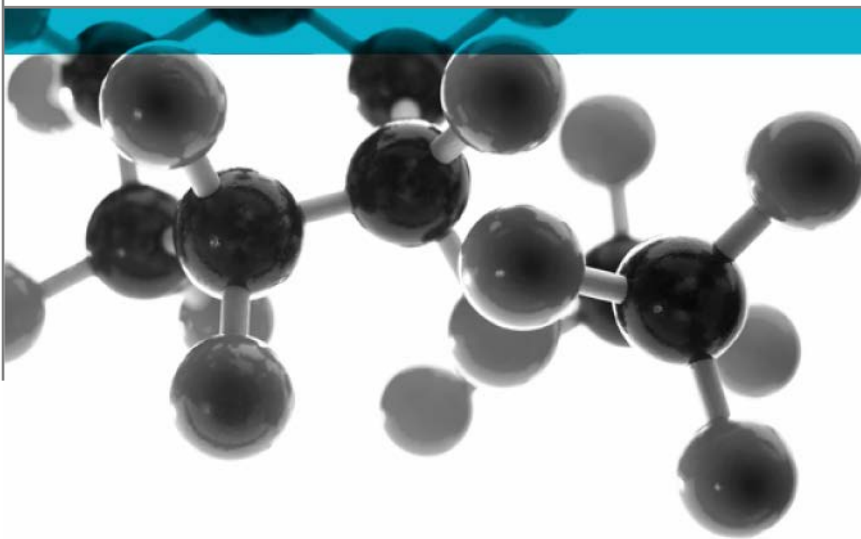


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# BS EN ISO 1182: 2010



## Fire Test For Non-Combustibility Of Building Products

A Report To: The International Glassfibre Reinforced Concrete Association (GRCA)

Document Reference: 384326

Date: 13<sup>th</sup> June 2017

Issue No.: 1

Page 1

Testing  
Advising  
Assuring



## Executive Summary

**Objective** To determine the performance of the following material when tested in accordance with BS EN ISO 1182: 2010.

Generic Description	Product reference	Thickness	Density
Glass fibre reinforced concrete	"Non-Polymer GRC"	45.95mm*	2133kg/m <sup>3</sup> *
<b>Please see page 5 of this test report for the full description of the product tested</b>			
*determined by <b>Exova Warringtonfire</b>			


**Test Sponsor** The International Glassfibre Reinforced Concrete Association (GRCA), PO Box 1454, Northampton, NN2 1DZ

**Test Results:**

	Mean
<b>Furnace thermocouple temperature rise (°C)</b>	<b>1.2</b>
<b>Specimen surface thermocouple temperature rise (°C)</b>	<b>0.6</b>
<b>Duration of sustained flaming (seconds)</b>	<b>Nil</b>
<b>Mass Loss (%)</b>	<b>7.86</b>


**Date of Test** 8<sup>th</sup> June 2017

## Signatories




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Responsible Officer  
C Jacques\*  
Technical Officer



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Approved  
T. Mort \*  
Senior Technical Officer



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Authorised  
S. Deeming \*  
Business Unit Head

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

Report Issued: 13<sup>th</sup> June 2017

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## Test Details

<b>Purpose of test</b>	<p>To determine the performance of a product when it is subjected to the conditions of the test specified in BS EN ISO 1182: 2010, Reaction to Fire Tests for Building Products – Non Combustibility.</p> <p>The test was conducted in accordance with the test procedure described in BS EN ISO 1182: 2010 and this test report should be read in conjunction with that European Standard.</p>
<b>Scope of test</b>	<p>BS EN ISO 1182: 2010 specifies a method of test for the determination of the combustibility performance of a building material under specified conditions. The method of test and its results should be used solely to describe the combustibility or non-combustibility of a material in response to heat under controlled laboratory conditions. It should not by itself be used for describing or appraising the fire hazard of materials under actual fire conditions or as a sole source on which a valid assessment of hazard pertaining to combustibility can be based.</p>
<b>Fire test study group/EGOLF</b>	<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 has 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>
<b>Instruction to test</b>	<p>The test was conducted on the 8<sup>th</sup> June 2017 at the request of The International Glassfibre Reinforced Concrete Association, the sponsor of the test.</p>
<b>Provision of test specimens</b>	<p>The specimens were supplied by the sponsor of the test. <b>Exova Warringtonfire</b> was not involved in any selection or sampling procedure.</p>
<b>Conditioning of specimens</b>	<p>The specimens were received on the 26<sup>th</sup> May 2017 and were conditioned for at least 48 hours at a temperature of <math>23 \pm 2^{\circ}\text{C}</math> and a relative humidity of <math>50 \pm 5\%</math>, in accordance with BS EN 13238:2010. Afterwards they were dried in a ventilated oven maintained at a temperature of <math>60 \pm 5^{\circ}\text{C}</math> for between 20 and 24 hours and were cooled to ambient temperature in a desiccator prior to testing.</p>
<b>Calibration data</b>	<p>A calibration in accordance with paragraphs 7.3.1 and 7.3.2 of BS EN ISO 1182: 2010 was performed on the 25<sup>th</sup> January 2017 and the results are detailed in Appendix 1.</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	Glass fibre reinforced concrete (GRC) product
Product reference	"Non-Polymer GRC"
Name of manufacturer	<b>See Note 1 Below</b>
Thickness tested	45.95mm (determined by <b>Exova Warringtonfire</b> )
Density tested	2133kg/m <sup>3</sup> (determined by <b>Exova Warringtonfire</b> )
Colour reference	"Natural" "Dark Grey" (observed by <b>Exova Warringtonfire</b> )
Flame retardant details	<b>See Note 3 Below</b>
Brief description of manufacturing process	<b>See Note 2 Below</b>

**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 component.**

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

The description of the specimens as given above is not as detailed as would usually be the case for descriptions included in **Exova Warringtonfire** test reports and the description may not fully comply with the requirements of the test standard. In all other respects however the tests were conducted fully in accordance with the requirements of the test standard and the test results are valid.

## Test Results

**Results** The individual test results for each specimen tested are given in Table 1. The calculated results for each specimen tested, as required by clause 8 and clause C.4 of the Standard are given in Table 2.

**Observations** The behaviour of the specimens during the tests was observed and no difficulties were experienced.

**Applicability of test results** The test results relate only to the behaviour of the test specimens of a material under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the material 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.

**Table 1**

Specimen number	1	2	3	4	5
Initial furnace temperature, $T_f$ (initial) (°C)	751.7	751.3	754.3	748.9	748.4
Maximum furnace temperature, $T_f$ (maximum) (°C)	780.3	785.0	784.6	778.4	774.8
Final furnace temperature, $T_f$ (final) (°C)	778.9	784.0	783.4	777.2	773.6
Maximum specimen surface temperature, $T_s$ (maximum) (°C)	774.7	773.4	775.3	774.4	773.3
Final specimen surface temperature $T_s$ (final) (°C)	774.1	772.5	774.7	773.8	772.9
Duration of sustained flaming (seconds)	Nil	Nil	Nil	Nil	Nil
Weight of specimen before test (gms)	182.79	184.43	182.20	187.31	185.55
Weight of specimen after test (gms)	169.38	169.21	167.15	172.33	171.75

**Table 2**

Specimen number	1	2	3	4	5	Mean
Furnace thermocouple temperature rise, $T_f$ (°C) ( $T_f$ maximum - $T_f$ final)	1.4	1.0	1.2	1.2	1.2	1.2
Specimen surface thermocouple temperature rise, $T_s$ (°C) ( $T_s$ maximum - $T_s$ final)	0.6	0.9	0.6	0.6	0.4	0.6
Duration of sustained flaming (seconds)	Nil	Nil	Nil	Nil	Nil	Nil
Mass Loss (%)	7.34	8.25	8.26	8.00	7.44	7.86

**Criteria for  
evaluation**

BS EN ISO 1182: 2010 does not specify any performance criteria. It is the responsibility of a particular regulating authority to decide which aspects of the test are appropriate to particular usages.

**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 I

### CALIBRATION RESULTS

#### Furnace Wall Temperature Calibration

Axis Level	1	2	3
1	823.3	827.4	828.2
2	824.3	826.6	827.8
3	821.2	825.9	829.4

#### Average furnace wall temperature

$$T_{\text{avg}} = 826.0^{\circ}\text{C}$$

#### Average furnace wall temperature on the three axis

$$T_{\text{avg.axis 1}} = 826.3^{\circ}\text{C}$$

$$T_{\text{avg.axis 2}} = 826.2^{\circ}\text{C}$$

$$T_{\text{avg.axis 3}} = 825.5^{\circ}\text{C}$$

#### Deviation of the temperature on the three axis to the average furnace wall temperature

$$T_{\text{dev.axis 1}} = 0.03\%$$

$$T_{\text{dev.axis 2}} = 0.03\%$$

$$T_{\text{dev.axis 3}} = 0.06\%$$

#### Average deviation of the temperature on the three axis to the average furnace wall temperature

$$T_{\text{avg.dev.axis}} = 0.04\%$$

#### Average furnace wall temperature at the three levels

$$T_{\text{avg.level 1}} = 822.9^{\circ}\text{C}$$

$$T_{\text{avg.level 2}} = 826.6^{\circ}\text{C}$$

$$T_{\text{avg.level 3}} = 828.5^{\circ}\text{C}$$

#### Deviation of the temperature on the three levels to the average furnace wall temperature

$$T_{\text{dev.level 1}} = 0.37\%$$

$$T_{\text{dev.level 2}} = 0.08\%$$

$$T_{\text{dev.level 3}} = 0.30\%$$

#### Average deviation of the temperature on the three levels to the average furnace wall temperature

$$T_{\text{avg.dev.level}} = 0.25\%$$



## CALIBRATION RESULTS (CONTINUED)

### Furnace Temperature Calibration

Furnace Height (mm)	Mean Furnace Temperature (°C)	Minimum Allowable Furnace Temperature (°C)	Maximum Allowable Furnace Temperature (°C)
145	661	639	671
135	688	664	698
125	707	683	716
115	723	698	729
105	733	709	737
95	740	717	743
85	743	722	746
75	744	723	747
65	741	720	746
55	732	712	743
45	717	699	736
35	693	679	724
25	663	652	705
15	626	616	678
5	585	570	639

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