Jeddah cables COMPANY

A Company of Energya Cables Saudi Arabia

MEDIUM VOLTAGE CABLES

Introduction

Today, XLPE (Cross- Linked Polyethylene) insulated cables are the most common cables used for power transmission and distribution by the power and energy utilities. XLPE Cables have replaced paper insulated cables since there first development in the 1960s. XLPE insulation is a thermo-set (non-recyclable) material, with an operating temperature of 90^{O}C at normal condition. Similar in properties to regular PE, XLPE is not limited by the temperature of 70^{O}C at normal condition. Cross-linking is the term used to describe the process where individual polymer molecules (in PE) are tied together to form a network structure. This is done using curing techniques, such as Nitrogen curing (Dry-Curing). Nitrogen curing technique is the method used in jeddah Cable Company in our CCV (Continuous Catinary Vulcanization) Lines. The effects of such cross-linking on the properties of polyethylene inculde :

- Excellent electrical properties
- Higher operating temperature, therefore higher current capacity of the insulated conductors
- Chemical properties are enhanced (namely oil resistance at elevated temperatures)
- Certain mechanical properties are also improved.

Nitrogen Curing is a process that utilizes nitrogen as a heating medium instead of pressurized steam. This method avoids saturating the insulation with water, thus reducing the number of voids generated there.

CCV (Continuous Catinary Vulcanization) lines are used in the manufacture of medium and high voltage cables. The CCV line is curved downward from a raised extruder platform, and follows a bowed shape rather than a straight line. This curved shape prevents dragging of the cable along the bottom of the tube, and helps minimize the sagging of the insulation. The State-of-Art CCV Line in jeddah Cable Company is used for triple extrusion of the inner semi-conductor, XLPE insulation, and the outer semiconductor ; the three layers are extruded simultaneously.

Medium Voltage Cables Design and Construction

Single-core or three-core cables consist of the following components:

Conductor

Conductors are made of copper or aluminum. Conductor design is usually circular stranded, and compacted. Our conductor design is in compliance with the requirements of IEC 60228 and BS 6360 Specifications

Insulation

Triple extrusion of inner semi-conductor (conductor screen) , XLPE insulation, and outer semi-conductor (insulation screen) is applied. XLPE insulation is dry cured. XLPE insulation material is as per the requirements of IEC 60502-2 or as per customer's request.

Metallic screen

The metallic screen is usually made of copper wires or copper tape. Radial water sealing such as AL-PE laminate and longitudinal water sealing may be applied upon customer's request.

Assembly

All cable cores are laid-up together with usage of non- hygroscopic filler material. These fillers are temperature compatible with all different cable layers such insulation, bedding, and sheath.

Armoring

Armor material can be either Aluminum for single core cables or Steel for multi-core cables. Armor can be either wires or tapes. Our cable armoring is in compliance with the requirements of IEC 60502-2 and BS 6622.

Outer Sheath/ Jacket

Our cables sheaths are made of an extruded layer of PVC or PE material and are in compliance with the requirements of IEC 60502-2 and BS 7655 Specifications. We are also capable of providing cable sheaths with special requirements to be:

- Termite retardant
- Oil & Gasoline retardant
- Ozone/acid/ alkali retardant
- Flame retardant and in compliance with requirements of IEC 60332-1 and IEC 61034-2
- Low smoke Halogen Free and in compliance with requirements of BS7211 and BS 6724

Testing of medium Voltage Power Cables

We, Jeddah Cable Company, are capable of performing all standard routine tests and sample tests that are normally carried out in accordance to IEC 60502-2 standards. We have all necessary equipment for such tests such as high voltage labs and special ovens.

We are also capable of performing tests in accordance with international or national requirements as agreed upon with our customers.

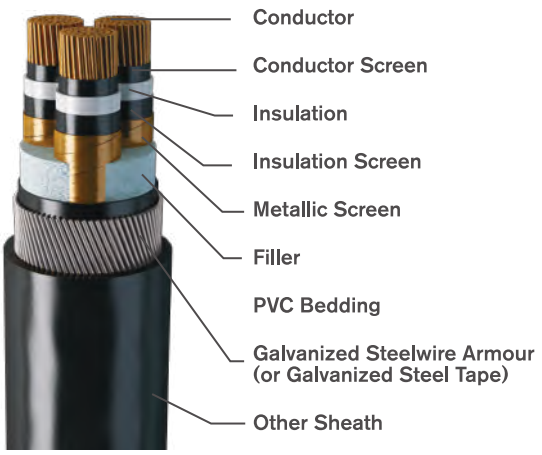
Routine Tests

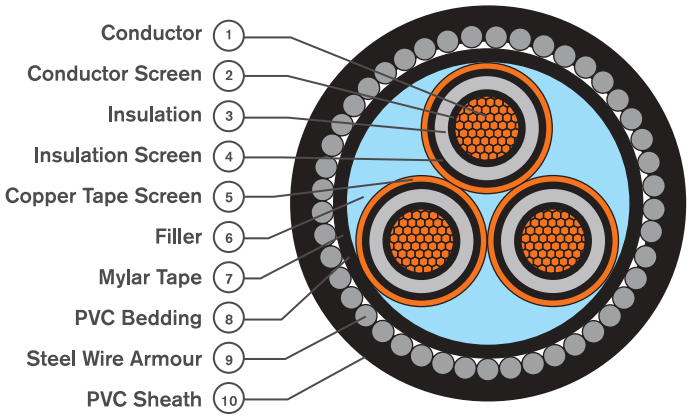
- Measurements of the Electrical Resistance of Conductors
- Partial Discharge Test.
- High Voltage Test

Sample Tests

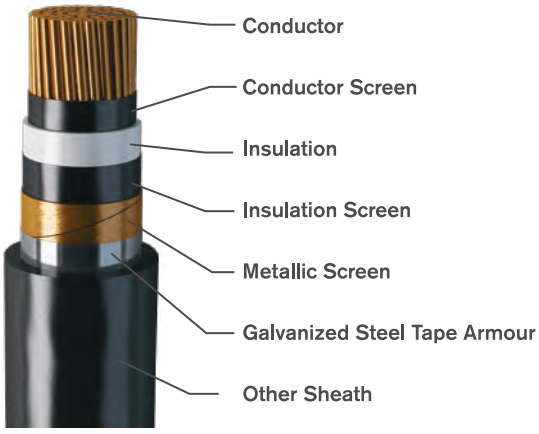
- Conductor Examination
- Check of Dimensions
- Hot Set Test for XLPE Insulations

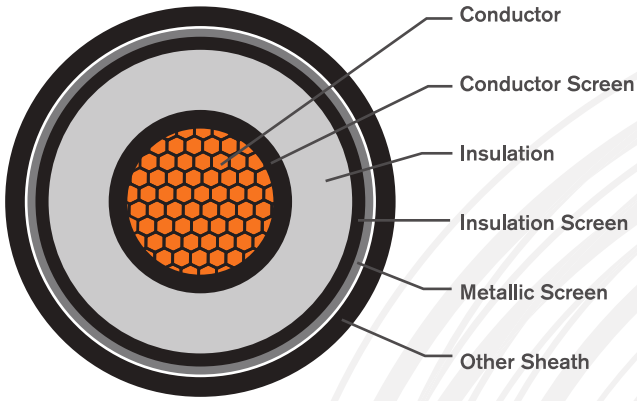
Medium Voltage Cables





3 Cores XLPE Cable





1 Core XLPE Cable

General Information
Selecting A Power Cables

The following factor are important when selecting a suitable cable construction which is required to transport electrical energy from the power station to the consumer:

- Maximum operating voltage
- Insulation level
- Frequency
- Load to be carried
- Magnitude and duration of possible overload
- Magnitude and duration of short-circuit current
- Voltage drop
- Length of line
- Mode of installation underground (direct or in ducts) in air
- Chemical and physical properties of soil
- Max. and min. ambient air temperature and soil temperatures
- Specification and requirements to be met

Voltages

The standard rated voltage of a cable is denoted by $U_o/U(Um)$,
where:
U_o : is the rated power-frequency voltage between conductor and earth or metallic screen.
U : is the rated power-frequency voltage between conductors.
Um : is the maximum continuously permissible operating voltage of a cable at any time or in any part ofthe network.

U_o/U	KV	3.6/6	6/10	8.7/15	12/20	18/30
Um	KV	7.2	12	17.5	24	36

Note:
Cable design for 6/10 and 18/30 kV is applicable for 6.35/11 and 19/33 kV respectively.

Standards

The cable described in this catalogue are all standard types,and their performance has been proved in operation.Construction and test are in accordance with the recommendation of IEC publications where applicable.
Power cables in accordance to other standards (e.g. BS, VDE, NEMA) can be manufactured upon customer's request.

Variation in Production and Delivery options

The provided data is approximate and subject to manufacturing tolerance Delivery length tolerance is ±5%

Jacket Marking

Standard embossed outer jacket marking consisting of:
1 - Name of manufacturer
2 - Type designation,size of conductor, rated voltage and standard.
3 - Continuous length marking every meter.
4 - Year of manufacture.

Laying Information

Minimum Bending Radius During Installation

During laying, the bending radius should not be smaller than values given below.

The radius depends on the outer diameter (D_o) of the cable.

XLPE insulated cables for 6.0 up to 30 kV

Type of Cable	Minimum Radius	
	During Laying	Adjacent to joints or terminations
Single-core		
- Unarmoured	20 D_o	15 D_o
- Armoured	20 D_o	12 D_o
Three-core		
- Unarmoured	15 D_o	12 D_o
- Amoured	12 D_o	10 D_o

Maximum Tensile Forces During Laying

Means of pulling	Type of cable	Formula	Factor
With the pulling head attached to the conductors	All types of cable	$P = \sigma . A$	$\sigma = 50 N/mm^2$ (Copper conductor) $\sigma = 30 N/mm^2$ (Alum. conductor)
With the pulling stocking	Un-armoured cables	$P = \sigma . A$	$\sigma = 50 N/mm^2$ (Copper conductor) $\sigma = 30 N/mm^2$ (Alum. conductor)
	Armoured cables	$P = k . d^2$	$K = 9 N/mm^2$

P = Pull in N

A = Total cross sectional area in mm^2 of all conductors (but not sceen or concentric conductor)

d = Outsode diameter of the cable in mm

σ = Permissible tensile stress of conductor in N/mm^2

k = Empirically derived factor on N/mm^2

Electrical Parameters Of The Cables

DC Resistance of Conductor

The Maximum DC resistance values of conductors at 20°C are as per " IEC 60228" standard.
DC resistances per unit length of the conductor at other conductor temperature are given by:

$$R = R_O [\ 1+\alpha_{20°C} (t-20^o)\ ]$$

where:

R = DC resistance at temperature t °C (Ω/km)

R_O = D.C resistance at temperature 20°C (Ω/km) (given in the relative tables for each type of cable)

t = Conductor temperature °C

$\alpha_{20°C}$ = Temperature coefficient at 20°C (1/°C)

For copper conductor $\alpha_{20°C} = 0.00393$

For aluminum conductor $\alpha_{20°C} = 0.00403$

A.C. Resistance of Conductor

The AC Resistance per unit length of the conductor (effective resistance) at its maximum operating temperature is made up of the DC resistance at this temperature and the extra resistance which takes into account additional losses caused by the current displacement in the conductor (Skin effect and Proximity effect). The AC resistance is given in the relative tables for each type of cable.

Inductance

The values of the inductance for both multicores and three single core cables have been calculated based on the following presumption equation.

$$L = K+0.2 \ln (2S/d) \text{ (mH/km)}$$

where:

K = a constant relating to the conductor formation (mH/km)

D = the conductor diameter (mm)

S = axial spacing between conductors for cables in trefoil formation (mm)

= 1.26 x axial spacing between conductors for cables in flat formation (mm)

The values for inductance of single core cables have been calculated based on one cable diameter between cables in flat formation

Operation Capacitance

The values of operating capacitance for cables have been calculated based on the following presumption:

$$C = \frac{\varepsilon_r}{18 \ln\left(\frac{D}{d}\right)} \ \mu f/km$$

Where:

ε_r = Relative permativity of insulation

D = External diameter of insulation (mm)

d = Conductor diameter (mm)

Operating temperature for XLPE insulated cables:

90°C for continuous normal operation

105°C for emergency overload conditions

250°C for short circuit conditions

Charging Current

The charging current is the capacitive current which flows when AC voltage is applied to the cable as a result of the capacitance between the conductors and metalic screen. The value can be derived from the equation.

$$I_C = U_O \omega C 10^{-6}$$

where:

U_O = Voltage between phase and earth (V)
$\omega = 2\pi f$ (rad/s)
f = Frequency (Hz)
C = Capacitance to neutral (μF/Km)

Dielectric Losses

The dielectric losses of an AC cable are proportional to the capacitance,the frequency, the phase voltage and dielectric power factor. They are given by:

$$D = (2\pi f C U_o^2 \tan\delta)10^{-6} \text{ (watt/m/phase)}$$

where:

f = Frequency Hz
C = Capacitance to neutral (μF/Km)
U_O = Voltage between phase and earth (V)
$\tan\delta$ = Dielectric power factor

Voltage Drop

When current flows in a cable conductor, there is a voltage drop between the ends of the conductor which is the product of the current and the impedance. The following equations should be used to calculate the voltage drop:

1-Single phase system

$$Vd = 2 (R \cos\phi + X \sin\phi) \text{ (Volt/amp/meter)}$$

2- Three phase system

$$Vd = \sqrt{3} (R\cos\phi + X\sin\phi) \text{ (Volt/amp/meter)}$$

where:

Vd = Voltage drop (V/am/m)
R = AC resistance of conductor at a maximum conductor temperature (Ω/km)
X = Inductive reactance of cable (Ω/km)
Cosϕ = power factor of load

Cable Short Circuit Current Capacity

The permissible short-circuit as presented in tables 11 to 13 are calculated in accordance with IEC 724, 1982. Which are based on the following conditions:

1- Short ciruit starts from the maximum operating temperature.
2- Maximum temperature during short circuit

XLPE=250°C
PVC= 160°C

3- Maximum short circuit current duration is 5 seconds The short circuit current (I) shall be calculated from the formula.

$$I^2 = (K^2 S^2/T) \ln \left[\frac{\theta_1 + \beta}{\theta_2 + \beta}\right] \text{ (A)}$$

where:

I = Short circuit current (A)
T = Duration of short circuit (second)
K = Constant for the material of the conductor
S = Area of conductor (mm^2)
θ_1 = Final temperature (°C)
θ_2 = Initial temperature (°C)
β = Reciprocal of the temperature coefficient of resistance (α) of the conductor

CURRENT RATINGS

1- RECOMMENDATIONS FOR CURRENT RATINGS

The current rating of power cables is defined by the maximum intensity of current (in amperes), which can flow continuously through the cable, under permanent loading conditions, without any risk of damaging the insulation or deterioration of its electrical properties.

- Current carrying capacities have been calculated in accordance with IEC 60287 (calculation of the continuous current rating of cables).

- The values given in the tables are valid for one circuit in three phase system under conditions specified. For grouping cables rating factors must be used.

- It is to be observed that the current carrying capacities presented in JCC technical data sheets are intended as a guide to assist operating engineers in selecting cables for safety and reliability.

- Basic assumptions and conditions of installation:

* Ambient ground temperature	:	20°C
* Ambient air temperature	:	30°C
* Depth of cable burial	:	1.0m
* Thermal resistivity of soil	:	120°C.Cm/W

- Cables in air are assumed to be protected from direct solar radiation.

- Single core cables are installed as indicated in the technical information tables. Spacing between cables in flat formation is assumed to be one cable diameter.

- For three and four-core cables, it is usual to assume the same current carrying capacity for four cores cables as for three-core cables. Our calculated values are based actually on three core cables. These values are suitable with enough accuracy also for four cores cables in most cases. Only for large four cores cables in air the values may be found to be too conservative, due to the large cable surface and consequent high heat dissipation factor.

- The inner diameter of ducts has been assumed to be at least 1.5 times the diameter of the cables.

- To obtain the maximum current carrying capacity of a cable operating at different conditions from the standards, you have to multiply the values of the current given in the technical information for the corresponding cable by the rating factors mentioned in the tables from 1 to 10, as follows:

$I_a = K_t I_s$ in amperes

where:

I_a : Current rating at actual operating conditions (amperes)

I_s : Current rating at standard operating conditions (amperes)

K_t : Rating factor given the in the tables 1 to 10.

It has to be noted that Kt is the total rating factor: $K_t = K_1 .... K_2 ..... K_n$

You may have a multiplication of so many partial rating factors, as many as the differences of laying and operating conditions from standard conditions.

Table 1

RATING FACTORS K FOR VARIATION IN GROUND TEMPERATURE

GROUND TEMPERATURE °C		20	25	30	35	40	45	50	55
PVC cables rated	70°C	1.00	0.95	0.90	0.84	0.78	0.71	0.63	0.54
PVC cables rated	85°C	1.00	0.96	0.92	0.87	0.83	0.78	0.73	0.67
XLPE cables rated	90°C	1.00	0.96	0.92	0.88	0.84	0.79	0.75	0.70

Table 2

RATING FACTORS K FOR VARIATION IN AIR TEMPERATURE

AIR TEMPERATURE °C		25	30	35	40	45	50	55
PVC cables rated	70°C	1.07	1.00	0.93	0.87	0.79	0.70	0.61
PVC cables rated	85°C	1.04	1.00	0.95	0.90	0.85	0.80	0.74
XLPE cables rated	90°C	1.04	1.00	0.96	0.91	0.87	0.82	0.76

Table 3

RATING FACTORS K FOR VARIATION IN GROUND DEPTH

DEPTH OF LAYING (m)	0.6	0.7	0.8	0.9	1.0	1.1	1.2
k	1.05	1.03	1.02	1.01	1.0	0.99	0.98

Table 4

RATING FACTORS K FOR VARIATION IN SOIL RESISTIVITY

SOIL RESISTIVITY (°C. cm/W)	80	90	100	120	150	200	250
k	1.17	1.12	1.07	1.0	0.91	0.80	0.73

Table 5

TREFOIL OR FLAT FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES LAID DIRECT IN GROUND

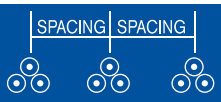
NUMBER OF CIRCUITS	 TREFOIL FORMATION				 FLAT FORMATION	
	TOUCHING		SPACING = 0.15 M		SPACING = 0.30 M	
NR	TREFOIL	FLAT	TREFOIL	FLAT	TREFOIL	FLAT
2	0.77	0.80	0.82	0.85	0.88	0.91
3	0.66	0.69	0.73	0.76	0.80	0.83
4	0.60	0.63	0.68	0.71	0.74	0.77
5	0.56	0.59	0.64	0.67	0.72	0.75
6	0.53	0.57	0.61	0.64	0.70	0.73

Table 6

TREFOIL OR FLAT FORMATION DERATING FACTORS FOR MULTI-CORE CABLES LAID DIRECT IN GROUND

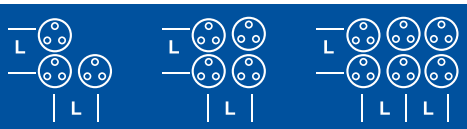
NUMBER OF CABLES	 TREFOIL FORMATION				 FLAT FORMATION	
	TOUCHING		SPACING = 0.15 M		SPACING = 0.30 M	
NR	TREFOIL	FLAT	TREFOIL	FLAT	TREFOIL	FLAT
2	0.81	0.81	0.87	0.87	0.91	0.91
3	0.69	0.70	0.76	0.78	0.82	0.84
4	0.62	0.63	0.72	0.74	0.77	0.81
5	0.58	0.60	0.66	0.70	0.73	0.78
6	0.54	0.56	0.63	0.67	0.70	0.76

Table 7

FLAT FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES LAID IN FREE AIR

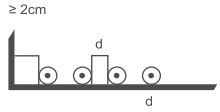
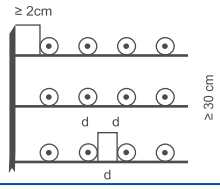
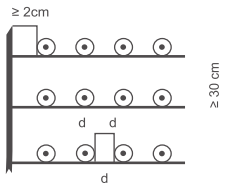
Clearance = Cable diameter (d) Clearance from the wall 2 Cm		Number of circuits 1	2	3	
Laid on the Floor		0.92	0.89	0.88	
	Number of troughs				
Laid cables	1	0.92	0.89	0.88	
troughs	2	0.87	0.84	0.83	
(circulation of air	3	0.84	0.82	0.81	
is restricted)	6	0.82	0.80	0.79	
	Number of racks				
	1	1.00	0.97	0.96	
	2	0.97	0.94	0.93	
Laid	3	0.96	0.93	0.92	
on cable racks	6	0.94	0.91	0.90	
Arranged near the wall		0.94	0.91	0.89	
Arranged on the wall		0.89	0.86	0.84	

Table 8

TREFOIL TOUCHING FORMATION DERATING FACTORS FOR THREE SINGLE CORE CABLES LAID IN FREE AIR

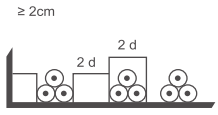
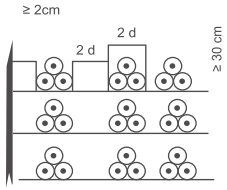
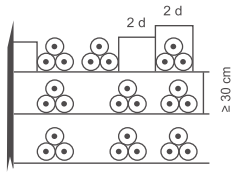
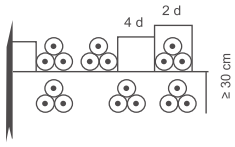
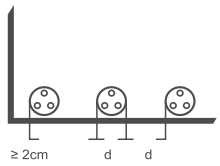
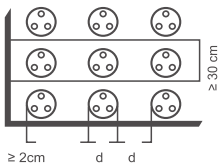
Clearance = 2 (d) Clearance from the wall 2 cm		Number of circuits 1	2	3	
Laid on the Floor		0.95	0.90	0.88	
	Number of troughs				
Laid cables	1	0.95	0.90	0.88	
troughs	2	0.90	0.85	0.83	
(circulation of air	3	0.88	0.83	0.81	
is restricted)	6	0.86	0.81	0.79	
	Number of racks				
Laid	1	1.00	0.98	0.96	
on cable racks	2	1.00	0.95	0.93	
	3	1.00	0.94	0.92	
	6	1.00	0.93	0.90	
Arrangements for which reduction of the current is not necessary					

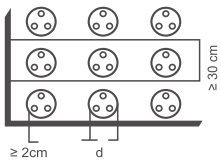
Table 9

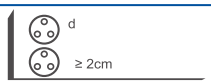
HORIZONTAL OR VERTICAL FORMATION DERATING FACTORS FOR MULTI-CORE CABLES LAID IN FREE AIR

Clearance = Cable diameter (d) Clearance from the wall 2 cm		Number of Cables 1	2	3	4	5	6	9
Laid on the Floor		0.95	0.90		0.88		0.85	0.84
	Number of troughs							
Laid cables troughs (circulation of air is restricted)	1	0.95	0.90		0.88		0.85	0.84
	2	0.90	0.85		0.83		0.81	0.80
	3	0.88	0.83		0.81		0.79	0.78
	6	0.86	0.81		0.79		0.77	0.76
	Number of racks							
Laid on cable racks	1	1.00	0.98		0.96		0.93	0.92
	2	1.00	0.95		0.93		0.90	0.89
	3	1.00	0.94		0.92		0.89	0.88
	6	1.00	0.93		0.90		0.87	0.86
Arranaged near the wall		1.00	0.93		0.90		0.87	0.86









Arrangements for which reduction of the current is not necessary	Clearance from the wall ≥ 2cm	Clearance between cables ≥ 2 d

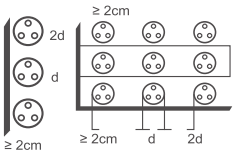
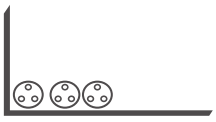
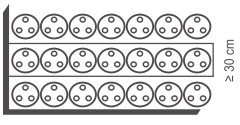


Table 10

DERATING FACTORS FOR MULTI-CORE CABLES TOUCHING AND IN CONTACT WITH THE WALL IN FREE AIR

Clearance touching troughs and contact with wall		Number of Cables 1	2	3	4	5	6	9
Laid on the Floor		0.90	0.84		0.80		0.75	0.73
	Number of troughs							
Laid cables troughs (circulation of air is restricted)	1	0.95	0.84		0.80		0.75	0.73
	2	0.95	0.80		0.76		0.71	0.69
	3	0.95	0.78		0.74		0.70	0.68
	6	0.95	0.76		0.72		0.68	0.66
	Number of racks							
Laid on cable racks	1	0.95	0.84		0.80		0.75	0.73
	2	0.95	0.80		0.76		0.71	0.69
	3	0.95	0.78		0.74		0.70	0.68
	6	0.95	0.76		0.72		0.68	0.66
Arranged on the wall		0.95	0.78		0.73		0.68	0.66





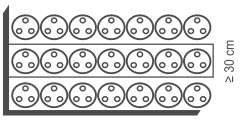


Table 11 (90/250 °C)

SHORT CIRCUIT CURRENT FOR COPPER CONDUCTORS - XLPE INSULATED (KA)										
Area (mm^2)	TIME (S)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	7.24	5.12	4.18	3.62	3.24	2.29	1.62	1.32	1.14	1.02
25	11.31	8.00	6.53	5.66	5.06	3.58	2.53	2.07	1.79	1.60
35	15.84	11.20	9.14	7.92	7.08	5.01	3.54	2.89	2.50	2.24
50	22.62	16.00	13.06	11.31	10.11	7.15	5.06	4.13	3.58	3.20
70	31.67	22.40	18.29	15.84	14.16	10.02	7.08	5.78	5.01	4.48
95	42.98	30.39	24.82	21.49	19.22	13.59	9.61	7.85	6.80	6.08
120	54.30	38.39	31.34	27.15	24.28	17.17	12.14	9.91	8.59	7.68
150	67.87	47.99	39.19	33.94	30.35	21.46	15.18	12.39	10.73	9.60
185	83.71	59.19	48.33	41.85	37.43	26.47	18.72	15.28	13.24	11.94
240	108.59	76.79	62.70	54.30	48.56	34.34	24.28	19.83	17.17	15.36
300	135.74	95.98	78.37	67.87	60.71	42.93	30.35	24.78	21.46	19.20

Table 12 (90/250 °C)

SHORT CIRCUIT CURRENT FOR ALUMINUM CONDUCTORS - XLPE INSULATED (KA)										
Area (mm^2)	TIME (S)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	4.78	3.38	2.76	2.39	2.14	1.51	1.07	0.87	0.76	0.68
25	7.47	5.28	4.31	3.73	3.34	2.36	1.67	1.36	1.18	1.06
35	10.46	7.40	6.04	5.23	4.68	3.31	2.34	1.91	1.65	1.48
50	14.94	10.56	8.63	7.47	6.68	4.72	3.34	2.73	2.36	2.11
70	20.91	14.79	12.08	10.46	9.35	6.61	4.68	3.82	3.31	2.96
95	28.38	20.07	16.39	14.19	12.69	8.98	6.35	5.18	4.49	4.01
120	35.85	25.35	20.70	17.93	16.03	11.34	8.02	6.55	5.67	5.07
150	44.82	31.69	25.88	22.41	20.04	14.17	10.02	8.18	7.09	6.34
185	55.28	39.09	31.91	27.64	24.72	17.48	12.36	10.09	8.74	7.82
240	71.71	50.71	41.40	35.85	32.07	22.68	16.03	13.09	11.34	10.14
300	89.64	63.38	51.75	44.82	40.09	28.35	20.04	16.37	14.17	12.68

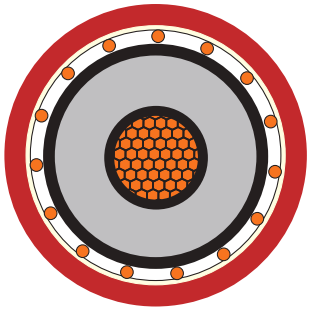
Table 13 (90/250 °C)

SHORT CIRCUIT CURRENT FOR COPPER SCREEN (KA)										
Area (mm^2)	TIME (S)									
	0.1	0.2	0.3	0.4	0.5	1	2	3	4	5
16	7.24	5.12	4.18	3.62	3.24	2.29	1.62	1.32	1.14	1.02
25	11.31	8.00	6.53	5.66	5.06	3.58	2.53	2.07	1.79	1.60
35	15.84	11.20	9.14	7.92	7.08	5.01	3.54	2.89	2.50	2.24

Single Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 3.6/6 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper(or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Annealed copper wires or (copper tape)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm²	mm	mm	mm	kg/km
1x25	2.5	1.5	19.8	640
1x35	2.5	1.6	21.0	765
1x50	2.5	1.6	22.4	905
1x70	2.5	1.6	24.0	1135
1x95	2.5	1.7	25.9	1405
1x120	2.5	1.8	27.6	1660
1x150	2.5	1.8	29.2	2035
1x185	2.5	1.9	31.4	2395
1x240	2.6	1.9	34.1	2980
1x300	2.8	2.0	36.3	3610
1x400	3.0	2.2	40.2	4500
1x500	3.2	2.3	44	5500
1x630	3.2	2.4	47.5	7110

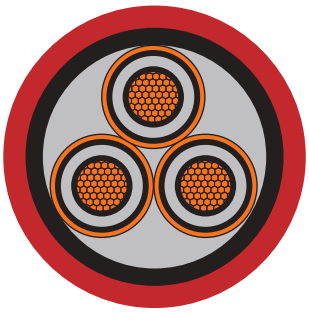
2. Electrical Data

Cross section Area	mm²	25	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm²	16	16	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 °C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.028
Ac Resist at 90 °C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.538	0.045
Inductance														
Flat Formation	mh/km	0.495	0.467	0.440	0.417	0.400	0.384	0.380	0.368	0.355	0.349	0.345	0.338	0.328
Trefoil Formation	mh/km	0.449	0.421	0.394	0.371	0.353	0.338	0.331	0.322	0.420	0.303	0.299	0.292	0.283
Capacitance	µF/km	0.269	0.306	0.337	0.385	0.430	0.472	0.514	0.558	0.606	0.617	0.646	0.672	0.751
Charging current	A/km	0.365	0.415	0.457	0.522	0.583	0.640	0.697	0.758	0.823	0.838	0.876	0.912	1.019
Dielectic losses	W/m	0.011	0.012	0.013	0.015	0.017	0.018	0.020	0.022	0.024	0.024	0.025	0.026	0.029
Current Ampacity														
Cable in ground	A	170	195	235	265	305	345	395	455	500	560	635	710	790
Cable in free air	A	180	210	245	285	355	410	470	540	630	720	840	960	1100
Short circuit current														
Conductor S.C (1 Sec)	KA	5.01	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5	90.0
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	: CU/XLPE/PVC, 3.6/6 KV
Standard	: IEC 60502-2
Conductor	: Circular stranded Compacted copper (or Aluminum)
Conductor Screen	: Bonded semiconducting material
Insulation	: XLPE material
Insulation Screen	: Strippable semiconducting material (or Bonded)
Metallic Screen	: Copper tape (or copper wires)
Bedding	: PVC compound (or LSHF or PE)
Jacketing	: PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
3x25	2.5	2.1	39.2	1955
3x35	2.5	2.2	42.2	2365
3x50	2.5	2.3	45.0	2891
3x70	2.5	2.4	48.9	3655
3x95	2.5	2.5	52.5	4590
3x120	2.5	2.6	56.4	5490
3x150	2.5	2.7	60.0	6466
3x185	2.5	2.8	64.0	7646
3x240	2.6	3.0	69.7	9645
3x300	2.8	3.2	75.7	11810
3x500	3.0	3.5	83.5	14665
	3.2	3.7	90.5	17900

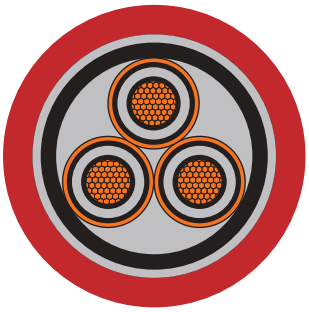
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{O}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.538
Inductance	mh/km	0.422	0.902	0.379	0.422	0.330	0.310	0.300	0.290	0.280	0.270	0.266	0.261	0.256
Capacitance	μF/km	0.241	0.269	0.306	0.337	0.385	0.430	0.472	0.514	0.558	0.606	0.617	0.646	0.672
Charging current	A/km	0.314	0.365	0.415	0.457	0.522	0.583	0.640	0.697	0.758	0.823	0.838	0.876	0.912
Dielectic losses	W/m	0.010	0.011	0.012	0.013	0.015	0.017	0.018	0.020	0.022	0.024	0.024	0.025	0.026
Current Ampacity Cable in ground Cable in free air	 A A	 115 120	 160 172	 191 203	 224 235	 255 275	 300 335	 340 390	 385 445	 435 510	 495 580	 555 665	 625 760	 700 890
Short circuit current Conductor S.C (1 Sec) Screen S.C (1 Sec)	 KA KA	 2.3 2.29	 3.57 2.29	 5.0 2.29	 7.15 2.29	 10.0 2.29	 13.5 2.29	 17.17 2.29	 21.4 3.58	 26.4 3.58	 34.4 3.58	 42.9 3.58	 57.2 5.07	 71.5 5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 3.6/6 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or copper wires)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel tape
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x16	2.5	0.5	2.1	39.4	2100
3x25	2.5	0.5	2.2	41.2	2585
3x35	2.5	0.5	2.2	44.0	3025
3x50	2.5	0.5	2.3	47.0	4460
3x70	2.5	0.5	2.5	51.1	5455
3x95	2.5	0.5	2.6	54.7	6420
3x120	2.5	0.5	2.7	58.6	7455
3x150	2.5	0.5	2.8	62.0	8695
3x185	2.5	0.5	2.9	66.0	9426
3x240	2.6	0.5	3.1	71.7	10805
3x300	2.8	0.5	3.3	77.9	13075
3x400	3.0	0.8	3.6	87.3	16570
3x500	3.2	0.8	3.8	95.1	19900

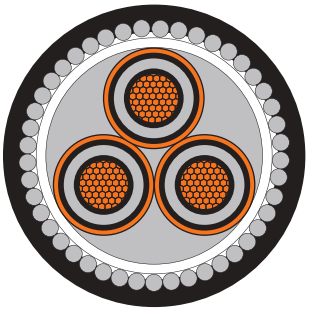
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{O}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.538
Inductance	mh/km	0.422	0.400	0.366	0.342	0.323	0.310	0.300	0.290	0.280	0.270	0.266	0.261	0.256
Capacitance	µF/km	0.241	0.269	0.306	0.337	0.385	0.430	0.472	0.514	0.558	0.606	0.617	0.646	0.672
Charging current	A/km	0.314	0.365	0.415	0.457	0.522	0.583	0.640	0.697	0.758	0.823	0.838	0.876	0.912
Dielectic losses	W/m	0.010	0.011	0.012	0.013	0.015	0.017	0.018	0.020	0.022	0.024	0.024	0.025	0.026
Current Ampacity														
Cable in ground	A	114	157	187	219	248	297	336	379	425	485	540	612	680
Cable in free air	A	120	170	198	230	281	335	390	445	495	575	650	745	860
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.17	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/SWA/PVC, 3.6/6 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or copper wire)
Armoring	:	Galvanized Steel Wire
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x16	2.5	2.00	2.2	41.0	2960
3x25	2.5	2.00	2.3	43.5	3410
3x35	2.5	2.50	2.3	46.5	3935
3x50	2.5	2.50	2.5	50.5	5045
3x70	2.5	2.50	2.6	54.5	5985
3x95	2.5	2.50	2.8	57.9	7090
3x120	2.5	2.50	2.8	65	8170
3x150	2.5	2.50	2.9	65.5	9280
3x185	2.5	2.50	3.1	70	10365
3x240	2.6	3.15	3.2	75.5	12945
3x300	2.8	3.15	3.5	83.5	16500
3x400	3.0	3.15	3.7	90.5	19865
3x500	3.2	3.15	4.0	98.5	23200

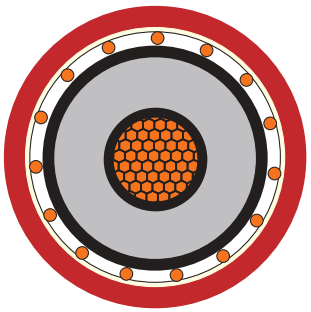
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{O}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.538
Inductance	mh/km	0.422	0.400	0.366	0.342	0.323	0.309	0.296	0.288	0.280	0.270	0.266	0.261	0.256
Capacitance	µF/km	0.241	0.269	0.306	0.337	0.385	0.430	0.472	0.514	0.558	0.606	0.617	0.646	0.672
Charging current	A/km	0.314	0.365	0.415	0.457	0.522	0.583	0.640	0.697	0.758	0.823	0.838	0.876	0.912
Dielectic losses	W/m	0.010	0.011	0.012	0.013	0.015	0.017	0.018	0.020	0.022	0.024	0.024	0.025	0.026
Current Ampacity														
Cable in ground	A	114	158	188	220	249	298	337	380	426	485	541	613	681
Cable in free air	A	120	172	199	230	282	336	392	447	495	576	650	746	862
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.17	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Single Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 6/10 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Annealed Copper Wire (or Copper Tape)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x25	3.4	1.6	21.8	710
1x35	3.4	1.6	23.1	825
1x50	3.4	1.7	24.4	980
1x70	3.4	1.7	26.1	1200
1x95	3.4	1.8	27.9	1495
1x120	3.4	1.8	29.4	1740
1x150	3.4	1.9	31.6	2134
1x185	3.4	1.9	33.2	2485
1x240	3.4	2.0	35.9	3080
1x300	3.4	2.1	38.3	3695
1x400	3.4	2.2	41.5	4620
1x500	3.4	2.3	44.6	5595
1x630	3.4	2.4	49.3	7145

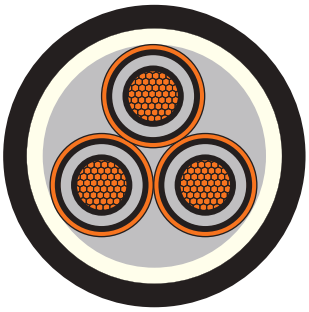
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	10	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{o}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Ac Resist at 90 ^{o}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.099	0.0812	0.0657	0.0538	0.0452
Inductance														
Flat Formation	mh/km	0.512	0.483	0.474	0.433	0.417	0.400	0.363	0.382	0.367	0.352	0.347	00.341	0.330
Trefoil Formation	mh/km	0.466	0.437	0.410	0.385	0.368	0.352	0.344	0.334	0.319	0.310	0.302	0.294	0.282
Capacitance	µF/km	0.213	0.240	0.264	0.299	0.332	0.363	0.394	0.427	0.479	0.520	0.577	0.636	0.711
Charging current	A/km	0.482	0.544	0.596	0.676	0.751	0.822	0.892	0.966	1.083	1.176	1.306	1.439	1.607
Dielectic losses	W/m	0.023	0.026	0.029	0.032	0.036	0.039	0.043	0.046	0.052	0.056	0.063	0.069	0.077
Current Ampacity														
Cable in ground	A	170	195	235	265	305	345	395	455	500	560	635	710	790
Cable in free air	A	180	210	245	285	355	410	470	540	630	720	840	960	1100
Short circuit current														
Conductor S.C (1 Sec)	KA	3.57	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5	90.0
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	2.29	3.58	3.58	5.07	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC,6/10 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or copper wires)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm²	mm	mm	mm	kg/km
3x16	3.4	2.2	41.0	1815
3x25	3.4	2.2	43.1	2220
3x35	3.4	2.3	46.5	2695
3x50	3.4	2.4	49.1	3195
3x70	3.4	2.5	53.0	3980
3x95	3.4	2.7	57.2	5020
3x120	3.4	2.8	60.7	5885
3x150	3.4	2.9	64.1	6885
3x185	3.4	3.0	67.8	8080
3x240	3.4	3.1	73.8	10120
3x300	3.4	3.3	78.5	12135
3x400	3.4	3.5	85.0	14875
3x500	3.4	3.7	91.6	18020

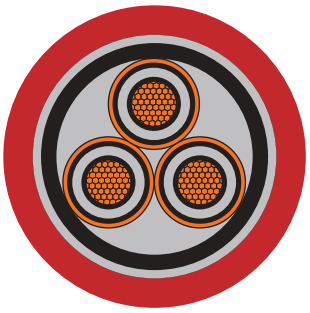
2. Electrical Data

Cross section Area	mm²	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm²	16	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 °C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 °C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1291	0.099	0.0814	0.0659	0.543
Inductance	mh/km	0.447	0.413	0.387	0.362	0.341	0.325	0.312	0.302	0.300	0.280	0.274	0.265	0.259
Capacitance	µF/km	0.192	0.213	0.240	0.264	0.299	0.332	0.363	0.394	0.427	0.479	0.520	0.577	0.636
Charging current	A/km	0.314	0.482	0.544	0.596	0.676	0.751	0.822	0.892	0.966	1.083	1.176	1.306	1.439
Dielectic losses	W/m	0.019	0.023	0.026	0.029	0.032	0.036	0.039	0.043	0.046	0.052	0.056	0.063	0.069
Current Ampacity														
Cable in ground	A	115	161	180	210	253	302	340	387	430	493	555	628	700
Cable in free air	A	120	173	199	230	275	335	390	447	505	578	665	758	890
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.17	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 6/10 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape(or copper wire)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel tape
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x16	3.4	0.5	2.3	43	2430
3x25	3.4	0.5	2.4	45.3	2920
3x35	3.4	0.5	2.4	48.7	3456
3x50	3.4	0.5	2.5	51.3	4000
3x70	3.4	0.5	2.6	55.2	4850
3x95	3.4	0.5	2.7	59.2	5935
3x120	3.4	0.5	2.8	62.7	6860
3x150	3.4	0.5	2.9	66	7910
3x185	3.4	0.5	3.1	69.8	9170
3x240	3.4	0.5	3.2	76	11350
3x300	3.4	0.5	3.4	80.7	13450
3x400	3.4	0.5	3.6	88.3	17090
3x500	3.4	0.5	3.8	95	20415

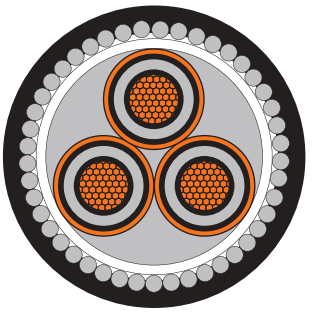
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	358	35
DC Resist at 20 ^{O}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1291	0.099	0.0814	0.0659	0.543
Inductance	mh/km	0.447	0.413	0.387	0.362	0.341	0.326	0.312	0.302	0.300	0.281	0.274	0.265	0.259
Capacitance	μF/km	0.192	0.213	0.240	0.264	0.299	0.332	0.363	0.394	0.427	0.479	0.520	0.577	0.636
Charging current	A/km	0.569	0.482	0.544	0.596	0.676	0.751	0.822	0.892	0.966	1.038	1.176	1.306	1.439
Dielectic losses	W/m	0.019	0.023	0.026	0.029	0.032	0.036	0.039	0.043	0.046	0.054	0.056	0.063	0.069
Current Ampacity														
Cable in ground	A	115	159	175	205	250	295	335	380	420	482	540	612	682
Cable in free air	A	125	172	195	232	232	340	390	446	495	570	650	745	863
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.11	21.4	26.4	34.3	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground and ducts, and indoor on trays, in walls, and in ducts.

Type	:	CU/XLPE/SWA/PVC, 6/10 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper*(or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material(or Bonded)
Metallic Screen	:	Copper tape (or copper wire)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel wires
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x16	3.4	2.00	2.4	45.0	3400
3x25	3.4	2.00	2.4	48.5	4280
3x35	3.4	2.50	2.6	51.9	4890
3x50	3.4	2.50	2.7	54.5	5520
3x70	3.4	2.50	2.8	58.4	6480
3x95	3.4	2.50	2.8	62.4	7670
3x120	3.4	2.50	2.9	65.9	8715
3x150	3.4	2.50	3.0	70.0	9880
3x185	3.4	2.50	3.2	73.2	11295
3x240	3.4	3.15	3.4	81.7	14825
3x300	3.4	3.15	3.6	86.4	17080
3x400	3.4	3.15	3.8	92.8	20255
3x500	3.4	3.15	4.0	99.1	23779

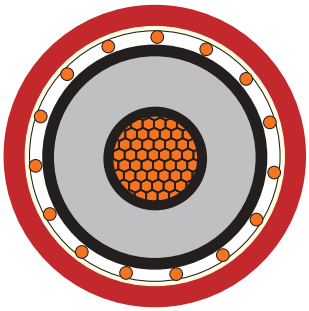
2. Electrical Data

Cross section Area	mm^2	16	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	16	25	25	25	25	358	35
DC Resist at 20 ^{O}C	Ω/km	1.150	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	1.466	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1290	0.0999	0.0814	0.0659	0.0543
Inductance	mh/km	0.447	0.413	0.387	0.362	0.341	0.326	0.312	0.302	0.294	0.281	0.274	0.265	0.259
Capacitance	µF/km	0.192	0.213	0.240	0.264	0.299	0.332	0.363	0.394	0.427	0.479	0.520	0.577	0.636
Charging current	A/km	0.314	0.482	0.544	0.596	0.676	0.751	0.822	0.892	0.966	1.083	1.176	1.306	1.439
Dielectic losses	W/m	0.019	0.023	0.026	0.029	0.032	0.036	0.039	0.043	0.046	0.052	0.056	0.063	0.069
Current Ampacity														
Cable in ground	A	115	160	175	205	245	295	330	375	418	470	525	590	640
Cable in free air	A	125	172	199	230	285	336	392	445	487	568	635	735	820
Short circuit current														
Conductor S.C (1 Sec)	KA	2.3	3.57	5.0	7.15	10.0	13.5	17.11	21.4	26.4	34.3	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Single Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 8.7/15 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper(or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Annealed Copper Wires (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x25	4.5	1.7	24.2	800
1x35	4.5	1.7	25.5	920
1x50	4.5	1.7	26.6	1065
1x70	4.5	1.8	28.5	1305
1x95	4.5	1.8	30.1	1590
1x120	4.5	1.9	31.8	1860
1x150	4.5	2	34	2260
1x185	4.5	2.0	35.0	2540
1x240	4.5	2.1	38.3	3225
1x300	4.5	2.2	40.5	3850
1x400	4.5	2.3	43.9	4785
1x500	4.5	2.4	47	5770
1x630	4.5	2.5	51.7	7335

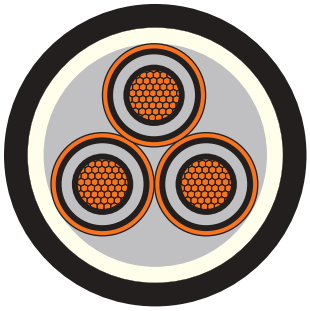
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	16	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{o}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Ac Resist at 90 ^{o}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1286	0.0992	0.0806	0.0651	0.532	0.0455
Inductance	mh/km	0.534	0.504	0.475	0.451	0.432	0.416	0.407	0.396	0.380	0.371	0.361	0.352	0.339
Flat Formation Trefoil Formation	mh/km	0.486	0.457	0.427	0.402	0.384	0.386	0.358	0.348	0.332	0.322	0.314	0.304	0.291
Capacitance	µF/km	0.175	0.196	0.213	0.240	0.266	0.289	0.313	0.338	0.377	0.408	0.452	0.496	0.553
Charging current	A/km	0.572	0.641	0.699	0.788	0.871	0.949	1.026	1.108	1.236	1.339	1.481	1.628	1.813
Dielectic losses	W/m	0.040	0.045	0.049	0.055	0.061	0.066	0.071	0.077	0.086	0.093	0.103	0.113	0.126
Current Ampacity														
Cable in ground	A	150	180	210	255	305	345	390	430	500	560	630	710	790
Cable in free air	A	165	200	240	300	360	415	475	540	635	730	840	960	1100
Short circuit current														
Conductor S.C (1 Sec)	KA	3.57	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5	90.0
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 8.7/15 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper Tape (or Copper Tape)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm²	mm	mm	mm	kg/km
3x25	4.5	2.4	48.7	2640
3x35	4.5	2.5	51.7	3095
3x50	4.5	2.6	54.2	3610
3x70	4.5	2.7	58.5	4480
3x95	4.5	2.8	62.2	5470
3x120	4.5	2.9	65.6	6350
3x150	4.5	3.0	69	7375
3x185	4.5	3.1	73.1	8670
3x240	4.5	3.3	78.9	10710
3x300	4.5	3.5	83.6	12760
3x400	4.5	3.7	90.1	15555
3x500	4.5	3.9	97.1	18835

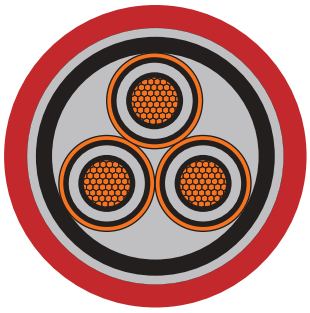
2. Electrical Data

Cross section Area	mm²	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm²	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 °C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 °C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1288	0.0995	0.0810	0.0655	0.0538
Inductance	mh/km	0.438	0.411	0.384	0.360	0.345	0.330	0.319	0.309	0.296	0.287	0.278	0.270
Capacitance	µF/km	0.175	0.196	0.213	0.240	0.266	0.289	0.313	0.338	0.377	0.408	0.452	0.496
Charging current	A/km	0.572	0.641	0.699	0.788	0.871	0.949	1.026	1.108	1.236	1.339	1.481	1.628
Dielectic losses	W/m	0.040	0.045	0.049	0.055	0.061	0.066	0.071	0.077	0.086	0.093	0.103	0.113
Current Ampacity Cable in ground	A	148	175	205	250	300	340	380	425	493	555	630	695
Cable in free air	A	160	195	230	280	340	390	440	505	585	665	765	885
Short circuit current Conductor S.C (1 Sec)	KA	3.57	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 8.7/15 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper Tape
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized Steel Tape
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x25	4.5	0.5	2.5	50.9	3440
3x35	4.5	0.5	2.6	53.19	3945
3x50	4.5	0.5	2.7	56.4	4500
3x70	4.5	0.5	2.8	60.7	5450
3x95	4.5	0.5	2.9	64.4	6500
3x120	4.5	0.5	3.0	67.8	7440
3x150	4.5	0.5	3.1	71.2	8525
3x185	4.5	0.5	3.2	75.3	9890
3x240	4.5	0.5	3.4	81.1	12030
3x300	4.5	0.8	3.6	87	14945
3x400	4.5	0.8	3.8	93.5	17910
3x500	4.5	0.8	4.0	100.5	21385

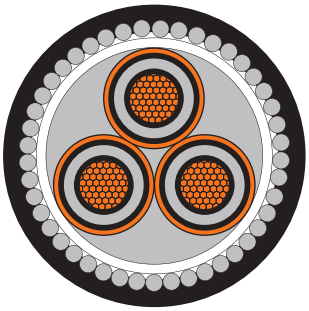
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{O}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{O}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1288	0.0995	0.0810	0.0655	0.0538
Inductance	mh/km	0.438	0.411	0.384	0.360	0.345	0.330	0.319	0.309	0.296	0.287	0.278	0.270
Capacitance	µF/km	0.175	0.196	0.213	0.240	0.266	0.289	0.313	0.338	0.377	0.408	0.452	0.496
Charging current	A/km	0.572	0.641	0.699	0.788	0.871	0.949	1.026	1.108	1.236	1.339	1.481	1.628
Dielectic losses	W/m	0.040	0.045	0.049	0.055	0.061	0.066	0.071	0.077	0.086	0.093	0.103	0.113
Current Ampacity Cable in ground	A	146	175	205	245	295	330	370	415	482	540	610	675
Cable in free air	A	160	195	232	285	345	395	450	500	590	660	750	860
Short circuit current													
Conductor S.C (1 Sec)	KA	3.57	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/SWA/PVC, 8.7/15 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper Tape
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized Steel Wires (or Steel Tape)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x25	4.5	2.50	2.6	54.1	4930
3x35	4.5	2.50	2.7	57.1	5555
3x50	4.5	2.50	2.8	59.6	6160
3x70	4.5	2.50	2.9	63.9	7250
3x95	4.5	2.50	3	67.6	8415
3x120	4.5	2.50	3.1	71.	9435
3x150	4.5	3.15	3.2	74.4	10635
3x185	4.5	3.15	3.4	81	13310
3x240	4.5	3.15	3.6	86.8	15720
3x300	4.5	3.15	3.7	91.3	18025
3x400	4.5	3.15	4.0	98.0	21245
3x500	4.5	3.15	4.1	104.8	24915

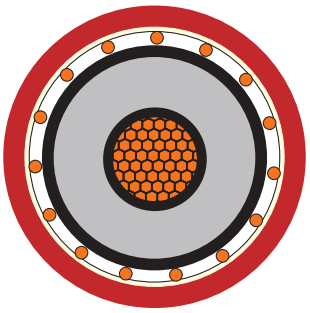
2. Electrical Data

Cross section Area	mm^2	25	35	50	70	95	120	150	185	240	300	400	500
Screen Area	mm^2	16	16	16	16	16	16	25	25	25	25	35	35
DC Resist at 20 ^{o}C	Ω/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366
Ac Resist at 90 ^{o}C	Ω/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.1288	0.0995	0.0810	0.0655	0.0538
Inductance	mh/km	0.438	0.411	0.384	0.360	0.345	0.330	0.319	0.309	0.296	0.287	0.278	0.270
Capacitance	µF/km	0.175	0.196	0.213	0.240	0.266	0.289	0.313	0.338	0.377	0.408	0.452	0.496
Charging current	A/km	0.572	0.641	0.699	0.788	0.871	0.949	1.026	1.108	1.236	1.339	1.481	1.628
Dielectic losses	W/m	0.040	0.045	0.049	0.055	0.061	0.066	0.071	0.077	0.086	0.093	0.103	0.113
Current Ampacity Cable in ground	A	160	175	205	245	295	333	370	415	470	525	690	640
Cable in free air	A	172	199	235	285	345	395	445	505	570	635	735	820
Short circuit current Conductor S.C (1 Sec)	KA	5	5.0	7.15	10.0	13.5	17.1	21.4	26.47	34.4	42.9	57.2	71.5
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07

Single Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 12/20 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Annealed Copper wires (or Copper Tape)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x35	5.5	1.8	27.7	1015
1x50	5.5	1.8	28.8	1160
1x70	5.5	1.9	30.7	1415
1x95	5.5	1.9	32.3	1700
1x120	5.5	2.0	34	1975
1x150	5.5	2.0	36	2365
1x185	5.5	2.1	37.8	2710
1x240	5.5	2.2	40.5	3360
1x300	5.5	2.2	42.5	3970
1x400	5.5	2.3	45.9	4920
1x500	5.5	2.4	48.6	5900
1x630	5.5	2.5	53.7	7495

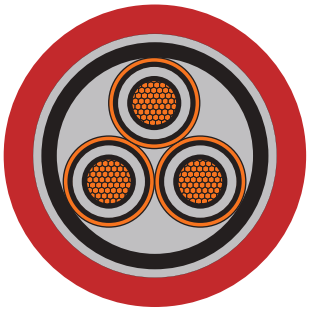
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{O}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.366	0.0283
Ac Resist at 90 ^{O}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.160	0.1286	0.0990	0.0806	0.0641	0.0530	0.0440
Inductance Flat Formation Trefoil Formation	 mh/km mh/km	 0.521 0.472	 0.491 0.443	 0.466 0.417	 0.446 0.398	 0.429 0.381	 0.419 0.371	 0.4080 0.359	 0.391 0.343	 0.380 0.333	 0.370 0.323	 0.358 0.310	 0.347 0.300
Capacitance	µF/km	0.170	0.185	0.207	0.228	0.247	0.267	0.287	0.319	0.345	0.381	0.417	0.464
Charging current	A/km	0.769	0.835	0.936	1.031	1.119	1.207	1.300	1.445	1.561	1.723	1.889	2.089
Dielectic losses	W/m	0.074	0.080	0.090	0.099	0.107	0.116	0.125	0.139	0.150	0.165	0.181	0.201
Current Ampacity Cable in ground Cable in free air	 A A	 175 200	 210 240	 255 300	 305 360	 345 415	 385 475	 430 540	 500 640	 560 730	 630 840	 710 960	 795 1105
Short circuit current Conductor S.C (1 Sec) Screen S.C (1 Sec)	 KA KA	 5.0 2.29	 7.15 2.29	 10.0 2.29	 13.5 2.29	 17.1 2.29	 21.4 3.58	 26.4 3.58	 34.4 3.58	 42.9 3.58	 57.2 5.07	 71.5 5.07	 90.0 5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 12/20 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wires)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel tape
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x35	5.5	0.5	2.7	58.8	4460
3x50	5.5	0.5	2.8	61.4	5040
3x70	5.5	0.5	2.9	65.2	5940
3x95	5.5	0.5	3.0	68.9	7020
3x120	5.5	0.5	3.1	72.3	7980
3x150	5.5	0.5	3.3	76.4	9210
3x185	5.5	0.5	3.4	80	10515
3x240	5.5	0.5	3.6	87	13470
3x300	5.5	0.5	3.7	91.5	15640
3x400	5.5	0.5	4.0	98.6	18805

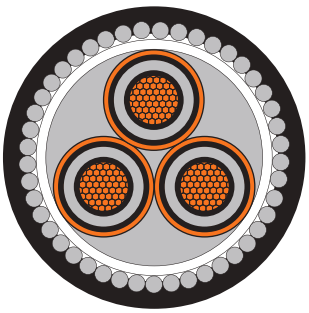
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35
DC Resist at 20 ^{O}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
Ac Resist at 90 ^{O}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.160	0.1286	0.0992	0.0806	0.0652
Inductance	mh/km	0.429	0.402	0.378	0.361	0.350	0.333	0.323	0.308	0.300	0.289
Capacitance	µF/km	0.170	0.185	0.207	0.228	0.247	0.267	0.287	0.319	0.345	0.381
Charging current	A/km	0.769	0.835	0.936	1.031	1.119	1.207	1.300	1.445	1.561	1.723
Dielectic losses	W/m	0.074	0.080	0.090	0.099	0.107	0.116	0.125	0.139	0.150	0.165
Current Ampacity											
Cable in ground	A	175	205	245	295	330	370	415	485	540	610
Cable in free air	A	195	240	285	350	395	450	500	590	685	750
Short circuit current											
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/SWA/PVC, 12/20 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wires)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel wires
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	mm	kg/km
3x35	5.5	2.50	2.8	62.0	6205
3x50	5.5	2.50	3.0	64.6	6875
3x70	5.5	2.50	3.0	68.4	7885
3x95	5.5	2.50	3.1	72.1	9075
3x120	5.5	2.50	3.3	75.7	10150
3x150	5.5	3.15	3.4	81.9	12640
3x185	5.5	3.15	3.6	85.7	14150
3x240	5.5	3.15	3.7	91.3	16550
3x300	5.5	3.15	3.8	96.9	18875
3x400	5.5	3.15	4.1	102.9	22250

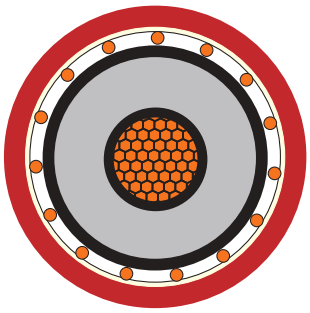
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35
DC Resist at 20 ^{O}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
Ac Resist at 90 ^{O}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.159	0.1286	0.0992	0.0806	0.0652
Inductance	mh/km	0.430	0.402	0.378	0.361	0.350	0.333	0.323	0.308	0.300	0.289
Capacitance	µF/km	0.170	0.185	0.207	0.228	0.247	0.267	0.287	0.319	0.345	0.381
Charging current	A/km	0.769	0.835	0.936	1.031	1.119	1.207	1.300	1.445	1.561	1.723
Dielectic losses	W/m	0.074	0.080	0.090	0.099	0.107	0.116	0.125	0.139	0.150	0.165
Current Ampacity											
Cable in ground	Amp.	175	205	245	295	330	370	410	470	520	585
Cable in free air	Amp.	200	235	290	350	400	450	500	590	660	725
Short circuit current											
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07

SIngle Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 18/30 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper Wires (or Copper Tape)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
1x35	8.0	1.9	32.9	1265
1x50	8.0	2.0	34.2	1436
1x70	8.0	2.0	35.9	1685
1x95	8.0	2.1	37.7	2005
1x120	8.0	2.1	39.2	2275
1x150	8.0	2.2	41.4	2695
1x185	8.0	2.2	43	3070
1x240	8.0	2.3	45.7	3710
1x300	8.0	2.4	47.9	4360
1x400	8.0	2.5	51.3	5330
1x500	8.0	2.6	54.3	6355
1x630	8.0	2.7	59.1	7975

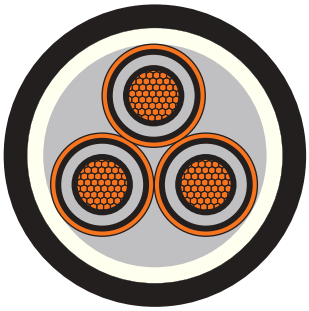
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400	500	630
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35	35	35
DC Resist at 20 ^{o}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.366	0.0283
Ac Resist at 90 ^{o}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.160	0.1286	0.0990	0.0806	0.0648	0.0530	0.0440
Inductance Flat Formation	mh/km	0.555	0.525	0.497	0.477	0.458	0.447	0.433	0.414	0.404	0.393	0.381	366
Trefoil Formation	µF/km	0.509	0.477	0.450	0.429	0.411	0.399	0.386	0.368	0.356	0.343	0.332	0.320
Capacitance	A/km	0.133	0.143	0.159	0.174	0.192	0.201	0.216	0.238	0.256	0.281	0.306	0.34
Charging current	W/m	0.903	0.974	1.081	0.181	1.274	1.366	1.464	1.161	1.737	1.906	2.6	2.30
Dielectic losses		0.130	0.140	0.156	0.170	0.183	0.197	0.221	0.233	0.250	0.270	0.300	0.330
Current Ampacity Cable in ground	A	176	210	257	305	346	387	432	500	563	630	712	795
Cable in free air	A	205	243	305	368	419	479	545	645	732	845	965	1105
Short circuit current Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2	71.5	90.0
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07	5.07	5.07

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 18/30 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wire)
Bedding	:	PVC compound (or LSHF or PE)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
3x35	8.0	3.0	68.2	4635
3x50	8.0	3.1	70.8	5215
3x70	8.0	3.2	75	6185
3x95	8.0	3.3	78.7	7260
3x120	8.0	3.5	82.3	8260
3x150	8.0	3.6	85.8	9370
3x185	8.0	3.7	89.4	10670
3x240	8.0	3.8	95	12790
3x300	8.0	4.0	100.1	15055

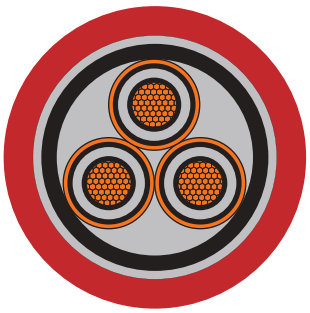
2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300
Screen Area	mm^2	16	16	16	16	16	25	25	25	25
DC Resist at 20 ^{O}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Ac Resist at 90 ^{O}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.159	0.1286	0.0993	0.0806
Inductance	mh/km	0.470	0.441	0.423	0.404	0.389	0.376	0.364	0.348	0.338
Capacitance	µF/km	0.133	0.143	0.159	0.174	0.188	0.201	0.216	0.238	0.256
Charging current	A/km	0.903	0.974	1.081	1.181	1.274	1.366	1.464	1.616	1.737
Dielectic losses	W/m	0.130	0.140	0.156	0.170	0.183	0.197	0.211	0.233	0.250
Current Ampacity										
Cable in ground	Amp.	177	205	252	302	340	380	429	494	555
Cable in free air	Amp.	200	240	290	360	405	455	520	610	690
Short circuit current										
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	3.44	42.9
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/STA/PVC, 18/30 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material
Metallic Screen	:	Copper tape (or Copper Wire)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel tapes (or Steel Wire)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm²	mm	mm	mm	mm	kg/km
3x35	8.0	0.5	3.1	70.4	5770
3x50	8.0	0.5	3.2	73	6395
3x70	8.0	0.5	3.3	77.2	7440
3x95	8.0	0.5	3.4	80.1	8580
3x120	8.0	0.8	3.6	85.7	10405
3x150	8.0	0.8	3.7	89.2	11610
3x185	8.0	0.8	3.8	92.8	13005
3x240	8.0	0.8	4.0	98.6	15335
3x300	8.0	0.8	4.1	103.5	17685

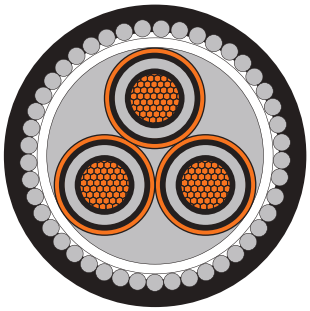
2. Electrical Data

Cross section Area	mm²	35	50	70	95	120	150	185	240	300
Screen Area	mm²	16	16	16	16	16	25	25	25	25
DC Resist at 20 °C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Ac Resist at 90 °C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.159	0.1286	0.0993	0.0806
Inductance	mh/km	0.470	0.449	0.423	0.404	0.389	0.376	0.364	0.348	0.338
Capacitance	µF/km	0.133	0.143	0.159	0.174	0.188	0.201	0.216	0.238	0.256
Charging current	A/km	0.903	0.974	1.081	1.181	1.274	1.366	1.464	1.616	1.737
Dielectic losses	W/m	0.130	0.140	0.156	0.170	0.183	0.197	0.211	0.233	0.250
Current Ampacity										
Cable in ground	A	174	204	245	295	335	370	420	483	540
Cable in free air	A	199	235	287	350	400	450	505	590	655
Short circuit current										
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	3.44	42.9
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/SWA/PVC, 18/30 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wire)
Bedding	:	PVC compound (or LSHF or PE)
Armoring	:	Galvanized steel wires
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Steel Wire Diameter	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm2	mm	mm	mm	mm	kg/km
3x35	8.0	2.50	3.2	73.6	7852
3x50	8.0	3.15	3.4	78.7	9710
3x70	8.0	3.15	3.5	82.9	10905
3x95	8.0	3.15	3.6	86.6	12270
3x120	8.0	3.15	3.7	90	13385
3x150	8.0	3.15	3.8	93.5	14715
3x185	8.0	3.15	3.9	97.1	16235
3x240	8.0	3.15	4.1	102.9	18780
3x300	8.0	3.15	4.2	107.8	21290

2. Electrical Data

Cross section Area	mm2	35	50	70	95	120	150	185	240	300
Screen Area	mm2	16	16	16	16	16	25	25	25	25
DC Resist at 20 ^{o}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Ac Resist at 90 ^{o}C	Ω/km	0.668	0.494	0.342	0.247	0.196	0.159	0.1286	0.0993	0.0806
Inductance	mh/km	0.470	0.449	0.423	0.404	0.389	0.376	0.364	0.348	0.338
Capacitance	µF/km	0.133	0.143	0.159	0.174	0.188	0.201	0.216	0.238	0.256
Charging current	A/km	0.903	0.974	1.081	1.181	1.274	1.366	1.464	1.616	1.737
Dielectic losses	W/m	0.130	0.140	0.156	0.170	0.183	0.197	0.211	0.233	0.250
Current Ampacity										
Cable in ground	A	174	204	245	295	330	370	420	470	520
Cable in free air	A	200	235	290	350	400	488	500	585	655
Short circuit current										
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	3.4	42.9
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58

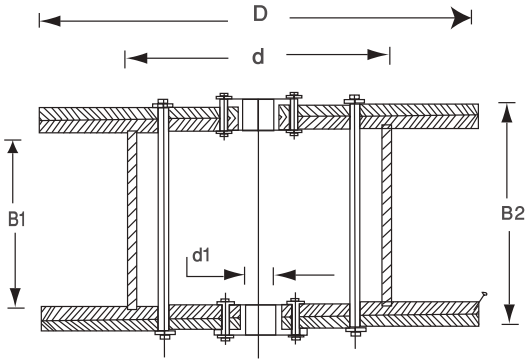
Conversion Table

Multiply	by	to obtain
WEIGHT - Imperial		
Ounces	28.3495	grams
Pounds (Av)	453.59	grams
Pounds (Av)	0.45359	kilograms
Tons (short)	907.19	kilograms
Tons (long)	1016.05	kilograms
WEIGHT - Metric		
Grams	0.03527	ounces
Grams	0.002205	pounds
Kilograms	35.274	ounces
Kilograms	2.2046	pounds
Kilograms	0.001102	tons (short)
Kilograms	0.0009842	tons (long)
MISCELLANEOUS - Imperial		
Pounds per 1000 feet	1.48816	kilograms per kilometer
Pounds per mile	0.28185	kilograms per kilometer
Pounds per square inch	0.0007031	kilograms per square millimeter
Pounds per square inch	0.07031	kilograms per square centimeter
Feet per second	18.288	meters per minute
Feet per second	1.09728	kilometers per hour
Mils per hour	1.60935	kilometers per hour
Ohms per 1000 feet	3.28083	ohms per kilometer
Ohms per mile	0.62137	ohms per kilometer
Decibels per 1000 feet	3.28083	decibels per kilometer
Decibels per mile	0.62137	decibels per kilometer
Decibles	0.1153	nepers
MISCELLANEOUS - Metric		
Kilograms per kilometer	0.67197	pounds per 1000 feet
Kilograms per kilometer	3.54795	pounds per mile
Kilograms per square millimeter	1422.34	pounds per square inch
Kilograms per square centimeter	14.2234	pounds per square inch
Grams per cubic cm	0.03613	pounds per cubic inch
Meters per minute	0.05468	feet per second
Kilometer per hour	0.91134	feet per second
Kilometer per hour	0.62137	miles per hour
Ohms per kilometer	0.3048	ohms per 1000 feet
Ohms per kilometer	1.6093	ohms per mile
Decibels per kilometer	0.3048	decibels per 1000 feet
Decibels per kilometer	1.6093	decibles per mile
TEMPERATURE		
°Fahrenheit	5/9 (°F)-32	°Celsius
°Celsius	9/5 (°C) + 32	°Fahrenheit

Multiply	by	to obtain
LENGTH - Imperial		
Mils	0.001	inches
Mils	0.0254	millimeters
Inches	1000	mils
Inches	25.40	millimeters
Inches	2.54	centimeters
Feet	30.48	centimeters
Feet	0.3048	meters
Feet (thousands of)	0.3048	kilometers
Yards	0.9144	meters
Mils	1.6093	kilometers
LENGTH - Imperial		
Millimeters	39.37	mils
Millimeters	0.03937	inches
Centimeters	0.3937	inches
Centimeters	0.032808	feet
Meters	39.37	inches
Meters	3.2808	feet
Meters	1.0936	yards
Kilometers	3280.83	feet
Kilometers	0.62137	mils
AREA - Imperial		
Square mils	1.2732	circular mills
Square mils	0.000001	square inches
Circular mils	0.7854	square mils
Circular mils	0.0000007854	square inches
Circular mils	0.00050657	square millimeters
Square inches	1000000	square mils
Square inches	1273240	circular mils
Square inches	645.16	square millimeters
Square inches	6.4516	square centimeters
Square inches	0.09290	square meters
Square inches	0.8361	square meters
AREA - Metric		
Square millimeters	1973.52	circular mills
Square millimeters	0.00155	square inches
Square centimeters	0.155	square inches
Square meters	10.7638	square feet
Square meters	1.19599	square yards
VOLUME - Imperial		
Cubic inches	16.38716	cubic centimeters
Cubic feet	0.028317	cubic meters
VOLUME - U.S.		
Quarts (liquid)	0.9463	cubic centimeters
Gallaons	3.7854	cubic meters
VOLUME - Metric		
Cubic centimeters	0.06102	cubic inches
Cubic meters	35.3145	cubic feet
Litres	1.05668	quarts (Liquid U.S.)
Litres	0.26417	gallons (U.S.)

Packing

International practice is to supply cables on wooden drums or as appropriate plastic spools. At the customers request we will also supply steel drums for improved on-site performance & handling.
The finished drums may be - when requested by our customer - closed with a continuous lagging with a wood having approximate thickness 2.00 mm.



Drum Dimensions:

D	d	d1	B1	B2
600	300	85	450	580
700	350	85	530	660
800	400	85	530	660
900	450	85	630	760
1000	500	85	630	772
1100	550	85	630	772
1200	600	85	850	992
1300	650	85	850	992
1400	700	85	850	992
1500	750	110	850	1020
1600	800	110	850	1020
1700	850	110	850	1020
1800	900	110	850	1032
1900	950	110	850	1032
2000	1000	110	980	1174
2100	1050	110	980	1174
2200	1100	110	1230	1274
2300	1150	110	1280	1432
2400	1200	110	1280	1482
2500	1250	110	1280	1482
2600	1300	110	1280	1432
2700	1350	110	1280	1482
2800	1400	110	1280	1482
2900	1450	110	1280	1482
3000	1500	110	1280	1482

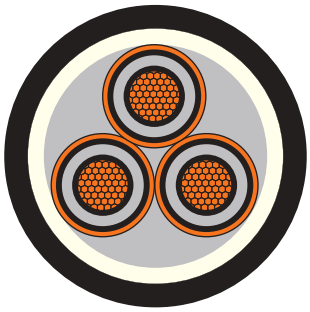
Legend

D = Flange Diameter (mm)
d = Barrel Diameter (mm)
d1 = Benz hole diameter (mm)
B1 = Distance between flanges (mm)
B2 = Overall Width (mm)

Three Core Cable

For Installations outdoor in ground, in ducts and indoor on trays.

Type	:	CU/XLPE/PVC, 12/20 KV
Standard	:	IEC 60502-2
Conductor	:	Circular stranded Compacted copper (or Aluminum)
Conductor Screen	:	Bonded semiconducting material
Insulation	:	XLPE material
Insulation Screen	:	Strippable semiconducting material (or Bonded)
Metallic Screen	:	Copper tape (or Copper Wire)
Jacketing	:	PVC compound (or LSHF or PE)



TECHNICAL INFORMATION

1. Weight and Dimension Data

Nominal Crosss Section	Nominal Insulation Thickness	Nominal Sheath Thickness	Approx. Overall Diameter	Approx. Cable Weight
n x mm^2	mm	mm	mm	kg/km
3x35	5.5	2.6	56.6	3525
3x50	5.5	2.7	59.2	4060
3x70	5.5	2.8	63	4895
3x95	5.5	3.0	66.49	5940
3x120	5.5	3.1	70.3	6845
3x150	5.5	3.2	74.2	7970
3x185	5.5	3.3	77.8	9215
3x240	5.5	3.5	83.6	11290
3x300	5.5	3.6	88.1	13330
3x400	5.5	3.9	95	16260

2. Electrical Data

Cross section Area	mm^2	35	50	70	95	120	150	185	240	300	400
Screen Area	mm^2	16	16	16	16	16	25	25	25	25	35
DC Resist at 20 ^{o}C	Ω/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470
Ac Resist at 90 ^{o}C	Ω/km	0.668	0.402	0.342	0.247	0.196	0.160	0.1286	0.0993	0.0806	0.0652
Inductance	mh/km	0.429	0.410	0.378	0.361	0.344	0.323	0.323	0.308	0.299	0.289
Capacitance	µF/km	0.170	0.185	0.207	0.228	0.247	0.267	0.287	0.319	0.345	0.381
Charging current	A/km	0.769	0.835	0.936	1.031	1.119	1.207	1.300	1.445	1.561	1.723
Dielectic losses	W/m	0.074	0.080	0.090	0.099	0.107	0.116	0.125	0.139	0.150	0.165
Current Ampacity											
Cable in ground	A	175	205	250	300	340	380	425	490	555	625
Cable in free air	A	195	240	285	350	395	450	510	600	680	775
Short circuit current											
Conductor S.C (1 Sec)	KA	5.0	7.15	10.0	13.5	17.1	21.4	26.4	34.4	42.9	57.2
Screen S.C (1 Sec)	KA	2.29	2.29	2.29	2.29	2.29	3.58	3.58	3.58	3.58	5.07

Selection Form: Medium Voltage Cables

This form needs to be filled in order to help Jeddah Cables Company prepare the right quotation:

Standard & Specification

- ☐ IEC
- ☐ BS
- ☐ Others: _____

Conductor:

Type:

- ☐ Copper
- ☐ Aluminum

Size (mm^2) _____

Number of Cores:

- ☐ Single Core
- ☐ Three Cores

Voltage Rating (Uo/U): _____

Metallic Shield Type:

- ☐ Copper Wire
- ☐ Copper Tape

Total Screen Area(mm^2): _____

Armoring Type (If Any):

Single Core Cables:

- ☐ Al Wire Armor (AWA)
- ☐ Double Al Tape Armor (ATA)

Three Core Cables:

- ☐ Steel Wire Armor (SWA)
- ☐ Double Steel Tape Armor (STA)

Jacket Type:

- ☐ PVC
- ☐ PE
- ☐ Low Smoke Halogen Free (LSHF)

Special Requirements: _____

_____

_____

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