

A circular collage of various industrial and technological images. The collage includes: a bundle of colorful cables, modern apartment buildings, a car engine, a car on an assembly line, a power substation, a red fire alarm pull station, a factory interior with machinery, a large spool of cable, a solar farm, a robotic arm, and an industrial facility at night.

RR KÄBEL

TECHNICAL BROCHURE
High Tension XLPE Cables



About RR KABEL

RR Kabel is part of RR Global, a USD 1.25 Billion conglomerate in the electrical sector with a presence more than 90 countries globally. Spread across multiple business verticals including Wires & Cables, we continue to endeavor to create best quality products using the latest advances in wire design and engineering. We offer the widest range of premium wires and cables for various residential, commercial, industrial and infrastructure purposes.

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.

With 29 international certifications, our products are also compliant to REACH (Registration Evaluation Authorization of Chemical Substances) and RoHS (Restriction of Hazardous Substances) directives have also 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 innovation and effective R&D that in turn helps one to push boundaries and eliminate borders. We at RR Kabel follow this and hence are constantly emerging with new products that are globally significant, at competitive prices and are aimed at providing an environment of utmost safety.

PRODUCTS

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SYSTEM CERTIFICATIONS

These certifications are a testament to the efficiency and continual improvement in our purpose to deliver customer service and satisfaction to our valued clients. Our each product meets an intensive Quality Assurance Inspection, which is endorsed by certifications of a dozen national & international standards monitoring agencies. Additionally, our products are also environmentally safe and utmost care is taken to make all our products safe for use.



PRODUCT CERTIFICATES

We are known for the superior quality of our products. All the products manufactured are of the highest international quality & we have total of 34 product certifications.

	भारतीय मानक ब्यूरो BUREAU OF INDIAN STANDARDS	Address: 3 rd Floor, Navjivan Amrut Jayanti Bhavan, Behind Gujarat Vidyapeeth, Off.AshramRoad, Ahmedabad 380014
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Attachment to Licence No. CM/L- 7200150190


CM/L	Name of the Licensee with the Factory Address	Name of the Product	Indian Standard No.
7200150190	RR KABEL LIMITED R.S.NO. 201-202/1-202/2-203-209 AND 327/3-215/1/P/2-216,217 & 218, KHANDA ROAD, WAGHODIA, DISTT : VADODARA- 391760. GUJARAT	Crosslinked Polyethylene Insulated Thermoplastics Sheathed Cables – Part 2 for Working Voltages from 3.3 kV up to and Including 33 k V	IS 7098 : Part 2 : 2011

Endorsement No. 01 Dated.. 31.05.2021

Whereas, the licence was valid upto 30/05/2020.

Now, consequent upon renewal, the validity of licence given in schedule of the original licence has been extended from 31/05/2020 to 30/05/2021.

Other terms and conditions of the licence remain the same.


(Sumit Sengar)
Scientist-E
भारतीय मानक ब्यूरो
Bureau of Indian Standards
अहमदाबाद शाखा कार्यालय
Ahmedabad Branch Office

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 at each stage of the manufacturing process. Post manufacturing tests ensure compliance of our cable with relevant Indian and International standards.



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

Type Tests:

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

Routine Tests:

- Partial Discharge test
- High voltage test
- Conductor resistance

MANUFACTURING PROCESS

RR Kabel HT cables are manufactured at our manufacturing setup at Waghodia, Vadodara. The world class infrastructure and state-of-art machinery include:

- CCV line enabling us to have extrusion free of voids, contamination, and manufacturing defects also its long continuous production schedules 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, a first of its kind in India
- High speed extrusion machines with high accuracy

All our production machineries are top of the line from the best machine builders. These are chosen carefully to meet the latest technology requirement and are built for optimum performance 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 equipments are armed 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 guarantees full traceability of the production from start to end, by being able to follow up the machines involved and the material used.

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:

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

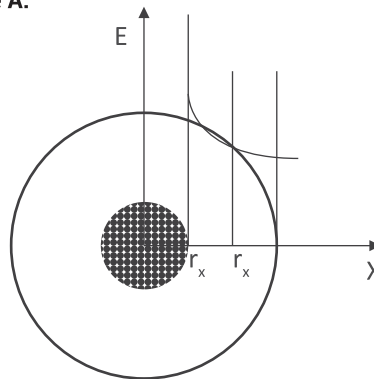
Where

- 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:

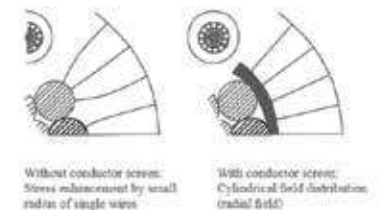


To ensure a defined cylindrical field and to withstand the field strength that occur, all medium voltage cables of rated voltages 6 kV and above, independent of their type of dielectric, require Field limiting or field smoothing layers, widely known as semi-conductive layers, in the interface between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

These semi-conductive layers have two principal purposes:

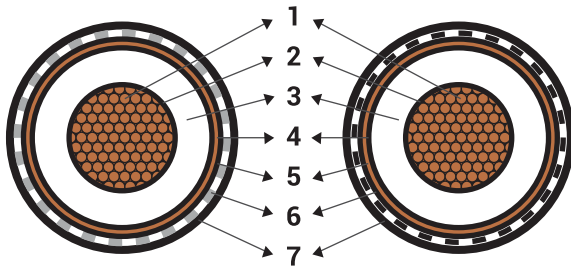
1. Equalizing and reduction of the electrical stress in the cable dielectric by preventing local field enhancement in non-homogenous areas such as the individual wires of the conductor. The semi-conductive layers eliminate the effect of the individual wires on the field distribution (see Fig. B).
2. 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:



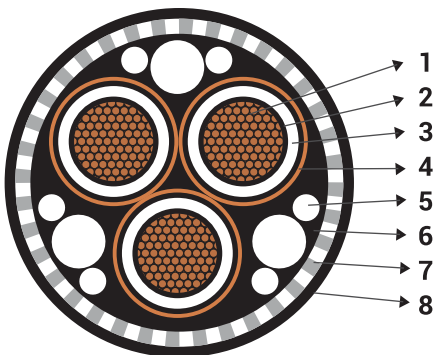
CONSTRUCTIONAL DETAILS

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 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

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

Charging Current

$I = U_0 * 2\pi * f * C * 10^{-6}$	
I : Charging current	A/km
U ₀ : voltage between phase and earth	V
C : Capacitance to neutral	$\mu\text{F}/\text{km}$

Dielectric Losses

$D = 2\pi * f * C * U_0^2 * \tan \delta * 10^{-6}$	watt/km/phase
D : Dielectric losses	watt/km/phase
U ₀ : Voltage between phase and earth	V
C : Capacitance to neutral	$\mu\text{F}/\text{km}$
$\tan \delta$ = 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
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

Size	Capacitance (Microfarads/km) Single core cable 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

Size	Capacitance (Microfarads/km) Multi core cable 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

Size	Approximate reactance at 50 Hz (Ohms/km) for Single core 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

Reactance

Size	Approximate reactance at 50 Hz (Ohms/km) for Multi core 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 Sq. mm	Single core cable Current Carrying Capacity (Amps.)					
	Aluminium			Copper		
	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 Sq. mm	3 core cable Current Carrying Capacity (Amps.)					
	Aluminium			Copper		
	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





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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMoured CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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													
Nominal size of conductor sq.mm	Nominal insulation thickness mm	UNARMOURED CABLE			Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
		Nominal thickness of PVC outer sheath mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm		Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight kg/mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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 sq.mm	Nominal insulation thickness mm	Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
			Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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) Single core Copper conductor XLPE insulated armoured unscreened cable as per IS 7098-2										
Nominal size of conductor sq.mm	Nominal insulation thickness mm	Minimum inner sheath thickness mm	STRIP ARMoured CABLE				WIRE ARMoured CABLE			
			Nominal dimension of strip mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight mm	Nominal dimension of wire mm	Minimum PVC outer sheath thickness mm	Approx. overall diameter mm	Approx. Cable Weight 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

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

Rating Factors

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

- Rating factors related to variation in ambient air temperature

Air Temperature in Deg.		20°	25°	30°	35°	40°	45°	50°	55°
Rating factors	Normal PVC	1.32	1.25	1.16	1.09	1.00	0.90	0.80	0.80
	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°
Rating factors	Normal PVC	1.17	1.12	1.06	1.00	0.94	0.87	0.79	0.71
	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 oC.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 oC.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 < 25 sqmm

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 300 sqmm

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 300 sqmm

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

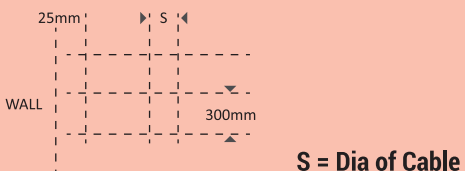

No of cables/ circuits in groups	Multicore cables in horizontal formation					Single cables in horizontal formation				
	Touching	S=15CM	S=30CM	S=45CM	S=60CM	Touching	S=15CM	S=30CM	S=45CM	S=60CM
2	0.80	0.84	0.87	0.90	0.91	0.80	0.85	0.90	0.92	0.95
3	0.68	0.74	0.79	0.83	0.86	0.70	0.78	0.85	0.88	0.91
4	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

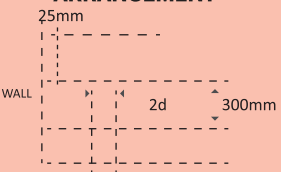
No of cables/ circuits in groups	No. of Tier	Multicore cables in Tier formation				
		Touching	S=15CM	S=30CM	S=45CM	S=60CM
2	1	0.80	0.84	0.87	0.90	0.91
3	1	0.68	0.74	0.79	0.83	0.86
4	2	0.60	0.66	0.73	0.77	0.79
5	2	0.55	0.61	0.68	0.71	0.73
6	2	0.51	0.57	0.63	0.67	0.69
7	3	0.48	0.54	0.59	0.63	0.64
8	3	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
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	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	—	—	—	—

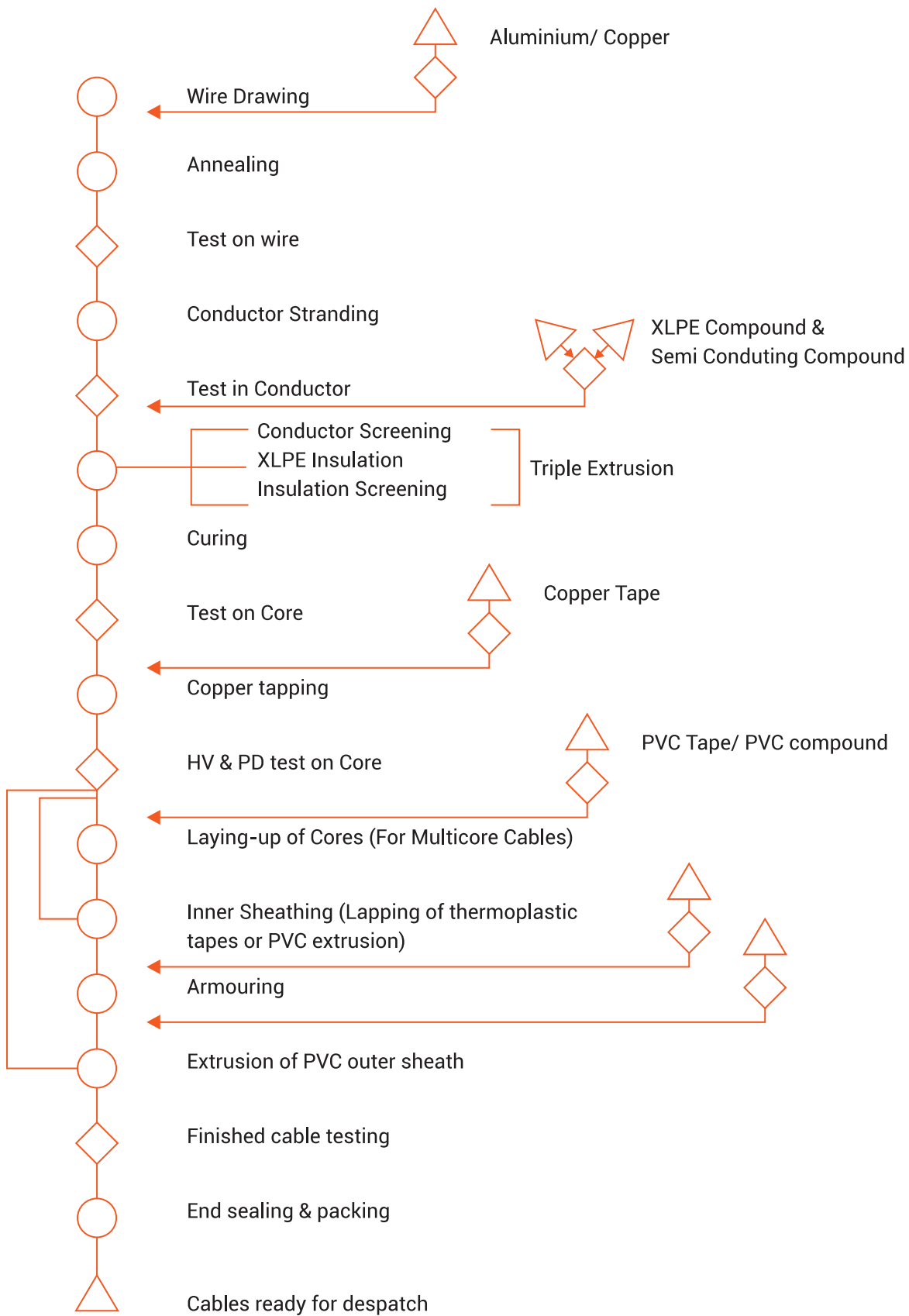
Nominal area of Conductor (Sq. mm)	Estimated Voltage Drops in XLPE Aluminum Cables For A.C. System Voltage Drop - mV/A/m			
	Copper Cable @90°C		Aluminium Cable @90°C	
	Single Phase	Three Phase	Single Phase	Three Phase
35	1.3559	1.1689	2.2284	1.9252
50	1.0083	0.8673	1.6511	1.4252
70	0.7097	0.6075	1.1485	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

PROCESS FLOW



RECOMMENDATIONS FOR INSTALLATION

Installation

- Precautions should be taken to avoid mechanical damage to the cables before and during installation.
- Exceeding the manufacturer's recommended maximum pulling tensions should be avoided as this can result in damage to the cable.
- If cables are to be installed in ducts, the correct size of the duct should be used.
- Type of jointing and filling compounds employed should be chemically compatible with the cable materials.
- The cable support system should be such as to avoid damage to the cables.
- Cables specified in this catalogue are designed for fixed installations only; they are not intended for use as, for example, trailing or reeling cables.
- Repeated over-voltage testing can lead to premature failure of the cable.
- The selection of cable glands, accessories and any associated tools should take account of all aspects of intended use. Any semi-conducting coating present on the oversheath should be removed for a suitable distance from joints and terminations.
- Care should be exercised with single-core cables to ensure that the bonding and earthing arrangements are adequate to cater for circulating currents in screen(s).

SELECTION GUIDE

Installation

List of tests as per IS:1554(Part-I), IS 1554 (Part-II), IS 7098 (Part-I), IS 7098 (Part-II) to the latest update.

Routine Tests:

- Conductor Resistance Test
- High Voltage Test
- Armour Resistance Test for mining Type Cables
- Partial Discharge test (for HT Screened cable)

Type Tests:

- Tensile Test (for Aluminium Conductor)
- Wrapping Test (for Aluminium Conductor)
- Annealing Test (for Copper Conductor)
- Conductor Resistance Test
- Test for Armour Wires/Strips
- Test for thickness of Insulation & Sheath
- Physical Test for Insulation & Outer Sheath
- Insulation Resistance Test
- High Voltage Test
- Flammability Test
- Hot Set Test - (For XLPE Insulation only)
- Partial Discharge test (for H.T. Screened cable)
- Bending test (for H.T. Screened cable)
- Dielectric Power factor test (for H.T. Screened cable with rated voltage 6.35/11 KV & above)
- Heating cycle test (for H.T. Screened cable)
- Impulse withstand test (for H.T. Screened cable)

Acceptance Tests:

- Tensile Test (For Aluminium Conductor)
- Wrapping Test (For Aluminium Conductor)
- Annealing Test (For Copper Conductor)
- Conductor Resistance Test
- Test for thickness of Insulation & Sheath
- High Voltage Test
- Insulation Resistance Test
- Tensile Strength & Elongation at break test for Insulation and Sheath
- Hot Set Test - (for XLPE Insulation only)
- Partial Discharge test (for H.T. Screened cable)

Optional Tests:

- Cold Bend Test
- Cold Impact Test
- Armour Resistance Test (for other than Mining Type Cables)
- Flammability Test as per IS 10810 Part 53
- Water absorption test (by Electrical Method)

For selection of a cable, a first hand knowledge of the system in which the cable is to be used, and the installation conditions under which the cable has to operate, is necessary. A knowledge of statutory restrictions and the manufacturing facilities available in the country will help in finding out as to what type of cable will be available for particular usage. The environmental conditions under which the cable has to operate will decide its protective covering. Thus once voltage grade of the cable, number of cores, conductor material, type of insulation and protective coverings are known, size of conductor remains to be decided. The first and foremost criteria for the size of conductor is continuous current rating for the present load. There after the same should be checked for short circuit, voltage drop, over load capacities and future expansions. Once decided the selection of next higher size compared to what is essential for the requirement, will always be worthwhile. Economic considerations are also necessary.

Information Required With Enquiry & Order

The following information should be included in an enquiry:

- Voltage Grade.
- Whether cable is to be used on Earthed or Unearthed system (for voltages above 3.3 KV).
- Type of installation whether in air or in ducts or in ground.
- If cables are grouped together, then number of cables in group and vertical and horizontal spacing between them.
- Required value and duration of short circuit current.

Following further information's are also required for offering the exact type of cable for any specific purpose:

- The normal ambient or operating temperature.
- The maximum temperature to which the PVC will be exposed and the duration and frequency of such exposures.
- The material with which the PVC will be in contact i.e. oil, gases, acids, alkalies etc. at normal and maximum temperature.
- If special flame retardent property is required.
- If any special electrical characteristics needed.

CABLE HANDLING & STORAGE GUIDELINE

Although RR Kabel's cables are durable & high quality products relatively unaffected by ambient conditions, they should be handled and stored properly to avoid incidental damage.

Reel Handling:

Upon receipt, and before acceptance of a shipment, all reels should be inspected for evidence of damage during shipment. This damage would include broken flanges, damaged wrapping or lagging, interlocked flanges, reels broken loose from their ties or blocking, etc. Any signs of such damage should immediately be reported to the carrier. If the protective wrapping or lagging is removed to inspect for possible damage during shipment, it should be replaced prior to placing the reel into long term storage. Unloading of reels from the delivery truck must be accomplished in a manner that prevents the transfer equipment from coming into contact with either the cable itself or the protective covering over the reel. A crane may be used to lift reels using a steel shaft of sufficient strength placed through the arbor holes. The shaft must be lifted using a spreader bar to prevent the lifting cable or chain from pressing against the reel flanges (see Figure 1). The force exerted by improperly positioned slings has been known to break reel flanges, resulting in damage to the cable.

If a fork lift truck is used, the forks must be placed at a 90° angle to

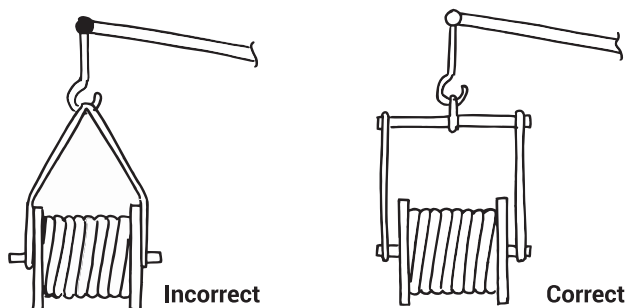
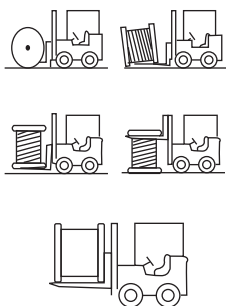


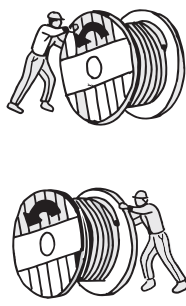
Figure-1

the flanges, and must be long enough to make contact with both flanges (see Figure 2). Under no circumstances should the forks make direct contact with the cable or protective covering. Some facilities may have an inclined ramp available for unloading reels. This ramp must be wide enough to contact both reel flanges with an adequate safety margin. The method used to stop the reel should ensure that the cable or protective covering does not come into contact with any solid object, and that the force transmitted to the reel flanges is not sufficient to damage them. Reels must not be dropped from the delivery vehicle to the ground



Correct

Figure-2



Correct

Figure-3

under any circumstances. When a reel is rolled from one point to another, care must be taken to see that the reel does not straddle objects such as rocks, pipes, or wooden blocks which could damage the cable or protective covering. A reel should always be rolled in the direction indicated by arrows stenciled on the reel. By doing so, you will ensure that the reel is rolled in such a direction as to tighten the cable on the reel. Rolling in the other direction will tend to loosen the turns of cable on the reel (see Figure 3). This can result in turns crossing over one another and subsequently causing kinks in the cable as it is removed from the reel

Storage Conditions:

Reels should be stored in an area reserved for this purpose. The location must be accessible to forklifts and trucks, but removed from areas of constant traffic. If available space prohibits separation, suitable barriers should be erected to prevent damage from moving equipment. Reels must be stored in an area where they cannot be damaged by falling objects, chemical spills including oil and grease, open flames or welding operations, and excessive heat.

It is also advisable to secure the designated area to prevent theft or vandalism. Whenever possible, reels should be stored indoors to provide maximum protection. If the cable must be stored outside, the reels should be placed on a hard, well-drained surface that will prevent the reel flanges sinking into it and allowing the weight of cable and reel to rest on the cable surface. It is recommended, but not required, that cable intended for storage longer than six months have overhead protection or be covered with a suitable material such as canvas or opaque polyethylene to avoid prolonged exposure to sunlight.

If a portion of the cable is used, the open end of the cable remaining on the reel should immediately be re-sealed in a manner equivalent to the factory seal to prevent the entrance of moisture. After re-sealing, the cut end should be fixed to the inside edge of the reel flange to prevent the end from extending beyond the flanges during reel movement.

Reels should always be stored with their flanges vertical. They

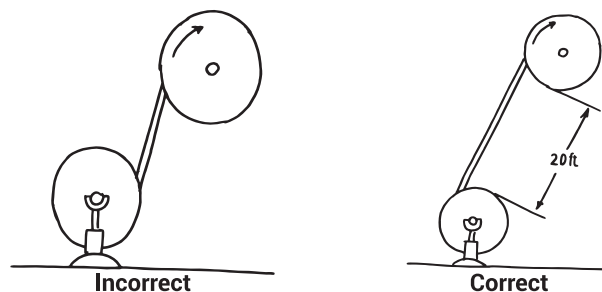


Figure-4

must not be stored on their sides or stacked one on top of another. Care should be taken that reels cannot roll into one another, so that the flange of one reel hits the surface of cable on another reel. If necessary, reel flanges should be chocked to prevent movement.

Removal of Cable from Reel:

Considerable care must be exercised in uncoiling or unreeling flexing cables since their performance is substantially influenced by the way in which they are handled. Reverse bending or twisting can cause internal

damage which can adversely affect the life of the cable. Reels should be placed on jacks or stands with a bar through the arbor holes. This will allow the reel to be turned easily, and the cable to be paid -out. Cables can be paid-out from the bottom or the top of the reel, but if they are to be removed from a shipping reel to be installed on another reel, they should be paid-out in such a manner as to follow the natural cast in the cable. Reverse bending should be avoided (see Figure 4). If possible, the distance between pay-off reel and take-up reel should be at least 20 feet to allow the cable to straighten before it is taken up on the application reel. Cable in coils should be handled in a similar manner. This can be achieved by supporting the coil in a vertical plane and rotating it by hand as the cable is carefully uncoiled (see Figure 5).

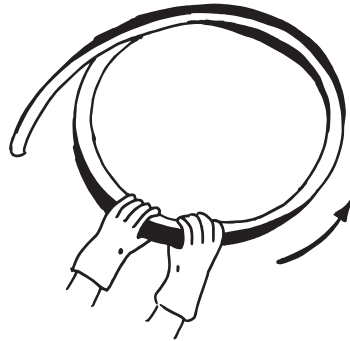
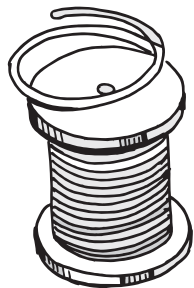
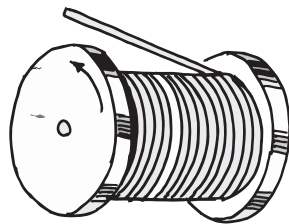


Figure-5

The cable should never be pulled over the flange of a reel, or pulled off the side of a coil, since this will introduce a twist in the cable (see Figure 6).



Incorrect

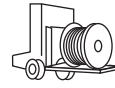


Correct

Figure-6

Cable Handling Summary :

YES



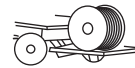
Cradle both reel flanges between forks



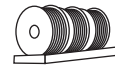
Reels can be hoisted with a shaft extended through both flanges



Place spacers under the bottom flanger and between reels to create a space to insert the forks.



Lower reels from truck hydraulic gate, hoist or lift, LOWER CAREFULLY



Always load with flanges on edge and chock and block securely.

NO



Do not lift by top flanges Cable or reel will be damaged



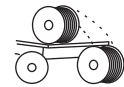
Use a spreader bar, to prevent bending the reel flanges and mashing the cable



Opened heavy reels. Will often arrive damaged. Refuse or receive subject to inspection for hidden damage.



Never allow forks to touch cable surface or reel wrap.

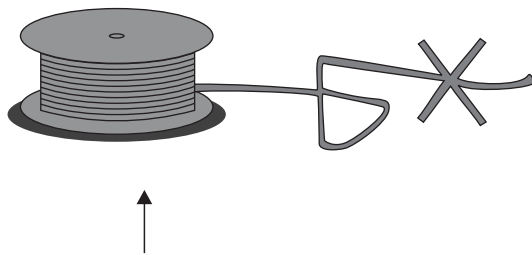
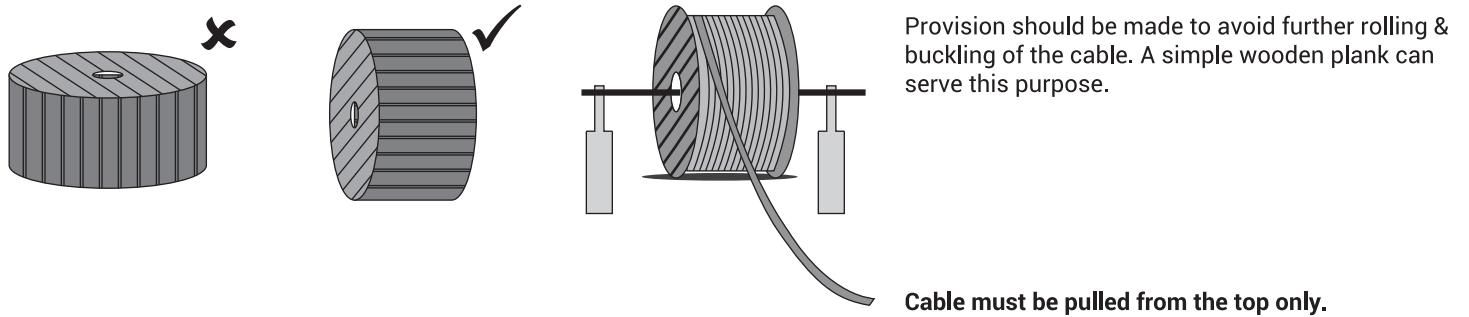


Never drop reels.

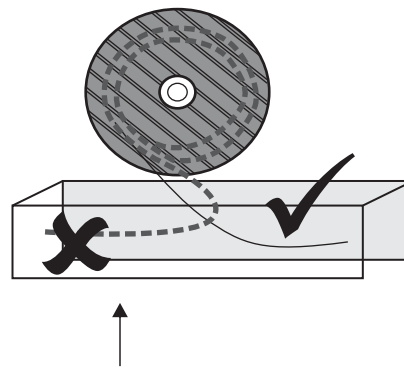
Remove all nails staples from reel flanges before moving a reel before moving a reel, and avoid all objects that could crush damage or impact the cable while it is being moved. NEVER use the cable as a means to move a reel. When re-reeling, observe recommended bending radii, use swivels to prevent twisting and avoid overruns.

CABLE LAYING GUIDELINE

For laying of cable, special care is to be taken to prevent sharp bending, kinking and twisting. Cable should be unwound from drum by proper mounting the cable drum on a cable wheel stand. Making sure that the spindle is strong enough to carry the weight without bending and that it is lying horizontally in the bearings so as to prevent the drum creeping to one side or the other while it is rotating.



This is the incorrect way of pulling the cable & will cause kinks & twist in cable. Shall be avoided.



Cable must not be pulled across hard and sharp objects to avoid damage to the cable.

Cable must be laid in ducts or trenches as shown.

RR KABEL - PRODUCT BASKET

CONSTRUCTION AND BUILDING RANGE

SUPEREX FR
FLAMEX FR-LSH
UNILAY HR FR
FIREX LS0H
RATNA CO-X
RATNACOM
RATNALAN CAT 5e/6
CCTV CAMERA CABLE
SPEAKER CABLE
BUS J-Y(St)Yh 2 x 2 x 0.8
HALOGEN-FREE H07Z-R-6491B
PVC INSULATED BUILDING WIRE (H07V-R)-6491X
6181Y - BS 6004
6181XY - BS 7889
PVC/PVC TWIN CORE FLAT CABLE (IS 694)
PVC/PVC 3 CORE SUBMERSIBLE FLAT CABLE
XLPE/PVC 3 CORE SUBMERSIBLE FLAT CABLE
STEEL BRAIDED YSY 1.1 kV

SINGLE CORE

RATNAFLEX FLEXIBLE (IS 694)
H05V-K & H07V-K
H05V2-K & H07V2-K
H05Z-K & H07Z-K
H05Z1-K & H07Z1-K
BS 6231 CK 90°C

CONTROL CABLES

RATNAFLEX MULTICORE (IS 694)
CONTROL CABLE (IS 694)
H03/H05VVH2-F & H03/H05VV-F
JB-750
H03 / H05V2V2H2-F & H03 / H05V2V2-F
JB-YCY
JB-YSY
JB-BLACK 0.6/1 kV
JZ-500
JZ-YCY
JZ-YSY
JZ-CY
JZ-BLACK 0.6/1 kV
JZ-YCY BLACK 0.6/1 kV
OZ-EB

OZ-EB CY
JB-H
JZ-H
JZ-HCH

DRAG CHAIN AND SERVO CABLES

JZ-30400 P
JZ-35400 CP
JZ-40415 CP
JZ-45440 P
JZ-50440 CP
SERVO 55700
SERVO 60700 CY
2YSLCY-JB-SERVO
SERVO FD 70750 P
SERVO FD 75781-CY
SERVO FD 80785 P
SERVO FD 85810
SERVO FD 90810 CY
SERVO FD 95810 P
SERVO FD 30810 CP
SERVO FD 05855 P
SERVO FD 10855 CP

DATA & COMMUNICATION CABLES

LiYY
LiYY (TP)
LiYCY
LiYCY (TP)
Li2Y(St)CY (TP)
Li2YCY PiMF
PROcess Field BUS

APPLIANCE WIRING MATERIAL

TRI RATED CABLE
UL 1015
UL 1007
UL 1569
UL 1275
UL 2587
UL 2464
UL 2576, 2598
UL 3289/3321/3173/3271/3344 XLPE CABLE
UL 2586

INSTRUMENTATION CABLES

RE-Y(St)Y - SINGLE & MULTI-PAIR
RE-Y(St)Y PiMF - MULTI-PAIR
RE-2X(St)Y - SINGLE & MULTI-PAIR
RE-2X(St)Y PiMF - MULTI-PAIR
RE-Y(St)YSWAY - SINGLE & MULTI-PAIR
RE-Y(St)YSWAY PiMF - MULTI-PAIR
RE-2X(St)YSWAY - SINGLE & MULTI-PAIR
RE-2X(St)YSWAY PiMF - MULTI-PAIR
RE-Y(St)Y - MULTICORE
RE-2X(St)Y - MULTICORE
RE-Y(St)YSWAY - MULTICORE
RE-2X(St)YSWAY - MULTICORE

SILICON CABLES

SiF/SiFF
SiHF
SiHF-GLS
SiF-GL, SiD, SiD-GL

AUTO CABLES

SXL
GXL
TXL
AV
AVS
AVSS
FLY
FLYW
FLYK
FLRYK
FLRY A
FLRY B
FLUY
FLRYW
FL11Y
FLYY
FLR13Y
FLRY n x (TWISTED CABLES)
ACW
THIN WALL MULTICORE CABLES
TINNED COPPER CABLES
PVC BATTERY CABLES
ELASTOMERIC BATTERY CABLES
COPPER EARTHING BRAIDS
PVC IGNITION CABLES

FIRE AND SECURITY CABLES

FIRE ALARM CABLES
FIRE SURVIVAL CABLE
SINGLE CORE FIRE RESISTANT

POWER CABLES

AYY/YY-1 CORE
AYY/YY-2 CORE
AYY/YY-3 CORE
AYY/YY-3.5 CORE
AYY/YY-4 CORE
AYFaY/YFaY-AYWaY/YWaY
AYFaY/YFaY-AYWaY/YWaY-2 CORE
AYFaY/YFaY-AYWaY/YWaY-3 CORE
AYFaY/YFaY-AYWaY/YWaY-3.5 CORE
AYFaY/YFaY-AYWaY/YWaY-4 CORE
YY/YFY/YWY-1.5 Sq. mm
YY/YFY/YWY-2.5 Sq. mm
A2XY/2XY-1 CORE
A2XY/2XY-2 CORE
A2XY/2XY-3 CORE
A2XY/2XY-3.5 CORE
A2XY/2XY-4 CORE
A2XFaY/2XFaY-A2XWaY/2XWaY
A2XFY/2XFY-A2XWY/2XWY-2 CORE
A2XFY/2XFY-A2XWY/2XWY-3 CORE
A2XFY/2XFY-A2XWY/2XWY-3.5 CORE
A2XFY/2XFY-A2XWY/2XWY-4 CORE
2XY/2XFY/2XWY-1.5 Sq. mm
2XY/2XFY/2XWY-2.5 Sq. mm
NYY
POWER CABLE-BS 5467

APPLICATION BASED CABLES

SOLAR CABLE
POWER CORDS & HARNESS
UNINYVIN CABLE
WELDEX-IS 9857
WELDEX-SI (SINGLE INSULATED)
WELDEX-DI (DOUBLE INSULATED)
ELEVATOR CABLE
BRAIDED STRAP-ABC/ATC
TUBULAR BRAIDS
BARE COPPER CONDUCTOR



WORLD OF EXCELLENCE



As a USD 1.25+ billion conglomerate, we are one of the largest, diversified & most prominent brands in the Indian electrical industry, with a noteworthy presence in over 90+ countries across the world. We offer a multi faceted range of quality products through our 10 successfully operating companies, 43 marketing offices and 15 manufacturing facilities.

At RR Global, we continue to innovate to ensure only the finest products reach our customers.



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Jalandhar: 0181 - 500 3394, **Kolkata**: 033 - 6607 1233, **Lucknow**: 0522-3516188/89,
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Raipur: 0771 - 2971 518, **Rajkot**: 09327 722 501, **Secunderabad**: 040 - 2780 4098,
Silvassa: 0260 - 2641 333, **Surat**: 09376 507 543, **Trichy**: 0431 - 4540 363

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The technical data mentioned in the book has been derived to have the best product in place. Having known that innovation has always been the base for R R Kabel products, the technical data would vary from time to time. Hence, current details should always be checked with R R Kabel for accuracy.

REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals
RoHS = Restriction of Hazardous Substances | **CE** = Conformance Européenne
ISI = Indian Standard Institution



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