CPRI

TEST REPORT

Central Power Research Institute

(A Govt.of India Society,)
P.B. No.8066, Sadashivanagar Post Office
Prof. Sir.C.V. Raman Road,
Bangalore - 560 080(INDIA)

CABLES LABORATORY
DIAGNOSTIC, CABLES & CAPACITORS DIVISION
CENTRAL POWER RESEARCH INSTITUTE
P.B.NO.8066, SADASHIVANAGAR SUB P.O
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Phone: + 91 (0) 80-2360 4435 Fax: 080 – 23601213

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NABL Accredited Laboratory
Cert.No.T- 0010

Draft TEST REPORT

Test Report Number	: DCCD-10862 **Dated** : 03.04.2009
Name & Address of the Customer	: M/s National Cables Industry.,. Post Box 27472, Sharjah, UAE.
Name & Address of the Manufacturer	: M/s National Cables Industry.,. Post Box 27472, Sharjah, UAE.
Particulars of sample tested	: 3 X 185 mm^2 6.35/11 kV XLPE Armoured Cable
Condition of the sample on receipt	: New.
Type	: XLPE Cable
Designation	: Conductor Material : Aluminium No. of cores : Three Size : 185 mm^2 Insulation: XLPE Armour : Galvanised steel Wire Outer sheath : PVC Voltage Rating : 6.35/11 kV Embossing: 11000 VOLTS ,3X185 MM^2 AL/XLPE/SWA/PVC, PROPERTY OF FEWA U.A.E.,NATIONAL CABLES INDUSTRY,U.A.E., 2009
Serial Number	: Nil
Number of Samples tested	: One
Date(s) of Test(s)	: 02.03.2009 to 19.03.09
CPRI Sample Code no(s)	: DCCDCAB09S0022
Particulars of test conducted	: Electrical Type Test
Test in accordance with Standard /Specification	: Asper IEC 60502-2-2005 & BS -6622-2007& Customer Request
Sampling plan	: Not Applicable
Customer's requirement	: Capacitance of Cable
Deviation if any	: Nil
Name of the witnessing persons	
Customer's representatives	: Mr. Radhakrishnan
Other than customer's representatives	: Mr.Mohammad Khalid Raza & Mr. Ahmed Rashed of Federal Electricity & Water Authority, Dubai
Test subcontracted with address of the laboratory	: Nil
Documents constituting this report (in words)	
Number of sheets	: Six
Number of oscillogram/s	: Twelve (Three Pages)
Number of graphs	: Nil
Number of photos	: Nil
Number of test circuit diagrams	: Nil
Number of drawings	: One .Drg. No.: FEWA/DWG/3X185/ 001

(Thirumurthy)
Test Engineer

(A.Sudhindra)
Joint Director

AUTHORISED SIGNATORIES

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TEST RESULTS

I. The following electrical tests were carried out in the order of sequence.

1. Bending Test

(i) Outer dia of conductor : 16.44 mm
(ii) Outer dia. Of Cable : 76.91 mm
(iii) Diameter of test cylinder : 1370 mm
(iv) Number of bending cycles : Three

2. Partial Discharge Test:

a) Length of the sample : 11.33 metres (Screen to Screen)
b) Sensitivity of the detector : 5 pC
c) Method of connection : Two ends of the cable were immersed in oil with high voltage applied to conductor and other cores shorted to grounded metallic shield and Armour.
d) Measuring voltage (1.73 Uo) :11 kV ac
e) Specified discharge magnitude at 1.73 Uo (Max) : 5 pC
f) Observed Discharge magnitude :

Sl.No.	Core Identification	Discharge magnitude in pC
1.	Red	Less than 5 pC
2.	Yellow	Less than 5 pC
3.	Blue	Less than 5 pC

3. Tan Delta measurement as a function of Voltage: (BS 6622-2007)

a) Specified tan delta at Uo(Max) : 0.004
b) Specified increment from 0.5 Uo to 2Uo : 0.002 (Max)
c) Ambient temperature : 28 ^{0}C
d) Observed Values:

Sl. No	Core Identification	Test Voltage (kV) ac	Tan delta (Abs Value)	Capacitance in pF	Increment of Tan Delta
1.	Red	3.20	0.00016	4418.5	
		6.35	0.00020		
		12.7	0.00027		+0.00011
2.	Yellow	3.20	0.00023	4208.8	
		6.35	0.00042		
		12.7	0.00025		+0.00002
3.	Blue	3.20	0.00015	4233.2	
		6.35	0.00020		
		12.7	0.00026		+0.00011

4. Capacitance Measurement:

Sl.No.	Core Identification	Observed Capacitance in μF/km
1.	Red	0.39
2.	Yellow	0.37
3.	Blue	0.37

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5. Tan Delta measurement as a function of Temperature:

(i) Temperature of the conductor during test : 95 to 100 ^{0} C
(ii) Test Voltage during measurement : 2 kV ac
(iii) Specified Tan delta(Max) : 0.004
(iv) Observed Values:-

Sl.No.	Core Identification	Capacitance in pF	Tan delta At 98^0 C
1.	Red	3919.1	0.00013
2.	Yellow	3839.5	0.00012
3.	Blue	3754.7	0.00016

6. Heating Cycle Test:

i) Conductor Temperature during Heating Cycle : 95 -100^0 C
ii) Total Duration of Heating cycle : 8 hours
iii) Heating period after attaining Temperature : 2 hours
iv) Natural Cooling Period : 3 hours
v) Number of heating cycles : 20 Only

7. Partial Discharge Test:

a) Length of the sample : 11.33 metres(Screen to Screen)
b) Sensitivity of the detector : 5 pC
c) Method of connection : Two ends of the cable were immersed in oil with high voltage applied to conductor and other cores shorted to grounded metallic shield and Armour.
d) Measuring voltage (1.73 Uo) :11 kV ac
e) Specified discharge magnitude at 1.73 Uo (Max) : 5 pC
f) Observed Discharge magnitudes :

Sl.No.	Core Identification	Discharge magnitude in pC
1.	Red	Less than 5 pC
2.	Yellow	Less than 5 pC
3.	Blue	Less than 5 pC

8. Impulse Withstand Test:

Test Voltage kV_{peak}	Temperature of Conductor during Test(^{0}C)	Ambient Temperature (^{0}C)		No. of Impulses
		Dry Bulb	Wet Bulb	
75	95-100	30.0	23.0	10 Positive & 10 Negative

Test Connection	The impulse source was connected to the conductor of the particular core (ends shorted) under test and the screen connected to ground. The conductors of the other two cores which were not under test were shorted together with screen and connected to ground.

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Core	Polarity	Shot Number	Oscillogram Number	Test Result
Red	Positive	First	1518	Withstood
		Tenth	1524	
	Negative	First	1527	
		Tenth	1532	
Yellow	Positive	First	1537	Withstood
		Tenth	1542	
	Negative	First	1547	
		Tenth	1553	
Blue	Positive	First	1557	Withstood
		Tenth	1603	
	Negative	First	1606	
		Tenth	1612	

(OSCILLOGRAMS ENCLOSED)

9. High Voltage Test: (After Impulse Test)

a) Test connection : High Voltage Connected to Conductor(s) & Screen(s) grounded
b) Test Voltage : 23 kV ac
c) Duration of test : Fifteen Minutes
d) Ambient Temperature : 29 ^{0}C
e) Length of Sample : 11.33 metres (Screen to Screen)
f) Result

Sl.No.	Core Identification	Remarks
1.	Red	WITHSTOOD
2.	Yellow	WITHSTOOD
3.	Blue	WITHSTOOD

10. High Voltage Test:

a) Test connection : High Voltage Connected to Conductor(s) & Screen(s) grounded
b) Test Voltage : 26 kV ac
c) Duration of test : Four Hours
d) Ambient Temperature : 29 ^{0}C
e) Length of Sample : 11.33 metres (Screen to Screen)
f) Result

Sl.No.	Core Identification	Remarks
1.	Red	WITHSTOOD
2.	Yellow	WITHSTOOD
3.	Blue	WITHSTOOD

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II. SEMICONDUCTOR RESISTIVITY MEASUREMENT

1. RESISTIVITY OF SEMICONDUCTING INSULATION SCREEN:

Sl.No	Core Identification	Resistivity of insulation screen in Ω-m at 90^0 C			
		Observed Values		Specified Value (max)	
		Unaged Sample	Aged sample	Unaged sample	Aged sample
1.	Red	7.13	6.83	500	500
2.	Yellow	7.71	6.70		
3.	Blue	6.44	4.61		

2. RESISTIVITY OF SEMICONDUCTING CONDUCTOR SCREEN

Sl. No	Core Identification	Resistivity of Conductor screen in Ω-m at 90^0 C			
		Observed Values		Specified Value (Max)	
		Unaged Sample	Aged sample	Unaged Sample	Aged Sample
1.	Red	20.12	3.88	1000	1000
2.	Yellow	23.22	2.18		
3.	Blue	20.95	2.71		

III. CONCLUSION: The sample submitted meets all electrical type test requirements as per IEC 60502-2 and FEWA Specifications

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NOTE

a) The Test results relate only to the item(s) tested.

b) Publication or reproduction of this report in any form other than by complete set of the whole report and in the language written, is not permitted without the written consent of CPRI.

c) Any Corrections/erasure invalidates this test report.

d) Any anomaly/discrepancy in this test report should be brought to our notice within 45 days from the date of issue.

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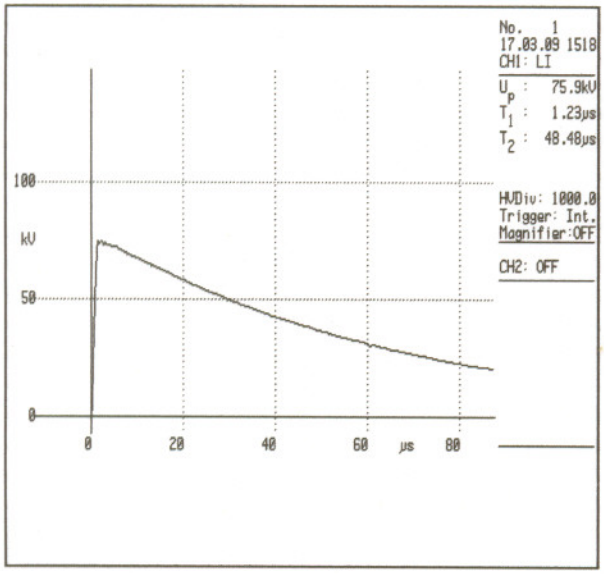
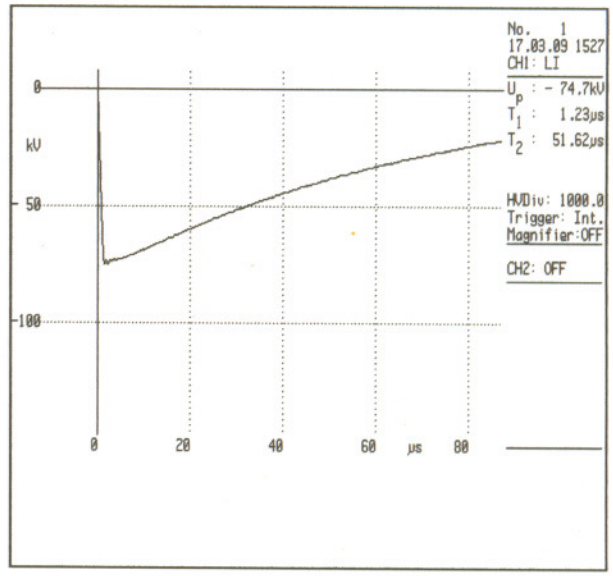
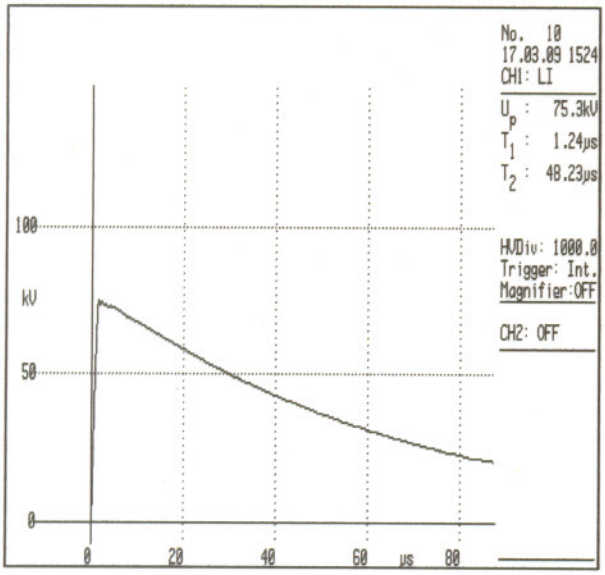
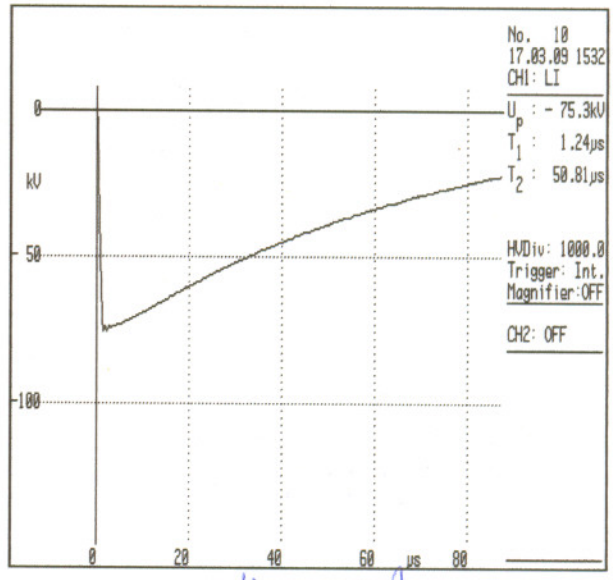
Sample Code : DCCDCAB09S0022
Core : Red









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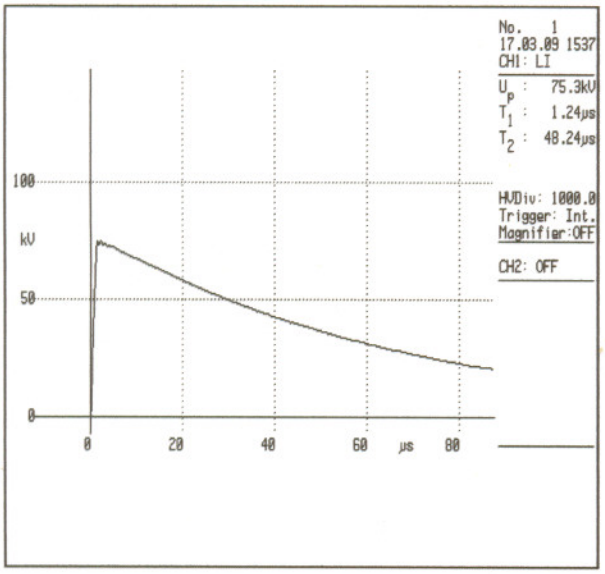
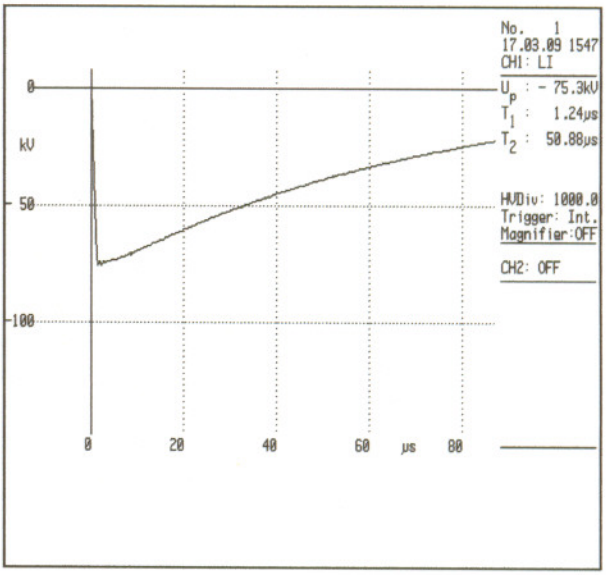
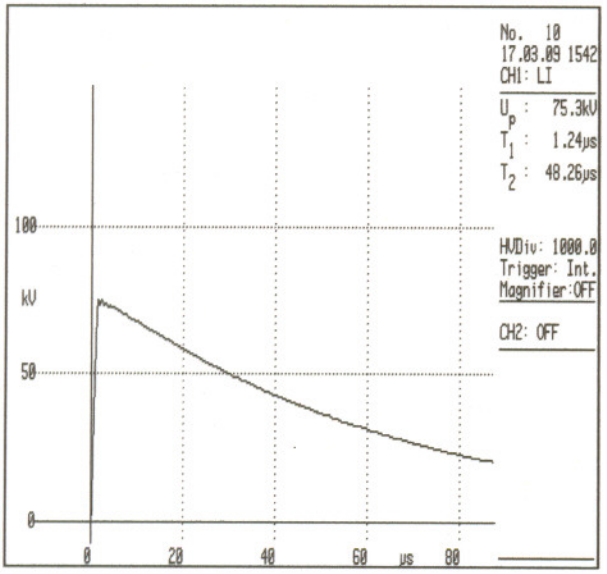
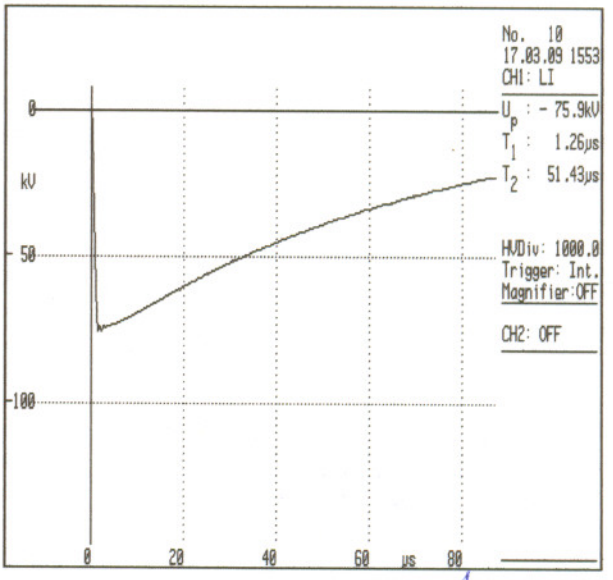
Test Report No.& Date : DCCD-10862 dated 03.04.2009
Sample Code : DCCDCAB09S0022
Core : Yellow









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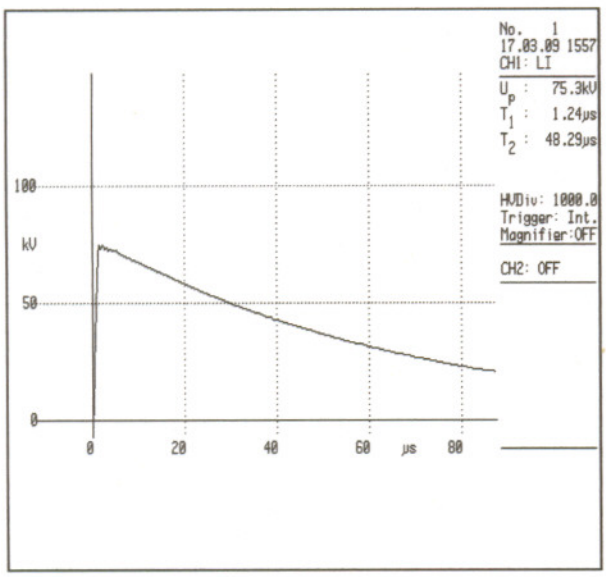
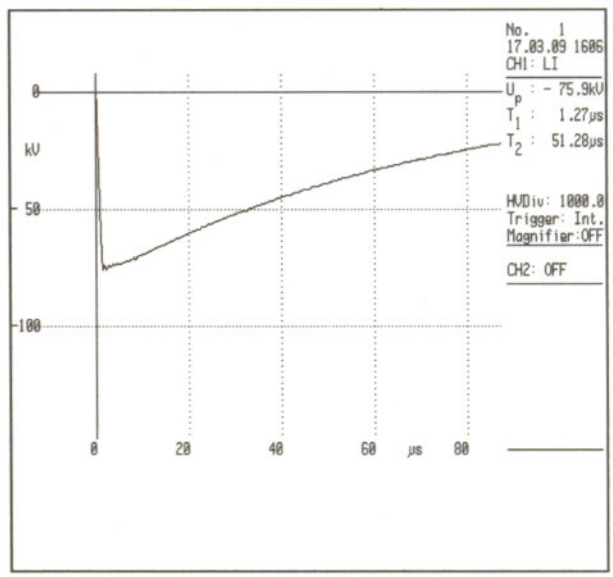
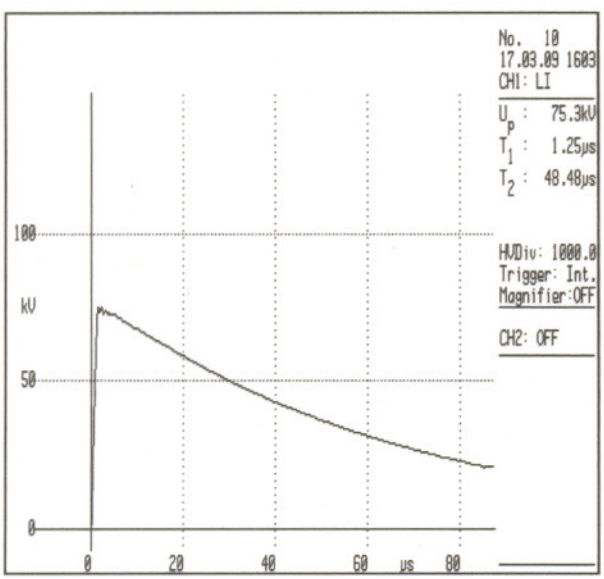
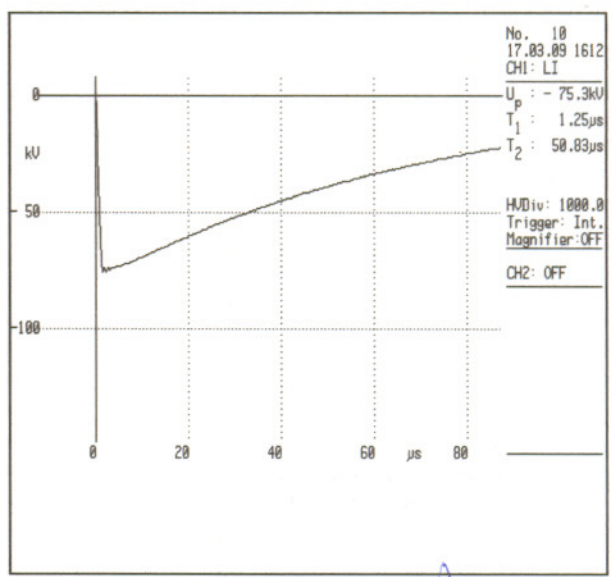
Sample Code : DCCDCAB09S0022
Core : Blue









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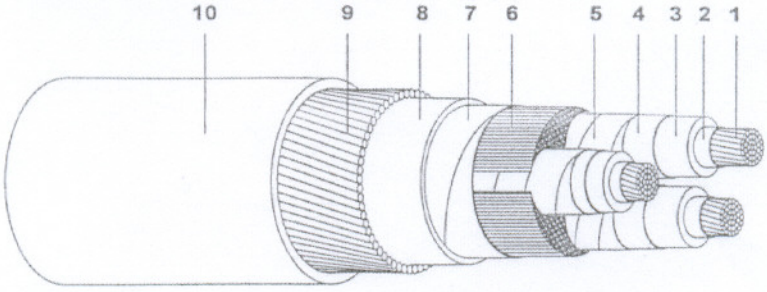
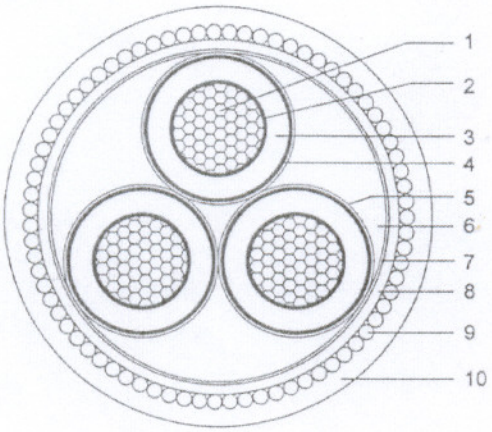
6.35 / 11 (12) kV, 3 CORES, XLPE INSULATED, CU TAPE SCREENED GALVANIZED STEEL ARMOURED AND PVC SHEATHED (AL/XLPE/SWA/PVC) POWER CABLE

Applicable Standard : IEC 60502-2 and FEWA specification CBL 3.2





1.	Conductor	: Aluminium, Round stranded compacted with semi-conductive tape over the conductor
2.	Conductor Shield	: Extruded semi-conductive compound
3.	Insulation	: Extruded Cross linked Polyethylene (XLPE)
4.	Insulation Shield	: Extruded semi-conductive compound, strippable type and semicon bedding tape over it.
5.	Metallic screen	: Copper Tape(s) with suitabe overlap
6.	Fillers	: Polypropylene string fillers
7.	Binding Tape	: Polypropylene Tape
8.	Bedding	: Extruded Polyvinyl Chloride (PVC)
9.	Armour	: Galvanized Round Steel Wires
10.	Outer Sheath	: Extruded Polyvinyl Chloride (PVC), Color: Black

Embossing on the Outer Sheath:

11000 VOLTS, 3x185 MM² AL/XLPE/SWA/PVC, PROPERTY OF FEWA U.A.E., NATIONAL CABLES INDUSTRY, U.A.E., 2008

THIS DRAWING PERTAINS
TO CPRI TEST REPORT
NO. DCCD - 10862 Dated 3-4-2009

FEWA/DWG/3x185/001

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TECHNICAL & QC NCI DEPT