GEMSCAB®
CABLES

THE RIGHT CONNECTION

LT-XLPE
C A B L E S

IS-7098
PT(I)1988

Introduction

"GEMSCAB" has been associated with marketing and manufacturing of Electric Cables for over a period 4 decades now. Customer satisfaction has been the prime focus of "GEMSCAB" and today it has established itself as a consistence, competent and a compatible manufacturer of Power, Control, Instrumentation and Flexible Cables.

"GEMSCAB" is proud to have succeeded in creating a pool of resources to provide quality products and services.

"GEMSCAB" has a state-of-the-art manufacturing plant at Bhiwadi (Rajasthan) and has been supplying cables to Industries, Process Industries, Automobile, Power Generation, Transmission and Distribution, Housing and Commercial Projects.

"GEMSCAB" has been growing during the last 5 years at a consistent growth rate of 30% to 50% and is expected to grow further in coming years by doubling its capacities and adding new product lines.

"GEMSCAB" has now set-up a state-of-the-art HT Cables manufacturing plant to meet the increasing demand in infrastructure projects like Power, Steel, Cement Industries etc. and to associate itself with the growing economy of the country.

"GEMSCAB" LT XLPE cables are being manufactured and tested at its Bhiwadi Complex. The cables are manufactured on latest machinery and provideded with Normal PVC Outer Sheath / FR Outer Sheath / FRLS Outer Sheath. These Cables are manufactured as per IS:7098 / (Part-1) and as per customer specifications.

"GEMSCAB" Bhiwadi Plant is an ISO-9001:2000 certified unit, where cables are manufactured as per National & International Standards and customers' specifications. A well-equipped Test Lab and modern instruments are constantly upgraded to carry out quality checks and testing on all incoming and finished material.

"GEMSCAB" is approved by prestigious clients and consultants. It has established its name in providing LT range of cables to its customers.

LT-XLPE Cables Application

'GEMSCAB' LT-XLPE Cables

'GEMSCAB' LT-XLPE Cables are manufactured as per IS:7098 / Part-I to be suitable for conductor temperature of 90^{0}C and short circuit capacity 250^{0}C. 'GEMSCAB' LT-XLPE Cables have excellent Mechanical, Electrical and Thermal Properties surpassing those of conventional polymeric dielectrics. The superior properties of XLPE have led to lower insulation thickness, high current carrying capacity, reduced weight and dimension. 'GEMSCAB' LT-XLPE Cable is the economic solution for low tension power distribution with high efficiency and total reliability.

Because of the excellent mechanical and electrical properties 'GEMSCAB' LT-XLPE CABLES can be used extensively in Power Stations, Industrial Units, Projects and Power Transmission and Distributions. They are ideally suited for Steel, Chemical, Fertilizers & Process Industry where cables are exposed to chemical corrosion or in heavy industries, where severe load fluctuations occur and for systems with frequent over voltages. "GEMSCAB" LT-XLPE CABLES can also be used at higher ambient temperature on account of their higher operating temperature. Their excellent installation properties permit the cable to be used even under most difficult cable routing conditions and also in cramped conditions. Single core cable due to their excellent installation properties are used in Power Station, Sub-Station and Industrial Plants.

Product Range

LT – XLPE CABLES				
CABLE TYPE	CONDUCTOR	GRADE	MFG. RANGE SPECIFICATION	RELEVANT
Power Cables	Aluminium & Copper Conductor	1.1 KV	S/core upto 1000mm^2 and Multicore upto 630mm^2	IS:7098 / Part-1 / 1988
Control Cables	Copper Conductor	1.1 KV	Upto 61 Core	IS:7098 / Part-1 / 1988

HT – XLPE CABLES				
CABLE TYPE	CONDUCTOR	GRADE	MFG. RANGE SPECIFICATION	RELEVANT
HT Cables	Aluminium & Copper Conductor	3.3 KV to 33 KV	Single core upto 1000mm^2 and Multicore upto 400 mm^2 Armoured / Unarmoured	IS:7098 / Part-2 / 1985

P.V.C.CABLES				
CABLE TYPE	CONDUCTOR	GRADE	MFG. RANGE SPECIFICATION	RELEVANT
Power Cables	Aluminium & Copper Conductor	1.1 KV	Single core upto 1000mm^2 and Multicore upto 630mm^2	IS:1554/ Part-I / 1988
Power Cables	Aluminium & Copper Conductor	3.3 KV	Single core upto 1000mm^2 Three core upto 400 mm^2	IS:1554 Part-II / 1988
Control / Railway Signalling Screened / Unscreened Cables	Copper Conductor	1.1 KV	Upto 61 core	IS:1554 / Part-I / 1988
Mining Cables	Copper Conductor	3.3 KV	Multicore upto 185 mm^2	IS:1554/ Part-II / 1988
Mining Cables	Copper Conductor	1.1 KV	Multicore upto 185mm^2	IS:1554/ Part-I / 1988
HR & FRLS Cables	Aluminium & Copper Conductor	1.1 KV	Single core upto 1000mm^2 Multicore upto 630mm^2 Control Cables upto 61 Cores	IS:1554/ Part-I / 1988
Flexible Wires & Cables	Aluminium / Copper	1.1 KV	Different Sizes	IS:694 / 1990

Product Range

LT-XLPE CABLES

Main Features

- LT-XLPE Cables have longer life as compared to conventional PVC Cables
- LT-XLPE Cables have a higher conductor temperature rating i.e. 90^{0}C
- LT-XLPE Cables have a higher emergency overload capacity 120^{0}C
- Max. temperature limit under short circuit conditions for LT-XLPE Cables is 250^{0}C. Hence XLPE Cables have higher short circuit rating
- Insulation resistance of LT-XLPE Cable is excellent & superior to Identical PVC Cables
- LT-XLPE Cables have high corrosion resistance in polluted atmosphere
- LT-XLPE Cables have better properties of resistance to chemical and corrosive gases
- LT-XLPE Cables have low installation cost because of light weight, dimensions and are far more flexible
- LT-XLPE Cables have better properties to withstand vibrations, hot impacts
- Jointing of LT-XLPE Cables is easier and quicker

PRODUCT CODE

As per IS:7098-Part:1

CONSTITUENT	CODE
Aluminium Conductor	A
XLPE Insulation	2X
Round Steel Wire	W
Flat Steel Strip Armour	F
Double Round Steel Wire Armour	WW
Double Flat Steel Strip Armour	FF
Non Magnetic (Al) Round Wire Armour	Wa
Non Magnetic (Al) Strip Armour	Fa
PVC Outer Sheath	Y

Construction

Conductor

Conductors are made from electrolytic grade aluminium / copper conforming to IS:8130, and are Compact circular or Compact shaped, Solid / Stranded circular.

Insulation

GEMSCAB XLPE cables use specially made from high grade cross-linked polyethylene for insulation by extrusion process.

Core Identification

The cores are identified by different colours:

Single core	Red, Black, Yellow, Blue or natural
Two core	Red and Black
Three core	Red, Yellow and Blue
Four core	Red, Yellow, Blue and Black
Three and half core	Red, Yellow, Blue and reduced neutral core in Black.
Five core	Red, Yellow, Blue, Black and Grey
Six core and above	Two adjacent cores (counting and direction core) in each layer Blue and Yellow. Remaining cores Grey. Core numbering & different colours are also for control cables.

Laying up

In multicore cables, cores are laid-up as per the above colour scheme, interstices are filled wherever necessary to make the laid-up cores circular.

Inner Sheath

Laid-up cores are bedded over with thermoplastic material for protection against mechanical and electrical damage.

Armouring

Armouring is provided over the inner sheath to guard against mechanical damage. Armouring is generally of galvanised steel wires or strips (in single core cables used in AC system armouring is by non-magnetic hard drawn aluminium wires / strips). Round steel wires are used where the diameter over the inner sheath does not exceed 13 mm, flat steel strip' armour is used above 13 mm dia. Round wire of different sizes can be provided against specific request.

Outer Sheath

Specially formulated heat resistant black PVC compound conforming to the requirement to type ST2 of IS:5831-1984, extruded to form the outer sheath. GEMSCAB XLPE also offers a specially formulated Flame Retardant Low Smoke compound (FRLS) for outer sheath used in fire hazardous environment.

Operating Characteristic

A.	Max. Conductor Temperature for continuous operaton	:	90°C
B.	Ambient Air Temperature	:	40°C
C.	Standard Ground Temperature	:	30°C
D.	Thermal Resistivity of Soil	:	150°C Cm/Watt
E.	Thermal Resistivity	:	350°C Cm/Watt
F.	Depth of Laying (for Cables laid direct in ground)	:	75 Cm
G.	Minimum Bending Radius (for Multi Core Cables)	:	12D (D-Dia of Cable)
H.	Max. Conductor temperature during short circuit	:	250°C
I.	Maximum Ambient, Air temperature	:	85°C

J. **Type of Installation**

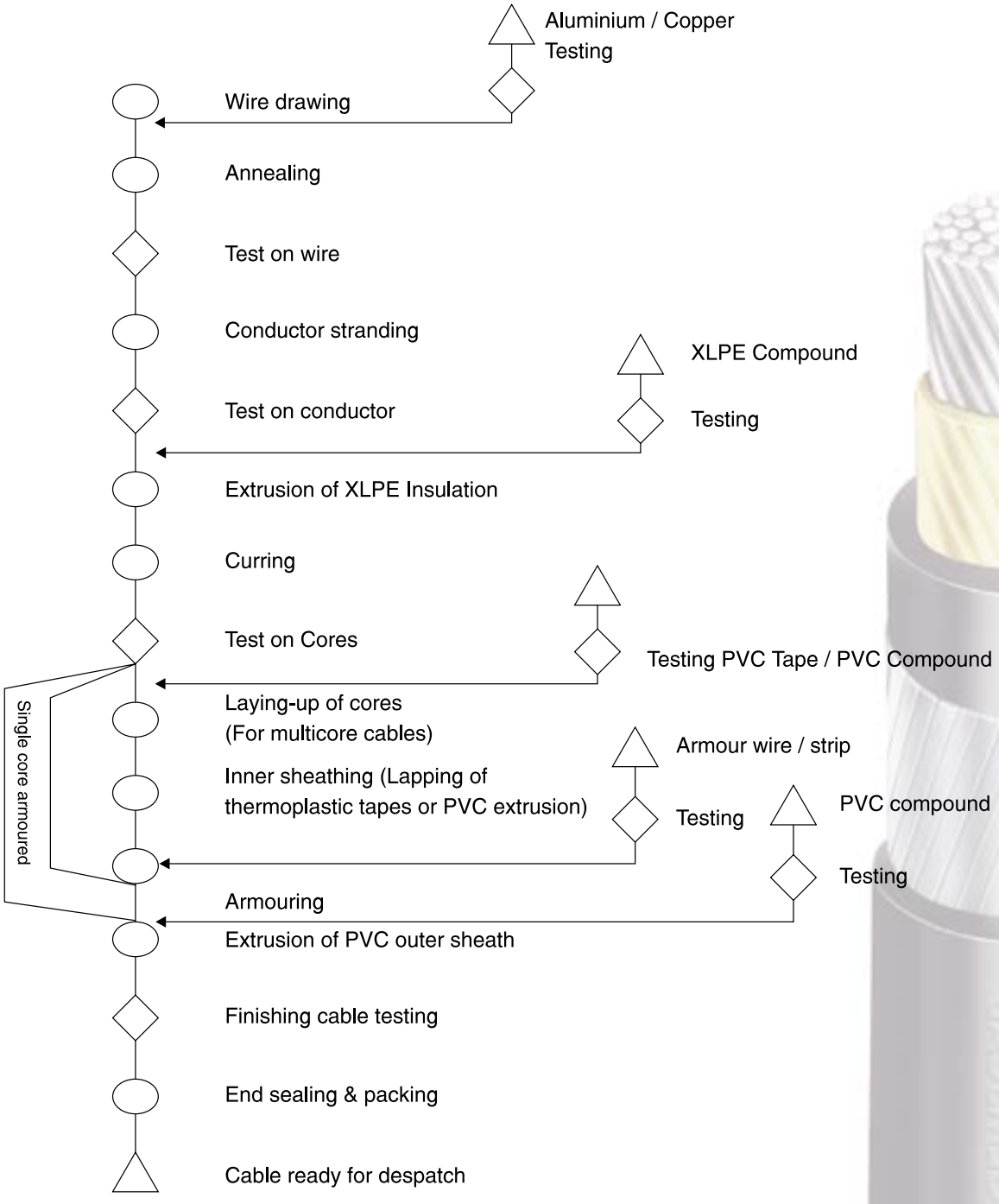
i. 3 Core Cable – Installed Independently

– Three cables in Trefoil

ii. Single Core Cables – Touching each other

Flow Chart

Flow Chart for manufacturing process & quality control checks for XLPE Cables conforming to IS:7098 (Part-1) 1988.



Note: *Inprocess quality assurance checks are carried out at each stage of manufacturing as per our Quality Assurance Plan.*

Stock Process Test

Quality Control System

1. Test on Raw Material Stage

'GEMSCAB' XLPE Cables are manufactured from high quality Raw Materials which are tested in our laboratory strictly according to our works standards. For XLPE Cables, the Raw Material used and tests conducted are as under.

i. Aluminium / copper wire

Conductor resistance, wire diameter tensile strength, annealing and wrapping test.

ii. XLPE / PVC compound

Density, tensile strength, elongation at break, volume resistivity and shrinkage test.

iii. Steel strip / wire

Dimensions, tensile strength elongation at break, torsion, resistivity and zinc coating test.

2. Production shop preventive test i.e. process inspection

The Process control tests are carried out at every stage of manufacture for checking the adequate manufacturing process, and taking necessary steps to remove any defects.

The following are the process inspections carried out by us for XLPE cables.

i. Conductor stranding

a. Dimensions
b. Surface and shape of conductor
c. Lay and direction of lay
d. D.C. resistance
e. No. of wires in each conductor

ii. Insulation

a. Dimension of cores
b. Thickness of insulation
c. Surface

iii. Curing

a. Temperature
b. Pressure
c. Time
d. Hot-set-test

iv. Laying up

a. Sequence of cores
b. Direction of laying up and lay
c. Circularity of cable
d. Diameter over laid up cores
e. Application of filler in the interstices

v. Inner sheath

a. Surface
b. Concentricity
c. Thickness
d. Diameter over inner sheath

vi. Armouring

a. Lay and direction of lay of armouring wire / strips
b. No. of wires / strips
c. Uniformity of application
d. Diameter over armouring
e. Dimension of wires-strips

vii. Outer sheath

a. Thickness
b. Concentricity
c. Diameter over sheath
d. Surface
e. Embossing with requisite information on outer sheath

3. Finished Cable Test

'GEMSCAB' have a well equipped air-conditioned laboratory with state-of-the-art Testing equipment. All routine, acceptance and type tests are conducted as per relevant specifications and testing schemes i.e. IS:7098 Part-I amended upto date.

Rating Factors

a. Rating factors for variation in ambient air temperature

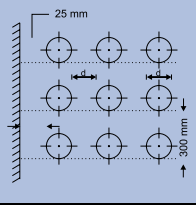
Air Temperature - °C		20	25	30	35	40	45	50	55	60
Rating Factors	Conductor Temp. 90°C	1.18	1.14	1.10	1.05	1.00	0.95	0.89	0.84	0.78

Rating factors for variation in ground temperature

Ground Temperature - °C		15	20	25	30	35	40	45	50
Rating Factors	Conductor Temp. 90°C	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82

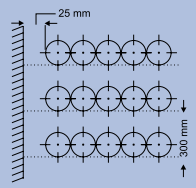
b. Rating factors for multicore cables laid on open racks in air

Arrangement 1



No. of racks	No. of cables per rack				
	1	2	3	6	9
1	1.00	0.98	0.96	0.93	0.92
2	1.00	0.95	0.93	0.90	0.89
3	1.00	0.94	0.92	0.89	0.88
6	1.00	0.93	0.90	0.87	0.86

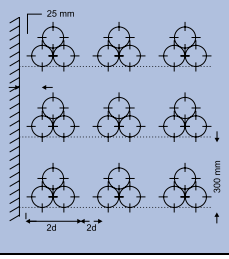
Arrangement 2



No. of racks	No. of cables per rack				
	1	2	3	6	9
1	1.00	0.84	0.80	0.75	0.73
2	1.00	0.80	0.76	0.71	0.69
3	1.00	0.78	0.74	0.70	0.68
6	1.00	0.76	0.72	0.68	0.66

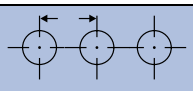
c. Rating factors for single core cable in trefoil circuits laid on open racks in air

Arrangement



No. of racks	No. of circuits per rack		
	1	2	3
1	1.00	0.98	0.96
2	1.00	0.95	0.93
3	1.00	0.94	0.92
6	1.00	0.93	0.90

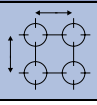
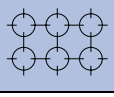
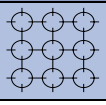
d. Rating factors for grouping of multicore cables laid direct in ground, in horizontal formation

Spacing Diagram 

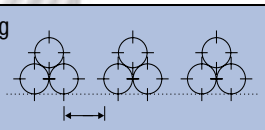
	No. of cables in group					
	2	3	4	6	8	10
Cables touching	0.79	0.69	0.62	0.54	0.50	0.46
15 cm	0.82	0.72	0.66	0.59	0.54	0.51
30 cm	0.86	0.76	0.72	0.65	0.62	0.59

Rating Factors

e. Rating factors for grouping of multicore cables laid direct in ground in tier formation

Spacing	Formation of cables		
			
Cables touching	0.60	0.51	0.43
15 cm	0.64	0.55	0.46
30 cm	0.69	0.60	0.50

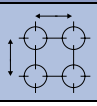
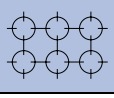
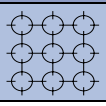
f. Rating factors for grouping of single core cable laid direct in ground in horizontal formation

Spacing 	No. of cables per rack					
	2	3	4	6	8	10
Cables touching	0.78	0.68	0.61	0.53	0.48	0.45
15 cm	0.81	0.71	0.65	0.57	0.53	0.50
30 cm	0.85	0.76	0.71	0.64	0.60	0.58

g. Rating factors for various depths of laying
(for cables laid direct in ground)

Depth of laying (mm)	Upto to 25 sq. mm.	above 25 sq. mm	above 300 sq. mm
75	1.0	1.0	1.0
90	0.99	0.98	0.97
105	0.98	0.97	0.96
120	0.97	0.97	0.95
150	0.96	0.94	0.92
180 or more	0.95	0.93	0.91

h. Rating factors for grouping of multicore cables laid direct in ground in tier formation

Spacing	Formation of cables		
			
Cables touching	0.60	0.51	0.43
15 cm	0.64	0.55	0.46
30 cm	0.69	0.60	0.50

Rating Factors

i. Ruling factor for Variation in thermal resistivity of soil (multicore cables laid direct in ground)

Nominal area of conductor sq. mm.	Rating Factors for value of Thermal Resistivity of Soil in ^{0}C cm / watt					
	100	120	150	200	250	300
25	1.14	1.08	1.00	0.91	0.84	0.78
35	1.15	1.08	1.00	0.91	0.84	0.77
50	1.15	1.08	1.00	0.91	0.84	0.77
70	1.15	1.08	1.00	0.90	0.83	0.76
95	1.15	1.08	1.00	0.90	0.83	0.76
120	1.17	1.09	1.00	0.90	0.82	0.76
150	1.17	1.09	1.00	0.90	0.82	0.76
185	1.18	1.09	1.00	0.89	0.81	0.75
240	1.18	1.09	1.00	0.89	0.81	0.75
300	1.18	1.09	1.00	0.89	0.81	0.75
400	1.19	1.10	1.00	0.89	0.81	0.75
500	1.21	1.10	1.00	0.89	0.81	0.75
630	1.22	1.10	1.00	0.89	0.81	0.74

j. Ruling factor for Variation in thermal resistivity of soil, three single core cables laid direct in ground (three cables in trefoil touching)

Nominal area of conductor sq. mm.	Rating Factors for value of Thermal Resistivity of Soil in ^{0}C cm / watt					
	100	120	150	200	250	300
25	1.19	1.09	1.00	0.88	0.80	0.74
35	1.20	1.09	1.00	0.88	0.80	0.74
50	1.20	1.09	1.00	0.88	0.80	0.74
70	1.21	1.10	1.00	0.88	0.80	0.74
95	1.22	1.10	1.00	0.88	0.80	0.74
120	1.22	1.10	1.00	0.88	0.79	0.74
150	1.22	1.10	1.00	0.88	0.79	0.73
185	1.22	1.10	1.00	0.88	0.79	0.73
240	1.22	1.10	1.00	0.88	0.79	0.73
300	1.22	1.10	1.00	0.88	0.79	0.72
400	1.24	1.11	1.00	0.88	0.79	0.72
500	1.24	1.11	1.00	0.88	0.79	0.72
630 to 1000	1.24	1.11	1.00	0.88	0.79	0.72

Dimensions & Weights

SINGLE CORE AL CABLES

1.1 KV Single core XLPE insulated unarmoured and armoured cable with aluminium conductor conforming to IS:7098 (Part 1) 1988

Unarmoured cables					Armoured cables								
					Single layer round wire armoured					Single layer flat strip armoured			
Nominal Area of Conductor (mm^2)	Nominal thickness of XLPE insulation (mm)	Nominal thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (mm)	Nominal thickness of XLPE insulation (mm)	Nominal diameter of Round Wire (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal thickness of flat strip (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg. / Km)
10	0.7	1.8	9.5	90	1.0	1.40	1.24	11.5	180	-	-	-	-
16	0.7	1.8	10.5	110	1.0	1.40	1.24	13.0	210	-	-	-	-
25	0.9	1.8	12.0	150	1.2	1.40	1.24	14.0	260	-	-	-	-
35	0.9	1.8	13.0	180	1.2	1.40	1.24	15.0	310	-	-	-	-
50	1.0	1.8	14.5	230	1.3	1.40	1.24	17.0	360	-	-	-	-
70	1.1	1.8	16.0	300	1.4	1.40	1.24	19.0	450	-	-	-	-
95	1.1	1.8	18.0	380	1.4	1.60	1.40	22.0	590	0.8	1.40	21.0	520
120	1.2	1.8	19.5	460	1.5	1.60	1.40	24.0	680	0.8	1.40	22.5	610
150	1.4	2.0	22.0	580	1.7	1.60	1.40	25.0	810	0.8	1.40	24.0	730
185	1.6	2.0	24.0	700	1.9	1.60	1.40	28.0	940	0.8	1.40	26.0	850
240	1.7	2.0	26.5	880	2.0	1.60	1.40	30.0	1150	0.8	1.40	30.0	1050
300	1.8	2.0	29.5	1070	2.1	1.60	1.56	33.0	1400	0.8	1.56	32.0	1290
400	2.0	2.2	33.0	1370	2.4	2.00	1.56	38.0	1800	0.8	1.56	35.5	1600
500	2.2	2.2	36.0	1660	2.6	2.00	1.56	41.0	2130	0.8	1.56	38.5	1910
630	2.4	2.2	40.0	2100	2.8	2.00	1.72	45.5	2670	0.8	1.72	43.0	2420
800	2.6	2.4	46.0	2670	3.1	2.00	1.88	51.0	3320	0.8	1.88	48.0	3670
1000	2.8	2.6	50.5	3310	3.3	2.50	1.88	56.0	4170	0.8	1.88	53.0	3030

TWIN CORE AL CABLES

1.1 KV Twin core XLPE insulated unarmoured and armoured cable with aluminium conductor conforming to IS:7098 (Part 1) 1988

Unarmoured cables						Armoured cables							
						Single layer round wire armoured				Single layer flat strip armoured			
Nominal Area of Conductor (mm^2)	Nominal thickness of XLPE insulation (mm)	Nominal thickness of PVC inner Sheath (mm)	Nominal thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal diameter of Round Wire (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal thickness of flat strip (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg. / Km)
10	0.7	0.3	1.8	16.5	270	1.40	1.24	18.0	610	-	-	-	-
16	0.7	0.3	1.8	17.0	290	1.40	1.40	18.5	720	-	-	-	-
25	0.9	0.3	2.0	19.0	340	1.60	1.40	21.0	740	0.8	1.40	20.0	600
35	0.9	0.3	2.0	20.0	410	1.60	1.40	23.0	900	0.8	1.40	21.0	700
50	1.0	0.3	2.0	22.0	510	1.60	1.40	25.0	1060	0.8	1.40	23.0	840
70	1.1	0.3	2.0	25.0	670	1.60	1.56	28.0	1320	0.8	1.40	26.0	1040
95	1.1	0.4	2.2	28.0	860	2.00	1.56	31.0	1760	0.8	1.56	29.0	1280
120	1.2	0.4	2.2	31.0	1050	2.00	1.56	34.0	2040	0.8	1.56	31.0	1520
150	1.4	0.4	2.2	33.0	1260	2.00	1.72	37.0	2360	0.8	1.72	34.0	1800
185	1.6	0.5	2.4	37.0	1700	2.00	1.88	40.0	2920	0.8	1.72	37.0	2280
240	1.7	0.5	2.6	41.0	2120	2.50	2.04	45.0	3830	0.8	1.88	42.0	2760
300	1.8	0.6	2.8	44.0	2560	2.50	2.20	49.0	4450	0.8	2.04	45.0	3280
400	2.0	0.6	3.0	48.0	3160	2.50	2.36	52.0	5270	0.8	2.36	50.0	4010
500	2.2	0.7	3.4	54.0	3920	3.15	2.68	60.0	6910	0.8	2.52	55.0	4820
630	2.4	0.7	3.6	62.0	4910	3.15	2.84	66.0	8230	0.8	2.68	63.0	5920

Dimensions & Weights

TWIN CORE AL CABLES

1.1 KV Three core XLPE insulated unarmoured and armoured cable with aluminium conductor conforming to IS:7098 (Part 1) 1988

Unarmoured cables						Armoured cables							
						Single layer round wire armoured				Single layer flat strip armoured			
Nominal Area of Conductor (mm^2)	Nominal thickness of XLPE insulation (mm)	Nominal thickness of PVC inner Sheath (mm)	Nominal thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal diameter of Round Wire (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal thickness of flat strip (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg. / Km)
10	0.7	0.3	1.8	18.0	250	1.40	1.24	20.0	630	-	-	-	-
16	0.7	0.3	1.8	18.0	310	1.60	1.40	20.5	810	0.8	1.24	19.0	590
25	0.9	0.3	2.0	21.0	440	1.60	1.40	23.0	940	0.8	1.40	21.0	730
35	0.9	0.3	2.0	22.0	540	1.60	1.40	25.0	1090	0.8	1.40	23.0	870
50	1.0	0.3	2.0	26.0	680	1.60	1.56	28.0	1320	0.8	1.40	26.0	1050
70	1.1	0.4	2.2	29.0	920	2.00	1.56	32.0	1840	0.8	1.56	29.0	1360
95	1.1	0.4	2.2	33.0	1170	2.00	1.56	35.0	2180	0.8	1.56	33.0	1660
120	1.2	0.4	2.2	35.0	1430	2.00	1.72	39.0	2580	0.8	1.56	36.0	1970
150	1.4	0.5	2.4	39.0	1760	2.00	1.88	43.0	3030	0.8	1.72	40.0	2360
185	1.6	0.5	2.6	43.0	2180	2.50	2.04	48.0	3960	0.8	1.88	44.0	2850
240	1.7	0.6	2.8	49.0	2790	2.50	2.20	53.0	4790	0.8	2.04	50.0	3550
300	1.8	0.6	3.0	53.0	3420	2.50	2.36	57.0	5630	0.8	2.20	53.0	4250
400	2.0	0.7	3.2	59.0	4310	3.15	2.68	65.0	7510	0.8	2.52	60.0	5300
500	2.2	0.7	3.6	66.0	5370	3.15	2.84	72.0	8860	0.8	2.68	66.0	6410
630	2.4	0.7	3.8	73.0	6810	4.00	3.00	81.0	11760	0.8	2.84	74.0	7980

THREE & HALF CORE AL CABLES

1.1 KV Three & A Half Core XLPE Insulated Unarmoured and Armoured cable with Aluminium Conductor Conforming to IS:7098 (Part 1) 1988

Unarmoured cables							Armoured cables							
							Single layer round wire armoured				Single layer flat strip armoured			
Nominal Area of Conductor (mm^2)	Nominal Area of reduced neutral conductor (mm^2)	Nominal thickness of XLPE insulation (mm)	Min. thickness of PVC inner Sheath (mm)	Nominal thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal diameter of Round Wire (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal thickness of flat strip (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)
25	16	0.9	0.3	2.0	22.0	510	1.60	1.40	25.0	1060	0.8	1.40	23.0	830
35	16	0.9	0.3	2.0	23.0	610	1.60	1.40	26.0	1210	0.8	1.40	24.0	970
50	25	1.0	0.3	2.0	27.0	790	1.60	1.56	30.0	1490	0.8	1.40	28.0	1200
70	35	1.1	0.4	2.2	31.0	1060	2.00	1.56	35.0	2070	0.8	1.56	32.0	1540
95	50	1.1	0.4	2.2	34.0	1360	2.00	1.56	38.0	2470	0.8	1.56	35.0	1900
120	70	1.2	0.4	2.2	37.0	1680	2.00	1.72	41.0	2960	0.8	1.72	38.0	2310
150	70	1.4	0.5	2.4	42.0	2020	2.00	1.88	45.0	3420	0.8	1.72	42.0	2680
185	95	1.6	0.5	2.6	46.0	2510	2.50	2.04	50.0	4470	0.8	1.88	47.0	3260
240	120	1.7	0.6	2.8	51.0	3210	2.50	2.20	55.0	5420	0.8	2.04	52.0	4060
300	150	1.8	0.6	3.0	56.0	3940	2.50	2.36	59.0	6390	0.8	2.20	56.0	4860
400	185	2.0	0.7	3.4	65.0	5010	3.15	2.68	70.0	8500	0.8	2.52	65.0	6060
500	240	2.2	0.7	3.6	73.0	6210	3.15	2.84	79.0	10030	0.8	2.68	74.0	7370
630	300	2.4	0.7	4.0	82.0	7900	4.00	3.00	88.0	13330	0.8	3.00	82.0	9210

Dimensions & Weights

FOUR CORE AL CABLES

1.1 KV Four core XLPE insulated unarmoured and armoured cable with aluminium conductor conforming to IS:7098 (Part 1) 1988

Unarmoured cables						Armoured cables							
						Single layer round wire armoured				Single layer flat strip armoured			
Nominal Area of Conductor (mm^2)	Nominal thickness of XLPE insulation (mm)	Minimum thickness of PVC inner Sheath (mm)	Nominal thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal diameter of Round Wire (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg / Km)	Nominal thickness of flat strip (mm)	Min. thickness of PVC outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. weight of Cable (Kg. / Km)
10	0.7	0.3	1.8	19.0	300	1.40	1.40	20.0	720	-	-	-	-
16	0.7	0.3	1.8	20.0	370	1.60	1.40	22.5	850	0.8	1.40	20.0	670
25	0.9	0.3	2.0	24.0	540	1.60	1.40	26.0	1110	0.8	1.40	24.0	880
35	0.9	0.3	2.0	26.0	680	1.60	1.40	28.0	1310	0.8	1.40	27.0	1050
50	1.0	0.3	2.0	29.0	860	1.60	1.56	32.0	1590	0.8	1.56	30.0	1320
70	1.1	0.4	2.2	34.0	1170	2.00	1.56	37.0	2220	0.8	1.56	34.0	1670
95	1.1	0.4	2.2	37.0	1500	2.00	1.72	40.0	2700	0.8	1.56	37.0	2070
120	1.2	0.5	2.4	41.0	1870	2.00	1.88	44.0	3210	0.8	1.72	41.0	2330
150	1.4	0.5	2.6	43.0	2300	2.50	2.04	47.0	4150	0.8	1.88	44.0	3000
185	1.6	0.5	2.8	48.0	2840	2.50	2.20	52.0	4910	0.8	2.04	49.0	3620
240	1.7	0.6	3.0	56.0	3650	2.50	2.36	60.0	5970	0.8	2.20	56.0	4530
300	1.8	0.7	3.2	63.0	4490	3.15	2.52	68.0	7750	0.8	2.36	63.0	5470
400	2.0	0.7	3.6	70.0	5690	3.15	2.84	76.0	9300	0.8	2.68	71.0	6780
500	2.2	0.7	3.8	79.0	7020	4.00	3.00	86.0	12150	0.8	2.84	79.0	8230
630	2.4	0.7	4.0	88.0	8910	4.00	3.00	94.0	14600	0.8	3.00	88.0	10280

Conductor Resistance

	Aluminium		Plain Copper	
Nominal Area of conductor	Max. D.C. Resistance at 20^0C	Approx A.C. Resistance at operating Temp. 90^0C	Max. D.C. Resistance at 20^0C	Approx A.C. Resistance at operating Temp. 90^0C
(Sq. mm)	Ohm / km	Ohm / km	Ohm / km	Ohm / km
1.5	-	-	12.1	15.5
2.5	-	-	7.41	9.50
4	7.41	9.50	4.61	5.91
6	4.61	5.91	3.08	3.95
10	3.08	3.95	1.83	2.35
16	1.91	2.45	1.15	1.47
25	1.20	1.539	0.727	0.932
35	0.868	1.113	0.524	0.672
50	0.641	0.822	0.387	0.496
70	0.443	0.568	0.268	0.343
95	0.320	0.410	0.193	0.247
120	0.253	0.325	0.153	0.196
150	0.206	0.265	0.124	0.159
185	0.164	0.212	0.0991	0.128
240	0.125	0.162	0.0754	0.0977
300	0.100	0.130	0.0601	0.0781
400	0.0778	0.102	0.0470	0.0616
500	0.0605	0.081	0.0366	0.0490
630	0.0469	0.064	0.0283	0.0386
800	0.0367	0.0526	0.0221	0.0317
1000	0.0291	0.0438	0.0176	0.0265

Current Rating

Current Rating for 1.1 KV XLPE Insulated - Aluminium Conductor Cables - Armoured and Unarmoured

Nominal Area of Cross-Section	Cables in Ground					Cables in Air				
	Single Core Cables			Two Core Cables	Three, Three and a half & Four Core Cables	Single Core Cables			Two Core Cables	Three, Three and a half & Four Core Cables
	Two Cables		Three Cables			Two Cables		Three Cables		
	AC	DC	AC	AC	AC	AC	DC	AC	AC	AC
Sq. mm	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)
10	69	69	59	71	57	60	60	53	67	53
16	90	90	76	91	73	82	82	73	88	70
25	116	116	97	120	97	108	108	99	117	95
35	139	139	116	143	116	136	136	122	145	117
50	162	162	139	167	134	163	163	149	176	140
70	199	199	171	204	167	208	208	190	221	176
95	241	241	204	245	199	258	258	235	271	221
120	273	273	231	278	227	303	303	276	316	258
150	305	305	259	315	255	348	348	321	362	294
185	347	347	292	356	287	407	407	371	420	339
240	407	407	342	407	333	488	488	447	497	402
300	458	463	384	463	375	569	569	515	578	461
400	518	528	440	528	426	669	678	606	678	542
500	592	602	500	592	481	786	805	705	786	624
630	666	694	565	676	537	922	958	823	913	723
800	750	796	629	-	-	1067	1130	949	-	-
1000	833	907	704	-	-	1220	1329	1076	-	-

Current Rating for 1.1 KV XLPE Insulated - Copper Conductor Cables - Armoured and Unarmoured

Nominal Area of Cross-Section	Cables in Ground					Cables in Air				
	Single Core Cables			Two Core Cables	Three, Three and a half & Four Core Cables	Single Core Cables			Two Core Cables	Three, Three and a half & Four Core Cables
	Two Cables		Three Cables			Two Cables		Three Cables		
	AC	DC	AC	AC	AC	AC	DC	AC	AC	AC
Sq. mm	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)	(Amps)
1.5	31	31	27	33	25	25	25	22	29	22
2.5	41	41	36	43	34	33	33	29	39	30
4.0	54	54	46	56	44	44	44	40	51	40
6.0	68	68	57	71	55	55	55	51	64	51
10	89	89	76	92	73	80	80	71	88	70
16	116	116	97	116	97	104	104	95	113	90
25	148	148	125	152	125	139	139	126	153	112
35	181	181	153	180	148	172	172	158	186	148
50	213	213	181	218	175	213	213	194	226	181
70	259	259	217	264	213	271	271	249	284	230
95	310	310	264	314	254	335	335	307	348	284
120	352	352	296	357	292	389	393	357	402	330
150	393	397	333	403	325	447	452	411	461	375
185	449	449	375	453	366	524	524	479	533	434
240	518	527	434	518	421	623	632	569	633	515
300	583	593	490	583	472	722	741	659	732	588
400	657	685	556	658	528	850	877	769	841	677
500	731	778	620	730	583	976	1031	877	967	767
630	823	897	695	-	-	1130	1229	1013	-	-
800	907	1027	758	-	-	1284	1464	1148	-	-
1000	981	1176	834	-	-	1437	1709	1275	-	-

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