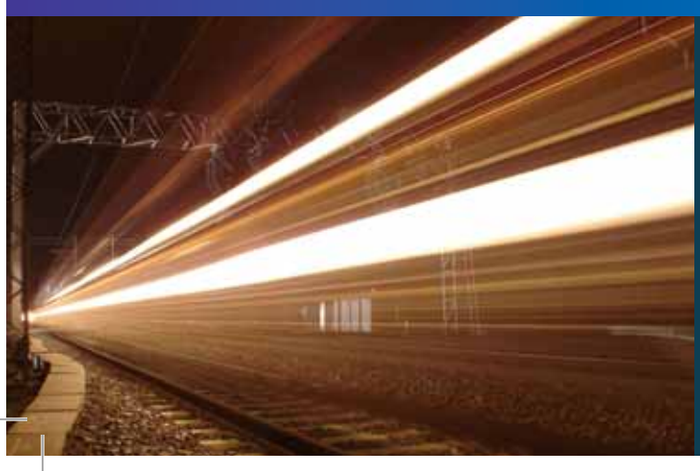
XLPE Insulated Power Cables

Universal Cable (M) Berhad was incorporated in 1967 as a private company prior to its merger with Leader Cable Industry Berhad in 1990 to form the single largest wire and cable manufacturer in the region. As part of leader Universal Holdings a public listed company with current capitalisation in excess of RM4 billion, Universal Cable shares the group's extensive network for synergistic integration in varied areas of cable technology.

Universal Cable, together with its subsidiary companies, cover a broad spectrum of products which includes XLPE and PVC power and control cables, telecommunication and instrument cables, rubber insulated cables and electrical grade aluminium rods. Continued capital investment has enabled Universal Cable to establish state-of-the-art facilities and utilize the latest cable manufacturing technologies for quality products. Universal Cable will continue to provide innovative improvements and refinements through critical selection of raw materials to produce better and more costeffective products for its customers.

With a strong emphasis on customer satisfaction, Universal Cable and its subsidiaries are constantly expanding their product range to enhance its position as a major supplier of power and telecommunication cables to local industries and increase its prominence abroad.

This catalogue serves as a guide to UCMB's manufacturing processess and standards in the manufacture of XLPE cables.



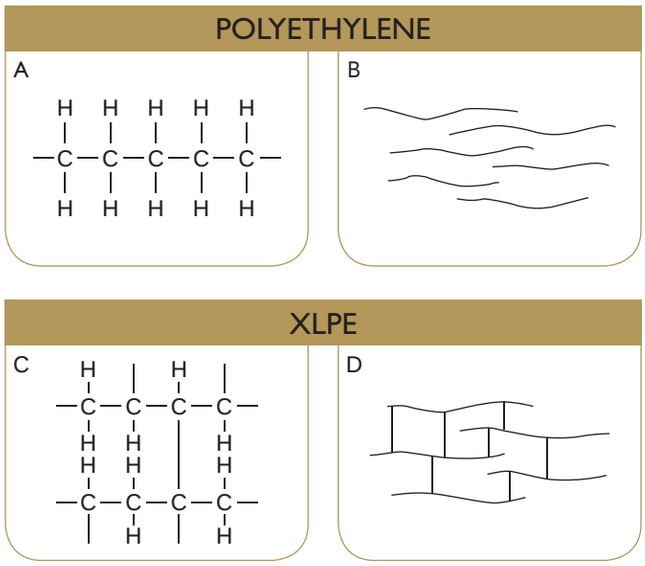
CONTENTS

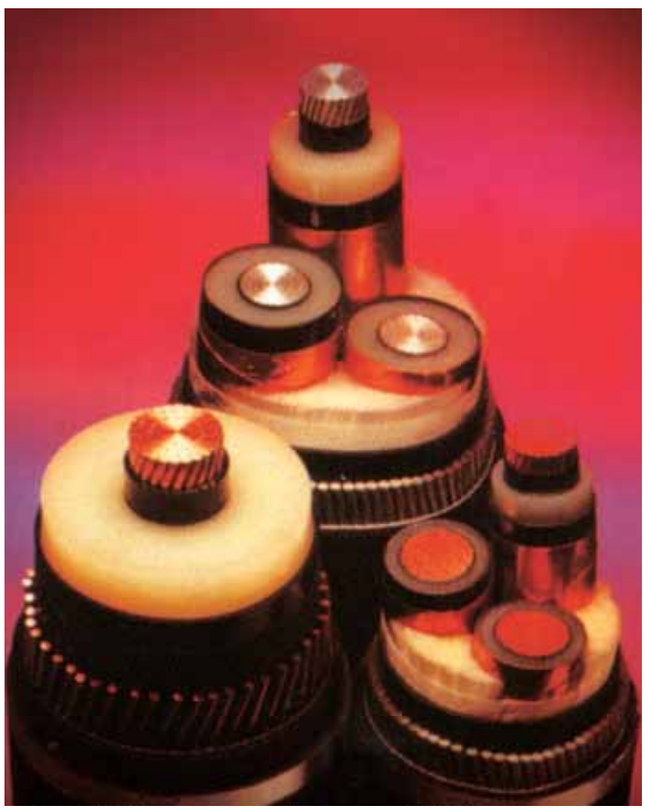
WHAT IS XLPE?

XLPE is an abbreviated designation of "cross-linked polyethylene". Polyethylene has a linear molecular structure as shown in A. Molecules of polyethylene not chemically bonded as shown in B are easily deformed at high temperature, while XLPE molecules bonded in a three dimensional network as shown in C and D, have strong resistance to deformation even at high temperature.

Cross linked polyethylene is produced from polyethylene under high pressure with organic peroxides as additives. The application of heat and pressure is used to effect the cross linking. This causes the individual molecular chains to link with one another which in turn causes the material to change from a thermoplastic to an elastic material.

An important advantage of XLPE as insulation for medium and high voltage cables is their low dielectric loss. The dielectric loss factor is about one decimal power lower than that of paper insulated cables and about two decimal powers lower than that of PVC-insulated cables. Since the dielectric constant is also more favourable the mutual capacitance of XLPE cables is also lower, thus reducing the charging currents and earth-leakage currents in networks without the rigid star-point earthing.





CHARACTERISTICS AND ADVANTAGES OF XLPE

Excellent Electrical and Physical Properties

XLPE cable constitutes the best cable for transmission and distribution lines because of its excellent electrical and physical properties.

Capability of Carrying Large Currents

The excellent resistance to thermal deformation and the excellent aging property of XLPE cable permit it to carry large current under normal (90 °C), emergency (130 °C) or short circuit (250 °C) conditions.

Ease of Installation

XLPE cable withstands smaller radius bending and is lighter in weight, allowing for easy and reliable installation. Furthermore, the splicing and terminating methods for XLPE cable are simpler in comparison with other kinds of cables.

Free from Height Limitation and Maintenance

XLPE cables can be installed anywhere without special consideration of the route profile (height limitations) since it does not contain oil and thus is free from failures due to oil migration in oil-filled cables.

No Metallic Sheath Required

XLPE cable does not generally demand a metallic sheath. Thus it is free from the failures peculiar to metallic-sheathed cables, such as corrosion and fatigue.

MANUFACTURING PROCESS OF XLPE CABLES

In the manufacture of medium and high voltage XLPE cable, our plant uses the latest technology available in the field by using an integrated high performance extrusion line which consists of a triple-layer crosshead and a water-free Completely Dry Curing and Cooling (CDCC) gas-vulcanizing process. This type of extrusion line minimises the risk of introducing external contaminants and produces high quality XLPE cable.

The conductor is paid off continuously through a metering capstan (which is the line speed master point), a triple extruder crosshead, a vulcanizing tube, an eccentricity monitoring unit, and haul-off caterpillars, and finally taken up.

Using a group of three extruders, the triple crosshead allows simultaneous extrusion of the cable insulation and two semiconducting screens with a high degree of smoothness and no voids or introduction of extrernal contaminants. Precise and stable temperatures at the crosshead are achieved by using multiple zone temperature controls.

In the water-free CDCC gas-vulcanizing process, the triple-extruded cable core is cured in an inert pressurised gas tube and heated to the required temperature for material cross-linking. By varying the curing temperature and time, different cure percentages can be achieved as per customer requirements.

The various functions of our integrated extrusion line such as line speed and curing tube temperatures synchronisation are monitored and controlled via the process automation computers to ensure production of quality ramps. Calculated ramp parameters can be preset on the control unit and closed circuit TV system is used to ease the running of the lines.

STRUCTURAL DESIGN AND PERFORMANCE OF XLPE CABLES

The design of XLPE cables conform to international standards and are similar to those in IEC 60502 and IEC 60840.

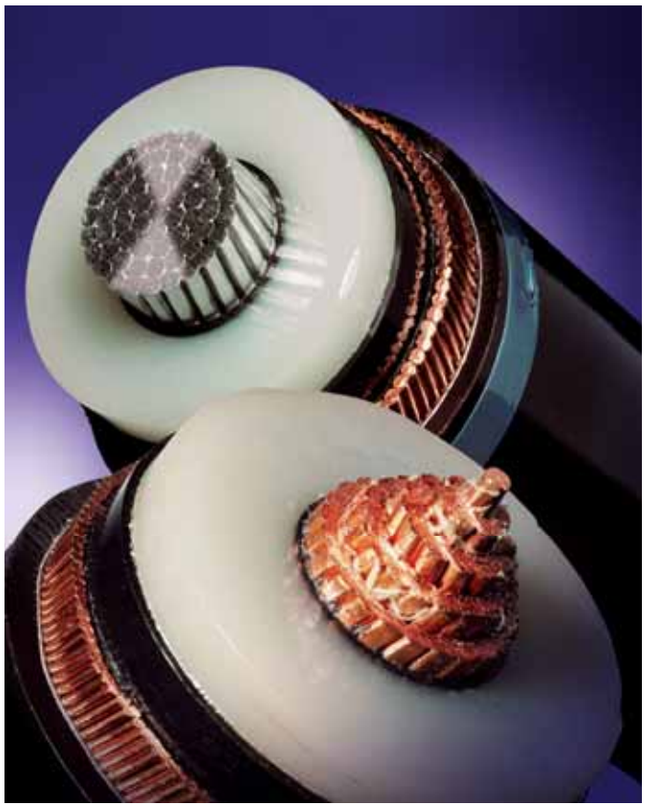
XLPE insulated cables for medium and high voltages have, in general, circular conductors and only single core construction is adopted for the latter. Conductors may be of compacted stranded aluminium or stranded copper and special care is taken to ensure a smooth profile, free from sharp juts that could damage the insulation due to high local electric stresses.

All XLPE insulated cables of Medium Voltage are supplied with extruded cross-linked semi conducting screens to protect the main solid XLPE insulation. The conductor screen fills the interstices between the wires and provides a smooth circular envelope around the conductor. This diminishes the concentration of flux lines around the individual wires and hence the electrical stress around the conductor. While the insulation screen can be either strippable or bonded for MV cables depending on the customer's option, bonded screen is used exclusively for high voltage cables.

A layer of copper wires, applied over the extruded insulation screen, as a metallic screen, provides an earthed envelope. The cross sectional area of this metallic screen is determined in order to satisfy the phase to earth fault level in the network.

PROCESS OF XLPE CABLES

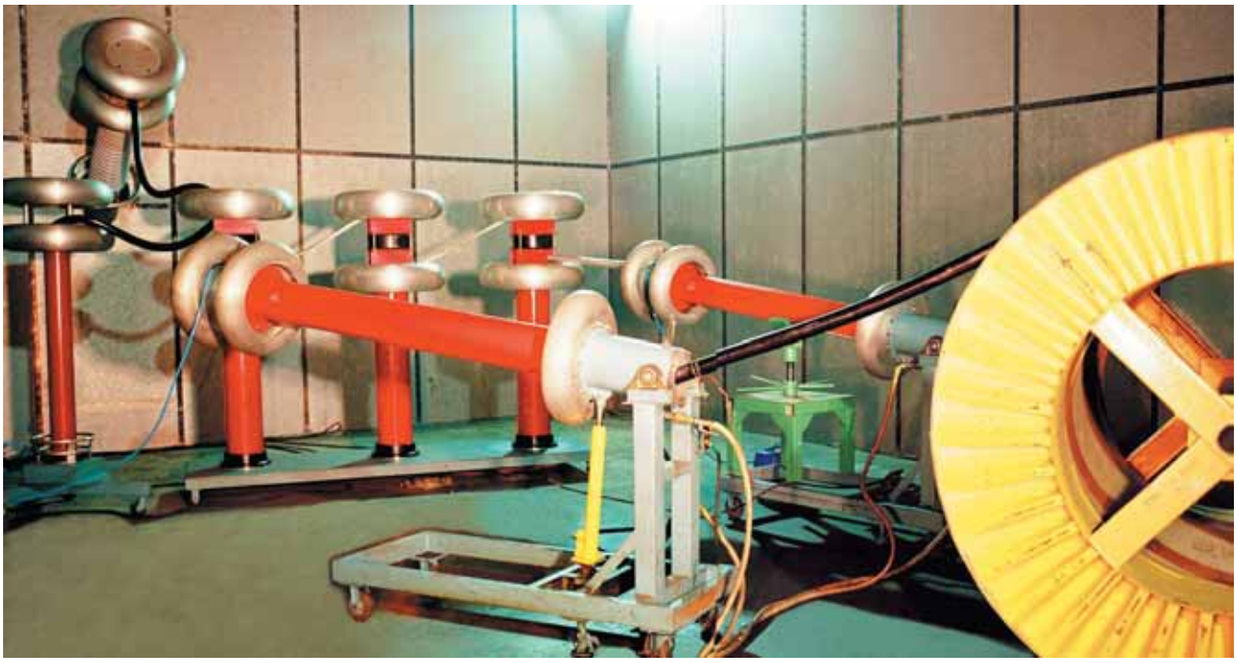
Although it has been verified that XLPE cables can be applied with a conductor temperature of 130ºC for emergency overload conditions, it must be understood that the erecting and laying conditions necessary to allow for those temperatures must be accurately carried out and controlled during installation in order to restrict thermomechanical problems. To be realistic, emergency conditions should be confined to 110°C at conductor with the balance of 20ºC premeditated as a safety margin to cope with some concerns in the laying conditions.



Subsequent to the constant use of XLPE for medium and high voltages for many years in the past, our plant has extensive field test result which evidently witness that XLPE insulated cables are of excellent quality particularly in respect of :

- partial discharges withstandability
- impulse test withstandability
- moisture resistance
- overload current-test under dielectric stress and thermic cycles

TESTING PROCEDURES FOR XLPE CABLES



At our plant the testing process of XLPE cables and its accessories is subjected to the most stringent standards to ensure that our products meet the quality required for optimum problem free performance.

In this respect our plant uses advanced state of the art testing equipment in a strict series of test processes to achieve the exacting quality standards.

Among the main test equipment

1. Partial Discharge Test System
2. Impulse Test System
3. Capacitance & Power Factor Measuring Bridge
4. A.C High Voltage Test System
5. A.C Long Time Test System

TESTING PROCEDURES FOR XLPE CABLES

The Differenet tests employed are listed as such :

Routine Test

These are tests to monitor overall cable quality and function. Tests listed here include high voltage tests, conductor resistance test, insulation resistance tests and voltage tests on protective sheath coverings.

Type Tests

These tests are used to calibrate and validate cable design type and they include bending tests, thermal stability tests, impulse voltage tests, head distortion tests, corona level tests and dielectric thermal resistance tests.

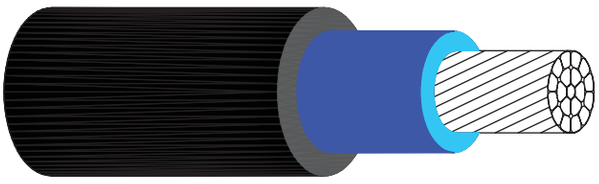
Special Tests

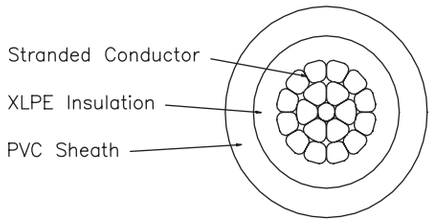
These tests are conducted to ensure major design changes to cables conform to proper performance thresholds.

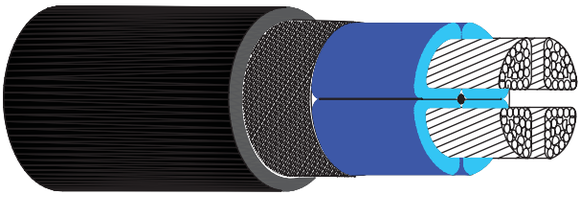
After Installation Tests

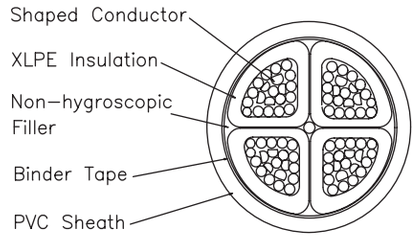
These tests are to determine and ensure that cables installed are in optimum operating conditions. Conductor resistance tests on the completed circuit verification tests of cross bonded systems and surge divertor tests are among the running lists of such critical test requirements.

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE 0.6 / 1 (1.2) kV









DESCRIPTION

Single core and multi-core cables with copper or aluminium conductor, XLPE insulated and PVC sheathed. Cables are rates at 0.6 / 1 (1.2) kV and conform to IEC 60502.

CONSTRUCTION

Conductor

Plain circular, compacted or shaped stranded copper or aluminium conductor, conform to IEC 60228 class 2.

Insulation

XLPE (cross-linked polyethylene) rated at 90'C.

Colours for core indentification

Single core - natural (black on request)
Two core - red, black
Three core - red, yellow and blue
Four core - red, yellow, blue and black
Five core - red, yellow, blue, black and green/yellow

Assembly

Two, three, four or five insulated conductors are laid up together if necessary filled with non- hygroscopic material compatible with the insulation. The filling may be omitted provided the outer shape of the cables remains practically circular and no adhesion occurs between cores and sheath.

Sheath

PVC type ST2 to IEC 60502, colour black.

APPLICATIONS

These cables are designated for general use including underground burial, where they are not likely to suffer mechanical damage.

Note: Cables complying with BS5467 and customer's specification are available upon request.

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/PVC CABLE 0.6 /1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
					Copper	Aluminium
mm^2		mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	1.4	5.8	50	-
2.5	r.m.	0.7	1.4	6.2	62	-
4	r.m.	0.7	1.4	6.8	81	-
6	r.m.	0.7	1.4	7.3	105	67
10	r.m.	0.7	1.4	8.3	151	88
16	c.c.	0.7	1.4	9.0	211	110
25	c.c.	0.9	1.4	10.6	315	155
35	c.c.	0.9	1.4	11.8	414	192
50	c.c.	1.0	1.4	13.2	542	243
70	c.c.	1.1	1.4	15.1	757	324
95	c.c.	1.1	1.5	17.0	1025	425
120	c.c.	1.2	1.5	18.8	1281	520
150	c.c.	1.4	1.6	20.8	1562	650
185	c.c.	1.6	1.6	23.0	1940	773
240	c.c.	1.7	1.7	25.8	2522	987
300	c.c.	1.8	1.8	28.5	3144	1215
400	c.c.	2.0	1.9	31.9	4006	1527
500	c.c.	2.2	2.0	35.5	5042	1903
630	c.c.	2.4	2.2	40.0	6460	2437
800	c.c.	2.6	2.3	43.5	8194	3049
1000	r.m.	2.8	2.4	52.0	10397	3853

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - TWO CORES CU/XLPE/PVC CABLE 0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
					Copper	Aluminium
mm^2		mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	1.8	9.7	119	-
2.5	r.m.	0.7	1.8	10.5	148	-
4	r.m.	0.7	1.8	11.6	192	-
6	r.m.	0.7	1.8	12.7	247	-
10	r.m.	0.7	1.8	14.6	354	-
16	c.c.	0.7	1.8	16.5	494	289
25	c.c.	0.9	1.8	19.4	727	411
35	c.c.	0.9	1.8	21.7	963	513v
50	s.m.	1.0	1.8	20.9	1116	507
70	s.m.	1.1	1.8	23.9	1553	672
95	s.m.	1.1	1.9	26.8	2093	872
120	s.m.	1.2	2.0	29.7	2629	1078
150	s.m.	1.4	2.2	33.1	3220	1324
185	s.m.	1.6	2.3	36.8	4012	1634
240	s.m.	1.7	2.5	41.3	5216	2088
300	s.m.	1.8	2.6	45.3	6482	2551
400	s.m.	2.0	2.9	51.0	8318	3254

Note : r.m. - circular stranded, c.c. - compacted circular stranded, s.m. - shaped stranded

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/PVC CABLE 0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of steel wire	Approximate overall diameter	Approximate weight of cable	
					Copper	Aluminium
mm^2		mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	1.8	10.1	141	-
2.5	r.m.	0.7	1.8	11.0	180	-
4	r.m.	0.7	1.8	12.2	240	-
6	r.m.	0.7	1.8	13.4	314	-
10	r.m.	0.7	1.8	15.4	461	-
16	c.c.	0.7	1.8	17.4	656	349
25	c.c.	0.9	1.8	21.0	990	503
35	c.c.	0.9	1.8	23.5	1312	637
50	s.m.	1.0	1.8	24.1	1633	719
70	s.m.	1.1	1.9	27.9	2299	978
95	s.m.	1.1	2.0	31.4	3104	1272
120	s.m.	1.2	2.1	34.8	3902	1576
150	s.m.	1.4	2.3	38.8	4782	1938
185	s.m.	1.6	2.4	43.2	5966	2399
240	s.m.	1.7	2.6	48.6	7761	3070
300	s.m.	1.8	2.7	53.4	9653	3757
400	s.m.	2.0	3.0	60.1	12387	4792

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - FOUR CORES CU/XLPE/PVC CABLE 0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of steel wire	Approximate overall diameter	Approximate weight of cable	
					Copper	Aluminium
mm^2		mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	1.8	10.9	168	-
2.5	r.m.	0.7	1.8	11.9	217	-
4	r.m.	0.7	1.8	13.2	294	-
6	r.m.	0.7	1.8	14.6	394	240
10	r.m.	0.7	1.8	16.9	586	328
16	c.c.	0.7	1.8	19.0	840	421
25	c.c.	0.9	1.8	23.0	1277	617
35	c.c.	0.9	1.8	25.8	1699	787
50	s.m.	1.0	1.8	27.1	2180	962
70	s.m.	1.1	2.0	31.6	3086	1325
95	s.m.	1.1	2.1	35.7	4163	1722
120	s.m.	1.2	2.3	39.8	5253	2152
150	s.m.	1.4	2.4	44.1	6414	2688
185	s.m.	1.6	2.6	49.3	8030	3276
240	s.m.	1.7	2.8	55.4	10434	4213
300	s.m.	1.8	3.0	61.3	13008	5184
400	s.m.	2.0	3.3	68.9	16647	6552

Note : r.m. - circular stranded, c.c. - compacted circular stranded, s.m. - shaped stranded

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - FOUR CORES WITH REDUCED NEUTRAL CU/XLPE/PVC CABLE 0.6 / 1 (1.2) kV.

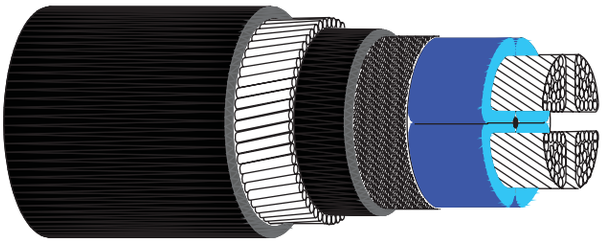
Phase		Neutral		Phase	Neutral	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
Nominal cross-sectional area	Conductor Shape	Nominal cross-sectional area	Conductor Shape	Nominal Thickness of insulation				Copper	Aluminium
mm^2		mm^2		mm	mm	mm	mm	Kg / Km	Kg / Km
25	c.c.	16	c.c.	0.9	0.7	1.8	22.2	1166	580
35	c.c.	16	c.c.	0.9	0.7	1.8	24.3	1479	740
50	s.m.	25	c.c.	1.0	0.9	1.8	27.1	1963	870
70	s.m.	35	c.c.	1.1	0.9	2.0	31.6	2763	1300
95	s.m.	50	c.c.	1.1	1.0	2.1	35.7	3713	1390
120	s.m.	70	c.c.	1.2	1.1	2.3	39.8	4757	1780
150	s.m.	70	c.c.	1.4	1.1	2.4	44.7	5841	2390
185	s.m.	95	c.c.	1.6	1.1	2.6	49.3	7175	2885
240	s.m.	120	c.c.	1.7	1.2	2.8	55.4	9283	3630
300	s.m.	150	c.c.	1.8	1.4	3.0	61.3	11590	4440
400	s.m.	185	c.c.	2.0	1.6	3.3	68.9	14739	5825

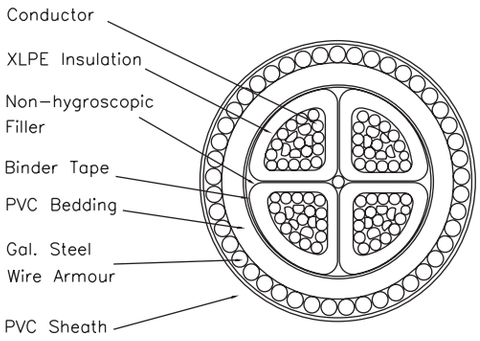
XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - FIVE CORES CU/XLPE/PVC CABLE 0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
					Copper	Aluminium
mm^2		mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	1.8	11.8	194	-
2.5	r.m.	0.7	1.8	12.9	254	-
4	r.m.	0.7	1.8	14.4	347	-
6	r.m.	0.7	1.8	15.9	464	-
10	r.m.	0.7	1.8	18.4	695	-
16	r.m.	0.7	1.8	20.8	1033	514
25	c.c.	0.9	1.8	25.2	1578	758
35	c.c.	0.9	1.8	28.4	2107	962
50	c.c.	1.0	1.9	32.3	2790	1267
70	c.c.	1.1	2.1	37.8	3930	1728
95	c.c.	1.1	2.2	42.8	5317	2264

Note : r.m. - circular stranded, c.c. - compacted circular stranded, s.m. - shaped stranded

XLPE INSULATED ARMOURED PVC SHEATHED CABLE 0.6 / 1 (1.2) kV





DESCRIPTION

Single core and multi-core cables with copper or aluminium conductor, XLPE insulated, armoured and PVC sheathed. Cables are rated at 0.6 / 1 (1.2) kV and conform to IEC 60502.

CONSTRUCTION

Conductor

Plain circular, compacted or shaped stranded copper or aluminium conductor, conform to IEC 60228 class 2.

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C.

Colours for core indentification

Single core - natural (black on request)
Two core - red, black
Three core - red, yellow and blue
Four core - red, yellow, blue and black
Five core - red, yellow, blue, black and green/yellow

Assembly

Two, three, four or five insulated conductors are laid up together, if necessary filled with non- hygroscopic material compatible with the insulation and covered with a layer of PVC bedding which may be an integral part of the filling.

Armour

Single Core - Aluminium wire shall be applied over the PVC bedding
Multi Cores - Galvanized steel wire shall be applied over the PVC bedding.

Sheath

PVC type ST2 to IEC 60502 colour black.

APPLICATIONS

These cables are most suitable for underground burial where there is a risk of mechanical damage.

NOTE : Cables complying with BS5467 and customer's specification are available upon request.

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/PVC/AWA/PVC CABLE 0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of aluminium wire	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
						Copper	Aluminium
mm^2		mm	mm	mm	mm	Kg / Km	Kg / Km
16	c.c.	0.7	0.9	1.8	13.6	357	255
25	c.c.	0.9	0.9	1.8	15.2	482	323
35	c.c.	0.9	0.9	1.8	16.4	597	375
50	c.c.	1.0	1.25	1.8	18.5	788	487
70	c.c.	1.1	1.25	1.8	20.4	1032	598
95	c.c.	1.1	1.25	1.8	22.1	1319	718
120	c.c.	1.2	1.6	1.8	25.1	1657	892
150	c.c.	1.4	1.6	1.8	26.9	1960	1048
185	c.c.	1.6	1.6	1.8	29.1	2375	1205
240	c.c.	1.7	1.6	1.9	31.9	3004	1467
300	c.c.	1.8	1.6	1.9	34.4	3655	1722
400	c.c.	2.0	2.0	2.1	39.2	4725	2245
500	c.c.	2.2	2.0	2.2	42.8	5837	2686
630	c.c.	2.4	2.0	2.3	47.1	7326	3271
800	c.c.	2.6	2.5	2.5	52.2	9376	4239
1000	r.m.	2.8	2.5	2.7	60.9	11799	5255

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - TWO CORES CU/XLPE/PVC/SWA/PVC CABLE 0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of steel wire	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
						Copper	Aluminium
mm^2		mm	mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	0.9	1.8	13.5	348	-
2.5	r.m.	0.7	0.9	1.8	14.3	394	-
4	r.m.	0.7	0.9	1.8	15.4	464	-
6	r.m.	0.7	0.9	1.8	16.5	544	467
10	r.m.	0.7	1.25	1.8	19.1	805	676
16	c.c.	0.7	1.25	1.8	21.0	1000	773
25	c.c.	0.9	1.6	1.8	25.0	1489	1133
35	c.c.	0.9	1.6	1.8	27.3	1804	1322
50	s.m.	1.0	1.6	1.8	26.1	1910	1302
70	s.m.	1.1	1.6	2.0	29.5	2489	1609
95	s.m.	1.1	2.0	2.1	33.6	3410	2190
120	s.m.	1.2	2.0	2.2	36.5	4053	2503
150	s.m.	1.4	2.0	2.3	39.7	4789	2926
185	s.m.	1.6	2.5	2.5	46	6186	3809
240	s.m.	1.7	2.5	2.7	50.5	7645	4119
300	s.m.	1.8	2.5	2.8	54.9	9205	5276
400	s.m.	2.0	2.5	3.1	60.6	11356	6295

Note : r.m. - circular stranded, c.c. - compacted circular stranded, s.m. - shaped stranded

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/PVC/SWA/PVC CABLE 0.6 /1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of steel wire	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
						Copper	Aluminium
mm^2		mm	mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	0.9	1.8	13.9	379	-
2.5	r.m.	0.7	0.9	1.8	14.8	437	-
4	r.m.	0.7	0.9	1.8	16.0	525	-
6	r.m.	0.7	0.9	1.8	17.2	628	512
10	r.m.	0.7	1.25	1.8	19.9	937	743
16	c.c.	0.7	1.25	1.8	21.9	1191	860
25	c.c.	0.9	1.6	1.8	26.2	1791	1273
35	c.c.	0.9	1.6	1.8	28.7	2201	1494
50	s.m.	1.0	1.6	1.9	29.5	2563	1650
70	s.m.	1.1	2.0	2.0	34.5	3637	2137
95	s.m.	1.1	2.0	2.2	38.2	4622	2791
120	s.m.	1.2	2.0	2.3	41.6	5557	3232
150	s.m.	1.4	2.5	2.5	48.0	7100	4305
185	s.m.	1.6	2.5	2.6	52.4	8493	4940
240	s.m.	1.7	2.5	2.8	58.2	10684	5995
300	s.m.	1.8	2.5	3.0	63.2	12865	6972
400	s.m.	2.0	2.5	3.2	69.7	15936	8344

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - FOUR CORES CU/XLPE/PVC/SWA/PVC CABLE 0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of steel wire	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
						Copper	Aluminium
mm^2		mm	mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	0.9	1.8	14.7	423	-
2.5	r.m.	0.7	0.9	1.8	15.7	496	-
4	r.m.	0.7	0.9	1.8	17.0	602	-
6	r.m.	0.7	1.25	1.8	19.1	845	691
10	r.m.	0.7	1.25	1.8	21.4	1104	846
16	c.c.	0.7	1.6	1.8	24.2	1566	1133
25	c.c.	0.9	1.6	1.8	28.2	2152	1473
35	c.c.	0.9	1.6	1.9	31.2	2692	1752
50	s.m.	1.0	1.6	2.0	32.7	3233	2015
70	s.m.	1.1	2.0	2.2	38.4	4605	2845
95	s.m.	1.1	2.0	2.3	42.5	5878	3436
120	s.m.	1.2	2.5	2.5	49.0	7621	4521
150	s.m.	1.4	2.5	2.6	53.3	8990	5201
185	s.m.	1.6	2.5	2.8	58.5	10910	6156
240	s.m.	1.7	2.5	3.0	65.0	13722	7470
300	s.m.	1.8	2.5	3.2	70.9	16610	8752
400	s.m.	2.0	3.15	3.5	80.2	21662	11539

Note : r.m. - circular stranded, c.c. - compacted circular stranded, s.m. - shaped stranded

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - FOUR CORES WITH REDUCED NEUTRAL CU/XLPE/PVC/SWA/PVC CABLE 0.6 / 1 (1.2) kV.

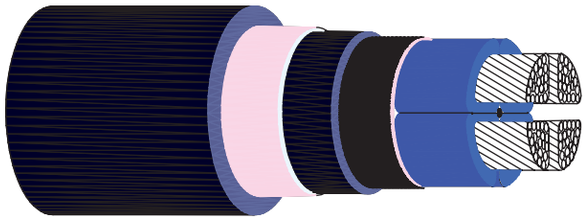
Phase		Neutral		Phase	Neutral	Nominal diameter of steel wire	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
Nominal cross-sectional area	Conductor Shape	Nominal cross-sectional area	Conductor Shape	Nominal Thickness of insulation					Copper	Aluminium
mm^2		mm^2		mm	mm	mm	mm	mm	Kg / Km	Kg / Km
25	c.c.	16	c.c.	0.9	0.7	1.6	1.8	27.4	2007	1295
35	c.c.	16	c.c.	0.9	0.7	1.6	1.9	29.7	2414	1640
50	s.m.	25	c.c.	1.0	0.9	1.6	2.0	32.7	3016	1888
70	s.m.	35	c.c.	1.1	0.9	2.0	2.2	38.4	4283	2790
95	s.m.	50	c.c.	1.1	1.0	2.0	2.3	42.5	5427	3290
120	s.m.	70	c.c.	1.2	1.1	2.5	2.5	49.0	7125	4255
150	s.m.	70	c.c.	1.4	1.1	2.5	2.6	53.9	8465	4405
185	s.m.	95	c.c.	1.6	1.1	2.5	2.8	58.5	10055	5770
240	s.m.	120	c.c.	1.7	1.2	2.5	3.0	65.0	12571	6905
300	s.m.	150	c.c.	1.8	1.4	2.5	3.2	70.9	15193	7985
400	s.m.	185	c.c.	2.0	1.6	3.15	3.5	80.4	19789	10945

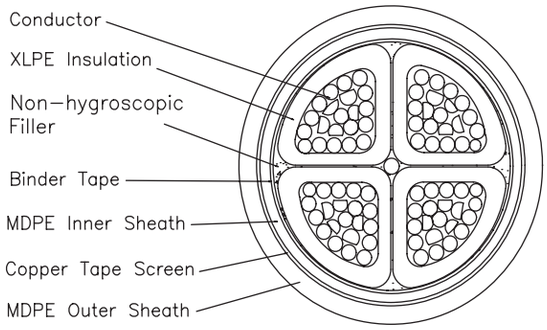
XLPE INSULATED ARMOURED PVC SHEATHED CABLE - FIVE CORES CU/XLPE/PVC/SWA/PVC CABLE 0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of steel wire	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
						Copper	Aluminium
mm^2		mm	mm	mm	mm	Kg / Km	Kg / Km
1.5	r.m.	0.7	0.9	1.8	15.6	471	-
2.5	r.m.	0.7	0.9	1.8	16.7	556	-
4	r.m.	0.7	1.25	1.8	18.9	794	-
6	r.m.	0.7	1.25	1.8	20.4	953	777
10	r.m.	0.7	1.25	1.8	22.9	1260	960
16	c.c.	0.7	1.6	1.8	26.0	1827	1286
25	c.c.	0.9	1.6	1.8	30.0	2528	1692
35	c.c.	0.9	1.6	1.9	33.8	3194	2034
50	c.c.	1.0	2.0	2.1	39.1	4342	2811
70	c.c.	1.1	2.0	2.3	44.6	5741	3504
95	c.c.	1.1	2.5	2.4	52.0	7835	4772

Note : r.m. - circular stranded, c.c. - compacted circular stranded, s.m. - shaped stranded

XLPE INSULATED, PE INNER SHEATH, SCREENED AND PE SHEATHED UNDERGROUND CABLE 0.6 / 1 (1.2) kV





DESCRIPTION

Circular compacted and shaped stranded aluminium conductor, XLPE insulated, four cores assembled together with non-hygroscopic filler, extruded with PE inner sheath, copper tape screened and followed by an extruded PE outer sheath. Cables are rated at 0.6/1 (1.2) kV and conform to IEC 60502.

CONSTRUCTION

Conductor

Plain compacted or shaped stranded aluminium conductor, conform to IEC 60228 class 2

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C

Colours for core indentification

Four Core - red, yellow, blue, and black

Assembly

Four insulated conductors are laid up together, if necessary filled with non-hygroscopic material compatible with the insulation and inner sheath materials.

Inner Sheath

Medium density polyetylene (MDPE)

Metallic Screen

Copper tape screen (SCT)

Sheath

Medium density polyethylene (MDPE)

APPLICATIONS

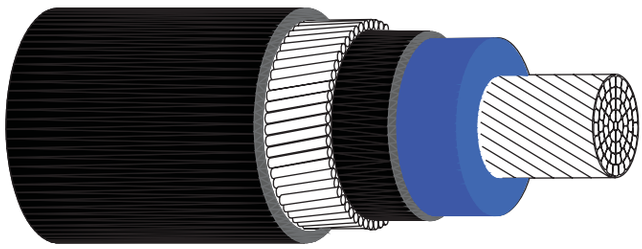
These cables are designated for general use including underground burial, where they are not likely to suffer mechanical damage.

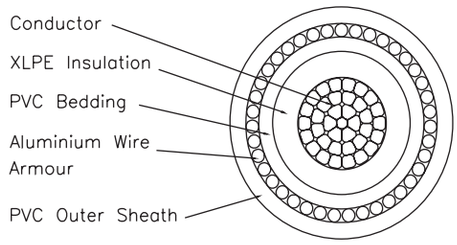
XLPE INSULATED SCREENED PE SHEATHED CABLE
- FOUR CORES AL/XLPE/MDPE/SCT/MDPE CABLE (WITH COPPER TAPE SCREENED)
0.6 / 1 (1.2) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of PE inner sheath	Metallic Screening	Nominal thickness of PE outer sheath	Approximate overall diameter	Approximate weight of cable
				Approximate thickness of copper tape			Aluminium
mm^2		mm	mm	mm	mm	mm	kg/mm
16	c.c.	0.7	1.0	0.2	1.8	21.4	538
25	c.c.	0.9	1.0	0.2	1.8	25.4	758
35	c.c.	0.9	1.0	0.2	1.8	28.1	943
50	s.m.	1.0	1.0	0.2	1.9	30.2	1139
70	s.m.	1.1	1.2	0.2	2.0	34.9	1532
95	s.m.	1.1	1.2	0.2	2.2	39.2	1960
120	s.m.	1.2	1.4	0.2	2.3	43.5	2417
150	s.m.	1.4	1.4	0.2	2.5	48.0	2923
185	s.m.	1.6	1.4	0.2	2.6	53.0	3575
240	s.m.	1.7	1.6	0.2	2.8	59.5	4534
300	s.m.	1.8	1.6	0.2	3.0	65.4	5516
400	s.m.	2.0	1.8	0.2	3.3	73.4	6945

Note : c.c. - compacted circular stranded, s.m. - shaped stranded

XLPE INSULATED ARMOURED PVC SHEATHED CABLE 1.9 / 3.3 (3.6) kV





DESCRIPTION

Single core and multi-core cables with copper or aluminium conductor, XLPE insulated, armoured and PVC sheathed. Cables are rated at 1.9 / 3.3 (3.6) kV and conform to IEC 60502.

CONSTRUCTION

Conductor

Plain circular, compacted stranded copper or aluminium conductor, conform to IEC 60228 class 2

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C

Colours for core indentification

Single core - Natural
Three core - red, yellow, and blue

Assembly

Three insulated conductors are laid up together, if necessary, filled with non-hygroscopic material compatible with the insulation and covered with layer of PVC bedding which may be an integral part of the filling

Armour

Single Core - Aluminium wire shall be applied over the PVC bedding
Multi Cores - Galvanized steel wire shall be applied over the PVC bedding.

Sheath

PVC type ST2 to IEC 60502 colour black

APPLICATIONS

These cables are most suitable for underground burial where there is a risk of mechanical damage

NOTE : Cables complying with BS5467 and customer's specification are available upon request.

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/PVC/AWA/PVC CABLE 1.9 / 3.3 (3.6) kV.

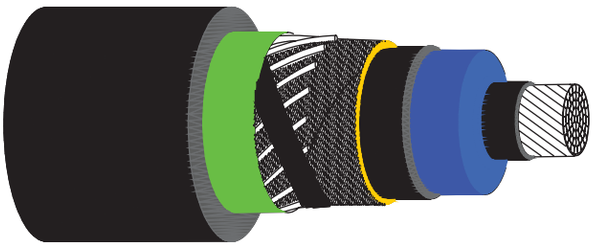
Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of aluminium wire	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
						Copper	Aluminium
mm^2		mm	mm	mm	mm	Kg / Km	Kg / Km
10	r.m.	2.0	0.9	1.8	15.5	367	304
16	c.c.	2.0	0.9	1.8	16.2	439	339
25	c.c.	2.0	1.25	1.8	18.1	598	439
35	c.c.	2.0	1.25	1.8	19.3	720	499
50	c.c.	2.0	1.25	1.8	20.5	867	568
70	c.c.	2.0	1.25	1.8	22.2	1108	676
95	c.c.	2.0	1.6	1.8	24.8	1445	846
120	c.c.	2.0	1.6	1.8	26.2	1714	958
150	c.c.	2.0	1.6	1.8	27.6	2008	1079
185	c.c.	2.0	1.6	1.8	29.4	2404	1238
240	c.c.	2.0	1.6	1.9	31.9	3037	1490
300	c.c.	2.0	1.6	2.0	34.3	3691	1750
400	c.c.	2.0	2.0	2.1	38.4	4708	2226
500	c.c.	2.2	2.0	2.2	41.9	5788	2659
630	c.c.	2.4	2.0	2.3	46.1	7311	3251
800	r.m.	2.6	2.5	2.5	52.2	9390	4197
1000	r.m.	2.8	2.5	2.7	60.9	11799	5252

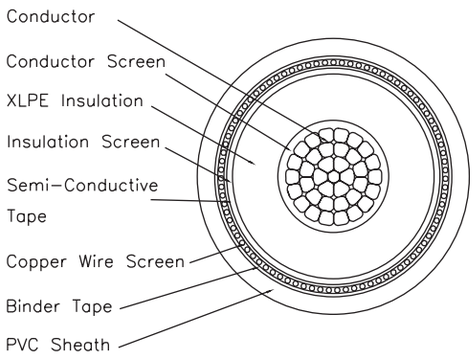
XLPE INSULATED ARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/PVC/SWA/PVC CABLE 1.9 / 3.3 (3.6) kV.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal diameter of steel wire	Nominal thickness of sheath	Approximate overall diameter	Approximate weight of cable	
						Copper	Aluminium
mm^2		mm	mm	mm	mm	Kg / Km	Kg / Km
10	r.m	2.0	1.6	1.8	26.2	1418	1224
16	c.c	2.0	1.6	1.8	27.8	1678	1371
25	c.c	2.0	1.6	1.9	30.7	2116	1629
35	c.c	2.0	1.6	1.9	33.2	2540	1865
50	c.c	2.0	2.0	2.1	37.8	3422	2508
70	c.c	2.0	2.0	2.2	41.6	4293	2972
95	c.c	2.0	2.0	2.3	44.8	5273	3441
120	c.c	2.0	2.0	2.4	50.6	6731	4416
150	c.c	2.0	2.5	2.5	53.8	7768	4924
185	c.c	2.0	2.5	2.7	57.9	9192	5625
240	c.c	2.0	2.5	2.8	63.6	11472	6738
300	c.c	2.0	2.5	3.0	68.8	13711	7773
400	c.c	2.0	2.5	3.2	75.0	16756	9161

Note : r.m. - circular stranded, c.c. - compacted circular stranded

SINGLE CORE - XLPE INSULATED UNARMOURED PVC SHEATHED CABLE FOR VOLTAGES 6.6 KV UP TO AND INCLUDING 33KV TO IEC 60502





DESCRIPTION

Circular compacted stranded copper or aluminium conductor, XLPE insulated, with copper wire or copper tape screen and PVC outer sheath.

CONSTRUCTION

Conductor

Plain circular compacted stranded copper or aluminium conductor to IEC 60228 class 2.

Conductor Screen

Extruded layer of semiconductive compound.

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C

Insulation screen
Non-metallic part

Extruded layer of semiconductive compound.

Metallic Part

Copper wire screen (SCW) or Copper tape screen (SCT)

Outer sheath

PVC type ST2 to IEC 60502 colour black

APPLICATIONS

For installation on trays, ducts or direct burial

NOTE : Cables Complying With BS 6622 And Customer's Specification Are Available Upon Request

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCW/PVC CABLE (WITH COPPER WIRE SCREENED) 3.8 / 6.6 (7.2) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Nominal cross-sectional area of metallic screen	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
						Copper	Aluminium
mm^2	mm	mm	mm^2	mm	mm	Kg / Km	Kg / Km
16	4.6	3.0	16	1.5	19	560	460
25	5.8	3.0	16	1.5	20	672	513
35	7.0	3.0	16	1.6	21	794	574
50	8.1	3.0	16	1.6	22	933	635
70	9.7	3.0	16	1.7	24	1174	743
95	11.5	3.0	16	1.7	26	1456	858
120	12.9	3.0	16	1.8	28	1729	973
150	14.3	3.0	25	1.8	29	2095	1167
185	16.1	3.0	25	1.9	31	2492	1328
240	18.4	3.0	25	2.0	34	3113	1567
300	20.6	3.0	25	2.0	36	3735	1796
400	23.3	3.0	35	2.2	39	4712	2232
500	26.2	3.2	35	2.3	42	5765	2638
630	29.8	3.2	35	2.4	46	7231	3158
800	33.7	3.2	50	2.5	50	9128	3940

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 3.8 / 6.6 (7.2) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.0	0.1	1.5	16	424	324
25	5.8	3.0	0.1	1.5	18	539	380
35	7.0	3.0	0.1	1.6	19	663	443
50	8.1	3.0	0.1	1.6	20	805	506
70	9.7	3.0	0.1	1.7	22	1049	618
95	11.5	3.0	0.1	1.7	24	1335	737
120	12.9	3.0	0.1	1.8	25	1610	855
150	14.3	3.0	0.1	1.8	27	1897	968
185	16.1	3.0	0.1	1.9	29	2297	1132
240	18.4	3.0	0.1	2.0	31	2922	1376
300	20.6	3.0	0.1	2.0	34	3550	1611
400	23.3	3.0	0.1	2.1	36	4422	1942
500	26.2	3.2	0.1	2.2	40	5479	2353
630	29.8	3.2	0.1	2.3	44	6953	2897
800	33.7	3.2	0.1	2.5	49	8741	3553

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCW/PVC CABLE (WITH COPPER WIRE SCREENED) 6.35 / 11 (12) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Nominal cross-sectional area of metallic screen	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
						Copper	Aluminium
mm^2	mm	mm	mm^2	mm	mm	Kg / Km	Kg / Km
16	4.6	3.4	16	1.5	19	583	483
25	5.8	3.4	16	1.6	21	707	548
35	7.0	3.4	16	1.6	22	821	600
50	8.1	3.4	16	1.7	23	972	673
70	9.7	3.4	16	1.7	25	1204	773
95	11.5	3.4	16	1.8	27	1501	903
120	12.9	3.4	16	1.8	28	1763	1007
150	14.3	3.4	25	1.9	30	2145	1217
185	16.1	3.4	25	1.9	32	2530	1366
240	18.4	3.4	25	2.0	34	3153	1608
300	20.6	3.4	25	2.1	37	3796	1857
400	23.3	3.4	35	2.2	40	4760	2280
500	26.2	3.4	35	2.3	43	5790	2664
630	29.8	3.4	35	2.4	47	7259	3203
800	33.7	3.4	50	2.5	51	9159	3971

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 6.35 / 11 (12) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.4	0.1	1.5	17	449	349
25	5.8	3.4	0.1	1.6	19	574	416
35	7.0	3.4	0.1	1.6	20	691	471
50	8.1	3.4	0.1	1.6	21	834	536
70	9.7	3.4	0.1	1.7	23	1081	649
95	11.5	3.4	0.1	1.8	25	1380	782
120	12.9	3.4	0.1	1.8	26	1646	890
150	14.3	3.4	0.1	1.9	28	1947	1019
185	16.1	3.4	0.1	1.9	29	2337	1172
240	18.4	3.4	0.1	2.0	32	2965	1419
300	20.6	3.4	0.1	2.1	34	3612	1673
400	23.3	3.4	0.1	2.2	37	4488	2008
500	26.2	3.4	0.1	2.3	40	5525	2399
630	29.8	3.4	0.1	2.4	45	7003	2947
800	33.7	3.4	0.1	2.5	49	8773	3585

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCW/PVC CABLE (WITH COPPER WIRE SCREENED) 8.7 / 15 (17.5) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Nominal cross-sectional area of metallic screen	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
						Copper	Aluminium
mm^2	mm	mm	mm^2	mm	mm	Kg / Km	Kg / Km
25	5.8	4.5	16	1.7	23	790	632
35	7.0	4.5	16	1.7	24	909	688
50	8.1	4.5	16	1.7	26	1053	754
70	9.7	4.5	16	1.8	27	1303	872
95	11.5	4.5	16	1.8	29	1593	995
120	12.9	4.5	16	1.9	31	1875	1119
150	14.3	4.5	25	1.9	32	2248	1320
185	16.1	4.5	25	2.0	34	2655	1490
240	18.4	4.5	25	2.1	37	3288	1742
300	20.6	4.5	25	2.1	39	3921	1982
400	23.3	4.5	35	2.3	42	4914	2435
500	26.2	4.5	35	2.4	45	5957	2830
630	29.8	4.5	35	2.5	50	7442	3386
800	33.7	4.5	50	2.6	54	9357	4169

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 8.7 / 15 (17.5) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
25	5.8	4.5	0.1	1.6	21	653	494
35	7.0	4.5	0.1	1.7	22	784	563
50	8.1	4.5	0.1	1.7	23	931	632
70	9.7	4.5	0.1	1.8	25	1184	753
95	11.5	4.5	0.1	1.8	27	1479	881
120	12.9	4.5	0.1	1.9	29	1763	1007
150	14.3	4.5	0.1	1.9	30	2056	1127
185	16.1	4.5	0.1	2.0	32	2466	1301
240	18.4	4.5	0.1	2.1	34	3104	1558
300	20.6	4.5	0.1	2.1	37	3742	1803
400	23.3	4.5	0.1	2.2	40	4629	2149
500	26.2	4.5	0.1	2.3	43	5676	2549
630	29.8	4.5	0.1	2.4	47	7168	3112
800	33.7	4.5	0.1	2.6	51	8976	3787

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCW/PVC CABLE (WITH COPPER WIRE SCREENED) 12.7 / 22 (24) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Nominal cross-sectional area of metallic screen	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
						Copper	Aluminium
mm^2	mm	mm	mm^2	mm	mm	Kg / Km	Kg / Km
35	7.0	5.5	16	1.8	27	998	777
50	8.1	5.5	16	1.8	28	1146	847
70	9.7	5.5	16	1.9	30	1403	972
95	11.5	5.5	16	1.9	31	1699	1101
120	12.9	5.5	16	2.0	33	1986	1231
150	14.3	5.5	25	2.0	34	2364	1436
185	16.1	5.5	25	2.1	36	2778	1613
240	18.4	5.5	25	2.1	39	3402	1856
300	20.6	5.5	25	2.2	41	4060	2122
400	23.3	5.5	35	2.3	44	5044	2564
500	26.2	5.5	35	2.4	47	6096	2969
630	29.8	5.5	35	2.5	52	7594	3538
800	33.7	5.5	50	2.7	56	9548	4360

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 12.7 / 22 (24) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
35	7.0	5.5	0.1	1.8	24	877	656
50	8.1	5.5	0.1	1.8	26	1027	729
70	9.7	5.5	0.1	1.8	27	1275	843
95	11.5	5.5	0.1	1.9	29	1588	990
120	12.9	5.5	0.1	2.0	31	1878	1122
150	14.3	5.5	0.1	2.0	32	2176	1247
185	16.1	5.5	0.1	2.1	34	2593	1428
240	18.4	5.5	0.1	2.1	36	3222	1677
300	20.6	5.5	0.1	2.2	39	3886	1947
400	23.3	5.5	0.1	2.3	42	4782	2302
500	26.2	5.5	0.1	2.4	45	5840	2713
630	29.8	5.5	0.1	2.5	49	7348	3291
800	33.7	5.5	0.1	2.6	53	9145	3957

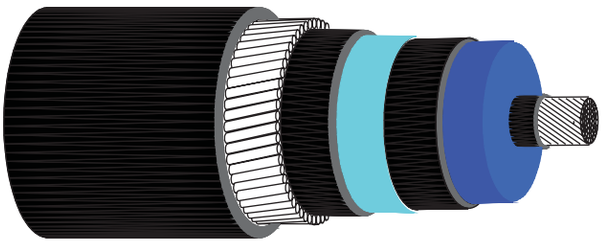
XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCW/PVC CABLE (WITH COPPER WIRE SCREENED) 19 / 33 (36) kV.

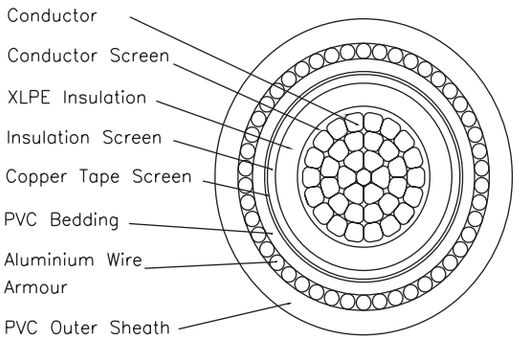
Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Nominal cross-sectional area of metallic screen	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
						Copper	Aluminium
mm^2	mm	mm	mm^2	mm	mm	Kg / Km	Kg / Km
50	8.1	8.0	16	2.0	33	1405	1107
70	9.7	8.0	16	2.0	35	1662	1231
95	11.5	8.0	16	2.1	37	1989	1391
120	12.9	8.0	16	2.1	38	2273	1517
150	14.3	8.0	25	2.2	40	2680	1752
185	16.1	8.0	25	2.2	42	3091	1926
240	18.4	8.0	25	2.3	44	3754	2208
300	20.6	8.0	25	2.4	47	4434	2495
400	23.3	8.0	35	2.5	49	5442	2962
500	26.2	8.0	35	2.6	52	6520	3393
630	29.8	8.0	35	2.7	57	8055	3999
800	33.7	8.0	50	2.8	61	10018	4830

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 19 / 33 (36) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
50	8.1	8.0	0.1	2.0	31	1297	999
70	9.7	8.0	0.1	2.0	33	1558	1127
95	11.5	8.0	0.1	2.1	35	1888	1290
120	12.9	8.0	0.1	2.1	36	2176	1420
150	14.3	8.0	0.1	2.2	38	2502	1574
185	16.1	8.0	0.1	2.2	39	2917	1752
240	18.4	8.0	0.1	2.3	42	3585	2039
300	20.6	8.0	0.1	2.4	44	4269	2330
400	23.3	8.0	0.1	2.5	47	5190	2710
500	26.2	8.0	0.1	2.6	50	6274	3148
630	29.8	8.0	0.1	2.7	55	7819	3763
800	33.7	8.0	0.1	2.8	59	9651	4463

SINGLE CORE - XLPE INSULATED ARMOURED PVC SHEATHED CABLE FOR VOLTAGES 6.6 kV UP TO AND INCLUDING 33kV TO IEC 60502





DESCRIPTION

Circular compacted stranded copper or aluminium conductor, XLPE insulated, with copper wire or copper tape screen and PVC outer sheath.

CONSTRUCTION

Conductor

Plain circular compacted stranded copper or aluminium conductor to IEC 60228 class 2.

Conductor Screen

Extruded layer of semiconductive compound.

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C

Insulation screen
Non-metallic part

Extruded layer of semiconductive compound

Metallic Part

Copper tape screen (SCT)

Bedding

Extruded layer of PVC ST2 compound

Armour

Aluminium wires shall be applied helically over the PVC bedding.

Outer sheath

PVC type ST2 to IEC 60502 colour black

APPLICATIONS

For installation on trays, ducts or direct burial

NOTE : Cables Complying With BS 6622 And Customer's Specification Are Available Upon Request.

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC/AWA/PVC CABLE (WITH COPPER TAPE SCREENED) 3.8 / 6.6 (7.2) kV.

Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of aluminium wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.0	0.1	1.6	1.8	23	782	682
25	5.8	3.0	0.1	1.6	1.8	24	919	760
35	7.0	3.0	0.1	1.6	1.8	25	1054	834
50	8.1	3.0	0.1	1.6	1.8	27	1218	920
70	9.7	3.0	0.1	1.6	1.9	28	1495	1064
95	11.5	3.0	0.1	1.6	1.9	30	1811	1213
120	12.9	3.0	0.1	1.6	2.0	32	2115	1359
150	14.3	3.0	0.1	2.0	2.1	34	2528	1599
185	16.1	3.0	0.1	2.0	2.1	36	2946	1782
240	18.4	3.0	0.1	2.0	2.2	38	3630	2084
300	20.6	3.0	0.1	2.0	2.2	41	4301	2363
400	23.3	3.0	0.1	2.0	2.4	44	5255	2775
500	26.2	3.2	0.1	2.5	2.5	48	6560	3434
630	29.8	3.2	0.1	2.5	2.6	52	8168	4074
800	33.7	3.2	0.1	2.5	2.7	57	10030	4822

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC/AWA/PVC CABLE (WITH COPPER TAPE SCREENED) 6.35 / 11 (12) kV.

Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of aluminium wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.4	0.1	1.6	1.8	24	822	722
25	5.8	3.4	0.1	1.6	1.8	25	961	802
35	7.0	3.4	0.1	1.6	1.8	26	1098	878
50	8.1	3.4	0.1	1.6	1.8	27	1261	963
70	9.7	3.4	0.1	1.6	1.9	29	1541	1109
95	11.5	3.4	0.1	1.6	2.0	31	1874	1276
120	12.9	3.4	0.1	2.0	2.0	33	2247	1491
150	14.3	3.4	0.1	2.0	2.1	35	2581	1652
185	16.1	3.4	0.1	2.0	2.1	37	3001	1837
240	18.4	3.4	0.1	2.0	2.2	39	3688	2142
300	20.6	3.4	0.1	2.0	2.3	42	4382	2443
400	23.3	3.4	0.1	2.5	2.4	46	5524	3003
500	26.2	3.4	0.1	2.5	2.5	48	6590	3464
630	29.8	3.4	0.1	2.5	2.6	53	8201	4145
800	33.7	3.4	0.1	2.5	2.8	58	10132	4944

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC/AWA/PVC CABLE (WITH COPPER TAPE SCREENED) 8.75 / 15 (17.5) kV.

Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of aluminium wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
25	5.8	4.5	0.1	1.6	1.8	27	1080	921
35	7.0	4.5	0.1	1.6	1.9	29	1234	1014
50	8.1	4.5	0.1	1.6	1.9	30	1401	1103
70	9.7	4.5	0.1	1.6	2.0	32	1688	1257
95	11.5	4.5	0.1	2.0	2.1	34	2111	1513
120	12.9	4.5	0.1	2.0	2.1	36	2412	1656
150	14.3	4.5	0.1	2.0	2.2	37	2752	1824
185	16.1	4.5	0.1	2.0	2.2	39	3188	2024
240	18.4	4.5	0.1	2.0	2.3	42	3875	2330
300	20.6	4.5	0.1	2.0	2.4	44	4579	2640
400	23.3	4.5	0.1	2.5	2.5	48	5709	3229
500	26.2	4.5	0.1	2.5	2.6	51	6849	3723
630	29.8	4.5	0.1	2.5	2.7	56	8456	4400
800	33.7	4.5	0.1	2.5	2.8	60	10362	5174

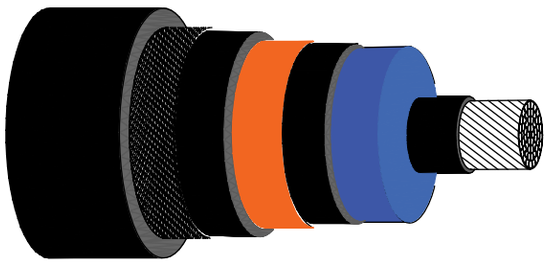
XLPE INSULATED ARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC/AWA/PVC CABLE (WITH COPPER TAPE SCREENED) 12.7 / 22 (24) kV.

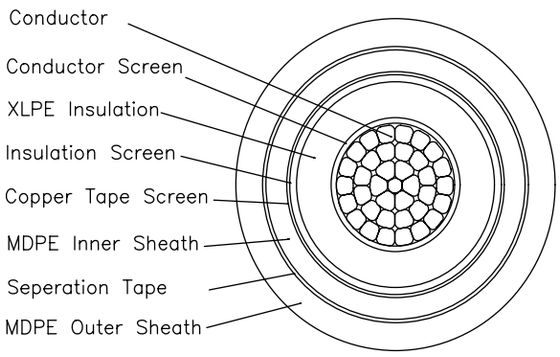
Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of aluminium wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
35	7.0	5.5	0.1	1.6	1.9	31	1352	1131
50	8.1	5.5	0.1	2.0	2.0	33	1615	1317
70	9.7	5.5	0.1	2.0	2.1	35	1910	1478
95	11.5	5.5	0.1	2.0	2.1	36	2251	1653
120	12.9	5.5	0.1	2.0	2.2	38	2573	1818
150	14.3	5.5	0.1	2.0	2.2	39	2900	1972
185	16.1	5.5	0.1	2.0	2.3	41	3352	2187
240	18.4	5.5	0.1	2.0	2.4	44	4057	2512
300	20.6	5.5	0.1	2.5	2.5	47	4945	3006
400	23.3	5.5	0.1	2.5	2.6	50	5912	3432
500	26.2	5.5	0.1	2.5	2.7	54	7064	3938
630	29.8	5.5	0.1	2.5	2.8	58	8711	4655
800	33.7	5.5	0.1	2.5	2.9	62	10623	5435

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - SINGLE CORE CU/XLPE/SCT/PVC/AWA/PVC CABLE (WITH COPPER TAPE SCREENED) 19/33 (36) kV

Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of aluminium wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
50	8.1	8.0	0.1	2.0	2.2	38	1993	1695
70	9.7	8.0	0.1	2.0	2.2	40	2293	1863
95	11.5	8.0	0.1	2.0	2.3	42	2659	2061
120	12.9	8.0	0.1	2.0	2.4	43	2996	2240
150	14.3	8.0	0.1	2.5	2.4	46	3498	2570
185	16.1	8.0	0.1	2.5	2.5	48	3979	2814
240	18.4	8.0	0.1	2.5	2.6	50	4714	3169
300	20.6	8.0	0.1	2.5	2.6	53	5462	3523
400	23.3	8.0	0.1	2.5	2.8	56	6480	4000
500	26.2	8.0	0.1	2.5	2.9	59	7662	4536
630	29.8	8.0	0.1	2.5	3.0	64	9362	5306
800	33.7	8.0	0.1	2.5	3.1	68	11300	6112

SINGLE CORE - XLPE INSULATED UNARMOURED PE INNER AND OUTER SHEATH CABLE FOR VOLTAGES 6.35 / 11 (12) kV AND 12.7 / 22 (24) kV





DESCRIPTION

Circular compacted stranded aluminium conductor, XLPE insulated, with copper tape screened, extruded with PE inner sheath and followed by an extruded PE outer sheath. Complies with Tenaga National Berhad (TNB) specification.

CONSTRUCTION

Conductor

Plain circular compacted stranded aluminium conductor to IEC 60228 class 2.

Conductor Screen

Extruded layer of semiconductive compound.

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C

Insulation screen
Non-metallic part

Extruded layer of semiconductive compound.

Metallic Part

Copper tape screen (SCT)

Inner sheath

MDPE types ST_7 to IEC 60502 colour black

Outer sheath

MDPE types ST_7 to IEC 60502 colour black containing an effective termite repellent.

APPLICATIONS

These cables are generally suitable for direct burial or for installation on trays or ducts.

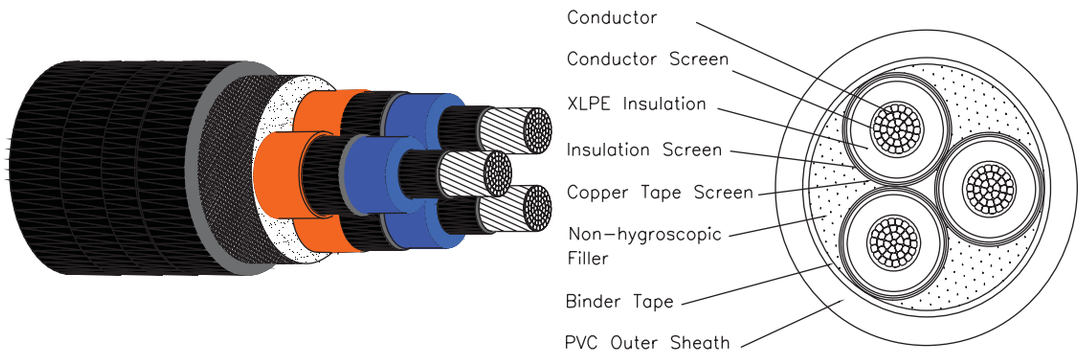
XLPE INSULATED UNARMOURED PE INNER AND OUTER SHEATH CABLE - SINGLE CORE AL/XLPE/SCT/MDPE/MDPE CABLE (WITH COPPER TAPE SCREENED) 6.35 / 11 (12) KV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PE inner sheath	Nominal thickness of PE outer sheath	Approximate overall diameter of cable	Approximate weight of cable
			Approximate thickness of copper tape				Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.4	0.2	2.5	1.8	24	558
25	5.8	3.4	0.2	2.5	1.8	25	629
35	7.0	3.4	0.2	2.5	1.8	26	695
50	8.1	3.4	0.2	2.5	1.8	27	772
70	9.7	3.4	0.2	2.5	1.8	29	891
95	11.5	3.4	0.2	2.5	1.8	30	1029
120	12.9	3.4	0.2	2.5	1.8	32	1151
150	14.3	3.4	0.2	2.5	1.9	33	1289
185	16.1	3.4	0.2	2.5	1.9	35	1458
240	18.4	3.4	0.2	2.5	2.0	38	1722
300	20.6	3.4	0.2	2.5	2.1	40	1991
400	23.3	3.4	0.2	2.5	2.2	43	2346
500	26.2	3.4	0.2	2.5	2.3	46	2755
630	29.8	3.4	0.2	2.5	2.4	51	3332
800	33.7	3.4	0.2	2.5	2.5	55	3995

XLPE INSULATED UNARMOURED PE INNER AND OUTER SHEATH CABLE - SINGLE CORE AL/XLPE/SCT/MDPE/MDPE CABLE (WITH COPPER TAPE SCREENED) 12.7 / 22 (24) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PE inner sheath	Nominal thickness of PE outer sheath	Approximate overall diameter of cable	Approximate weight of cable
			Approximate thickness of copper tape				Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	5.5	0.2	2.5	1.8	28	749
25	5.8	5.5	0.2	2.5	1.8	29	827
35	7.0	5.5	0.2	2.5	1.8	30	900
50	8.1	5.5	0.2	2.5	1.8	31	983
70	9.7	5.5	0.2	2.5	1.9	33	1123
95	11.5	5.5	0.2	2.5	1.9	35	1272
120	12.9	5.5	0.2	2.5	2.0	36	1414
150	14.3	5.5	0.2	2.5	2.0	38	1551
185	16.1	5.5	0.2	2.5	2.1	40	1743
240	18.4	5.5	0.2	2.5	2.2	42	2025
300	20.6	5.5	0.2	2.5	2.2	45	2297
400	23.3	5.5	0.2	2.5	2.3	47	2670
500	26.2	5.5	0.2	2.5	2.4	51	3099
630	29.8	5.5	0.2	2.5	2.5	55	3704
800	33.7	5.5	0.2	2.5	2.7	59	4411

THREE CORES - XLPE INSULATED UNARMOURED PVC SHEATHED CABLE FOR VOLTAGES 6.6 kV UP TO AND INCLUDING 33 kV TO IEC 60502



DESCRIPTION

Circular compacted stranded copper or aluminium conductor, XLPE insulated, copper tape screened, three cores assembled together with non-hygroscopic polypropylene fillers and extruded with PVC outer sheath.

CONSTRUCTION

Conductor

Plain circular compacted stranded copper or aluminium conductor to IEC 60228 class 2.

Conductor Screen

Extruded layer of semiconductive compound.

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C

Insulation screen
Non-metallic part

Extruded layer of semiconductive compound.

Metallic Part

Copper tape screen (SCT)

Colour for core indentification

Red, yellow and blue tapes shall be applied between non metallic and metallic part of insulation screen.

Assembly

Three screened cores are laid up together, if necessary filled with non-hygroscopic material compatible with insulation and covered with a layer of PVC sheath

Outer sheath

PVC types ST2 IEC 60502 colour black

APPLICATIONS

These cables are generally suitable for direct burial or for installation on trays or ducts. Where there is a risk of mechanical damage, armoured cables should be used.

NOTE: Cables complying with BS 6622 and customer's specification are available upon request.

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 3.8 / 6.6 (7.2) kV

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.0	0.1	2.1	33	1393	1086
25	5.8	3.0	0.1	2.1	35	1769	1282
35	7.0	3.0	0.1	2.2	38	2162	1487
50	8.1	3.0	0.1	2.3	41	2640	1728
70	9.7	3.0	0.1	2.4	44	3417	2097
95	11.5	3.0	0.1	2.6	49	4385	2555
120	12.9	3.0	0.1	2.7	52	5263	2950
150	14.3	3.0	0.1	2.8	55	6211	3371
185	16.1	3.0	0.1	2.9	59	7485	3922
240	18.4	3.0	0.1	3.1	65	9506	4777
300	20.6	3.0	0.1	3.2	70	11556	5623
400	23.3	3.0	0.1	3.4	76	14372	6783

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 6.35 / 11 (12) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.4	0.1	2.1	35	1484	1178
25	5.8	3.4	0.1	2.2	37	1883	1397
35	7.0	3.4	0.1	2.3	40	2284	1609
50	8.1	3.4	0.1	2.4	43	2769	1856
70	9.7	3.4	0.1	2.5	46	3557	2237
95	11.5	3.4	0.1	2.6	50	4513	2683
120	12.9	3.4	0.1	2.7	54	5398	3085
150	14.3	3.4	0.1	2.8	57	6354	3513
185	16.1	3.4	0.1	3.0	61	7666	4102
240	18.4	3.4	0.1	3.1	66	9670	4941
300	20.6	3.4	0.1	3.3	71	11765	5833
400	23.3	3.4	0.1	3.5	78	14598	7010

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 8.7 / 15 (17.5) kV.

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
25	5.8	4.5	0.1	2.4	43	2213	1727
35	7.0	4.5	0.1	2.5	45	2633	1958
50	8.1	4.5	0.1	2.6	48	3137	2224
70	9.7	4.5	0.1	2.7	52	3953	2633
95	11.5	4.5	0.1	2.8	55	4937	3107
120	12.9	4.5	0.1	2.9	59	5845	3533
150	14.3	4.5	0.1	3.0	62	6826	3985
185	16.1	4.5	0.1	3.1	66	8137	4574
240	18.4	4.5	0.1	3.3	71	10212	5482
300	20.6	4.5	0.1	3.4	76	12308	6376
400	23.3	4.5	0.1	3.7	83	15223	7635

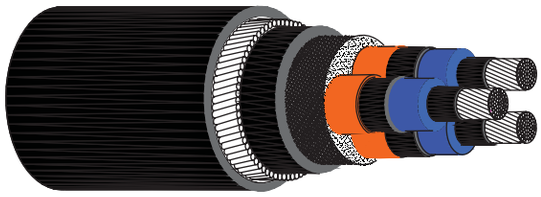
XLPE INSULATED UNARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED) 12.7 / 22 (24) kV

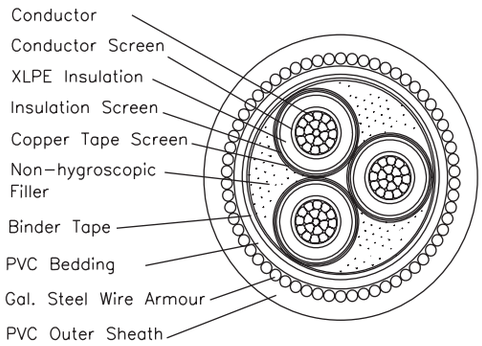
Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
35	7.0	5.5	0.1	2.6	50	2963	2288
50	8.1	5.5	0.1	2.7	52	3483	2570
70	9.7	5.5	0.1	2.8	56	4323	3003
95	11.5	5.5	0.1	3.0	60	5360	3530
120	12.9	5.5	0.1	3.1	64	6292	3980
150	14.3	5.5	0.1	3.2	67	7293	4453
185	16.1	5.5	0.1	3.3	71	8631	5067
240	18.4	5.5	0.1	3.4	76	10706	5976
300	20.6	5.5	0.1	3.6	81	12872	6939
400	23.3	5.5	0.1	3.8	87	15789	8201

XLPE INSULATED UNARMOURED PVC SHEATHED CABLE
- THREE CORES CU/XLPE/SCT/PVC CABLE (WITH COPPER TAPE SCREENED)
19 / 33 (36) kV

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape			Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
50	8.1	8.0	0.1	3.1	64	4521	3608
70	9.7	8.0	0.1	3.2	68	5420	4100
95	11.5	8.0	0.1	3.3	72	6494	4664
120	12.9	8.0	0.1	3.4	75	7478	5165
150	14.3	8.0	0.1	3.5	78	8530	5689
185	16.1	8.0	0.1	3.7	82	9970	6406
240	18.4	8.0	0.1	3.8	88	12131	7401
300	20.6	8.0	0.1	4.0	93	14380	8448
400	23.3	8.0	0.1	4.2	99	17402	9814

THREE CORES - XLPE INSULATED ARMOURED PVC SHEATHED CABLE FOR VOLTAGES 6.6 kV UP TO AND INCLUDING 33 kV TO IEC 60502





DESCRIPTION

Circular compacted stranded copper or aluminium conductor, XLPE insulated copper tape screened, three cores assembled together with non-hygroscopic polypropylene fillers, covered with extruded PVC bedding, armoured and PVC outer sheath.

CONSTRUCTION

Conductor

Plain circular compacted stranded copper or aluminium conductor to IEC 60228 class 2.

Conductor screen

Extruded layer of semiconductive compound.

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C

Insulation screen

Non-metallic part

Extruded layer of semiconductive compound.

Metallic Part

Copper tape screen (SCT)

Colour for core indentification

Red, Yellow, and blue tapes shall be applied between non metallic and metallic part of insulation screen.

Assembly

Three screened cores are laid up together, if necessary filled with non-hygroscopic material compatible with insulation and covered with a layer of PVC sheath.

Bedding

Extruded layer of PVC ST2 compound

Armour

Galvanized steel wires shall be applied helically over the PVC bedding.

Outer sheath

PVC types ST2 to IEC 60502 colour black.

APPLICATIONS

These cables are generally suitable for direct burial or for installation on trays or ducts. Where there is a risk of mechanical damage, armoured cables should be used.

NOTE: Cables complying with BS 6622 and customer's specification are available upon request. Galvanized steel tapes applied helically over the PVC bedding is available upon request.

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC/SWA/PVC CABLE (WITH COPPER TAPE SCREENED) 3.8 / 6.6 (7.2) kV

Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of steel wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.0	0.1	2.0	2.3	40	2982	2675
25	5.8	3.0	0.1	2.5	2.4	44	3889	3403
35	7.0	3.0	0.1	2.5	2.5	47	4434	3760
50	8.1	3.0	0.1	2.5	2.6	50	5086	4173
70	9.7	3.0	0.1	2.5	2.7	54	6068	4749
95	11.5	3.0	0.1	2.5	2.9	58	7272	5442
120	12.9	3.0	0.1	2.5	3.0	61	8381	6068
150	14.3	3.0	0.1	2.5	3.1	65	9533	6692
185	16.1	3.0	0.1	2.5	3.2	69	11047	7484
240	18.4	3.0	0.1	3.15	3.4	76	14244	9514
300	20.6	3.0	0.1	3.15	3.6	81	16760	10827
400	23.3	3.0	0.1	3.15	3.8	88	20029	12441

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC/SWA/PVC CABLE (WITH COPPER TAPE SCREENED) 6.35 / 11 (12) kV

Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of steel wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.4	0.1	2.0	2.4	42	3161	2854
25	5.8	3.4	0.1	2.5	2.5	46	4107	3621
35	6.9	3.4	0.1	2.5	2.6	48	4659	3984
50	8.1	3.4	0.1	2.5	2.7	51	5319	4406
70	9.7	3.4	0.1	2.5	2.8	55	6336	5016
95	11.5	3.4	0.1	2.5	2.9	59	7500	5670
120	12.9	3.4	0.1	2.5	3.0	63	8617	6304
150	14.3	3.4	0.1	2.5	3.1	66	9805	6965
185	16.1	3.4	0.1	2.5	3.3	70	11334	7771
240	18.4	3.4	0.1	3.15	3.5	77	14597	9867
300	20.6	3.4	0.1	3.15	3.6	82	17089	11157
400	23.3	3.4	0.1	3.15	3.9	89	20417	12828

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC/SWA/PVC CABLE (WITH COPPER TAPE SCREENED) 8.7 / 15 (17.5) kV

Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of steel wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
25	5.8	4.5	0.1	2.5	2.6	51	4740	4253
35	7.0	4.5	0.1	2.5	2.7	54	5269	4595
50	8.1	4.5	0.1	2.5	2.9	57	5976	5063
70	9.7	4.5	0.1	2.5	3.0	61	7069	5749
95	11.5	4.5	0.1	2.5	3.1	65	8264	6434
120	12.9	4.5	0.1	2.5	3.2	68	9407	7094
150	14.3	4.5	0.1	3.15	3.4	73	11405	8564
185	16.1	4.5	0.1	3.15	3.5	77	13064	9500
240	18.4	4.5	0.1	3.15	3.6	83	15540	10810
300	20.6	4.5	0.1	3.15	3.8	88	18046	12113
400	23.3	4.5	0.1	3.15	4.0	95	21448	13860

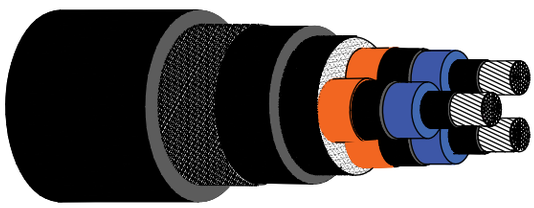
XLPE INSULATED ARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC/SWA/PVC CABLE (WITH COPPER TAPE SCREENED) 12.7/ 22 (24) kV

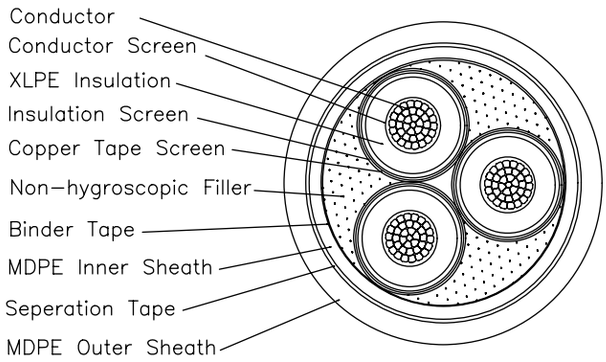
Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of steel wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
35	7.0	5.5	0.1	2.5	2.9	58	5905	5230
50	8.1	5.5	0.1	2.5	3.0	61	6606	5693
70	9.7	5.5	0.1	2.5	3.1	65	7697	6378
95	11.5	5.5	0.1	2.5	3.2	69	8947	7117
120	12.9	5.5	0.1	3.15	3.4	74	11021	8708
150	14.3	5.5	0.1	3.15	3.5	77	12195	9354
185	16.1	5.5	0.1	3.15	3.6	82	13882	10318
240	18.4	5.5	0.1	3.15	3.8	87	16436	11707
300	20.6	5.5	0.1	3.15	4.0	93	18982	13050
400	23.3	5.5	0.1	3.15	4.2	99	22485	14896

XLPE INSULATED ARMOURED PVC SHEATHED CABLE - THREE CORES CU/XLPE/SCT/PVC/SWA/PVC CABLE (WITH COPPER TAPE SCREENED) 19/13 (36) kV

Nominal cross-sectional area of conduuctor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal diameter of steel wire	Nominal thickness of PVC sheath	Approximate overall diameter of cable	Approximate weight of cable	
			Approximate thickness of copper tape				Copper	Aluminium
mm^2	mm	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
35	7.0	8.0	0.1	3.15	3.3	72	8422	7748
50	8.1	8.0	0.1	3.15	3.4	75	9250	8337
70	9.7	8.0	0.1	3.15	3.6	79	10466	9146
95	11.5	8.0	0.1	3.15	3.7	83	11858	10028
120	12.9	8.0	0.1	3.15	3.8	86	13124	10811
150	14.3	8.0	0.1	3.15	3.9	90	14460	11619
185	16.1	8.0	0.1	3.15	4.0	94	16116	12552
240	18.4	8.0	0.1	3.15	4.2	100	18825	14095
300	20.6	8.0	0.1	3.15	4.4	105	21466	15533
400	23.3	8.0	0.1	3.15	4.6	111	24969	17381

THREE CORES - XLPE INSULATED UNARMOURED PE INNER AND OUTER SHEATH CABLE FOR VOLTAGE 6.35 / 11 (12) kV





DESCRIPTION

Circular compacted stranded aluminium conductor, xlpe insulated, with copper tape screened, three cores assembled together with non hygroscopic polypropylene fillers, extruded with PE inner sheath and followed by an extruded PE outer sheath.Complies with Tenaga Nasional Berhad (TNB) specification..

CONSTRUCTION

Conductor

Plain circular compacted stranded aluminium conductor to IEC 60228 class 2.

Conductor screen

Extruded layer of semiconductive compound.

Insulation

XLPE (cross-linked polyethylene) rated at 90 °C

Insulation screen
Non-metallic part

Extruded layer of semiconductive compound.

Metallic Part

Copper tape screen (SCT)

Colour for core indentification

Red,yellow and blue tapes shall be applied between non metallic and metallic part of insulation screen.

Assembly

Three screened cores are laid up together, if necessary filled with non-hygroscopic material compatible with insulation and inner sheath.

Inner sheath

MDPE types ST_7 to IEC 60502 colour black

Outer sheath

MDPE types ST_7 to IEC 60502 colour back, containing and effective termite repellent.

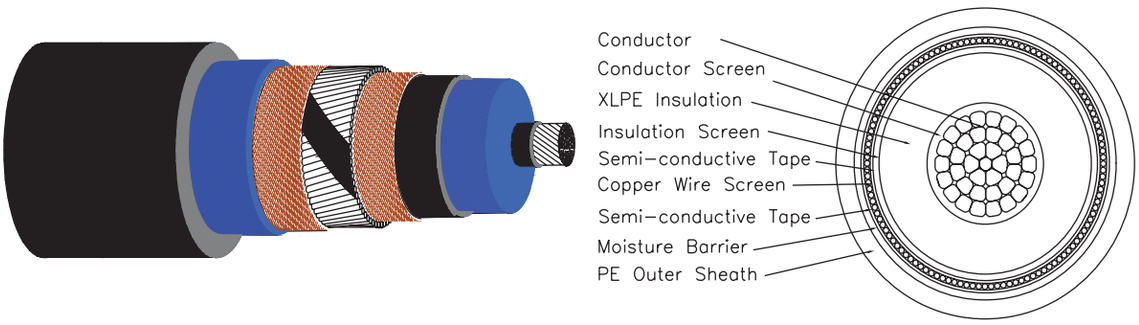
APPLICATIONS

These cables are generally suitable for direct burial or for installation on trays or ducts.

XLPE INSULATED UNARMOURED PE INNER AND OUTER SHEATH CABLE - THREE CORES AL/XLPE/SCT/MDPE/MDPE CABLE (WITH COPPER TAPE SCREENED) 6.35 / 11 (12) kV

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Metallic Screening	Nominal thickness of PE inner Sheath	Nominal thickness of PE outer Sheath	Approximate overall diameter of cable	Approximate weight of cable
			Approximate thickness of copper tape				Aluminium
mm^2	mm	mm	mm	mm	mm	Kg / Km	Kg / Km
16	4.6	3.4	0.2	2.5	2.2	41	1543
25	5.8	3.4	0.2	2.5	2.2	43	1771
35	7.0	3.4	0.2	2.5	2.3	46	2001
50	8.1	3.4	0.2	2.5	2.4	48	2264
70	9.7	3.4	0.2	2.5	2.5	52	2673
95	11.5	3.4	0.2	2.5	2.7	56	3163
120	12.9	3.4	0.2	2.5	2.8	60	3586
150	14.3	3.4	0.2	2.5	2.9	63	4035
185	16.1	3.4	0.2	2.5	3.0	67	4619
240	18.4	3.4	0.2	2.5	3.1	72	5512
300	20.6	3.4	0.2	2.5	3.3	77	6398
400	23.3	3.4	0.2	2.5	3.6	84	7624

SINGLE CORE - XLPE INSULATED UNARMOURED PE SHEATHED CABLE FOR VOLTAGE 76 / 132 (145) KV



DESCRIPTIONS

Circular compacted stranded copper or aluminium conductor, XLPE insulated, with copper wire screen and PE outer sheath. Complies with Tenaga Nasional Berhad (TNB) Specification.

CONSTRUCTION

Conductor

Plain circular compacted stranded copper or aluminium conductor to IEC 60228 class 2.

Conductor screen

Extruded semi-conductive cross-linked polyethylene compound.

Insulation

Extruded superclean XLPE (cross-linked polythylene)

Insulation screen
Non-metallic part

Extruded semi-conductive cross-linked polyethylene compound.It is firmly bonded to the insulation by virtue of the simultaneous cross linking of insulation. The Conductor screen, insulation and insulation screen are extruded by simultaneous triple extrusion process.

Metallic Part

Concentric round uncoated copper wires shall be applied helically and shall be capable of carrying an earth fault current of 25kA for 3 seconds.

Radial moisture barrier

Laminated Aluminium Tape shall be applied longitudinally

Outer sheath

Extruded black PE containing and effective termite repellent

APPLICATIONS

For installation on trays, ducts or direct burial.

XLPE INSULATED UNARMOURED PE SHEATHED CABLE - SINGLE CORE CU/XLPE/SCW/PE CABLE (WITH COPPER WIRE SCREENED) 76/132 (145) kV

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Nominal cross-sectional area of metallic screen	Nominal thickness of PE sheath	Approximate overall diameter of cable	Approximate weight of cable	
						Copper	Aluminium
mm^2	mm	mm	mm^2	mm	mm	Kg / Km	Kg / Km
300	20.6	20	415	4.0	85	11160	9270
400	23.3	20	415	4.0	88	12150	9750
500	26.2	20	415	4.0	90	13310	10280
630	29.8	20	415	4.0	94	14900	10980
800	33.7	20	415	4.0	98	16820	11800
1000	39.0	20	415	4.0	103	19120	12880

* Metallic Srceen with earth fault of 31.5 kA at 3S

Nominal cross-sectional area of conductor	Nominal diameter of conductor	Nominal thickness of XLPE insulation	Nominal cross- sectional area of metallic screen	Nominal thickness of PE sheath	Approximate overall diameter of cable	Approximate weight of cable	
						Copper	Aluminium
mm^2	mm	mm	mm^2	mm	mm	Kg / Km	Kg / Km
300	20.6	20	330	4.0	84	10330	8440
400	23.3	20	330	4.0	87	11320	8910
500	26.2	20	330	4.0	90	12480	9440
630	29.8	20	330	4.0	93	14070	10150
800	33.7	20	330	4.0	97	15990	10970
1000	39.0	20	330	4.0	102	18290	12050

* Metallic Srceen with earth fault of 31.5 kA at 3S

APPENDIX : TECHNICAL DATA

CURRENT CARRYING CAPACITY

The Current Carrying Capacity given in the following tables are based on the assumption shown below:

1) Maximum Conductor temperature : ---------- 90ºC
2) Maximum Ambient Temperature : In Air (Voltage up to 1.9/3.3 (3.6) kV)---------- 30ºC
   (Voltage 6.6kV up to and including 33 kV) ---------- 25ºC
   In Ground ---------- 15ºC
3) Ground Thermal Resistivity : ..... 1.2°Cm / W
4) Laying Depth : For Voltage up to 1 KV----------0.5M
   For Higher Voltage above 1 KV----------0.8M
5) For other conditions, the rating factors included should be applied

Table 1 RATING FACTORS FOR CABLE IN FREE AIR

FOR VOLTAGE UP TO 1.9 / 3.3 (3.6) kV							
Ambient Air Temperature	20 ºC	25 ºC	30 ºC	35 ºC	40 ºC	45 ºC	50 ºC
Rating Factor	1.09	1.04	1.00	0.96	0.91	0.87	0.82

FOR VOLTAGE 6.6 kV UP TO AND INCLUDING 132kV							
Ambient Air Temperature	20 ºC	25 ºC	30 ºC	35 ºC	40 ºC	45 ºC	50 ºC
Rating Factor	1.05	1.00	0.95	0.91	0.86	0.80	0.75

All the ratings for cables run in air are based upon the assumption that they are shielded from direct sunlight and without restriction of ventilation.

Effect of grouping cables : No reduction in rating is necessary where there is free circulation of air around the circuits provided that :

1. The horizontal clearance between circuits is not less than twice the overall diameter of an individual cable.
2. The vertical clearance between circuits is not less than four times the diameter of an individual cable.
3. If the number of circuits exceeds three, they are installaed in a horizontal plane.

Table 2 RATING FACTORS FOR CABLE IN GROUND

Ambient Air Temperature	10 ºC	15 ºC	20 ºC	25 ºC	30 ºC	35 ºC	40 ºC	45 ºC
Rating Factor	1.03	1.00	0.97	0.93	0.89	0.85	0.81	0.77

Table 3 GROUP RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLE, IN TREFOIL AND LAID FLAT TOUCHING, HORIZONTAL FORMATION

Cable voltage (kV)	Number of circuits	Spacing of circuit (between centres cable groups)					
		Touching		0.15 m*	0.3m	0.45m	0.6m
		Trefoil	Laid flat				
0.6 / 1	2	0.77	0.80	0.82	0.88	0.90	0.93
	3	0.65	0.68	0.72	0.79	0.83	0.87
	4	0.59	0.63	0.67	0.75	0.81	0.85
	5	0.55	0.58	0.63	0.72	0.78	0.83
	6	0.52	0.56	0.60	0.70	0.77	0.82
	7	0.50	0.54	0.58	0.68	0.76	0.81
	8	0.48	0.52	0.56	0.66	0.75	0.79
	9	0.46	0.50	0.54	0.64	0.74	0.78
	10	0.44	0.48	0.52	0.62	0.73	0.77
1.9 / 3.3 to 12.7 / 22	2	0.78	0.80	0.81	0.85	0.88	0.90
	3	0.66	0.69	0.71	0.76	0.80	0.83
	4	0.60	0.63	0.65	0.72	0.76	0.80
	5	0.55	0.58	0.61	0.68	0.73	0.77
	6	0.52	0.55	0.58	0.66	0.72	0.76
	7	0.49	0.52	0.55	0.63	0.69	0.74
	8	0.46	0.49	0.51	0.60	0.66	0.72
	9	0.43	0.46	0.48	0.56	0.63	0.70
	10	0.40	0.43	0.45	0.53	0.61	0.68
19 / 33 to 76 / 132	2	0.79	0.81	0.81	0.85	0.88	0.90
	3	0.67	0.70	0.71	0.76	0.80	0.83
	4	0.62	0.65	0.65	0.72	0.76	0.80
	5	0.57	0.60	0.60	0.68	0.73	0.76
	6	0.54	0.57	0.57	0.66	0.72	0.76

Table 4 GROUP RATING FACTORS FOR MULTICORE CABLE IN HORIZONTAL FORMATION

Cable voltage (kV)	Number of Cables in Group	Spacing of circuits (between centres cable groups)				
		Touching	0.15m	0.3m	0.45m	0.6m
0.6 / 1	2	0.81	0.87	0.91	0.93	0.94
	3	0.70	0.78	0.84	0.87	0.90
	4	0.63	0.74	0.81	0.86	0.89
	5	0.59	0.70	0.78	0.83	0.87
	6	0.55	0.67	0.76	0.82	0.86
	7	0.52	0.64	0.74	0.79	0.83
	8	0.50	0.62	0.72	0.77	0.81
	9	0.48	0.60	0.70	0.75	0.79
	10	0.46	0.58	0.68	0.73	0.77
1.9 / 3.3 to 12.7 / 22	2	0.80	0.85	0.89	0.90	0.92
	3	0.69	0.75	0.80	0.84	0.86
	4	0.63	0.70	0.77	0.80	0.84
	5	0.57	0.66	0.73	0.78	0.81
	6	0.55	0.63	0.71	0.76	0.80
	7	0.53	0.60	0.68	0.74	0.78
	8	0.50	0.57	0.66	0.72	0.76
	9	0.48	0.55	0.64	0.70	0.74
	10	0.46	0.53	0.62	0.68	0.73
19 / 33 to 76 / 132	2	0.80	0.83	0.87	0.89	0.91
	3	0.70	0.73	0.78	0.82	0.85
	4	0.64	0.68	0.74	0.78	0.82
	5	0.59	0.63	0.70	0.75	0.79
	6	0.56	0.60	0.68	0.74	0.78

Table 5 RATING FACTORS FOR SOIL THERMAL RESISTIVITY

Conducotor Size (mm2)	Soil Thermal Resistivity (Km / W)						
	0.8	0.9	1.0	1.5	2.0	2.5	3.0
Single core cables							
Up to 150	1.16	1.11	1.07	0.91	0.81	0.73	0.67
From 185 to 400	1.17	1.12	1.07	0.90	0.80	0.72	0.66
From 500 to 1200	1.18	1.13	1.08	0.90	0.79	0.71	0.65
Multi core cables							
Up to 16	1.09	1.06	1.04	0.95	0.86	0.79	0.74
From 25 to 150	1.14	1.10	1.07	0.93	0.84	0.76	0.70
From 185 to 400	1.16	1.11	1.07	0.92	0.82	0.74	0.68

Table 6 RATING FACTORS FOR DEPTH OF LAYING (to centre of cable or trefoil group of cable)

Depth of Laying (m)	0.6 / 1 (1.2) kV Cables			1.9 / 3.3 (3.6) kV to 19 / 33 (36) kV cables	
	up to 50 mm^2	70mm^2 to 300mm^2	above 300mm^2	up to 300mm^2	above 300mm^2
0.5	1.00	1.00	1.00	1.00	1.00
0.6	0.99	0.98	0.97	1.00	1.00
0.8	0.97	0.96	0.94	1.00	1.00
1.00	0.95	0.94	0.92	0.98	0.97
1.25	0.94	0.92	0.90	0.96	0.95
1.50	0.93	0.91	0.89	0.95	0.94
1.75	0.92	0.89	0.87	0.94	0.92
2.00	0.91	0.88	0.86	0.92	0.90
2.50	0.90	0.87	0.85	0.91	0.89
3.0 or above	0.89	0.86	0.83	0.90	0.88

Table 7a CURRENT RATINGS FOR 0.6 / 1 (1.2) kV UNARMOURED XLPE CABLE

Conductor Size (mm^2)	Current Rating						Voltage Drop		
	In Air			In Ground					
	1C	2C	3/4C	1C	2C	3/4C	1C	2C	3/4C
	(A)			(A)			(mV/ A/m)		
Copper Conductor									
1.5	25	26	23	35	39	33	27	31	27
2.5	33	36	32	46	52	43	16	19	16
4	44	49	42	59	67	56	10	12	10
6	56	63	54	73	85	71	6.8	7.9	6.8
10	77	86	75	98	113	95	4.0	4.7	4.0
16	102	115	100	125	146	122	2.5	2.9	2.5
25	135	149	127	161	190	158	1.62	1.9	1.65
35	169	185	158	193	229	191	1.18	1.35	1.15
50	207	225	192	228	265	223	0.87	1.00	0.87
70	268	289	246	279	326	274	0.62	0.69	0.60
95	328	352	298	335	391	329	0.47	0.52	0.45
120	383	410	346	380	445	375	0.39	0.42	0.37
150	444	473	399	426	499	421	0.33	0.35	0.30
185	510	542	456	482	566	478	0.28	0.29	0.26
240	607	641	538	558	658	556	0.24	0.24	0.21
300	703	741	621	629	745	630	0.21	0.21	0.185
400	823	865	741	712	849	719	0.195	0.19	0.165
500	946	-	-	802	-	-	0.180	-	-
630	1069	-	-	900	-	-	0.170	-	-
800	1214	-	-	1002	-	-	0.165	-	-
1000	1349	-	-	1090	-	-	0.155	-	-
Aluminium Conductor									
6	46	49	42	60	69	58	1.0	12	10
10	60	67	58	75	87	73	6.8	7.9	6.8
16	78	91	77	97	113	94	4.2	4.8	4.2
25	103	108	97	125	147	123	2.7	3.1	2.7
35	129	135	120	149	177	148	1.9	2.2	1.95
50	159	164	146	177	205	173	1.4	1.65	1.45
70	206	211	187	217	253	213	0.98	1.15	0.97
95	253	257	227	259	303	255	0.74	0.84	0.72
120	296	300	263	295	346	291	0.60	0.66	0.58
150	343	346	304	331	387	326	0.49	0.55	0.47
185	395	397	347	375	440	371	0.41	0.45	0.39
240	471	470	409	436	511	432	0.34	0.35	0.31
300	547	543	471	492	579	490	0.29	0.29	0.26
400	663	645	570	564	665	563	0.24	0.25	0.21
500	770	-	-	643	-	-	0.21	-	-
630	899	-	-	733	-	-	0.19	-	-
800	1038	-	-	825	-	-	0.18	-	-
1000	1211	-	-	924	-	-	0.16	-	-

* Single core cable with aluminium wire armour

Table 7b CURRENT RATINGS FOR 0.6 / 1 (1.2) kV ARMOURED XLPE CABLE

Conductor Size (mm^2)	Current Rating						Voltage Drop		
	In Air			In Ground					
	1C	2C	3/4C	1C	2C	3/4C	1C	2C	3/4C
	(A)			(A)			(mV/ A/m)		
Copper Conductor									
1.5	28	29	25	36	40	33	27	31	27
2.5	37	39	33	47	52	43	16	19	16
4	48	52	44	61	67	56	10	12	10
6	60	66	56	75	84	70	6.8	7.9	6.8
10	82	90	78	100	113	94	4.0	4.7	4.0
16	106	115	99	127	141	119	2.5	2.9	2.5
25	140	152	131	163	183	152	1.62	1.9	1.65
35	170	188	162	195	219	182	1.18	1.35	1.15
50	222	228	197	231	259	217	0.87	1.00	0.87
70	285	291	251	284	317	266	0.62	0.69	0.60
95	346	354	304	340	381	319	0.47	0.52	0.45
120	402	410	353	386	433	363	0.39	0.42	0.37
150	463	472	406	431	485	406	0.33	0.35	0.30
185	529	539	463	485	547	458	0.28	0.29	0.26
240	625	636	546	558	632	529	0.24	0.24	0.21
300	720	732	628	623	708	592	0.21	0.21	0.185
400	815	847	728	691	799	667	0.195	0.19	0.165
500	918	-	-	765	-	-	0.180	-	-
630	1027	-	-	841	-	-	0.170	-	-
800	1119	-	-	888	-	-	0.165	-	-
1000	1214	-	-	942	-	-	0.155	-	-
Aluminium Conductor									
6	49	52	44	61	69	57	1.0	12	10
10	63	67	57	77	87	73	6.8	7.9	6.8
16	82	85	74	98	108	91	4.2	4.8	4.2
25	108	112	98	127	138	116	2.7	3.1	2.7
35	132	138	120	151	165	139	1.9	2.2	1.95
50	162	166	145	177	196	165	1.4	1.65	1.45
70	207	211	185	218	241	203	0.98	1.15	0.97
95	252	254	224	260	288	244	0.74	0.84	0.72
120	292	303	264	296	343	278	0.60	0.66	0.58
150	337	345	305	331	385	311	0.49	0.55	0.47
185	391	412	350	374	437	353	0.41	0.45	0.39
240	465	473	418	433	507	409	0.34	0.35	0.31
300	540	540	488	486	572	461	0.29	0.29	0.26
400	625	628	562	563	655	534	0.24	0.25	0.21
500	714	-	-	629	-	-	0.21	-	-
630	801	-	-	701	-	-	0.19	-	-
800	890	-	-	777	-	-	0.18	-	-
1000	980	-	-	854	-	-	0.16	-	-

* Single core cable with aluminium wire armour

Table 8 CURRENT RATINGS FOR 1.9 / 3.3 (3.6) kV ARMOURED XLPE CABLE

Conductor Size	In Air			In Ground		
	Single Core[a]		3 Core	Single Core[a]		3 Core
	Trefoil	Flat		Trefoil	Flat	
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)
Copper Conductor						
50	230	287	204	222	230	207
70	288	357	257	271	279	254
95	353	434	315	324	331	305
120	411	492	365	366	369	345
150	468	553	415	409	409	387
185	534	622	476	460	454	436
240	630	715	560	528	512	502
300	717	793	640	589	560	563
400	817	851	734	651	595	633
500	924	929	-	720	641	-
630	1041	1007	-	789	684	-
800	1131	1054	-	831	703	-
1000	1227	1121	-	880	735	-
Aluminium Conductor						
50	173	217	155	170	176	158
70	216	270	194	208	215	194
95	264	328	237	248	256	233
120	308	377	276	282	288	265
150	350	424	313	315	320	297
185	402	483	360	355	359	336
240	475	561	425	410	409	389
300	544	631	489	460	453	439

[a] Single core cables with aluminium wire armour

Table 9 CURRENT RATINGS FOR ARMOURED XLPE CABLE

Conductor Size	3.8 / 6.6 (7.2) kV TO 8.7 / 15 (17.5)				12.7 / 22 (24) kV TO 19 / 33 (36)			
	In Air		In Ground		In Air		In Ground	
	Single Core[a] Trefoil	3 Core	Single Core[a] Trefoil	3 Core	Single Core[a] Trefoil	3 Core	Single Core[a] Trefoil	3 Core
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
Copper Conductor								
50	235	220	220	210	245	225	220	210
70	285	270	270	255	300	275	270	255
95	360	330	320	300	360	330	320	295
120	415	375	360	340	425	380	360	335
150	470	430	410	380	485	430	410	375
185	540	490	460	430	550	490	460	420
240	640	570	530	490	650	570	530	480
300	740	650	600	540	740	650	600	530
400	840	740	680	600	850	740	690	590
500	990	-	750	-	980	-	760	-
630	1110	-	830	-	1130	-	850	-
800	1270	-	920	-	1280	-	930	-
Aluminium Conductor								
50	180	170	170	160	190	175	170	160
70	225	210	210	195	235	215	210	195
95	280	250	250	230	280	260	250	230
120	320	295	280	265	330	300	280	260
150	365	330	320	300	375	335	320	290
185	425	385	360	335	430	390	360	330
240	500	450	415	380	510	460	415	380
300	580	510	475	435	580	520	475	425
400	670	590	540	490	680	600	550	480
500	790	-	610	-	790	-	610	-
630	910	-	680	-	920	-	690	-
800	1060	-	770	-	1060	-	770	-

[a] Copper wire screened

Table 10 ELECTRICAL CHARACTERISTICS
0.6 / 1 (1.2) kV ARMOURED XLPE CABLE

Conductor Size	Single core cables*				Multicore cable		
	A.C.resistance at 90°C		Reactance (50Hz)		A.C.resistance at 90°C		Reactance (50Hz)
	Copper	Aluminium	Trefoil	Flat#	Copper	Aluminium	
(mm^2)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)
1.5	15.4	-	0.182	0.271	15.4	-	0.103
2.5	9.45	-	0.169	0.252	9.45	-	0.097
4	5.88	-	0.158	0.236	5.88	-	0.091
6	3.93	5.91	0.148	0.222	3.93	5.91	0.087
10	2.33	3.95	0.137	0.206	2.33	3.95	0.082
16	1.47	2.45	0.129	0.196	1.47	2.45	0.081
25	0.927	1.54	0.122	0.185	0.927	1.54	0.079
35	0.668	1.11	0.116	0.175	0.668	1.11	0.077
50	0.494	0.822	0.106	0.164	0.494	0.822	0.076
70	0.342	0.568	0.103	0.161	0.342	0.568	0.075
95	0.247	0.411	0.098	0.156	0.247	0.411	0.073
120	0.197	0.325	0.096	0.154	0.197	0.325	0.073
150	0.160	0.265	0.096	0.154	0.160	0.265	0.073
185	0.128	0.211	0.096	0.154	0.128	0.211	0.073
240	0.0989	0.162	0.092	0.150	0.0989	0.162	0.072
300	0.0802	0.130	0.090	0.148	0.0802	0.130	0.072
400	0.0640	0.103	0.090	0.148	0.0640	0.103	0.069
500	0.0515	0.081	0.089	0.146	0.0515	-	-
630	0.0420	0.065	0.086	0.144	0.0420	-	-
800	0.0363	0.053	0.086	0.144	0.0363	-	-
1000	0.0316	0.045	0.084	0.142	0.0316	-	-

Table 11 ELECTRICAL CHARACTERISTICS
1.9 / 3.3 (3.6) kV ARMOURED XLPE CABLE

Conductor Size	Single core cables*				3 core cable		
	A.C.resistance at 90°C		Reactance (50Hz)		A.C.resistance at 90°C		Reactance (50Hz)
	Copper	Aluminium	Trefoil	Flat#	Copper	Aluminium	
(mm^2)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)
16	1.47	2.45	0.140	0.197	1.47	2.45	0.104
25	0.907	1.54	0.133	0.189	0.907	1.54	0.095
35	0.668	1.11	0.126	0.181	0.668	1.11	0.092
50	0.494	0.822	0.116	0.172	0.494	0.822	0.088
70	0.342	0.568	0.110	0.165	0.342	0.568	0.084
95	0.247	0.411	0.104	0.160	0.247	0.411	0.081
120	0.197	0.325	0.104	0.159	0.197	0.325	0.079
150	0.160	0.265	0.100	0.156	0.160	0.265	0.077
185	0.128	0.211	0.098	0.154	0.128	0.211	0.076
240	0.0989	0.162	0.094	0.150	0.0989	0.162	0.074
300	0.0802	0.130	0.091	0.147	0.0802	0.130	0.073
400	0.0640	0.103	0.090	0.147	0.0640	0.103	0.070
500	0.0515	0.081	0.089	0.145	-	-	-
630	0.0420	0.065	0.086	0.143	-	-	-

* Aluminium wire armoured
# Twice cable diameter spacing between centres

Table 12 ELECTRICAL CHARACTERISTICS
3.8 / 6.6 (7.2) kV AND 6.35 / 11 (12) kV ARMOURED XLPE CABLE

Conductor Size	Single core cables*					3 core cable			
	A.C.resistance at 90°C		Reactance (50Hz)		Capacitance	A.C.resistance at 90°C		Reactance (50Hz)	Capacitance
	Copper	Aluminium	Trefoil	Flat#		Copper	Aluminium		
(mm²)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(uF/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(uF/km)
3.8 / 6.6 (7.2) kV									
50	0.494	0.822	0.121	0.181	0.34	0.493	0.822	0.105	0.36
70	0.342	0.568	0.115	0.174	0.38	0.343	0.568	0.100	0.41
95	0.247	0.411	0.109	0.167	0.43	0.247	0.411	0.095	0.46
120	0.196	0.325	0.105	0.162	0.47	0.196	0.325	0.092	0.50
150	0.159	0.265	0.102	0.159	0.51	0.159	0.265	0.090	0.55
185	0.128	0.211	0.099	0.156	0.56	0.128	0.211	0.087	0.60
240	0.0982	0.162	0.096	0.153	0.61	0.0986	0.162	0.085	0.65
300	0.0791	0.130	0.094	0.151	0.62	0.0798	0.130	0.084	0.67
400	0.0632	0.102	0.092	0.149	0.65	0.0641	0.102	0.082	0.70
500	0.0510	0.0804	0.089	0.147	0.69	-	-	-	-
630	0.0417	0.0639	0.086	0.144	0.78	-	-	-	-
6.35 / 11 (12) kV									
50	0.494	0.822	0.127	0.185	0.26	0.493	0.822	0.111	0.28
70	0.342	0.568	0.120	0.177	0.30	0.342	0.568	0.106	0.32
95	0.247	0.411	0.114	0.171	0.33	0.247	0.410	0.100	0.36
120	0.196	0.325	0.109	0.166	0.36	0.196	0.325	0.097	0.39
150	0.159	0.265	0.106	0.163	0.39	0.159	0.265	0.094	0.42
185	0.128	0.211	0.103	0.160	0.43	0.128	0.211	0.092	0.46
240	0.0981	0.161	0.099	0.156	0.48	0.0984	0.161	0.089	0.51
300	0.0791	0.130	0.096	0.153	0.52	0.0797	0.130	0.086	0.56
400	0.0632	0.102	0.093	0.150	0.58	0.0639	0.102	0.083	0.62
500	0.0510	0.0804	0.090	0.147	0.66	-	-	-	-
630	0.0417	0.0639	0.087	0.145	0.74	-	-	-	-

* Copper wire screened
# Twice cable diameter spacing between centres

Table 13 ELECTRICAL CHARACTERISTICS
8.7 / 15 (17.5) kV AND 12.7 / 22 (24) kV ARMOURED XLPE CABLE

Conductor Size	Single core cables*					3 core cable			
	A.C.resistance at 90°C		Reactance (50Hz)		Capacitance	A.C.resistance at 90°C		Reactance (50Hz)	Capacitance
	Copper	Aluminium	Trefoil	Flat#		Copper	Aluminium		
(mm²)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(uF/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(uF/km)
8.7 / 15 (17.5) kV									
50	0.494	0.822	0.132	0.190	0.21	0.493	0.822	0.118	0.23
70	0.342	0.568	0.125	0.183	0.24	0.342	0.568	0.112	0.26
95	0.247	0.411	0.119	0.176	0.27	0.247	0.410	0.106	0.29
120	0.196	0.325	0.114	0.171	0.29	0.196	0.325	0.102	0.31
150	0.159	0.265	0.111	0.168	0.31	0.159	0.264	0.100	0.34
185	0.128	0.211	0.107	0.164	0.34	0.128	0.211	0.097	0.37
240	0.0979	0.161	0.103	0.160	0.38	0.0982	0.161	0.093	0.41
300	0.0790	0.130	0.100	0.156	0.41	0.0794	0.130	0.090	0.45
400	0.0630	0.102	0.097	0.153	0.46	0.0636	0.102	0.087	0.50
500	0.0507	0.0802	0.093	0.151	0.51	-	-	-	-
630	0.0413	0.0636	0.090	0.147	0.57	-	-	-	-
12.7 / 22 (24) kV									
50	0.494	0.822	0.137	0.192	0.18	0.493	0.822	0.124	0.20
70	0.342	0.568	0.130	0.185	0.21	0.342	0.568	0.118	0.22
95	0.247	0.411	0.123	0.178	0.23	0.247	0.410	0.111	0.24
120	0.196	0.325	0.118	0.173	0.25	0.196	0.325	0.107	0.26
150	0.159	0.265	0.115	0.170	0.27	0.159	0.264	0.104	0.28
185	0.128	0.211	0.111	0.165	0.29	0.127	0.211	0.101	0.31
240	0.098	0.161	0.106	0.161	0.32	0.098	0.161	0.097	0.34
300	0.079	0.130	0.103	0.158	0.35	0.079	0.130	0.094	0.37
400	0.063	0.102	0.0995	0.155	0.39	0.063	0.102	0.090	0.41
500	0.051	0.080	0.0959	0.152	0.43	-	-	-	-
630	0.041	0.064	0.0923	0.149	0.48	-	-	-	-

* Copper wire screened
# Twice cable diameter spacing between centres

Table 14 ELECTRICAL CHARACTERISTICS
19 / 33 (36) kV ARMOURED XLPE CABLE

Conductor Size	Single core cables*					3 core cable			
	A.C.resistance at 90°C		Reactance (50Hz)		Capacitance	A.C.resistance at 90°C		Reactance (50Hz)	Capacitance
	Copper	Aluminium	Trefoil	Flat#		Copper	Aluminium		
(mm²)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(uF/km)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(uF/km)
70	0.342	0.568	0.143	0.194	0.16	0.342	0.568	0.129	0.15
95	0.247	0.411	0.136	0.189	0.18	0.247	0.410	0.122	0.17
120	0.196	0.325	0.13	0.184	0.19	0.196	0.324	0.117	0.18
150	0.160	0.265	0.127	0.178	0.20	0.159	0.265	0.114	0.20
185	0.127	0.211	0.122	0.174	0.22	0.127	0.211	0.110	0.21
240	0.0976	0.161	0.117	0.169	0.24	0.0978	0.161	0.106	0.25
300	0.0785	0.129	0.113	0.166	0.26	0.0789	0.129	0.102	0.27
400	0.0624	0.101	0.109	0.162	0.29	0.0629	0.102	0.098	0.30
500	0.0500	0.0797	0.104	0.158	0.32	-	-	-	-
630	0.0405	0.0630	0.100	0.155	0.35	-	-	-	-
800	0.0388	0.0509	0.095	0.151	0.40	-	-	-	-

* Copper wire screened
# Twice cable diameter spacing between centres

Table 15 ELECTRICAL CHARACTERISTICS
76 / 132(145) kV SINGLE CORE UNARMOURED XLPE CABLE

Conductor Size	Single core cables*			
	A.C.resistance at 90°C		Reactance (50Hz)	Capacitance
	Copper	Aluminium	Trefoil	
(mm²)	(Ohm/km)	(Ohm/km)	(Ohm/km)	(uF/km)
300	0.078	0.129	0.122	0.141
400	0.062	0.101	0.118	0.151
500	0.049	0.079	0.114	0.162
630	0.040	0.062	0.110	0.175
800	0.033	0.050	0.106	0.189
1000	0.028	0.041	0.102	0.208

Table 16 BENDING RADIUS

MINIMUM BENDING RADIUS		
FOR VOLTAGE 1 kV UP TO AND INCLUDING 3.3kV		
	During installation	Fixed installation
Unarmoured cable		
- Circular conductor - Shaped conductor	6D 8D	6D 8D
Armoured cable		
- Circular conductor - Shaped conductor	6D 8D	6D 8D
FOR VOLTAGE 6.6 kV UP TO AND INCLUDING 33kV		
Unarmoured cable		
- Single core - Three core	20D 15D	15D 12D
Armoured cable		
- Single core - Three core	15D 12D	12D 10D
FOR VOLTAGE MORE THAN 33kV UP TO 132kV		
Unarmoured cable		
- Single core - Three core	20D 18D	20D 15D
Armoured cable		
- Single core - Three core	20D 18D	15D 12D

Note : * D is overall cable diameter

Table 17 SIDE WALL PRESSURE

Permissible maximum side wall pressure to the cable at bending point during installation is 500 kgf/m.

$$\text{Side wall pressure to cable} = \frac{\text{Puling tension (kgf)}}{\text{Bending radius (m)}} = \frac{T}{R}$$

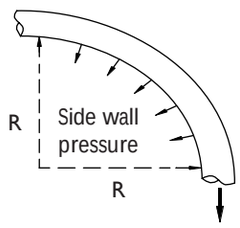


Table 18 COPPER SCREEN FOR SINGLE CORE UNARMOURED CABLES FOR VOLTAGE 6.6kV UP TO 33kV

For single core unarmoured cables it is common practice to provide copper screen of minimum cross-sectional area as indicated below, unless specific by earth fault requirements of the system.

Conductor cross section	Copper screen area
mm²	mm²
50 - 120	16
150 - 300	25
400 - 630	35
800 and above	50

Table 19 PERMISSIBLE MAXIMUM PULLING FORCE (P)

Means of pulling	Type of cable	Formula	Factor
With pulling eye attached to the conductors	All types of cables	$P = \sigma . A$	s = 70N/mm² (Copper conductor) s = 40N/mm² (Aluminium conductor)
With pulling Stocking	Un-armoured cables*	$P = \sigma . A$	s = 50N/mm² (Copper conductor) s = 30N/mm² (Aluminium conductor)
	Armoured cables**	$P = k . d^2$	k = 9N/mm²
	Lead sheath cables	$P = k . d^2$	k = 3N/mm²

* When pulling 3 single core cables simultaneously with a common pulling stocking, the same maximum pulling force applies, whereas the pulling force 3 laid-up single core cables is 3 times that of a single core and for 3 non-laid-up single core cables is 2 times that of a single core

** Not applicable for high voltage cables

P = Permissable maximum pulling force in N
A = Total cross sectional area in mm² of all conductors (but not screen or concentric conductor)
d = Outside diameter of cable in mm
σ = Permissible tensile stress of conductor in N/mm²
k = Empirically derived factor in N/mm²

Table 20 PERMISSIBLE RADIAL LOAD

Permissible radial loads for pulling through pipes	
Non-Armoured Cables	10000N/m
Cables with Single Armour	15000N/m
Maximum permissible loads on rollers fitted on bends	
Non-Armoured Cables	1500N/m
Cables with Single Armour	2500N/m
When using roller chain (5 rollers / m)	
Non-Armoured Cables	7500N/m
Cables with Single Armour	12500N/m
When only 3 rollers / m are fitted	
Non-Armoured Cables	4500N/m
Cables with Single Armour	7500N/m

Table 21 METRIC CONDUCTOR SIZES AND RESISTANCES (at 20°C)

Conductor Size (mm^2)	Minimum number of wires in the conductor						Maximum d.c.resistance		
	Circular conductor		Circular compacted stranded		Shaped Conductor		Plain Copper (ohm / km)	Metal Coated Copper (ohm / km)	Aluminium* (ohm / Km)
	Cu	Al	Cu	Al	Cu	Al			
0.5	7	-	-	-	-	-	36.0	36.7	-
0.75	7	-	-	-	-	-	24.5	24.8	-
1	7	-	-	-	-	-	18.1	18.2	-
1.5	7	-	6	-	-	-	12.1	12.2	-
2.5	7	-	6	-	-	-	7.41	7.56	-
4	7	7	6	-	-	-	4.61	4.70	7.41
6	7	7	6	-	-	-	3.08	3.11	4.61
10	7	7	6	-	-	-	1.83	1.84	3.08
16	7	7	6	6	-	-	1.15	1.16	1.91
25	7	7	6	6	6	6	0.727	0.734	1.20
35	7	7	6	6	6	6	0.524	0.529	0.868
50	19	19	6	6	6	6	0.387	0.391	0.641
70	19	19	12	12	12	12	0.268	0.270	0.443
95	19	19	15	15	15	15	0.193	0.195	0.320
120	37	37	18	15	18	15	0.153	0.154	0.253
150	37	37	18	15	18	15	0.124	0.126	0.206
185	37	37	30	30	30	30	0.0991	0.100	0.164
240	61	61	34	30	34	30	0.0754	0.0762	0.125
300	61	61	34	30	34	30	0.0601	0.0607	0.100
400	61	61	53	53	53	53	0.0470	0.0475	0.0778
500	61	61	53	53	53	53	0.0366	0.0369	0.0605
630	91	91	53	53	53	53	0.0283	0.0286	0.0469
800	91	91	53	53	-	-	0.0221	0.0224	0.0367
1000	91	91	53	53	-	-	0.0176	0.0177	0.0291

* includes metal-coated and metal clad

Except where stated, the data is in accordance with IEC 60228 and BS 6360

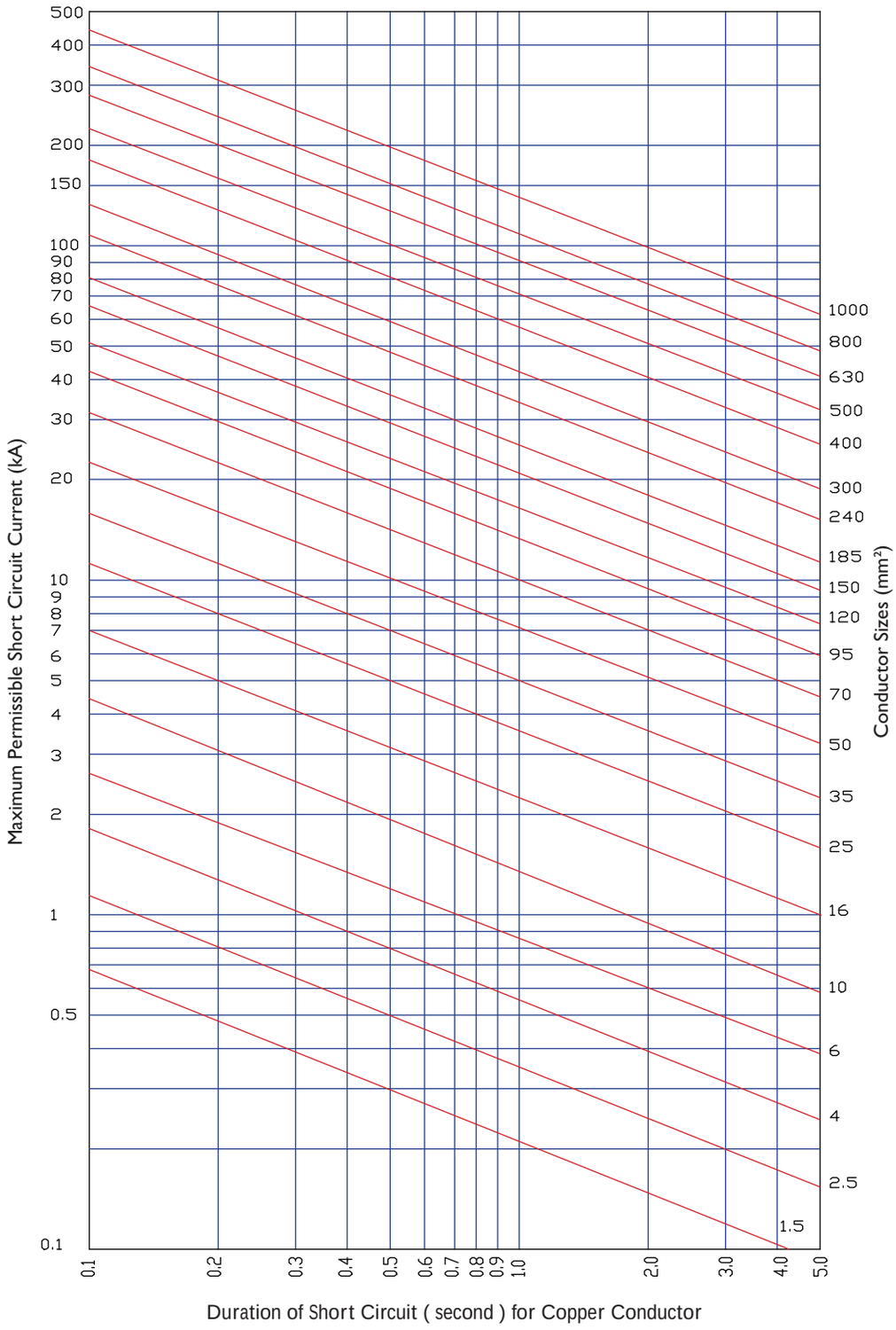
Table 22 TEMPERATURE CORRECTION FACTORS FOR CONDUCTOR RESISTANCE

Temperature of conductor (°C)	Factor to convert to 20°C	Reciprocal to convert from 20°C
5	1.064	0.940
6	1.059	0.944
7	1.055	0.948
8	1.050	0.952
9	1.046	0.956
10	1.042	0.960
11	1.037	0.964
12	1.033	0.968
13	1.029	0.972
14	1.025	0.976
15	1.020	0.980
16	1.016	0.984
17	1.012	0.988
18	1.008	0.992
19	1.004	0.996
20	1.000	1.000
21	0.996	1.004
22	0.992	1.008
23	0.988	1.012
24	0.984	1.016
25	0.980	1.020
26	0.977	1.024
27	0.973	1.028
28	0.969	1.032
29	0.965	1.036
30	0.962	1.040
31	0.958	1.044
32	0.954	1.048
33	0.951	1.052
34	0.947	1.056
35	0.943	1.060
40	0.926	1.080
45	0.909	1.100
50	0.893	1.120
55	0.877	1.140
60	0.862	1.160
65	0.847	1.180
70	0.833	1.200
75	0.820	1.220
80	0.806	1.240
85	0.794	1.260
90	0.781	1.280

SHORT CIRCUIT CURRENT FOR XLPE CABLES (COPPER CONDUCTOR)

Curves are based on :

* Cables was at maximum operating temperature of 90°C at the start of short-circuit.
* Final conductor temperature of 250°C



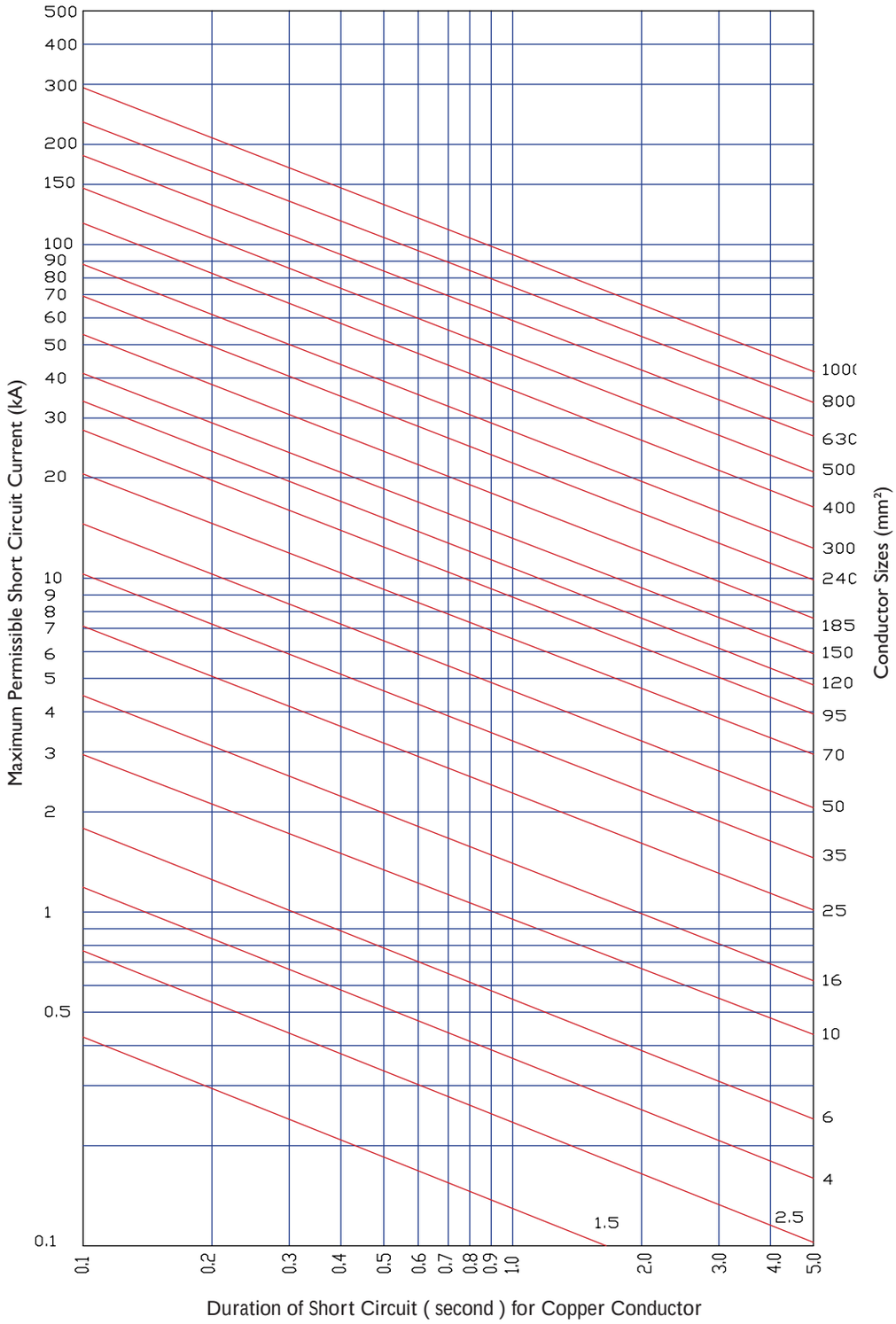
Conductor size (mm²)	Short circuit current (1s) (kA)
1.5	0.21
2.5	0.36
4	0.57
6	0.86
10	1.43
16	2.29
25	3.58
35	5.01
50	7.15
70	10.02
95	13.59
120	17.17
150	21.46
185	26.47
240	34.34
300	42.92
400	57.23
500	71.54
630	90.14
800	114.46
1000	143.08

Note:
For any other duration 't' seconds, please divide the given value by √t

SHORT CIRCUIT CURRENT FOR XLPE CABLES (ALUMINIUM CONDUCTOR)

Curves are based on :

* Cables was at maximum operating temperature of 90°C at the start of short-circuit.
* Final conductor temperature of 250°C



Conductor size (mm²)	Short circuit current (1s) (kA)
1.5	0.14
2.5	0.24
4	0.38
6	0.57
10	0.94
16	1.51
25	2.36
35	3.31
50	4.72
70	6.61
95	8.98
120	11.34
150	14.17
185	17.48
240	22.68
300	28.34
400	37.79
500	47.24
630	59.52
800	75.58
1000	94.48

Note:
For any other duration 't' seconds, please divide the given value by √t

PUBLICATIONS REFERRED TO

IEC 60038	IEC Standard Voltages
IEC 60060	High Voltage Test Techniques
IEC 60183	Guide To The Selection Of High Voltage Cable
IEC 60228	Conductors Of Insulated Cable
IEC 60230	Impulse Test On Cables And Their Accessories
IEC 60287	Electric Cable -- Calculation Of The Current Rating
IEC 60332	Test On Electric Cable Under Fire Conditions
IEC 60502	Power Cable With Extruded Insulation And Their Accessories For Rated Voltages From 1 kV (Um = 1.2 kV) Up To 30 kV (Um = 36 kV)
IEC 60724	Short Circuit Temperature Limits Of Electric Cable With Rated Voltage Of 1kV (Um = 1.2 kV) And 3 kV (Um = 3.6 kV)
IEC 60811	Common Test Methods For Insulating And Sheathing Materials Of Electric Cables And Optical Cable.
IEC 60840	Power Cable With Extruded Insulation And Their Accessories For Rated Voltages Above 30 kV (Um = 36 kV) Up To 150 kV (Um = 170 kV)
IEC 60885	Electrical Test Methods For Electric Cable
IEC 60986	Short Circuit Temperature Limits Of Electric Cable With Rated Voltages From 6 kV (Um = 7.2 kV) Up To 30 kV (Um = 36 kV)