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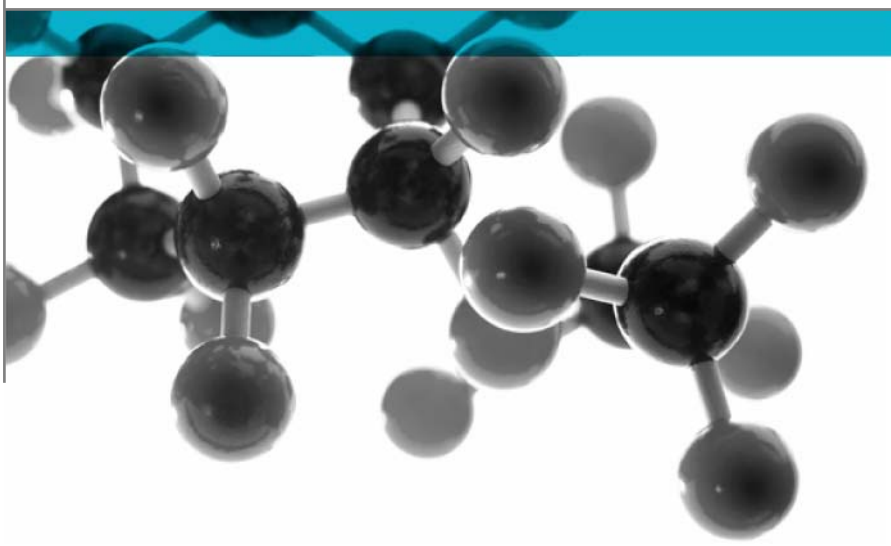
IEC 60331-11-21



Method of test defined in IEC 60331-11 / -21 for determining the circuit integrity of electric cables under fire conditions

A Report To: Arabian Vermiculite Industries

Document Reference: Additional test report No. 196977

Date: 17th September 2010

Issue No.: 1

Testing
Advising
Assuring

UKAS TESTING
0249

Executive Summary

Objective To determine the performance of the following cable when it is subjected to the conditions of test specified in IEC 60331-21: 1999, utilising the test apparatus detailed in IEC 60331-11:1999 + A1: 2009.

Generic Description	Product reference	Thickness / diameter	Weight per unit area or density
Power cable for residential or industrial areas	"196057"	20-21mm	Not Stated
Individual components used to manufacture composite:			
Copper conductor	Not Stated	1.5mm	Not Stated
XLPE conductor Insulation	Not Stated	1.0mm	Not Stated
PVC inner sheath	Not Stated	3.0mm	Not Stated
Galvanised steel armour	Not Stated	1.2mm	Not Stated
PVC outer sheath	Not Stated	1.2mm	Not Stated
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor Arabian Vermiculite Industries, 1st Dammam Industrial Area, P.O. Box 7137, Dammam 31462, Kingdom of Saudi Arabia

Test Results: **When tested in accordance with the procedures specified in IEC 60331-21: 1999, utilising the test apparatus detailed in IEC 60331-11: 1999 + A1: 2009, at a temperature of at least 750^{0}C and at a rated voltage of 1000 V-rms, the cable maintained it's circuit integrity for a duration of 8 minutes and 57 seconds.**

Date of Test 25th August 2010

This test report is additional to that issued as WF No. 196057 dated 7th September 2010 and has been issued at the request of the sponsor. The original test report remains valid and is not replaced by this additional test report. The product referred to in the original report and this additional test report has not been re-tested since the original test and neither has a technical review of the original test report resulting in any technical changes been carried out.

The name and address details of the original sponsor have been removed and the details of Arabian Vermiculite Industries have been entered. The sponsor of the test has stated that the material described in this additional report is identical to the material which was tested. Both the original and the alternative name and address details have been documented and the documentation is maintained in the confidential file covering this investigation.

Signatories

Responsible Officer
S. Deeming *
Senior Technical Officer

Authorised P.P. D. J. Owen
C. Dean *
Operations Manager

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

Report Issued: 17th September 2010

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Test Details

Purpose of test

To determine the performance of a specimen of a cable when it is subjected to the conditions of test specified in IEC 60331-21: 1999, utilising the test apparatus detailed in IEC 60331-11:1999 + A1: 2009. The purpose of this test method is to determine whether a cable can maintain circuit integrity when it is exposed to the fire conditions described within the method.

Scope of test

IEC 60331-21: 1999 specifies a test procedure and gives a performance requirement, including a recommended flame application time, for cables of rated voltage up to and including 600/1000 V. It is intended to cover low voltage power cables and control cables with a rated voltage.

In accordance with section 7.1 of the test standard, a 90 minute flame application time was used.

IEC 60331-11: 1999 + A1: 2009 specifies the test apparatus to be used for testing cables required to maintain circuit integrity when subject to fire alone where the test condition is based upon a flame with a controlled heat output corresponding to a temperature of at least 750°C.

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 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.

Instruction to test

The test was conducted on the 25th August 2010 at the request of the original sponsor of the test.

Provision of test specimens

The specimens were supplied by the original sponsor of the test. **Exova Warringtonfire** was not involved in any selection or sampling procedure.

The specimens were received on the 6th August 2010.

Burner verification procedure

The verification procedure for the burner was conducted in accordance with Annex A of IEC 60331-11: 1999 + A1: 2009 at the start of the test day. This determined the gas & air flow rates and the position of the burner that were used for the subsequent cable tests.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the original sponsor of the test. All values quoted are nominal, unless tolerances are given.

Product reference		"196057"
Cable markings		"ELECTRIC CABLE 600/1000V BS 5467 (DRAKA UK) BASEC MADE IN UK"
Cable function		Power cable for residential or industrial areas
Number of cores		3
Voltage rating		600/1000 V
Diameter		Between 20 and 21mm (stated by original sponsor) 21mm (determined by **Exova Warringtonfire**)
Cable manufacturer		Nexans
Conductors	Product reference	**See Note 1 Below**
	Generic type	Copper
	Name of manufacturer	**See Note 1 Below**
	Total cross-sectional area of each conductor	3.142 x 3^2= 28.28mm^2
	Diameter of each strand	1.5mm
	Weight per unit length per strand	**See Note 1 Below**
	Number of strands per conductor	7
Conductor Insulation	Product reference	**See Note 1 Below**
	Generic type	XLPE
	Name of manufacturer	**See Note 1 Below**
	Colour	"Brown", "Black", "Grey"
	Thickness	1mm
	Density / weight per unit area	**See Note 1 Below**
	Flame retardant details	**See Note 2 Below**
Inner sheath	Product reference	**See Note 1 Below**
	Generic type	PVC
	Name of manufacturer	**See Note 1 Below**
	Colour	"Black"
	Thickness	3mm
	Density / weight per unit area	**See Note 1 Below**
	Flame retardant details	**See Note 2 Below**
Armour	Product reference	**See Note 1 Below**
	Generic type	Single layer galvanised round steel wire
	Name of manufacturer	**See Note 1 Below**
	Diameter of each strand	1.2mm
	Weight per unit length of each strand	**See Note 1 Below**
	Number of strands	34

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Outer sheath	Product reference	**See Note 1 Below**
	Generic type	PVC
	Name of manufacturer	**See Note 1 Below**
	Colour	"Black"
	Thickness	1.2mm
	Density / weight per unit area	**See Note 1 Below**
	Flame retardant details	**See Note 2 Below**
Brief description of manufacturing process		**See Note 1 Below**

Note 1 - The original sponsor was unable to provide this information.

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

The original sponsor has confirmed that the cable specimen was manufactured by another party and that they were not able to obtain from the manufacturer some details that would normally be included in **Exova Warringtonfire** test reports. The description of the specimen given above is therefore not as complete as would normally 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 test was conducted fully in accordance with the requirements of the test standard and the test results are valid.

Test Results

Applicability of test result

The test results relate only to the specimen of the cable in the form in which it was tested. Small differences in the composition 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 specimen, which was tested.

Results of test

When tested in accordance with the procedures specified in IEC 60331-21: 1999, utilising the test apparatus detailed in IEC 60331-11: 1999 + A1: 2009, at a temperature of at least 750°C and at a rated voltage of 1000 V-rms, the cable maintained it's circuit integrity for a duration of 8 minutes and 57 seconds.

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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