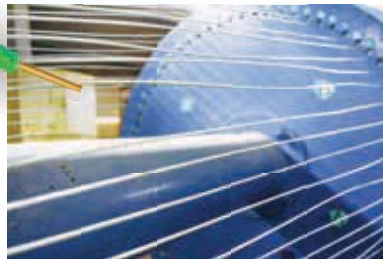
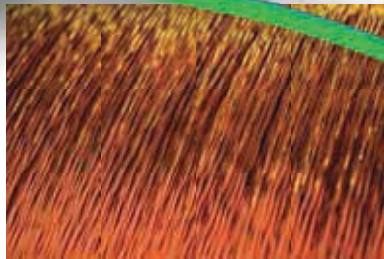




TRUSTED NOT TO COMPROMISE

LOW SMOKE ZERO HALOGEN



PERFORMANCE OF CABLES UNDER FIRE

Although cables seldom cause fire, they may be subjected to fire due to other causes being an integral part of property and equipment. When PVC burns, it produces poisonous gases, mainly hydrogen chloride (HCL). When HCL combines with moisture, it forms hydrochloric acid, which is a threat to life, electronic equipment, metal surface and even buildings. It also gives off a thick black smoke preventing people to find their way to exits and makes it difficult for others to evacuate them from areas affected by fire and toxic fumes. Hence it is recommended to use Low Smoke Halogen Free cables especially in public places like airports, mass transit transport, shopping malls etc. Cables manufactured with such materials have acid gas evolution of less than 0.5% in comparison with 25%- 30% for PVC compounds.

This brochure mentions technical terms relating to performance of such cables under fire, their characteristics and standards. There are different abbreviations used for such cables having similar characteristics, such as LSF (Low Smoke and Fume), LSOH/LSHF/LSZH (Low Smoke Zero Halogen), HFFR (Halogen Free and Flame Retardant).

FIRE RETARDANT OR FLAME RETARDANT

Fire Retardant cables are designed for use in fire situations where the spread of flames along a cable route needs to be retarded. Due to relative low cost, fire retardant cables are widely used as fire survival cables. During a fire, the flame spread will be retarded and the fire will be confined to a small area, thus reducing the fire hazard due to fire propagation. All our LV and MV cables manufactured by Pakistan Cables come with PVC sheathing which is fire retardant.

LOW SMOKE AND FUME FIRE RETARDANT CABLES (LSF)

All those cables releasing low smoke and fume during fire are called Low Smoke and Fume cables. PVC Compounds after inclusion of smoke suppressant and flame retardant additives reduce smoke generation thus have reduced flame propagating characteristics in the event of fire, but these are not halogen free.

LOW SMOKE ZERO HALOGEN FIRE RETARDANT (LSZH)

LSZH cables are not only characterized by the fire retardant performance but also by the halogen free properties, thus offering low corrosivity and toxicity. During a fire, such cables will emit less smoke and acid gases which severely affect respiratory system of human beings leading to death and at the same time damage expensive equipment. Compared with traditional PVC cables, LSZH cables outperform by their fire retardancy, low corrosivity and low smoke emission properties.

LSZH cables are also environmentally friendly.

HALOGEN FREE ADVANTAGES

LOW SMOKE

- Improve visibility
- Increased time to exit the fire area

LOW CORROSIVITY/TOXICITY

- Low acid gases from halogens prevent corrosion and damage to equipment
- Less harmful emissions
- Increased time to exit the fire area

SAFER CHOICE

- Reduced chance of loss of life due to less harmful emissions.
- Environmentally friendly than PVC compound.

TESTING FOR PERFORMANCE UNDER FIRE

Pakistan Cables is the only manufacturer in Pakistan to have state of the art testing equipment to verify performance of cables under fire as required by the International standards for such types of cables.

TESTING FOR FIRE RETARDANCE

IEC / BSEN 60332-1-2 - Single Cable



IEC / BSEN 60332-3 - Bunched Cables



TESTING FOR SMOKE EMISSION AND CORROSIVITY/TOXICITY

SMOKE DENSITY

IEC / BSEN 61034



CORROSIVITY/TOXICITY

IEC / BSEN 60754-1 (HCL Emission)

IEC / BSEN 60754-2 (PH and Conductivity)



APPLICATIONS

HOTELS, COMMERCIAL BUILDINGS, HOSPITALS, SHOPPING MALLS, CINEMAS, AIRPORTS, MASS TRANSIT, SHIPS, DATA CENTERS AND SIMILAR PUBLIC PLACES.



TECHNICAL ADVISORY SERVICE

One of the most important things to understand about LSZH cable (and of course cable in general) is that no two products are the same and that there are many factors that will define the suitability of the final product to its application. By understanding your project objectives, the Technical advisory team at Pakistan Cables can help identify (tests, material types, installation environmental) the right product for you.

ABOUT PAKISTAN CABLES – TRUSTED NOT TO COMPROMISE SINCE 1953

Pakistan Cables is the pioneer of Pakistan's wires and cables industry. Principally engaged in the manufacture of conductors, wires and cables for transmission and distribution of electricity since 1953, established as a joint venture with British Insulated Callender's Cables (BICC), a global leader in the segment at the time.

In the subsequent six decades, Pakistan Cables earned a reputation as a market leader and premier cable manufacturer in the country. As the first and only wires and cable manufacturer in Pakistan listed on the Pakistan Stock Exchange since 1955 till date, the Company is renowned for its commitment to ethics and business excellence. Between 2010 and 2017, the Company was affiliated with General Cable, a world leader in the cable industry and a Fortune 500 Company headquartered in the United States.

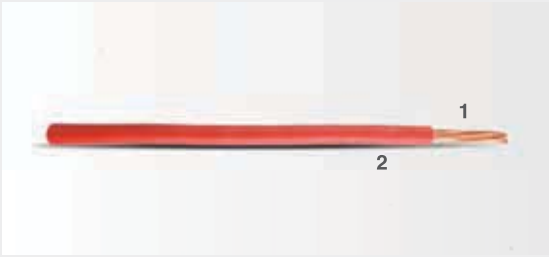
Pakistan Cables is **ISO 9001:2015**, **ISO 14001:2015** and **OHSAS 18001:2007** certified and is the first cable manufacturer in Pakistan to have its cables **type tested** by the world renowned **KEMA Laboratory**, Netherlands in 1984. Pakistan Cables also attained the prestigious **GOLD** certification by **KEMA Laboratory, Netherlands**. Only cable manufacturer in Pakistan with the **CNC** certification, which certifies that Pakistan Cables product range meets European Health, Safety, and Environmental protection legislation and can be legally sold and moved within the European Union. In addition to this, the Company's products are also **PSQCA certified**, **ERDA** (Electrical Research and Development Association), **India, TUV SUD PSB Pte. Ltd.**, Singapore, and have also been successfully **type tested** in Pakistan's well reputed **High Voltage and Short Circuit Laboratory in Rawat**. Moreover, it remains the only Pakistani manufacturer approved by **Oman's regulatory authority** to sell into the Oman market.

Pakistan Cables' highly advanced quality assurance and PVC laboratories, equipped with the latest equipment, are manned by professional and skilled personnel that check process variables at every step of the manufacturing process, to ensure that all products are in compliance with the relevant international specifications.

With a history of foreign affiliations with leading international cable manufacturers, Pakistan Cables enhance its technical support, introduce innovative technology in the industry, leverage on management best practices, procurement advantages and mapped export opportunities.

CABLE CONSTRUCTION AND STANDARDS

SINGLE CORE, LSZH INSULATED CABLES, WITHOUT SHEATH 450/750V



1. Copper Conductor
2. LSZH Insulation

BS EN 50525:

Electric cables- low voltage energy cables of rated voltage upto and including 450 / 750 V (U_o / U)

Part 3-31:

Cables with special fire performance-single core non-sheathed cables with halogen-free thermoplastic insulation, and low emission of smoke.

CONDUCTOR:

COPPER

MAXIMUM CONTINUOUS CONDUCTOR OPERATING TEMPERATURE:

70°C

CONSTRUCTION:

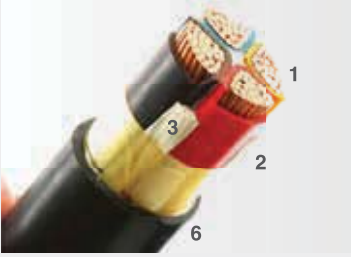
INSULATION: LSZH POLYMER (Red, Yellow, Blue, Black,Green)

PERFORMANCE:

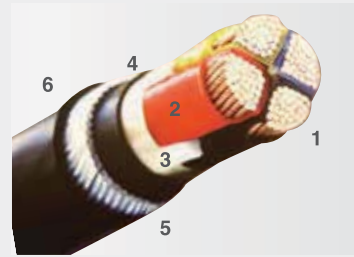
HCL Emission :	0.5% (Max)
Corrosivity pH :	4.3(Min)
Conductivity.	10 μ S/mm (Max)
Smoke Emission:	Light Transmittance 60% (Min)
Fire Propagation:	On single vertical cables

Note: Technical data mentioned in the Annexure

SINGLE CORE AND MULTICORE, XLPE INSULATED, UNARMoured AND ARMoured, LSZH SHEATHED, 600/1000V:



1. Copper / Aluminium Conductor
2. XLPE Insulation
3. Polypropylene Filler
4. LSZH Bedding
5. Armour Wire
6. LSZH Oversheath



IEC 60502-1:	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1.2 kV) upto 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)										
CONDUCTOR:	COPPER and ALUMINIUM										
MAXIMUM CONTINUOUS CONDUCTOR OPERATING TEMPERATURE:	90°C										
CONSTRUCTION:	<table border="0"> <tr> <td style="padding-right: 10px;">Insulation:</td> <td>XLPE (Red, Yellow, Blue, Black)</td> </tr> <tr> <td>Bedding:</td> <td>LSZH POLYMER (Black)</td> </tr> <tr> <td>Sheath:</td> <td>LSZH POLYMER (Black)</td> </tr> </table>	Insulation:	XLPE (Red, Yellow, Blue, Black)	Bedding:	LSZH POLYMER (Black)	Sheath:	LSZH POLYMER (Black)				
Insulation:	XLPE (Red, Yellow, Blue, Black)										
Bedding:	LSZH POLYMER (Black)										
Sheath:	LSZH POLYMER (Black)										
PERFORMANCE:	<table border="0"> <tr> <td style="padding-right: 10px;">HCL Emission:</td> <td>0.5% (Max)</td> </tr> <tr> <td>Corrosivity :</td> <td>pH: 4.3(Min)</td> </tr> <tr> <td>Conductivity:</td> <td>10 μS/mm (Max)</td> </tr> <tr> <td>Smoke Emission :</td> <td>Light Transmittance 70% (Min)</td> </tr> <tr> <td>Fire Propagation :</td> <td>On single vertical cables On bunched cables.</td> </tr> </table>	HCL Emission:	0.5% (Max)	Corrosivity :	pH: 4.3(Min)	Conductivity:	10 μ S/mm (Max)	Smoke Emission :	Light Transmittance 70% (Min)	Fire Propagation :	On single vertical cables On bunched cables.
HCL Emission:	0.5% (Max)										
Corrosivity :	pH: 4.3(Min)										
Conductivity:	10 μ S/mm (Max)										
Smoke Emission :	Light Transmittance 70% (Min)										
Fire Propagation :	On single vertical cables On bunched cables.										

Note: Technical data mentioned in the Annexure

PRECAUTIONS FOR HANDLING AND STORING LSZH CABLES

- Cables should not be exposed to sun.
- Avoid any contact of cables with hot surface.
- It is preferable to lay cables in the morning hours.
- Rough terrain or sharp edges of the tray should be avoided while pulling the cables, as it may damage LSZH sheath.
- Rollers and bends should be smooth.
- There should be a cushion between the clamp and cable surface. Clamps should not be applied directly over the sheath.

Technical Data



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Conductor Data

Table 1

Class 2 Stranded Conductors for Single-core and Multi-core cables

Nominal cross-sectional area mm ²	Minimum number of wires in the conductor						Maximum resistance of conductor at 20°C	
	Circular Conductor		Circular Compacted Conductor		Shaped Conductor		Annealed Copper Conductor	Plain aluminium Conductor
	Cu	Al	Cu	Al	Cu	Al	Plain wires	
1.5	7	-	6	-	-	-	12.1	-
2.5	7	-	6	-	-	-	7.41	-
4	7	7	6	-	-	-	4.61	-
6	7	7	6	-	-	-	3.08	-
10	7	7	6	-	-	-	1.83	3.08
16	7	7	6	6	-	-	1.15	1.91
25	7	7	6	6	6	6	0.727	1.20
35	7	7	6	6	6	6	0.524	0.868
50	19	19	6	6	6	6	0.387	0.641
70	19	19	12	12	12	12	0.268	0.443
95	19	19	15	15	15	15	0.193	0.320
120	37	37	18	15	18	15	0.153	0.253
150	37	37	18	15	18	15	0.124	0.206
185	37	37	30	30	30	30	0.0991	0.164
240	37	37	34	30	34	30	0.0754	0.125
300	61	61	34	30	34	30	0.0601	0.100
400	61	61	53	53	53	53	0.0470	0.778
500	61	61	53	53	-	-	0.0366	0.0605
630	91	91	53	53	-	-	0.0283	0.0469
800	91	91	-	-	-	-	0.0221	0.0369
1000	91	91	-	-	-	-	0.0176	0.0291

Diameters of stranded circular compacted copper and aluminium conductors

Table 2

Cross-sectional Area mm ²	Stranded Compacted circular conductors (Class 2)	
	Minimum diameter mm	Maximum diameter mm
10	3.6	4
16	4.6	5.2
25	5.6	6.5
35	6.6	7.5
50	7.7	8.6
70	9.3	10.2
95	11	12
120	12.3	13.5
150	13.7	15
185	15.3	16.8
240	17.6	19.2
300	19.7	21.6
400	22.3	24.6
500	25.3	27.6
630	28.7	32.5

Dimensions & Weights

Table 3

Single Core, 450 / 750V. LSZH Insulated Cables, Non Armoured Without Sheath

BSEN 50525 - 3 -31

1 Nominal Cross-sectional area of *conductors mm ²	2 Minimum number of wires in conductor (BS EN 60228)	3 Radial thickness of insulation specified value mm	4 Mean overall diameter		6 Approx Weight of Cable Copper Kg / Km
			Lower limit mm	Upper limit mm	
1.5	6	0.7	2.7	3.3	22
2.5	6	0.8	3.3	4.0	35
4	6	0.8	3.8	4.6	50
6	6	0.8	4.3	5.2	70
10	6	1.0	5.6	6.7	120
16	6	1.0	6.4	7.8	175
25	6	1.2	8.1	9.7	270
35	6	1.2	9.0	10.9	360
50	6	1.4	10.6	12.8	490
70	12	1.6	12.1	14.6	680
95	15	1.6	14.1	17.1	950
120	18	1.6	15.6	18.8	1170
150	18	1.6	17.3	20.9	1500
185	30	1.8	19.3	23.3	1820
240	34	2.0	22.0	26.6	2360
300	34	2.2	24.5	29.6	3000
400	53	2.4	27.5	33.2	3770
500	53	2.6	30.5	36.9	4790
630	53	2.8	34.0	41.1	6250

* Circular / Circular Compacted Copper Conductor

Note : 1 - Can also be supplied, if desired with single solid size upto 6mm²

Note : 2 - Can also be supplied, if desired with flexible class - 5 conductor size upto 240mm².



Dimensions & Weights

Table 4

XLPE Insulated Power Cables

600 / 1000 V Unarmoured and single wire armoured, LSZH over - sheathed cables

IEC 60502-1

Nominal Area of Conductor	Nominal Thickness of Insulation	Unarmoured				Armoured			
		Approx. Cable Diameter overall	Approximate Cable weight		Armour Wire Diameter	Approx. Cable Diameter overall	Approximate Cable weight		
			Copper	Aluminium			Copper	Aluminium	
mm ²	mm	mm	kg / km		mm	mm	kg / km		
S I N G L E C O R E	* 1.5	0.7	7.80	50	-	-	-	-	-
	* 2.5	0.7	8.20	70	-	-	-	-	-
	* 4.0	0.7	8.70	90	-	-	-	-	-
	* 6.0	0.7	9.20	110	-	-	-	-	-
	* 10	0.7	10.10	160	-	-	-	-	-
	* 16	0.7	11.00	210	110	♣ 1.25	15.20	360	260
	* 25	0.9	12.00	320	160	♣ 1.25	16.10	480	320
	* 35	0.9	13.30	420	190	♣ 1.25	18.00	600	380
	* 50	1.0	14.30	540	240	♣ 1.25	19.20	790	490
	* 70	1.1	16.40	760	330	♣ 1.25	20.40	1030	600
	* 95	1.1	18.40	1030	430	♣ 1.25	22.60	1370	770
	* 120	1.2	20.30	1280	520	♣ 1.60	25.10	1660	900
	* 150	1.4	22.30	1560	630	♣ 1.60	26.80	1960	1030
	* 185	1.6	24.50	1940	770	♣ 1.60	29.10	2380	1210
	* 240	1.7	27.30	2460	930	♣ 1.60	32.20	3000	1470
	* 300	1.8	30.00	3150	1220	♣ 1.60	38.10	3660	1730
	^ 400	2.0	34.47	4160	1700	♣ 2.00	42.00	4730	2250
	^ 500	2.2	38.00	5040	1900	♣ 2.50	47.20	5840	2700
^ 630	2.4	43.50	6680	2680	♣ 2.50	53.00	7880	3880	
^ 800	2.6	48.70	8300	3110	♣ 2.50	57.90	9560	4360	
^ 1000	2.8	54.00	10400	3850	♣ 2.50	63.00	11800	5250	
T W O C O R E	* 1.5	0.7	11.50	-	-	0.90	14.30	280	-
	* 2.5	0.7	11.30	-	-	0.90	16.20	360	-
	* 4.0	0.7	12.00	-	-	0.90	17.00	460	-
	* 6.0	0.7	13.10	-	-	0.90	19.70	610	-
	* 10	0.7	15.00	-	-	1.25	21.50	870	-
	* 16	0.7	16.60	490	280	1.25	22.20	1110	900
	* 25	0.9	21.30	730	400	1.60	26.40	1470	1140
	# 35	0.9	21.70	960	500	1.60	25.30	1780	1320
	# 50	1.0	20.90	1120	510	1.60	26.10	1910	1300
	# 70	1.1	23.90	1550	670	1.60	29.50	2490	1610
	# 95	1.1	26.80	2100	870	2.00	33.60	3410	2180
	# 120	1.2	29.70	2630	1080	2.00	36.50	4050	2500
	# 150	1.4	33.10	3220	1320	2.00	39.70	4790	2890
	# 185	1.6	36.80	4010	1630	2.50	46.00	6190	3810
	# 240	1.7	41.30	5220	2090	2.50	50.50	7640	4510
	# 300	1.8	45.30	6480	2550	2.50	54.90	9200	5270
# 400	2.0	51.00	8320	3260	2.50	60.60	11360	6300	

* Circular/Circular Compacted Stranded Conductors

Shaped Stranded Conductors

♣ Aluminium Wire Armoured

^ Circular Stranded Conductor

Dimensions & Weights

Table 5

XLPE Insulated Power Cables

600 / 1000 V Unarmoured and single wire armoured, LSZH over - sheathed cables.

IEC 60502-1

Nominal Area of Conductor	Nominal Thickness of Insulation	Unarmoured				Armoured			
		Approx. Cable Diameter overall	Approximate Cable weight		Armour Wire Diameter	Approx. Cable Diameter overall	Approximate Cable weight		
			Copper	Aluminium			Copper	Aluminium	
mm ²	mm	mm	kg / km		mm	mm	kg / km		
T H R E E C O R E	* 1.5	0.7	11.10	140	-	0.90	15.90	380	-
	* 2.5	0.7	11.80	150	-	0.90	16.00	440	-
	* 4.0	0.7	12.70	240	-	0.90	17.50	530	-
	* 6.0	0.7	13.90	320	-	0.90	18.80	630	-
	* 10	0.7	15.90	460	-	1.25	21.20	940	-
	* 16	0.7	17.60	650	340	1.25	23.20	1300	990
	* 25	0.9	21.30	960	480	1.60	26.50	1720	1240
	# 35	0.9	21.40	1210	550	1.60	28.30	2000	1340
	# 50	1.0	23.30	1590	690	1.60	30.50	2450	1550
	# 70	1.1	26.80	2240	940	2.00	34.50	3250	1950
	# 95	1.1	30.50	2910	1090	2.00	39.40	4620	2800
	# 120	1.2	33.90	3790	1470	2.00	42.60	6180	3860
	# 150	1.4	38.00	4680	1840	2.50	48.00	7100	4260
	# 185	1.6	42.50	5880	2320	2.50	52.40	8780	5220
	# 240	1.7	47.10	7600	2920	2.50	57.20	10680	6000
	# 300	1.8	52.50	9710	3950	2.50	62.30	11920	6160
# 400	2.0	58.40	12390	4790	2.50	69.70	15940	8340	
F O U R C O R E	* 1.5	0.7	12.00	170	-	0.90	16.90	420	-
	* 2.5	0.7	12.90	220	-	0.90	17.80	500	-
	* 4.0	0.7	13.70	300	-	0.90	17.60	600	-
	* 6.0	0.7	15.10	390	-	1.25	20.00	840	-
	* 10	0.7	16.90	590	-	1.25	22.20	1200	-
	* 16	0.7	19.50	860	430	1.60	24.60	1650	1220
	* 25	0.9	22.90	1200	560	1.60	28.10	2460	1820
	# 35	0.9	23.80	1660	770	1.60	30.80	2540	1900
	# 50	1.0	27.10	2180	960	1.60	32.70	3100	2000
	# 70	1.1	33.10	3040	1330	2.00	41.00	4900	3190
	# 95	1.1	34.50	4160	1720	2.00	43.50	6390	3950
	# 120	1.2	38.50	5040	2150	2.50	49.00	7520	4630
	# 150	1.4	42.60	6420	2620	2.50	53.30	8600	4800
	# 185	1.6	47.40	8030	3280	2.50	58.50	10430	5680
	# 240	1.7	53.70	10430	4180	2.50	63.90	13120	6870
	# 300	1.8	59.00	13010	5150	2.50	69.50	16370	8510
# 400	2.0	66.70	16650	6520	3.15	78.70	21660	11530	

* Circular/Circular Compacted Stranded Conductors

Shaped Stranded Conductors

Dimensions & Weights

Table 6

XLPE Insulated Power Cables

600 / 1000 V Unarmoured and single wire armoured, LSZH over - sheathed cables.

IEC 60502-1

Nominal Area of Conductor		Nominal Area of Neutral Conductor	Nominal Thickness of Insulation		Unarmoured			Armoured			
					Approx. Cable Diameter overall	Approximate Cable weight		Armour Wire Diameter	Approx. Cable Diameter overall	Approximate Cable weight	
						Copper	Aluminium			Copper	Aluminium
mm ²		mm ²	mm		mm	kg / km		mm	mm	kg / km	
FOUR CORE WITH REDUCED NEUTRAL CONDUCTOR	* 25	* 16	0.9	0.7	23.70	1120	550	1.60	29.50	1880	1310
	# 35	* 16	0.9	0.7	24.10	1440	680	1.60	30.50	2280	1520
	# 50	* 25	1.0	0.9	27.10	1890	830	1.60	33.70	2960	1900
	# 70	* 35	1.1	0.9	31.70	2640	1110	2.00	39.50	4330	2800
	# 95	* 50	1.1	1.0	35.80	3970	1870	2.00	43.70	5950	3850
	# 120	* 70	1.2	1.1	39.90	4570	2010	2.50	48.60	6740	4180
	# 150	* 70	1.4	1.1	44.40	5470	2240	2.50	53.00	7680	440
	# 185	* 95	1.6	1.1	49.40	6890	2770	2.50	58.00	9650	5530
	# 240	* 120	1.7	1.2	55.80	9330	3990	2.50	64.50	11370	6030
	# 300	* 150	1.8	1.4	61.70	12540	4650	2.50	69.80	16020	8130
# 400	* 185	2.0	1.6	68.80	14580	5830	2.50	79.30	19700	10950	

* Circular/Circular Compacted Stranded Conductors

Shaped Stranded Conductors



Current Carrying Capacity and Voltage Drop

Current Carrying Capacity and Voltage Drop of cables mentioned in this catalogue are taken from BS 7671, 17th edition of IEE Wiring Regulations.

Appendix 4 of BS 7671 may be referred to for details on methods of Installation and Overload Protection.



TABLE 4D1A-Single-core 70°C LSZH Insulated cables ,non-armoured without sheath (COPPER CONDUCTORS)

Table 7



CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor cross-sectional area	Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method F (in free air or on a perforated cable tray horizontal or vertical etc.) Touching			Reference Method G (in free air) Spaced By one cable diameter		
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. flat	3 cables, three-phase a.c. flat	3 cables, three-phase a.c. trefoil	2 Cables, single-phase a.c. or d.c. or 3 cables three-phase a.c. flat		
	1	2	3	4	5	6	7	8	9	10
(mm ²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1.5	17.5	15.5	20	18	-	-	-	-	-	-
2.5	24	21	27	25	-	-	-	-	-	-
4	32	28	37	33	-	-	-	-	-	-
6	41	36	47	43	-	-	-	-	-	-
10	57	50	65	59	-	-	-	-	-	-
16	76	68	87	79	-	-	-	-	-	-
25	101	89	114	104	131	114	110	146	130	
35	125	110	141	129	162	143	137	181	162	
50	151	134	182	167	196	174	167	219	197	
70	192	171	234	214	251	225	216	281	254	
95	232	207	284	261	304	275	264	341	311	
120	269	239	330	303	352	321	308	396	362	
150	300	262	381	349	406	372	356	456	419	
185	341	296	436	400	463	427	409	521	480	
240	400	346	515	472	546	507	485	615	569	
300	458	394	594	545	629	587	561	709	659	
400	546	467	694	634	754	689	656	852	795	
500	626	533	792	723	868	789	749	982	920	
630	720	611	904	826	1005	905	855	1138	1070	

TABLE 4D1B-Single-core 70 °C LSZH Insulated cables ,non-armoured without sheath (COPPER CONDUCTORS)

Table 8



VOLTAGE DROP (per ampere per metre):

Conductor operating temperature : 70 °C

Conductor cross-sectional area 1	2 Cables d.c.	2 cables, single-phase a.c.									3 or 4 cables, three-phase a.c.											
		Reference Method B (enclosed in conduit or trunking)			Reference Methods C, F & G (clipped direct, on tray or in free air)						Reference Method B (enclosed in conduit or trunking)			Reference Methods C, F & G (clipped direct, on tray or in free air),								
					Cables touching			Cables spaced*						Cables touching, Trefoil		Cables touching, Flat		Cables spaced*, Flat				
		3	4	5	6	7	8	9	7	8	9											
(mm ²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)					
1.5	29	29			29			29			25			25			25					
2.5	18	18			18			18			15			15			15					
4	11	11			11			11			9.5			9.5			9.5					
6	7.3	7.3			7.3			7.3			6.4			6.4			6.4					
10	4.4	4.4			4.4			4.4			3.8			3.8			3.8					
16	2.8	2.8			2.8			2.8			2.4			2.4			2.4					
		γ	x	z	γ	x	z	γ	x	z	γ	x	z	γ	x	z	γ	x	z	γ	x	z
25	1.75	1.80	0.33	1.80	1.75	0.20	1.75	1.75	0.29	1.80	1.50	0.29	1.55	1.50	0.175	1.50	1.50	0.25	1.55	1.50	0.32	1.55
35	1.25	1.30	0.31	1.30	1.25	0.195	1.25	1.25	0.28	1.30	1.10	0.27	1.10	1.10	0.170	1.10	1.10	0.24	1.10	1.10	0.32	1.15
50	0.93	0.95	0.30	1.00	0.93	0.190	0.95	0.93	0.28	0.97	0.81	0.26	0.85	0.80	0.165	0.82	0.80	0.24	0.84	0.80	0.32	0.86
70	0.63	0.65	0.29	0.72	0.63	0.185	0.66	0.63	0.27	0.69	0.56	0.25	0.61	0.55	0.160	0.57	0.55	0.24	0.60	0.55	0.31	0.63
95	0.46	0.49	0.28	0.56	0.47	0.180	0.50	0.47	0.27	0.54	0.42	0.24	0.48	0.41	0.155	0.43	0.41	0.23	0.47	0.40	0.31	0.51
120	0.36	0.39	0.27	0.47	0.37	0.175	0.41	0.37	0.26	0.45	0.33	0.23	0.41	0.32	0.150	0.36	0.32	0.23	0.40	0.32	0.30	0.44
150	0.29	0.31	0.27	0.41	0.30	0.175	0.34	0.29	0.26	0.39	0.27	0.23	0.36	0.26	0.150	0.30	0.26	0.23	0.34	0.26	0.30	0.40
185	0.23	0.25	0.27	0.37	0.24	0.170	0.29	0.24	0.26	0.35	0.22	0.23	0.32	0.21	0.145	0.26	0.21	0.22	0.31	0.21	0.30	0.36
240	0.180	0.195	0.26	0.33	0.185	0.165	0.25	0.185	0.25	0.31	0.17	0.23	0.29	0.160	0.145	0.22	0.160	0.22	0.27	0.160	0.29	0.34
300	0.145	0.160	0.26	0.31	0.150	0.165	0.22	0.150	0.25	0.29	0.14	0.23	0.27	0.130	0.140	0.190	0.130	0.22	0.25	0.130	0.29	0.32
400	0.105	0.130	0.26	0.29	0.120	0.160	0.20	0.115	0.25	0.27	0.12	0.22	0.25	0.105	0.140	0.175	0.105	0.21	0.24	0.100	0.29	0.31
500	0.086	0.110	0.26	0.28	0.098	0.155	0.185	0.093	0.24	0.26	0.10	0.22	0.25	0.086	0.135	0.160	0.086	0.21	0.23	0.081	0.29	0.30
630	0.068	0.094	0.25	0.27	0.081	0.155	0.175	0.076	0.24	0.25	0.08	0.22	0.24	0.072	0.135	0.150	0.072	0.21	0.22	0.66	0.28	0.29



TABLE 4E1A - Single core 90°C XLPE Insulated cables, unarmoured with LSZH sheath (COPPER CONDUCTORS)

Table 9



CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method F (in free air or on a perforated cable tray etc, Horizontal or vertical etc.) Touching			Reference Method G (in free air) Spaced By one cable diameter		
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. flat	3 cables, three-phase a.c. flat	3 cables, three-phase a.c. trefoil	2 cables, single-phase a.c or d.c. or 3 cables three-phase a.c. flat		
	1	2	3	4	5	6	7	8	9	10
(mm ²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1.5	23	20	25	23	-	-	-	-	-	-
2.5	31	28	34	31	-	-	-	-	-	-
4	42	37	46	41	-	-	-	-	-	-
6	54	48	59	54	-	-	-	-	-	-
10	75	66	81	74	-	-	-	-	-	-
16	100	88	109	99	-	-	-	-	-	-
25	133	117	143	130	161	141	135	182	161	
35	164	144	176	161	200	176	169	226	201	
50	198	175	228	209	242	216	207	275	246	
70	253	222	293	268	310	279	268	353	318	
95	306	269	355	326	377	342	328	430	389	
120	354	312	413	379	437	400	383	500	454	
150	393	342	476	436	504	464	444	577	527	
185	449	384	545	500	575	533	510	661	605	
240	528	450	644	590	679	634	607	781	719	
300	603	514	743	681	783	736	703	902	833	
400	683	584	868	793	940	868	823	1058	1008	
500	783	666	990	904	1083	998	946	1253	1169	
630	900	764	1130	1033	1254	1151	1088	1454	1362	
800	-	-	1288	1179	1358	1275	1214	1581	1485	
1000	-	-	1443	1323	1520	1436	1349	1775	1671	

Notes:

1. Where a conductor operates at a temperature exceeding 70°C it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512.1.2).
2. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for PVC thermoplastic insulated cables (Table 4D1A) must be used (see also Regulation 523.1)

TABLE 4E1B - Single core 90°C XLPE Insulated cables, unarmoured with LSZH sheath (COPPER CONDUCTORS)

Table 10



VOLTAGE DROP (per ampere per metre):

Conductor operating temperature: 90°C

Conductor cross-sectional area 1	2 Cables d.c.	2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.											
		Reference Method B (enclosed in conduit or trunking)			Reference Methods C, F & G (clipped direct, on tray or in free air)			Reference Method B (enclosed in conduit or trunking)			Reference Methods C, F & G (clipped direct, on tray or in free air)								
					Cables touching			Cables spaced*			Cables touching, Trefoil			Cables touching, Flat			Cables spaced*, Flat		
		3	4	5	6	7	8	9											
(mm ²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)					
1.5	31	31			31			27			27			27					
2.5	19	19			19			16			16			16					
4	12	12			12			10			10			10					
6	7.9	7.9			7.9			6.8			6.8			6.8					
10	4.7	4.7			4.7			4.0			4.0			4.0					
16	2.9	2.9			2.9			2.5			2.5			2.5					
25	1.85	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
35	1.35	1.85	0.31	1.90	1.85	0.190	1.85	1.85	0.28	1.85	1.60	0.27	1.65	1.60	0.165	1.60	1.60	0.190	1.60
50	0.99	1.35	0.29	1.35	1.35	0.180	1.35	1.35	0.27	1.35	1.15	0.25	1.15	1.15	0.155	1.15	1.15	0.180	1.15
70	0.68	1.00	0.29	1.05	0.99	0.180	1.00	0.99	0.27	1.00	0.87	0.25	0.90	0.86	0.155	0.87	0.86	0.180	0.87
95	0.49	0.70	0.28	0.75	0.68	0.175	0.71	0.68	0.26	0.73	0.60	0.24	0.65	0.59	0.150	0.61	0.59	0.175	0.62
120	0.39	0.49	0.27	0.58	0.49	0.170	0.52	0.49	0.26	0.56	0.44	0.23	0.50	0.43	0.145	0.45	0.43	0.170	0.46
150	0.32	0.39	0.26	0.48	0.39	0.165	0.43	0.39	0.25	0.47	0.35	0.23	0.42	0.34	0.140	0.37	0.34	0.165	0.38
185	0.25	0.32	0.26	0.43	0.32	0.165	0.36	0.32	0.25	0.41	0.29	0.23	0.37	0.28	0.140	0.31	0.28	0.165	0.32
240	0.190	0.26	0.26	0.37	0.26	0.165	0.30	0.25	0.25	0.36	0.23	0.23	0.32	0.22	0.140	0.26	0.22	0.165	0.28
300	0.155	0.20	0.26	0.33	0.20	0.160	0.25	0.195	0.25	0.31	0.185	0.22	0.29	0.170	0.140	0.22	0.170	0.165	0.24
400	0.120	0.160	0.25	0.31	0.160	0.160	0.22	0.155	0.25	0.29	0.150	0.22	0.27	0.140	0.140	0.195	0.135	0.160	0.21
500	0.093	0.130	0.25	0.29	0.130	0.155	0.20	0.125	0.24	0.27	0.125	0.22	0.25	0.110	0.135	0.175	0.110	0.160	0.195
630	0.072	0.105	0.25	0.28	0.105	0.155	0.185	0.098	0.24	0.26	0.100	0.22	0.24	0.090	0.135	0.160	0.088	0.160	0.180
800	0.056	0.086	0.25	0.27	0.086	0.155	0.175	0.078	0.24	0.25	0.088	0.21	0.23	0.074	0.135	0.150	0.071	0.160	0.170
1000	0.045	0.072	-	-	0.072	0.150	0.170	0.064	0.24	0.25	0.062	0.130	0.145	0.062	0.130	0.145	0.059	0.155	0.165
		0.063	-	-	0.063	0.150	0.165	0.054	0.24	0.24	0.055	0.130	0.140	0.050	0.155	0.165	0.047	0.23	0.24

Note: *Spacings larger than one cable diameter will result in a larger voltage drop.

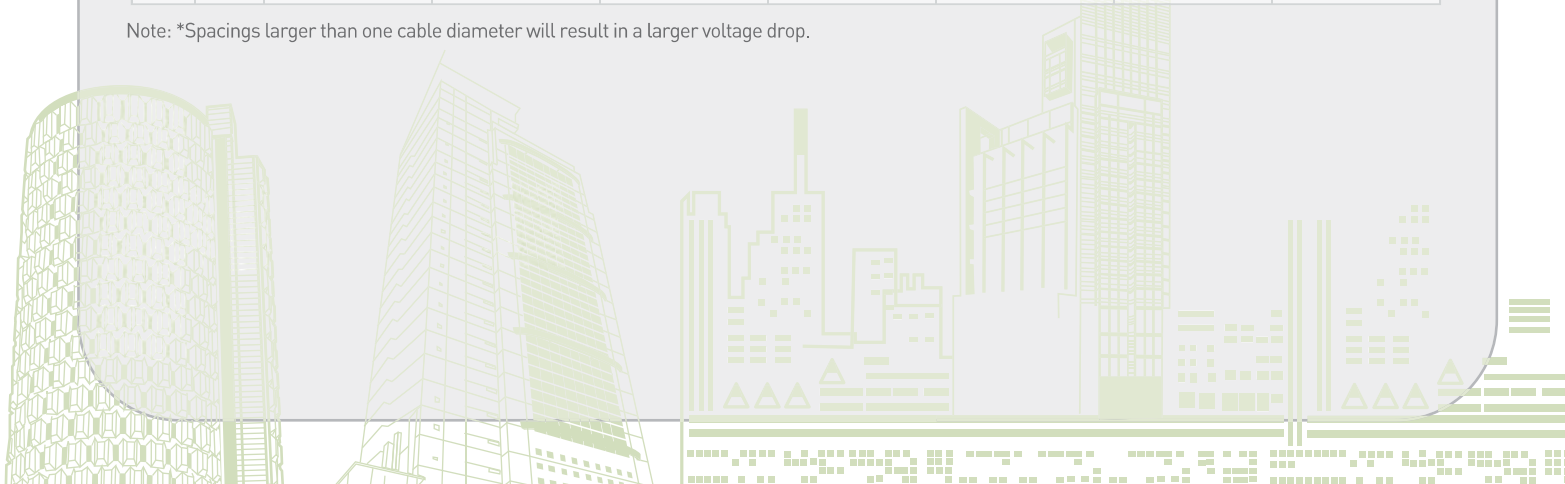
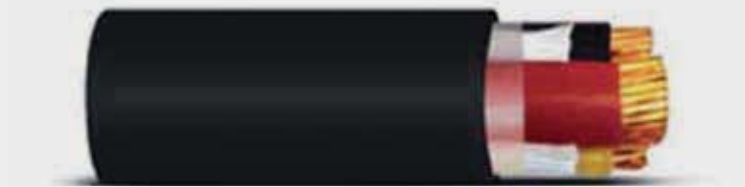


TABLE 4E2A - Multi core 90°C XLPE Insulated and LSZH sheathed cables, non-armoured (COPPER CONDUCTORS)

Table 11



CURRENT-CARRYING CAPACITY [amperes]:

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated cable tray etc. horizontal or vertical)	
	1 two-core cable*, single phase a.c. or d.c.	1 three or four-core cable*, three-phase a.c.	1 two-core cable*, single-phase a.c. or d.c.	1 three or four-core cable*, three-phase a.c.	1 two-core cable*, single-phase a.c. or d.c.	1 three or four-core cable*, three-phase a.c.
1	2	3	4	5	6	7
(mm ²)	(A)	(A)	(A)	(A)	(A)	(A)
1.5	22	19.5	24	22	26	23
2.5	30	26	33	30	36	32
4	40	35	45	40	49	42
6	51	44	58	52	63	54
10	69	60	80	71	86	75
16	91	80	107	96	115	100
25	119	105	138	119	149	127
35	146	128	171	147	185	158
50	175	154	209	179	225	192
70	221	194	269	229	289	246
95	265	233	328	278	352	298
120	305	268	382	322	410	346
150	334	300	441	371	473	399
185	384	340	506	424	542	456
240	459	398	599	500	641	538
300	532	455	693	576	741	621
400	625	536	803	667	865	741

* with or without a protective conductor

NOTES:

- Where a conductor operates at a temperature exceeding 70°C it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512.1.2).
- Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C thermoplastic insulated cables (Table 4D2A) must be used (see also Regulation 523.1).

TABLE 4E2B - Multi core 90°C XLPE Insulated and LSZH sheathed cables, non-armoured (COPPER CONDUCTORS)

Table 12



VOLTAGE DROP (per ampere per metre):

Conductor operating temperature: 90°C

Conductor cross-sectional area 1	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three or four-core cable, Three-phase a.c.		
	2	3			4		
(mm ²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1.5	31	31			27		
2.5	19	19			16		
4	12	12			10		
6	7.9	7.9			6.8		
10	4.7	4.7			4.0		
16	2.9	2.9			2.5		
		r	x	z	r	x	z
25	1.85	1.85	0.160	1.90	1.60	0.140	1.65
35	1.35	1.35	0.155	1.35	1.15	0.135	1.15
50	0.98	0.99	0.155	1.00	0.86	0.135	0.87
70	0.67	0.67	0.150	0.69	0.59	0.130	0.60
95	0.49	0.50	0.150	0.52	0.43	0.130	0.45
120	0.39	0.40	0.145	0.42	0.34	0.130	0.37
150	0.31	0.32	0.145	0.35	0.28	0.125	0.30
185	0.25	0.26	0.145	0.29	0.22	0.125	0.26
240	0.195	0.200	0.140	0.24	0.175	0.125	0.21
300	0.155	0.160	0.140	0.21	0.140	0.120	0.185
400	0.120	0.130	0.140	0.190	0.115	0.120	0.165



TABLE 4E3A - Single core 90°C armoured XLPE Insulated and LSZH sheathed cables, Aluminium wire armour (COPPER CONDUCTORS)

Table 13



CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method C (clipped direct)		Reference Method F (in free air or on a perforated cable tray horizontal or vertical)								
	Touching		Touching			Spaced by one cable diameter					
	2 cables, single-phase a.c. or d.c. flat	3 or 4 cables, three-phase a.c. flat	2 cables, single-phase a.c. or d.c. flat	3 cables, three-phase a.c. flat	3 cables, three-phase a.c. trefoil	2 cables, d.c.		2 cables, single-phase a.c.		3 or 4 cables, three-phase a.c.	
						Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
1	2	3	4	5	6	7	8	9	10	11	12
(mm ²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	237	220	253	232	222	284	270	282	266	288	266
70	303	277	322	293	285	356	349	357	337	358	331
95	367	333	389	352	346	446	426	436	412	425	393
120	425	383	449	405	402	519	497	504	477	485	449
150	488	437	516	462	463	600	575	566	539	549	510
185	557	496	587	524	529	688	660	643	614	618	574
240	656	579	689	612	625	815	782	749	714	715	666
300	755	662	792	700	720	943	906	842	805	810	755
400	853	717	899	767	815	1137	1094	929	889	848	797
500	962	791	1016	851	918	1314	1266	1032	989	923	871
630	1082	861	1146	935	1027	1528	1474	1139	1092	992	940
800	1170	904	1246	987	1119	1809	1744	1204	1155	1042	978
1000	1261	961	1345	1055	1214	2100	2026	1289	1238	1110	1041

Notes:

- Where a conductor operates at a temperature exceeding 70°C, it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512.1.2).
- Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C thermoplastic insulated cables (Table 4D3A) must be used (see also Regulation 523.1).

TABLE 4E3B - Single core 90°C armoured XLPE Insulated and LSZH sheathed cables, Aluminium wire armour (COPPER CONDUCTORS)

Table 14



VOLTAGE DROP (per ampere per metre):

Conductor operating temperature: 90°C

Conductor cross-sectional area 1	2 Cables d.c. 2	Reference Methods C & F (clipped direct, on tray or in free air)														
		2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.								
		Touching 3			Spaced* 4			Trefoil and touching 5			Flat and touching 6			Flat and spaced* 7		
(mm ²)	(mV/A/m)	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	0.98	0.99	0.21	1.00	0.98	0.29	1.00	0.86	0.180	0.87	0.84	0.25	0.88	0.84	0.33	0.90
70	0.67	0.68	0.200	0.71	0.69	0.29	0.75	0.59	0.170	0.62	0.60	0.25	0.65	0.62	0.32	0.70
95	0.49	0.51	0.195	0.55	0.53	0.28	0.60	0.44	0.170	0.47	0.46	0.24	0.52	0.49	0.31	0.58
120	0.39	0.41	0.190	0.45	0.43	0.27	0.51	0.35	0.165	0.39	0.38	0.24	0.44	0.41	0.30	0.51
150	0.31	0.33	0.185	0.38	0.36	0.27	0.45	0.29	0.160	0.33	0.31	0.23	0.39	0.34	0.29	0.45
185	0.25	0.27	0.185	0.33	0.30	0.26	0.40	0.23	0.160	0.28	0.26	0.23	0.34	0.29	0.29	0.41
240	0.195	0.21	0.180	0.28	0.24	0.26	0.35	0.180	0.155	0.24	0.21	0.22	0.30	0.24	0.28	0.37
300	0.155	0.170	0.175	0.25	0.195	0.25	0.32	0.145	0.150	0.21	0.170	0.22	0.28	0.20	0.27	0.34
400	0.115	0.145	0.170	0.22	0.180	0.24	0.30	0.125	0.150	0.195	0.160	0.21	0.27	0.20	0.27	0.33
500	0.093	0.125	0.170	0.21	0.165	0.24	0.29	0.105	0.145	0.180	0.145	0.20	0.25	0.190	0.24	0.31
630	0.073	0.105	0.165	0.195	0.150	0.23	0.27	0.092	0.145	0.170	0.135	0.195	0.24	0.175	0.23	0.29
800	0.056	0.090	0.160	0.190	0.145	0.23	0.27	0.086	0.140	0.165	0.130	0.180	0.23	0.175	0.195	0.26
1000	0.045	0.092	0.155	0.180	0.140	0.21	0.25	0.080	0.135	0.155	0.125	0.170	0.21	0.165	0.180	0.24

Note: * Spacings larger than one cable diameter will result in a larger voltage drop.

TABLE 4E4A - Multi core 90°C armoured XLPE Insulated and LSZH sheathed cables, (COPPER CONDUCTORS)

Table 15



Air Ambient temperature: 30°C
Ground ambient temperature: 20°C
Conductor operating temperature: 90°C

CURRENT-CARRYING CAPACITY (amperes):

Conductor cross-sectional area	Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated cable tray etc. horizontal or vertical)		Reference Method D (direct in ground or in ducting in ground, in or around buildings)	
	1 two-core cable, single-phase a.c. or d.c.	1 three or 1 four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three or 1 four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three or 1 four-core cable, three-phase a.c.
1	2	3	4	5	6	7
(mm ²)	(A)	(A)	(A)	(A)	(A)	(A)
1.5	27	23	29	25	25	21
2.5	36	31	39	33	33	28
4	49	42	52	44	43	36
6	62	53	66	56	53	44
10	85	73	90	78	71	58
16	110	94	115	99	91	75
25	146	124	152	131	116	96
35	180	154	188	162	139	115
50	219	187	228	197	164	135
70	279	238	291	251	203	167
95	338	289	354	304	239	197
120	392	335	410	353	271	223
150	451	386	472	406	306	251
185	515	441	539	463	343	281
240	607	520	636	546	395	324
300	698	599	732	628	446	365
400	787	673	847	728	-	-

Notes:

1. Where a conductor operates at a temperature exceeding 70°C it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512.1.2).
2. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C thermoplastic insulated cables (Table 4D4A) must be used (see also Regulation 523.1).

TABLE 4E4B - Multi core 90°C armoured XLPE Insulated and LSZH sheathed cables, (COPPER CONDUCTORS)

Table 16



VOLTAGE DROP (per ampere per metre):

Conductor operating temperature: 90°C

Conductor cross-sectional area 1	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three or four-core cable, three-phase a.c.		
	2	3			4		
(mm ²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1.5	31	31			27		
2.5	19	19			16		
4	12	12			10		
6	7.9	7.9			6.8		
10	4.7	4.7			4.0		
16	2.9	2.9			2.5		
		r	X	Z	r	x	Z
25	1.85	1.85	0.160	1.90	1.60	0.140	1.65
35	1.35	1.35	0.155	1.35	1.15	0.135	1.15
50	0.98	0.99	0.155	1.00	0.86	0.135	0.87
70	0.67	0.67	0.150	0.69	0.59	0.130	0.60
95	0.49	0.50	0.150	0.52	0.43	0.130	0.45
120	0.39	0.40	0.145	0.42	0.34	0.130	0.37
150	0.31	0.32	0.145	0.35	0.28	0.125	0.30
185	0.25	0.26	0.145	0.29	0.22	0.125	0.26
240	0.195	0.20	0.140	0.24	0.175	0.125	0.21
300	0.155	0.16	0.140	0.21	0.140	0.120	0.185
400	0.120	0.13	0.140	0.190	0.115	0.120	0.165

TABLE 4J1A - Single core 90°C XLPE Insulated cables, unarmoured, with LSZH sheath (ALUMINIUM CONDUCTORS)

Table 17



CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 90°C

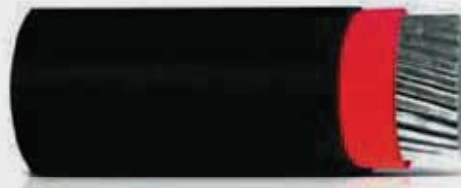
Conductor cross-sectional area	Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method F (in free air or on a perforated cable tray horizontal or vertical etc.) Touching			Reference Method G (in free air) Spaced By one cable diameter	
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. flat	3 cables, three-phase a.c. flat	3 cables, three-phase a.c. trefoil	2 Cables, single-phase a.c. or d.c. or 3 cables three-phase a.c. flat	
1	2	3	4	5	6	7	8	9	10
[mm ²]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]
50	157	140	154	136	184	165	159	210	188
70	200	179	198	174	237	215	206	271	244
95	242	217	241	211	289	264	253	332	300
120	281	251	280	245	337	308	296	387	351
150	307	267	324	283	389	358	343	448	408
185	351	300	371	323	447	413	395	515	470
240	412	351	439	382	530	492	471	611	561
300	471	402	508	440	613	571	544	708	652

Notes:

1. Where a conductor operates at a temperature exceeding 70°C it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature [see Regulation 512.1.2].
2. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C thermoplastic insulated cables (Table 4H1A) must be used (see also Regulation 523.1).

TABLE 4J1B - Single core 90°C XLPE Insulated cables, unarmoured, with LSZH sheath (ALUMINIUM CONDUCTORS)

Table 18



VOLTAGE DROP (per ampere per metre):

Conductor operating temperature: 90°C

Conductor cross-sectional area 1	2 Cables d.c.	2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.														
		Reference Method B (enclosed in conduit or trunking) 3			Reference Methods C, F & G (clipped direct, on tray or in free air)			Reference Method B (enclosed in conduit or trunking) 6			Reference Methods C, F & G (clipped direct, on tray or in free air)											
					Cables touching 4			Cables spaced* 5			Cables touching, Trefoil 7			Cables touching, Flat 8			Cables spaced*, Flat 9					
(mm ²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)					
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	1.65	1.70	0.30	1.72	1.65	0.190	1.66	1.65	0.28	1.68	1.44	0.26	1.46	1.44	0.165	1.45	1.44	0.24	1.46	1.44	0.32	1.48
70	1.13	1.17	0.30	1.21	1.12	0.185	1.14	1.12	0.27	1.15	1.00	0.26	1.04	0.97	0.160	0.98	0.97	0.24	1.00	0.97	0.31	1.02
95	0.82	0.86	0.29	0.91	0.82	0.185	0.84	0.82	0.27	0.94	0.75	0.25	0.79	0.71	0.160	0.73	0.71	0.23	0.75	0.71	0.31	0.78
120	0.65	0.68	0.29	0.74	0.65	0.180	0.67	0.65	0.27	0.70	0.59	0.25	0.64	0.57	0.155	0.59	0.57	0.23	0.61	0.57	0.31	0.64
150	0.53	0.54	0.28	0.61	0.52	1.75	0.55	0.52	0.26	0.58	0.48	0.24	0.54	0.45	0.155	0.47	0.45	0.23	0.50	0.45	0.30	0.54
185	0.42	0.45	0.28	0.53	0.43	0.175	0.46	0.42	0.26	0.49	0.38	0.24	0.45	0.36	0.150	0.39	0.36	0.23	0.43	0.36	0.30	0.47
240	0.32	0.34	0.27	0.43	0.32	0.170	0.36	0.32	0.26	0.41	0.30	0.24	0.38	0.28	0.150	0.32	0.28	0.22	0.35	0.28	0.30	0.41
300	0.26	0.28	0.27	0.38	0.26	0.170	0.31	0.26	0.26	0.36	0.25	0.23	0.34	0.22	0.145	0.27	0.22	0.22	0.31	0.22	0.30	0.37

Note: * Spacings larger than one cable diameter will result in a larger voltage drop.



TABLE 4J2A- Multi core 90°C XLPE Insulated and LSZH Sheathed cables, non-aremoured (ALUMINIUM CONDUCTORS)

Table 19



Ambient temperature: 30°C

Conductor operating temperature: 90°C

CURRENT-CARRYING CAPACITY (amperes):

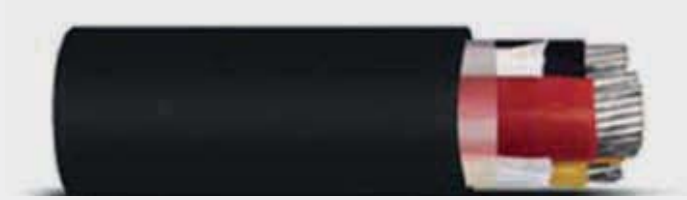
Conductor cross-sectional area	Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated Cable tray etc, Horizontal or vertical)	
	1 two-core Cable, single-Phase a.c. or d.c.	1 three- or Four-core Cable, three-Phase a.c.	1 two-core Cable, single-Phase a.c. or d.c.	1 three- or Four-core Cable, three-Phase a.c.	1 two-core Cable, single-Phase a.c. or d.c.	1 three- or Four-core Cable, three-Phase a.c.
1	2	3	4	5	6	7
(mm ²)	(A)	(A)	(A)	(A)	(A)	(A)
16	72	64	84	76	91	77
25	94	84	101	90	108	97
35	115	103	126	112	135	120
50	138	124	154	136	164	146
70	175	156	198	174	211	187
95	210	188	241	211	257	227
120	-	216	-	245	-	263
150	-	240	-	283	-	304
185	-	272	-	323	-	347
240	-	318	-	382	-	409
300	-	364	-	440	-	471

Notes:

1. Where a conductor operates at a temperature exceeding 70°C, it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512.1.2).
2. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C thermoplastic insulated cables (Table 4H2A) must be used (see also Regulation 523.1).

TABLE 4J2B- Multi core 90°C XLPE Insulated and LSZH Sheathed cables, non-aremoured (ALUMINIUM CONDUCTORS)

Table 20



VOLTAGE DROP (per ampere per metre):

Conductor operating temperature: 90°C

Conductor cross-sectional area 1	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three or four-core cable, three-phase a.c.		
	2	3			4		
(mm ²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
16	4.8	4.8			4.2		
		r	x	z	r	x	z
25	3.1	3.1	0.165	3.1	2.7	0.140	2.7
35	2.2	2.2	0.160	2.2	1.90	0.140	1.95
50	1.60	1.60	0.160	1.65	1.40	0.135	1.45
70	1.10	1.10	0.155	1.15	0.96	0.135	0.97
95	0.82	0.82	0.150	0.84	0.71	0.130	0.72
120	-	-	-	-	0.56	0.130	0.58
150	-	-	-	-	0.45	0.130	0.47
185	-	-	-	-	0.37	0.130	0.39
240	-	-	-	-	0.28	0.125	0.31
300	-	-	-	-	0.23	0.125	0.26

**TABLE 4J3A - Single core 90°C armoured XLPE Insulated and LSZH Sheathed cables
Aluminium wire armour (ALUMINIUM CONDUCTORS)**

Table 21



CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method C (clipped direct)		Reference Method F (in free air or on a perforated cable tray, horizontal or vertical)									
	Touching		Touching			Spaced by one cable diameter						
	2 cables, single-phase a.c. or d.c. flat	3 or 4 cables, three-phase a.c. flat	2 cables, single-phase a.c. or d.c. flat	3 cables, three-phase a.c. flat	3 cables, three-phase a.c. trefoil	2 cables, d.c.		2 cables, single-phase a.c.		3 or 4 cables, three-phase a.c.		
						Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	
1	2	3	4	5	6	7	8	9	10	11	12	
(mm ²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	179	165	192	176	162	216	197	212	199	215	192	
70	228	209	244	222	207	275	253	269	254	270	244	
95	276	252	294	276	252	332	307	328	310	324	296	
120	320	291	340	308	292	384	357	378	358	372	343	
150	368	333	390	352	337	441	411	429	409	424	394	
185	419	378	444	400	391	511	480	490	467	477	447	
240	494	443	521	468	465	605	572	576	549	554	523	
300	568	508	597	536	540	701	666	654	624	626	595	

Notes:

1. Where a conductor operates at a temperature exceeding 70°C, it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512.1.2).
2. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C thermoplastic insulated cables (Table 4H3A) must be used (see also Regulation 523.1).

**TABLE 4J3B - Single core 90°C armoured XLPE Insulated and LSZH Sheathed cables
Aluminium wire armour (ALUMINIUM CONDUCTORS)**

Table 22



VOLTAGE DROP (per ampere per metre):

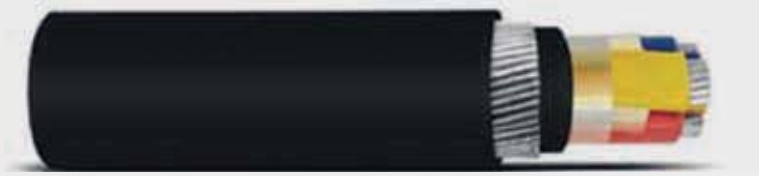
Conductor operating temperature: 90°C

Conductor cross-sectional area 1	2 Cables d.c. 2	Reference Methods C & F (clipped direct, on tray or in free air)														
		2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.								
		Touching 3			Spaced* 4			Trefoil and touching 5			Flat and touching 6			Flat and spaced* 7		
(mm ²)	(mV/ A/m)	(mV/ A/m)			(mV/ A/m)			(mV/ A/m)			(mV/ A/m)			(mV/ A/m)		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	1.60	1.60	0.22	1.60	1.60	0.30	1.60	1.40	0.185	1.40	1.40	0.26	1.40	1.35	0.34	1.40
70	1.10	1.10	0.21	1.15	1.10	0.29	1.15	0.96	0.180	0.98	0.97	0.25	1.00	0.99	0.33	1.05
95	0.82	0.83	0.20	0.85	0.85	0.29	0.90	0.71	0.175	0.74	0.74	0.25	0.78	0.76	0.32	0.83
120	0.66	0.66	0.20	0.69	0.69	0.28	0.74	0.57	0.170	0.60	0.60	0.24	0.64	0.63	0.31	0.70
150	0.52	0.53	0.195	0.57	0.56	0.28	0.62	0.46	0.170	0.49	0.49	0.24	0.54	0.52	0.30	0.60
185	0.42	0.43	0.190	0.47	0.46	0.27	0.54	0.38	0.165	0.41	0.40	0.24	0.47	0.44	0.30	0.53
240	0.32	0.34	0.185	0.39	0.37	0.27	0.45	0.29	0.160	0.34	0.32	0.23	0.39	0.35	0.29	0.46
300	0.26	0.27	0.185	0.33	0.30	0.26	0.40	0.24	0.160	0.29	0.26	0.23	0.34	0.29	0.29	0.41

Note: * Spacings larger than one cable diameter will result in a larger voltage drop.

TABLE 4J4A - Multi core 90°C armoured XLPE Insulated and LSZH Sheathed cables (ALUMINIUM CONDUCTORS)

Table 23



Air ambient temperature: 30°C
Ground ambient temperature: 20°C
Conductor operating temperature: 90°C

CURRENT-CARRYING CAPACITY (amperes):

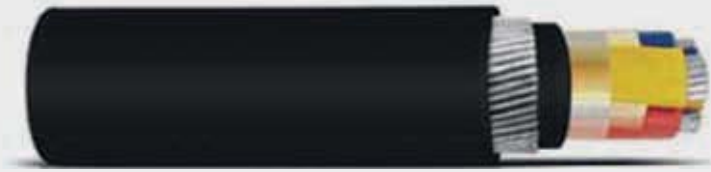
Conductor cross-sectional area	Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated cable tray etc. horizontal or vertical)		Reference Method D (direct in ground or in ducting in ground, in or around buildings)	
	1 two-core cable, single-phase a.c. or d.c.	1 three or 1 four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three or 1 four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three or 1 four-core cable, three-phase a.c.
1	2	3	4	5	6	7
(mm ²)	(A)	(A)	(A)	(A)	(A)	(A)
16	82	71	85	74	71	59
25	108	92	112	98	90	75
35	132	113	138	120	108	90
50	159	137	166	145	128	106
70	201	174	211	185	158	130
95	242	214	254	224	186	154
120	-	249	-	264	-	174
150	-	284	-	305	-	197
185	-	328	-	350	-	220
240	-	386	-	418	-	253
300	-	441	-	488	-	286

Notes:

1. Where a conductor operates at a temperature exceeding 70°C, it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512.1.2).
2. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C thermoplastic insulated cables (Table 4H4A) must be used (see also Regulation 523.1).

TABLE 4J4B - Multi core 90°C armoured XLPE Insulated and LSZH Sheathed cables (ALUMINIUM CONDUCTORS)

Table 24



VOLTAGE DROP (per ampere per metre):

Conductor operating temperature: 90°C

Conductor cross-sectional area 1	Two-core cable, d.c.	Two-core cable, Single-phase a.c.			Three-or four-core cable, three-phase a.c.		
	2	3			4		
(mm ²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
16	4.8	4.8			4.2		
		r	x	z	r	x	z
25	3.1	3.1	0.165	3.1	2.7	0.140	2.7
35	2.2	2.2	0.160	2.2	1.90	0.140	1.95
50	1.60	1.65	0.160	1.65	1.40	0.135	1.45
70	1.10	1.10	0.155	1.15	0.96	0.135	0.97
95	0.82	0.82	0.150	0.84	0.71	0.130	0.72
120	-	-	-	-	0.56	0.130	0.58
150	-	-	-	-	0.45	0.130	0.47
185	-	-	-	-	0.37	0.130	0.39
240	-	-	-	-	0.28	0.125	0.31
300	-	-	-	-	0.23	0.125	0.26

Correction Factors:

Table 25

TABLE 4B1-Rating factors for ambient air temperatures other than 30°C to be applied to the current-carrying capacities for cables in free air.

Ambient temperature °C	Insulation	
	70 °C LSZH	90 °C XLPE
25	1.03	1.02
30	1.00	1.00
35	0.94	0.96
40	0.87	0.91
45	0.79	0.87
50	0.71	0.82
55	0.61	0.76

TABLE 4B2-Rating factors for ambient ground temperatures other than 20°C to be applied to the current-carrying capacities for cables buried direct in the ground or in an underground conduit system to BS EN 50086-2-4.

Table 26

Ground temperature °C	Insulation	
	70 °C LSZH	90 °C XLPE
10	1.10	1.07
15	1.05	1.04
20	1.00	1.00
25	0.95	0.96
30	0.89	0.93
35	0.84	0.89
40	0.77	0.85
45	0.71	0.80

TABLE 4B3 - Rating factors for cables buried direct in the ground or in an underground conduit system to BS EN 50086-2-4 for soil thermal resistivities other than 2.5 K.m/W to be applied to the current-carrying capacities for Reference Method D

Table 27

Thermal resistivity, K.m/W	0.5	0.8	1	1.5	2	2.5	3
Rating factor for cables in buried ducts	1.28	1.20	1.18	1.1	1.05	1	0.96
Rating factor for direct buried cables	1.88	1.62	1.5	1.28	1.12	1	0.90

Note 1: The rating factors given have been averaged over the range of conductor sizes and types of installation included in the relevant tables in this appendix. The overall accuracy of rating factors is within $\pm 5\%$.

Note 2: The rating factors are applicable to cables drawn into buried ducts. For cables laid direct in the ground the rating factors for thermal resistivities less than 2.5 K.m/W will be higher. Where more precise values are required they may be calculated by methods given in BS 7769 (BS IEC 60287).

Note 3: The rating factors are applicable to ducts buried at depths of up to 0.8m

TABLE 4C1 - Rating factors for one circuit or one multicore cable or for a group of circuits, or a group of multicore cables

Table 28

Arrangement (cables touching)	Number of circuits or multicore cables												To be used with current-carrying capacities, Reference
	1	2	3	4	5	6	7	8	9	12	16	20	
Bunched in air, on a surface, embedded or enclosed	1.00	0.80	0.70	0.65	0.60	0.57	0.54	0.52	0.50	0.45	0.41	0.38	Methods A to F
Single layer on wall or floor	1.00	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70	0.70	0.70	0.70	Method C
Single layer multicore on a perforated horizontal or vertical cable tray system	1.00	0.88	0.82	0.77	0.75	0.73	0.73	0.72	0.72	0.72	0.72	0.72	Methods E and F
Single layer multicore on cable ladder system or cleats etc.	1.00	0.87	0.82	0.80	0.80	0.79	0.79	0.78	0.78	0.78	0.78	0.78	

Note 1: These factors are applicable to uniform groups of cables, equally loaded.

Note 2: Where horizontal clearances between adjacent cables exceed twice their overall diameter, no rating factor needs to be applied.

Note 3: The same factors are applied to:

- Groups of two or three single-core cables;
- Multicore cables

Note 4: If a system consists of both two and three-core cables, the total number of cables is taken as the number of circuits and the corresponding factor is applied to the tables for two loaded conductors for the two-core cables and to the tables for three loaded conductors for the three-core cables.

Note 5: If a group consists of n single-core cables, it may either be considered as $n/2$ circuits of two loaded conductors or $n/3$ circuits of three loaded conductors.

Note 6: The rating factors given have been averaged over the range of conductor sizes and types of the overall accuracy of tabulated values is within 5%.

Note 7: For some installations and for other methods not provided for in the above table, it may be appropriate to use factors calculated for specific cases, see Tables 4C4 and 4C5, for example.

Note 8: When cables having differing conductor operating temperature are grouped together, the current rating is to be based upon the lowest operating temperature of any cable in the group.

Note 9: If due to known operating conditions, a cable is expected to carry not more than 30% of its grouped rating, it may be ignored for the purpose of obtaining the rating factor for the rest of the group.

For example, a group of N loaded cables would normally require a group rating factor of C_g applied to the tabulated I_t .

However, if M cables in the group carry loads which are not greater than $0.3 C_g I_t$ amperes the other cables can be sized by using the group rating factor corresponding to $(N-M)$ cables.



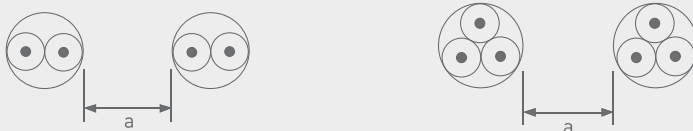
TABLE 4C2 -Rating factors for more than one circuit, cables laid directly in the ground — Reference Method D

Single-core or Multi - core cables

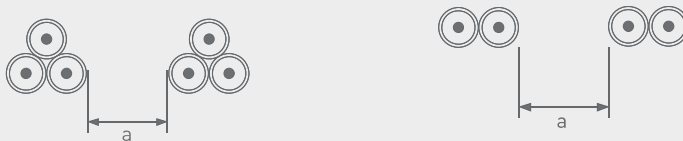
Table 29

Number of circuits	Cable-to-cable clearance (α)				
	Nil (cables touching)	One cable diameter	0.125 m	0.25 m	0.5 m
2	0.75	0.80	0.85	0.90	0.90
3	0.65	0.70	0.75	0.80	0.85
4	0.60	0.60	0.70	0.75	0.80
5	0.55	0.55	0.65	0.70	0.80
6	0.50	0.55	0.60	0.70	0.80

Multicore cables



Single-core cables



Note 1: Values given apply to an installation depth of 0.7m and a soil thermal resistivity of 2.5 K.m/W. These are average values. The process of averaging, together with rounding off, can result in some cases in errors of up to $\pm 10\%$. (Where more precise values are required they may be calculated by methods given in BS 7769 [BS IEC 60287].)

Note 2: In case of a thermal resistivity lower than 2.5 K.m/W, the rating factors can, in general, be increased and can be calculated by the methods given in BS 7769 [BS IEC 60287].

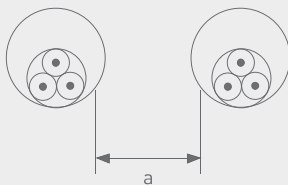
TABLE 4C3 - Rating factors for more than one circuit, cables laid in ducts in the ground — Reference Method D

i) Multi-core cables in single-way ducts

Table 30

Number of cables	Duct-to-duct clearance (α)			
	Nil (ducts touching)	0.25 m	0.5 m	1.0 m
2	0.85	0.90	0.95	0.95
3	0.75	0.85	0.90	0.95
4	0.70	0.80	0.85	0.90
5	0.65	0.80	0.85	0.90
6	0.60	0.80	0.80	0.90

Multicore cables



Note 1: Values given apply to an installation depth of 0.7m and a soil thermal resistivity of 2.5 K.m/W. They are average values. The process of averaging, together with rounding off, can result in some cases in errors of up to $\pm 10\%$. (Where more precise values are required they may be calculated by methods given in BS 7769 (BS IEC 60287))

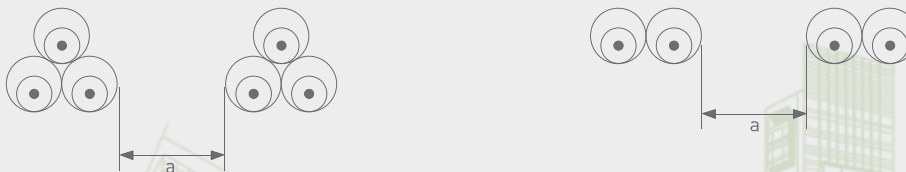
Note 2: In case of a thermal resistivity lower than 2.5 K.m/W, the rating factors can, in general, be increased and can be calculated by the methods given in BS 7769 (BS IEC 60287).

ii) Single-core cables in non-ferrous single-way ducts

Table 31

Number of single-core circuits of two or three cables	Duct-to-duct clearance (α)			
	Nil (ducts touching)	0.25 m	0.5 m	1.0 m
2	0.80	0.90	0.90	0.95
3	0.70	0.80	0.85	0.90
4	0.65	0.75	0.80	0.90
5	0.60	0.70	0.80	0.90
6	0.60	0.70	0.80	0.90

Single-core cables



Note 1: Values given apply to an installation depth of 0.7m and a soil thermal resistivity of 2.5 K.m/W. They are average values. The process of averaging, together with rounding off, can result in some cases in errors of up to $\pm 10\%$. (Where more precise values are required they may be calculated by methods given in BS 7769 (BS IEC 60287)).

Note 2: In case of a thermal resistivity lower than 2.5 K.m/W, the rating factors can, in general, be increased and can be calculated by the methods given in BS 7769 (BS IEC 60287).

TABLE 4C4 - Rating factors for groups of more than one multicore cable, to be applied to reference current-carrying capacities for multicore cables in free air — Reference Method E

Installation Method in Table 4A2		Number of trays or ladders	Number of cables per tray or ladder							
			1	2	3	4	6	9		
Perforated cable tray systems (Note 3)	31	Touching		See item 4 of Table 4C1						
		1	See item 4 of Table 4C1							
		2, 3, 6	1.00	0.87	0.80	0.77	0.73	0.68		
		Spaced	1	1.00	1.00	0.98	0.95	0.91	-	
	2		1.00	0.99	0.96	0.92	0.87	-		
	3		1.00	0.98	0.95	0.91	0.85	-		
Vertical perforated cable tray systems (Note 4)	31	Touching		See item 4 of Table 4C1						
		1, 2	1.00	0.88	0.81	0.76	0.71	0.70		
	Spaced	1	1.00	0.91	0.89	0.88	0.87	-		
		2	1.00	0.91	0.88	0.87	0.85	-		
Unperforated cable tray systems	30	Touching		1	0.97	0.84	0.78	0.75	0.71	0.68
		2	0.97	0.83	0.76	0.72	0.68	0.63		
		3	0.97	0.82	0.75	0.71	0.66	0.61		
		6	0.97	0.81	0.73	0.69	0.63	0.58		
Cable ladder systems, cleats, wire mesh tray, etc. (Note 3)	32	Touching		See item 4 of Table 4C1						
		1	See item 4 of Table 4C1							
		2, 3, 6	1.00	0.86	0.80	0.78	0.76	0.73		
	33	Spaced	1	1.00	1.00	1.00	1.00	1.00	-	
			2	1.00	0.99	0.98	0.97	0.96	-	
			3	1.00	0.98	0.97	0.96	0.93	-	
34	Touching	1	See item 4 of Table 4C1							
		2, 3, 6	1.00	0.84	0.77	0.73	0.68	0.64		
		1	See item 4 of Table 4C1							

Note 1: Values given are averages for the cable types and range of conductor sizes. The spread of values is generally less than 5%.

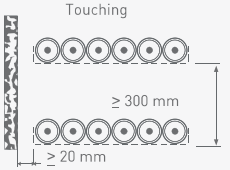
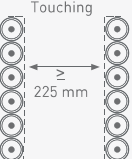
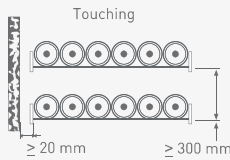
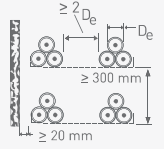
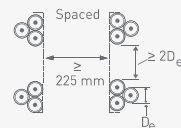
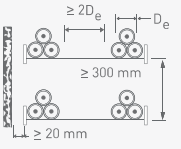
Note 2: Factors apply to single layer groups of cables as shown above and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and must be determined by an appropriate method.

Note 3: Values are given for vertical spacing between cable trays of 300 mm and at least 20 mm between cable trays and wall. For closer spacing the factors should be reduced.

Note 4: Values are given for horizontal spacing between cable trays of 225 mm with cable trays mounted back to back. For closer spacing the factors should be reduced.

Table 33

TABLE 4C5 - Rating factors for groups of one or more circuits of single-core cables to be applied to reference current-carrying capacity for one circuit of single-core in free air Reference Method F

Installation Method in Table 4A2		Number of trays or ladders	Number of three-phase circuits per tray or ladder			Use as a multiplier or rating	
			1	2	3		
Perforated cable tray systems (Note 3)	31		1	0.98	0.91	0.87	Three cables in horizontal formation
			2	0.96	0.87	0.81	
			3	0.95	0.85	0.78	
Vertical perforated cable tray systems (Note 4)	31		1	0.96	0.86	-	Three cables in vertical formation
2	0.95	0.84	-				
Cable ladder systems, cleats, wire mesh tray, etc. (Note 3)	32		1	1.00	0.97	0.96	Three cables in horizontal formation
	33		2	0.98	0.93	0.89	
	34		3	0.97	0.90	0.86	
Perforated cable tray systems (Note 3)	31		1	1.00	0.98	0.96	Three cables in trefoil formation
			2	0.97	0.93	0.89	
			3	0.96	0.92	0.86	
Vertical perforated cable tray systems (Note 4)	31		1	1.00	0.91	0.89	
			2	1.00	0.90	0.86	
Cable ladder systems, cleats, wire mesh tray, etc. (Note 3)	32		1	1.00	1.00	1.00	
	33		2	0.97	0.95	0.93	
	34		3	0.96	0.94	0.90	

Note 1: Values given are averages for the cable types and range of conductor sizes. The spread of values is generally less than 5%.

Note 2: Factors apply to single layer groups of cables (or trefoil groups) as shown above and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and must be determined by an appropriate method.

Note 3: Values are given for vertical spacing between cable trays of 300 mm and at least 20 mm between cable trays and wall. For closer spacing the factors should be reduced.

Note 4: Values are given for horizontal spacing between cable trays of 225 mm with cable trays mounted back to back. For closer spacing the factors should be reduced.

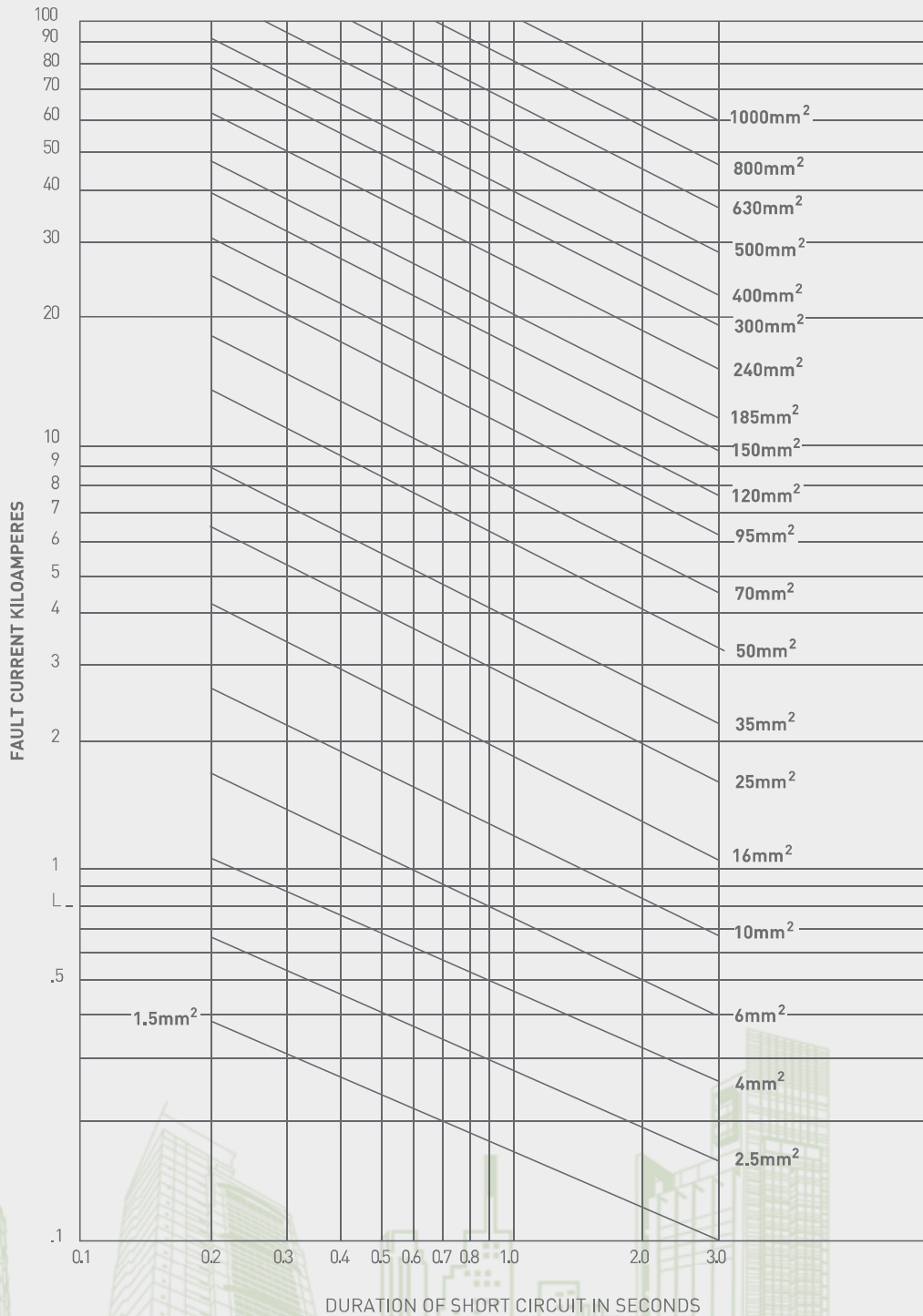
Note 5: For circuits having more than one cable in parallel per phase, each three-phase set of conductors is to be considered as a circuit for the purpose of this table.

Short Circuit Ratings

LSZH insulated Cables

The values of fault current given in the graph are based on the cable being fully loaded at the start of the short circuit (conductor temperature 70°C) and a final conductor temperature of 160°C for conductor sizes up to and including 300mm² and 140°C for conductor sizes above 300mm².

Copper Conductors

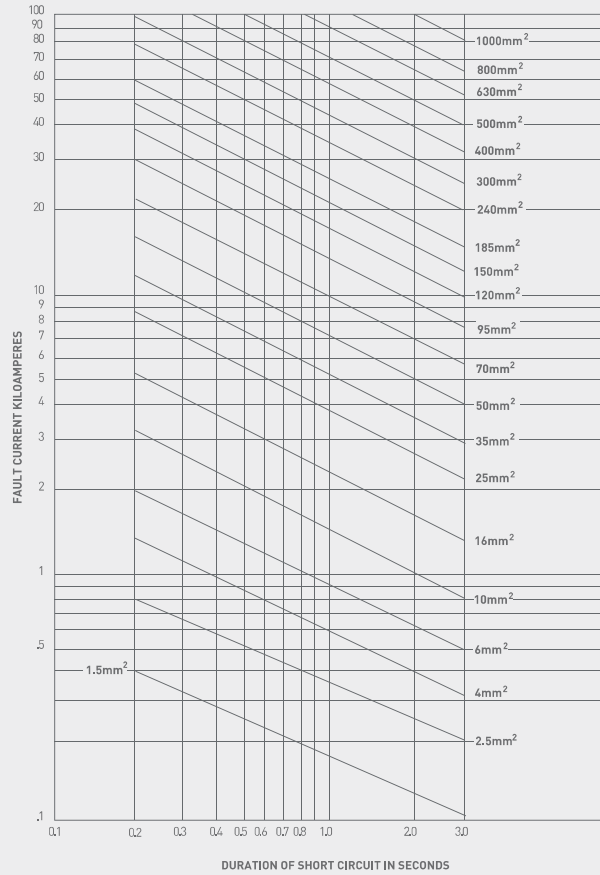


Short Circuit Ratings

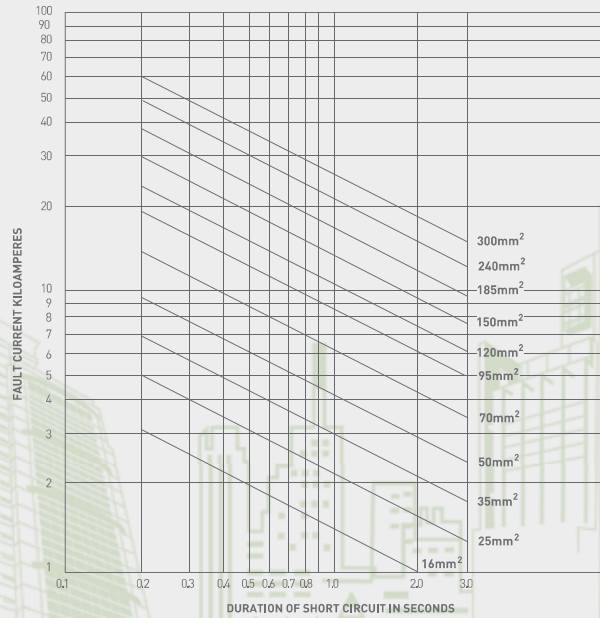
XLPE Insulated Cables

The values of fault current given in the graph are based on the cable being fully loaded at the start of the short circuit (conductor temperature 90°C) and a final conductor temperature of 250°C. It should be ensured that the accessories associated with the cable are also capable of operation at these values of fault current and temperature.

Copper Conductors



Aluminium Conductors





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