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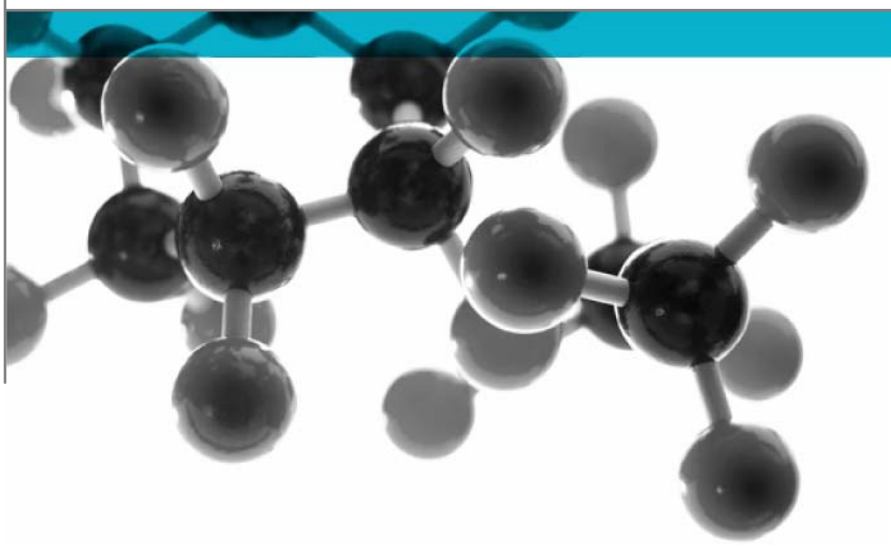
BS 6387: 1994



Specification For Performance Requirements For Cables Required To Maintain Circuit Integrity Under Fire Conditions

A Report To: Giza Cables Co. Energya

Document Reference: 322001

Date: 4th October 2012

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 BS 6387: 1994.

Generic Description	Product reference	Diameter	Weight per unit length
Electricity power cable	"GIZA CABLES - ELSEWEDY 3 X 300 + 150 MM2 0.6 / 1 KV CU/MICA/XLPE/SWA/LSHF 2012"	65mm	13.8kg/m
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor Giza Cables Co. Energya, Giza Cables Elsewedy Industrial Zone, Abu Rawash El Kelo, 28 Misr-Alex Desert Road, Giza City, Egypt

Test Results: **When tested in accordance with BS 6387: 1994: Sections D.2, D.3 and D.4 the cable meets the criteria for Categories C, W and Z.**

It should however, be noted that in the case of the Category Z test the cable was mounted in accordance with the procedure detailed in Annex E.2 of BS 7629: Part 1:1997.

Date of Test 17th, 18th & 19th September 2012

Signatories

Responsible Officer T. Benyon * Technical Officer	Authorised S. Deeming * Operations Manager

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

Report Issued: 4th October 2012

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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 BS6387: 1994 "Specification for performance requirements for cables required to maintain circuit integrity under fire conditions".

The tests were performed in accordance with the procedures specified in BS 6387: 1994: Sections D.2, D.3 and D.4 and this report should be read in conjunction with that Standard.

Table 1, contained within Clause 6 of BS 6387: 1994 states that for Category Z (resistance to fire and mechanical shock) tests, a cable having a diameter greater than 20mm cannot be accommodated utilising the “Z” shaped specimen support. The standard further states that guidance on testing these cables should be sought from the manufacturer.

In the case of the Category Z test, the cable specimen was mounted in accordance with the procedure detailed in Annex E.2 of BS 7629: Part 1:1997.

Scope of test

BS 6387: 1994 specifies methods of test for resistance to fire, resistance to fire with water and resistance to fire and mechanical shock. The specification recommends three test categories which are as follows: -

Resistance to fire alone (Section D.2): Tests are carried out at

	Symbol
650^{0}C for 3 hours	A
750^{0}C for 3 hours	B
950^{0}C for 3 hours	C
950^{0}C for 20 minutes	S

Resistance to fire with water (Section D.3): W

Resistance to fire and mechanical shock (Section D.4): Tests are carried out at

	Symbol
650^{0}C	X
750^{0}C	Y
950^{0}C	Z

At the request of the sponsor, tests in accordance with the procedures defined in Section D.2 (at a temperature of 950°C and rated voltage of 1000V-rms for a period of three hours), Section D.3 and Section D.4 (at a temperature of 950°C and rated voltage of 1000V-rms for a period of fifteen minutes) of the standard have been performed to determine compliance with the requirements of Categories C, W & Z. In the case of the Category Z test, the cable specimen was mounted in accordance with the procedure detailed in Annex E.2 of BS 7629: Part 1:1997.

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 17th, 18th & 19th September 2012 at the request of Giza Cables Co. Energya, 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 5th September 2012.

Prior to the test the specimens were conditioned for at least 16 hours in an atmosphere having a temperature of 23 ± 2°C and a relative humidity of 50 ± 5%.

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.

Cable marking		"GIZA CABLES - ELSEWEDY 3 X 300 + 150 MM2 0.6 / 1 KV CU/MICA/XLPE/SWA/LSHF 2012"
Cable function		Electricity power cable
Number of cores x core size		3x 300mm^2 + 1x 150mm^2
Voltage rating		0.6/1KV
Name of manufacturer		Giza Cables – Elsewedy Energya
Overall diameter		65mm (stated by sponsor) 67.8mm (determined by **Exova Warringtonfire**)
Overall weight per unit length		13.8kg/m
Conductors	Product reference	"ENERGYA Metal"
	Generic type	Copper
	Name of manufacturer	ENERGYA Metal
	Total cross-sectional area of each conductor	300mm^2 for phase / 150 mm^2 for neutral
	Cross sectional area of each strand	8.6mm^2 for phase / 4.2mm^2 for neutral
	Weight per unit length per strand	9.32kg/m
	Number of strands per conductor	37 for phase / 37 for neutral
Tape (surrounding each conductor)	Product reference	"Cogebi"
	Generic type	Mica tape
	Name of manufacturer	Cogebi
	Colour	"Light Grey"
	Thickness	0.11mm
	Weight per unit length	160g/m^2
	Flame retardant details	**See Note 1 below**
Conductor insulation	Product reference	"Borealis"
	Generic type	Cross linked polyethylene
	Name of manufacturer	Borealis
	Colour	"Red", "Yellow", "Blue", "Black"
	Thickness	1.8mm for phase / 1.4mm for neutral
	Density	0.93g/cm^3
	Flame retardant details	**See Note 1 below**
Inner sheath	Product reference	"Fainplast"
	Generic type	LS0H **See Note 1 below**
	Name of manufacturer	Fainplast
	Colour	"Black"
	Thickness	1.3mm
	Density	1.46g/cm^3
	Flame retardant details	**See Note 1 below**

Continued on next page

Armour	Product reference	"Energya Steel"
	Generic type	Galvanized steel wires
	Name of manufacturer	Energya steel
	Number of strands	64 wires laid flat
	Cross sectional area of each strand	4.9mm^2
	Weight per unit length of each strand	38.3kg/km
Outer sheath	Product reference	"Fainplast"
	Generic type	LS0H **See Note 1 below**
	Name of manufacturer	Fainplast
	Colour	"Black"
	Thickness	2.7mm
	Density	1.46g/cm^3
	Flame retardant details	**See Note 1 below**
Brief description of manufacturing process		• Drawing • Stranding • Taping (mica + polyester) • Insulation • Assembling • Inner sheath (bedding) • Armouring • Sheathing

Note 1: The sponsor was unable to provide this or further information.

Test Results

Applicability of test results

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

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

Resistance to fire alone (Section D.2, Category C)

When tested in accordance with the procedures specified in Section D.2 of the standard, for a period of 3 hours at a temperature of 950^0C and a rated voltage of 1000V-rms, the cable maintained its circuit integrity and consequently satisfied the performance requirements specified in BS 6387: 1994.

Resistance to fire with water (Section D.3, Category W)

When tested in accordance with the procedures specified in Section D.3 of the standard, for a period of 30 minutes at a temperature of 650^0C and a rated voltage of 1000V-rms, the cable maintained its circuit integrity and consequently satisfied the performance requirements specified in BS 6387: 1994.

Resistance to fire and mechanical shock (Section D.4, Category Z)

When mounted in accordance with the procedure detailed in Annex E.2 of BS 7629: Part 1:1997 and tested in accordance with the procedures specified in Section D.4 of the standard, for a period of 15 minutes at a temperature of 950^0C and a rated voltage of 1000V-rms, the cable maintained its circuit integrity and consequently satisfied the performance requirements specified in BS 6387: 1994.

Conclusion

When tested in accordance with BS 6387: 1994: Section D.2, D.3 and D.4 the cable meets the criteria for Categories C, W and Z.

It should however, be noted that in the case of the Category Z test the cable was mounted in accordance with the procedure detailed in Annex E.2 of BS 7629: Part 1:1997.

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 :	Re-issue Date:
Revised By:	Approved By:
Reason for Revision:	

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