



TECHNICAL BROCHURE
High Tension XLPE Cables





About RR KABEL

RR Kabel is part of RR Global, a USD 850 Million conglomerate in the electrical sector with a presence in over 80 countries globally. Spread across multiple business verticals including Wires & Cables, we continue to endeavour to create products of the highest quality using the latest advances in wire design and engineering. We offer the widest range of Wires & Cables for various residential, commercial, industrial and infrastructure purposes including our newest and most advanced High Tension Cables which is certified for IS 7098-2 and IEC 60502-2 covering high tension up to 33 kV.

RR Kabel is ISO 9001, ISO 14001 and ISO 45001 certified company. We are available globally with our products being certified to BASEC (UK), UL (USA), CSA (Canada), VDE (Germany), TUV Rheinland (Germany) and others.

Our products are also compliant to REACH & RoHS, where directives have been achieved with extensive research and development by skilled professionals to make sure our products adhere to global guidelines and standards.

We believe that the future of our industry lies in innovative and effective R&D, that in turn helps one to push boundaries and eliminate borders. We at RR Kabel believe in this and hence are constantly emerging with new products that are globally significant, aimed at providing an environment of utmost safety.

RANGE OF PRODUCTS

- XLPE Insulated HT Cables upto and including 33 KV
- LT Copper / Aluminum Conductor, PVC & XLPE Insulated, Power & Control Cables
- PVC & XLPE Insulated – Control & Instrumentation Cables
- Construction & building Wires & Cables(Single & Multi Core)
- Flexible – Control/Industrial Application Wires & Cables (Single & Multi Core)
- Solar Cables
- Fire Survival & Fire Alarm – Zero Halogen Cables
- Automobile Cables
- Elevator Cables
- Battery Cables
- Ignition Cables
- Welding Cables
- Uninyvin Cables
- Silicon Rubber Cables & with Fibre glass & Polyester yarn braiding
- Submersible Cables
- Data & Communication Cables
- Servo & drag Chain Cables
- BUS application Cables
- Coaxial & Lan networking Cables Cat 5e & Cat 6 Cables
- CCTV application Cables
- Braided Straps
- Power & Moulded Cords & Harness
- Customised Cable Range

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MANUFACTURING PROCESS

All production machineries are top of the line from the best machine builders. All production machineries are chosen carefully to meet the latest technology requirements, they are built for optimum performance and with all online controls from established global suppliers. From Wire Drawing Lines to Extrusion Lines, from assembly machines to laboratories and the final test fields, all technical equipment is provided with the highest standards of electronic control equipment and measuring devices which ensure that the requirement of different quality standards are met.

All machine/production lines are equipped for data communication and data exchanges bottom up and top down using the most modern decentralized control software at the lines (PLC) combined with an efficient central steering and a planning system focused on the demand of cable manufacturers. This way, full traceability will be guaranteed from production start to end, by being able to follow up the machines involved and the material used.

RR KABEL HT cable are manufactured at our manufacturing setup at Waghodia, Vadodara.

Our manufacturing set-up equipped with CCV line enables us to have extrusion free of voids, contamination, and manufacturing defects also it's long continuous production schedules delivers uniform production.

World class infrastructure, and state-of-art machinery which include -

- CCV line for H.T cable extrusion for long continuous production schedules taking care of frictional heat and pressure and to deliver uniform production.
- Dual take up Rod Break Down machine.
- 28/32 line wire drawing machine, first of its kind in India.
- High speed Drum Twister machine for faster laying up.
- Synchronized Stranding machine, first of its kind in India.
- High speed extrusion machines with high accuracy.

QUALITY ASSURANCE

RR Kabel always aims to achieve satisfaction of customer, for that RR Kabel has Up-to-date laboratory facilities.

Our system of assuring quality consist of regular inspection and audits followed by conscientious quality check of each stage of manufacturing process.Post manufacturing tests ensure compliance of our cable with relevant Indian and International standard.



We have self-reliant facility to conduct all routine and type test which are as below:

Type Test:

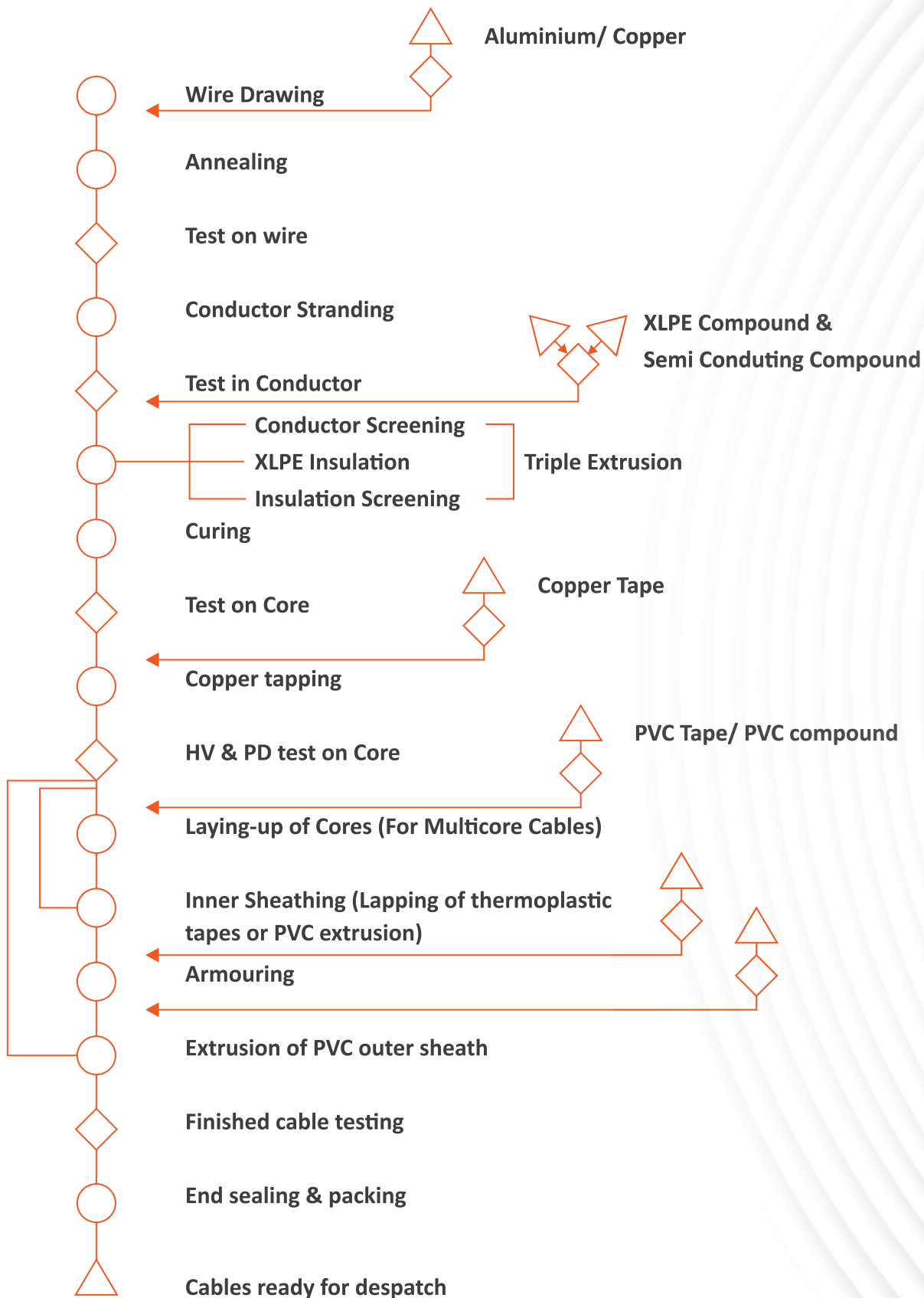
- Electrical tests
- Non-electrical tests
- Special tests
- Impulse tests

Routine Tests:

- Partial Discharge test
- High voltage test
- Conductor resistance



PROCESS FLOW



DESIGN FEATURE

Medium voltage cables have common design features independent of the rated voltage and operating frequency. The components that essentially determine the electrical and thermal behavior of the cable are the conductor, the insulation with inner and outer semi-conductive layers and the metallic screen.

Medium voltage cables of rated voltages from 3.3 kV up to 33 kV are designed as so-called Radial Field Cables.

The main XLPE insulation of a medium voltage cable can be regarded as a homogenous cylinder. Its field distribution or voltage gradient is therefore represented by a homogenous radial field. The value of the voltage gradient at a point x within the insulation can therefore be calculated as:

$$E_x = \frac{u_o}{r_x \cdot \ln \left[\frac{r_a}{r_i} \right]} \quad (\text{kV/mm})$$

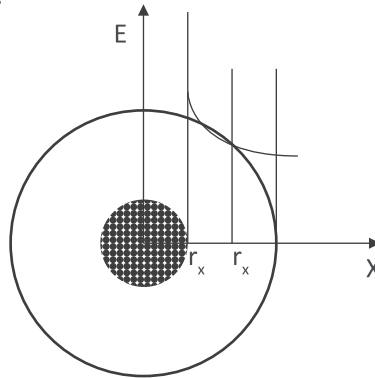
Where

- u_o : Operating voltage (kV)
- r_x : Radius at position x.
- r_a : External radius over insulation
- r_i : Radius of the inner semi-conductive layer

Note: All dimensions are in mm.

The electrical field strength is maximum at the inner semi-conductive layer and minimum above the insulation (below the outer semi-conductive layer, where $r_x = r_a$)

Figure A:



To ensure a defined cylindrical field and to withstand the field strength that occur, all medium voltage cables of rated voltages 6 kV and above, independent of their type of dielectric, require Field limiting or field smoothing layers, widely known as semi-conductive layers, in the interface between conductor and insulation (Conductor screen) and between insulation and metallic screen (Insulation screen).

These semi-conductive layers have two principal purposes:

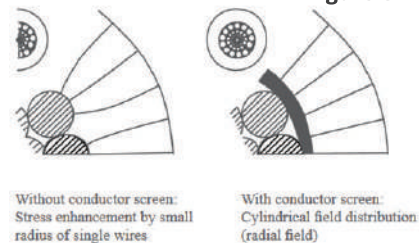
1. Equalizing and reduction of the electrical stress in the cable dielectric by preventing local field enhancement in non-homogenous areas such as the individual wires of the conductor. The semi-conductive layers eliminate the effect of the individual wires on the field distribution (see Fig. B).

2. Prevention of the formation of gaps or voids between the voltage-carrying components of the cable (conductor and metallic screen) and the insulation layer due to mechanical stress, e.g. bending of the cable or differential expansion of the various materials under varying thermal stress. A solid and permanent bond between the semi-conductive layers and the insulation effectively prevents the occurrence of partial discharges; an essential feature in the case of polymer-insulated cables.

The grounded metallic screen, which is always needed, provides effective electrical screening of the cable. The cable environment is thus free of electrical fields

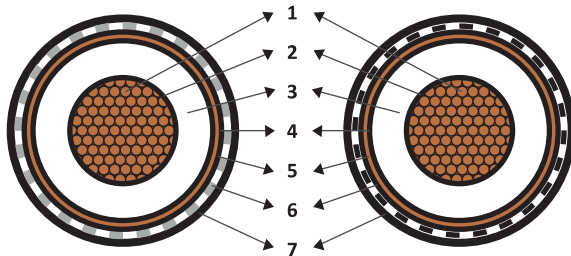
The cable is finally given an overall sheath of suitable thermoplastic material to protect the metallic screen along with the complete cable from moisture and corrosion damages.

Figure 8:



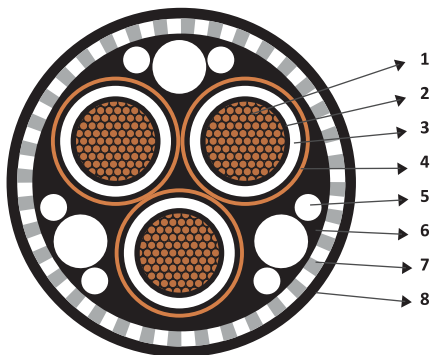
CONSTRUCTIONAL DETAILS

SINGLE CORE CABLE



1. Conductor : Stranded Compacted Circular Aluminum / Copper as per Class-2 of IS: 8130
2. Conductor Screening : Extruded Semiconductor Compound
3. Insulation Material : XLPE (Cross linked polyethylene)
4. Insulation Screening : Extruded Semiconducting Compound followed by helically wrapped Copper Tape
5. Inner Sheath : Extruded PVC Type ST-2/FR Type/FRLS Type as per IS:5831
6. Armouring : Single layer of Aluminium Round Wire / Flat Strip
7. Outer Sheath : Extruded PVC Type ST-2/FR Type/FRLS Type as per IS:5831

THREE CORE CABLE



1. Conductor: Stranded Compacted Circular Aluminum / Copper as per Class-2 of IS: 8130
2. Conductor Screening: Extruded Semiconducting Compound
3. Insulation Material: Crosslinked Polyethylene (XLPE)
4. Insulation Screening: Extruded Semiconducting Compound Followed By Helically Wrapped Copper Tape.
5. PVC Fillers
6. Inner Sheath: Extruded PVC Type ST-2/FR Type/FRLS Type as per IS:5831
7. Armouring: Single Layer of Galvanized Flat Strip/ Round Wires.
8. Outer Sheath: Extruded PVC Type ST-2/FR Type/FRLS Type as per IS:5831

RR KABEL Manufacture Following voltage grade cables as per IS 7098-2

- 3.3 kV (E) & (UE) Unscreened & Screened cable
- 3.8/6.6 kV Screened cable
- 6.35/11 kV Screened cable /6.6 kV (UE)
- 11/11 kV Screened cable /11 kV (UE)
- 12.7/22 kV Screened cable / 22 kV (E)
- 19/33 kV Screened cable / 33 kV (E)
- 33 kV (UE) Screened cable

ELECTRICAL FORMULAS

NOMINAL VOLTAGE

The Nominal voltage is to be expressed with two values of alternative current U_0/U in V (volt)

U_0 : Voltage between conductor and earth

U : Voltage between phases (conductors)

RESISTANCE

The Values of conductor DC resistance are dependent on temperature as given by:

$$R_t = R_{20} \times [1 + \alpha (t - 20)] \quad \Omega/\text{km}$$

R_t : Conductor DC resistance at t °C Ω/km

R_{20} : Conductor DC resistance at 20°C Ω/km

t : Operating temperature °C

α : Resistance temperature coefficient

= 0.00393 for copper

= 0.00403 for aluminium

Generally DC resistance is based on IEC 60228 To calculate AC resistance of the conductor at the operating temperature as the following:

$$R_{AC} = R_t \times [1 + y_s + y_p]$$

y_s : Skin effect factor

y_p : Proximity effect

Generally AC Resistance is based on IEC 60287

CAPACITANCE

$$C = \frac{\epsilon_r}{18 \ln \frac{D}{d}} \quad \mu\text{F}/\text{km}$$

C : Operating capacitance $\mu\text{F}/\text{km}$

D : Diameter over insulation mm

d : Conductor diameter mm

ϵ_r : Relative permittivity of insulation material

$\epsilon_r = 4.8$ for PVC

$\epsilon_r = 2.3$ for XLPE

INDUCTANCE

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

L : Inductance mH/km

K : Constant depends on number of wires of conductor

d : Conductor diameter

S : Axial spacing between cables (Trefoil formation)

S : 1.26 x axial spacing between cables(Flat formation)

REACTANCE

The inductive reactance per phase of a cable may be obtained by the formula:

$$X = 2 \pi f L \times 10^{-3}$$

X : Reactance Ω/km

f : Frequency Hz

L : Inductance mH/km

ELECTRICAL FORMULAS

IMPEDANCE

$z = \sqrt{R^2_{ac} + X^2}$	Ω/km
Z : Phase impedance of cable	Ω/km
R _{ac} : AC resistance at operating temperature	Ω/km
X : Reactance	Ω/km

INSULATION RESISTANCE

$R = \frac{1000}{2 * \pi} * \text{LN} (D/d)$	
R : Insulation resistance at 20° C	M Ω .km
D : Insulated conductor diameter	mm
d : Conductor diameter	mm

CHARGING CURRENT

$I = U_o \times 2\pi f \times C \times 10^{-6}$	
I : Charging current	A/km
U _o : voltage between phase and earth	V
C : Capacitance to neutral	$\mu\text{F}/\text{km}$

DIELECTRIC LOSSES

$D = 2\pi f C U_o^2 \tan d \times 10^{-6}$	watt/km/phase
D : Dielectric losses	watt/km/phase
U _o : Voltage between phase and earth	V
C : Capacitance to neutral	$\mu\text{F}/\text{km}$
tan d = Die-electric power factor (0.004 for XLPE)	

CABLE SHORT CIRCUIT CAPACITY

$I_{sc}(t) = I_{sc}(1) / \sqrt{t}$ kA	
I _{sc} (t) : Short circuit for t second kA	
I _{sc} (1) : Short circuit for 1 second kA	

VOLTAGE DROP

When the current flows in conductor, there is a voltage drop between the ends of the conductor. For low voltage cable network of normal operation, it is advisable of a voltage drop of 3-5 %. To calculate voltage drop as the following :

1- for single phase circuit:		
$V_d = 2 (R \cos\phi + X \sin\phi)$		
2- for three phase circuit :		
$V_d = \sqrt{3} (R \cos\phi + X \sin\phi)$		
V _d : Voltage drop	V	
I : Load current	A	
R : AC resistance	Ω/km	
X : Reactance	Ω/km	
l : Length	km	
cos ϕ : Power factor		

ELECTRICAL PARAMETERS

Conductor Parameters

Nominal Size of Conductor	Minimum No. of Wires		Max D.C. Resistance at 20°C		A.C Resistance at 90°C	
	Compacted Round		Copper	Aluminium	Copper	Aluminium
	Plain Copper	Aluminium				
Sq. mm	Nos	Nos	Ohm/Km	Ohm/Km	Ohm/Km	Ohm/Km
25	6	6	0.727	1.20	0.927	1.54
35	6	6	0.524	0.868	0.668	1.11
50	6	6	0.387	0.641	0.494	0.822
70	12	12	0.268	0.443	0.342	0.568
95	15	15	0.193	0.320	0.247	0.411
120	18	15	0.153	0.253	0.196	0.325
150	18	15	0.124	0.206	0.159	0.265
185	30	30	0.0991	0.164	0.128	0.211
240	34	30	0.0754	0.125	0.0982	0.161
300	34	30	0.0601	0.100	0.0792	0.130
400	53	53	0.0470	0.0778	0.0632	0.102
500	53	53	0.0366	0.0605	0.0509	0.0801
630	53	53	0.0283	0.0469	0.0414	0.0634
800	53	53	0.0221	0.0367	0.0394	0.0513
1000	53	53	0.0176	0.0291	0.0306	0.0426

Short Circuit rating for duration of 1 Sec (All values are in K.Amps)

Nominal Size	XLPE Insulated	
	Copper	Aluminium
Sq. mm		
25	3.58	2.36
35	5.01	3.31
50	7.15	4.72
70	10.02	6.61
95	13.59	8.98
120	17.17	11.34
150	21.46	14.17
185	26.47	17.48
240	34.34	22.68
300	42.93	28.35
400	57.23	37.79
500	71.54	47.24
630	90.14	59.52
800	114.47	75.59
1000	143.08	94.48

ELECTRICAL PARAMETERS

Capacitance

Capacitance (Microfarads/km) Single core cable							
Size	Voltage Grade (kV)						
	1.9/3.3 & 3.3/3.3	3.8/6.6	6.6/6.6 & 6.35/11	11/11	12.7/22	19/33	33/33
35							
50	0.32	0.26	0.22				
70	0.37	0.30	0.24	0.18			
95	0.41	0.34	0.28	0.20	0.19	0.14	0.14
120	0.46	0.38	0.30	0.22	0.20	0.16	0.15
150	0.50	0.40	0.33	0.23	0.22	0.16	0.16
185	0.55	0.44	0.36	0.25	0.24	0.18	0.17
240	0.61	0.49	0.40	0.28	0.26	0.19	0.18
300	0.67	0.51	0.43	0.30	0.28	0.21	0.20
400	0.75	0.52	0.48	0.34	0.31	0.23	0.22
500	0.79	0.56	0.55	0.38	0.35	0.26	0.24
630	0.83	0.64	0.62	0.43	0.40	0.29	0.27
800	0.87	0.71	0.69	0.47	0.44	0.32	0.30
1000	0.88	0.75	0.75	0.51	0.47	0.34	0.32

Capacitance (Microfarads/km) Multi core cable							
Size	Voltage Grade (kV)						
	1.9/3.3 & 3.3/3.3	3.8/6.6	6.6/6.6 & 6.35/11	11/11	12.7/22	19/33	33/33
35	0.30	0.25	0.20				
50	0.33	0.27	0.22				
70	0.37	0.30	0.25	0.18			
95	0.42	0.35	0.28	0.20	0.19	0.15	0.14
120	0.47	0.38	0.31	0.22	0.21	0.16	0.15
150	0.51	0.41	0.33	0.24	0.22	0.17	0.16
185	0.56	0.45	0.36	0.26	0.24	0.18	0.17
240	0.63	0.50	0.41	0.29	0.27	0.20	0.19
300	0.68	0.52	0.44	0.31	0.29	0.21	0.20
400	0.77	0.53	0.49	0.34	0.32	0.24	0.22

ELECTRICAL PARAMETERS

Reactance

Approximate reactance at 50 Hz (Ohms/km) for Single core														
Size	Voltage Grade (kV)													
	1.9/3.3 & 3.3/3.3		3.8/6.6		6.6/6.6 & 6.35/11		11/11		12.7/22		19/33		33/33	
	Arm	Un-Arm	Arm	Un-Arm	Arm	Un-Arm	Arm	Un-Arm	Arm	Un-Arm	Arm	Un-Arm	Arm	Un-Arm
35	0.139	0.125												
50	0.124	0.117	0.126	0.121	0.130	0.126	0.140	0.136	0.143	0.155	0.140	0.151		
70	0.115	0.108	0.117	0.112	0.121	0.117	0.130	0.126	0.133	0.144	0.133	0.141		
95	0.109	0.103	0.110	0.106	0.115	0.111	0.124	0.120	0.126	0.136	0.127	0.133	0.139	0.136
120	0.104	0.098	0.105	0.101	0.109	0.105	0.118	0.115	0.120	0.130	0.122	0.127	0.130	0.129
150	0.101	0.096	0.102	0.099	0.107	0.103	0.115	0.111	0.117	0.127	0.118	0.123	0.127	0.126
185	0.0986	0.093	0.0999	0.096	0.104	0.100	0.111	0.108	0.112	0.123	0.115	0.120	0.123	0.122
240	0.0952	0.089	0.0964	0.093	0.0993	0.096	0.106	0.103	0.108	0.117	0.110	0.114	0.117	0.116
300	0.092	0.088	0.0939	0.091	0.0961	0.093	0.103	0.100	0.105	0.113	0.105	0.111	0.113	0.113
400	0.0892	0.085	0.0914	0.089	0.0930	0.090	0.0993	0.096	0.101	0.109	0.102	0.106	0.109	0.108
500	0.0870	0.082	0.0895	0.087	0.0898	0.087	0.0955	0.093	0.0971	0.105	0.099	0.102	0.105	0.104
630	0.0858	0.082	0.0877	0.085	0.088	0.085	0.0927	0.091	0.0942	0.101	0.096	0.099	0.101	0.101
800	0.0845	0.081	0.0848	0.083	0.0851	0.083	0.0902	0.088	0.0914	0.098	0.092	0.096	0.098	0.097
1000	0.0839	0.080	0.0839	0.082	0.0839	0.082	0.0886	0.086	0.0895	0.0958	0.090	0.094	0.0958	0.095

Approximate reactance at 50 Hz (Ohms/km) for Multi core							
Size	Voltage Grade (kV)						
	1.9/3.3 & 3.3/3.3	3.8/6.6	6.6/6.6 & 6.35/11	11/11	12.7/22	19/33	33/33
35	0.107	0.112	0.119				
50	0.103	0.108	0.114				
70	0.0955	0.100	0.106	0.118			
95	0.0914	0.0958	0.101	0.112	0.114	0.127	0.130
120	0.0877	0.0914	0.096	0.106	0.109	0.121	0.124
150	0.0858	0.0895	0.094	0.104	0.106	0.117	0.120
185	0.0836	0.0870	0.091	0.100	0.102	0.113	0.116
240	0.0811	0.0842	0.088	0.0964	0.0983	0.109	0.111
300	0.0789	0.0826	0.086	0.0933	0.0952	0.105	0.107
400	0.077	0.0817	0.083	0.0898	0.0917	0.101	0.103

ELECTRICAL PARAMETERS

Current Carrying Capacity

Nominal Size of Conductor	Single core cable Current Carrying Capacity (Amps.)					
	Aluminium			Copper		
Sq. mm	In Ground at 30°C	In Duct at 30°C	In Air at 40°C	In Ground at 30°C	In Duct at 30°C	In Air at 40°C
35	117	104	139	151	134	181
50	138	123	166	178	158	216
70	168	149	208	216	191	269
95	200	177	252	257	227	326
120	227	201	292	290	256	376
150	252	223	329	323	285	424
185	285	251	380	360	317	487
240	326	286	448	411	361	568
300	365	319	511	456	399	643
400	412	359	593	508	443	735
500	461	401	680	559	486	828
630	514	445	777	611	529	930
800	552	476	863	639	550	1003
1000	595	509	954	672	575	1083

Nominal Size of Conductor	3 core cable Current Carrying Capacity (Amps.)					
	Aluminium			Copper		
Sq. mm	In Ground at 30°C	In Duct at 30°C	In Air at 40°C	In Ground at 30°C	In Duct at 30°C	In Air at 40°C
35	112	96	123	144	124	159
50	131	113	146	169	146	188
70	160	138	182	206	178	234
95	191	165	221	246	212	284
120	216	187	254	278	240	326
150	241	208	286	310	268	368
185	273	236	330	350	302	422
240	315	277	385	401	353	492
300	354	312	440	449	395	559
400	403	355	512	506	445	642

DERATING FACTORS AND ASSUMPTION

The current ratings of cables as indicated in various tables have been calculated on certain assumed conditions.

In actual practice these conditions may be different. Therefore to determine the actual current ratings as per installation conditions, the tabulated ratings shall be multiplied with appropriate factors.

Basic assumption for current ratings

- Maximum permissible temperature - 90°C for XLPE insulation
- Ground/Duct temperature - 30°C
- Ambient temperature - 40°C
- Thermal resistivity of soil - 150°C cm/W
- Thermal resistivity of Dielectric 650°C cm/W for PVC, 350°C cm/W for XLPE
- Single core cables installed in one circuit in following arrangement

Or

- Multicore cables installed in single circuit

Voltage Grade	Depth of Laying
3.3kV to 11kV	900mm
More than 11 kV	1050 mm

Rating Factors

- Rating factors related to variation in ambient air temperature

Air Temperature in Deg.		20°	25°	30°	35°	40°	45°	50°	55°
	Normal PVC	1.32	1.25	1.16	1.09	1.00	0.90	0.80	0.80
Rating factors	HR PVC	1.22	1.17	1.12	1.06	1.00	0.94	0.87	0.80
	XLPE	1.20	1.16	1.11	1.06	1.00	0.95	0.88	0.82

- Rating factors related to variation in ground temperature

Air Temperature in Deg.		15°	20°	25°	30°	35°	40°	45°	50°
	Normal PVC	1.17	1.12	1.06	1.00	0.94	0.87	0.79	0.71
Rating factors	HR PVC	1.13	1.09	1.04	1.00	0.95	0.90	0.85	0.80
	XLPE	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82

- Rating factors related to variation in ground thermal resistivity of soil for 3 single core cables laid direct in ground. (Average value)

Thermal Res. in °C.Cm/W	100	120	150	200	250	300
Rating factors	1.20	1.10	1.00	0.90	0.81	0.74

- Rating factors related to variation in ground thermal resistivity of soil for multi core cables laid direct in ground. (Average value)

Thermal Res. in °C.Cm/W	100	120	150	200	250	300
Rating factors	1.16	1.08	1.00	0.90	0.82	0.76

- Rating factors related to variation in depth of laying for 1.1kv cables

For cross-sectional area of conductor < 25sqmm

Depth of laying (cm) >	75	90	105	120	150	180 & Above
Rating factors	1.00	0.99	0.98	0.97	0.96	0.95

For cross-sectional area of conductor 25 to 300sqmm

Depth of laying (cm) >	75	90	105	120	150	180 & Above
Rating factors	1.00	0.98	0.97	0.96	0.94	0.93

For cross-sectional area of conductor above 300sqmm

Depth of laying (cm) >	75	90	105	120	150	180 & Above
Rating factors	1.00	0.97	0.96	0.95	0.92	0.91

- Rating factors related to variation in depth of laying for 1.1kV cables

Depth of laying (cm) >	75	90	105	120	150	180 & Above
Rating factors	-	1.00	0.99	0.98	0.96	0.95

- Rating factors related to variation in depth of laying for above 11kV cables

Depth of laying (cm) >	75	90	105	120	150	180 & Above
Rating factors	-	-	1.00	0.99	0.98	0.96

Group Rating Factors

- Cable laid direct in Ground

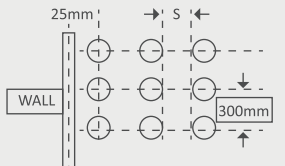
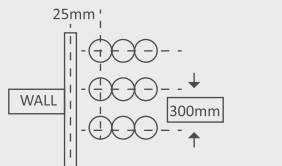
No of cables/ circuits in groups	Multicore cables in horizontal formation					Single cables in horizontal formation				
	Touching	S=15CM	S=30CM	S=45CM	S=60CM	Touching	S=15CM	S=30CM	S=45CM	S=60CM
2	0.80	0.84	0.87	0.90	0.91	0.80	0.85	0.90	0.92	0.95
3	0.68	0.74	0.79	0.83	0.86	0.70	0.78	0.85	0.88	0.91
4	0.62	0.69	0.75	0.80	0.83	0.64	0.73	0.81	0.86	0.89
5	0.58	0.65	0.72	0.77	0.80	0.59	0.70	0.79	0.84	0.88
6	0.55	0.62	0.69	0.75	0.78	0.55	0.67	0.77	0.83	0.87
7	0.52	0.59	0.67	0.73	0.77	0.53	0.65	0.76	0.82	0.86
8	0.50	0.57	0.66	0.72	0.75	0.51	0.64	0.76	0.82	0.86
9	0.48	0.55	0.65	0.71	0.75	0.49	0.63	0.74	0.81	0.85
10	0.46	0.54	0.64	0.70	0.74	0.48	0.63	0.74	0.81	0.85
11	0.45	0.53	0.63	0.70	0.74	0.47	0.62	0.73	0.80	0.84
12	0.44	0.52	0.62	0.69	0.73	0.46	0.61	0.73	0.80	0.84

s= axial spacing of cable

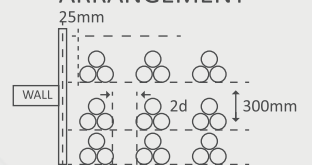
No of cables/ circuits in groups	No. of Tier	Multicore cables in Tier formation				
		Touching	S=15CM	S=30CM	S=45CM	S=60CM
2	1	0.80	0.84	0.87	0.90	0.91
3	1	0.68	0.74	0.79	0.83	0.86
4	2	0.60	0.66	0.73	0.77	0.79
5	2	0.55	0.61	0.68	0.71	0.73
6	2	0.51	0.57	0.63	0.67	0.69
7	3	0.48	0.54	0.59	0.63	0.64
8	3	0.46	0.51	0.56	0.60	0.61
9	3	0.44	0.48	0.53	0.57	0.58
10	4	0.42	0.47	0.52	0.55	0.56
11	4	0.41	0.46	0.50	0.54	0.55
12	4	0.40	0.45	0.49	0.53	0.54

Cable laid direct in open racks in air

- Multicore Cables in open racks in air

No. of racks	 S = Dia of Cable					 t = touching				
	1	2	3	6	9	1	2	3	6	9
1	1.00	0.98	0.96	0.93	0.92	1.00	0.84	0.80	0.75	0.73
2	1.00	0.95	0.93	0.90	0.89	1.00	0.80	0.76	0.71	0.69
3	1.00	0.94	0.92	0.89	0.88	1.00	0.78	0.74	0.70	0.68
6	1.00	0.93	0.90	0.87	0.86	1.00	0.76	0.72	0.65	0.66

- Single Core Cables In open racks In air

ARRANGEMENT			
			
1	2	3	6
1	1	2	6
2	1	0.98	0.96
3	1	0.95	0.93
4	1	0.94	0.92
5	1	0.93	0.9

No of cables/ circuits in groups	Multicore cables in tier formation											
	No. of Tier	Touching	S=15CM	S=30CM	S=45CM	S=60CM						
2	1	0.80	0.84	0.87	0.90	0.91						
3	1	0.68	0.74	0.79	0.83	0.86						
4	2	0.60	0.66	0.73	0.77	0.79						
5	2	0.55	0.61	0.68	0.71	0.73						
6	2	0.51	0.57	0.63	0.67	0.69						
7	3	0.48	0.54	0.59	0.63	0.64						
8	3	0.46	0.51	0.56	0.6	0.61						
9	3	0.44	0.48	0.53	0.57	0.58						
10	4	0.42	0.47	0.52	0.55	0.56						
11	4	0.41	0.46	0.50	0.54	0.55						
12	4	0.40	0.45	0.49	0.53	0.54						
No of cables/ circuits in groups	Multicore cable (Touching) No of cables in racks				Multicore cables (spacing of cable equal to dia meter of cable No of cables in racks				S/core cables in trefoil touching formation spacing between circuits equal to twice the diameter of cable) No of cables in racks			
	1	2	3	4	1	2	3	4	1	2	3	4
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	0.84	0.80	0.78	0.76	0.98	0.95	0.94	0.93	0.98	0.95	0.94	0.93
3	0.80	0.76	0.74	0.72	0.96	0.93	0.92	0.90	0.96	0.93	0.92	0.90
4	0.76	0.71	0.70	0.68	0.93	0.90	0.89	0.87	—	—	—	—

Nominal area of Conductor (Sq. mm)	Estimated Voltage Drops in XLPE Aluminum Cables For A.C. System			
	Voltage Drop - mV/A/m			
	Copper Cable @90°C		Aluminium Cable @90°C	
	Single Phase	Three Phase	Single Phase	Three Phase
35	1.3559	1.1689	2.2284	1.9252
50	1.0083	0.8673	1.6511	1.4252
70	0.7097	0.6075	1.1485	0.9895
95	0.525	0.4458	0.8391	0.7206
120	0.4296	0.3616	0.6714	0.5744
150	0.354	0.3028	0.5569	0.4740
185	0.3085	0.2532	0.4550	0.3845
240	0.2593	0.2082	0.3639	0.3035
300	0.2302	0.1812	0.3080	0.2533
400	0.2091	0.1604	0.2631	0.2170
500	0.1942	0.1461	0.2300	0.1809
630	0.1834	0.1359	0.2069	0.1591
800	0.1775	--	0.1928	--
1000	0.1732	--	0.1831	--

ELECTRICAL FORMULAS FOR CALCULATING A.C. LOAD CURRENT

Load current in Amps when KVA is given	for Single phase (A.C.) $KVA \times 1000V$	for Three phase (A.C.) $KVA \times 1000 \times 1.732 \times V$
Load current in Amps when Kilo Watt is given	for Single phase (A.C.) $KW \times 1000V \times pf$	for Three phase (A.C.) $KW \times 1000 \times 1.732 \times V \times pf$
Load current in Amps when H.P. is given	for Single phase (A.C.) $H.P. \times 746V \times \%Eff \times pf$	for Three phase (A.C.) $H.P. \times 746 \times 1.732 \times V \times \%Eff \times pf$

V = Nominal system voltage in Volts, pf = Power factor, KVA = Kilo Volts Ampere, H.P. = Horse Power





DIMENSIONAL PARAMETERS & WEIGHT

TABLE 1

Single core copper cables

1.9/3.3 KV (E) & 3.3/3.3 KV (UE) Single core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMOURED CABLE					WIRE ARMOURED CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
35	2.5	2.0	20	694	0.3	4 x 0.8	1.40	20	739	1.6	1.40	22	810
50	2.5	2.0	21	832	0.3	4 x 0.8	1.40	21	882	1.6	1.40	23	955
70	2.5	2.0	23	1063	0.3	4 x 0.8	1.40	23	1116	1.6	1.40	25	1199
95	2.5	2.0	25	1350	0.3	4 x 0.8	1.40	25	1405	1.6	1.40	27	1496
120	2.5	2.0	26	1608	0.3	4 x 0.8	1.40	27	1405	1.6	1.56	28	1790
150	2.5	2.0	28	1896	0.3	4 x 0.8	1.56	28	1982	1.6	1.56	30	2086
185	2.5	2.2	30	2290	0.3	4 x 0.8	1.56	30	2351	2.0	1.56	32	2534
240	2.5	2.2	32	2861	0.4	4 x 0.8	1.56	32	2931	2.0	1.56	34	3116
300	2.5	2.2	34	3459	0.4	4 x 0.8	1.56	34	3531	2.0	1.56	36	3734
400	2.6	2.2	37	4302	0.4	4 x 0.8	1.56	37	4388	2.0	1.72	40	4634
500	2.8	2.4	41	5437	0.4	4 x 0.8	1.72	41	5520	2.0	1.88	44	5799
630	3.0	2.6	45	6906	0.5	4 x 0.8	1.88	45	6991	2.5	2.04	49	7433
800	3.3	2.6	49	8653	0.5	4 x 0.8	2.04	50	8788	2.5	2.04	53	9225
1000	3.5	2.8	54	10732	0.6	4 x 0.8	2.20	55	10869	2.5	2.20	58	11353

TABLE 2

Single core copper cables

3.8/6.6 KV (E) Single core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMOURED CABLE					WIRE ARMOURED CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	2.8	2.0	19	603	0.3	4 x 0.8	1.40	20	649	1.6	1.40	21	720
35	2.8	2.0	21	718	0.3	4 x 0.8	1.40	21	761	1.6	1.40	23	837
50	2.8	2.0	22	857	0.3	4 x 0.8	1.40	22	905	1.6	1.40	24	984
70	2.8	2.0	23	1090	0.3	4 x 0.8	1.40	24	1141	1.6	1.40	25	1229
95	2.8	2.0	25	1378	0.3	4 x 0.8	1.40	26	1440	1.6	1.40	27	1528
120	2.8	2.0	27	1638	0.3	4 x 0.8	1.40	27	1703	1.6	1.56	29	1824
150	2.8	2.0	28	1927	0.3	4 x 0.8	1.56	29	2020	1.6	1.56	31	2121
185	2.8	2.2	30	2323	0.3	4 x 0.8	1.56	30	2390	2.0	1.56	33	2566
240	2.8	2.2	32	2896	0.4	4 x 0.8	1.56	33	2965	2.0	1.56	35	3158
300	3.0	2.2	35	3522	0.4	4 x 0.8	1.56	35	3599	2.0	1.56	37	3803
400	3.3	2.2	38	4397	0.4	4 x 0.8	1.72	39	4518	2.0	1.72	41	4744
500	3.5	2.4	42	5542	0.5	4 x 0.8	1.72	43	5629	2.0	1.88	45	5919
630	3.5	2.6	46	6988	0.5	4 x 0.8	1.88	46	7078	2.5	2.04	50	7526
800	3.5	2.6	50	8689	0.5	4 x 0.8	2.04	50	8823	2.5	2.04	54	9273
1000	3.6	2.8	54	10751	0.6	4 x 0.8	2.20	55	10888	2.5	2.20	58	11371

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 3
Single core copper cables

6.35/11 KV (E) Single core Copper Conductor XLPE Insulated Armoured & Unarmoured Cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	3.6	2.0	21	666	0.3	4 x 0.8	1.40	21	716	1.6	1.40	23	789
35	3.6	2.0	22	784	0.3	4 x 0.8	1.40	23	838	1.6	1.40	24	915
50	3.6	2.0	23	925	0.3	4 x 0.8	1.40	24	977	1.6	1.40	25	1065
70	3.6	2.0	25	1163	0.3	4 x 0.8	1.40	25	1225	1.6	1.40	27	1314
95	3.6	2.0	27	1456	0.3	4 x 0.8	1.40	27	1521	1.6	1.56	29	1642
120	3.6	2.0	28	1720	0.3	4 x 0.8	1.56	29	1812	1.6	1.56	31	1914
150	3.6	2.2	30	2044	0.3	4 x 0.8	1.56	31	2110	2.0	1.56	33	2286
185	3.6	2.2	32	2415	0.4	4 x 0.8	1.56	32	2485	2.0	1.56	34	2670
240	3.6	2.2	34	2994	0.4	4 x 0.8	1.56	34	3065	2.0	1.56	37	3268
300	3.6	2.2	36	3599	0.4	4 x 0.8	1.56	36	3681	2.0	1.72	39	3925
400	3.6	2.2	39	4439	0.4	4 x 0.8	1.72	40	4559	2.0	1.72	42	4794
500	3.6	2.4	43	5558	0.5	4 x 0.8	1.72	43	5644	2.0	1.88	46	5934
630	3.6	2.6	47	7005	0.5	4 x 0.8	1.88	47	7094	2.5	2.04	50	7543
800	3.6	2.8	50	8757	0.5	4 x 0.8	2.04	50	8840	2.5	2.04	54	9290
1000	3.6	2.8	54	10751	0.6	4 x 0.8	2.20	55	10888	2.5	2.20	58	11371

TABLE 4
Single core copper cables

11/11 KV (UE) Single core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	5.5	2.0	25	833	0.3	4 x 0.8	1.40	25	888	1.6	1.40	27	984
35	5.5	2.0	26	957	0.3	4 x 0.8	1.40	26	1017	1.6	1.56	28	1133
50	5.5	2.0	27	1105	0.3	4 x 0.8	1.40	27	1170	1.6	1.56	29	1291
70	5.5	2.2	29	1382	0.3	4 x 0.8	1.56	29	1444	1.6	1.56	31	1552
95	5.5	2.2	31	1689	0.3	4 x 0.8	1.56	31	1754	2.0	1.56	34	1938
120	5.5	2.2	33	1964	0.4	4 x 0.8	1.56	33	2040	2.0	1.56	35	2226
150	5.5	2.2	34	2269	0.4	4 x 0.8	1.56	34	2348	2.0	1.56	37	2543
185	5.5	2.2	36	2649	0.4	4 x 0.8	1.56	36	2732	2.0	1.72	39	2967
240	5.5	2.2	38	3242	0.4	4 x 0.8	1.72	38	3356	2.0	1.72	41	3581
300	5.5	2.4	40	3900	0.4	4 x 0.8	1.72	40	3986	2.0	1.72	43	4222
400	5.5	2.4	43	4762	0.5	4 x 0.8	1.88	44	4889	2.0	1.88	46	5145
500	5.5	2.6	47	5908	0.5	4 x 0.8	1.88	47	5997	2.5	2.04	51	6445
630	5.5	2.8	51	7385	0.5	4 x 0.8	2.04	51	7467	2.5	2.20	55	7961
800	5.5	2.8	54	9112	0.6	4 x 0.8	2.20	55	9249	2.5	2.20	58	9732
1000	5.5	3.0	59	11190	0.6	4 x 0.8	2.20	59	11281	2.5	2.36	62	11889

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 5
Single core copper cables

12.7/22 KV (E) Single core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMOURED CABLE					WIRE ARMOURED CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	6	2.0	26	881	0.3	4 x 0.8	1.40	26	941	1.6	1.56	28	1057
35	6	2.0	27	1006	0.3	4 x 0.8	1.40	27	1071	1.6	1.56	29	1192
50	6	2.0	28	1156	0.3	4 x 0.8	1.56	29	1249	1.6	1.56	30	1351
70	6	2.2	30	1437	0.3	4 x 0.8	1.56	30	1504	2.0	1.56	33	1680
95	6	2.2	32	1748	0.4	4 x 0.8	1.56	32	1817	2.0	1.56	35	2011
120	6	2.2	34	2025	0.4	4 x 0.8	1.56	34	2098	2.0	1.56	36	2301
150	6	2.2	35	2332	0.4	4 x 0.8	1.56	35	2408	2.0	1.56	38	2621
185	6	2.2	37	2714	0.4	4 x 0.8	1.56	37	2794	2.0	1.72	40	3048
240	6	2.2	39	3311	0.4	4 x 0.8	1.72	39	3431	2.0	1.72	42	3666
300	6	2.4	41	3974	0.4	4 x 0.8	1.72	41	4057	2.0	1.88	44	4336
400	6	2.4	44	4840	0.5	4 x 0.8	1.88	45	4965	2.0	1.88	47	5238
500	6	2.6	48	5993	0.5	4 x 0.8	1.88	48	6086	2.5	2.04	52	6555
630	6	2.8	52	7477	0.5	4 x 0.8	2.04	52	7563	2.5	2.20	56	8063
800	6	2.8	55	9209	0.6	4 x 0.8	2.20	56	9343	2.5	2.20	59	9841
1000	6	3.0	60	11295	0.6	4 x 0.8	2.36	60	11430	2.5	2.36	63	11975

TABLE 6
Single core copper cables

19/33 KV (E) Single core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMOURED CABLE					WIRE ARMOURED CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	8.8	2.2	32	1210	0.4	4 x 0.8	1.56	32	1280	2.00	1.56	35	1474
35	8.8	2.2	33	1346	0.4	4 x 0.8	1.56	33	1421	2.00	1.56	36	1615
50	8.8	2.2	34	1507	0.4	4 x 0.8	1.56	34	1587	2.00	1.56	37	1782
70	8.8	2.2	36	1776	0.4	4 x 0.8	1.56	36	1858	2.00	1.72	39	2102
95	8.8	2.2	38	2104	0.4	4 x 0.8	1.72	38	2219	2.00	1.72	41	2444
120	8.8	2.4	40	2434	0.4	4 x 0.8	1.72	40	2514	2.00	1.72	42	2749
150	8.8	2.4	41	2757	0.4	4 x 0.8	1.72	41	2840	2.00	1.88	44	3119
185	8.8	2.4	43	3154	0.5	4 x 0.8	1.72	43	3241	2.00	1.88	45	3531
240	8.8	2.6	45	3818	0.5	4 x 0.8	1.88	45	3897	2.50	2.04	49	4346
300	8.8	2.6	47	4463	0.5	4 x 0.8	1.88	47	4551	2.50	2.04	51	5013
400	8.8	2.8	51	5410	0.5	4 x 0.8	2.04	51	5493	2.50	2.20	54	5986
500	8.8	2.8	54	6552	0.6	4 x 0.8	2.20	54	6682	2.50	2.20	58	7174
630	8.8	3.0	58	8078	0.6	4 x 0.8	2.20	58	8164	2.50	2.36	61	8722
800	8.8	3.2	62	9907	0.6	4 x 0.8	2.36	61	9984	3.15	2.52	66	10821
1000	8.8	3.2	66	11979	0.7	4 x 0.8	2.52	66	12116	3.15	2.68	71	13002

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 7
Single core Aluminium cables

1.9/3.3 KV (E) & 3.3/3.3 KV (UE) Single core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	2.5	2.0	19	431	0.3	4 x 0.8	1.40	19	470	1.6	1.40	21	543
35	2.5	2.0	20	486	0.3	4 x 0.8	1.40	20	531	1.6	1.40	22	601
50	2.5	2.0	21	550	0.3	4 x 0.8	1.40	21	600	1.6	1.40	23	673
70	2.5	2.0	23	656	0.3	4 x 0.8	1.40	23	709	1.6	1.40	25	792
95	2.5	2.0	25	784	0.3	4 x 0.8	1.40	25	839	1.6	1.40	27	930
120	2.5	2.0	26	896	0.3	4 x 0.8	1.40	27	955	1.6	1.56	28	1077
150	2.5	2.0	28	1014	0.3	4 x 0.8	1.56	28	1100	1.6	1.56	30	1204
185	2.5	2.2	30	1189	0.3	4 x 0.8	1.56	30	1251	2.0	1.56	32	1434
240	2.5	2.2	32	1413	0.4	4 x 0.8	1.56	32	1484	2.0	1.56	34	1669
300	2.5	2.2	34	1639	0.4	4 x 0.8	1.56	34	1712	2.0	1.56	36	1915
400	2.6	2.2	37	1982	0.4	4 x 0.8	1.56	37	2069	2.0	1.72	40	2315
500	2.8	2.4	41	2462	0.4	4 x 0.8	1.72	41	2545	2.0	1.88	44	2824
630	3	2.6	45	3052	0.5	4 x 0.8	1.88	45	3138	2.5	2.04	49	3579
800	3.3	2.6	49	3713	0.5	4 x 0.8	2.04	50	3849	2.5	2.04	53	4285
1000	3.5	2.8	54	4545	0.6	4 x 0.8	2.20	55	4683	2.5	2.20	58	5166

TABLE 8
Single core Aluminium cables

3.8/6.6 KV (E) Single core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	8.8	2.0	19	453	0.3	4 x 0.8	1.40	20	499	1.6	1.40	21	569
35	8.8	2.0	21	509	0.3	4 x 0.8	1.40	21	552	1.6	1.40	23	628
50	8.8	2.0	22	574	0.3	4 x 0.8	1.40	22	622	1.6	1.40	24	702
70	8.8	2.0	23	683	0.3	4 x 0.8	1.40	24	734	1.6	1.40	25	822
95	8.8	2.0	25	812	0.3	4 x 0.8	1.40	26	874	1.6	1.40	27	962
120	8.8	2.0	27	925	0.3	4 x 0.8	1.40	27	991	1.6	1.56	29	1111
150	8.8	2.0	28	1045	0.3	4 x 0.8	1.56	29	1138	1.6	1.56	31	1240
185	8.8	2.2	30	1223	0.3	4 x 0.8	1.56	30	1290	2.0	1.56	33	1465
240	8.8	2.2	32	1449	0.4	4 x 0.8	1.56	33	1517	2.0	1.56	35	1711
300	8.8	2.2	35	1702	0.4	4 x 0.8	1.56	35	1779	2.0	1.56	37	1983
400	8.8	2.2	38	2078	0.4	4 x 0.8	1.72	39	2199	2.0	1.72	41	2425
500	8.8	2.4	42	2567	0.5	4 x 0.8	1.72	43	2654	2.0	1.88	45	2943
630	8.8	2.6	46	3134	0.5	4 x 0.8	1.88	46	3225	2.5	2.04	50	3673
800	8.8	2.6	50	3749	0.5	4 x 0.8	2.04	50	3883	2.5	2.04	54	4333
1000	8.8	2.8	54	4565	0.6	4 x 0.8	2.20	55	4701	2.5	2.20	58	5185

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 9
Single core Aluminium cables

6.35/11 KV (E) Single core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	3.6	2.0	21	516	0.3	4 x 0.8	1.40	21	566	1.6	1.40	23	639
35	3.6	2.0	22	575	0.3	4 x 0.8	1.40	23	630	1.6	1.40	24	706
50	3.6	2.0	23	643	0.3	4 x 0.8	1.40	24	694	1.6	1.40	25	782
70	3.6	2.0	25	756	0.3	4 x 0.8	1.40	25	818	1.6	1.40	27	907
95	3.6	2.0	27	890	0.3	4 x 0.8	1.40	27	955	1.6	1.56	29	1076
120	3.6	2.0	28	1007	0.3	4 x 0.8	1.56	29	1099	1.6	1.56	31	1201
150	3.6	2.2	30	1161	0.3	4 x 0.8	1.56	31	1228	2.0	1.56	33	1404
185	3.6	2.2	32	1314	0.4	4 x 0.8	1.56	32	1384	2.0	1.56	34	1569
240	3.6	2.2	34	1546	0.4	4 x 0.8	1.56	34	1618	2.0	1.56	37	1821
300	3.6	2.2	36	1779	0.4	4 x 0.8	1.56	36	1861	2.0	1.72	39	2105
400	3.6	2.2	39	2120	0.4	4 x 0.8	1.72	40	2240	2.0	1.72	42	2474
500	3.6	2.4	43	2582	0.5	4 x 0.8	1.72	43	2668	2.0	1.88	46	2958
630	3.6	2.6	47	3151	0.5	4 x 0.8	1.88	47	3241	2.5	2.04	50	3689
800	3.6	2.8	50	3816	0.5	4 x 0.8	2.04	50	3901	2.5	2.04	54	4350
1000	3.6	2.8	54	4565	0.6	4 x 0.8	2.20	55	4701	2.5	2.20	58	5185

TABLE 10
Single core Aluminium cables

11/11 KV (UE) Single core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	5.5	2.0	25	683	0.3	4 x 0.8	1.40	25	737	1.6	1.40	27	834
35	5.5	2.0	26	748	0.3	4 x 0.8	1.40	26	808	1.6	1.56	28	924
50	5.5	2.0	27	822	0.3	4 x 0.8	1.40	27	887	1.6	1.56	29	1008
70	5.5	2.2	29	975	0.3	4 x 0.8	1.56	29	1037	1.6	1.56	31	1145
95	5.5	2.2	31	1123	0.3	4 x 0.8	1.56	31	1187	2.0	1.56	34	1371
120	5.5	2.2	33	1251	0.4	4 x 0.8	1.56	33	1327	2.0	1.56	35	1513
150	5.5	2.2	34	1386	0.4	4 x 0.8	1.56	34	1465	2.0	1.56	37	1661
185	5.5	2.2	36	1548	0.4	4 x 0.8	1.56	36	1631	2.0	1.72	39	1866
240	5.5	2.2	38	1793	0.4	4 x 0.8	1.72	38	1908	2.0	1.72	41	2133
300	5.5	2.4	40	2079	0.4	4 x 0.8	1.72	40	2165	2.0	1.72	43	2401
400	5.5	2.4	43	2441	0.5	4 x 0.8	1.88	44	2569	2.0	1.88	46	2825
500	5.5	2.6	47	2932	0.5	4 x 0.8	1.88	47	3020	2.5	2.04	51	3469
630	5.5	2.8	51	3530	0.5	4 x 0.8	2.04	51	3613	2.5	2.20	55	4106
800	5.5	2.8	54	4170	0.6	4 x 0.8	2.20	55	4308	2.5	2.20	58	4791
1000	5.5	3.0	59	5002	0.6	4 x 0.8	2.20	59	5094	2.5	2.36	62	5701

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 11

Single core Aluminium cables

12.7/22 KV (E) Single core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMOURD CABLE					WIRE ARMOURD CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	6	2.0	26	730	0.3	4 x 0.8	1.40	26	790	1.6	1.56	28	907
35	6	2.0	27	797	0.3	4 x 0.8	1.40	27	862	1.6	1.56	29	983
50	6	2.0	28	873	0.3	4 x 0.8	1.56	29	966	1.6	1.56	30	1068
70	6	2.2	30	1030	0.3	4 x 0.8	1.56	30	1097	2.0	1.56	33	1273
95	6	2.2	32	1181	0.4	4 x 0.8	1.56	32	1250	2.0	1.56	35	1444
120	6	2.2	34	1311	0.4	4 x 0.8	1.56	34	1384	2.0	1.56	36	1588
150	6	2.2	35	1449	0.4	4 x 0.8	1.56	35	1525	2.0	1.56	38	1738
185	6	2.2	37	1613	0.4	4 x 0.8	1.56	37	1693	2.0	1.72	40	1947
240	6	2.2	39	1862	0.4	4 x 0.8	1.72	39	1983	2.0	1.72	42	2217
300	6	2.4	41	2152	0.4	4 x 0.8	1.72	41	2236	2.0	1.88	44	2515
400	6	2.4	44	2519	0.5	4 x 0.8	1.88	45	2644	2.0	1.88	47	2918
500	6	2.6	48	3016	0.5	4 x 0.8	1.88	48	3110	2.5	2.04	52	3578
630	6	2.8	52	3621	0.5	4 x 0.8	2.04	52	3708	2.5	2.20	56	4208
800	6	2.8	55	4267	0.6	4 x 0.8	2.20	56	4402	2.5	2.20	59	4899
1000	6	3.0	60	5107	0.6	4 x 0.8	2.36	60	5242	2.5	2.36	63	5787

TABLE 12

Single core Aluminium cables

19/33 KV (E) Single core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMOURD CABLE					WIRE ARMOURD CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	8.8	2.2	32	1060	0.4	4 x 0.8	1.56	32	1130	2.0	1.56	35	1323
35	8.8	2.2	33	1137	0.4	4 x 0.8	1.56	33	1211	2.0	1.56	36	1406
50	8.8	2.2	34	1224	0.4	4 x 0.8	1.56	34	1303	2.0	1.56	37	1499
70	8.8	2.2	36	1368	0.4	4 x 0.8	1.56	36	1450	2.0	1.72	39	1694
95	8.8	2.2	38	1536	0.4	4 x 0.8	1.72	38	1651	2.0	1.72	41	1876
120	8.8	2.4	40	1720	0.4	4 x 0.8	1.72	40	1800	2.0	1.72	42	2035
150	8.8	2.4	41	1873	0.4	4 x 0.8	1.72	41	1956	2.0	1.88	44	2235
185	8.8	2.4	43	2052	0.5	4 x 0.8	1.72	43	2139	2.0	1.88	45	2429
240	8.8	2.6	45	2369	0.5	4 x 0.8	1.88	45	2447	2.5	2.04	49	2897
300	8.8	2.6	47	2640	0.5	4 x 0.8	1.88	47	2728	2.5	2.04	51	3190
400	8.8	2.8	51	3088	0.5	4 x 0.8	2.04	51	3172	2.5	2.20	54	3665
500	8.8	2.8	54	3574	0.6	4 x 0.8	2.20	54	3705	2.5	2.20	58	4196
630	8.8	3.0	58	4221	0.6	4 x 0.8	2.20	58	4308	2.5	2.36	61	4866
800	8.8	3.2	62	4963	0.6	4 x 0.8	2.36	61	5040	3.15	2.52	66	5877
1000	8.8	3.2	66	5789	0.7	4 x 0.8	2.52	66	5927	3.15	2.68	71	6813

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 13
Three core Copper cables

1.9/3.3 KV (E) & 3.3/3.3 KV (UE) Three core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMOURD CABLE					WIRE ARMOURD CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	2.2	2.2	33	1726	0.40	4 x 0.8	1.56	34	2105	2.0	1.56	36	2608
35	2.2	2.2	35	2099	0.40	4 x 0.8	1.56	36	2517	2.0	1.72	38	3079
50	2.2	2.2	38	2549	0.40	4 x 0.8	1.72	38	3013	2.0	1.72	41	3599
70	2.2	2.4	42	3351	0.50	4 x 0.8	1.72	42	3835	2.0	1.88	45	4511
95	2.2	2.6	46	4347	0.50	4 x 0.8	1.88	47	4878	2.5	2.04	50	5995
120	2.2	2.6	50	5205	0.50	4 x 0.8	2.04	50	5811	2.5	2.04	53	6961
150	2.2	2.8	53	6215	0.60	4 x 0.8	2.04	53	6806	2.5	2.20	57	8111
185	2.2	3.0	57	7465	0.60	4 x 0.8	2.20	57	8079	2.5	2.36	61	9499
240	2.2	3.2	62	9404	0.60	4 x 0.8	2.36	62	10080	3.15	2.52	67	12199
300	2.2	3.4	67	11438	0.70	4 x 0.8	2.52	67	12152	3.15	2.68	72	14456
400	2.2	3.6	74	14275	0.70	4 x 0.8	2.68	74	15064	3.15	2.84	78	17632

TABLE 14
Three core Copper cables

3.8/6.6 KV (E) Three core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMOURD CABLE					WIRE ARMOURD CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	2.8	2.2	36	1898	0.40	4 x 0.8	1.56	36	2315	2.0	1.72	39	2903
35	2.8	2.2	38	2281	0.40	4 x 0.8	1.72	39	2745	2.0	1.72	41	3355
50	2.8	2.4	41	2782	0.40	4 x 0.8	1.72	41	3246	2.0	1.88	44	3920
70	2.8	2.4	44	3563	0.50	4 x 0.8	1.88	45	4121	2.0	1.88	47	4816
95	2.8	2.6	49	4581	0.50	4 x 0.8	2.04	50	5165	2.50	2.04	52	6055
120	2.8	2.8	53	5505	0.60	4 x 0.8	2.04	53	6075	2.50	2.20	56	7078
150	2.8	3.0	56	6537	0.60	4 x 0.8	2.20	56	7153	2.50	2.20	59	8159
185	2.8	3.0	59	7747	0.60	4 x 0.8	2.36	60	8446	2.50	2.36	62	9551
240	2.8	3.2	65	9711	0.70	4 x 0.8	2.36	65	10400	3.15	2.52	70	12621
300	3.0	3.4	70	11879	0.70	4 x 0.8	2.52	70	12626	3.15	2.68	75	15072
400	3.3	3.8	79	15024	0.70	4 x 0.8	2.84	78	15845	4.0	3.00	85	19645

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 15
Three core Copper cables

6.35/11 KV (E) Three core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	3.6	2.4	40	2185	0.40	4 x 0.8	1.72	40	2630	2.00	1.72	42	3267
35	3.6	2.4	42	2583	0.50	4 x 0.8	1.72	42	3068	2.00	1.88	45	3744
50	3.6	2.4	44	3060	0.50	4 x 0.8	1.88	45	3596	2.00	1.88	47	4289
70	3.6	2.6	48	3911	0.50	4 x 0.8	2.04	49	4498	2.50	2.04	52	5632
95	3.6	2.8	53	4962	0.60	4 x 0.8	2.04	53	5555	2.50	2.20	57	6860
120	3.6	3.0	56	5913	0.60	4 x 0.8	2.20	56	6529	2.50	2.36	60	7910
150	3.6	3.0	60	6912	0.60	4 x 0.8	2.20	60	7562	2.50	2.36	63	9054
185	3.6	3.2	63	8205	0.70	4 x 0.8	2.36	63	8900	3.15	2.52	68	11058
240	3.6	3.4	68	10206	0.70	4 x 0.8	2.52	68	10937	3.15	2.68	73	13281
300	3.6	3.6	73	12297	0.70	4 x 0.8	2.68	73	13064	3.15	2.84	78	15594
400	3.6	3.8	80	15215	0.70	4 x 0.8	2.84	80	16053	4.00	3.00	86	19931

TABLE 16
Three core Copper cables

11/11 KV (UE) Three core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	5.5	2.6	48	2912	0.50	4 x 0.8	1.88	48	3460	2.50	2.04	52	4633
35	5.5	2.8	51	3395	0.50	4 x 0.8	2.04	51	3972	2.50	2.20	55	5181
50	5.5	2.8	53	3910	0.60	4 x 0.8	2.04	53	4501	2.50	2.20	57	5806
70	5.5	3.0	57	4830	0.60	4 x 0.8	2.20	57	5467	2.50	2.36	61	6864
95	5.5	3.2	62	5959	0.60	4 x 0.8	2.36	62	6636	3.15	2.52	67	8754
120	5.5	3.2	65	6905	0.70	4 x 0.8	2.36	65	7593	3.15	2.68	70	9932
150	5.5	3.4	69	8024	0.70	4 x 0.8	2.52	69	8754	3.15	2.68	74	11160
185	5.5	3.6	72	9378	0.70	4 x 0.8	2.68	72	10126	3.15	2.84	77	12616
240	5.5	3.8	77	11466	0.70	4 x 0.8	2.84	77	12247	4.00	3.00	84	15993
300	5.5	3.8	82	13556	0.70	4 x 0.8	3.00	82	14452	4.00	3.00	88	18365
400	5.5	4.0	89	16580	0.70	4 x 0.8	3.00	88	17478	4.00	3.00	95	21675

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 17

Three core Copper cables

12.7/22 KV (E) Three core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMoured CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	6	2.8	51	3163	0.50	4 x 0.8	2.04	51	3717	2.50	2.20	55	4949
35	6	2.8	53	3606	0.60	4 x 0.8	2.04	53	4198	2.50	2.20	57	5502
50	6	3.0	56	4185	0.60	4 x 0.8	2.20	56	4804	2.50	2.36	59	6145
70	6	3.0	59	5066	0.60	4 x 0.8	2.36	60	5765	2.50	2.36	63	7170
95	6	3.2	64	6212	0.70	4 x 0.8	2.36	64	6904	3.15	2.52	69	9124
120	6	3.4	68	7239	0.70	4 x 0.8	2.52	67	7950	3.15	2.68	72	10316
150	6	3.4	71	8304	0.70	4 x 0.8	2.68	71	9105	3.15	2.84	76	11617
185	6	3.6	74	9672	0.70	4 x 0.8	2.68	74	10458	3.15	3.00	80	13090
240	6	3.8	80	11781	0.70	4 x 0.8	2.84	79	12598	4.00	3.00	86	16399
300	6	4.0	84	13972	0.70	4 x 0.8	3.00	84	14821	4.00	3.00	90	18788
400	6	4.0	91	16937	0.70	4 x 0.8	3.00	90	17872	4.00	3.00	97	22221

TABLE 18

Three core Copper cables

19/33 KV (E) Three core Copper conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMoured CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	8.8	3.2	65	4677	0.70	4 x 0.8	2.52	65	5442	3.15	2.52	70	7588
35	8.8	3.4	67	5242	0.70	4 x 0.8	2.52	67	5955	3.15	2.68	72	8260
50	8.8	3.4	69	5824	0.70	4 x 0.8	2.52	69	6575	3.15	2.68	74	8958
70	8.8	3.6	74	6870	0.70	4 x 0.8	2.68	73	7636	3.15	2.84	78	10166
95	8.8	3.8	78	8137	0.70	4 x 0.8	2.84	78	8938	4.00	3.00	85	12662
120	8.8	3.8	81	9178	0.70	4 x 0.8	3.00	81	10076	4.00	3.00	88	13989
150	8.8	4.0	85	10411	0.70	4 x 0.8	3.00	85	11257	4.00	3.00	91	15324
185	8.8	4.0	88	11786	0.70	4 x 0.8	3.00	88	12687	4.00	3.00	94	16884
240	8.8	4.0	93	13933	0.70	4 x 0.8	3.00	93	14880	4.00	3.00	99	19307
300	8.8	4.0	97	16144	0.70	4 x 0.8	3.00	97	17139	4.00	3.00	103	21797
400	8.8	4.0	104	19253	0.70	4 x 0.8	3.00	103	20334	4.00	3.00	110	25275

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 19

Three core Copper cables

33/33 KV (UE) Three core Copper conductor XLPE insulated armoured & unarmoured cable													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	9.1	3.4	66	4884	0.70	4 x 0.8	2.52	66	5579	3.15	2.68	71	7844
35	9.1	3.4	68	5389	0.70	4 x 0.8	2.52	68	6121	3.15	2.68	73	8464
50	9.1	3.4	71	5976	0.70	4 x 0.8	2.68	71	6801	3.15	2.84	76	9228
70	9.1	3.6	75	7030	0.70	4 x 0.8	2.68	75	7814	3.15	2.84	80	10384
95	9.1	3.8	79	8307	0.70	4 x 0.8	2.84	79	9126	4.00	3.00	86	12927
120	9.1	4.0	83	9437	0.70	4 x 0.8	3.00	83	10271	4.00	3.00	89	14162
150	9.1	4.0	86	10595	0.70	4 x 0.8	3.00	86	11483	4.00	3.00	92	15504
185	9.1	4.0	89	11977	0.70	4 x 0.8	3.00	89	12895	4.00	3.00	95	17169
240	9.1	4.0	94	14133	0.70	4 x 0.8	3.00	94	15098	4.00	3.00	100	19602
300	9.1	4.0	98	16354	0.70	4 x 0.8	3.00	98	17367	4.00	3.00	104	22100
400	9.1	4.0	105	19476	0.70	4 x 0.8	3.00	105	20574	4.00	3.00	111	25592

TABLE 20

Three core Aluminium cables

1.9/3.3 KV (E) & 3.3/3.3 KV (UE) Three core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMOURED CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	2.2	2.2	33	1271	0.40	4 x 0.8	1.56	34	1650	2.0	1.56	36	2153
35	2.2	2.2	35	1466	0.40	4 x 0.8	1.56	36	1884	2.0	1.72	38	2446
50	2.2	2.2	38	1692	0.40	4 x 0.8	1.72	38	2157	2.0	1.72	41	2742
70	2.2	2.4	42	2116	0.50	4 x 0.8	1.72	42	2601	2.0	1.88	45	3277
95	2.2	2.6	46	2629	0.50	4 x 0.8	1.88	47	3160	2.5	2.04	50	4277
120	2.2	2.6	50	3043	0.50	4 x 0.8	2.04	50	3649	2.5	2.04	53	4799
150	2.2	2.8	53	3537	0.60	4 x 0.8	2.04	53	4129	2.5	2.20	57	5434
185	2.2	3.0	57	4127	0.60	4 x 0.8	2.20	57	4742	2.5	2.36	61	6161
240	2.2	3.2	62	5011	0.60	4 x 0.8	2.36	62	5688	3.15	2.52	67	7807
300	2.2	3.4	67	5912	0.70	4 x 0.8	2.52	67	6628	3.15	2.68	72	8932
400	2.2	3.6	74	7238	0.70	4 x 0.8	2.68	73	8028	3.15	2.84	78	10596

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 21

Three core Aluminium cables

3.8/6.6 KV (E) Three core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMoured CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	2.8	2.2	36	1443	0.40	4 x 0.8	1.56	36	1860	2.00	1.72	39	2448
35	2.8	2.2	38	1647	0.40	4 x 0.8	1.72	39	2111	2.00	1.72	41	2721
50	2.8	2.4	41	1924	0.40	4 x 0.8	1.72	41	2389	2.00	1.88	44	3063
70	2.8	2.4	44	2328	0.50	4 x 0.8	1.88	45	2886	2.00	1.88	47	3581
95	2.8	2.6	49	2861	0.50	4 x 0.8	2.04	49	3447	2.15	2.04	52	4336
120	2.8	2.8	53	3342	0.60	4 x 0.8	2.04	52	3913	2.15	2.20	56	4915
150	2.8	3.0	56	3858	0.60	4 x 0.8	2.20	56	4475	2.15	2.20	59	5481
185	2.8	3.0	59	4408	0.60	4 x 0.8	2.36	60	5107	2.15	2.36	62	6212
240	2.8	3.2	65	5317	0.70	4 x 0.8	2.36	65	6007	3.15	2.52	70	8228
300	3.0	3.4	70	6352	0.70	4 x 0.8	2.52	70	7100	3.15	2.68	75	9545
400	3.3	3.8	79	7985	0.70	4 x 0.8	2.84	78	8807	4.00	3.00	85	12607

TABLE 22

Three core Aluminium cables

6.35/11 KV (E) Three core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
UNARMoured CABLE					STRIP ARMoured CABLE					WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	3.6	2.4	40	1730	0.40	4 x 0.8	1.72	40	2175	2.00	1.72	42	2811
35	3.6	2.4	42	1949	0.50	4 x 0.8	1.72	42	2433	2.00	1.88	45	3109
50	3.6	2.4	44	2202	0.50	4 x 0.8	1.88	45	2738	2.00	1.88	47	3432
70	3.6	2.6	48	2676	0.50	4 x 0.8	2.04	49	3263	2.50	2.04	52	4397
95	3.6	2.8	53	3242	0.60	4 x 0.8	2.04	53	3835	2.50	2.20	57	5140
120	3.6	3.0	56	3750	0.60	4 x 0.8	2.20	56	4366	2.50	2.36	60	5747
150	3.6	3.0	60	4232	0.60	4 x 0.8	2.20	60	4882	2.50	2.36	63	6375
185	3.6	3.2	63	4865	0.70	4 x 0.8	2.36	63	5560	3.15	2.52	68	7718
240	3.6	3.4	68	5811	0.70	4 x 0.8	2.52	68	6543	3.15	2.68	73	8886
300	3.6	3.6	73	6768	0.70	4 x 0.8	2.68	73	7537	3.15	2.84	78	10066
400	3.6	3.8	80	8175	0.70	4 x 0.8	2.84	80	9015	4.00	3.00	86	12892

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 23

Three core Aluminium cables

11/11 KV (UE) Three core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
		UNARMOURED CABLE				STRIP ARMoured CABLE				WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	5.5	2.6	48	2456	0.50	4 x 0.8	1.88	48	3004	2.50	2.04	52	4177
35	5.5	2.8	51	2760	0.50	4 x 0.8	2.04	51	3337	2.50	2.20	55	4546
50	5.5	2.8	53	3050	0.60	4 x 0.8	2.04	53	3642	2.50	2.20	57	4947
70	5.5	3.0	57	3593	0.60	4 x 0.8	2.20	57	4230	2.50	2.36	61	5627
95	5.5	3.2	62	4236	0.60	4 x 0.8	2.36	62	4914	3.15	2.52	67	7032
120	5.5	3.2	65	4740	0.70	4 x 0.8	2.36	65	5428	3.15	2.68	70	7767
150	5.5	3.4	69	5340	0.70	4 x 0.8	2.52	69	6071	3.15	2.68	74	8477
185	5.5	3.6	72	6035	0.70	4 x 0.8	2.68	72	6784	3.15	2.84	77	9274
240	5.5	3.8	77	7067	0.70	4 x 0.8	2.84	77	7849	4.00	3.00	84	11594
300	5.5	3.8	82	8022	0.70	4 x 0.8	3.00	82	8919	4.00	3.00	88	12832
400	5.5	4.0	89	9537	0.70	4 x 0.8	3.00	88	10436	4.00	3.00	95	14633

TABLE 24

Three core Aluminium cables

12.7/22 KV (E) Three core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2													
		UNARMOURED CABLE				STRIP ARMoured CABLE				WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	6	2.8	51	2707	0.50	4 x 0.8	2.04	51	3261	2.50	2.20	55	4493
35	6	2.8	53	2970	0.60	4 x 0.8	2.04	53	3563	2.50	2.20	57	4867
50	6	3.0	56	3325	0.60	4 x 0.8	2.20	56	3944	2.50	2.36	59	5285
70	6	3.0	59	3829	0.60	4 x 0.8	2.36	60	4528	2.50	2.36	63	5934
95	6	3.2	64	4489	0.70	4 x 0.8	2.36	64	5182	3.15	2.52	69	7402
120	6	3.4	68	5073	0.70	4 x 0.8	2.52	67	5785	3.15	2.68	72	8151
150	6	3.4	71	5620	0.70	4 x 0.8	2.68	71	6422	3.15	2.84	76	8933
185	6	3.6	74	6329	0.70	4 x 0.8	2.68	74	7115	3.15	3.00	80	9747
240	6	3.8	80	7381	0.70	4 x 0.8	2.84	79	8199	4.00	3.00	86	12000
300	6	4.0	84	8437	0.70	4 x 0.8	3.00	84	9287	4.00	3.00	90	13255
400	6	4.0	91	9893	0.70	4 x 0.8	3.00	90	10829	4.00	3.00	97	15179

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 25

Three core Aluminium cables

19/33 KV (E) Three core Aluminium conductor XLPE insulated armoured & unarmoured cable as per IS 7098-2														
		UNARMOURED CABLE					STRIP ARMoured CABLE				WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km	
25	8.8	3.2	65	4219	0.70	4 x 0.8	2.52	65	4984	3.15	2.52	70	7131	
35	8.8	3.4	67	4604	0.70	4 x 0.8	2.52	67	5318	3.15	2.68	72	7622	
50	8.8	3.4	69	4962	0.70	4 x 0.8	2.52	69	5713	3.15	2.68	74	8096	
70	8.8	3.6	74	5630	0.70	4 x 0.8	2.68	73	6397	3.15	2.84	78	8927	
95	8.8	3.8	78	6410	0.70	4 x 0.8	2.84	78	7212	4.00	3.00	85	10936	
120	8.8	3.8	81	7009	0.70	4 x 0.8	3.00	81	7908	4.00	3.00	88	11821	
150	8.8	4.0	85	7721	0.70	4 x 0.8	3.00	85	8569	4.00	3.00	91	12635	
185	8.8	4.0	88	8438	0.70	4 x 0.8	3.00	88	9340	4.00	3.00	94	13537	
240	8.8	4.0	93	9528	0.70	4 x 0.8	3.00	93	10476	4.00	3.00	99	14903	
300	8.8	4.0	97	10601	0.70	4 x 0.8	3.00	97	11598	4.00	3.00	103	16255	
400	8.8	4.0	104	12204	0.70	4 x 0.8	3.00	103	13286	4.00	3.00	110	18226	

TABLE 26

Three core Aluminium cables

33/33 KV (UE) Three core Aluminium conductor XLPE insulated armoured & unarmoured cable														
		UNARMOURED CABLE					STRIP ARMoured CABLE				WIRE ARMoured CABLE			
Nominal size of conductor	Nominal insulation thickness	Nominal thickness of PVC outer sheath	Approx. overall diameter	Approx. Cable Weight	Minimum inner sheath thickness	Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	
Sq.mm	mm	mm	mm	kg/km	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km	
25	9.1	3.4	66	4427	0.70	4 x 0.8	2.52	66	5122	3.15	2.68	71	7387	
35	9.1	3.4	68	4751	0.70	4 x 0.8	2.52	68	5483	3.15	2.68	73	7827	
50	9.1	3.4	71	5114	0.70	4 x 0.8	2.68	71	5939	3.15	2.84	76	8366	
70	9.1	3.6	75	5791	0.70	4 x 0.8	2.68	75	6575	3.15	2.84	80	9144	
95	9.1	3.8	79	6580	0.70	4 x 0.8	2.84	79	7400	4.00	3.00	86	11201	
120	9.1	4.0	83	7268	0.70	4 x 0.8	3.00	83	8103	4.00	3.00	89	11993	
150	9.1	4.0	86	7905	0.70	4 x 0.8	3.00	86	8794	4.00	3.00	92	12815	
185	9.1	4.0	89	8629	0.70	4 x 0.8	3.00	89	9548	4.00	3.00	95	13821	
240	9.1	4.0	94	9728	0.70	4 x 0.8	3.00	94	10694	4.00	3.00	100	15197	
300	9.1	4.0	98	10810	0.70	4 x 0.8	3.00	98	11825	4.00	3.00	104	16558	
400	9.1	4.0	105	12426	0.70	4 x 0.8	3.00	105	13525	4.00	3.00	111	18543	

DIMENSIONAL PARAMETERS & WEIGHT

TABLE 27

Single core cable 1.9/3.3 kV unscreened Copper cable

1.9/3.3 KV (E) & 3.3/3.3 KV (UE) Single core Copper conductor XLPE insulated armoured unscreened cable as per IS 7098-2										
Nominal size of conductor	Nominal insulation thickness	Minimum inner sheath thickness	STRIP ARMOURD CABLE				WIRE ARMOURD CABLE			
			Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	2.5	0.3					1.4	1.24	17	484
35	2.5	0.3					1.4	1.40	18	607
50	2.5	0.3	4 x 0.8	1.40	18	696	1.6	1.40	19	760
70	2.5	0.3	4 x 0.8	1.40	19	914	1.6	1.40	21	987
95	2.5	0.3	4 x 0.8	1.40	21	1192	1.6	1.40	23	1266
120	2.5	0.3	4 x 0.8	1.40	23	1440	1.6	1.40	25	1522
150	2.5	0.3	4 x 0.8	1.40	24	1716	1.6	1.40	26	1802
185	2.5	0.3	4 x 0.8	1.40	26	2070	1.6	1.56	28	2186
240	2.5	0.4	4 x 0.8	1.56	28	2640	1.6	1.56	30	2744
300	2.5	0.4	4 x 0.8	1.56	31	3227	2.0	1.56	33	3402
400	2.6	0.4	4 x 0.8	1.56	34	4042	2.0	1.56	36	4237
500	2.8	0.4	4 x 0.8	1.56	37	5109	2.0	1.71	40	5356
630	3.0	0.5	4 x 0.8	1.72	42	6522	2.0	1.88	44	6810
800	3.3	0.5	4 x 0.8	1.88	46	8267	2.5	2.04	50	8709
1000	3.5	0.6	4 x 0.8	2.03	51	10288	2.5	2.20	55	10781

TABLE 28

Three core cable 1.9/3.3 kV unscreened Copper cable

1.9/3.3 KV (E) & 3.3/3.3 KV (UE) Three core Copper conductor XLPE insulated armoured unscreened cable as per IS 7098-2										
Nominal size of conductor	Nominal insulation thickness	Minimum inner sheath thickness	STRIP ARMOURD CABLE				WIRE ARMOURD CABLE			
			Nominal dimension of strip	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight	Nominal dimension of wire	Minimum PVC outer sheath thickness	Approx. overall diameter	Approx. Cable Weight
Sq.mm	mm	mm	mm	mm	mm	kg/km	mm	mm	mm	kg/km
25	2.20	0.3	4 x 0.8	1.56	29	1736	1.60	1.56	30	1992
35	2.20	0.3	4 x 0.8	1.56	31	2103	2.00	1.56	34	2578
50	2.20	0.4	4 x 0.8	1.56	33	2569	2.00	1.56	36	3073
70	2.20	0.4	4 x 0.8	1.56	37	3327	2.00	1.72	40	3941
95	2.20	0.4	4 x 0.8	1.72	42	4321	2.00	1.88	44	5020
120	2.20	0.5	4 x 0.8	1.88	45	5238	2.00	1.88	48	5933
150	2.20	0.5	4 x 0.8	1.88	49	6195	2.50	2.04	52	7369
185	2.20	0.5	4 x 0.8	2.04	52	7430	2.50	2.20	56	8679
240	2.20	0.6	4 x 0.8	2.2	57	9349	2.50	2.36	61	10769
300	2.20	0.6	4 x 0.8	2.36	62	11367	3.15	2.52	67	13692
400	2.20	0.7	4 x 0.8	2.52	69	14200	3.15	2.67	74	16606