

COSMOLINK

WIRE & CABLE

THINKING FOR FUTURE VALUE





YOUR FRIENDLY PARTNER, COSMOLINK, IN THE GLOBAL CABLE INDUSTRY

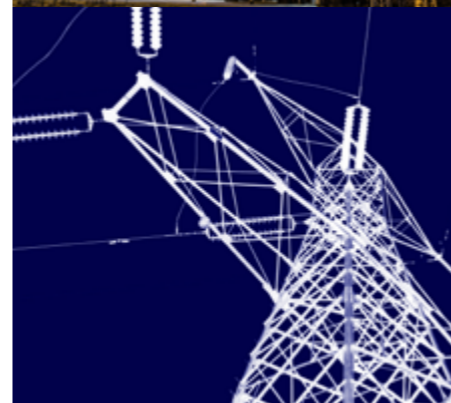
Cosmolink Co., Ltd. is a leading cable manufacturer in Korea with accumulated technical skills and know-how. Cosmolink has specialized in manufacturing and supplying various cables since, including:

- LV/MH/HV (up to 66kV) power cables
- Control & instrument cables
- Cathodic protection cables for cathodic protection systems
- Fire retardant cable for extra high temperature (950°C)
- TIW (Triple Insulated Wire) for transformers (mainly applied to electronic components)
- LAN UTP cables, optical fiber cables

Our cables are supplied to domestic and overseas customers in many regions, such as the Middle East (including Saudi Arabia, UAE, Jordan and Kuwait), Asia (including Myanmar, Singapore, Vietnam, Philippines and Indonesia), as well as North and South America.

Additionally, Cosmolink participates in domestic and overseas EPC (Engineering, Procurement and Construction) companies' projects as a trusted vendor to supply cables. We have earned faith and trust through cable delivery and quality, by supplying to plant, oil and gas, environment and other various construction projects.

Cosmolink Co., Ltd. is a member of Kabul International Group, a multinational corporation with affiliates spanning many industries, including automobile, cables, raw materials, construction, textiles, environment, and medical care.



C O N T E N T

PVC Insulated Wires

- 450/750V 60227 IEC 01 Single-core non-sheathed cable with rigid conductor (450/750V IV)
- 300/500V 60227 IEC 07 Single-core non-sheathed cable with solid conductor for internal wiring (300/500V HIV)
- 0.6/1kV Flame retardant PVC Insulated Grounding Wire (0.6/1kV TFR-GV)

Flame Retardant Control & Power Cables

- 0.6/1kV PVC Insulated Control Cables (Non-armoured & Armoured Type)
 - With/Without copper tape or braid shield
(0.6/1kV TFR-CVV, TFR-CVV-S, TFR-CVV-SB, TFR-CVVWAV, TFR-CVVWAV-S)
 - With polyester coated aluminum tape shield
(0.6/1kV TFR-CVV-AMS, TFR-CVVWAV-AMS, TFR-CVV-I/CAMS, TFR-CVVWAV-I/CAMS)
- 0.6/1kV XLPE Insulated Power Cables (Non-armoured & Armoured Type)
(0.6/1kV TFR-CV, TFR-CVAWAV, TFR-CVWAV, TFR-CV-S, TFR-CVAWAV-S, TFR-CVWAV-S)
- MV XLPE Insulated Power Cables (Non-armoured & Armoured Type)
(Rated voltage TFR-CV, TFR-CVAWAV, TFR-CVWAV)

Fire resistant Cables

- 0.6/1kV Fire Resistant Cables with MICA tapes (Non-armoured & Armoured Type)
(0.6/1kV TFR-8, FRT-CVAWAV, FRT-CVWAV)
- 0.6/1kV Fire Alarm Cable with Heat Resistant tape
(0.6/1kV TFR-3)

Bare Conductors

- Hard-Drawn Copper Stranded Wire for Electrical Purposes (Korean Standard)
- Annealed Copper Stranded Wires for Electrical Purposes (Korean Standard & IEC)

MV URD(Underground Residential Distribution) Cables

- 15kV to 35kV Cables

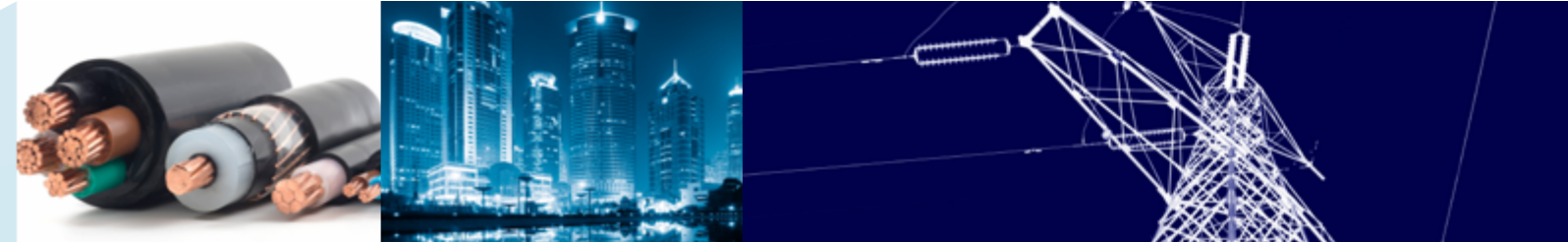
Technical Data

ACRONYM

ANSI	American National Standard Institute	NF	Association Francaise de Normalisation
AS	Australian Standard	NFPA	National Fire Protection Association, Inc.
ASTM	American Society for Testing Materials	UL	Underwriters Laboratories Inc.
AWG	American Wire Gauge (Brown & Sharp Wire Gauge)	VDE	Verband Deutscher Electrotechniker
BS	British Standards institution	PE	Polyethylene
CSA	Canadian Standards Association	XLPE	Cross-Linked Polyethylene
DIN	Deutsches Institut fur Normung	TR-XLPE	Tree Retardant Cross-Linked Polyethylene
ICEA	Insulated Cable Engineers Associaion, Inc.	PVC	Polyvinyl Chloride
IEC	International Electrotechnical Commission	FR-PVC	Flame Retardant Polyvinyl Chloride
IEEE	Institute of Electrical and Electronics Engineers	HFPO	Halogen Free Polyolefin
NEMA	National Electrical Manufacturers Association	VTFT	Vertical Tray Flame Test

Observes requirement of quality management system and satisfies customer's terms desired continuously
Keeps basis via internal standard to establishes and achieves quality objectives and conforms law.
Confirm effectiveness of quality management system regularly.
Through continuous improvement of quality management system, reduce expense.

PVC INSULATED WIRES



450/750V 60227 IEC 01 Single-core non-sheathed cable with rigid conductor
(450/750V IV)

300/500V 60227 IEC 07 Single-core non-sheathed cable with solid conductor for internal wiring
(300/500V HIV)

0.6/1kV Flame retardant PVC Insulated Grounding Wire
(0.6/1kV TFR-GV)

450/750V 60227 IEC 01

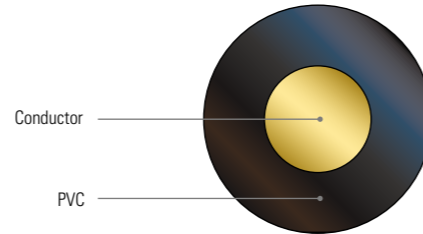
Single-core non-sheathed cable with rigid conductor (450/750V IV)

SCOPE
It is mainly used in fixed wiring of electric apparatus and equipment up to and 450/750V.

APPLICATION STANDARDS
IEC 60227-3 Polyvinyl chloride insulated cables of rated voltage up to and including 450/750V
Part 3 : Non-sheathed cables for fixed wiring

MATERIALS & CONSTRUCTION
Conductor Annealed copper wires, Class 1(Solid type) or 2(Stranded type)
Insulation PVC (Max. operating conductor temperature, 70°C)

COLOR
Black, White, Red, Green, Yellow, Blue and others



450/750V CU/PVC

Type	Conductor		Thick. of Insulation (nom.)	Overall Diameter		Max. D.C Conductor Resistance (20°C)	Net Weight (approx.)
	Size	Outer Dia. (approx.)		Min.	Max.		
	mm ²	mm		mm	mm		
Class 1 (Solid)	1.5	1.38	0.7	2.6	3.2	12.1	22
	2.5	1.78	0.8	3.2	3.9	7.41	35
	4	2.25	0.8	3.6	4.4	4.61	50
	6	2.76	0.8	4.1	5.0	3.08	71
	10	3.57	1.0	5.3	6.4	1.83	117
Class 2 (Strand)	1.5	1.59	0.7	2.7	3.3	12.1	24
	2.5	2.01	0.8	3.3	4.0	7.41	36
	4	2.55	0.8	3.8	4.6	4.61	53
	6	3.12	0.8	4.3	5.2	3.08	75
	10	4.05	1.0	5.6	6.7	1.83	124
	16	5.10	1.0	6.4	7.8	1.15	187
	25	6.42	1.2	8.1	9.7	0.727	296
	35	7.56	1.2	9.0	10.9	0.524	398
	50	8.90	1.4	10.6	12.8	0.387	534
	70	10.70	1.4	12.1	14.6	0.268	752
	95	12.60	1.6	14.1	17.1	0.193	1038
	120	14.21	1.6	15.6	18.8	0.153	1293
	150	15.75	1.8	17.3	20.9	0.124	1590
	185	17.64	2.0	19.3	23.3	0.0991	1974
	240	20.25	2.0	22.0	26.6	0.0754	2608
300	22.68	2.4	24.5	29.6	0.0601	3260	
400	25.65	2.6	27.5	33.2	0.0470	4150	

300/500V 60227 IEC 07

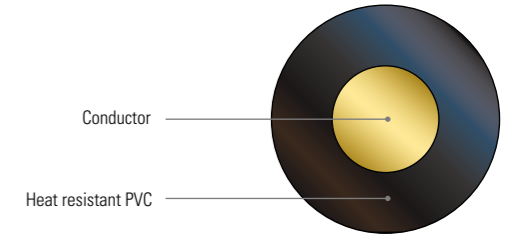
Single-core non-sheathed cable with solid conductor for internal wiring (300/500V HIV)

SCOPE
It is mainly used in fixed wiring of electric apparatus and equipment up to and 300/500V.

APPLICATION STANDARDS
IEC 60227-3 Polyvinyl chloride insulated cables of rated voltage up to and including 450/750V
Part 3 : Non-sheathed cables for fixed wiring

MATERIALS & CONSTRUCTION
Conductor Annealed copper wires, Class 1(Solid type)
Insulation Heat resistant PVC (Max. operating conductor temperature, 90°C)

COLOR
Black, White, Red, Green, Yellow, Blue and others



300/500V CU/PVC

Type	Conductor		Thick. of Insulation (nom.)	Overall Diameter		Max. D.C Conductor Resistance (20°C)	Net Weight (approx.)
	Size	Outer Dia. (approx.)		Min.	Max.		
	mm ²	mm		mm	mm		
Class 1 (Solid)	1.5	1.38	0.7	2.6	3.2	12.1	22
	2.5	1.78	0.8	3.2	3.9	7.41	34

0.6/1kV

Flame retardant PVC Insulated Grounding Wire (0.6/1kV TFR-GV)

SCOPE

This wire is used for grounding of electric apparatus.

APPLICATION STANDARDS

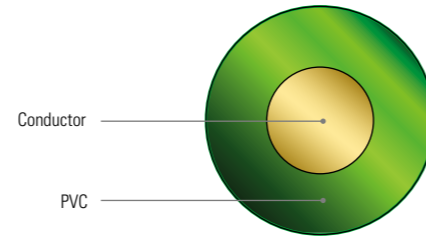
IEC 60502-1 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV)
Part 1: Cables for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3.6 kV)

IEC 60332-3-24 Tests on electric cables under fire conditions - Part 3-24 : Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

MATERIALS & CONSTRUCTION

Conductor Annealed copper wires Class 2 (Circular stranded or Compacted circular stranded type)

Insulation Flame retardant PVC (FR-PVC)



COLOR

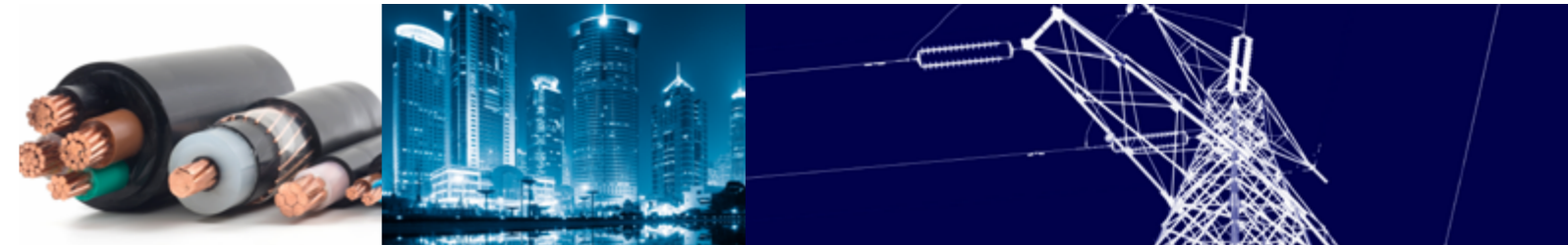
Green or Green/Yellow

0.6/1kV CU/PVC

Size	Conductor		Thick. of Insulation (nom.)	Overall Diameter (approx.)	Max. D.C Conductor Resistance (20°C)	A.C Test Voltage	Net Weight (approx.)
	Construction	Outer Dia. (approx.)					
mm ²	Nos./mm	mm	mm	mm	Ω/km	V/5min.	kg/km
1.5	7/0.53	1.59	2.2	7	12.1	3500	61
2.5	7/0.67	2.01	2.2	7	7.41	3500	75
4	7/0.85	2.55	2.4	9	4.61	3500	105
6	7/1.04	3.12	2.4	9	3.08	3500	132
10	7/1.35	4.05	2.4	10	1.83	3500	184
16	C.C	4.7	2.4	11	1.15	3500	240
25	C.C	5.9	2.6	12	0.727	3500	352
35	C.C	6.9	2.6	14	0.524	3500	455
50	C.C	8.1	2.8	15	0.387	3500	600
70	C.C	9.8	2.8	17	0.268	3500	816
95	C.C	11.4	3.1	19	0.193	3500	1114
120	C.C	12.9	3.1	21	0.153	3500	1367
150	C.C	14.4	3.4	23	0.124	3500	1684
185	C.C	15.9	3.7	25	0.0991	3500	2087
240	C.C	18.3	4.0	29	0.0754	3500	2708
300	C.C	20.5	4.3	31	0.0601	3500	3376
400	C.C	23.2	4.6	35	0.0470	3500	4270
500	C.C	26.4	4.9	39	0.0366	3500	5433
630	C.C	30.2	5.0	43	0.0283	3500	6905

Note) C.C : Compacted circular stranded type

FLAME RETARDANT CONTROL & POWER CABLES



0.6/1kV PVC Insulated Control Cables with/without Copper tape or Braid Shield
(0.6/1kV TFR-CVV, TFR-CVVS, TFR-CVV-SB, TFR-CVWAV, TFR-CVWAV-S)

0.6/1kV PVC Insulated Control Cables with polyester coated Aluminum tape Shield
(0.6/1kV TFR-CVV-AMS, TFR-CVWAV-AMS, TFR-CVV-I/CAMS, TFR-CVWAV-I/CAMS)

0.6/1kV XLPE Insulated Power Cables (Non-armoured & Armoured Type)
(0.6/1kV TFR-CV, TFR-CVAWAV, TFR-CVWAV, TFR-CV-S, TFR-CVAWAV-S, TFR-CVWAV-S)

MV XLPE Insulated Power Cables (Non-armoured & Armoured Type)
(Rated voltage TFR-CV, TFR-CVAWAV, TFR-CVWAV)

0.6/1kV PVC Insulated Control Cables (Non-armoured & Armoured Type)

With/Without copper tape or braid Shield

(0.6/1kV TFR-CV, TFR-CW-S, TFR-CW-SB, TFR-CVWAV, TFR-CVWAV-S)

SCOPE

This cable is designed for the purpose of using in control system in power plant and substation.

APPLICATION STANDARDS

IEC 60502-1 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 1: Cables for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3.6 kV)

IEC 60332-3-24 Tests on electric cables under fire conditions - Part 3-24 : Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

MATERIALS & CONSTRUCTION

- Conductor** Annealed copper wires, Class 2(Circular stranded type)
- Insulation** PVC (Max. operating conductor temperature, 70°C)
- Common Shield** Annealed copper tape or braid of copper wires (for shielded cables only)
- Inner Covering** Extruded black PVC (for armoured cables only)
- Armour** Galvanized steel round wires (for armoured cables only)
- Oversheath** Flame retardant black PVC (FR-PVC/ST1)

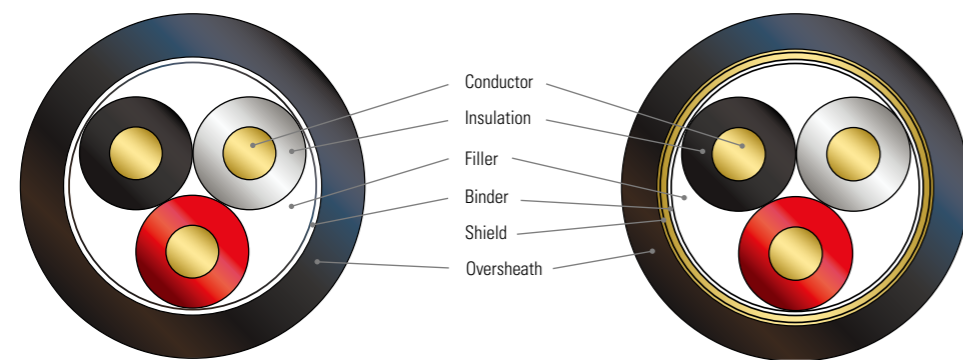
CORE IDENTIFICATION

- 2cores Black and White
- 3cores Black, White and Red
- 4cores Black, White, Red and Green
- 5cores and above Numbering on black colored insulation

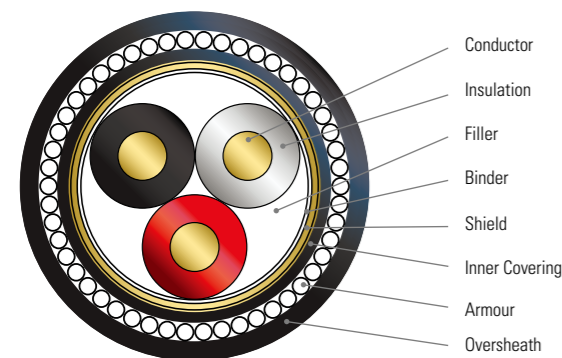
OPTION

- Different color of core identification and oversheath
- Flame Retardant : Cat. A or Cat. B in accordance with IEC 60332-3-22, -23
- Oil Resistance, Anti-termites, Anti-rodent, Ozone resistance

Non-armoured Type



Armoured Type



Non-armoured Type (0.6/1kV CU/PVC/PVC, CU/PVC/CTS/PVC, CU/PVC/CSB/PVC)
(0.6/1kV TFR-CV, TFR-CV, TFR-CV, TFR-CV-SB)

Nos. of Core	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)			Max. D.C. Conductor Resistance (20°C)	A.C. Voltage Test	Net Weight (approx.)		
	Size	Construction	Outer Dia. (approx.)			A type	B type	C type			A type	B type	C type
	mm ²	Nos./mm	mm			mm	mm	mm			kg/km	kg/km	kg/km
2	1.5	7/0.53	1.59	0.8	1.8	12	13	13	12.1	3500	142	168	165
	2.5	7/0.67	2.01	0.8	1.8	13	14	14	7.41	3500	175	203	200
	4	7/0.85	2.55	1.0	1.8	15	16	16	4.61	3500	241	274	271
	6	7/1.04	3.12	1.0	1.8	16	17	17	3.08	3500	300	336	339
	10	7/1.35	4.05	1.0	1.8	18	19	18	1.83	3500	417	458	454
3	1.5	7/0.53	1.59	0.8	1.8	13	13	13	12.1	3500	172	199	197
	2.5	7/0.67	2.01	0.8	1.8	14	14	14	7.41	3500	213	242	240
	4	7/0.85	2.55	1.0	1.8	16	17	17	4.61	3500	300	336	336
	6	7/1.04	3.12	1.0	1.8	17	18	18	3.08	3500	384	423	426
	10	7/1.35	4.05	1.0	1.8	19	20	19	1.83	3500	544	588	583
4	1.5	7/0.53	1.59	0.8	1.8	14	14	14	12.1	3500	203	233	231
	2.5	7/0.67	2.01	0.8	1.8	15	15	15	7.41	3500	256	289	292
	4	7/0.85	2.55	1.0	1.8	17	18	18	4.61	3500	371	409	411
	6	7/1.04	3.12	1.0	1.8	19	19	19	3.08	3500	479	522	524
	10	7/1.35	4.05	1.0	1.8	21	22	22	1.83	3500	688	737	739
5	1.5	7/0.53	1.59	0.8	1.8	15	15	15	12.1	3500	241	273	271
	2.5	7/0.67	2.01	0.8	1.8	16	17	17	7.41	3500	305	342	342
	4	7/0.85	2.55	1.0	1.8	19	19	19	4.61	3500	447	487	483
	6	7/1.04	3.12	1.0	1.8	20	21	21	3.08	3500	573	624	612
	10	7/1.35	4.05	1.0	1.8	23	24	23	1.83	3500	835	889	865
6	1.5	7/0.53	1.59	0.8	1.8	16	16	16	12.1	3500	278	313	320
	2.5	7/0.67	2.01	0.8	1.8	17	18	18	7.41	3500	356	396	395
	4	7/0.85	2.55	1.0	1.8	20	21	21	4.61	3500	514	568	561
	6	7/1.04	3.12	1.0	1.8	22	23	23	3.08	3500	666	731	719
	10	7/1.35	4.05	1.0	1.8	25	26	25	1.83	3500	966	1047	1032
7	1.5	7/0.53	1.59	0.8	1.8	16	16	16	12.1	3500	298	333	334
	2.5	7/0.67	2.01	0.8	1.8	17	18	18	7.41	3500	386	426	428
	4	7/0.85	2.55	1.0	1.8	20	21	21	4.61	3500	571	61	619
	6	7/1.04	3.12	1.0	1.8	22	23	23	3.08	3500	743	799	788
	10	7/1.35	4.05	1.0	1.8	25	26	25	1.83	3500	1093	1155	1150
8	1.5	7/0.53	1.59	0.8	1.8	17	18	17	12.1	3500	338	374	376
	2.5	7/0.67	2.01	0.8	1.8	18	19	19	7.41	3500	439	482	482
	4	7/0.85	2.55	1.0	1.8	22	22	22	4.61	3500	640	699	694
	6	7/1.04	3.12	1.0	1.8	24	25	25	3.08	3500	838	908	907
	10	7/1.35	4.05	1.0	1.8	27	28	28	1.83	3500	1232	1319	1309
10	1.5	7/0.53	1.59	0.8	1.8	19	20	20	12.1	3500	405	461	450
	2.5	7/0.67	2.01	0.8	1.8	21	22	21	7.41	3500	532	596	593
	4	7/0.85	2.55	1.0	1.8	25	26	26	4.61	3500	789	871	857
	6	7/1.04	3.12	1.0	1.8	27	28	28	3.08	3500	1068	1136	1116
	10	7/1.35	4.05	1.0	1.8	31	32	32	1.83	3500	1550	1652	1643
12	1.5	7/0.53	1.59	0.8	1.8	20	21	21	12.1	3500	460	505	503
	2.5	7/0.67	2.01	0.8	1.8	22	22	22	7.41	3500	606	656	660
	4	7/0.85	2.55	1.0	1.8	26	27	27	4.61	3500	902	964	975
	6	7/1.04	3.12	1.0	1.8	29	29	29	3.08	3500	1198	1266	1282
	10	7/1.35	4.05	1.0	1.8	33	34	34	1.83	3500	1538	1617	1648

Nos. of Core	Conductor			Thickness		Dia. of wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Conductor Size	Construction	Outer Dia.(approx.)	Insulation (nom.)	Inner covering (approx.)					
	mm ²	Nos./mm	mm	mm	mm					
5	1.5	7/0.53	1.59	0.8	1.0	0.8	1.8	20	12.1	560
	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	23	7.41	779
	4	7/0.85	2.55	1.0	1.0	1.25	1.8	25	4.61	1013
	6	7/1.04	3.12	1.0	1.0	1.25	1.8	27	3.08	1193
	10	7/1.35	4.05	1.0	1.0	1.25	1.8	30	1.83	1538
6	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	22	12.1	750
	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	24	7.41	870
	4	7/0.85	2.55	1.0	1.0	1.25	1.8	27	4.61	1122
	6	7/1.04	3.12	1.0	1.0	1.6	1.8	30	3.08	1470
	10	7/1.35	4.05	1.0	1.0	1.6	1.9	33	1.83	1909
7	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	22	12.1	771
	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	24	7.41	899
	4	7/0.85	2.55	1.0	1.0	1.25	1.8	27	4.61	1179
	6	7/1.04	3.12	1.0	1.0	1.6	1.8	30	3.08	1548
	10	7/1.35	4.05	1.0	1.0	1.6	1.9	33	1.83	2037
8	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	23	12.1	839
	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	25	7.41	992
	4	7/0.85	2.55	1.0	1.0	1.6	1.8	29	4.61	1442
	6	7/1.04	3.12	1.0	1.0	1.6	1.8	31	3.08	1706
	10	7/1.35	4.05	1.0	1.0	1.6	1.9	35	1.83	2243
10	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	26	12.1	985
	2.5	7/0.67	2.01	0.8	1.0	1.6	1.8	28	7.41	1294
	4	7/0.85	2.55	1.0	1.0	1.6	1.8	33	4.61	1699
	6	7/1.04	3.12	1.0	1.0	1.6	1.9	35	3.08	2072
	10	7/1.35	4.05	1.0	1.0	2.0	2.0	41	1.83	2968
12	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	27	12.1	1055
	2.5	7/0.67	2.01	0.8	1.0	1.6	1.8	29	7.41	1409
	4	7/0.85	2.55	1.0	1.0	1.6	1.9	34	4.61	1870
	6	7/1.04	3.12	1.0	1.0	1.6	1.9	37	3.08	2270
	10	7/1.35	4.05	1.0	1.2	2.0	2.0	43	1.83	3082
15	1.5	7/0.53	1.59	0.8	1.0	1.6	1.8	28	12.1	1324
	2.5	7/0.67	2.01	0.8	1.0	1.6	1.8	31	7.41	1591
	4	7/0.85	2.55	1.0	1.0	1.6	1.9	36	4.61	2144
	6	7/1.04	3.12	1.0	1.0	2.0	2.0	40	3.08	2867
20	1.5	7/0.53	1.59	0.8	1.0	1.6	1.8	32	12.1	1581
	2.5	7/0.67	2.01	0.8	1.0	1.6	1.8	34	7.41	1896
	4	7/0.85	2.55	1.0	1.0	2.0	2.0	41	4.61	2845
30	6	7/1.04	3.12	1.0	1.2	2.0	2.1	45	3.08	3535
	1.5	7/0.53	1.59	0.8	1.0	1.6	1.9	36	12.1	2030
	2.5	7/0.67	2.01	0.8	1.0	2.0	1.9	40	7.41	2733
	4	7/0.85	2.55	1.0	1.2	2.5	2.2	49	4.61	4176

0.6/1kV PVC Insulated Control Cables (Non-armoured & Armoured Type)

With polyester coated aluminum tape shield

(0.6/1kV TFR-CVV-AMS, TFR-CVWVAV-AMS, TFR-CW-I/CAMS, TFR-CVWVAV-I/CAMS)

SCOPE

This cable is designed for the purpose of using in control system in power plant and substation.

APPLICATION STANDARDS

IEC 60502-1 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 1:Cables for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3.6 kV)

IEC 60332-3-24 Tests on electric cables under fire conditions - Part 3-24 : Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

MATERIALS & CONSTRUCTION

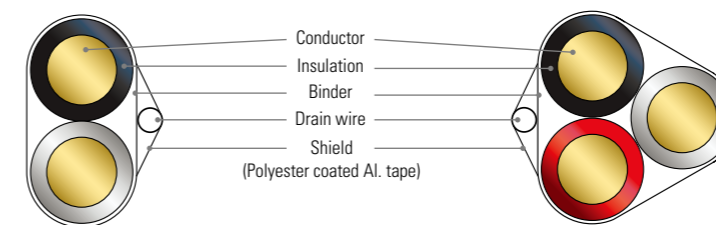
- Conductor** Annealed copper wires, Class 2 (Circular stranded type)
- Insulation** PVC (Max. operating conductor temperature, 70°C)
- Pairs/Triads** Twisted with polyester coated Al. tape and a drain wire in electrical contact (for Pairs/Triads cables)
- Assembly** Concentric layers
- Common Shield** Polyester coated Aluminum tape in electrical contact with a drain wire
- Inner Covering** Extruded black PVC (for armoured cables only)
- Armour** Galvanized steel round wires (for armoured cables only)
- Oversheath** Flame retardant black PVC (FR-PVC/ST1)

CORE IDENTIFICATION

- | | |
|--|--|
| For Core type | For Pairs/Triads type |
| 2cores Black and White | Pair Black and White |
| 3cores Black, White and Red | Triad Black, White and Red |
| 4cores Black, White, Red and Green | Multi pairs and Triads Numbering on colored insulation as above pair/triad |
| 5cores and above Numbering on black colored insulation | |

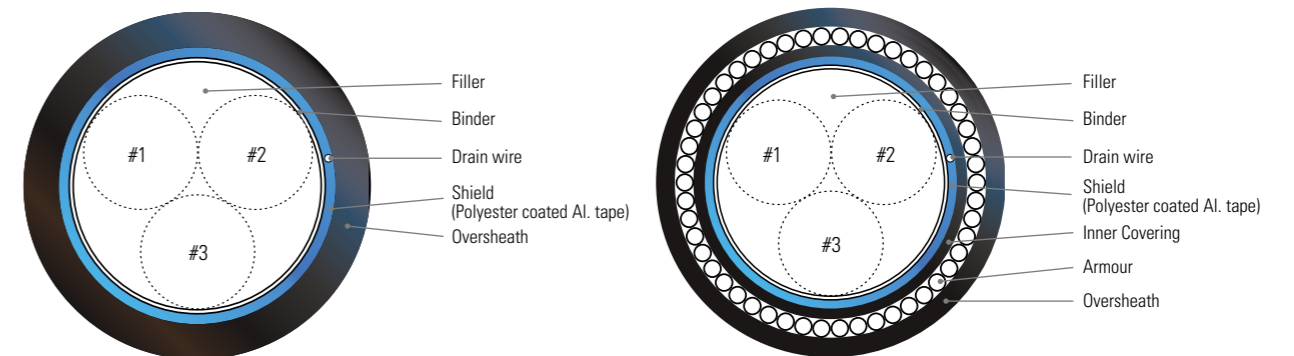
OPTION

- Different color of core identification and oversheath
- Flame Retardant : Cat. A or Cat. B in accordance with IEC 60332-3-22, -23
- Oil Resistance, Anti-termite, Anti-rodent, Ozone resistance



Non-armoured Type

Armoured Type



Pair/Triad type with individual/common shielded cables
(Armoured Type, 0.6/1kV CU/PVC/IS/CS/PVC/SWA/PVC)
(0.6/1kV TFR-CVVWAV-1/CAMS)

Nos. of Core	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Conductor Size	Construction	Outer Dia. (approx.)	Insulation (nom.)	Inner Covering (approx.)					
1P	1.5	7/0.53	1.59	0.8	1.0	0.8	1.8	17	12.1	368
2P	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	24	12.3	785
3P	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	26	12.3	900
4P	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	28	12.3	1038
5P	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	30	12.3	1165
6P	1.5	7/0.53	1.59	0.8	1.0	1.6	1.8	33	12.3	1463
7P	1.5	7/0.53	1.59	0.8	1.0	1.6	1.8	33	12.3	1484
8P	1.5	7/0.53	1.59	0.8	1.0	1.6	1.9	36	12.3	1664
10P	1.5	7/0.53	1.59	0.8	1.2	2.0	2.0	42	12.3	2384
12P	1.5	7/0.53	1.59	0.8	1.2	2.0	2.0	43	12.3	2508
15P	1.5	7/0.53	1.59	0.8	1.2	2.5	2.2	50	12.3	3218
20P	1.5	7/0.53	1.59	0.8	1.2	2.5	2.3	53	12.3	3797
30P	1.5	7/0.53	1.59	0.8	1.4	3.15	2.8	68	12.3	6808
1P	2.5	7/0.67	2.01	0.8	1.0	0.8	1.8	18	7.41	422
2P	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	26	7.56	902
3P	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	28	7.56	1056
4P	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	30	7.56	1216
5P	2.5	7/0.67	2.01	0.8	1.0	1.6	1.8	33	7.56	1541
6P	2.5	7/0.67	2.01	0.8	1.0	1.6	1.9	36	7.56	1763
7P	2.5	7/0.67	2.01	0.8	1.0	1.6	1.9	36	7.56	1778
8P	2.5	7/0.67	2.01	0.8	1.0	1.6	1.9	39	7.56	1986
10P	2.5	7/0.67	2.01	0.8	1.2	2.0	2.1	47	7.56	2800
12P	2.5	7/0.67	2.01	0.8	1.2	2.0	2.2	48	7.56	3015
15P	2.5	7/0.67	2.01	0.8	1.2	2.5	2.3	52	7.56	3851
20P	2.5	7/0.67	2.01	0.8	1.2	2.5	2.5	58	7.56	4637
30P	2.5	7/0.67	2.01	0.8	1.2	3.15	2.8	71	7.56	7008
1T	1.5	7/0.53	1.59	0.8	1.0	0.8	1.8	17	12.1	407
2T	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	25	12.3	880
3T	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	27	12.3	1029
4T	1.5	7/0.53	1.59	0.8	1.0	1.25	1.8	29	12.3	1197
5T	1.5	7/0.53	1.59	0.8	1.0	1.6	1.8	32	12.3	1503
6T	1.5	7/0.53	1.59	0.8	1.0	1.6	1.8	35	12.3	1671
7T	1.5	7/0.53	1.59	0.8	1.0	1.6	1.8	35	12.3	1737
8T	1.5	7/0.53	1.59	0.8	1.0	1.6	1.9	37	12.3	1946
10T	1.5	7/0.53	1.59	0.8	1.2	2.0	2.1	45	12.3	2750
12T	1.5	7/0.53	1.59	0.8	1.2	2.0	2.1	46	12.3	2957
15T	1.5	7/0.53	1.59	0.8	1.2	2.0	2.2	49	12.3	3407
20T	1.5	7/0.53	1.59	0.8	1.4	2.5	2.4	56	12.3	4561
30T	1.5	7/0.53	1.59	0.8	1.4	3.15	2.8	68	12.3	6806
1T	2.5	7/0.67	2.01	0.8	1.0	0.8	1.8	18	7.41	451
2T	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	27	7.56	1027
3T	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	29	7.56	1216
4T	2.5	7/0.67	2.01	0.8	1.0	1.25	1.8	33	7.56	1580
5T	2.5	7/0.67	2.01	0.8	1.0	1.6	1.8	35	7.56	1811
6T	2.5	7/0.67	2.01	0.8	1.0	1.6	1.9	38	7.56	2076
7T	2.5	7/0.67	2.01	0.8	1.0	1.6	1.9	38	7.56	2155
8T	2.5	7/0.67	2.01	0.8	1.2	2.0	2.0	42	7.56	2703
10T	2.5	7/0.67	2.01	0.8	1.2	2.5	2.2	50	7.56	3645
12T	2.5	7/0.67	2.01	0.8	1.2	2.5	2.3	52	7.56	4005
15T	2.5	7/0.67	2.01	0.8	1.2	2.5	2.4	55	7.56	4604
20T	2.5	7/0.67	2.01	0.8	1.4	3.15	2.6	63	7.56	6179
30T	2.5	7/0.67	2.01	0.8	1.6	3.15	3.0	76	7.56	8438

0.6/1kV XLPE Insulated Power Cables (Non-armoured & Armoured Type)

(0.6/1kV TFR-CV, TFR-CV-S, TFR-CVAWAV, TFR-CVWAV)

SCOPE

This cable is designed for the purpose of using in power distribution lines.

APPLICATION STANDARDS

IEC 60502-1 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 1: Cables for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3.6 kV)
IEC 60332-3-24 Tests on electric cables under fire conditions - Part 3-24 : Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

MATERIALS & CONSTRUCTION

Conductor Annealed copper wires, Class 2
(Circular stranded or Compacted circular stranded type)
Insulation XLPE (Max. operating conductor temperature, 90°C)
Common Shield Annealed copper tape (for shielded cables only)
Inner Covering Extruded PVC (for armoured cables only)
Armour Hard-drawn aluminum round wires for single core or galvanized steel round wires for multi-cores (for armoured cables only)
Oversheath Flame retardant black PVC (FR-PVC/ST2)

CORE IDENTIFICATION

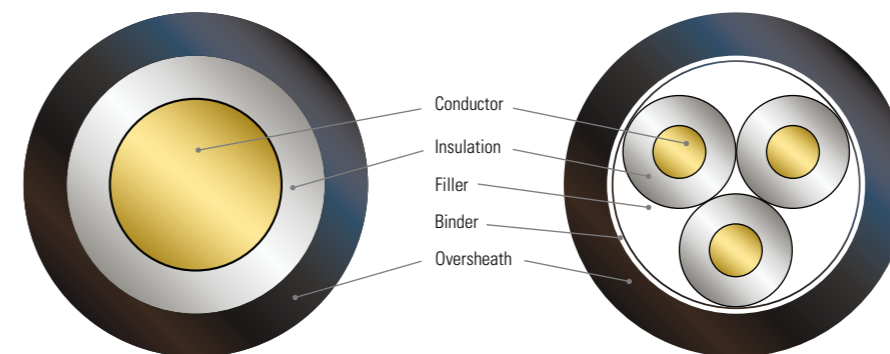
2cores Red and Black
 3cores Red, Yellow and Blue
 4cores Red, Yellow, Blue and Black

Generally, the cores will be identified with a narrow colored tapes between conductor and insulation.

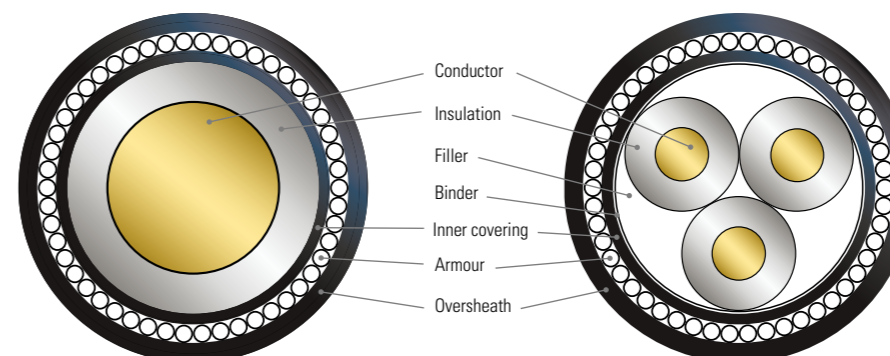
OPTION

Different color of core identification and oversheath
 Material of oversheath : Halogen free flame retardant polyolefin (ST8) or Polyethylene (ST7)
 Flame Retardant : Cat. A or Cat. B in accordance with IEC 60332-3-22, -23
 Oil Resistance, Anti-termite, Anti-rodent, Ozone resistance

Non-armoured Type



Non-armoured Type



MV XLPE Insulated Power Cables (Non-armoured & Armoured Type)

(Rated voltage TFR-CV, TFR-CVAWAV, TFR-CWAV)

SCOPE

This cable is designed for the purpose of using in power distribution lines.

APPLICATION STANDARDS

IEC 60502-2 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 2: Cables for rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)
IEC 60332-3-24 Tests on electric cables under fire conditions - Part 3-24 : Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

MATERIALS & CONSTRUCTION

- Conductor** Annealed copper wires Class 2 (Compacted circular stranded type)
- Conductor Screen** Extruded semi-conducting compound layer
- Insulation** XLPE (Max. operating conductor temperature, 90°C)
- Insulation Screen** Extruded semi-conducting compound layer
- Metallic Screen** Annealed copper tape
- Separation Sheath** Extruded PVC (for armoured cables only)
- Armour** Hard-drawn aluminum round wires for single core or galvanized steel round wires for multi-cores (for armoured cables only)
- Oversheath** Flame retardant black PVC (FR-PVC/ST2)

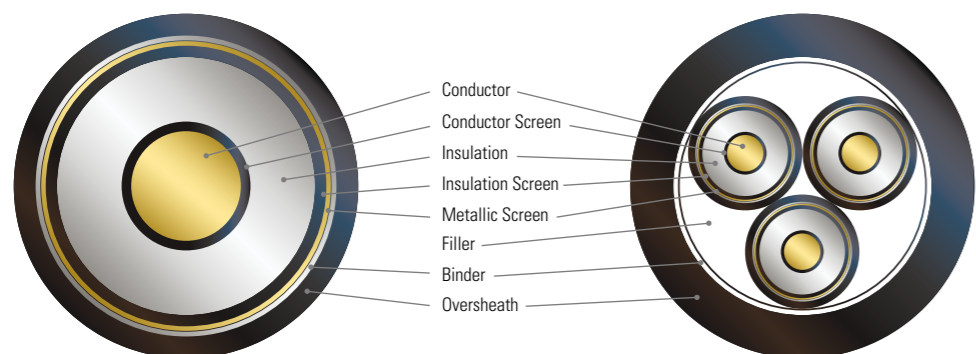
CORE IDENTIFICATION

3cores Red, Yellow and Blue
Generally, the cores will be identified with a narrow colored tapes between insulation screen and metallic screen.

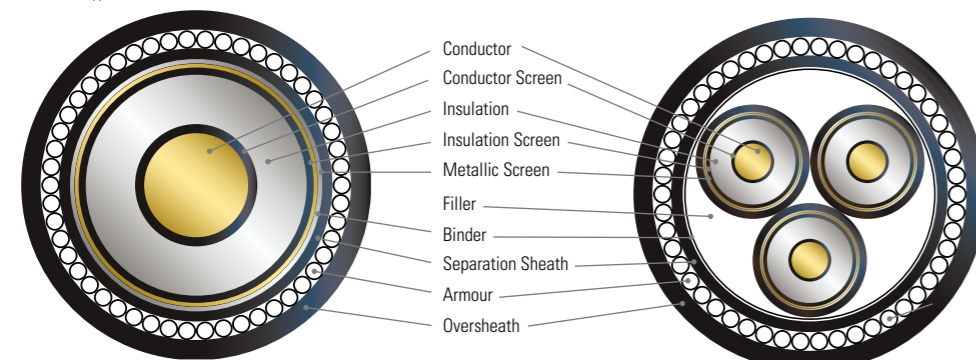
OPTION

Different color of core identification and oversheath
Material of oversheath : Halogen free flame retardant polyolefin (ST8) or Polyethylene (ST7)
Flame Retardant : Cat. A or Cat. B in accordance with IEC 60332-3-22, -23
Oil Resistance, Anti-termite, Anti-rodent, Ozone resistance

Non-armoured Type



Armoured Type



6/10kV Non-armoured Cables (6/10kV CU/XLPE/PVC) (6/10kV TFR-CV)

Nos. of Core	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Size	Construction	Outer Dia. (approx.)						
	mm ²	Nos./mm	mm	mm	mm	mm	Ω/km	kV/5min.	kg/km
1	35	C.C	6.9	3.4	1.6	23	0.524	21	707
	50	C.C	8.1	3.4	1.6	24	0.387	21	853
	70	C.C	9.8	3.4	1.7	26	0.268	21	1102
	95	C.C	11.4	3.4	1.7	28	0.193	21	1388
	120	C.C	12.9	3.4	1.8	30	0.153	21	1670
	150	C.C	14.4	3.4	1.8	32	0.124	21	1972
	185	C.C	15.9	3.4	1.9	33	0.0991	21	2369
	240	C.C	18.3	3.4	2.0	36	0.0754	21	2987
	300	C.C	20.5	3.4	2.0	39	0.0601	21	3649
	400	C.C	23.2	3.4	2.2	43	0.0470	21	4550
3	500	C.C	26.4	3.4	2.2	46	0.0366	21	5662
	630	C.C	30.2	3.4	2.3	50	0.0283	21	7159
	35	C.C	6.9	3.4	2.3	46	0.524	21	2350
	50	C.C	8.1	3.4	2.4	49	0.387	21	2843
	70	C.C	9.8	3.4	2.5	53	0.268	21	3616
	95	C.C	11.4	3.4	2.6	57	0.193	21	4570
	120	C.C	12.9	3.4	2.7	61	0.153	21	5441
	150	C.C	14.4	3.4	2.8	65	0.124	21	6461
	185	C.C	15.9	3.4	2.9	68	0.0991	21	7710
	240	C.C	18.3	3.4	3.1	74	0.0754	21	9786
300	C.C	20.5	3.4	3.3	80	0.0601	21	11802	

Note) C.C : Compacted circular stranded type

**12/20kV Armoured Cables (12/20kV CU/XLPE/PVC/AWA/PVC, CU/XLPE/PVC/SWA/PVC)
(12/20kV TFR-CVAWAV, TFR-CVWAV)**

Rated voltage	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia.(approx.)	Insulation (nom.)	Separation Sheath (nom.)					
	mm ²	-	mm	mm	mm					
12/20kV	1 x 50	C.C	8.1	5.5	1.2	2.0	2.0	38	0.387	1654
	1 x 70	C.C	9.8	5.5	1.2	2.0	2.1	40	0.268	1952
	1 x 95	C.C	11.4	5.5	1.2	2.0	2.1	42	0.193	2290
	1 x 120	C.C	12.9	5.5	1.2	2.0	2.2	44	0.153	2617
	1 x 150	C.C	14.4	5.5	1.2	2.0	2.2	46	0.124	2969
	1 x 185	C.C	15.9	5.5	1.2	2.0	2.3	48	0.0991	3601
	1 x 240	C.C	18.3	5.5	1.2	2.0	2.4	51	0.0754	4108
	1 x 300	C.C	20.5	5.5	1.3	2.5	2.5	55	0.0601	5008
	1 x 400	C.C	23.2	5.5	1.3	2.5	2.6	58	0.0470	6011
	1 x 500	C.C	26.4	5.5	1.4	2.5	2.7	62	0.0366	7291
	1 x 630	C.C	30.2	5.5	1.5	2.5	2.8	67	0.0283	8937
	3 x 50	C.C	8.1	5.5	1.6	2.5	3.0	71	0.387	6798
	3 x 70	C.C	9.8	5.5	1.6	2.5	3.1	76	0.268	7900
	3 x 95	C.C	11.4	5.5	1.7	2.5	3.2	80	0.193	9172
	3 x 120	C.C	12.9	5.5	1.8	3.15	3.4	86	0.153	11168
	3 x 150	C.C	14.4	5.5	1.8	3.15	3.5	90	0.124	12513
	3 x 185	C.C	15.9	5.5	1.9	3.15	3.6	94	0.0991	14067
	3 x 240	C.C	18.3	5.5	2.0	3.15	3.8	100	0.0754	16679
	3 x 300	C.C	20.5	5.5	2.1	3.15	3.9	106	0.0601	19091

Note) C.C : Compacted circular stranded type

**18/30kV Non-armoured Cables (18/30kV CU/XLPE/PVC)
(18/30kV TFR-CV)**

Rated voltage	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia.(approx.)						
	mm ²	-	mm						
18/30kV	1 x 50	C.C	8.1	8.0	1.9	36	0.387	63	1320
	1 x 70	C.C	9.8	8.0	2.0	38	0.268	63	1600
	1 x 95	C.C	11.4	8.0	2.1	40	0.193	63	1930
	1 x 120	C.C	12.9	8.0	2.1	42	0.153	63	2222
	1 x 150	C.C	14.4	8.0	2.1	43	0.124	63	2547
	1 x 185	C.C	15.9	8.0	2.2	45	0.0991	63	2973
	1 x 240	C.C	18.3	8.0	2.3	48	0.0754	63	3632
	1 x 300	C.C	20.5	8.0	2.4	51	0.0601	63	4331
	1 x 400	C.C	23.2	8.0	2.5	55	0.0470	63	5277
	1 x 500	C.C	26.4	8.0	2.5	58	0.0366	63	6449
	1 x 630	C.C	30.2	8.0	2.7	63	0.0283	63	8038
	3 x 50	C.C	8.1	8.0	3.1	74	0.387	63	4724
	3 x 70	C.C	9.8	8.0	3.2	78	0.268	63	5505
	3 x 95	C.C	11.4	8.0	3.3	83	0.193	63	6653
	3 x 120	C.C	12.9	8.0	3.4	86	0.153	63	7522
	3 x 150	C.C	14.4	8.0	3.5	90	0.124	63	8615
	3 x 185	C.C	15.9	8.0	3.6	94	0.0991	63	9991
	3 x 240	C.C	18.3	8.0	3.8	101	0.0754	63	12315
	3 x 300	C.C	20.5	8.0	3.9	106	0.0601	63	14358

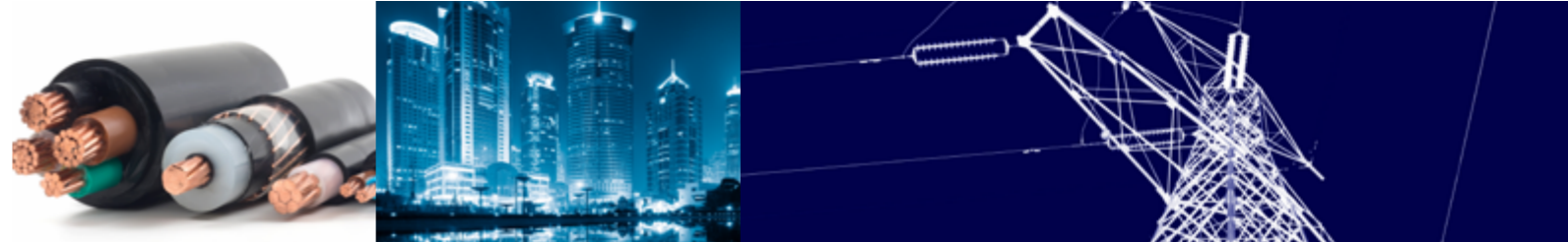
Note) C.C : Compacted circular stranded type

**18/30kV Armoured Cables (18/30kV CU/XLPE/PVC/AWA/PVC, CU/XLPE/PVC/SWA/PVC)
(18/30kV TFR-CVAWAV, TFR-CVWAV)**

Rated voltage	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia.(approx.)	Insulation (nom.)	Separation Sheath (nom.)					
	mm ²	-	mm	mm	mm					
18/30kV	1 x 50	C.C	8.1	8.0	1.2	2.0	2.2	39	0.387	1995
	1 x 70	C.C	9.8	8.0	1.2	2.0	2.2	46	0.268	2347
	1 x 95	C.C	11.4	8.0	1.2	2.0	2.3	48	0.193	2718
	1 x 120	C.C	12.9	8.0	1.2	2.0	2.4	50	0.153	3062
	1 x 150	C.C	14.4	8.0	1.3	2.5	2.4	53	0.124	3581
	1 x 185	C.C	15.9	8.0	1.3	2.5	2.5	55	0.0991	4051
	1 x 240	C.C	18.3	8.0	1.3	2.5	2.6	58	0.0754	4778
	1 x 300	C.C	20.5	8.0	1.4	2.5	2.7	61	0.0601	5566
	1 x 400	C.C	23.2	8.0	1.5	2.5	2.8	65	0.0470	6626
	1 x 500	C.C	26.4	8.0	1.5	2.5	2.9	69	0.0366	7915
	3 x 50	C.C	8.1	8.0	1.8	3.15	3.4	86	0.387	9614
	3 x 70	C.C	9.8	8.0	1.8	3.15	3.5	91	0.268	10636
	3 x 95	C.C	11.4	8.0	1.9	3.15	3.7	95	0.193	12167
	3 x 120	C.C	12.9	8.0	2.0	3.15	3.8	99	0.153	13382
	3 x 150	C.C	14.4	8.0	2.0	3.15	3.9	103	0.124	14711
	3 x 185	C.C	15.9	8.0	2.1	3.15	4.0	107	0.0991	16377
	3 x 240	C.C	18.3	8.0	2.2	3.15	4.2	114	0.0754	19217
	3 x 300	C.C	20.5	8.0	2.3	3.15	4.3	120	0.0601	21639

Note) C.C : Compacted circular stranded type

FIRE RESISTANT CABLES



0.6/1kV Fire Resistant Cables with MICA/Glass tapes (Non-armoured & Armoured Type)
(0.6/1kV TFR-8, FRT-CVAWAV, FRT-CVWAV)

0.6/1kV Fire Alarm Cable with Heat Resistant tape
(0.6/1kV TFR-3)

0.6/1kV Fire Resistant Cables with MICA/Glass tapes (Non-armoured & Armoured Type)

(0.6/1kV TFR-8, FRT-CVAWAV, FRT-CVWAV)

SCOPE
This cable is mainly used in wiring of fireplug system up to and 0.6/1kV grade.

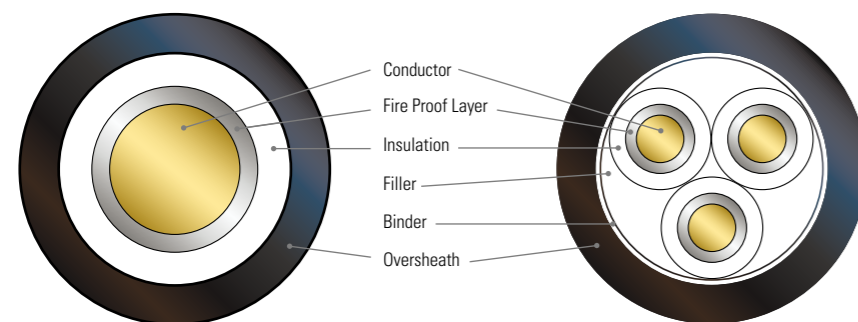
APPLICATION STANDARDS
IEC 60502-1 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 1: Cables for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3.6 kV)
IEC 60331-11 Apparatus - Fire alone at a flame temperature of at least 750°C
IEC 60332-3-24 Tests on electric cables under fire conditions - Part 3-24 : Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

MATERIALS & CONSTRUCTION
Conductor Annealed copper wires Class 2 (Circular stranded or Compacted circular stranded type)
Fire Proof Layer MICA/Glass tape(s)
Insulation XLPE (Max. operating conductor temperature, 90°C)
Inner Covering Extruded PVC (for armoured cables only)
Armour Hard-drawn aluminum round wires for single core or galvanized steel round wires for multi-cores (for armoured cables only)
Oversheath Flame retardant black PVC (FR-PVC/ST2)

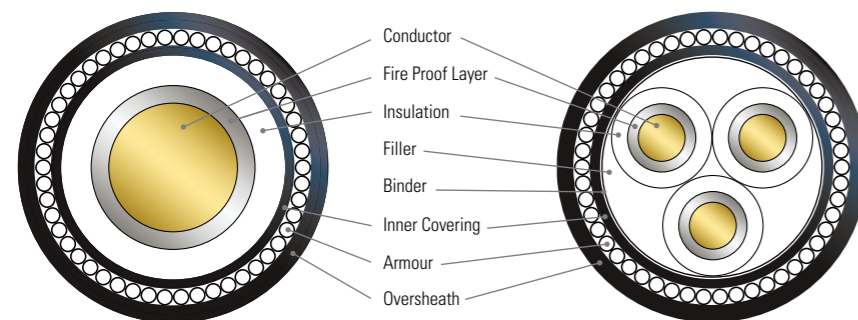
CORE IDENTIFICATION
 2cores Red and Black
 3cores Red, Yellow and Blue
 4cores Red, Yellow, Blue and Black
 Generally, the cores will be identified with a narrow colored tapes between fire proof layer and insulation.

OPTION
 Different color of core identification and oversheath
 Material of oversheath : Halogen free flame retardant polyolefin (ST8)
 Fire Resistance : 830°C/120min. in accordance with IEC 60331-1,2
 950°C/180min. (Cat. C) in accordance with BS 6387
 Flame Retardant : Cat. A or Cat. B in accordance with IEC 60332-3-22, -23
 Oil Resistance, Anti-termite, Anti-rodent, Ozone resistance

Non-armoured Type



Armoured Type



Non-armoured Type (0.6/1kV CU/MICA/XLPE/PVC) (0.6/1kV TFR-8)

Nos. of Core	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Size	Construction	Outer Dia. (approx.)						
	mm ²	Nos./mm	mm	mm	mm	mm	Ω/km	V/5min.	kg/km
1	1.5	7/0.53	1.59	0.7	1.4	8	12.1	3500	65
	2.5	7/0.67	2.01	0.7	1.4	8	7.41	3500	78
	4	7/0.85	2.55	0.7	1.4	9	4.61	3500	99
	6	7/1.04	3.12	0.7	1.4	10	3.08	3500	124
	10	7/1.35	4.05	0.7	1.4	11	1.83	3500	173
	16	C.C	4.7	0.7	1.4	11	1.15	3500	230
	25	C.C	5.9	0.9	1.4	13	0.727	3500	336
	35	C.C	6.9	0.9	1.4	14	0.524	3500	437
	50	C.C	8.1	1.0	1.4	16	0.387	3500	568
	70	C.C	9.8	1.1	1.4	18	0.268	3500	787
	95	C.C	11.4	1.1	1.5	20	0.193	3500	1063
	120	C.C	12.9	1.2	1.5	22	0.153	3500	1319
	150	C.C	14.4	1.4	1.6	24	0.124	3500	1625
	185	C.C	15.9	1.6	1.6	26	0.0991	3500	2003
	240	C.C	18.3	1.7	1.7	29	0.0754	3500	2595
	300	C.C	20.5	1.8	1.8	32	0.0601	3500	3233
	400	C.C	23.2	2.0	1.9	36	0.0470	3500	410
	500	C.C	26.4	2.2	2.0	40	0.0366	3500	5205
630	C.C	30.2	2.4	2.2	45	0.0283	3500	6700	
2	1.5	7/0.53	1.59	0.7	1.8	14	12.1	3500	162
	2.5	7/0.67	2.01	0.7	1.8	14	7.41	3500	193
	4	7/0.85	2.55	0.7	1.8	16	4.61	3500	240
	6	7/1.04	3.12	0.7	1.8	17	3.08	3500	299
	10	7/1.35	4.05	0.7	1.8	19	1.83	3500	412
	16	C.C	4.7	0.7	1.8	20	1.15	3500	540
	25	C.C	5.9	0.9	1.8	24	0.727	3500	779
	35	C.C	6.9	0.9	1.8	26	0.524	3500	999
	50	C.C	8.1	1.0	1.8	29	0.387	3500	1295
	70	C.C	9.8	1.1	1.8	33	0.268	3500	1793
	95	C.C	11.4	1.1	1.9	37	0.193	3500	2381
	120	C.C	12.9	1.2	2.0	41	0.153	3500	2959
150	C.C	14.4	1.4	2.2	46	0.124	3500	3661	
185	C.C	15.9	1.6	2.3	50	0.0991	3500	4510	
240	C.C	18.3	1.7	2.5	56	0.0754	3500	5852	
300	C.C	20.5	1.8	2.6	62	0.0601	3500	7231	

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

Nos. of Core	Conductor			Thick. of Insulation (nom.)	Thick. of Oversight (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Size	Construction	Outer Dia. (approx.)						
	mm ²	Nos./mm	mm						
3	1.5	7/0.53	1.59	0.7	1.8	14	12.1	3500	190
	2.5	7/0.67	2.01	0.7	1.8	15	7.41	3500	236
	4	7/0.85	2.55	0.7	1.8	16	4.61	3500	296
	6	7/1.04	3.12	0.7	1.8	18	3.08	3500	380
	10	7/1.35	4.05	0.7	1.8	20	1.83	3500	542
	16	C.C	4.7	0.7	1.8	22	1.15	3500	715
	25	C.C	5.9	0.9	1.8	25	0.727	3500	1046
	35	C.C	6.9	0.9	1.8	28	0.524	3500	1376
	50	C.C	8.1	1.0	1.8	31	0.387	3500	1793
	70	C.C	9.8	1.1	1.9	36	0.268	3500	2494
	95	C.C	11.4	1.1	2.0	40	0.193	3500	3316
	120	C.C	12.9	1.2	2.1	44	0.153	3500	4143
	150	C.C	14.4	1.4	2.3	49	0.124	3500	506
	185	C.C	15.9	1.6	2.4	54	0.0991	3500	6356
	240	C.C	18.3	1.7	2.6	61	0.0754	3500	8212
300	C.C	20.5	1.8	2.7	66	0.0601	3500	10253	
4	1.5	7/0.53	1.59	0.7	1.8	15	12.1	3500	230
	2.5	7/0.67	2.01	0.7	1.8	16	7.41	3500	283
	4	7/0.85	2.55	0.7	1.8	18	4.61	3500	363
	6	7/1.04	3.12	0.7	1.8	19	3.08	3500	473
	10	7/1.35	4.05	0.7	1.8	22	1.83	3500	678
	16	C.C	4.7	0.7	1.8	24	1.15	3500	915
	25	C.C	5.9	0.9	1.8	28	0.727	3500	1343
	35	C.C	6.9	0.9	1.8	30	0.524	3500	1755
	50	C.C	8.1	1.0	1.9	34	0.387	3500	2307
	70	C.C	9.8	1.1	2.0	40	0.268	3500	3239
	95	C.C	11.4	1.1	2.1	44	0.193	3500	4354
	120	C.C	12.9	1.2	2.3	49	0.153	3500	5455
	150	C.C	14.4	1.4	2.4	55	0.124	3500	6713
	185	C.C	15.9	1.6	2.6	60	0.0991	3500	8324
	240	C.C	18.3	1.7	2.8	67	0.0754	3500	10825
300	C.C	20.5	1.8	3.0	74	0.0601	3500	13496	

Note) C.C : Compacted circular stranded type

Armoured Type (0.6/1kV CU/MICA/XLPE/PVC/AWA/PVC, CU/MICA/XLPE/PVC/SWA/PVC)
(0.6/1kV FRT-CVAWAV, FRT-CVWAV)

Nos. of Core	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversight (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Conductor Size	Construction	Outer Dia. (approx.)	Insulation (nom.)	Inner Covering (approx.)					
	mm ²	Nos./mm	mm	mm	mm					
1	50	C.C	8.1	1.0	1.0	1.6	1.8	23	0.387	859
	70	C.C	9.8	1.1	1.0	1.6	1.8	25	0.268	1114
	95	C.C	11.4	1.1	1.0	1.6	1.8	27	0.193	1406
	120	C.C	12.9	1.2	1.0	1.6	1.8	29	0.153	1701
	150	C.C	14.4	1.4	1.0	1.6	1.8	31	0.124	2024
	185	C.C	15.9	1.6	1.0	1.6	1.8	33	0.0991	2436
	240	C.C	18.3	1.7	1.0	1.6	1.9	36	0.0754	3076
	300	C.C	20.5	1.8	1.0	1.6	2.0	39	0.0601	3761
	400	C.C	23.2	2.0	1.2	2.0	2.1	44	0.0470	4811
	500	C.C	26.4	2.2	1.2	2.0	2.2	50	0.0366	6148
	630	C.C	30.2	2.4	1.2	2.0	2.3	55	0.0283	7729
	1.5	7/0.53	1.59	0.7	1.0	0.8	1.8	18	12.1	411
	2.5	7/0.67	2.01	0.7	1.0	0.8	1.8	19	7.41	463
	4	7/0.85	2.55	0.7	1.0	0.8	1.8	21	4.61	533
	6	7/1.04	3.12	0.7	1.0	0.8	1.8	23	3.08	749
10	7/1.35	4.05	0.7	1.0	0.8	1.8	25	1.83	923	
16	C.C	4.7	0.7	1.0	1.6	1.8	27	1.15	1214	
25	C.C	5.9	0.9	1.0	1.6	1.8	31	0.727	1572	
35	C.C	6.9	0.9	1.0	1.6	1.8	33	0.524	1870	
50	C.C	8.1	1.0	1.0	1.6	1.8	36	0.387	2299	
70	C.C	9.8	1.1	1.0	1.6	2.0	42	0.268	3255	
95	C.C	11.4	1.1	1.2	2.0	2.1	46	0.193	4023	
120	C.C	12.9	1.2	1.2	2.0	2.2	52	0.153	5141	
150	C.C	14.4	1.4	1.2	2.0	2.3	56	0.124	6064	
185	C.C	15.9	1.6	1.4	2.5	2.5	63	0.0991	7831	
240	C.C	18.3	1.7	1.4	2.5	2.7	70	0.0754	9681	
300	C.C	20.5	1.8	1.6	2.5	2.8	76	0.0601	11500	
2	1.5	7/0.53	1.59	0.7	1.0	0.8	1.8	19	12.1	455
	2.5	7/0.67	2.01	0.7	1.0	0.8	1.8	20	7.41	520
	4	7/0.85	2.55	0.7	1.0	0.8	1.8	21	4.61	606
	6	7/1.04	3.12	0.7	1.0	0.8	1.8	24	3.08	855
	10	7/1.35	4.05	0.7	1.0	0.8	1.8	26	1.83	1079
	16	C.C	4.7	0.7	1.0	1.6	1.8	30	1.15	1568
	25	C.C	5.9	0.9	1.0	1.6	1.8	32	0.727	1897
	35	C.C	6.9	0.9	1.0	1.6	1.8	35	0.524	2306
	50	C.C	8.1	1.0	1.0	1.6	1.9	39	0.387	3087
	70	C.C	9.8	1.1	1.0	2.0	2.0	45	0.268	4034
	95	C.C	11.4	1.1	1.2	2.0	2.2	50	0.193	5383
	120	C.C	12.9	1.2	1.2	2.0	2.3	55	0.153	6473
	150	C.C	14.4	1.4	1.4	2.5	2.5	62	0.124	8387
	185	C.C	15.9	1.6	1.4	2.5	2.6	67	0.0991	9910
	240	C.C	18.3	1.7	1.4	2.5	2.8	74	0.0754	12310
300	C.C	20.5	1.8	1.6	2.5	3.0	80	0.0601	14733	

Nos. of Core	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Conductor Size	Construction	Outer Dia. (approx.)	Insulation (nom.)	Inner Covering (approx.)					
	mm ²	Nos./mm	mm	mm	mm					
4	1.5	7/0.53	1.59	0.7	1.0	0.8	1.8	20	12.1	518
	2.5	7/0.67	2.01	0.7	1.0	0.8	1.8	21	7.41	592
	4	7/0.85	2.55	0.7	1.0	0.8	1.8	23	4.61	835
	6	7/1.04	3.12	0.7	1.0	0.8	1.8	25	3.08	994
	10	7/1.35	4.05	0.7	1.0	0.8	1.8	28	1.83	1262
	16	C.C	4.7	0.7	1.0	1.6	1.8	30	1.15	1703
	25	C.C	5.9	0.9	1.0	1.6	1.8	35	0.727	2285
	35	C.C	6.9	0.9	1.0	1.6	1.9	38	0.524	2815
	50	C.C	8.1	1.0	1.0	1.6	2.0	43	0.387	3805
	70	C.C	9.8	1.1	1.2	2.0	2.2	50	0.268	5327
	95	C.C	11.4	1.1	1.2	2.0	2.3	55	0.193	6767
	120	C.C	12.9	1.2	1.4	2.5	2.5	62	0.153	8706
	150	C.C	14.4	1.4	1.4	2.5	2.6	68	0.124	10368
	185	C.C	15.9	1.6	1.4	2.5	2.8	74	0.0991	12418
	240	C.C	18.3	1.7	1.6	2.5	3.0	81	0.0754	15388
300	C.C	20.5	1.8	1.6	2.5	3.2	89	0.0601	18594	

Note) C.C : Compacted circular stranded type

0.6/1kV Fire Alarm Cable with Heat Resistant tape

(0.6/1kV TFR-3)

SCOPE

This cable is used in signaling or telecommunication under D.C 100V fire fighting equipments.

APPLICATION STANDARDS

IEC 60502-1 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 1: Cables for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3.6 kV)
IEC 60332-3-24 Tests on electric cables under fire conditions - Part 3-24 : Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

MATERIALS & CONSTRUCTION

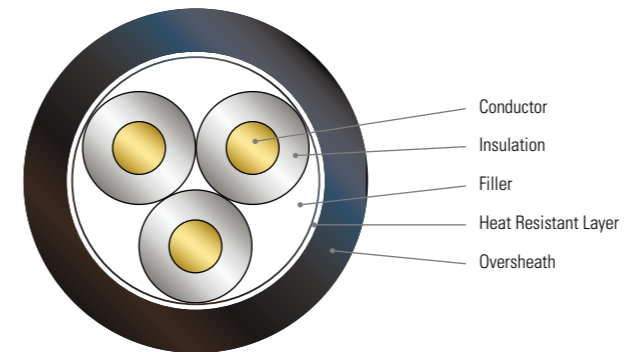
Conductor Annealed copper wires Class 1 (Solid type) or Class 2 (Circular stranded type)
Insulation XLPE (Max. operating conductor temperature, 90°C)
Heat Resistant Layer Heat resistant tape
Oversheath Flame retardant black PVC (FR-PVC/ST2)

CORE IDENTIFICATION

2cores Red and Black
 3cores Red, Yellow and Blue
 4cores Red, Yellow, Blue and Black
 5cores and above Numbering on black colored insulation
 Generally, the cores will be identified with a narrow colored tapes between conductor and insulation.

OPTION

Different color of core identification and oversheath
 Material of oversheath : Halogen free flame retardant polyolefin (ST8)
 Flame Retardant : Cat. A or Cat. B in accordance with IEC 60332-3-22, -23
 Oil Resistance, Anti-termite, Anti-rodent, Ozone resistance



0.6/1kV CU/XLPE/HT/PVC
(0.6/1kV TFR-3)

Nos. of Core	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Size	CLASSES	Outer Dia.(approx.)						
	mm ²	-	mm						
2	1.5	CLASS 1	1.38	0.7	1.8	11	12.1	3500	125
	2.5	CLASS 1	1.78	0.7	1.8	12	7.41	3500	157
	4	CLASS 1	2.25	0.7	1.8	13	4.61	3500	200
	1.5	CLASS 2	1.59	0.7	1.8	12	12.1	3500	136
	2.5	CLASS 2	2.01	0.7	1.8	13	7.41	3500	164
	4	CLASS 2	2.55	0.7	1.8	14	4.61	3500	213
3	1.5	CLASS 1	1.38	0.7	1.8	12	12.1	3500	147
	2.5	CLASS 1	1.78	0.7	1.8	13	7.41	3500	187
	4	CLASS 1	2.25	0.7	1.8	14	4.61	3500	247
	1.5	CLASS 2	1.59	0.7	1.8	12	12.1	3500	156
	2.5	CLASS 2	2.01	0.7	1.8	13	7.41	3500	200
	4	CLASS 2	2.55	0.7	1.8	15	4.61	3500	260
4	1.5	CLASS 1	1.38	0.7	1.8	13	12.1	3500	177
	2.5	CLASS 1	1.78	0.7	1.8	14	7.41	3500	228
	4	CLASS 1	2.25	0.7	1.8	15	4.61	3500	299
	1.5	CLASS 2	1.59	0.7	1.8	13	12.1	3500	188
	2.5	CLASS 2	2.01	0.7	1.8	14	7.41	3500	238
	4	CLASS 2	2.55	0.7	1.8	16	4.61	3500	322
5	1.5	CLASS 1	1.38	0.7	1.8	14	12.1	3500	206
	2.5	CLASS 1	1.78	0.7	1.8	15	7.41	3500	268
	4	CLASS 1	2.25	0.7	1.8	16	4.61	3500	358
	1.5	CLASS 2	1.59	0.7	1.8	14	12.1	3500	219
	2.5	CLASS 2	2.01	0.7	1.8	16	7.41	3500	282
	4	CLASS 2	2.55	0.7	1.8	17	4.61	3500	377
6	1.5	CLASS 1	1.38	0.7	1.8	15	12.1	3500	236
	2.5	CLASS 1	1.78	0.7	1.8	16	7.41	3500	312
	4	CLASS 1	2.25	0.7	1.8	18	4.61	3500	418
	1.5	CLASS 2	1.59	0.7	1.8	15	12.1	3500	251
	2.5	CLASS 2	2.01	0.7	1.8	17	7.41	3500	326
	4	CLASS 2	2.55	0.7	1.8	19	4.61	3500	441
7	1.5	CLASS 1	1.38	0.7	1.8	15	12.1	3500	252
	2.5	CLASS 1	1.78	0.7	1.8	16	7.41	3500	336
	4	CLASS 1	2.25	0.7	1.8	18	4.61	3500	456
	1.5	CLASS 2	1.59	0.7	1.8	15	12.1	3500	269
	2.5	CLASS 2	2.01	0.7	1.8	17	7.41	3500	352
	4	CLASS 2	2.55	0.7	1.8	19	4.61	3500	480
8	1.5	CLASS 1	1.38	0.7	1.8	16	12.1	3500	281
	2.5	CLASS 1	1.78	0.7	1.8	17	7.41	3500	380
	4	CLASS 1	2.25	0.7	1.8	19	4.61	3500	518
	1.5	CLASS 2	1.59	0.7	1.8	16	12.1	3500	286
	2.5	CLASS 2	2.01	0.7	1.8	18	7.41	3500	398
	4	CLASS 2	2.55	0.7	1.8	20	4.61	3500	545

Nos. of Core	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Size	CLASSES	Outer Dia.(approx.)						
	mm ²	-	mm						
10	1.5	CLASS 1	1.38	0.7	1.8	18	12.1	3500	338
	2.5	CLASS 1	1.78	0.7	1.8	19	7.41	3500	459
	4	CLASS 1	2.25	0.7	1.8	21	4.61	3500	630
	1.5	CLASS 2	1.59	0.7	1.8	18	12.1	3500	361
	2.5	CLASS 2	2.01	0.7	1.8	20	7.41	3500	481
	4	CLASS 2	2.55	0.7	1.8	23	4.61	3500	666
12	1.5	CLASS 1	1.38	0.7	1.8	18	12.1	3500	376
	2.5	CLASS 1	1.78	0.7	1.8	19	7.41	3500	518
	4	CLASS 1	2.25	0.7	1.8	22	4.61	3500	721
	1.5	CLASS 2	1.59	0.7	1.8	19	12.1	3500	403
	2.5	CLASS 2	2.01	0.7	1.8	21	7.41	3500	540
	4	CLASS 2	2.55	0.7	1.8	24	4.61	3500	759
15	1.5	CLASS 1	1.38	0.7	1.8	20	12.1	3500	448
	2.5	CLASS 1	1.78	0.7	1.8	22	7.41	3500	617
	4	CLASS 1	2.25	0.7	1.8	24	4.61	3500	865
	1.5	CLASS 2	1.59	0.7	1.8	21	12.1	3500	480
	2.5	CLASS 2	2.01	0.7	1.8	23	7.41	3500	649
	4	CLASS 2	2.55	0.7	1.8	25	4.61	3500	908
20	1.5	CLASS 1	1.38	0.7	1.8	22	12.1	3500	564
	2.5	CLASS 1	1.78	0.7	1.8	24	7.41	3500	792
	4	CLASS 1	2.25	0.7	1.8	27	4.61	3500	1120
	1.5	CLASS 2	1.59	0.7	1.8	23	12.1	3500	608
	2.5	CLASS 2	2.01	0.7	1.8	26	7.41	3500	830
	4	CLASS 2	2.55	0.7	1.8	29	4.61	3500	1180
30	1.5	CLASS 1	1.38	0.7	1.8	25	12.1	3500	786
	2.5	CLASS 1	1.78	0.7	1.8	28	7.41	3500	1119
	4	CLASS 1	2.25	0.7	1.8	32	4.61	3500	1601
	1.5	CLASS 2	1.59	0.7	1.8	27	12.1	3500	845
	2.5	CLASS 2	2.01	0.7	1.8	30	7.41	3500	1172
	4	CLASS 2	2.55	0.7	1.8	34	4.61	3500	1684

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

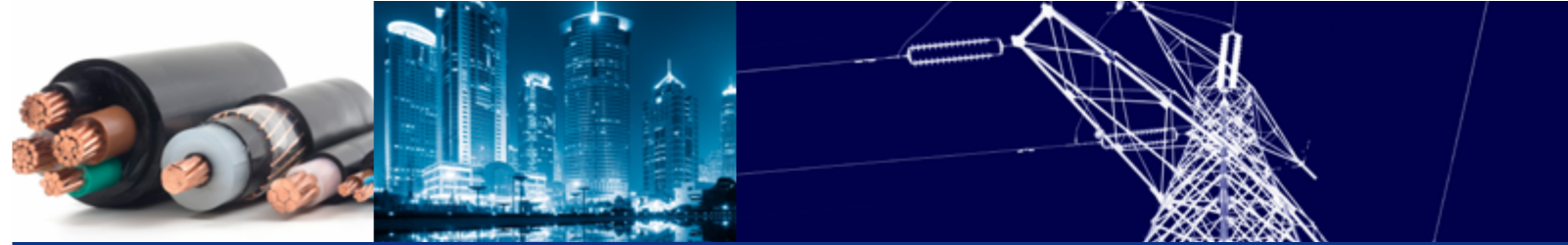
FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

BARE CONDUCTORS



Hard-Drawn Copper Stranded Wire for Electrical Purposes (Korean Standard)
Annealed Copper Stranded Wires for Electrical Purposes (Korean Standard & IEC)

Hard-Drawn Copper Stranded Wire (Korean Standard)

APPLICATION STANDARDS

KS C 3104 Hard-drawn copper stranded conductors

H (Hard-drawn copper stranded wires)

Size	Conductor		Min. of tensile force	Reference		
	Construction	Outer Dia.(approx.)		Calculated Sectional Area (approx.)	Max. D.C Conductor Resistance (20°C)	Net Weight (approx.)
mm ²	No./mm	kgf (N)	mm	mm	Ω/km	kg/km
1.4	7/0.5	58 (362.85)	1.5	1.375	13.2	12.37
2.0	7/0.6	83 (813.79)	1.8	1.979	9.18	17.80
3.5	7/0.8	146 (1431.8)	2.4	3.519	5.17	31.66
5.5	7/1.0	227 (2226.1)	3.0	5.498	3.31	49.46
8	7/1.2	326 (3197.0)	3.6	7.917	2.30	71.19
14	7/1.6	574 (5629.0)	4.8	14.08	1.29	126.7
22	7/2.0	888 (8708.3)	6.0	21.99	0.818	197.9
30	7/2.3	1170 (11474)	6.9	29.09	0.618	261.7
38	7/2.6	1480 (14514)	7.8	37.16	0.484	334.4
50	19/1.8	1970 (19319)	9.0	48.36	0.376	435.1
60	19/2.0	2410 (23634)	10.0	59.70	0.301	537.0
80	19/2.3	3160 (30989)	11.5	78.95	0.228	710.3
100	19/2.6	4020 (39423)	13.0	100.9	0.178	907.6
125	19/2.9	4960 (48641)	14.5	125.5	0.143	1129
150	37/2.3	6160 (60409)	16.1	153.7	0.118	1390
200	37/2.6	7830 (76786)	18.2	196.4	0.0920	1776
250	61/2.3	10200 (100030)	20.7	253.5	0.0715	2298
325	61/2.6	12900 (126510)	23.4	323.8	0.0560	2937
400	61/2.9	15900 (155930)	26.1	402.9	0.0450	3654
500	61/3.2	19300 (189270)	28.8	490.6	0.0370	4448

PH (Hard-drawn copper stranded wires) for Overhead Transmission Purpose)

Size	Conductor		Min. of tensile force	Reference		
	Construction	Outer Dia.(approx.)		Calculated Sectional Area (approx.)	Max. D.C Conductor Resistance (20°C)	Net Weight (approx.)
mm ²	No./mm	kgf (N)	mm	mm	Ω/km	kg/km
22	7/2.0	888 (8708.3)	6.0	21.99	0.818	197.9
30	7/2.3	1170 (11474)	6.9	29.09	0.618	261.7
38	7/2.6	1480 (14514)	7.8	37.16	0.484	334.4
45	7/2.9	1830 (17946)	8.7	46.24	0.389	416.0
55	7/3.2	2210 (21673)	9.6	56.29	0.320	506.4
75	7/3.7	2910 (28537)	11.1	75.25	0.239	677.0
100	7/4.3	3880 (38050)	12.9	101.6	0.177	914.5
125	19/2.9	4960 (48641)	14.5	125.5	0.143	1129
150	19/3.2	6000 (58840)	16.0	152.8	0.118	1375
180	19/3.5	7130 (69921)	17.5	182.8	0.0984	1645
200	19/3.7	7900 (77473)	18.5	204.3	0.0880	1838
240	19/4.0	9180 (90025)	20.0	238.8	0.0753	2148

Annealed Copper Stranded Wires (Korean Standard)

APPLICATION STANDARDS

KS C 3103 Annealed copper stranded wires for electrical purposes

AS (Annealed copper stranded wires)

Size	Conductor		Min. of tensile force	Reference		
	Construction	Outer Dia.(approx.)		Calculated Sectional Area (approx.)	Max. D.C Conductor Resistance (20°C)	Net Weight (approx.)
mm ²	No./mm	kgf (N)	mm	mm	Ω/km	kg/km
0.9	7/0.4	58 (362.85)	1.2	0.8799	20.0	7.913
1.25	7/0.45	83 (813.79)	1.35	1.113	15.8	10.02
1.4	7/0.5	146 (1431.8)	1.5	1.375	12.7	12.37
2.0	7/0.6	227 (2226.1)	1.8	1.979	8.82	17.80
3.5	7/0.8	326 (3197.0)	2.4	3.519	4.96	31.66
5.5	7/1.0	574 (5629.0)	3.0	5.498	3.17	49.46
8	7/1.2	888 (8708.3)	3.6	7.917	2.20	71.19
14	7/1.6	1480 (14514)	4.8	14.08	1.24	126.7
22	7/2.0	2410 (23634)	6.0	21.99	0.793	197.9
30	7/2.3	3160 (30989)	6.9	29.09	0.600	261.7
38	7/2.6	4020 (39423)	7.8	37.16	0.470	334.4
50	19/1.8	4960 (48641)	9.0	48.36	0.261	435.1
60	19/2.0	6160 (60409)	10.0	59.70	0.292	537.0
80	19/2.3	7830 (76786)	11.5	78.95	0.221	710.3
100	19/2.6	10200 (100030)	13.0	100.9	0.173	907.3
125	19/2.9	12900 (126510)	14.5	125.5	0.139	1129
150	37/2.3	15900 (155930)	16.1	153.7	0.114	1390
200	37/2.6	19300 (189270)	18.2	196.4	0.0893	1776
250	61/2.3	2410 (23634)	20.7	253.5	0.0694	2298
325	61/2.6	3160 (30989)	23.4	353.8	0.0543	2937
400	61/2.9	4020 (39423)	26.1	402.9	0.0136	3654
500	61/3.2	4960 (48641)	28.8	490.6	0.0359	4448

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

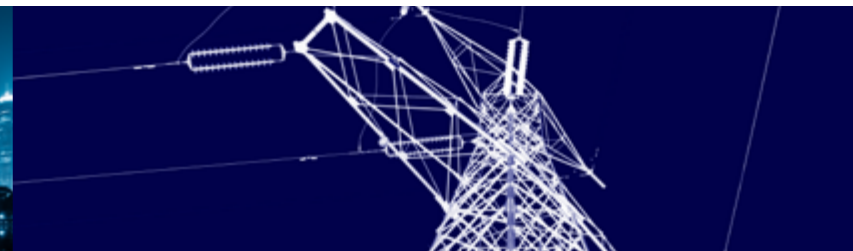
Annealed Copper Stranded Wires (IEC)

APPLICATION STANDARDS

IEC 60228 Conductors of insulated cables

Size	Conductor				Max. D.C. Conductor Resistance (20°C)	Reference	
	Un-compacted		Compacted			Un-compacted	Compacted
	Construction	Outer Dia. (approx.)	No. of Wires	Outer Dia. (approx.)		Net Weight (approx.)	
mm ²	No./mm	mm	EA	mm	Ω/km	kg/km	kg/km
1.5	7/0.53	1.59	-	-	12.1	14	-
2.5	7/0.67	2.01	-	-	7.41	22	-
4	7/0.85	2.55	-	-	4.61	35	-
6	7/1.04	3.12	-	-	3.08	53	-
10	7/1.35	4.05	-	-	1.83	90	-
16	7/1.70	5.10	7	4.7	1.15	140	138
25	7/2.14	6.42	7	5.9	0.727	225	218
35	7/2.52	7.56	7	6.9	0.524	310	302
50	19/1.78	8.90	7	8.1	0.387	420	409
70	19/2.14	10.70	19	9.8	0.268	610	593
95	19/2.52	12.60	19	11.4	0.193	850	823
120	37/2.03	14.21	19	12.9	0.153	1070	1038
150	37/2.25	15.75	19	14.4	0.124	1300	1287
185	37/2.52	17.64	19	15.9	0.0991	1650	1610
240	61/2.25	20.25	19	18.3	0.0754	2200	2115
300	61/2.52	22.68	61	20.5	0.0601	2700	2667
400	61/2.85	25.65	61	23.2	0.0470	3500	3410
500	61/3.20	28.60	61	26.4	0.0366	4400	4379

MV URD CABLES (UNDERGROUND RESIDENTIAL DISTRIBUTION)



15kV to 35kV Cables

MV URD Cables (15kV to 35kV)

SCOPE

These cables are used in dry or wet locations for urban underground distribution systems of single or three phase medium voltage power.

APPLICATION STANDARDS

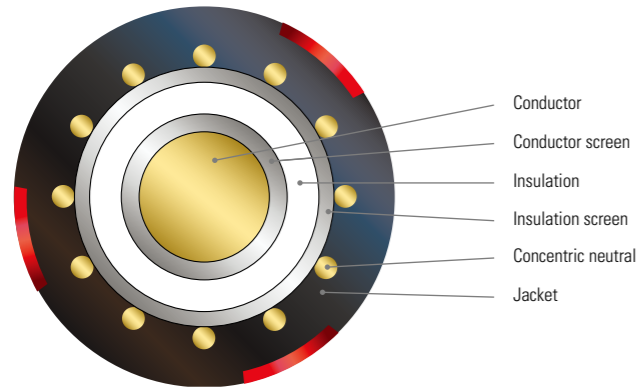
ICEA S-94-649 Standard for concentric neutral cables rated 5 through 46kV
 UL 1072 Medium-Voltage power cables

MATERIALS & CONSTRUCTION

- Conductor** Compacted or compressed concentric lay stranded 1350 aluminum or annealed copper wires with swelling tape for impediment to longitudinal water penetration
- Insulation** Triple extruded inner semi conductive layer-Tree retardant Cross linked Polyethylene (TRXLPE)
- Concentric neutral** Helically applied, annealed, solid bare copper wires
- Jacket** Black, non-conducting, sunlight-resistant, Linear Low-Density Polyethylene (LLDPE) extruded to fill spaces between neutral wires

OPTION

Red strip on jacket



15kV Al Conductor, 100% Insulation level

Nominal Cross Sectional Area	Conductor		Thickness					Diameter				*) Ampacity		
	Shape	Overall diameter (Approx.)	Conductor screen thickness (Min.)	Insulation thickness (Nom.)	Insulation screen thickness (Min./Max.)	Concentric neutral conductor	Jacket thickness (Min./Max.)	Insulation overall diameter		Insulation screen overall diameter		Completed cable diameter (Approx.)	Direct Buried	In Conduit in Air
								Min.	Max.	Min.	Max.			
AWG or kcmil	-	Inch	mils	mils	mils	No./AWG	mils	Inch		Inch		Inch	A	A
Full neutral														
1/0	Compacted	0.336	12	175	30 / 60	16 / 14	45 / 80	0.690	0.775	0.750	0.875	1.299	241	144
2/0	Compacted	0.376	12	175	30 / 60	20 / 14	45 / 80	0.730	0.815	0.790	0.915	1.346	272	163
3/0	Compacted	0.423	12	175	30 / 60	16 / 12	45 / 80	0.775	0.860	0.835	0.960	1.433	304	185
4/0	Compacted	0.475	12	175	30 / 60	20 / 12	45 / 80	0.830	0.910	0.890	1.010	1.496	339	210
One-third neutral														
1/0	Compacted	0.336	12	175	30 / 60	9 / 16	45 / 80	0.690	0.775	0.750	0.875	1.268	246	144
2/0	Compacted	0.376	12	175	30 / 60	11 / 16	45 / 80	0.730	0.815	0.790	0.915	1.315	279	164
3/0	Compacted	0.423	12	175	30 / 60	14 / 16	45 / 80	0.775	0.860	0.835	0.960	1.366	315	187
4/0	Compacted	0.475	12	175	30 / 60	17 / 16	45 / 80	0.830	0.910	0.890	1.010	1.429	355	213
250	Compacted	0.520	16	175	30 / 60	20 / 16	45 / 80	0.880	0.965	0.940	1.065	1.476	383	233
350	Compacted	0.616	16	175	30 / 60	18 / 14	45 / 80	0.980	1.065	1.040	1.165	1.614	446	281
500	Compacted	0.736	16	175	40 / 75	16 / 12	45 / 80	1.100	1.185	1.180	1.305	1.815	513	349
750	Compacted	0.908	20	175	40 / 75	24 / 12	70 / 120	1.280	1.365	1.360	1.485	2.087	575	425
1000	Compacted	1.060	20	175	40 / 75	31 / 12	70 / 120	1.430	1.515	1.510	1.635	2.256	645	495

*) Ampacity based on the condition as follows in accordance with IEEE 835, and for specific ampacities based on another installation conditions refer to tables in IEEE 835.
 1) Direct buried in single circuit with 3 cables-spaced : 25°C earth ambient temperature, earth thermal resistivity of 90°C-cm/w, 90°C conductor temperature and 75% load factor
 2) In conduit in air - triplexed: 40°C air ambient temperature, no sun, 90°C conductor temperature and 75% load factor

15kV Al Conductor, 133% Insulation level

Nominal Cross Sectional Area	Conductor		Thickness					Diameter				*) Ampacity		
	Shape	Overall diameter (Approx.)	Conductor screen thickness (Min.)	Insulation thickness (Nom.)	Insulation screen thickness (Min./Max.)	Concentric neutral conductor	Jacket thickness (Min./Max.)	Insulation overall diameter		Insulation screen overall diameter		Completed cable diameter (Approx.)	Direct Buried	In Conduit in Air
								Min.	Max.	Min.	Max.			
AWG or kcmil	-	Inch	mils	mils	mils	No./AWG	mils	Inch		Inch		Inch	A	A
Full neutral														
1/0	Compacted	0.336	12	220	30 / 60	16 / 14	45 / 80	0.780	0.865	0.840	0.965	1.398	241	144
2/0	Compacted	0.376	12	220	30 / 60	20 / 14	45 / 80	0.820	0.905	0.880	1.005	1.449	272	163
3/0	Compacted	0.423	12	220	30 / 60	16 / 12	45 / 80	0.865	0.955	0.925	1.055	1.535	304	185
4/0	Compacted	0.475	12	220	30 / 60	20 / 12	45 / 80	0.920	1.005	0.980	1.105	1.594	339	210
One-third neutral														
1/0	Compacted	0.336	12	220	30 / 60	9 / 16	45 / 80	0.780	0.865	0.840	0.965	1.370	246	144
2/0	Compacted	0.376	12	220	30 / 60	11 / 16	45 / 80	0.820	0.905	0.880	1.005	1.417	279	164
3/0	Compacted	0.423	12	220	30 / 60	14 / 16	45 / 80	0.865	0.955	0.925	1.055	1.465	315	187
4/0	Compacted	0.475	12	220	30 / 60	17 / 16	45 / 80	0.920	1.005	0.980	1.105	1.528	355	213
250	Compacted	0.520	16	220	30 / 60	20 / 16	45 / 80	0.970	1.060	1.030	1.160	1.579	383	233
350	Compacted	0.616	16	220	40 / 75	18 / 14	45 / 80	1.070	1.155	1.150	1.275	1.740	446	281
500	Compacted	0.736	16	220	40 / 75	16 / 12	70 / 120	1.190	1.275	1.270	1.395	1.984	513	349
750	Compacted	0.908	20	220	40 / 75	24 / 12	70 / 120	1.370	1.460	1.450	1.580	2.189	575	425
1000	Compacted	1.060	20	220	55 / 90	31 / 12	70 / 120	1.520	1.610	1.630	1.760	2.370	645	495

*) Ampacity based on the condition as follows in accordance with IEEE 835, and for specific ampacities based on another installation conditions refer to tables in IEEE 835.
 1) Direct buried in single circuit with 3 cables-spaced : 25°C earth ambient temperature, earth thermal resistivity of 90°C-cm/w, 90°C conductor temperature and 75% load factor
 2) In conduit in air - triplexed: 40°C air ambient temperature, no sun, 90°C conductor temperature and 75% load factor

25kV AI Conductor, 100% Insulation level

Table with columns: Nominal Cross Sectional Area, Conductor (Shape, Overall diameter, Conductor screen thickness, Insulation thickness, Insulation screen thickness, Concentric neutral conductor, Jacket thickness), Diameter (Insulation overall diameter, Insulation screen overall diameter, Completed cable diameter), and Ampacity (Direct Buried, In Conduit in Air). Rows include Full neutral (1/0 to 4/0) and One-third neutral (1/0 to 1000).

*) Ampacity based on the condition as follows in accordance with IEEE 835, and for specific ampacities based on another installation conditions refer to tables in IEEE 835.
1) Direct buried in single circuit with 3 cables-spaced : 25°C earth ambient temperature, earth thermal resistivity of 90°C-cm/w, 90°C conductor temperature and 75% load factor
2) In conduit in air - triplexed: 40°C air ambient temperature, no sun, 90°C conductor temperature and 75% load factor

35kV AI Conductor, 100% Insulation level

Table with columns: Nominal Cross Sectional Area, Conductor (Shape, Overall diameter, Conductor screen thickness, Insulation thickness, Insulation screen thickness, Concentric neutral conductor, Jacket thickness), Diameter (Insulation overall diameter, Insulation screen overall diameter, Completed cable diameter), and Ampacity (Direct Buried, In Conduit in Air). Rows include Full neutral (1/0 to 4/0) and One-third neutral (1/0 to 1000).

*) Ampacity based on the condition as follows in accordance with IEEE 835, and for specific ampacities based on another installation conditions refer to tables in IEEE 835.
1) Direct buried in single circuit with 3 cables-spaced : 25°C earth ambient temperature, earth thermal resistivity of 90°C-cm/w, 90°C conductor temperature and 75% load factor
2) In conduit in air - triplexed: 40°C air ambient temperature, no sun, 90°C conductor temperature and 75% load factor

25kV AI Conductor, 133% Insulation level

Table with columns: Nominal Cross Sectional Area, Conductor (Shape, Overall diameter, Conductor screen thickness, Insulation thickness, Insulation screen thickness, Concentric neutral conductor, Jacket thickness), Diameter (Insulation overall diameter, Insulation screen overall diameter, Completed cable diameter), and Ampacity (Direct Buried, In Conduit in Air). Rows include Full neutral (1/0 to 4/0) and One-third neutral (1/0 to 1000).

*) Ampacity based on the condition as follows in accordance with IEEE 835, and for specific ampacities based on another installation conditions refer to tables in IEEE 835.
1) Direct buried in single circuit with 3 cables-spaced : 25°C earth ambient temperature, earth thermal resistivity of 90°C-cm/w, 90°C conductor temperature and 75% load factor
2) In conduit in air - triplexed: 40°C air ambient temperature, no sun, 90°C conductor temperature and 75% load factor

35kV AI Conductor, 133% Insulation level

Table with columns: Nominal Cross Sectional Area, Conductor (Shape, Overall diameter, Conductor screen thickness, Insulation thickness, Insulation screen thickness, Concentric neutral conductor, Jacket thickness), Diameter (Insulation overall diameter, Insulation screen overall diameter, Completed cable diameter), and Ampacity (Direct Buried, In Conduit in Air). Rows include Full neutral (1/0 to 4/0) and One-third neutral (1/0 to 1000).

*) Ampacity based on the condition as follows in accordance with IEEE 835, and for specific ampacities based on another installation conditions refer to tables in IEEE 835.
1) Direct buried in single circuit with 3 cables-spaced : 25°C earth ambient temperature, earth thermal resistivity of 90°C-cm/w, 90°C conductor temperature and 75% load factor
2) In conduit in air - triplexed: 40°C air ambient temperature, no sun, 90°C conductor temperature and 75% load factor

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

35kV Cu Conductor, 100% Insulation level

Nominal Cross Sectional Area	Conductor		Thickness					Diameter				*) Ampacity		
	Shape	Overall diameter (Approx.)	Conductor screen thickness (Min.)	Insulation thickness (Nom.)	Insulation screen thickness (Min./Max.)	Concentric neutral conductor	Jacket thickness (Min./Max.)	Insulation overall diameter		Insulation screen overall diameter		Completed cable diameter (Approx.)	Direct Buried	In Conduit in Air
								Min.	Max.	Min.	Max.			
AWG or kcmil	-	Inch	mils	mils	mils	No./AWG	mils	Inch	Inch	Inch	Inch	A	A	
Full neutral														
1/0	Compacted	0.336	12	345	40 / 75	16 / 12	45 / 80	1.020	1.120	1.100	1.240	1.744	290	186
2/0	Compacted	0.376	12	345	40 / 75	20 / 12	45 / 80	1.060	1.160	1.140	1.280	1.791	325	216
3/0	Compacted	0.423	12	345	40 / 75	25 / 12	45 / 80	1.105	1.205	1.185	1.325	1.843	362	244
4/0	Compacted	0.475	12	345	40 / 75	32 / 12	45 / 80	1.160	1.260	1.240	1.380	1.906	401	274
One-third neutral														
1/0	Compacted	0.336	12	345	40 / 75	14 / 16	45 / 80	1.020	1.120	1.100	1.240	1.677	298	188
2/0	Compacted	0.376	12	345	40 / 75	18 / 16	45 / 80	1.060	1.160	1.140	1.280	1.724	337	219
3/0	Compacted	0.423	12	345	40 / 75	14 / 14	45 / 80	1.105	1.205	1.185	1.325	1.803	378	248
4/0	Compacted	0.475	12	345	40 / 75	18 / 14	45 / 80	1.160	1.260	1.240	1.380	1.866	422	281
250	Compacted	0.520	16	345	40 / 75	21 / 14	45 / 80	1.210	1.315	1.290	1.435	1.984	447	306
350	Compacted	0.616	16	345	40 / 75	18 / 12	70 / 120	1.310	1.410	1.390	1.530	2.126	509	362
500	Compacted	0.736	16	345	40 / 75	26 / 12	70 / 120	1.430	1.530	1.510	1.650	2.264	570	426
750	Compacted	0.908	20	345	55 / 90	25 / 10	70 / 120	1.610	1.710	1.720	1.860	2.531	642	508
1000	Compacted	1.060	20	345	55 / 90	32 / 10	70 / 120	1.760	1.865	1.870	2.015	2.701	690	566

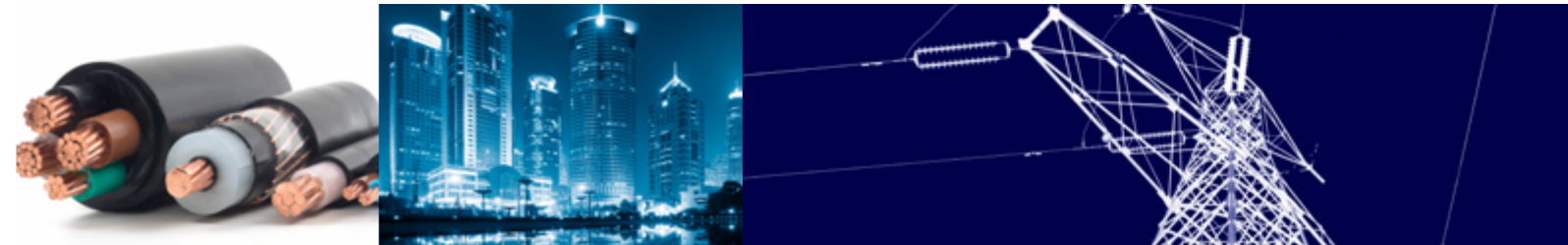
*) Ampacity based on the condition as follows in accordance with IEEE 835, and for specific ampacities based on another installation conditions refer to tables in IEEE 835.
 1) Direct buried in single circuit with 3 cables-spaced : 25°C earth ambient temperature, earth thermal resistivity of 90°C-cm/w, 90°C conductor temperature and 75% load factor
 2) In conduit in air - triplexed: 40°C air ambient temperature, no sun, 90°C conductor temperature and 75% load factor

35kV Cu Conductor, 133% Insulation level

Nominal Cross Sectional Area	Conductor		Thickness					Diameter				*) Ampacity		
	Shape	Overall diameter (Approx.)	Conductor screen thickness (Min.)	Insulation thickness (Nom.)	Insulation screen thickness (Min./Max.)	Concentric neutral conductor	Jacket thickness (Min./Max.)	Insulation overall diameter		Insulation screen overall diameter		Completed cable diameter (Approx.)	Direct Buried	In Conduit in Air
								Min.	Max.	Min.	Max.			
AWG or kcmil	-	Inch	mils	mils	mils	No./AWG	mils	Inch	Inch	Inch	Inch	A	A	
Full neutral														
1/0	Compacted	0.336	12	420	30 / 60	16 / 12	45 / 80	1.160	1.265	1.240	1.385	1.913	290	186
2/0	Compacted	0.376	12	420	30 / 60	20 / 12	45 / 80	1.200	1.305	1.280	1.425	2.031	325	216
3/0	Compacted	0.423	12	420	30 / 60	25 / 12	70 / 120	1.245	1.355	1.325	1.475	2.079	362	244
4/0	Compacted	0.475	12	420	30 / 60	32 / 12	70 / 120	1.300	1.405	1.380	1.525	2.142	401	274
One-third neutral														
1/0	Compacted	0.336	12	420	40 / 75	14 / 16	45 / 80	1.160	1.265	1.240	1.385	1.846	298	188
2/0	Compacted	0.376	12	420	40 / 75	18 / 16	45 / 80	1.200	1.305	1.280	1.425	1.894	337	219
3/0	Compacted	0.423	12	420	40 / 75	14 / 14	45 / 80	1.245	1.355	1.325	1.475	2.039	378	248
4/0	Compacted	0.475	12	420	40 / 75	18 / 14	70 / 120	1.300	1.405	1.380	1.525	2.102	422	281
250	Compacted	0.520	16	420	40 / 75	21 / 14	70 / 120	1.350	1.460	1.430	1.580	2.154	447	306
350	Compacted	0.616	16	420	40 / 75	18 / 12	70 / 120	1.450	1.555	1.530	1.675	2.295	509	362
500	Compacted	0.736	16	420	55 / 90	26 / 12	70 / 120	1.570	1.675	1.680	1.825	2.449	570	426
750	Compacted	0.908	20	420	55 / 90	25 / 10	70 / 120	1.750	1.860	1.860	2.010	2.701	642	508
1000	Compacted	1.060	20	420	55 / 90	32 / 10	70 / 120	1.900	2.010	2.010	2.160	2.870	690	566

*) Ampacity based on the condition as follows in accordance with IEEE 835, and for specific ampacities based on another installation conditions refer to tables in IEEE 835.
 1) Direct buried in single circuit with 3 cables-spaced : 25°C earth ambient temperature, earth thermal resistivity of 90°C-cm/w, 90°C conductor temperature and 75% load factor
 2) In conduit in air - triplexed: 40°C air ambient temperature, no sun, 90°C conductor temperature and 75% load factor

TECHNICAL DATA



PHYSICAL CHARACTERISTICS OF INSULATING MATERIALS
 ELECTRICAL CHARACTERISTICS OF INSULATING MATERIALS
 HEAT CHARACTERISTICS OF INSULATING MATERIALS
 CURRENT CARRYING CAPACITY
 SHORT CIRCUIT CURRENT RATING
 HANDLING AND INSTALLATION OF XLPE CABLES

(1) PHYSICAL CHARACTERISTICS OF INSULATING MATERIALS

The physical characteristics of various kinds of insulating materials are shown in TABLE 1.

TABLE 1. PHYSICAL CHARACTERISTICS OF INSULATING MATERIALS

Materials	Common Designation	Tensile Strength psi	Elongation %	Specific Gravity	Abrasion Resist.	Cut through Resist.
PolyVinyl Chloride	PVC	2,400	260	1.2-1.5	poor	poor
Polyethylene	PE	1,400	300	0.92	poor	poor
Cross-Linked Polyethylene	XLPE	3,000	120	1.2	fair	fair
Poly Tetra Fluoro Ethylene	TFE	3,000	150	2.15	fair	fair
Fluorinated Ethylene 30-Propylene	FEP	3,000	150	2.15	poor	poor
Ethylene TetraFluoroEthylene	Tefzel(ETFE)	6,000	150	1.7	good	good
PolyVinylidene Fluoride	Kynar	7,100	300	1.76	good	good
Silicone Rubber	Silicone	800-1,800	100-800	1.15-1.38	fair	poor
Polychloroprene Rubber	Neoprene	150-4,000	60-700	1.23	good	good
Butyl Rubber	Butyl	700-1,500	500-700	0.92	fair	fair
Ethylene Propylene Diene Terpolmer	EPDM	1,200-1,700	300	0.86-0.87	fair	fair
Fluorocarbon Rubber	Viton	2,400	350	1.4-1.95	fair	fair
Polyurethane	Urethane	5,000-8,000	100-600	1.24-1.26	good	good
Polyamide	Nylon	4,000-7,000	300-600	1.1	good	good
Polyimide Film	Kapton	18,000	707	1.42	excellent	excellent
Polyester Film	Mylar	1,3000	185	1.39	excellent	excellent
Polyalkene	-	2,000-7,000	200-300	1.76	good	good

(2) ELECTRICAL CHARACTERISTICS OF INSULATING MATERIALS

The electrical characteristics of several kinds of insulating materials are shown in TABLE 2.

TABLE 2. ELECTRICAL CHARACTERISTICS OF INSULATING MATERIALS

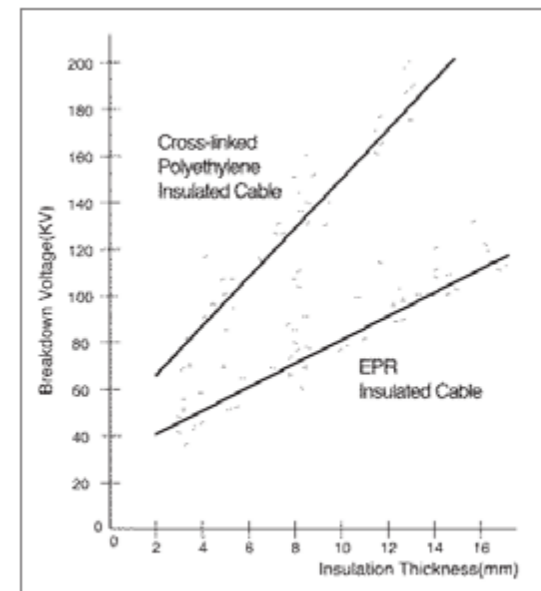
Materials	Common Designation	Dielectric Strength volts/mil	Dielectric Constant 10 ³ Hz	Loss Factor 10 ³ Hz	Volume Resistivity ohm-cm
PolyVinyl Chloride	PVC	400	5-7	0.02	2×10 ¹⁴
Polyethylene	PE	480	2.3	0.005	10 ¹⁶
Cross-Linked Polyethylene	XLPE	700	2.3	0.005	10 ¹⁶
Poly Tetra Fluoro Ethylene	TFE	480	2.1	0.0003	10 ¹⁸
Fluorinated Ethylene 30-Propylene	FEP	500	2.1	0.0003	10 ¹⁸
Ethylene TetraFluoroEthylene	Tefzel(ETFE)	500	2.6	0.005	10 ¹⁶
PolyVinylidene Fluoride	Kynar	1,280(8 mils)	7.7	0.02	2×10 ¹⁴
Silicone Rubber	Silicone	575-700	3-3.6	0.003	2×10 ¹⁴
Polychloroprene Rubber	Neoprene	113	9	0.03	10 ¹¹
Butyl Rubber	Butyl	600	2.3	0.003	10 ¹⁷
Ethylene Propylene Diene Terpolmer	EPDM	600	2.3	0.003	10 ¹⁷
Fluorocarbon Rubber	Viton	500	4.2	0.14	2×10 ¹³
Polyurethane	Urethane	450-500	6.7-7.5	0.055	2×10 ¹¹
Polyamide	Nylon	385	4-10	0.02	4.5×10 ¹³
Polyimide Film	Kapton	5,400(2 mils)	3.5	0.003	10 ¹⁸
Polyester Film	Mylar	2,600	3.1	0.15	6×10 ¹⁶
Polyalkene	-	1,870	3.5	0.028	6×10 ¹³

A. CHARACTERISTICS OF AC LONG TIME BREAKDOWN VOLTAGE

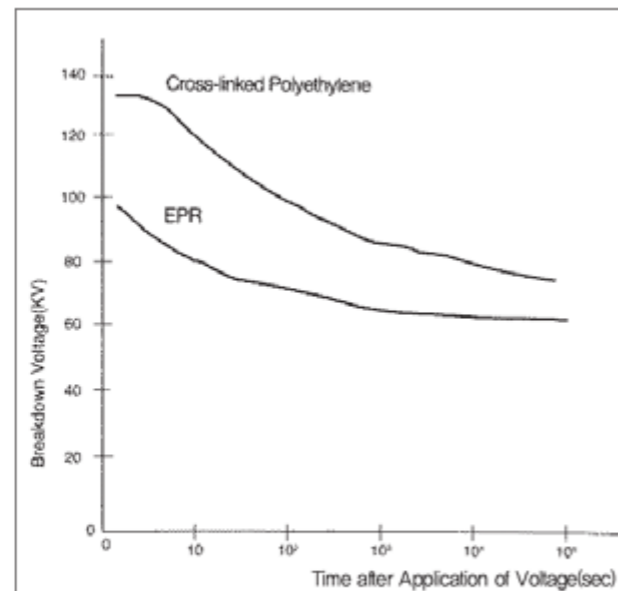
The characteristics of AC long time breakdown voltage of cable depend upon diameter of conductor and insulation thickness. The relationship between the insulation thickness and the breakdown voltage is shown in FIG. 1.

B. CHARACTERISTICS OF AC SHORT TIME BREAKDOWN VOLTAGE

The AC breakdown voltage declines some what soon after the cable being electrified and then reaches at a saturation point. FIG. 2 shows quick rise of applied voltage to a certain value which was maintained to obtain the breakdown time.



▶ FIG. 1. Characteristics of AC long time breakdown voltage

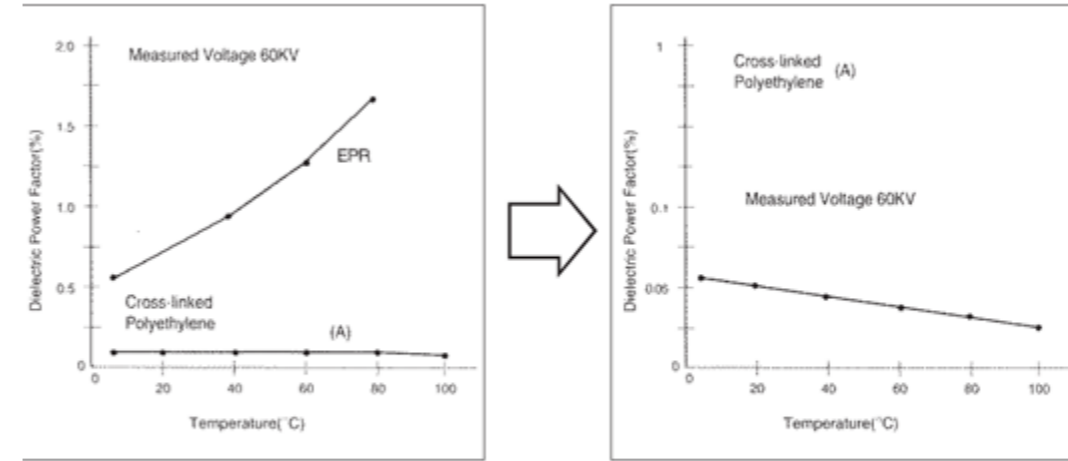


▶ FIG. 2. Characteristics of AC short time breakdown voltage and applying time

C. DIELECTRIC POWER FACTOR

The characteristics of typical dielectric power factor vs temperature are shown in FIG. 3.

The Cross-linked Polyethylene insulated cable is also superior in such point as the dielectric power factor essentially small.



▶ FIG. 3. Dielectric Power Factor vs Temperature characteristics of EPR and Cross-Linked Polyethylene insulated cables

D. VOLUME RESISTIVITY

Variation of volume resistivity due to temperature are shown in TABLE 3.

TABLE 3. VOLUME RESISTIVITY AND TEMPERATURE

Materials	Volume Resistivity [Ω-cm]				
	20	40	60	80	100
EPR	10 ¹⁵	10 ¹⁵	1.1×10 ¹⁵	2.3×10 ¹⁴	4.5×10 ¹²
Natural Rubber	10 ¹⁵	1.6×10 ¹⁵	2.8×10 ¹⁴	2.1×10 ¹³	1.3×10 ¹²
Polyethylene	10 ¹⁷	-	10 ¹⁷	-	10 ¹⁷
Cross-linked Polyethylene	10 ¹⁷	-	10 ¹⁷	-	10 ¹⁷
PVC	10 ¹⁵	1.9×10 ¹⁴	1.9×10 ¹³	1.4×10 ¹²	2.6×10 ¹¹

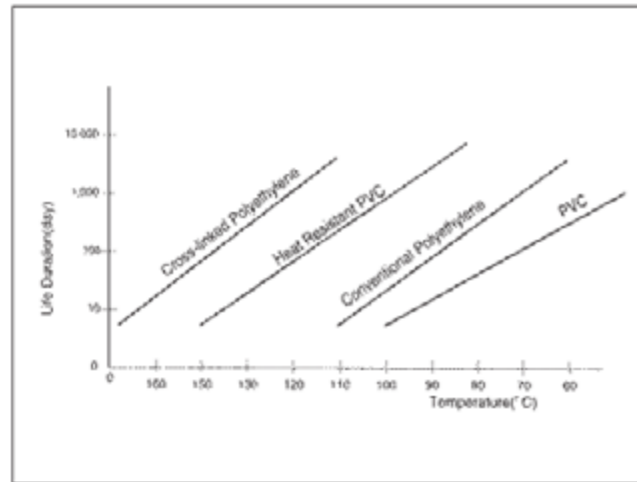
The volume resistivity of materials is generally higher in comparison with Rubber. And the Cross-linked Polyethylene does not drop at a high temperature.

(3) HEAT CHARACTERISTICS OF INSULATING MATERIALS

A. RELATIONSHIP BETWEEN LIFE DURATION AND TEMPERATURE

In the synthetic resinous materials, the life evaluation is made by investigation as to number of days until deterioration that the elongation goes down to 100 percent.

The relationship of temperature proves that the Cross-linked Polyethylene is considerably superior in point of the heat resistance to the prevailing polyethylene or PVC



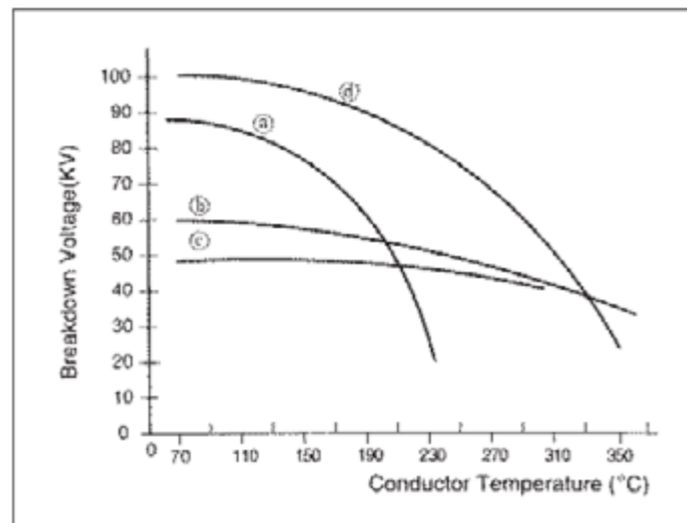
► FIG. 4. Relationship between life duration and temperature

B. OVER CURRENT CHARACTERISTICS

The result of over current test is shown in FIG. 5.

In Cross-linked Polyethylene, variation of the characteristics can not be seen up to near 250°C even under loaded condition

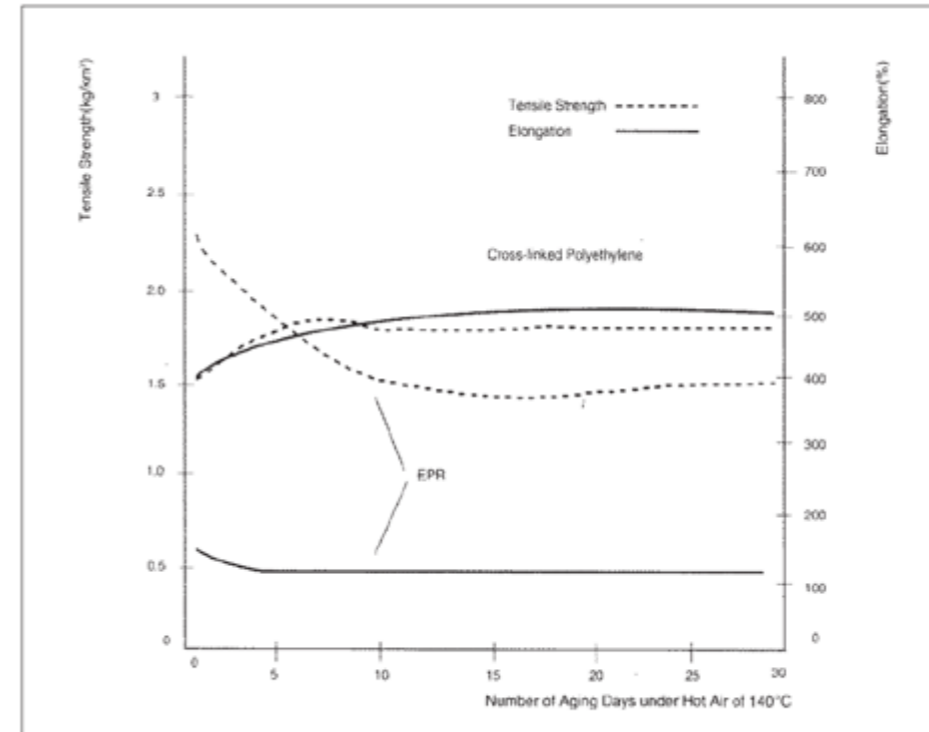
- Ⓐ Polyethylene
- Ⓑ Butyl Rubber
- Ⓒ Natural Rubber
- Ⓓ Cross-linked Polyethylene



► FIG. 5. Over current characteristics

C. AGING RESISTANCE

Variation of tensile strength and elongation when aging test was performed in hot air of 140°C are shown in FIG. 6.



► FIG. 6. Aging characteristics of insulating materials

(4) CURRENT CARRYING CAPACITY

Each current ratings are calculated under the following conditions.

Method of Laying	In Air	Direct Burial
Ambient Temperatur / °C	40	25
Soil Thermal Resistivity / °C cm/W	-	120
Depth of Ground / cm	-	80

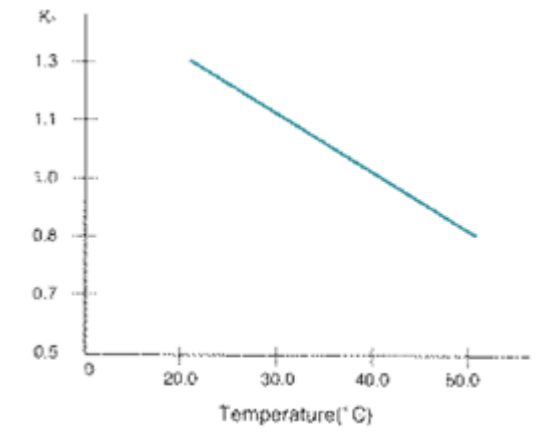
Layout of Cable	Flat	Diagram
	Trefoil	Diagram

DERATING FACTOR

A. Rating Factors in Air

Rating factors for cables in air(K_A)

Air Temperature / °C	Rating Factor
20	1.18
25	1.14
30	1.10
35	1.05
40	1.00
45	0.95
50	0.90



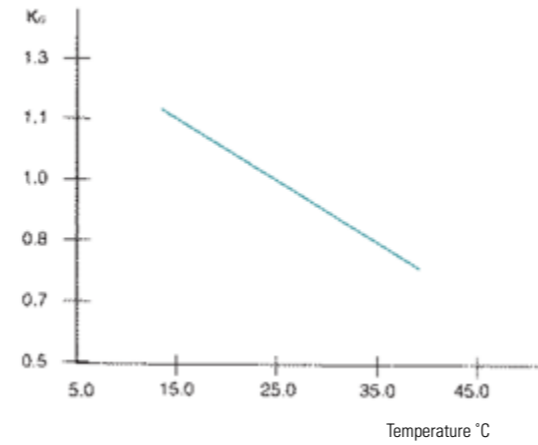
Rating factors relating to the proximity of other cable system mounted in air.

Types	Plain Racks				Perforated Racks				Plain Racks				Perforated Racks				
	Diagram				Diagram				Diagram				Diagram				
No. of Racks	1	2	3	6	1	2	3	6	1	2	3	6	1	2	3	6	
No. of System	1	0.95	0.90	0.88	0.86	1	1	1	1	0.92	0.87	0.84	0.82	1	1	1	1
	2	0.90	0.85	0.83	0.81	0.98	0.95	0.94	0.93	0.89	0.84	0.82	0.80	0.97	0.94	0.93	0.91
	3	0.88	0.83	0.81	0.79	0.9	0.93	0.92	0.90	0.88	0.83	0.81	0.79	0.96	0.93	0.92	0.90

B. Rating Factors in Ground

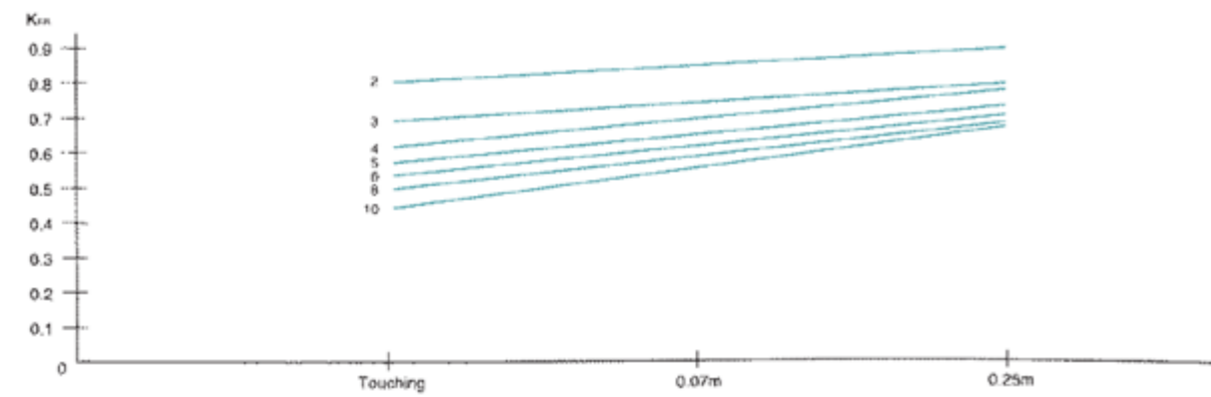
Rating factors relating to ground temperature (K_G)

Ground temperature(°C)	Rating Factor
15	1.07
20	1.04
25	1.00
30	0.96
35	0.92
40	0.87
45	0.83



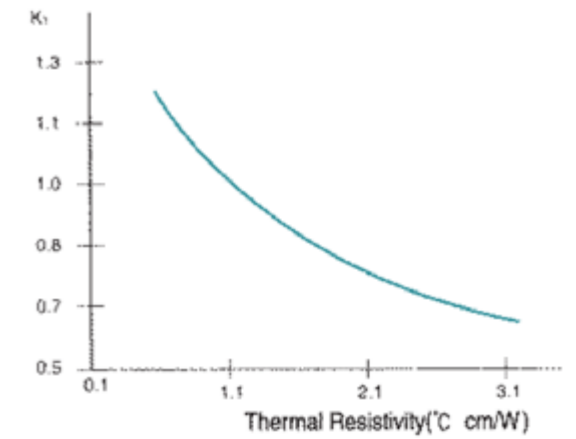
Group rating factors relating to the proximity of other cables in ground (K_{GR})

Types	2	3	4	5	6	8	10
Touching	0.80	0.70	0.63	0.58	0.55	0.50	0.46
0.07m	0.85	0.75	0.68	0.64	0.66	0.56	0.53
0.25m	0.87	0.79	0.75	0.72	0.69	0.66	0.64



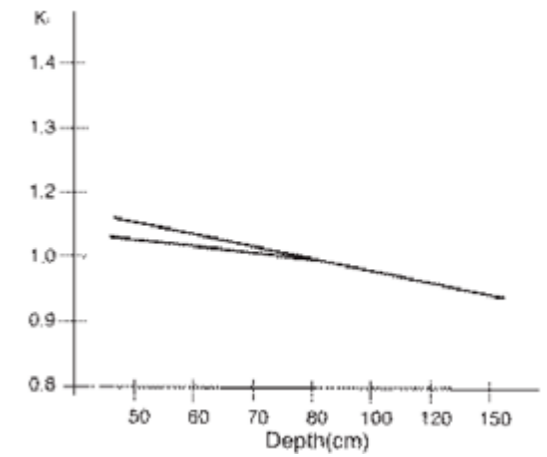
Rating factors for thermal resistivity of ground (K_T)

Thermal Resistivity / °C cm/W	Rating Factor
0.7	1.14
1.0	1.00
1.2	0.93
1.5	0.84
2.0	0.74
2.5	0.67
3.0	0.61



Rating factors relating laying depth (K_L)

Depth (cm)	Size ≤ 50mm²	Size > 50mm²
50	1.03	1.06
60	1.02	1.04
70	1.01	1.02
80	1.00	1.00
100	0.98	0.98
120	0.96	0.96
150	0.94	0.94



0.6/1kV

Copper Conductor
XLPE Insulated Cable

Single Core

(Unit :Ampere)

Conductor Nominal Area mm ²	In Air						Underground, Direct Burial					
	1 cct		2 cct		3 cct		1 cct		2 cct		3 cct	
	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil
1.5	23	19	22	18	20	18	32	31	26	25	22	21
2.5	32	26	31	25	28	25	44	42	35	34	31	29
4	43	35	41	33	37	33	57	55	46	44	40	38
6	55	44	52	42	47	42	71	68	57	55	49	47
10	76	61	72	58	65	58	95	91	75	73	66	63
16	101	82	96	78	87	78	122	117	97	94	84	80
25	141	114	133	108	121	108	159	152	126	121	110	104
35	172	138	162	131	147	131	190	181	150	145	131	124
50	211	170	197	160	181	160	225	214	178	171	156	147
70	271	218	255	207	232	207	276	263	219	210	192	181
95	338	273	317	260	290	260	332	315	264	252	231	217
120	396	321	374	305	340	305	378	358	301	287	264	247
150	459	372	434	353	395	353	425	401	339	323	298	278
185	536	434	507	412	462	412	482	454	386	366	340	316
240	647	523	612	497	558	497	562	526	451	426	398	367
300	754	607	713	575	651	575	636	592	512	481	454	415
400	893	716	846	680	773	680	729	672	589	548	524	474
500	1,039	826	984	785	900	785	825	750	668	614	596	532
630	1,215	956	1,152	908	1,056	908	939	840	765	691	684	600
800	1,410	1,093	1,337	1,038	1,228	1,038	1,060	930	867	768	779	669
1000	1,606	1,226	1,525	1,165	1,400	1,165	1,177	1,012	967	839	872	733

Three Core

(Unit :Ampere)

Conductor Nominal Area mm ²	Unarmoured Cable						Armoured Cable					
	In Air			Underground, Direct Burial			In Air			Underground, Direct Burial		
	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct
1.5	18	17	15	29	24	20	17	16	13	26	21	18
2.5	25	24	21	40	32	28	23	22	19	36	30	26
4	33	31	29	51	42	36	34	29	25	47	39	34
6	42	40	36	64	52	45	39	37	32	59	48	42
10	59	56	51	85	69	60	55	52	46	80	65	57
16	79	74	68	110	89	77	73	69	62	104	84	73
25	109	103	94	143	116	101	103	98	86	136	111	95
35	134	127	116	171	139	120	125	119	105	162	132	114
50	164	155	142	203	165	142	153	145	128	192	157	136
70	210	199	182	249	203	175	196	187	166	236	193	167
95	262	248	227	300	244	211	243	231	205	284	232	201
120	307	291	267	341	278	240	284	270	240	323	265	229
150	355	337	309	383	313	271	327	311	277	363	298	258
185	412	392	360	433	355	308	377	356	320	408	336	292
240	492	469	432	501	412	358	451	430	383	473	391	340
300	568	542	500	565	465	405	518	494	441	532	440	383
400	662	632	584	639	529	461	600	574	512	600	498	434

1.8/3(3.6)kV

Copper Conductor
XLPE Insulated Cable

Single Core

(Unit :Ampere)

Conductor Nominal Area mm ²	In Air						Underground, Direct Burial					
	1 cct		2 cct		3 cct		1 cct		2 cct		3 cct	
	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil
10	84	69	80	65	73	65	92	88	73	71	64	61
16	111	91	105	86	96	86	118	113	94	91	82	78
25	150	123	142	117	130	117	153	147	121	117	105	100
35	182	149	173	141	158	141	182	174	144	139	125	119
50	221	181	209	172	191	172	215	206	170	164	148	140
70	281	230	266	218	243	218	264	252	208	201	182	172
95	348	285	330	270	301	270	316	301	250	240	218	205
120	407	332	385	315	352	315	359	342	284	273	248	233
150	467	381	442	362	404	362	403	381	318	305	278	261
185	543	443	514	420	470	420	456	432	361	345	316	296
240	652	531	618	505	565	505	530	500	420	400	368	343
300	759	614	719	583	657	583	600	562	476	450	417	386
400	897	721	849	685	777	685	686	636	545	510	478	438
500	1,042	831	988	790	904	790	774	710	616	571	543	491
630	1,218	961	1,156	913	1,060	913	879	794	703	641	620	552
800	1,413	1,099	1,342	1,044	1,232	1,044	990	877	794	710	703	613
1000	1,608	1,232	1,529	1,170	1,404	1,170	1,097	953	882	774	783	669

Three Core

(Unit :Ampere)

Conductor Nominal Area mm ²	Unarmoured Cable						Armoured Cable					
	In Air			Underground, Direct Burial			In Air			Underground, Direct Burial		
	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct
10	71	67	61	89	71	61	71	67	61	86	70	60
16	94	89	81	114	91	78	93	88	81	111	89	77
25	126	119	108	147	117	100	125	119	109	143	115	99
35	153	145	132	175	139	119	152	144	132	170	137	118
50	185	175	159	206	164	140	183	174	160	201	162	139
70	235	222	202	252	200	171	231	219	201	245	197	170
95	290	275	250	301	240	205	284	270	248	292	235	202
120	338	320	292	342	272	233	352	335	309	337	273	235
150	388	367	335	383	305	261	399	380	350	376	304	262
185	449	425	388	432	345	295	458	436	402	421	341	294
240	536	508	464	499	399	342	541	515	475	483	391	338
300	618	585	535	561	449	385	612	583	538	535	434	375
400	721	648	626	634	508	436	698	666	615	593	482	417

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

3.6/6(7.2)kV

Copper Conductor XLPE Insulated Cable

Single Core (Unit :Ampere)

Conductor Nominal Area mm ²	In Air						Underground, Direct Burial					
	1 cct		2 cct		3 cct		1 cct		2 cct		3 cct	
	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil
10	86	72	82	68	76	68	92	89	74	71	64	61
16	114	94	108	89	99	89	118	114	94	91	82	78
25	153	127	146	120	134	120	153	147	122	118	106	101
35	186	154	177	146	162	146	182	175	145	140	126	120
50	225	186	214	176	196	176	215	206	171	165	149	141
70	285	235	271	223	248	223	264	252	209	202	183	173
95	353	291	335	276	307	276	316	301	251	241	219	207
120	411	338	390	321	357	321	359	342	285	274	249	235
150	471	388	447	368	410	368	403	382	320	306	280	263
185	546	449	518	426	475	426	456	432	362	346	317	297
240	656	538	623	511	571	511	530	500	422	401	370	345
300	762	624	724	592	665	592	600	563	478	453	421	389
400	899	734	855	697	786	697	686	638	548	515	483	444
500	1,043	847	993	805	914	805	774	714	621	578	549	498
630	1,217	975	1,159	926	1,067	926	881	799	708	648	626	559
800	1,409	1,110	1,342	1,055	1,236	1,055	991	882	798	717	708	620
1,000	1,600	1,242	1,525	1,180	1,405	1,180	1,098	959	886	781	788	676

Three Core (Unit :Ampere)

Conductor Nominal Area mm ²	Unarmoured Cable						Armoured Cable					
	In Air			Underground, Direct Burial			In Air			Underground, Direct Burial		
	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct
10	71	70	64	89	72	61	73	70	64	87	70	61
16	94	92	84	114	92	78	96	91	84	111	89	78
25	130	123	112	147	118	101	128	122	112	143	116	100
35	158	149	136	175	140	120	155	148	136	170	138	119
50	190	180	164	206	165	140	187	178	163	200	162	140
70	240	227	208	252	201	172	235	223	206	245	198	171
95	296	280	256	301	241	206	307	293	270	298	242	209
120	344	326	298	342	273	234	353	337	311	337	273	236
150	394	373	341	383	307	263	403	385	355	376	305	263
185	454	430	394	432	346	297	462	441	408	421	342	296
240	542	514	470	500	401	344	541	516	478	481	392	339
300	624	592	542	561	451	387	614	587	544	534	435	376
400	726	690	633	635	511	439	700	670	621	592	484	419

6/10(12)kV

Copper Conductor XLPE Insulated Cable

Single Core (Unit :Ampere)

Conductor Nominal Area mm ²	In Air						Underground, Direct Burial					
	1 cct		2 cct		3 cct		1 cct		2 cct		3 cct	
	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil
16	118	99	112	112	104	94	118	114	95	92	84	79
25	158	132	150	150	139	125	153	147	123	119	108	102
35	191	160	182	182	168	152	182	175	146	141	128	121
50	231	192	220	220	203	182	215	206	172	166	151	143
70	291	243	277	277	255	230	264	252	211	203	185	175
95	359	298	341	341	314	283	316	301	252	243	221	209
120	417	347	397	397	365	330	359	342	287	275	252	237
150	477	396	454	454	418	376	403	383	322	308	282	265
185	552	458	525	525	482	435	456	432	365	348	320	300
240	660	547	628	628	579	520	530	500	424	404	373	348
300	765	631	728	728	670	600	600	563	480	455	423	392
400	900	738	857	857	789	700	686	639	549	516	485	445
500	1,042	847	993	993	914	805	774	713	621	578	549	498
630	1,217	976	1,159	1,159	1,067	927	880	799	707	648	626	559
800	1,407	1,111	1,340	1,340	1,235	1,055	990	882	798	718	708	620
1,000	1,600	1,242	1,524	1,524	1,405	1,180	1,097	959	885	781	787	676

Three Core (Unit :Ampere)

Conductor Nominal Area mm ²	Unarmoured Cable						Armoured Cable					
	In Air			Underground, Direct Burial			In Air			Underground, Direct Burial		
	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct
16	102	97	89	115	93	80	100	96	89	112	91	79
25	136	129	118	148	119	102	133	127	117	144	117	101
35	164	156	143	176	141	121	161	153	141	171	139	120
50	197	187	172	207	166	143	192	183	169	201	163	141
70	247	235	215	253	203	174	256	244	227	250	204	177
95	304	289	265	302	243	209	313	299	277	298	243	210
120	352	334	307	343	275	237	361	345	320	337	275	238
150	402	382	351	384	309	265	409	391	363	375	307	266
185	463	440	404	433	349	300	465	445	412	420	343	297
240	550	523	481	501	404	347	544	521	483	480	392	340
300	633	602	553	563	454	391	614	588	546	532	435	377
400	736	701	645	638	515	444	700	670	622	591	484	420

8.7/15(17.5)kV

Copper Conductor
XLPE Insulated Cable

Single Core (Unit :Ampere)

Conductor Nominal Area mm ²	In Air						Underground, Direct Burial					
	1 cct		2 cct		3 cct		1 cct		2 cct		3 cct	
	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil
25	164	139	157	132	146	132	153	147	124	120	110	104
35	198	168	189	160	176	160	183	175	148	143	131	123
50	238	202	228	192	211	192	216	206	175	168	154	145
70	299	253	286	240	265	240	264	253	213	205	188	177
95	366	310	350	295	325	295	317	302	255	245	225	212
120	424	359	406	341	376	341	360	342	290	278	256	240
150	484	409	463	389	429	389	403	383	325	311	287	269
185	558	471	534	447	495	447	457	433	368	352	325	304
240	666	560	637	532	590	532	531	502	428	408	378	352
300	796	645	735	612	682	612	601	565	484	459	429	397
400	903	753	863	715	800	715	687	642	554	522	491	451
500	1,043	863	997	820	924	820	775	768	627	585	556	506
630	1,215	994	1,162	945	1,077	945	882	805	714	657	634	569

Three Core (Unit :Ampere)

Conductor Nominal Area mm ²	Unarmoured Cable						Armoured Cable					
	In Air			Underground, Direct Burial			In Air			Underground, Direct Burial		
	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct
25	144	137	126	149	121	104	148	142	133	147	122	106
35	173	165	152	177	144	124	177	170	159	175	144	126
50	207	197	182	208	169	146	212	204	190	206	170	148
70	258	246	227	254	206	178	264	254	237	251	207	180
95	316	301	278	303	246	212	320	307	286	298	245	213
120	364	347	321	344	279	241	365	351	327	336	277	241
150	415	396	365	386	313	270	415	398	371	375	309	268
185	476	454	419	435	353	304	470	451	421	419	345	300
240	564	538	497	504	409	353	549	527	492	479	394	343
300	647	617	570	567	460	397	619	594	555	531	438	381
400	751	717	663	642	522	451	702	674	629	590	486	423

12/20(24)kV

Copper Conductor
XLPE Insulated Cable

Single Core (Unit :Ampere)

Conductor Nominal Area mm ²	In Air						Underground, Direct Burial					
	1 cct		2 cct		3 cct		1 cct		2 cct		3 cct	
	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil
35	200	172	192	163	179	163	183	175	149	143	132	124
50	240	206	231	195	215	195	216	206	176	169	155	146
70	301	258	289	245	269	245	264	253	215	206	190	179
95	369	315	354	300	330	300	317	302	257	246	227	213
120	427	364	409	345	381	345	360	343	291	279	258	242
150	486	414	466	393	434	393	403	383	327	313	289	271
185	560	477	537	453	500	453	457	433	370	353	327	306
240	667	566	640	537	595	537	531	502	430	409	381	354
300	770	651	738	618	686	618	601	565	486	462	431	399
400	902	759	865	721	804	721	687	642	557	525	494	454
500	1,041	873	999	830	930	830	776	720	631	590	561	512
630	1,211	1,005	1,162	955	1,082	955	883	810	719	664	640	576

Three Core (Unit :Ampere)

Conductor Nominal Area mm ²	Unarmoured Cable						Armoured Cable					
	In Air			Underground, Direct Burial			In Air			Underground, Direct Burial		
	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct
35	177	169	157	177	145	125	181	174	163	175	145	127
50	212	202	187	209	170	147	216	208	194	206	171	149
70	263	252	233	254	207	179	267	257	240	251	207	181
95	321	306	284	304	247	214	322	310	290	298	246	214
120	370	353	327	345	281	243	370	355	332	336	278	242
150	420	402	372	386	314	272	417	401	375	374	309	270
185	482	460	426	436	355	307	472	454	424	419	346	301
240	570	544	504	504	411	355	551	530	495	478	395	344
300	653	624	578	568	463	400	622	598	559	531	439	382
400	757	724	671	644	525	455	705	678	633	590	488	425

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

PVC INSULATED WIRES

FLAME RETARDANT CONTROL & POWER CABLES

FIRE RESISTANT CABLES

BARE CONDUCTORS

MV URD CABLES

TECHNICAL DATA

18/30(36)kV

Copper Conductor
XLPE Insulated Cable

Single Core

(Unit :Ampere)

Conductor Nominal Area mm ²	In Air						Underground, Direct Burial					
	1 cct		2 cct		3 cct		1 cct		2 cct		3 cct	
	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil
50	245	213	236	202	222	202	216	207	178	171	158	149
70	306	266	295	252	277	252	246	252	217	208	193	181
95	373	324	359	307	337	307	316	302	259	249	231	216
120	430	373	415	355	389	355	360	342	295	282	262	245
150	490	424	471	402	442	402	403	383	330	316	294	274
185	563	487	542	462	508	462	457	433	373	357	332	310
240	669	576	643	547	603	547	531	502	434	413	386	359
300	770	662	740	628	693	628	600	566	491	466	437	405
400	900	770	866	731	810	731	687	644	561	530	501	460
500	1,037	884	998	840	935	840	776	723	636	596	568	518

Three Core

(Unit :Ampere)

Conductor Nominal Area mm ²	Unarmoured Cable						Armoured Cable					
	In Air			Underground, Direct Burial			In Air			Underground, Direct Burial		
	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct
50	220	211	196	210	173	150	221	214	201	207	173	152
70	272	261	243	256	210	182	272	262	247	251	109	183
95	330	317	295	305	251	218	328	316	297	298	248	217
120	380	364	339	346	284	247	375	361	340	336	280	245
150	431	413	385	388	318	276	422	406	382	374	311	272
185	492	472	440	437	359	311	477	460	432	418	348	304
240	580	557	519	506	416	361	554	534	501	477	397	347
300	663	637	593	570	468	406	625	602	565	530	441	385
400	768	737	687	647	532	462	709	683	641	590	491	429

26/35kV

Copper Conductor
XLPE Insulated Cable

Single Core

(Unit :Ampere)

Conductor Nominal Area mm ²	In Air						Underground, Direct Burial					
	1 cct		2 cct		3 cct		1 cct		2 cct		3 cct	
	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil	Flat	Trefoil
50	264	230	254	217	239	217	233	223	192	185	171	161
70	330	287	318	270	297	270	287	270	233	224	209	196
95	402	347	386	330	417	330	340	324	277	264	250	233
120	463	401	447	381	449	383	386	368	317	303	283	265
150	528	456	507	433	475	432	434	412	354	340	318	295
185	608	524	584	496	547	497	492	466	402	384	359	334
240	721	622	693	589	650	587	572	541	457	443	417	388
300	831	714	798	677	746	677	648	612	529	502	472	437
400	972	830	934	787	873	787	740	694	604	570	542	496

Three Core

(Unit :Ampere)

Conductor Nominal Area mm ²	Unarmoured Cable						Armoured Cable					
	In Air			Underground, Direct Burial			In Air			Underground, Direct Burial		
	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct	1 cct	2 cct	3 cct
50	239	229	213	228	188	163	240	233	218	225	118	165
70	295	284	260	278	228	198	295	285	268	273	188	199
95	358	345	320	330	273	237	356	343	322	324	270	235
120	413	394	363	376	309	267	407	392	370	365	304	265
150	468	449	418	421	346	300	458	441	415	406	338	294
185	534	513	478	475	390	338	518	500	470	454	378	330
240	630	605	562	550	452	392	602	580	545	518	432	375
300	720	690	640	619	509	441	679	657	614	576	479	416
400	834	800	745	703	578	502	770	741	697	641	534	464

(5) SHORT CIRCUIT CURRENT RATING

At the commencement of the Short Circuit the cable may be operating at its maximum permissible continuous temperature and the increase in temperature caused by the short circuit is main factor in deriving acceptable ratings.

However, the current may be 20 or more times greater than the sustained current and it produces thermomechanical and electromagnetic forces.

The graph on figure provides curves from which the short circuit capacity can be determined.

$$I = 226 \frac{A}{\sqrt{t}} \sqrt{\ln \frac{\theta_1 + 234}{\theta_0 + 234}}$$

(in Copper Conductor)

$$I = 148 \frac{A}{\sqrt{t}} \sqrt{\ln \frac{\theta_1 + 228}{\theta_0 + 228}}$$

(in Aluminium Conductor)

Where,

I = Short Circuit Current [A]

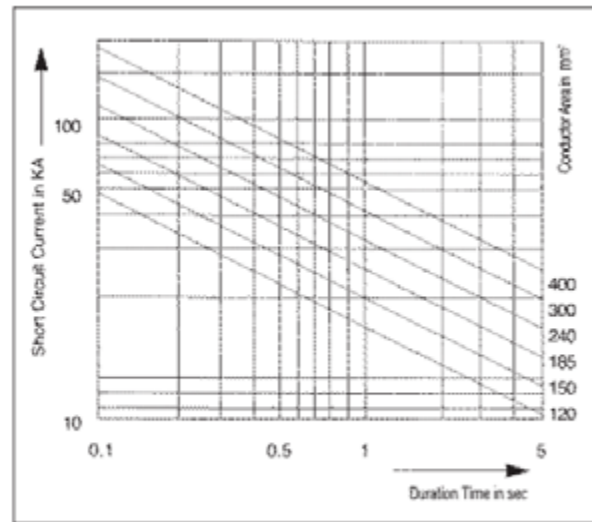
A = Nominal Area of Conductor [mm²]

t = Duration Time (sec)

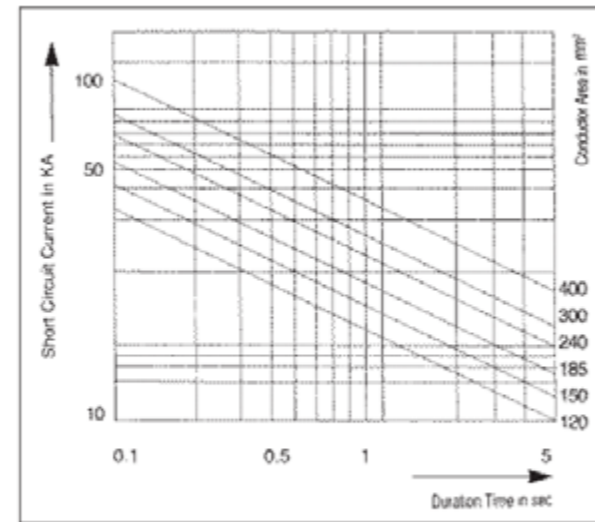
θ₀ = Initial Temperature (90°C)

θ₁ = Temperature of Short Circuit (250°C)

Short Circuit (Copper Conductor)



Short Circuit (Aluminium Conductor)



► FIG. 7. Short Circuit Rating

(6) HANDLING AND INSTALLATION OF XLPE CABLES

A. Minimum Bending Radius and Permissible Maximum Pulling Tension

The minimum bending radius and permissible maximum pulling tension shall be given as following Table 4 and Table 5.

TABLE 4. MINIMUM BENDING RADIUS

Cable Type	When laying	When installed
Non-armored cable	10D	6D
Armored cable or Metallic shield cable	15D	12D

D : Overall Dia. of Cable

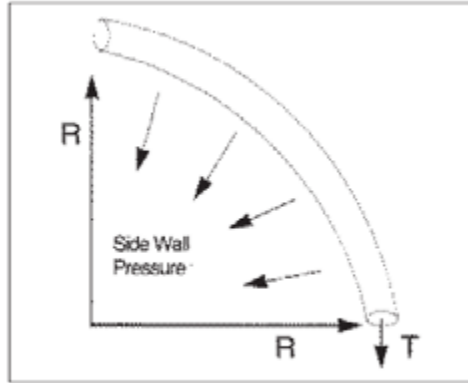
TABLE 5. PERMISSIBLE MAXIMUM PULLING TENSION

Pulling Tool	Material of Conductor	Permissible Maximum Pulling Tension(kg)
Pulling Eye	Copper Aluminium	7×(No. of Cores)×(Cross-sectional Area of Conductor) 4×(No. of Cores)×(Cross-sectional Area of Conductor)
Basket grip (Wire grip)	PVC Sheath	1.0×(Cross-sectional Area of Sheath in mm ²)
	Polychloroprene Sheath	0.5×(Cross-sectional Area of Sheath in mm ²)

NOTE : When the cable grip is used it should cover more than 500mm in length of the cable end and be bound to the cable sheath.

B. Side Wall Pressure to Cable

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



► FIG. 8. Side Wall Pressure

[NOTE]

Side Wall Pressure to Cable =	$\frac{\text{Pulling Tension(kg)}}{\text{Bending Radius(m)}}$	= T/R
T :	Pulling Tension (kg)	
R :	Bending Radius (m)	

C. Removal of Sheath or Tape

Special care must be taken not to harm the insulation when removing the sheath or tapes with a knife. Otherwise it may result in a dielectric breakdown.

D. Cleanning the Surface of Insulation

The surface of insulation should be cleaned to avoid a flash over at the cable termination or joint.

E. Applying of Self-adhesive Tap

When applying a self-adhesive tape after jointing or terminating of XLPE cable, stretch it properly about 1.2 times as long the original one. If it is over-stretched, crack may occur on the tape in the long run and if not stretched properly, tape will not be adhered between each layer.

F. Water Proof Treatment for Outdoor Termination

For outdoor termination water proof treatment is necessary to avoid the water penetrating into the cable end and special care must be taken to apply tapes and terminals it is desirable to use a compression or solder type terminal.



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