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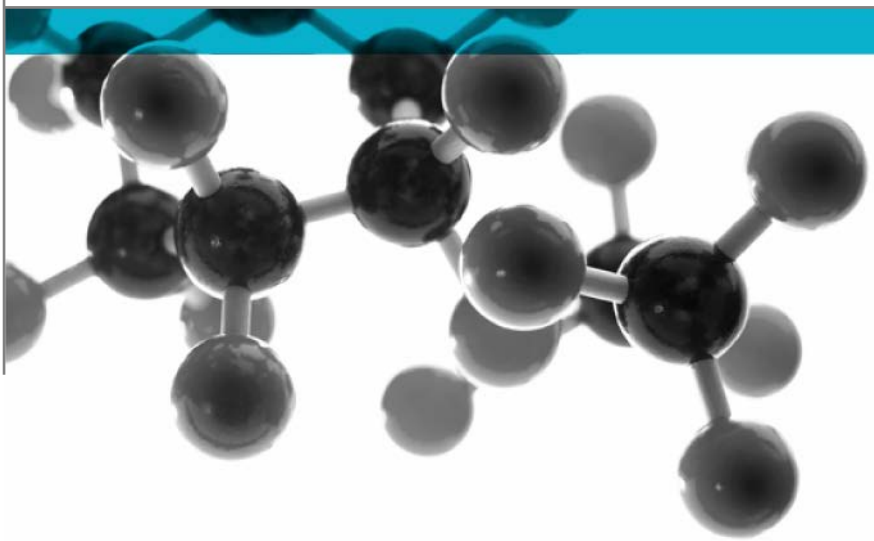
ASTM D635-15



Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position

A Report To: FibreGrid Limited

Document Reference: 358606

Date: 24th December 2015

Issue No.: 2

Testing
Advising
Assuring

UKAS TESTING
0249

Executive Summary

Objective

To determine the performance of the following material when tested in accordance with ASTM D635 - 15 "Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position".

Generic Description	Product reference	Thickness	Weight per unit area / specific gravity
Gel coated aggregate applied to a glass reinforced plastic (GRP)	Not stated	4mm	9.52kg/m^{2*}
Individual components used to manufacture composite:			
Gel coat	Unwilling to provide	Unwilling to provide	Unwilling to provide
Aggregate	Unwilling to provide	Unwilling to provide	Unwilling to provide
Resin	Unwilling to provide	Unwilling to provide	Unwilling to provide
Fibre reinforcement	Unwilling to provide	Unwilling to provide	Unwilling to provide
*determined by **Exova Warringtonfire**			
Please see pages 5 & 6 of this test report for the full description of the product tested			

Test Sponsor FibreGrid Limited, Unit 2 Civic Industrial Estate, Homefield Road Central, Haverhill, Suffolk, CB9 8QP.

Test Results: **When the test results are assessed using the test criteria specified in Appendix X1 of the Standard, the material, when tested at a nominal thickness of 4mm, is classified as "HB".**

Date of Test 12th November 2015

Reason for Revision This document replaces issue 1 (dated 18th November 2015) of the same number which has been withdrawn. The incorrect sponsor was added to the issue 1 report. The correct details have been added to this issue 2 report.

Signatories

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

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

Report Issued: 24th December 2015

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Test Details

Purpose of test

To determine the flammability of a plastic material when it is tested in accordance with the test procedure specified in ASTM D635 - 15 “Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position”.

Each specimen was tested in accordance with the test method specified in the Standard, the gas supplied to the Bunsen burner being technical grade methane. This report should be read in conjunction with ASTM D635 - 15.

Scope of test

This fire-test-response test method covers a small-scale laboratory screening procedure for comparing the relative linear rate of burning or extent and time of burning, or both, of plastics in the form of bars moulded or cut from sheets, plates or panels, and tested in the horizontal position.

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 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.

Instruction to test

The test was conducted on the 12th November 2015 at the request of FibreGrid Limited, 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 November 2015.

Three specimens were conditioned for at least 48 hours at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5% prior to testing.

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			Gel coated aggregate applied to a glass reinforced plastic (GRP)
Product reference			**See Note 1 below**
Name of manufacturer			Fibregrid UK Ltd
Colour			"Yellow, Black"
Thickness			4mm (stated by sponsor) 5.78mm (determined by **Exova Warringtonfire**)
Weight per unit area			9.62kg/m^2 (determined by **Exova Warringtonfire**)
Moulded Sheet	Gel-coat	Generic type	**See Note 1 below**
		Product reference	**See Note 1 below**
		Name of manufacturer	**See Note 1 below**
		Colour	**See Note 1 below**
		Application rate	**See Note 1 below**
		Specific gravity	**See Note 1 below**
		Application method	**See Note 1 below**
		Flame retardant details	**See Note 1 below**
	Aggregate	Generic type	Aluminum oxide
		Product reference	**See Note 1 below**
		Name of manufacturer	**See Note 1 below**
		Thickness	**See Note 1 below**
		Weight per unit area	**See Note 1 below**
		Colour reference	**See Note 1 below**
		Flame retardant details	**See Note 1 below**
	Resin	Generic type	Isophathalic
		Product reference	**See Note 1 below**
		Name of manufacturer	**See Note 1 below**
		Specific gravity	**See Note 1 below**
		Flame retardant details	**See Note 1 below**

	Fibre reinforcement	Generic type	E-glass
		Product reference	**See Note 1 below**
		Number of layers	**See Note 1 below**
		Weight per unit area of each layer	**See Note 1 below**
		Configuration of glass reinforcement	**See Note 1 below**
		Name of manufacturer	**See Note 1 below**
	Resin to glass ratio (by weight)		3:7
	Percentage glass reinforcement (by weight)		70%
	Curing process (duration and temperature)		150 degree
Brief description of manufacturing process			Pultrusion

Note 1: The sponsor was unwilling 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

Test results The following results were obtained for each of the specimens tested.

Specimen Number	Time for flame front to reach 25mm mark (seconds)	Time for flame front to reach 100mm mark (seconds)	Burnt distance, L (mm)	Time to travel distance, L (seconds)	Burning Rate (mm/minute)
1	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
2	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
3	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
4	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
5	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
6	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
7	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
8	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
9	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil
10	Did Not Reach	Did Not Reach	< 25mm	Not applicable	Nil

Classification system

Appendix X1 of the standard specifies that the behaviour of the specimens shall be classified as HB if:

(a) There are no visible signs of combustion after the ignition source is removed, or
(b) The flame front does not pass the 25 mm reference mark, or
(c) The flame front passes the 25 mm reference mark but does not reach the 100 mm reference mark, or
(d) The flame front reaches the 100 mm reference mark and the linear burning rate does not exceed 40 mm/min for specimens having a thickness between 3 and 13 mm or 75 mm/min for specimens having a thickness less than 3 mm.

Note 1 - If only one specimen from the first set of specimens does not comply with the criteria indicated, another set of specimens is to be tested. All specimens from this second set shall comply with the criteria indicated in order for the material, of that thickness, to be classified as HB.

Note 2 - If the linear burning rate does not exceed 40 mm/min when tested in the 3.0 mm ± 0.2 mm thickness, the HB category designation shall be extended to a 1.5 mm minimum thickness.

Conclusion

When the test results are assessed using the test criteria specified in Appendix X1 of the Standard, the material, when tested at a nominal thickness of 4mm, is designated as "HB".

Applicability of test results

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.

Revision History

Issue No : 2	Re-issue Date: 24th December 2015
Revised By: C Jacques	Approved By: T Mort
Reason for Revision: This document replaces issue 1 (dated 18th November 2015) of the same number which has been withdrawn. The incorrect sponsor was added to the issue 1 report. The correct details have been added to this issue 2 report.	

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Revised By:	Approved By:
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