

# test report

Method of test defined  
in IEC 60331-21 for  
determining the circuit  
integrity performance  
of a cable under fire  
conditions.

WF Report Number:

148371

Test Sponsor:

FTC - Fabbrica Trentina  
Conduttori Srl

Date:

9<sup>th</sup> August 2005

**Warringtonfire Report No. 148371**

**Method of test defined in IEC 60331-21  
for determining the circuit integrity  
performance of a cable under fire  
conditions.**

**Sponsored By**

**FTC - Fabbrica Trentina Conduttori Srl  
Sud Tirol KabelWerke  
Via Pineta 21B  
38068 Rovereto (TN)  
Italy**



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## Test Details

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<b>Purpose of test</b>	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. 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.
<b>Scope of test</b>	<p>IEC 60331-21 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.</p> <p>IEC 60331-11 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.</p>
<b>Instruction to test</b>	The test was conducted on the 22 <sup>nd</sup> July 2005 at the request of FTC – Fabbrica Trentina Conduttori S.r.l., the sponsor of the test.
<b>Provision of test specimens</b>	The specimens were supplied on 19 <sup>th</sup> June 2005 by the sponsor of the test. Warringtonfire was not involved in any selection or sampling procedure.



## Description of Test Specimen

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

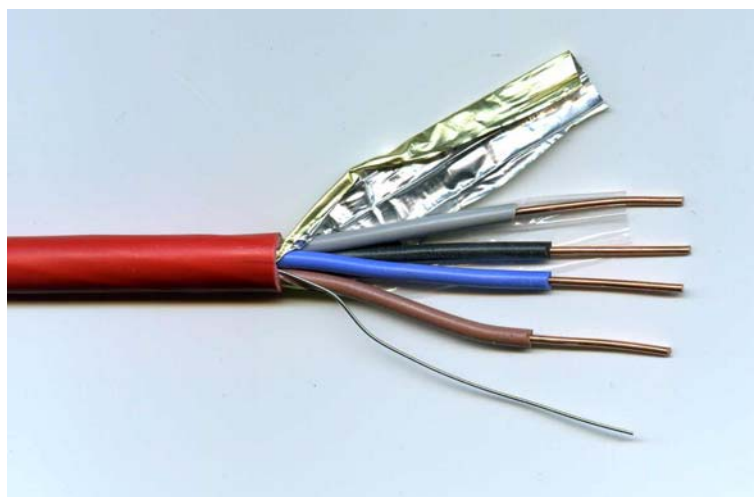


Plate 1 – Detail of test specimen

Product reference	'Eurosafes'	
Cable function	Fire systems connections	
Number of cores x core size	4 x 1.50 mm <sup>2</sup>	
Voltage rating	300 / 500 V	
Overall diameter	9.3 mm	
Conductors	Composition	Solid plain annealed copper wire
	Cross-sectional area of each conductor	1.50 mm <sup>2</sup>
	Weight per unit length	13.52 kg/km
	Name of manufacturer	See Note 1 below
Conductor insulation	Composition	Silicon rubber
	Colours	Brown, Blue, Grey & Black
	Thickness	0.6 mm
	Density or weight per unit length	1.23 kg/dm <sup>3</sup>
	Name of manufacturer	FTC Fabbrica Trentina Conuttori S.r.l.
Clear tape (surrounding the four conductors)	Details of flame retardant	The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the component
	Composition	Polyester
	Colour	Transparent
	Thickness	12 µm
	Weight per unit area	See Note 1 below
	Name of manufacturer	See Note 1 below
	Details of flame retardant	See Note 1 below



Drain wire	Composition	Solid tinned copper
	Cross-sectional area	0.28 mm <sup>2</sup>
	Weight per unit length	2.5 kg/km
	Name of manufacturer	<i>See Note 1 below</i>
Electrostatic screen	Composition	Aluminium / polyester laminate tape
	Thickness	25 µm
	Weight per unit area	<i>See Note 1 below</i>
	Name of manufacturer	<i>See Note 1 below</i>
	Details of flame retardant	<i>See Note 1 below</i>
Outer sheath	Composition	<i>See Note 1 below</i>
	Colour reference	Red
	Average thickness	0.9 mm
	Density or weight per unit area	1.48 kg/dm <sup>3</sup>
	Name of manufacturer	FTC Fabbrica Trentina Conuttori S.r.l.
	Details of flame retardant	<i>See Note 1 below</i>
	Cable markings	None
Brief description of manufacturing process		The conductor wires are insulated by extrusion of a continuous silicon rubber layer, which has been high temperature cross-linked. The cores are then twisted together and then screened. The sheathing is then applied by a semi-compression extrusion process.

Note 1 – The sponsor was unwilling to provide this information



## Test Result

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### Test result

The test results relate only to the behaviour of the specimen of the cable under the particular conditions of the test; they are not intended to be the sole criterion for assessing the performance of the product in its end use.

When tested in accordance with the procedures specified in IEC 60331-21: 1999, for a period of 90 minutes at a temperature of at least 750°C followed by a 15 minute cooling period, at a rated voltage of 500V-rms, the cable maintained its circuit integrity and consequently satisfied the performance requirements specified in Clause 7 of the standard.

### 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.




## Validity & Signatories

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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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Responsible Officer P Webb*


Authorised P E Lythgoe*

\* For and on behalf of warringtonfire.

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