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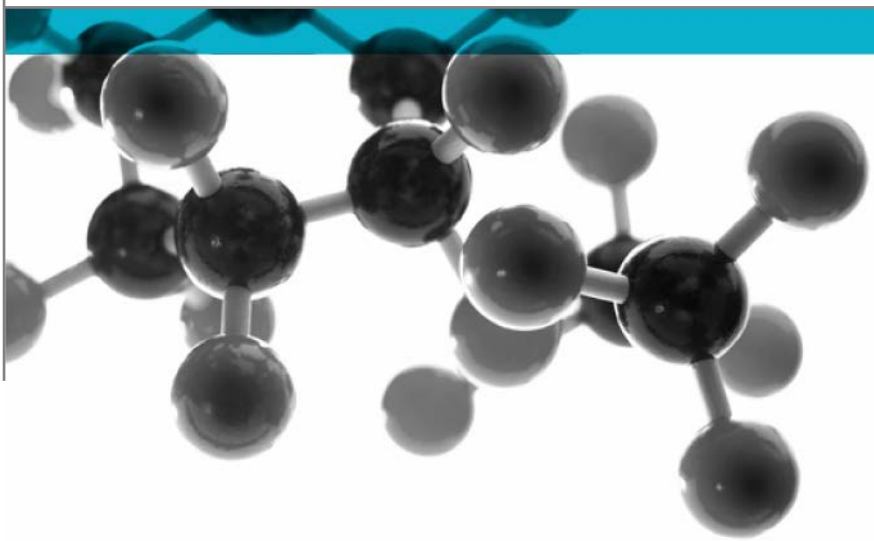
IEC 60331-11-21



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

A Report To: Polyseam Ltd.

Document Reference: 415038

Date: 20th August 2019

Issue No.: 1

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 / csa	Weight per unit length or density
Electrical cable with fire rated protective coating	"Protecta Service Coat FR-1"	29.4mm	Not stated
Individual components used to manufacture composite:			
Coating	"Protecta Service Coating FR-1"	900 microns	1.40g/cm³
Outer sheath	"Triflex Plus H07RN-F 4G25"	4.1mm	Not stated
Conductor insulation	Not stated	1.4mm	Not stated
Conductors	"Triflex Plus H07RN-F 4G25"	25mm^2	Not stated
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor

Polyseam Ltd., 15 St Andrews Road, Huddersfield, West Yorkshire, HD1 6SB

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 750 V-rms, the coated cable maintained it's circuit integrity for the full 105 minute test duration.

Date of Test

18th June 2019

Signatories

Responsible Officer
H. Harper *
Testing Officer

Authorised
S. Deeming *
Business Unit Head

* For and on behalf of Warringtonfire.

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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 18th June 2019 at the request of Polyseam Ltd., the sponsor of the test.

Provision of test specimens

The specimens were supplied by the sponsor of the test. The coating material utilised was taken from a batch sampled by Warringtonfire (BMTrada) as detailed in Annex 1 of this report. A representative from Warringtonfire witnessed the application of the coating to the cable and verified the application quantity.

Conditioning of specimens

The specimens were received on the 6th June 2019 and were conditioned at a temperature of 25 ± 5°C and a relative humidity of (50±20)% until constant mass was achieved.

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 test.

Description of Test Specimens

The description of the system given below has been prepared from information provided by the sponsor of the test. This information has not been independently verified by Warringtonfire**.** All values quoted are nominal, unless tolerances are given.

General description		Electrical cable with fire rated protective coating
Product reference		"Protecta Service Coating FR-1"
Name of manufacturer		Polyseam Ltd (coating only)
Diameter		29.4mm (determined by Warringtonfire)
Cable marking		TRIFLEX Plus H07RN-F 4G25 ECA 450/750V
Cable function		Electrical cable
Number of cores x core size		4 x 6.2mm
Voltage rating		450/750 V a.c
Coating	Generic type	Fire rated cable coating
	Product reference	"Protecta Service Coating FR-1"
	Name of manufacturer	Polyseam Ltd
	Colour reference	"White"
	Number of coats	12 (continuously applied)
	Thickness per coat	70 microns
	Overall coating thickness	900 microns
	Density	1.40g/cm³
	Application method	Brush and roller
	Curing process per coat	No drying/curing between coating
	Flame retardant details	**See Note 1 below**
Outer sheath	Trade name	"TRIFLEX Plus H07RN-F"
	Generic type	Rubber
	Name of manufacturer	Triflex
	Colour	"Black"
	Thickness	4.1mm
	Density / weight per unit area	**See Note 2 below**
	Flame retardant details	**See Note 2 below**
Conductor insulation	Trade name	**See Note 2 below**
	Generic type	LS0H rubber compound
	Name of manufacturer	Triflex
	Colour	"Black, Brown, Grey, Green/Yellow"
	Thickness	1.4mm
	Density / weight per unit area	**See Note 2 below**
	Flame retardant details	**See Note 2 below**
Conductors	Trade name	"TRIFLEX Plus H07RN-F"
	Generic type	Copper
	Name of manufacturer	Triflex
	Total cross-sectional area of each conductor	25mm²
	Cross sectional area of each strand	**See Note 2 below**
	Weight per unit length per strand	**See Note 2 below**
	Number of strands per conductor	**See Note 2 below**
Brief description of manufacturing process		**See Note 2 below**

Note 1: The sponsor was unwilling to provide this information.

Note 2: The sponsor was unable to provide this information.

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^{0}C and at a rated voltage of 750 V-rms, the coated cable maintained it's circuit integrity for the full 105 minute test duration. (Consisting of a 90 minute flame application period, plus a 15 minute cool down period).

Consequently, the coated cable satisfied the 90 minute performance requirement as recommended in clause 7 of the standard.

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.

Appendix 1

BMTRADA

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www.bmtrada.com

Sampling Report

Contract Reference: PS 18001 Notified Body ID: 1224

Company Name: POLYSEAM LTD.

Location of Sampling: HUDDERSFIELD.

Product: INTERIOR FR1.

Sampled By (Name): PETER SARGISSON Signature: [signature] Date: 05/03/18.

Requirement	Write the names of the people present
Explain the sampling process Yes ☑	WOL HLUCHAN
Explain confidentiality Yes ☑	RESEARCH AND DEVELOPMENT DIRECTOR
Requirement	**Evidence / Comments**
Description of product(s)	PRO 216 WHITE/BASE INTERIOR FR1. PHOTO Nº 13
Product identification / reference numbers / codes	5318 FS — PRO216 1/6 - 6/6.
Batch number(s)	80086517
Date of manufacture	18/01/2018.
Quantity of stock and size of sample(s) taken	6 PAILS
Traceability of material records: Purchase Orders and links to any certification or QMS (if applicable) including location of these records	RECORDS MAINTAINED ON THE COMPANY'S, 123 INSIGHT DATA BASE THIS GIVES FULL TRACKABILITY OF ALL MATERIALS USED. CODE W/58946 (No135)
Example of sampler's markings applied to the product(s)	BARCODE PRODUCT IDENTIFICATION LABEL (INCL. BATCH Nº)
Details of any FPC processes witnessed during the visit	NONE.
Determine the essential characteristics of the product and confirm the details of in-process checks conducted on the sample to ensure conformity.	IN PROCESS CHECKS CARRIED OUT AT EACH STAGE OF MANUFACTURE. ELECTRONIC DATA STORAGE.
Where possible, take photographs of the sampled product after marking. Yes ☑ No ☐	

Declaration by Manufacturer:
I declare that the product/s witnessed during this sampling visit is representative of normal production.

Details of responsible person for manufacturer:

Name: WOL HLUCHAN Signature: [signature]

Position: DIRECTOR Date: 9/3/18

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Revision History

Issue No :	Re-issue Date:
Revised By:	Approved By:
Reason for Revision:	

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