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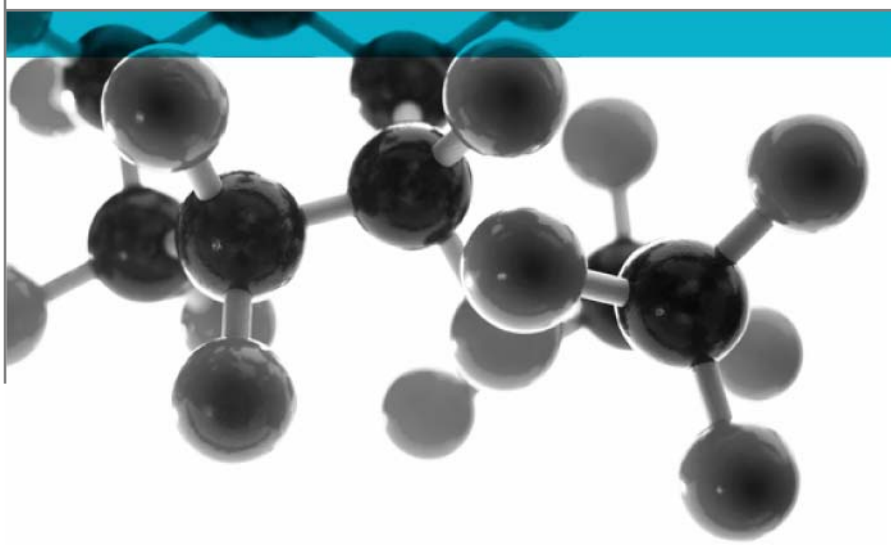
BS EN 60695-2-11: 2001 & IEC 60695-2-11:2000



Glow-wire flammability test for end-products

A Report To: Xiamen Wain Electrical Co., Ltd

Document Reference: 308706

Date: 2nd September 2011

Issue No.: 1

Testing
Advising
Assuring

Laboratory approved by CERTIFER Railway Certification Agency

UKAS TESTING
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Executive Summary

Objective

To determine the glow wire flammability performance of the following product when tested in accordance with BS EN 60695-2-11:2001 & IEC 60695-2-11:2000

Generic Description	Product reference	Thickness	Density
Fibre glass reinforced polycarbonate heavy duty connector	"Heavy Duty Connector"	31.91mm*	1.33g/cm³
Individual components used to manufacture composite:			
Polycarbonate	"PC"	Not stated	Not stated
Glass fibre	"GF20"	Not stated	Not stated
***Determined by Exova Warringtonfire**			
Please see page 6 of this test report for the full description of the product tested			

Test Sponsor

Xiamen Wain Electrical Co., Ltd, 759-3 Chengbei Industrial Zone, Chaoyuan Road, Tongan District, Xiamen, China

Test Results:

The following results were recorded when the results were assessed against the requirements detailed in NF F 16-101 and STM-S-001:

- **Ignition did occur at a temperature of 850°C.**
- **Ignition did not persist at 850°C.**

Date of Test

14th July 2011

Signatories

Responsible Officer
T. Mort *
Senior Technical Officer

Authorised
S. Deeming *
Senior Technical Officer

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

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Test Details

Purpose of test

To determine the performance of a material when it is subjected to the conditions of the test specified in BS EN 60695-2-11: 2001 / IEC 60695-2 11: 2000, Fire Hazard Testing Part 2-11: Glowing / Hot-Wire Based Test Methods – Glow-Wire Flammability Test Methods For End-Products utilising the test procedure specified in Clause 8 of BS EN 60695-2-10: 2001 and Clause 10 of BS EN 60695-2-11: 2001 / IEC 60695-2 11: 2000.

Scope of test

BS EN 60695-2-11: 2001 / IEC 60695-2 11: 2000 specifies the details of a glow wire test when applied to end products for fire hazard testing.

For the purpose of this standard, end product means electro technical equipment its sub-assemblies and components.

If possible, the specimen should be a complete end-product.

If the test cannot be made on the complete end-product, it is acceptable to:

A) Cut a piece containing the part under examination from it, or

B) Cut an aperture in the complete end-product to allow access of the glow-wire, or

C) Remove the part under examination in its entirety and test it separately.

The test is carried out to ensure that under defined conditions, the glow-wire does not cause ignition of parts, and that a part, if ignited, has a limited duration of burning without spreading fire by flames or by burning or glowing particles falling from the test specimen.

If the test specimen emits flames during the application of the glow-wire, the fire hazard created my necessitate further tests using other ignition sources such as the needle-flame applied to those parts which are reached by the emitted flames.

This test shall not be used for small parts for which reference may need to be made to other test methods, for example, the needle flame test in IEC 60695-2-2.

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 14th July 2011 at the request of Xiamen Wain Electrical Co., Ltd, 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 20th June 2011. Prior to the test, the specimens were conditioned for a minimum period of 24 hours in an atmosphere having a temperature between 15°C and 35°C and a relative humidity of between 45% and 75%.
Face to test	The glow wire was applied to 3 different points of the specimen (see below).

Positions of glow wire application points

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		Fibre glass reinforced polycarbonate heavy duty connectors
Product reference		"Heavy Duty Connector"
Name of manufacturer		Xiamen Wain Electrical Co., Ltd
Colour reference		"Grey"
Overall size		65mm x 44.4mm x 31.91mm (determined by **Exova Warringtonfire**)
Overall weight of connector		42.46g (determined by **Exova Warringtonfire**)
Overall density		1.36g/cm^3 (stated by sponsor) 1.33g/cm^3 (determined by **Exova Warringtonfire**)
Polycarbonate	Generic type	Polycarbonate
	Product reference	"PC"
	Name of manufacturer	**See Note 1 below**
	Trade name of flame retardant	"Non-Halogen Flame Retardant"
	Generic type of flame retardant	Non-halogen flame retardant **See Note 1 below**
	Amount of flame retardant	0.5 to 5%
Glass fibre	Type	Fibrous glass
	Product reference	"CAS Number - 65997-17-3"
	Name of manufacturer	**See Note 1 below**
Resin to glass ratio (by weight)		
Percentage glass reinforcement (by weight)		20%
Brief description of manufacturing process		Design mould → Injection moulding → Deburring → Semi-finished products (PC body)

Note 1. The sponsor of the test was unable to provide this, or further information, as their supplier is unwilling to provide this information.

Test Results

The test results relate only to the behaviour of the specimens of the product under the particular conditions of test; they are not intended to the sole criterion for assessing the potential smoke 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.

The test was performed in accordance with the requirements of BS EN 60695-2-11: 2001 / IEC 60695-2 11: 2000, Fire Hazard Testing Part 2-11: Glowing / Hot-Wire Based Test Methods – Glow-Wire Flammability Test Methods For End-Products utilising the test procedures specified in Clause 8 of BS EN 60695-2-10: 2001 and Clause 10 of BS EN 60695-2-11: 2001 / IEC 60695-2 11: 2000 and this report should be read in conjunction with those Standards.

In accordance with the standard, wrapping tissue was placed 200mm below the point of glow-wire application. A total of three specimens was tested at 850°C and the following observations were recorded:

Where:

t_i = The duration from the beginning of tip application up to the time at which the specimen or the layer placed below it ignites.

t_e = The duration from the beginning of tip application up to the time when flames extinguish during or after the period of application.

t_a = The duration of tip application

Temperature	850ºC	850ºC	850ºC
Duration of Glow Wire Application – t_a (secs)	30	30	30
Time to Ignition - t_i (secs)	N/A	26	17
Time to Extinguishment - t_e (secs)	N/A	31	30
Duration of flaming after removal of the Glow- Wire (secs)	N/A	1	0
Duration of flaming (t_e – t_i) (secs)	N/A	5	13
Max Height of Flaming (mm)	N/A	5	10
Ignition of Tissue Paper	No	No	No

Evaluation of Test Results

BS EN 60695-2-11: 2001 / IEC 60695-2 11: 2000 specifies that, unless otherwise specified in any relevant technical specification, the specimen is considered to have satisfactorily withstood the glow-wire test if one of the following two situations applies:

A) if flames or glowing of the test specimen extinguish within 30 s after removal of the glow wire, i.e. $t_e \leq t_a + 30s$; and

B) when the specified layer of wrapping tissue is used there shall be no ignition of the wrapping tissue.

In this case the sponsor stated that the test was being performed to determine the performance of the product against the technical specifications referenced NFF 16-101 and STM-S-001. When the results obtained during this investigation are assessed against the aforementioned specifications, the following conclusions can be made:

- **Ignition did occur at a temperature of 850°C.**
- **Flame did not persist following removal of glow-wire at a temperature of 850°C.**

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 :	Issue Date:
Revised By:	Approved By:
Reason for Revision:	

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