

BRE Global Test Report

Testing of National Cables Industry 'Armoured Cables' to LPCB Test Schedule E122340/1.1

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1 Introduction

The requirement of the work was to determine the performance of a cable when tested to selected clauses from BS 7846:2009 [1] on various cable sizes.



2 Cable Details

The 'Armoured Cables' 2x10mm² comprised the following components. The items in italics were sourced from manufacturer's data

- Conductors –Stranded (*Class 2*) copper
- Mica Tape – (*Von Roll Cablosam*)
- Insulation – (*Type GP8 XLPE (PLASCOM PLS 400A)*)
- Bedding – (*Megolon S384*)
- Armour – *Galvanised Steel Wire (Link Middle East)*
- Sheath – (*Type LTS1 LSOH Solvay Cogegum AFR/920*) Black

The 'Armoured Cables' 3x95mm² (Original sample) and 4x400mm² comprised the following components. The items in italics were sourced from manufacturer's data

- Conductors –Stranded (*Class 2*) copper
- Mica Tape – (*Von Roll Cablosam*)
- Insulation – (*Type GP8 XLPE (PLASCOM PLS 400A)*)
- Fillers – (*Polypropylene yarn (FIPCO)*)
- Lay-up Tape – (*BUIL PPF-125*)
- Mica Tape – (*Von Roll Cablosam*)
- Bedding – (*Megolon S384*)
- Armour – *Galvanised Steel Wire (Link Middle East)*
- Mica Tape – (*Von Roll Cablosam*)
- Sheath – (*Type LTS1 LSOH Solvay Cogegum AFR/920*) Black



The 'Armoured Cables' 3x95mm² (Sample sent for Smoke re-test) comprised the following components. The items in italics were sourced from manufacturer's data

- Conductors – Stranded (*Class 2*) copper
- Mica Tape – (*Von Roll Cablosam*)
- Insulation – (*Type GP8 XLPE (PLASCOM PLS 400A)*)
- Fillers – (*Polypropylene yarn (FIPCO)*)
- Lay-up Tape – (*BUIL PPF-125*)
- Mica Tape – (*Von Roll Cablosam*)
- Bedding – (*Megolon S384*)
- Armour – Galvanised Steel Wire (*Link Middle East*)
- Mica Tape – (*Von Roll Cablosam*)
- Cloth (Type) Tape
- Sheath – (*Type LTS1 LSOH Solvay Cogegum AFR/920*)

The 2x10mm² sheath had the following printed markings:

'ELECTRIC CABLE 600/1000V – 2 x 10mm² CU/XLPE/SWA/LSZH BS 7846-F2 NATIONAL CABLES INDUSTRY UAE 2015 NCI-FR'

The 3x95mm² (Original) had the following printed markings:

'ELECTRIC CABLE 600/1000V 3x95mm² CU/XLPE/SWA/LSZH BS 7846-F2 NATIONAL CABLES INDUSTRY UAE 2012 NCI-FR'

The 3x95mm² (Sample sent for smoke re-test) had the following printed markings:

'ELECTRIC CABLE 600/1000V 3x95mm² CU/XLPE/SWA/LSZH BS 7846-F2 NATIONAL CABLES INDUSTRY UAE 2015 NCI-FR'

The 4x400mm² (Original sample) sheath had the following printed markings:

'NATIONAL CABLES INDUSTRY UAE 2013 NCI-FR ELECTRIC CABLE 600/1000V 4x400mm² CU/XLPE/SWA/LSZH BS 7846-F2'



The 4x400mm² (Sample sent for smoke re-test) sheath had the following printed markings:

'NATIONAL CABLES INDUSTRY UAE 2014 NCI-FR ELECTRIC CABLE 600/1000V 4x400mm²
CU/XLPE/SWA/LSZH BS 7846-F2'

The test specimen was supplied by the client and received on 13 July 2015. BRE Global was not involved in the sample selection process and therefore cannot comment upon the relationship between samples supplied for test and the product supplied to market.



3 Test results

3.1 BS 7846:2009 Clause 6.4 - Acid gas emission of insulation and tapes

Cable type	Component	%HCl per gram of sample	Result
4x400mm ²	Binding tape	<0.1%	Pass
	Insulation	<0.1%	Pass

3.2 BS 7846:2009 Clause 8.2 - Acid gas emission of tapes and fillers

Cable type	Component	%HCl per gram of sample	Result
4x400mm ²	Filler	<0.1%	Pass
	Lay-up Tape	<0.1%	Pass

3.3 BS 7846:2009 Clause 11.4 - Acid gas emission of sheath

Cable type	Component	%HCl per gram of sample	Result
4x400mm ²	Sheath	<0.1%	Pass

3.4 BS 7846:2009 Clause 13 - End sealing

Both ends of the 'Armoured cables' 4x400mm² cables were sealed.



3.5 BS 7846:2009 Clause 17.2 - Flame propagation on a single cable

Cable type	Cable diameter (mm)	Duration burner applied to cable (s)	Unaffected length of cable (mm)	Extent of charring (mm)	Result
2x10mm ²	19.56	60	392	496	Pass
4x400mm ²	85.9	480	395	500	Pass

3.6 BS 7846:2009 Clause 17.3 - Smoke emission

Cable Type	Cable Diameter (mm)	No. of cable lengths	Minimum light transmittance (%)	Result
2x10mm ²	19.52	3	75.66	Pass
3x95mm ²	41.0	2	77.54	Pass
4x400mm ²	79.29	1	79.29	Pass

3.7 BS 7846:2009 Clause 17.4.2 - Resistance to fire - Category F2

BS 7846:2009 [1] Clause 17.4.2 - Category F2 states that the cables shall be tested in accordance with BS 6387:1994 [2], D.2 and shall withstand 950°C for 3 hours. Additionally, the cable shall be tested in accordance with BS 6387:1994, D.3 and D.4 and shall conform to the requirements for Category W and Category Z.

3.7.1 BS 6387:1994 Clause 11.1 (Annex D.1 & D.2) - Resistance to fire alone

Cable type	Test category	Test voltage (U _o /U)	Comment	Result
2x10mm ²	C	600/1000V	No fuses ruptured or lamps extinguished	Pass*
3x95mm ²	C	600/1000V	No fuses ruptured or lamps extinguished	Pass*
4x400mm ²	C	600/1000V	No fuses ruptured or lamps extinguished	Pass*

* Tested with 2A fuses



3.7.2 BS 6387:1994 Clause 11.2 (Annex D.1 & D.3) - Resistance to fire with water

Cable type	Test category	Test voltage (Uo/U)	Comment	Result
2x10mm ²	W	600/1000V	No fuses ruptured or lamps extinguished	Pass*
3x95mm ²	W	600/1000V	No fuses ruptured or lamps extinguished	Pass*
4x400mm ²	W	600/1000V	No fuses ruptured or lamps extinguished	Pass*

* Tested with 2A fuses

3.7.3 BS 6387:1994 Clause 11.3 (Annex D.1 & D.4) - Resistance to fire with mechanical shock

Cable type	Test category	Test voltage (Uo/U)	Comment	Result
2x10mm ²	Z	600/1000V	No fuses ruptured or lamps extinguished	Pass*
3x95mm ²	Z	600/1000V	No fuses ruptured or lamps extinguished	Pass*
4x400mm ²	Z	600/1000V	No fuses ruptured or lamps extinguished	Pass*

* Tested with 2A fuses



3.8 BS 7846:2009 Clause 18.5 - Flame propagation on multiple cables

Cable Type	Non-metallic volume per unit length (l/m)	Number of cable lengths in test array	Extent of char above burner (m)	Result
2x10mm ²	0.2620	6	0.48	Pass
3x95mm ²	0.7982	2	0.41	Pass
4x400mm ²	3.1733	2	0.45	Pass



4 References

1. BS 7846:2009. Electric cables – Thermosetting insulated, armoured fire-resistant cables of rated voltage 600/1000 V having low emission of smoke and corrosive gases when affected by fire - Specification. British Standards Institution, London 2009.
2. BS 6387:2013. Specification for performance requirements for cables required to maintain circuit integrity under fire conditions. British Standards Institution, London 2013.