue No : 2	Issue Date: 24 th February 2014
Revised By: K Hughes	Approved By: S. Deeming
Reason for Revision: This document replaces Issue 1 (dated 12th February 2014) of the report which has been withdrawn. The sponsor has requested amendments to be made to the description tables in this Issue 2 report.	

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