

test report



BS 476: Part 3: 2004

External Fire Exposure Roof
Test

WF Report Number

176729

Date:

23rd January 2009

Test Sponsor:

G & B (North West) Limited

Bodycote warringtonfire Test Report No. 176729

**BS 476: Part 3: 2004
External Fire Exposure Roof Test**

Sponsored By

**G & B (North West) Limited
Giants Hall
Standish
Wigan
Lancashire
WN6 8RY**

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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 23rd September 2008 at the request of G & B (North West) Limited</p>
Provision of test specimens	<p>The specimens were supplied by the sponsor of the test. Bodycote warringtonfire was not involved in any selection or sampling procedure.</p>
Conditioning of specimens	<p>The specimens were received on the 12th of September 2008. 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		GRP waterproofing system applied to an 18mm thick tongue and groove oriented strand board decking.
Product reference of reinforced coating system		"Cure It GRP Waterproofing System"
Overall thickness of reinforced coating system		2mm
Overall thickness		20.6mm (determined by Bodycote warringtonfire)
Overall weight per unit area		13.77Kg/m ² (determined by Bodycote warringtonfire)
Final coating product (Test face)	Generic type	Unsaturated polyester resin in styrene monomer
	Product reference	"Cure It Roofing Topcoat"
	Name of manufacturer	G & B (North West) Ltd.
	Colour	Grey
	Number of coats	One
	Application rate per coat	0.5kg/m ²
	Application method	Roller applied
	Flame retardant details	See Note 1 Below
Reinforcement	Curing process per coat	M.E.K.P catalyst + cobalt
	Generic type	Chopped Strand Mat
	Product reference	"450g/m ² chopped strand mat"
	Name of manufacturer	E-glass C.S.M
	Colour	White
	Number of layers	One
	Weight per unit area	450g/m ²
Flame retardant details	See Note 2 Below	
First coating product	Generic type	Unsaturated polyester resin in styrene monomer
	Product reference	"Cure It Roofing Resin"
	Name of manufacturer	G & B (North West) Ltd.
	Colour	Blue
	Number of coats	One
	Application rate per coat	1.5kg/m ²
	Application method	Roller applied
	Flame retardant details	None
Curing process per coat	M.E.K.P catalyst + cobalt	
Substrate	Product reference	"Sterling OSB3 18mm T & G"
	Generic type	Oriented strand board
	Name of manufacturer	Norbord
	Thickness	18mm
	Density	620 to 640kg/m ³
Flame retardant details	See Note 2 Below	
Brief description of manufacturing process of coatings		Single hand laminated 450g/m ² laminate applied direct onto 18mm OSB3 T & G boards finished with brush applied topcoat.

Continued on next page

Brief description of construction of specimens	Timber OSB3 18mm T & G substrate panel. Single 450g/m ² laminate consisting of 450g/m ² chopped strand mat, unsaturated polyester resin in styrene monomer at 3:1 resin to C.S.M. ratio cured with MEKP catalyst at 2%. 0.5mm polyester topcoat applied by brush cured with MEKP catalyst at 2% Panel post-cured for 10 days before testing.
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Note 1: The sponsor of the test has provided this information but at the specific request of the sponsor, these details have been omitted from the report and are instead held on the confidential file relating to this investigation.

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

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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Signatories


Responsible Officer K Hughes *


P.P. T Mort
Approved M. Dale * Deputy Operations Manager


Authorised C. Dean * Operations Manager

* For and on behalf of **Bodycote warringtonfire**.

Report Issued: 23rd January 2009

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Table 1

PRELIMINARY IGNITION TEST WITH BURNING BRANDS (STAGE 1)	Specimen No:		
		1	
Room Temperature at Start of Test (°C)	22		
Time to Fire Penetration (if applicable) (min:sec)	N/A		
Duration of Flaming after Withdrawal of the Test Flame (if applicable) (min:sec)	N/A		
Maximum Flame Spread Distance (if applicable) (mm)	N/A		

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)	24	25	25
Duration of Flaming after Withdrawal of the Test Flame (if applicable) (min:sec)	3:40	2:41	4:46
Maximum Flame Spread Distance (if applicable) (mm)	18	16	13
Other observations: In the case of each specimen flame spread began to occur at 1 minute 30 seconds			

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)	N/A	N/A	N/A
Other observations: In the case of each specimen fire penetration did not occur.			

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 there is not more than 533mm spread of flame
- C. Those specimens on which there is more than 533mm spread of flame
- 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.

Bodycote

Bodycote warringtonfire · Head Office · Holmesfield Road · Warrington · Cheshire · WA1 2DS · United Kingdom

Tel: +44 (0) 1925 655 116 · Fax: +44 (0) 1925 655 419 · Email: Info@warringtonfire.net · Website: www.warringtonfire.net

