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PRODUCT DATA TABLES

LEAD SHEATHED CABLES

شركة الخليج للكابلات والصناعات المتعددة - الأردن
Gulf Cable & Multi Industries Co. Jordan



شركة الخليج للكابلات والصناعات الكهربائية ش.م.ك. - الكويت
Gulf Cable & Electrical Industries Co. K.S.C.P.- Kuwait



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INTRODUCTION

Gulf Cable and Electrical Industries Company K.S.C.P. (Gulf Cable) is the only domestic manufacturer and exporter of power cables, control cables, telecommunication cables and overhead conductors in Kuwait. We were established in March 1975 and have been listed on the Kuwait Stock Exchange since 1984. Our manufacturing operations commenced in 1979.

We embarked upon a massive restoration of our plant & its facilities during the early 90's when state-of-the-art machinery and testing equipment were acquired. Thereafter, new machines are recurrently being introduced to enhance our production capacity and product range. The new machines and equipment have numerous built-in functions and features assuring precision and consistency of the highest standard.

On a regular basis, we develop new products and enhance our existing ones. At Gulf Cable we pay utmost attention to product quality, and to ensure this, we have adapted a comprehensive Quality Assurance System that complies with international standards.

Quality has always been our top priority and meeting customer's expectations has been our prime objective. The very basis on which we have earned the confidence of our clientele.

At Gulf Cable we follow stringent quality standards which go beyond stipulations of international specifications, rendering long term performance and reliability to our products during their service life.

At Gulf Cable we always aim for the best. When most of the cable manufacturers in the region settled for ISO: 9002, we stand out with ISO 9001, which recognizes our ability for Design and Development as well. We are also acknowledged by the Kuwait Quality Mark issued by the Ministry of Commerce and Industries.



PRODUCT RANGE



We at Gulf Cable always aim for the best. While most of the Cable Manufacturers in Gulf and Middle East region settled for ISO 9002, we stand out with ISO 9001 which recognizes our ability for Design & Development as well.

As a philosophy, our commitment to customers does not end with a sale. We also offer a host of related services before and after the sale. These include,

- Application engineering service for selection of appropriate product best suiting the end use.
- An extensive range of cables, single core wires, flexible cords bare & insulated conductors manufactured to stringent Quality Standards going beyond international specifications.
- Design and Development of products tailored to meet specific requirements of the application.
- To help the customers understand the product intricacies and its performance levels.

NOTE 1: THE TABULATIONS ON SUBSEQUENT PAGES FURNISH OVERALL DIMENSIONS, NET & GROSS WEIGHTS AND DRUM DIMENSIONS. PLEASE NOTE THAT THESE ARE "APPROXIMATE" VALUES. THEY HAVE BEEN FURNISHED FOR GENERAL GUIDELINES AND INTENDED TO BE USED FOR THUMB RULE ESTIMATIONS/FREIGHT CALCULATIONS.

NOTE 2: THE FOLLOWING LIST TABULATES ONLY THE "STANDARD" PRODUCTS. FOR ANY PRODUCT NOT LISTED BELOW, PLEASE DO NOT HESITATE TO CONTACT OUR SALES & MARKETTING DIVISION. WE SHALL BE TOO PLEASED TO MEET YOUR SPECIFIC REQUIREMENTS.

PRODUCT	STANDARD
LOW VOLTAGE POWER CABLES 1000 / 600 V & 3.3 / 1.9 KV	
XLPE Insulated, Lead Sheathed, Armoured and PVC Sheathed Cables	IEC 1 - 60502
MEDIUM VOLTAGE POWER CABLES 11 / 6.35 KV	
XLPE Insulated, Lead Sheathed, Armoured and PVC Sheathed Cables	IEC 2 - 60502

1000 / 600 V - TWO CORE

**COPPER CONDUCTOR XLPE INSULATED
LEAD SHEATHED
STEEL WIRE ARMoured
PVC SHEATHED CABLES**

CU/XLPE/PVC/LC/PVC/SWA/PVC

1



Nominal area of conductor	Maximum Conductor Resistance at 20 °C	Thickness of Insulation (Nom.)	Thickness of Extruded Bedding (Approx.)	Thickness of Lead Sheath (Nom.)	Thickness of Separation Sheath (Nom.)	Dia of Armour wire (Nom.)	Thickness of Outer Sheath (Nom.)	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length	Drum Size	Approx. Gross Weight
Sqmm	Ohm/KM	mm	mm	mm	mm	mm	mm	mm	kg / km	Metre ± %5		Kg
1.5	12.1	0.7	1.0	1.2	1.0	1.25	1.8	20.3	1150	1000	D - 12	1260
2.5	7.41	0.7	1.0	1.2	1.0	1.25	1.8	21.1	1250	1000	D - 14	1400
4	4.61	0.7	1.0	1.2	1.0	1.25	1.8	22.1	1370	1000	D - 14	1520
6	3.08	0.7	1.0	1.2	1.0	1.25	1.8	23.3	1525	1000	D - 14	1675
10	1.83	0.7	1.0	1.2	1.0	1.60	1.8	25.4	1870	1000	D - 16	2080
16	1.15	0.7	1.0	1.2	1.0	1.60	1.8	27.6	2210	1000	D - 18	2450
25	0.727	0.9	1.0	1.2	1.0	1.60	1.8	30.8	2740	500	D - 14	1520
35	0.524	0.9	1.0	1.2	1.0	1.60	1.9	33.2	3180	500	D - 16	1800
50	0.387	1.0	1.0	1.3	1.1	2.00	2.0	37.5	3945	500	D - 18	2215
70	0.268	1.1	1.0	1.4	1.1	2.00	2.2	41.7	4880	500	D - 18	2680
95	0.193	1.1	1.2	1.5	1.2	2.00	2.3	46.5	6075	500	D - 19	3360
120	0.153	1.2	1.2	1.6	1.3	2.50	2.4	51.5	7525	500	D - 19	4085
150	0.124	1.4	1.2	1.7	1.3	2.50	2.6	55.7	8775	250	D - 18	2435
185	0.0991	1.6	1.4	1.8	1.4	2.50	2.7	60.7	10335	250	D - 18	2825
240	0.0754	1.7	1.4	2.0	1.5	2.50	2.9	67.1	12665	250	D - 18	3410
300	0.0601	1.8	1.6	2.1	1.6	2.50	3.1	72.7	14875	250	D - 21	4140
400	0.0470	2.0	1.6	2.3	1.8	3.15	3.4	82.0	19120	200	D - 21	4245
500	0.0366	2.2	1.6	2.5	1.9	3.15	3.6	89.8	22940	200	D - 21	5010

All conductors circular stranded or circular stranded compacted (Class 2).
Extruded PVC Bedding above and below Lead Sheath.
Lead Alloy Type 'E' to BS 801, Lead Sheath Thickness to IEC 1997/1-60502.
PVC Type - 9 / ST2- Outersheath.
Cables conform to IEC 1997/1-60502.

1000 / 600 V - THREE CORE

COPPER CONDUCTOR XLPE INSULATED
LEAD SHEATHED
STEEL WIRE ARMoured
PVC SHEATHED CABLES

CU/XLPE/PVC/LC/PVC/SWA/PVC



Nominal area of conductor	Maximum Conductor Resistance at 20 °C	Thickness of Insulation (Nom.)	Thickness of Extruded Bedding (Approx.)	Thickness of Lead Sheath (Nom.)	Thickness of Separation Sheath (Nom.)	Dia of Armour wire (Nom.)	Thickness of Outer Sheath (Nom.)	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length	Drum Size	Approx. Gross Weight
Sqmm	Ohm/KM	mm	mm	mm	mm	mm	mm	mm	kg / km	Metre ± %5		Kg
1.5	12.1	0.7	1.0	1.2	1.0	1.25	1.8	20.8	1210	1000	D - 12	1320
2.5	7.41	0.7	1.0	1.2	1.0	1.25	1.8	21.7	1320	1000	D - 14	1470
4	4.61	0.7	1.0	1.2	1.0	1.25	1.8	22.8	1470	1000	D - 14	1620
6	3.08	0.7	1.0	1.2	1.0	1.25	1.8	24.1	1650	1000	D - 14	1800
10	1.83	0.7	1.0	1.2	1.0	1.60	1.8	26.3	2045	1000	D - 16	2255
16	1.15	0.7	1.0	1.2	1.0	1.60	1.8	28.7	2445	1000	D - 18	2685
25	0.727	0.9	1.0	1.2	1.0	1.60	1.9	29.7	2710	500	D - 12	1465
35	0.524	0.9	1.0	1.2	1.0	1.60	1.9	32.1	3190	500	D - 16	1805
50	0.387	1.0	1.0	1.3	1.1	2.00	2.1	36.9	4235	500	D - 18	2360
70	0.268	1.1	1.2	1.4	1.2	2.00	2.2	40.4	5265	500	D - 18	2875
95	0.193	1.1	1.2	1.5	1.2	2.00	2.4	44.8	6565	500	D - 19	3605
120	0.153	1.2	1.2	1.6	1.3	2.50	2.5	49.8	8220	500	D - 19	4430
150	0.124	1.4	1.4	1.7	1.4	2.50	2.7	54.0	9705	250	D - 18	2670
185	0.0991	1.6	1.4	1.8	1.5	2.50	2.8	58.8	11270	250	D - 18	3060
240	0.0754	1.7	1.6	2.0	1.6	2.50	3.0	65.9	14365	250	D - 18	3835
300	0.0601	1.8	1.6	2.1	1.7	2.50	3.2	71.0	16970	250	D - 21	4665
400	0.0470	2.0	1.6	2.4	1.9	3.15	3.6	81.1	22195	250	D - 21	5970
500	0.0366	2.2	1.8	2.6	2.0	3.15	3.8	87.3	26470	200	D - 23	5795

Conductors including 16 sqmm Circular Stranded (Class 2).
25 Sqmm and above shaped stranded conductors (Class 2).
Extruded PVC Bedding above and below Lead Sheath.
Lead Alloy Type -'E' to BS 801, Lead Sheath Thickness to IEC 1997/1-60502.
PVC Type - 9 / ST2- Outersheath.
Cables conform to IEC 1997/1-60502.

1000 / 600 V - FOUR CORE

**COPPER CONDUCTOR XLPE INSULATED
LEAD SHEATHED
STEEL WIRE ARMoured
PVC SHEATHED CABLES**

CU/XLPE/PVC/LC/PVC/SWA/PVC



Nominal area of conductor	Maximum Conductor Resistance at 20 °C	Thickness of Insulation (Nom.)	Thickness of Extruded Bedding (Approx.)	Thickness of Lead Sheath (Nom.)	Thickness of Separation Sheath (Nom.)	Dia of Armour wire (Nom.)	Thickness of Outer Sheath (Nom.)	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length	Drum Size	Approx. Gross Weight
Sqmm	Ohm/KM	mm	mm	mm	mm	mm	mm	mm	kg / km	Metre ± %5		Kg
1.5	12.1	0.7	1.0	1.2	1.0	1.25	1.8	21.7	1305	1000	D - 14	1455
2.5	7.41	0.7	1.0	1.2	1.0	1.25	1.8	22.7	1430	1000	D - 14	1580
4	4.61	0.7	1.0	1.2	1.0	1.25	1.8	23.9	1605	1000	D - 14	1755
6	3.08	0.7	1.0	1.2	1.0	1.60	1.8	26.0	1945	1000	D - 16	2155
10	1.83	0.7	1.0	1.2	1.0	1.60	1.8	27.7	2270	1000	D - 18	2510
16	1.15	0.7	1.0	1.2	1.0	1.60	1.8	30.4	2760	1000	D - 18	3000
25	0.727	0.9	1.0	1.2	1.0	1.60	1.9	31.8	3145	500	D - 14	1725
35	0.524	0.9	1.0	1.2	1.1	2.00	2.1	36.6	4080	500	D - 18	2280
50	0.387	1.0	1.0	1.4	1.2	2.00	2.2	40.3	2660	500	D - 18	2795
70	0.268	1.1	1.2	1.5	1.2	2.00	2.3	44.4	6450	500	D - 19	3545
95	0.193	1.1	1.2	1.6	1.3	2.50	2.5	50.3	8460	500	D - 19	4550
120	0.153	1.2	1.4	1.7	1.4	2.50	2.7	54.7	10100	500	D - 23	5550
150	0.124	1.4	1.4	1.8	1.5	2.50	2.9	59.5	11960	250	D - 18	3230
185	0.0991	1.6	1.4	2.0	1.6	2.50	3.0	65.5	14440	250	D - 19	3930
240	0.0754	1.7	1.6	2.2	1.7	2.50	3.3	71.8	17800	250	D - 23	4950
300	0.0601	1.8	1.6	2.3	1.8	3.15	3.5	79.3	22000	250	D - 23	6000
400	0.0470	2.0	1.8	2.6	2.0	3.15	3.8	88.1	27435	200	D - 23	5990
500	0.0366	2.2	1.8	2.8	2.2	3.15	4.1	98.0	33475	200	D - 23	7195

Conductors including 16 sqmm Circular Stranded (Class 2).
25 Sqmm and above shaped stranded conductors (Class 2).
Extruded PVC Bedding above and below Lead Sheath.
Lead Alloy Type -'E' to BS 801, Lead Sheath Thickness to IEC 1997/1-60502.
PVC Type - 9 / ST2- Outersheath.
Cables conform to IEC 1997/1-60502.

3.3 / 1.9 KV - THREE CORE

COPPER CONDUCTOR XLPE INSULATED
LEAD SHEATHED
STEEL WIRE ARMoured
PVC SHEATHED CABLES

CU/XLPE/PVC/LC/PVC/SWA/PVC



Nominal area of conductor	Maximum Conductor Resistance at 20 °C	Thickness of Insulation (Nom.)	Thickness of Extruded Bedding (Approx.)	Thickness of Lead Sheath (Nom.)	Thickness of Separation Sheath (Nom.)	Dia of Armour wire (Nom.)	Thickness of Outer Sheath (Nom.)	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length	Drum Size	Approx. Gross Weight
Sqmm	Ohm/KM	mm	mm	mm	mm	mm	mm	mm	kg / km	Metre ± %5		Kg
25	0.727	2.0	1.0	1.2	1.1	2.00	2.1	35.8	3515	500	D - 18	2000
35	0.524	2.0	1.0	1.3	1.1	2.00	2.1	38.3	4135	500	D - 18	2310
50	0.387	2.0	1.2	1.4	1.2	2.00	2.3	42.3	5030	500	D - 18	2755
70	0.268	2.0	1.2	1.5	1.3	2.50	2.4	46.0	6345	500	D - 19	3495
95	0.193	2.0	1.2	1.6	1.3	2.50	2.5	50.2	7715	500	D - 19	4180
120	0.153	2.0	1.4	1.7	1.4	2.50	2.7	54.4	9105	500	D - 21	4975
150	0.124	2.0	1.4	1.8	1.5	2.50	2.8	57.1	10385	250	D - 18	2840
185	0.0991	2.0	1.4	1.9	1.5	2.50	2.9	60.9	12010	250	D - 18	3245
240	0.0754	2.0	1.6	2.0	1.6	2.50	3.1	67.4	14630	250	D - 18	3900
300	0.0601	2.0	1.6	2.2	1.7	2.50	3.3	72.2	17375	250	D - 21	4765
400	0.0470	2.0	1.6	2.4	1.9	3.15	3.6	81.1	22195	200	D - 21	4860
500	0.0366	2.2	1.8	2.6	2.0	3.15	3.8	87.3	26470	200	D - 23	5795

All conductors shaped stranded conductors (Class 2).
Extruded PVC Bedding above and below Lead Sheath.
Lead Alloy Type -'E' to BS 801, Lead Sheath Thickness to IEC 1997/1-60502.
PVC Type - 9 / ST2- Outersheath.
Cables conform to IEC 1997/1-60502.

11/6.35 KV - THREE CORE (HIGHEST SYSTEM VOLTAGE - 12 KV)

**COPPER CONDUCTOR XLPE INSULATED
LEAD SHEATHED
STEEL WIRE ARMoured
PVC SHEATHED CABLES**

CU/SC/XLPE/SC/CUT/PVC/LC/PVC/SWA/PVC



Nominal area of conductor	Maximum Conductor Resistance at 20 °C	Thickness of XLPE Insulation (Nom.)	Thickness of Copper Tape (Approx.)	Thickness of Extruded Bedding (Approx.)	Thickness of Lead Sheath (Nom.)	Thickness of Separation Sheath (Nom.)	Dia of Armour wire (Nom.)	Thickness of Outer Sheath (Nom.)	Approx. Overall Diameter	Approx. Cable Weight	Standard Packing Length	Drum Size	Approx. Gross Weight
Sqmm	Ohm/KM	mm	mm	mm	mm	mm	mm	mm	mm	kg / km	Metre ± %5		Kg
35	0.524	3.4	0.075	1.4	1.8	1.4	2.50	2.7	59.6	8360	500	D - 22	4650
50	0.387	3.4	0.075	1.4	1.9	1.5	2.50	2.8	62.6	9340	500	D - 23	5170
70	0.268	3.4	0.075	1.4	2.0	1.5	2.50	2.9	66.5	10725	500	D - 23	5865
95	0.193	3.4	0.075	1.4	2.1	1.6	2.50	3.0	71.2	12445	500	D - 23	6725
120	0.153	3.4	0.075	1.6	2.2	1.7	2.50	3.2	75.6	14105	500	D - 23	7555
150	0.124	3.4	0.075	1.6	2.3	1.7	3.15	3.3	80.3	16535	400	D - 23	7115
185	0.0991	3.4	0.075	1.6	2.4	1.8	3.15	3.5	84.6	18550	250	D - 23	5140
240	0.0754	3.4	0.075	1.6	2.5	1.9	3.15	3.6	90.6	21530	250	D - 25	6135
300	0.0601	3.4	0.075	1.8	2.6	2.0	3.15	3.8	96.1	24610	250	D - 25	6905

All conductor circular compacted.

Equivalent voltage designation as per IEC 10/6 : 1997/2-60502 KV.

Lead Alloy Type'E' to BS 801, Lead Sheath Thickness to IEC 1997/2-60502.

PVC Type - 9 / ST2- Outersheath.

Cables conform to IEC 1997/2-60502.

INSTALLATION CONDITIONS

- | | | |
|----|---|---------------|
| 1. | Continuous operating temperature of conductor | : - |
| | a) PVC type5- insulated | : 85° C |
| | b) XLPE insulated | : 90° C |
| 2. | Ambient temperature | : 52° C |
| 3. | Temperature of ground | : 35° C |
| 4. | Depth of laying in ground :- | |
| | a) LV Cables | : 750 mm |
| | b) MV Cables | : 1000 mm |
| 5. | Thermal resistivity of soil | : 1.2° C .m/W |

OTHER CONDITIONS

A. LOW VOLTAGE CABLES 1000/600 V

1. SINGLE CORE CABLES

- i) Two cables spaced one cable diameter installed vertical in air.
- ii) Two cables spaced one cable diameter laid horizontally underground.

2. MULTI CORE CABLES

- i) Single cable touching wall installed in air.
- ii) Single isolated buried cable in ground.
- iii) Single cable installed in single isolated buried ducts -

- | | | |
|----------------------------|---|---------------------------|
| a) Duct material | : | Earthen ware |
| b) Depth of laying | : | - |
| | | i) LV Cables : 750 mm |
| | | ii) MV Cables : 1000 mm |
| c) Duct diameter | | |
| i) Cable dia. up to 65 mm | : | OD = 130 mm & ID = 100 mm |
| ii) Cable dia. above 65 mm | : | OD = 160 mm & ID = 125 mm |

B. MEDIUM VOLTAGE CABLES 6.6 KV TO 33 KV

1. SINGLE CORE CABLES

- i) Three cables, trefoil, in air, two point bonding, separated from wall.
- ii) Three cables flat with a gap of one cable diameter installed vertically in air, separated from wall. Single point or cross bonded.
- iii) Three cables with gap one cable diameter laid horizontally underground.

2. MULTI CORE CABLES

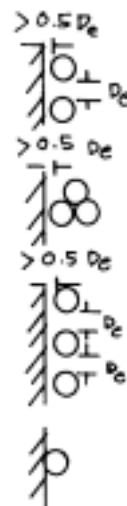
- i) Single cable touching wall installed in air.
- ii) Single isolated buried cable in ground.

INSTALLATION DETAILS

I) IN AIR (Installed on non-continuous brackets, ladder supports or cleats)

a) Single Core

- 1) Two cables spaced 'De' vertical :
- 2) Three cables trefoil :
- 3) Three cables (flat) spaced 'De' vertical :



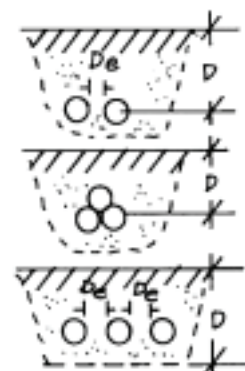
b) Multi Core

- 1) Single cable touching wall :

II) IN GROUND

a) Single Core

- 1) Two cables spaced 'De' horizontal :
- 2) Three cables trefoil :
- 3) Three cables (flat) spaced 'De' horizontal :



b) Multi Core

- 1) Single isolated buried cable :



III) IN DUCT (Multi Core Cables)

- 1) Single isolated buried ducts :



NOTE:-

De : External diameter of cable
D : Depth of Laying

LOW VOLTAGE CABLES 1000/600 V

COPPER CONDUCTOR
XLPE INSULATED CABLES

TWO CORE ARMoured CABLES



CURRENT CARRYING CAPACITY IN AMPERES			
Nominal Area of Conductor Sqmm	In Air	In Ground	In Duct
	XLPE Insulated	XLPE Insulated	XLPE Insulated
	Copper	Copper	Copper
1.5	21	32	26
2.5	28	41	34
4	37	53	44
6	47	66	54
10	63	87	72
16	84	113	93
25	113	146	120
35	137	174	145
50	165	205	172
70	206	251	211
95	254	301	255
120	293	341	290
150	332	381	325
185	380	428	367
240	447	494	424
300	506	552	475
400	578	619	533
***	I.b.1	II.b.1	III.1

Note
*** Installation condition (please refer at the beginning of this section).

LOW VOLTAGE CABLES 1000/600 V TO 3.3/1.9 KV

**COPPER CONDUCTOR
XLPE INSULATED CABLES**

THREE OR FOUR CORE ARMoured CABLES



CURRENT CARRYING CAPACITY IN AMPERES			
Nominal Area of Conductor Sqmm	In Air	In Ground	In Duct
	XLPE Insulated	XLPE Insulated	XLPE Insulated
	Copper	Copper	Copper
1.5	17	27	22
2.5	23	35	28
4	30	45	37
6	38	57	46
10	52	75	61
16	70	98	79
25	91	122	101
35	113	148	122
50	140	176	146
70	175	215	179
95	218	258	216
120	254	295	247
150	288	328	276
185	333	371	313
240	396	430	363
300	449	481	407
400	519	545	469
500	590	595	514
***	I.b.1	II.b.1	III.1

Note

*** Installation condition (please refer at the beginning of this section).

MEDIUM VOLTAGE CABLES 6.6/3.8KV TO 33/19KV

COPPER CONDUCTOR
XLPE INSULATED CABLES



CURRENT CARRYING CAPACITY IN AMPERES		
Nominal Area of Conductor Sqmm	In Air	In Ground
	Copper	Copper
35	130	145
50	160	170
70	196	210
95	240	250
120	275	284
150	312	318
185	355	360
240	415	410
300	469	458
400	530	510
***	I.b.1	II.b.1

Note
*** Installation Condition (please refer at the beginning of this section)



**RATING FACTORS FOR VARIATION IN
AMBIENT TEMPERATURE FOR CABLES LAID IN AIR**

Ambient temperature ° C	25	30	35	40	45	50	52	55	60
XLPE insulated cables	1.37	1.30	1.24	1.17	1.09	1.03	1.00	0.95	0.88

**RATING FACTORS FOR VARIATION IN GROUND TEMPERATURE
FOR CABLES LAID DIRECT IN GROUND OR IN DUCTS**

Ground temperature °C	15	20	25	30	35	40	45
XLPE insulated cables	1.16	1.13	1.08	1.03	1.00	0.95	0.90

**RATING FACTORS FOR DEPTHS OF LAYING FOR
CABLES LAID DIRECT IN GROUND OR IN DUCTS**

Depth of Laying Metre	1000/600 V Cables			3.3/1.9 KV to 33/19 KV Cables		
	Cables Laid in Ground			Cables Laid in Ducts	Cables Laid in Ground	
	Upto 50 Sqmm	70 Sqmm to 300 Sqmm	Above 300 Sqmm	Multicore	Upto 300 Sqmm	Above 300 Sqmm
0.50	1.026	1.036	1.055	1.026	-	-
0.60	1.015	1.016	1.023	1.015	-	-
0.75	1.000	1.000	1.000	1.000	-	-
0.80	0.995	0.995	0.992	0.995	1.020	1.031
1.00	0.974	0.974	0.970	0.985	1.000	1.000
1.25	0.964	0.953	0.949	0.974	0.980	0.979
1.50	0.954	0.943	0.939	0.964	0.969	0.969
1.75	0.944	0.922	0.918	0.964	0.959	0.948
2.00	0.933	0.912	0.907	0.954	0.939	0.928
2.50	0.923	0.902	0.897	0.954	0.929	0.918
3.00	0.913	0.891	0.876	0.944	0.918	0.907
or more						

Depth of laying is measured from surface of ground to the centre of a Cable/Duct or to the centre of a trefoil group of Cables/ ducts as the case may be.



GROUP RATING FACTORS (1/0.6 KV CABLES) LAID IN GROUND

No. of Circuits	Multicore Cable in Horizontal Formation				
	Spacing of Circuits (M)				
	Touching	0.15	0.30	0.45	0.60
2	0.81	0.87	0.91	0.93	0.95
3	0.70	0.78	0.84	0.88	0.90
4	0.63	0.74	0.81	0.86	0.89
5	0.59	0.70	0.78	0.84	0.87
6	0.55	0.68	0.77	0.83	0.87
7	0.52	0.66	0.75	0.82	0.86
8	0.50	0.64	0.75	0.81	0.86
9	0.48	0.63	0.74	0.81	0.85
10	0.47	0.62	0.73	0.80	0.85
11	0.45	0.61	0.73	0.80	0.85
12	0.44	0.60	0.72	0.80	0.84

GROUP RATING FACTORS (3.3/1.9 KV TO 33/19 KV CABLES) LAID IN GROUND

No. of Circuits	Multicore Cable in Horizontal Formation				
	Spacing Between Cables (M)				
	Touching	0.15	0.30	0.45	0.60
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



**RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
TWIN OR MULTI -CORE CABLES LAID DIRECT IN THE GROUND**

Nominal Area of Conductor Sqmm	Thermal Resistivity of Soil in ° C m/w										
	0.7	0.8	0.9	1.0	1.2	1.5	2.0	2.5	3.0	3.5	4.0
2.5	1.12	1.09	1.07	1.04	1.0	0.94	0.86	0.80	0.75	0.70	0.66/1.5
4	1.13	1.10	1.07	1.05	1.0	0.94	0.85	0.79	0.74	0.69	0.65
6	1.14	1.10	1.07	1.05	1.0	0.93	0.85	0.79	0.74	0.68	0.64
10	1.15	1.11	1.08	1.05	1.0	0.93	0.85	0.78	0.73	0.67	0.63
16	1.16	1.12	1.08	1.05	1.0	0.93	0.84	0.77	0.72	0.66	0.62
25	1.17	1.13	1.09	1.05	1.0	0.93	0.83	0.77	0.71	0.65	0.61
35	1.17	1.13	1.09	1.06	1.0	0.92	0.83	0.76	0.71	0.65	0.61
50	1.17	1.13	1.09	1.06	1.0	0.92	0.83	0.76	0.71	0.65	0.61
70	1.18	1.14	1.09	1.06	1.0	0.92	0.83	0.75	0.70	0.64	0.60
95	1.18	1.14	1.09	1.06	1.0	0.92	0.83	0.75	0.70	0.64	0.60
120	1.19	1.14	1.10	1.06	1.0	0.92	0.82	0.75	0.69	0.63	0.60
150	1.19	1.14	1.10	1.06	1.0	0.92	0.82	0.75	0.69	0.63	0.59
185	1.19	1.14	1.10	1.06	1.0	0.92	0.82	0.74	0.69	0.63	0.59
240	1.20	1.15	1.10	1.07	1.0	0.92	0.81	0.74	0.69	0.63	0.59
400	1.20	1.15	1.10	1.07	1.0	0.92	0.81	0.74	0.69	0.63	0.59/300



RATING FACTORS FOR VARIATION IN THERMAL RESISTIVITY OF SOIL
TWIN OR MULTI-CORE CABLES LAID IN SINGLE -WAY DUCTS

Nominal Area of Conductor Sqmm	Thermal Resistivity of Soil in ° C m/w										
	0.7	0.8	0.9	1.0	1.2	1.5	2.0	2.5	3.0	3.5	4.0
2.5	1.04	1.03	1.02	1.02	1.0	0.98	0.94	0.91	0.88	0.86	0.83/1.5
4	1.04	1.04	1.03	1.02	1.0	0.97	0.94	0.90	0.87	0.85	0.82
6	1.05	1.04	1.03	1.02	1.0	0.97	0.93	0.90	0.86	0.84	0.81
10	1.05	1.04	1.03	1.02	1.0	0.97	0.93	0.89	0.86	0.83	0.80
16	1.06	1.04	1.03	1.02	1.0	0.97	0.92	0.88	0.85	0.82	0.79
25	1.06	1.05	1.03	1.02	1.0	0.96	0.92	0.88	0.84	0.82	0.78
35	1.06	1.05	1.03	1.02	1.0	0.96	0.92	0.87	0.83	0.81	0.77
50	1.07	1.05	1.03	1.02	1.0	0.96	0.91	0.87	0.83	0.80	0.77
70	1.07	1.05	1.04	1.02	1.0	0.96	0.91	0.86	0.82	0.79	0.76
95	1.07	1.06	1.04	1.02	1.0	0.96	0.91	0.86	0.82	0.78	0.75
120	1.08	1.06	1.04	1.03	1.0	0.95	0.90	0.85	0.81	0.78	0.74
150	1.09	1.06	1.04	1.03	1.0	0.95	0.90	0.85	0.80	0.77	0.73
185	1.09	1.07	1.05	1.03	1.0	0.95	0.89	0.84	0.80	0.76	0.72
240	1.09	1.07	1.05	1.03	1.0	0.95	0.89	0.84	0.79	0.76	0.72
400	1.10	1.07	1.05	1.03	1.0	0.95	0.88	0.83	0.78	0.75	0.71/300

VOLTAGE DROP

XLPE INSULATED CABLES 1000/600 V TO 3.3/1.9 KV

VOLTAGE DROPS AT MAXIMUM

CONDUCTOR OPERATING TEMPERATURE IN V/A/KM



Nominal Area of Conductor Sqmm	2 Core or 2 Single Core Cables - Touching	3 and 4 Core Cables
	Copper	Copper
1.5	30.9	26.7
2.5	18.9	16.4
4	11.8	10.2
6	7.9	6.8
10	4.7	4.0
16	2.9	2.5
25	1.9	1.65
35	1.35	1.15
50	1.0	0.87
70	0.69	0.60
95	0.52	0.45
120	0.42	0.37
150	0.35	0.30
185	0.29	0.26
240	0.24	0.21
300	0.21	0.19
400	0.20	0.17
500	0.17	0.16
630	0.16	-
800	0.15	-
1000	0.15	-

1000/600 V TO 3.3/1.9 KV CABLES

A.C. RESISTANCE AND REACTANCE VALUES



Nominal Area of Conductor Sqmm	XLPE INSULATED CABLES	
	A.C. Resistance at 90°C	Reactance at 50 Hz
	Multicore Cables	Multicore Cables
	Copper	
	Ohm/km	Ohm/km
1.0	-	-
1.5	15.43	0.115
2.5	9.45	0.107
4	5.88	0.093
6	3.93	0.089
10	2.33	0.084
16	1.47	0.081
25	0.927	0.081
35	0.668	0.079
50	0.494	0.075
70	0.342	0.074
95	0.247	0.073
120	0.197	0.072
150	0.160	0.072
185	0.128	0.072
240	0.0989	0.071
300	0.0802	0.070
400	0.0645	0.070
500	0.0530	0.070
630	-	-
800	-	-
1000	-	-



6.6/3.8 KV CABLES

A.C. RESISTANCE, REACTANCE AND CAPACITANCE VALUES

Conductor size Sq.mm	-3Core Cables		
	A.C. Resistance at 90°C	Reactance (50 Hz)	Capacitance
	Copper (Ω/km)	(Ω/km)	(μF/km)
35	0.668	0.108	0.30
50	0.494	0.103	0.33
70	0.342	0.098	0.38
95	0.247	0.094	0.43
120	0.196	0.090	0.48
150	0.159	0.088	0.52
185	0.127	0.086	0.56
240	0.0971	0.083	0.61
300	0.0778	0.082	0.62
400	0.0614	0.080	0.65
500	-	-	-
630	-	-	-

11/6.35 KV CABLES

A.C. RESISTANCE, REACTANCE AND CAPACITANCE VALUES

Conductor size Sq.mm	-3Core Cables		
	A.C. Resistance at 90°C	Reactance (50 Hz)	Capacitance
	Copper (Ω/km)	(Ω/km)	(μF/km)
35	0.668	0.116	0.24
50	0.494	0.111	0.26
70	0.342	0.105	0.29
95	0.247	0.100	0.34
120	0.196	0.097	0.37
150	0.159	0.093	0.40
185	0.128	0.091	0.43
240	0.097	0.087	0.48
300	0.0778	0.085	0.52
400	0.0614	0.082	0.59
500	-	-	-
630	-	-	-

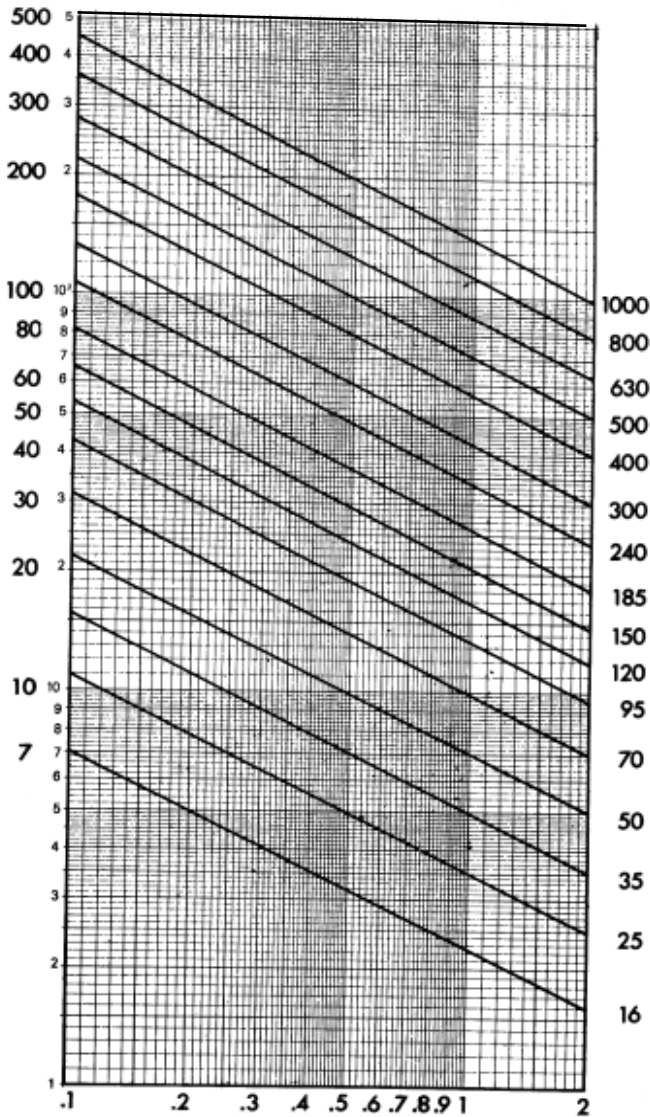
SHORT CIRCUIT CURRENT CURVES FOR
COPPER CONDUCTOR XLPE INSULATED CABLES



$$I_{sc} = 0.14 \frac{A}{\sqrt{t}}$$

I_{sc} - Short Circuit Current in KA
A - Conductor Area in Sqmm
t - Short Circuit Time in Sec.

MAX. SHORT CIRCUIT CURRENT KA

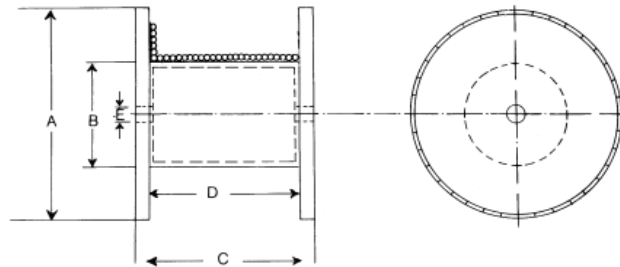


SHORT CIRCUIT TIME (Sec.) t.

CONDUCTOR AREA Sqmm

DRUMS SIZES AND DIMENSIONS

A - Flange diameter (excluding lagging), mm
B - Barrel diameter, mm
C - Overall width, mm
D - Traverse width, mm
E - Minimum spindle hole diameter, mm



DIMENSIONS

Drum Size D-No	A	B	C	D	E
D-6	600	250	470	400	110
D-7	700	325	570	500	110
D-8	800	375	570	500	110
D-9	900	425	620	550	110
D-10	1000	500	690	600	110
D-11	1100	575	740	650	110
D-12	1200	675	950	850	110
D-14	1400	800	950	850	110
D-16	1600	950	970	850	110
D-18	1800	1100	1220	1100	110
D-19	1900	1100	1230	1100	110
D-20	2000	1300	1235	1100	110
D-21	2100	1150	1290	1100	110
D-22	2200	1400	1390	1250	110
D-23	2340	1200	1795	1625	110
D-24	2400	1200	1795	1625	110
D-25-S	2540	1200	1825	1625	110
D-25	2540	1400	1800	1625	110
D-26	2600	1400	1970	1800	110

Drum dimensions in actual deliveries are subject to change without notice.

NOTES

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NOTES

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