Test Report

BSI Product Services

Report No	243/4443362 This Report consists of 10 pages
Client	National Cables Industry P.O.Box 27472 Sharjah U.A.E
Authority & date	Clients order dated 19 July 2002
Items tested	2 samples of Electric Cable
Specification	CEI IEC 60502-1:1997 Including AMD 1
Results	The samples submitted complied with the requirements of the Specification For the tests which were requested
Prepared by	G Kelly Technician
Authorized by	C Yogaratnam Technical Engineer
Issue Date	20 March 2003
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of *PS082* 'General conditions relating to acceptance of testing'. The results contained herein apply only to the particular sample/s tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of the General Manager, BSI Product Services, who reserves the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.

1. Introduction

This Report relates to tests conducted on two samples of electric cable submitted by National Cables Industry, Sharjah, U.A.E.

This Report applies only to the particular samples tested and to the specific tests carried out and detailed within the Report. It does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of these or any related products.

2. Samples

The client submitted two samples of Electric Cable described as follows;
1) 4x10mm²
2) 4x35mm²

3. Testing

The samples submitted were subjected to the tests specified in CEI IEC 60502-1: 1997

4. Results

Note 1:- The test results were taken from the original test report 243/4351381

Note 2:- The potential variability in, both the items tested and the method of measurement used, means that for measurements close to a specified limit, the level of confidence in a compliance statement may or may not be reduced.

Further advice on the specific measurements in this report that may be affected can be obtained from the report authoriser shown on the front cover.

The results of the tests carried out are detailed in the following report

5. Conclusion

The samples submitted complied with the requirements of the Specification for the tests which were requested

TESTING OF CABLE MANUFACTURED TO CEI IEC 60502-1:1997

4 core **Conductor size:** 10 sq.mm

ASSESSMENT

Marking

Embossed on sheath
ELECTRIC CABLE 600/1000V BS 5467 4x10 MM2 CU/XLPE/SWA/PVC
NATIONAL CABLES UAE 2002

Marking on 2 line(s) Character size 4 mm. Repeat intervals:-480 mm N/A*

Clauses 5, 7, 12 and 13:- Construction

Sheath colour Black			PASS
Filler	Textile fibres		PASS
Extruded bedding			PASS
Conductor:-Circular stranded plain annealed Cu		Core lay up RH	PASS
Armoured Galvanised steel wire	LH Lay	Size: 1.24 mm	PASS

Clause 15.3:- Voltage Tests:-

Complete Cable @ 3.5 kV PASS

Clauses 7.1.3 and 13.3:- Bedding thickness and Oversheath thickness

Thickness of oversheath	Mean 1.7 mm	PASS
Thickness of extruded bedding	Mean 1.01 mm	PASS

*Note :- "The IEC provides no marking procedure to indicate its approval. Therefore no assessment required for marking".

TESTING OF CABLE MANUFACTURED TO CEI IEC 60502-1:1997

4 core **Conductor size:** 10 sq.mm

ASSESSMENT

Tests on individual cores

Clauses 5 and 15.2

Core I.D and sequence	Red	Yellow	Blue	Black	PASS
Indelibility	P	P	P	P	PASS
Class of conductor	2	2	2	2	PASS
No. of Wires	7	7	7	7	PASS
Conductor resistance @ 20°C (ohms/km)	1.06	1.40	1.45	1.49	PASS

Clauses 6.2:- Insulation Thickness

Mean (mm)	0.80	0.89	0.82	0.76	PASS
Min (mm)	0.72	0.83	0.75	0.71	PASS

Overall assessment:- PASS

TESTING OF CABLE MANUFACTURED TO CEI IEC 60502-1:1997

4 core **Conductor size:** 10 sq.mm

ASSESSMENT

Clause 18.14:-
Flame Test on complete cable PASS

Clauses 6.1, 13.2,18.3 and 18.5 :-
Tensile tests on Sheath

Compound	ST2
Tensile strength unaged (N/mm²)	20.1
Elongation at Break-unaged (%)	267
Tensile strength aged 7 days Air @ 100° C	19.8
% Var Tensile strength aged 7 days in air @ 100° C	-2
Elongation @ break aged 7 days Air @ 100° C	270
% Var.Elongation aged 7 days Air @ 100° C	1
Compatibility Tensile Strength after ageing	20.9
Compatibility Elongation @ break after ageing	289
Compatibility % Var Tensile Strength	4
Compatibility % Var Elongation at break	8

Assessment of tensile tests on sheath PASS

Tensile tests on Cores

Compound	XLPE			
	Red	Yellow	Blue	Black
Tensile strength unaged (N/mm²)	22.2	20.4	21.8	18.9
Elongation at Break-unaged (%)	571	538	560	509
% Var Tensile strength, aged 7 days @ 135° C air	-6	5	-1	9
% Var.Elongation at break, aged 7 days @ 135° C air	-6	-3	-8	-3
% Var Tensile strength, aged with CU conductor 7 days @ 135° C air	0	-6	-6	-5
% Var.Elongation at break, aged with CU conductor 7 days @ 135° C air	-11	-11	-11	-13
Compatibility Tensile Strength after ageing	22.6	18.6	18.8	15.9
Compatibility Elongation @ break after ageing	545	473	498	442
Compatibility % Var Tensile Strength	2	-9	-14	-16
Compatibility % Var Elongation at break	-4	-12	-11	-13

Assessment of tensile tests on cores PASS

Overall assessment :- PASS

Date samples received:- 24/01/03	Testing commenced:- 06/02/03	Tested by:- G.Kelly
Date job raised:- 17/07/02	Testing completed:- 20/03/03	Checked by:- C.Yogaratnam

N/A = Not Applicable N/R = Not Requested N/T = Not Tested

TESTING OF CABLE MANUFACTURED TO CEI IEC 60502-1:1997

4 core **Conductor size:** 10 sq.mm

ASSESSMENT

Tests on Sheath or complete cable

Clauses 18.6, 18.7, 18.8 and 18.9:-

Compound	ST2	
Cold elongation @ -15° C		PASS
Cold Impact @ -15° C		PASS
Loss of mass mg/cm²	0.48	PASS
Hot pressure (%)	22	PASS
Heat shock test	PASS	PASS

Tests on individual cores

Clauses 6.1, 16.9, 17.2, 18.13 and 18.16:-

Compound	XLPE				
CORE COLOURS	Red	Yellow	Blue	Black	
Hot set test Max Elongation %	58	55	58	55	PASS
Hot set test Permanent Elongation	5	3	5	3	PASS
Water absorption (Gravimetric) mg/cm²	0	0	0		PASS
Volume resistivity @ 90° C ohms.cm	$4.6x10^{16}$	$2.7x10^{16}$	$2.6x10^{16}$	$3.5x10^{16}$	PASS
Insulation resistance constant @ 90° C Mohms.km	169834	99950	93703	126697	PASS
Voltage test for 4 hours	PASS	PASS	PASS	PASS	PASS
% Shrinkage of cores after test 1hr @ 130° C	1.5	1.5	1.5	1.5	PASS

Overall assessment:- **PASS**

The sample complied with the requirements of the standard

Date samples received:- 24/01/03	Testing commenced:- 06/02/03	Tested by:- G.Kelly
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TESTING OF CABLE MANUFACTURED TO CEI IEC 60502-1:1997

4 core **Conductor size:** 35 sq.mm

ASSESSMENT

Marking

Embossed on sheath
ELECTRIC CABLE 600/1000V BS 5467 4x35 MM2 CU/XLPE/SWA/PVC
NATIONAL CABLES UAE 2002

Marking on 2 line(s) Character size 4 mm. Repeat intervals:-475 mm N/A*

Clauses 5, 7, 12 and 13:- Construction

Sheath colour Black			PASS
Filler	Textile fibres		PASS
Extruded bedding			PASS
Conductor:-Shaped stranded plain annealed Cu		Core lay up RH	PASS
Armoured Galvanised steel wire	LH Lay	Size: 1.61 mm	PASS

Clause 15.3:- Voltage Tests:-

Complete Cable @ 3.5 kV PASS

Clauses 7.1.3 and 13.3:- Bedding thickness and Oversheath thickness

Thickness of oversheath	Mean 1.9 mm	PASS
Thickness of extruded bedding	Mean 1.17 mm	PASS

*Note :- "The IEC provides no marking procedure to indicate its approval. Therefore no assessment required for marking".

TESTING OF CABLE MANUFACTURED TO CEI IEC 60502-1:1997

4 core **Conductor size:** 35 sq.mm

ASSESSMENT

Tests on individual cores

Clauses 5 and 15.2

Core I.D and sequence	Red	Yellow	Blue	Black	PASS
Indelibility	P	P	P	P	PASS
Class of conductor	2	2	2	2	PASS
No. of Wires	7	7	7	7	PASS
Conductor resistance @ 20°C (ohms/km)	0.520	0.514	0.516	0.522	PASS

Clauses 6.2:- Insulation Thickness

Mean (mm)	1.01	1.06	1.14	1.15	PASS
Min (mm)	0.91	0.85	1.03	1.05	PASS

Overall assessment:- PASS

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TESTING OF CABLE MANUFACTURED TO CEI IEC 60502-1:1997

4 core **Conductor size:** 35 sq.mm

ASSESSMENT

Clause 18.14:-
Flame Test on complete cable PASS

Clauses 6.1, 13.2, 18.3 and 18.5 :-
Tensile tests on Sheath

Compound	ST2
Tensile strength unaged (N/mm²)	20.5
Elongation at Break-unaged (%)	245
Tensile strength aged 7 days Air @ 100° C	20.9
% Var Tensile strength aged 7 days in air @ 100° C	-2
Elongation @ break aged 7 days Air @ 100° C	260
% Var.Elongation aged 7 days Air @ 100° C	6
Compatibility Tensile Strength after ageing	19.6
Compatibility Elongation @ break after ageing	190
Compatibility % Var Tensile Strength	-4
Compatibility % Var Elongation at break	-22

Assessment of tensile tests on sheath PASS

Tensile tests on Cores

Compound	XLPE			
	Red	Yellow	Blue	Black
Tensile strength unaged (N/mm²)	18.1	18.2	23.3	22.0
Elongation at Break-unaged (%)	531	530	589	599
% Var Tensile strength, aged 7 days @ 135° C air	21	3	-13	3
% Var.Elongation at break, aged 7 days @ 135° C air	9	4	-8	-5
% Var Tensile strength, aged with CU conductor 7 days @ 135° C air	17	-2	-13	6
% Var.Elongation at break, aged with CU conductor 7 days @ 135° C air	3	-6	-14	-6
Compatibility Tensile Strength after ageing	15.4	14.7	17.9	17.5
Compatibility Elongation @ break after ageing	501	438	566	517
Compatibility % Var Tensile Strength	-15	-20	-23	-20
Compatibility % Var Elongation at break	-6	-17	-9	-14

Assessment of tensile tests on cores PASS

Overall assessment :- PASS

Date samples received:- 24/01/03	Testing commenced:- 06/02/03	Tested by:- G.Kelly
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TESTING OF CABLE MANUFACTURED TO CEI IEC 60502-1:1997

4 core **Conductor size:** 35 sq.mm

ASSESSMENT

Tests on Sheath or complete cable

Clauses 11.1:-

Compound	ST2	
Cold elongation @ -15° C		PASS
Cold Impact @ -15° C		PASS
Loss of mass mg/cm²	0.60	PASS
Hot pressure (%)	16	PASS
Heat shock test	PASS	PASS

Tests on individual cores

Clauses 6.1,16.9, 17.2, 18.13 and 18.16:-

Compound	XLPE				
CORE COLOURS	Red	Yellow	Blue	Black	
Hot set test Max Elongation %	60	58	58	55	PASS
Hot set test Permanent Elongation	3	0	5	0	PASS
Water absorption (Gravimetric) mg/cm²	0	0	0		PASS
Volume resistivity @ 90° C ohms.cm	$1.0x10^{16}$	$1.1x10^{16}$	$2.5x10^{16}$	$1.4x10^{16}$	PASS
Insulation resistance constant @ 90° C Mohms.km	38220	40463	91801	52898	PASS
Voltage test for 4 hours	PASS	PASS	PASS	PASS	PASS
% Shrinkage of cores after test 1hr @ 130° C	1.5	1.5	1.5	1.5	PASS

Overall assessment:- **PASS**

The sample complied with the requirements of the standard

Date samples received:- 24/01/03	Testing commenced:- 06/02/03	Tested by:- G.Kelly
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