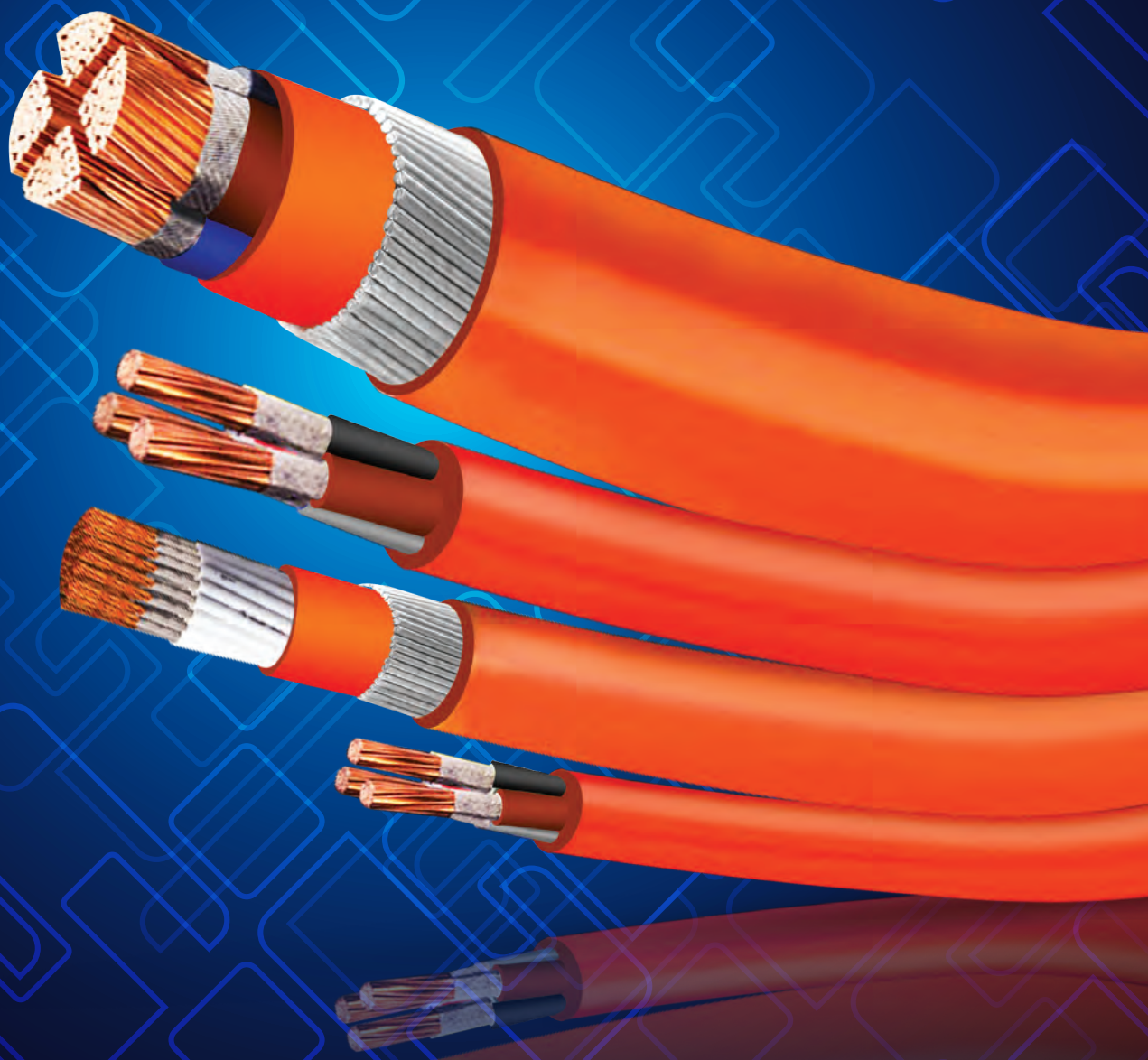
sierra cables

ISO 9001, ISO 14001 & OHSAS 18001 CERTIFIED COMPANY



LSHF & Fire Resistant Cables Catalogue

1. Sierra Cables PLC

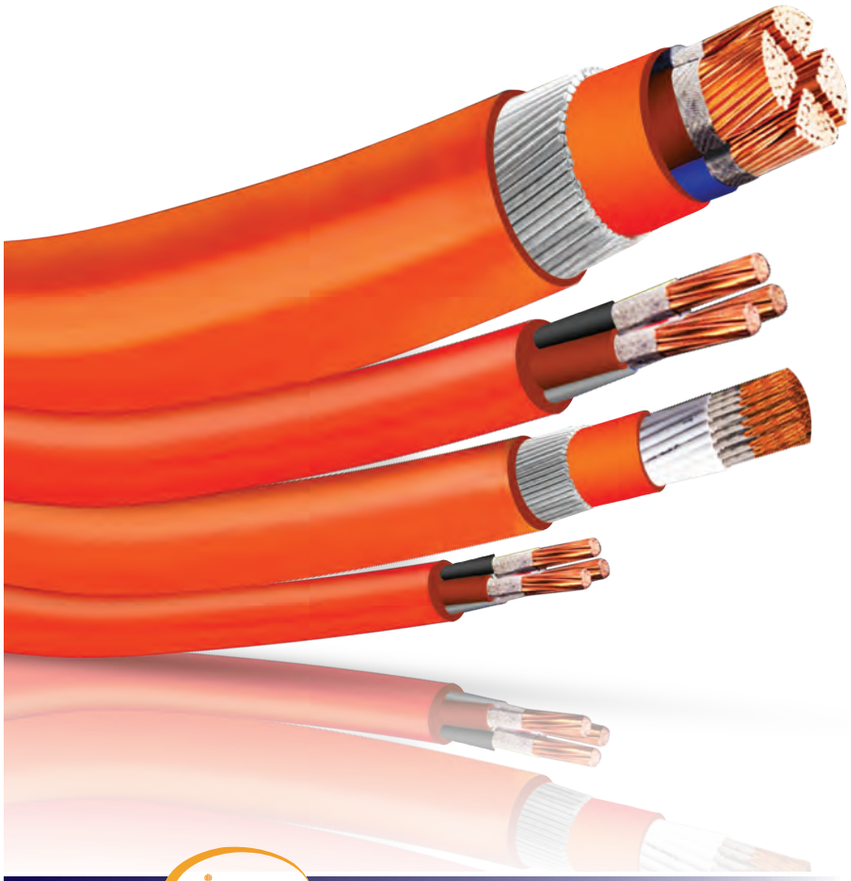
With the experience and knowledge of many years in the industry, Sierra Cables has grown to become a leading manufacturer in Sri Lanka today. Sierra cables PLC comprises a highly skilled & competent work force and the cables are manufactured using modern machinery & state of the art technology.

Sierra offers an expansive range of products mainly of Domestic cables, Industrial cables (Armoured and Unarmoured), Aerial Bundled Conductors(ABC), Overhead conductors, Telecommunication cables and Low Smoke Halogen Free (LSHF) cables. Sierra has the manufacturing capacity upto 1000mm^2 for single core cables and upto 400mm^2 for four core cables.

Being a quality conscious company, we utilize superior raw materials to enhance our final product quality. With the aim of producing electric cables of highest quality and providing best customer service Island wide, we manufacture the cables to the most stringent industry standards and our products are awarded with SLS 733, SLS 1143, SLS 750 and SLS 1186 product certification marks.

Sierra has built-up expertise in cable technology and implemented a quality management system complying with the requirements of ISO 9001:2008 standard and ensure that only the highest quality products are allowed in to the market.

Being OHSAS 18001 certified company we ensure the health and well-being of employees, sub-contractors and the visitors to our factory while increasing employee motivation through the provision of a safe workplace. Also, as a ISO14001 certified company we manage our activities with minimum negative impact to the environment.



Certifications

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BUREAU VERITAS

INDUSTRY & FACILITIES

PRODUCT CONFORMITY CERTIFICATE

N° PCC-SRL.C.8.16.051

Name and address of the factory	Sierra Cables PLC 39/1A, Galwarusawa Rd, Korathota, Kaduwela, Sri Lanka.
Type(s) of product and component manufactured	• PVC insulated non sheathed general purpose cable, 450/750V, single core-Rigid/Flexible copper conductor • PVC insulated, non-sheathed cable for internal wiring, 300/500V, single core and twisted twin • PVC insulated, PVC sheathed 300/500V, circular twin, 3-core, 4-core and 5-core • PVC insulated , PVC sheathed cable, 300/500V, Single core, flat twin and flat 3 core • PVC insulated, PVC sheathed cable with or without circuit protective conductor,300/500V, single core and flat twin • XLPE insulated Armoured Cables 600/1000V • Light Duty PVC insulated and sheathed flexible cord, parallel twin, circular twin, 3-core and 4-core, 300/300V • Ordinary Duty PVC insulated and sheathed flexible cord, parallel twin, circular twin, 3-core, 4-core and 5-core 300/500V • PVC insulated Armoured Cables 600/1000V.
Certified according to	BS 6004:2012 BS EN 50525-2-31:2011 BS 5467:1997+A3:2008 BS EN 50525-2-11:2011 BS 6346:1997
Reference Documents	FR-SRL.C.8.16.051 FAC-SRL.C.8.16.051 TR-SRL.C.8.16.051 TC-SRL.C.8.16.051
Expiry Date	[redacted]

Certificate of Conformity

SLSI ISO 9001

RvA MGMT. SYS. RvA C 155

SLAB ACCREDITED ISO/IEC: 17021 QMS-001-01

The Sri Lanka Standards Institution
certifies that the Quality Management System of

SIERRA CABLES PLC
NO. 39/1 A, GALWARUSA ROAD, KORATHOTA, KADUWELA
SRI LANKA

has been assessed and approved in accordance with
the requirements of ISO 9001: 2008/ SLS ISO 9001: 2008

Certificate No: **QSC 02004**
This certificate issued on [redacted] is valid up to [redacted]
Date of first certification [redacted]

SCOPE OF CERTIFICATION

MANUFACTURE OF ELECTRIC CABLES, CONDUCTORS, AERIAL BUNDLE CONDUCTORS, ELECTRIC WINDING WIRES, TELECOMMUNICATION CABLES FOR INTERIOR USE, DROP WIRE AND RF CABLES AS PER PRE-DETERMINED SPECIFICATIONS.

This approval is subject to the continued satisfactory operation of the organization's Quality Management System.

DIRECTOR GENERAL

SRI LANKA STANDARDS INSTITUTION
No. 17, Victoria Place, Elvitigala Mawatha, Colombo 08, Sri Lanka
www.slsi.lk

ISO 9001

Certificate of Conformity

SLSI ISO 14001 Certified

RvA MGMT. SYS. RvA C 155

SLAB ACCREDITED ISO/IEC: 17021 EMS-001-01

The Sri Lanka Standards Institution
certifies that the Environmental Management System of

SIERRA CABLES PLC
GALWARUSA ROAD
KORATHOTA, KADUWELA
SRI LANKA

has been assessed and approved in accordance with
the requirements of ISO 14001 : 2004 / SLS ISO 14001 : 2004

Certificate No. SC/EMS/00804
This certificate issued on [redacted] is valid up to [redacted]
Date of First Certification [redacted]

SCOPE OF CERTIFICATION

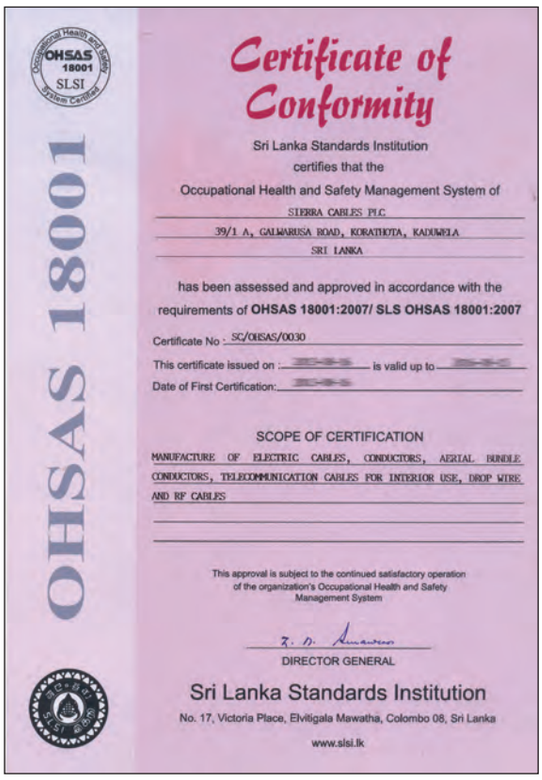
MANUFACTURING OF SIERRA BRAND ELECTRIC CABLES, CONDUCTORS AND ELECTRIC WINDING WIRE, TELECOMMUNICATION CABLES FOR INTERIOR USE, DROP WIRE, RF CABLES AND ABC

This approval is subject to the continued satisfactory operation of the organization's Environmental Management System.

DIRECTOR GENERAL

Sri Lanka Standards Institution
No. 17, Victoria Place, Elvitigala Mawatha, Colombo 08, Sri Lanka
www.slsi.lk

ISO 14001



Occupational Health and Safety OHSAS 18001 SLSI System Certified

OHSAS 18001

Certificate of Conformity

Sri Lanka Standards Institution
certifies that the
Occupational Health and Safety Management System of

SIERRA CABLES PLC
39/1 A, GALWARUSA ROAD, KORATHOTA, KADUWELA
SRI LANKA

has been assessed and approved in accordance with the
requirements of **OHSAS 18001:2007/ SLS OHSAS 18001:2007**

Certificate No : SC/OHSAS/0030
This certificate issued on [redacted] is valid up to [redacted]
Date of First Certification: [redacted]

SCOPE OF CERTIFICATION

MANUFACTURE OF ELECTRIC CABLES, CONDUCTORS, AERIAL BUNDLE CONDUCTORS, TELECOMMUNICATION CABLES FOR INTERIOR USE, DROP WIRE AND RF CABLES

This approval is subject to the continued satisfactory operation of the organization's Occupational Health and Safety Management System

DIRECTOR GENERAL

Sri Lanka Standards Institution
No. 17, Victoria Place, Elvitigala Mawatha, Colombo 08, Sri Lanka
www.slsi.lk

2. LSHF Cables

LOW SMOKE HALOGEN FREE (LSHF) CABLES

With the increased demand for safety in public areas and buildings, the trend of installing materials that are non-hazardous to the public in case of fire has increased. It is now understood that smoke and poisonous fumes can be a greater risk to lives than that of fire alone. An electrical short circuit can cause an instant emission of heat energy which leads to fire.Being highly fire retardant, Sierra offers the guarantee to the customer of that fire generated due to an electrical short circuit would be immediately extinguished precluding it to spread along the cable.

Sierra Low Smoke Halogen Free cables are designed not to emit toxic and corrosive gases during combustion and are ideal for areas of low ventilation, public facilities, airports, railway stations and high rise buildings, particularly where human and animal life as well as valuable property are exposed to a high risk of fire hazards. Our Low Smoke Halogen Free Cables are manufactured to a very high standard and meet all the industry standards so that the disadvantages associated with the PVC cables can be overcome.

Benefits associated with Sierra LSHF cables.

1. No emission of toxic gases
2. No emission of black smoke
3. No emission of acidic gases
4. Retard the spread of fire

First ever building wired totally with LSHF cables in Sri Lanka.

Sierra Cables PLC is proud to declare that Epilepsy unit of National Hospital Sri Lanka is totally wired with LSHF cables of sierra brand. This is the first building in Sri Lanka to wire totally with LSHF cables. The consultants for this project was TURKISH ENGINEERING , CONSULTING AND CONTRACTING COMPANY . The cables were tested and approved by Headship of TSE Test and Calibration Centre Electrotechnical Laboratory(Ankara).

Epilepsy unit at NHSL

Test Related to LSHF Cables

Fire test methods relating to cables can be split into two categories, those which test the whole cable and those which evaluate individual component materials. The tests on materials are not specific to cable standards but are often specified therein.

The performance of cables under fire conditions is defined in a number of international standards, the outline of which is as follows:

Flame Propagation Test: (IEC 60332-1, BS EN 60332-1)

This test is used to measure the resistance to vertical flame propagation for a single vertical electrical insulated conductor or cable under fire conditions.

Performance of Cables in the Event of Fire

Flame Spread Test: (IEC 60332-3, BS EN 60332-3) This series of standards covered by parts 3-22, 3-23, 3-24 and 3-25 define the tests used to measure the resistance to vertical flame spread of vertically-mounted bunched wires or cables under fire conditions.

The test categories are distinguished by test duration, the volume of non-metallic material of the test sample and the method of mounting the sample for the test as follows:

IEC 60332-3-22 (Category A): The number of test pieces required to provide a total volume of 7.0 l/m of nonmetallic material shall be bunched on a ladder exposed to flame for 40 minutes.

IEC 60332-3-23 (Category B): The number of test pieces required to provide a total volume of 3.5 l/m of nonmetallic material shall be bunched on a ladder exposed to flame for 40 minutes.

IEC 60332-3-24 (Category C): The number of test pieces required to provide a total volume of 1.5 l/m of nonmetallic material shall be bunched on a ladder exposed to flame for 20 minutes.

IEC 60332-3-25 (Category D): The number of test pieces required to provide a total volume of 0.5 l/m of nonmetallic material shall be bunched on a ladder exposed to flame for 20 minutes.

Acid Gas Emission Tests: (IEC 60754, BS EN 60754)

IEC 60754-1 and BS EN 60754-1 Standards specify a test for determination of the halogen acid gas other than the hydrofluoric acid evolved during combustion of compound based on halogenated polymers and compounds containing halogenated additives taken from cable constructions.

This test cannot determine if the cable is 100% halogen free or not. To determine if the cable specimen is 100% halogen free or not, IEC 60754-2 has to be employed.

Determination of Acidity

IEC 60754-2 and BS EN 60754-2 Standards specify a test for the determination of degree of acidity of gases evolved during combustion of the cable specimen by measuring its pH and ionic conductivity.

2.1. LSHF - Copper

Smoke Emission Test: (IEC 61034, BS EN 61034)

Smoke evolution is another critical performance indicator which needs to be evaluated on a laboratory scale and there are a number of methods used, based either on gravimetric or optical techniques.

IEC 61034 and BS EN 61034 Standards specify a test for determination of smoke density. The 3 meter cube test measures the generation of smoke from electric cables during fire. The higher the light transmittance, the less smoke emitted during a fire.

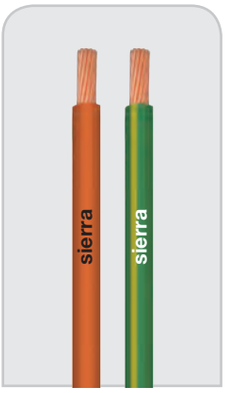
Limiting Oxygen Index (LOI): (BS EN ISO 4589)

Oxygen index is perhaps the most widely used indicator of a material's flammability. It is the minimum percentage of oxygen in an oxygen/nitrogen mixture required to support combustion of a given material at room temperature.

BS EN ISO 4589 Standard Specifies methods for the determination the minimum concentration of oxygen, in a mixture with nitrogen, which will support combustion of small vertical test specimens.

Flame retardant materials require a level of oxygen higher than that normally present in the atmosphere (21%) for burning to be maintained and a material having an oxygen index of 26 or above is considered to be self extinguishing. In general, the oxygen index of flame retardant PVC jacketed cables ranges from 28% to 32%,

2.1.1
Single Core Thermosetting Insulated, Non-Sheathed Cable - Rigid Conductor



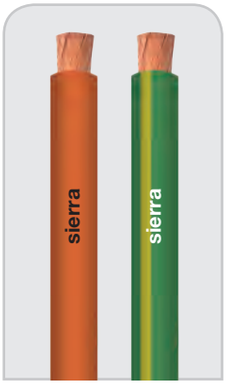
Specifications

Type		: Cu/LSHF
Standard		: BS 7211/ EN 50525-3-41
Nominal Voltage		: 450/750V
Conductor		: Class 1 or Class 2 Annealed Copper Wires
Insulation	Material	: LSHF material - EI 5
	Colour	: Green/Yellow, Blue or other colour

Nominal Cross Sectional Area	No. & Dia. Of wires	Nominal Insulation Thickness	Mean Overall Diameter		Minimum Insulation Resistance at 90 °C	Max. d.c. Resistance at 20 °C	Approx. Weight
			Lower limit	Upper limit			
mm²	x/mm	mm	mm	mm	MΩ.km	Ω/km	kg/km
Copper Solid Conductor							
1.5	1/1.38	0.7	2.6	3.3	0.011	12.1	20
2.5	1/1.78	0.8	3.2	4	0.010	7.41	32
Copper Stranded Conductors							
1.5	7/0.53	0.7	2.7	3.4	0.010	12.1	21
2.5	7/0.67	0.8	3.3	4.1	0.009	7.41	33
4	7/0.85	0.8	3.8	4.7	0.0077	4.61	49
6	7/1.04	0.8	4.3	5.4	0.0065	3.08	69
10	7/1.35	1.0	5.6	7.0	0.0065	1.83	115
16	7/1.70	1.0	6.4	8.0	0.0050	1.15	174
25	7/2.14	1.2	8.1	10.1	0.0050	0.727	274
35	19/1.53	1.2	9.0	11.3	0.0043	0.524	371
50	19/1.78	1.4	10.6	13.2	0.0043	0.387	502
70	19/2.14	1.4	12.1	15.1	0.0035	0.268	709
95	19/2.52	1.6	14.1	17.6	0.0035	0.193	980
120	37/2.03	1.6	15.6	19.4	0.0032	0.153	1215
150	37/2.25	1.8	17.3	21.6	0.0032	0.124	1495
185	37/2.52	2.0	19.3	24.1	0.0032	0.0991	1873
240	61/2.25	2.2	22.0	27.5	0.0032	0.0754	2444
300	61/2.52	2.4	24.5	30.6	0.0030	0.0601	3058
400	61/2.85	2.6	27.5	34.3	0.0028	0.0470	3895
500	61/3.2	2.8	30.5	38.2	0.0028	0.0366	4893
630	91/2.98	2.8	34.0	42.5	0.0025	0.0283	6266

2.1. LSHF - Copper

2.1.2
Single Core Thermosetting Insulated, Non-Sheathed Cable - Flexible Conductor



Specifications

Type		: Cu/LSHF
Standard		: BS 7211/ EN 50525-3-41
Nominal Voltage		: 450/750V or 300/500V
Conductor		: Class 5 Annealed Copper Wires
Insulation	Material	: LSHF material - EI 5
	Colour	: Green/Yellow, Blue or other colour

Nominal Cross Sectional area	No. & Dia. Of wires	Nominal Insulation Thickness	Mean Overall Diameter		Minimum Insulation Resistance at 90 °C	Max. d.c. Resistance at 20 °C	Approx. Weight
			Lower limit	Upper limit			
mm²	x/mm	mm	mm	mm	MΩ.km	Ω/km	kg/km
300/500V							
0.5	16/0.20	0.6	2.1	2.6	0.013	39.0	9
0.75	24/0.20	0.6	2.2	2.8	0.011	26.0	11
1	32/0.20	0.6	2.4	2.9	0.010	19.5	14
450/750V							
1.5	30/0.25	0.7	2.8	3.5	0.010	13.3	21
2.5	50/0.25	0.8	3.4	4.3	0.009	7.98	33
4	56/0.30	0.8	3.9	4.9	0.007	4.95	48
6	84/0.30	0.8	4.4	5.5	0.006	3.30	68
10	80/0.40	1.0	5.7	7.1	0.0056	1.91	115
16	126/0.40	1.0	6.7	8.4	0.0046	1.21	172
25	196/0.40	1.2	8.4	10.6	0.0044	0.78	265
35	276/0.40	1.2	9.7	12.1	0.0038	0.554	363
50	396/0.40	1.4	11.5	14.4	0.0037	0.386	518
70	360/0.50	1.4	13.2	16.6	0.0032	0.272	718
95	475/0.50	1.6	15.1	18.8	0.0032	0.206	947
120	608/0.50	1.6	16.7	20.9	0.0029	0.161	1195
150	756/0.50	1.8	18.6	23.3	0.0029	0.129	1488
185	925/0.50	2.0	20.6	25.8	0.0029	0.106	1821
240	1221/0.50	2.2	23.5	29.4	0.0028	0.0801	2393

2.1.3
Single Core Thermosetting Insulated and Sheathed Cable - Rigid Conductor

Specifications

Type		: Cu/XLPE/LSHF
Standard		: BS 7211
Nominal Voltage		: 450/750V
Conductor		: Class 1 or 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 4
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. Of wires	Nominal Insulation Thickness	Nominal Sheathing Thickness	Mean Overall Diameter		Minimum Insulation Resistance at 90 °C	Max. d.c. Resistance at 20 °C	Approx. Weight
				Lower limit	Upper limit			
mm²	x/mm	mm	mm	mm	mm	MΩ.km	Ω/km	kg/km
1	1/1.13	0.7	0.8	3.9	4.8	0.011	18.1	26
1.5	1/1.38	0.7	0.8	4.2	5.0	0.011	12.1	32
1.5	7/0.53	0.7	0.8	4.3	5.2	0.010	12.1	35
2.5	1/1.78	0.7	0.8	4.6	5.5	0.0092	7.41	44
2.5	7/0.67	0.7	0.8	4.7	5.6	0.0084	7.41	46
4	7/0.85	0.7	0.9	5.3	6.4	0.0070	4.61	66
6	7/1.04	0.7	0.9	5.9	7.1	0.0059	3.08	88
10	7/1.35	0.7	0.9	6.7	8.1	0.0047	1.83	132
16	7/1.70	0.7	0.9	7.6	9.2	0.0039	1.15	193
25	7/2.14	0.9	1.0	9.4	11.4	0.0039	0.727	300
35	19/1.53	0.9	1.1	10.6	12.8	0.0034	0.524	405

2.1. LSHF - Copper

2.1.4
Multicore Thermosetting Insulated and Sheathed Cable - Rigid Conductor

Specifications

Type		: Cu/XLPE/LSHF
Standard		: BS 7211
Nominal Voltage		: 450/750V
Conductor		: Class 1 or 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 4
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. Of wires	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Sheathing Thickness	Mean Overall Diameter		Minimum Insulation Resistance at 90 °C	Max. d.c. Resistance at 20 °C	Approx. Weight
					Lower limit	Upper limit			
mm²	x/mm	mm	mm	mm	mm	mm	MΩ.km	Ω/km	kg/km
Two Core Cables									
1.5	1/1.38	0.7	0.4	1.2	8.4	10.1	0.011	12.1	115
1.5	7/0.53	0.7	0.4	1.2	8.5	10.3	0. 010	12.1	124
2.5	1/1.78	0.7	0.4	1.2	9.1	11.0	0.0092	7.41	148
2.5	7/0.67	0.7	0.4	1.2	9.3	11.3	0.0084	7.41	157
4	1/2.24	0.7	0.4	1.2	10.0	12.1	0.0077	4.61	192
4	7/0.85	0.7	0.4	1.2	10.3	12.4	0.0070	4.61	207
6	1/2.74	0.7	0.4	1.2	10.9	13.2	0.0065	3.08	248
6	7/1.04	0.7	0.4	1.2	11.3	13.7	0.0059	3.08	268
10	1/3.56	0.7	0.4	1.4	12.9	15.5	0.0053	1.83	373
10	7/1.35	0.7	0.6	1.4	13.8	16.7	0.0047	1.83	416
16	7/1.70	0.7	0.6	1.4	15.6	18.8	0.0039	1.15	584
25	7/2.14	0.9	0.8	1.4	19.2	23.2	0.0039	0.727	894
35	19/1.53	0.9	0.8	1.6	21.5	26.0	0.0034	0.524	1191
Three Core Cables									
1.5	1/1.38	0.7	0.4	1.2	8.8	10.6	0.011	12.1	131
1.5	7/0.53	0.7	0.4	1.2	9	10.9	0.010	12.1	140
2.5	1/1.78	0.7	0.4	1.2	9.6	11.6	0.0092	7.41	172
2.5	7/0.67	0.7	0.4	1.2	9.8	11.9	0.0084	7.41	180
4	1/2.24	0.7	0.4	1.2	10.5	12.7	0.0077	4.61	228
4	7/0.85	0.7	0.4	1.2	10.8	13.1	0.0070	4.61	242
6	1/2.74	0.7	0.4	1.2	11.8	14.0	0.0065	3.08	300
6	7/1.04	0.7	0.4	1.4	12.4	15.0	0.0059	3.08	333
10	1/3.56	0.7	0.6	1.4	14.0	16.9	0.0053	1.83	474
10	7/1.35	0.7	0.6	1.4	14.6	17.5	0.0047	1.83	503
16	7/1.70	0.7	0.6	1.4	16.5	19.9	0.0039	1.15	648
25	7/2.14	0.9	0.8	1.4	20.4	24.7	0.0039	0.727	991
35	19/1.53	0.9	0.8	1.6	22.9	27.6	0.0034	0.524	1330

2.1.4
Multicore Thermosetting Insulated and Sheathed Cable - Rigid Conductor (Continued)

Specifications

Type		: Cu/XLPE/LSHF
Standard		: BS 7211
Nominal Voltage		: 450/750V
Conductor		: Class 1 or 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 4
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. Of wires	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Sheathing Thickness	Mean Overall Diameter		Minimum Insulation Resistance at 90 °C	Max. d.c. Resistance at 20 °C	Approx. Weight
					Lower limit	Upper limit			
mm²	x/mm	mm	mm	mm	mm	mm	MΩ.km	Ω/km	kg/km
Four Core Cables									
1.5	1/1.38	0.7	0.4	1.2	9.5	11.4	0.011	12.1	155
1.5	7/0.53	0.7	0.4	1.2	9.7	11.7	0.010	12.1	166
2.5	1/1.78	0.7	0.4	1.2	10.4	12.6	0.0092	7.41	207
2.5	7/0.67	0.7	0.4	1.2	10.6	12.8	0.0084	7.41	217
4	1/2.24	0.7	0.4	1.2	11.4	13.8	0.0077	4.61	278
4	7/0.85	0.7	0.4	1.2	11.6	14.0	0.0070	4.61	295
6	1/2.74	0.7	0.4	1.4	13.0	15.7	0.0065	3.08	385
6	7/1.04	0.7	0.6	1.4	13.8	16.7	0.0059	3.08	423
10	1/3.56	0.7	0.6	1.4	15.2	18.4	0.0053	1.83	588
10	7/1.35	0.7	0.6	1.4	15.9	19.2	0.0047	1.83	622
16	7/1.70	0.7	0.6	1.4	18.0	21.8	0.0039	1.15	826
25	7/2.14	0.9	0.8	1.6	22.7	27.5	0.0039	0.727	1295
35	19/1.53	0.9	1.0	1.6	25.4	30.7	0.0034	0.524	1737
Five Core Cables									
1.5	1/1.38	0.7	0.4	1.2	10.2	12.3	0.011	12.1	180
1.5	7/0.53	0.7	0.4	1.2	10.5	12.6	0.010	12.1	193
2.5	1/1.78	0.7	0.4	1.2	11.2	13.6	0.0092	7.41	243
2.5	7/0.67	0.7	0.4	1.2	11.5	13.9	0.0084	7.41	254
4	1/2.24	0.7	0.4	1.4	12.8	15.5	0.0077	4.61	344
4	7/0.85	0.7	0.6	1.4	13.6	16.4	0.0070	4.61	379
6	1/2.74	0.7	0.6	1.4	14.5	17.5	0.0065	3.08	474
6	7/1.04	0.7	0.6	1.4	15.0	18.1	0.0059	3.08	501
10	1/3.56	0.7	0.6	1.4	16.5	20.0	0.0053	1.83	704
10	7/1.35	0.7	0.6	1.4	17.3	20.9	0.0047	1.83	743
16	7/1.70	0.7	0.8	1.4	20.0	24.2	0.0039	1.15	1027
25	7/2.14	0.9	1.0	1.6	25.2	30.5	0.0039	0.727	1606
35	19/1.53	0.9	1.0	1.6	27.8	33.6	0.0034	0.524	2120

2.1. LSHF - Copper

2.1.5
Single Core, Flat Twin & Flat Three Core Thermosetting Insulated and Sheathed Cable with Circuit Protective Conductor

Type		: Cu/XLPE/LSHF
Standard		: BS 7211
Nominal Voltage		: 300/500V
Conductor		: Class 1 or 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 2
	Colour	: Orange

Nominal Cross sectional area	No. & Dia. Of wires	Nominal Insulation Thickness	Nominal Sheathing Thickness	Mean Overall Diameter		Circuit Protective Conductor (Uninsulated)		Minimum insulation resistance at 90 ºC	Approx. Weight
				lower limit	upper limit	nominal cross-sectional area	No. & Dia. Of wires		
mm²	x/mm	mm	mm	mm	mm	mm²	x/mm	MΩ.km	kg/km
Single Core									
1	1/1.13	0.7	0.9	4.1x5.2	5.0x6.3	1.0	1/1.13	0.011	26
1.5	1/1.38	0.7	0.9	4.4x5.4	5.3x6.6	1.0	1/1.13	0.011	33
Flat Twin									
1	1/1.13	0.7	0.9	4.1x7.6	5.0x9.1	1.0	1/1.13	0.011	49
1.5	1/1.38	0.7	0.9	4.4x8.1	5.3x9.7	1.0	1/1.13	0.011	59
1.5	7/0.53	0.7	0.9	4.5x8.3	5.4x10.0	1.0	1/1.13	0.011	62
2.5	1/1.78	0.7	1	4.9x9.3	6.0x11.2	1.5	1/1.38	0.0092	87
2.5	7/0.67	0.7	1	5.0x9.5	6.1x11.4	1.5	1/1.38	0.0084	89
4	7/0.85	0.7	1	5.5x10.4	6.7x12.6	1.5	1/1.38	0.0070	120
6	7/1.04	0.7	1.1	6.2x12.0	7.5x14.6	2.5	1/1.78	0.0059	174
10	7/1.35	0.7	1.2	7.3x14.5	8.8x17.6	4.0	7/0.85	0.0047	275
16	7/1.70	0.7	1.3	8.4x17.0	10.1x20.5	6.0	7/1.04	0.0039	415
Flat Three Core									
1	1/1.13	0.7	0.9	4.1x10.0	5.1x12.1	1.0	1/1.13	0.011	65
1.5	1/1.38	0.7	0.9	4.4x10.7	5.3x12.9	1.0	1/1.13	0.011	81
2.5	1/1.78	0.7	1.0	4.9x12.0	6.0x14.6	1.0	1/1.13	0.0092	123
4	7/0.85	0.7	1.0	5.5x14.0	6.7x16.9	1.5	1/1.38	0.0070	181
6	7/1.04	0.7	1.1	6.2x16.2	7.5x19.5	2.5	1/1.78	0.0059	259
10	7/1.35	0.7	1.2	7.3x19.5	8.8x23.6	4.0	7/0.85	0.0047	407
16	7/1.70	0.7	1.3	8.4x22.8	10.1x27.6	6.0	7/1.04	0.0039	612

2.1.6
Single Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Conductor

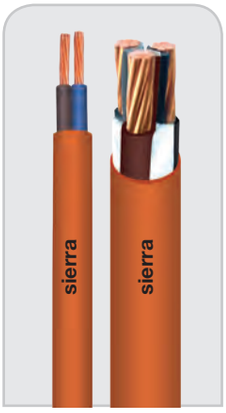
Specifications

Type		: Cu/XLPE/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page -"CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. of wires	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ^{0}C	Approx. Weight
mm^2	x/mm	mm	mm	mm	Ω/km	kg/km
50	19/1.78	1.0	1.5	13.9	0.387	564
70	19/2.14	1.1	1.5	15.9	0.268	784
95	19/2.52	1.1	1.6	18.0	0.193	1058
120	37/2.03	1.2	1.6	19.8	0.153	1309
150	37/2.25	1.4	1.7	22.0	0.124	1604
185	37/2.52	1.6	1.8	24.4	0.0991	2002
240	61/2.25	1.7	1.8	27.3	0.0754	2574
300	61/2.52	1.8	1.9	30.1	0.0601	3200
400	61/2.85	2.0	2.0	33.7	0.0470	4063
500	61/3.20	2.2	2.1	37.4	0.0366	5088
630	91/2.98	2.4	2.2	42.0	0.0283	6527
800	91/3.35	2.6	2.4	46.9	0.0221	8215
1000	91/3.74	2.8	2.5	51.7	0.0176	10173

2.1. LSHF - Copper

2.1.7
Two & Three Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Conductor



Specifications

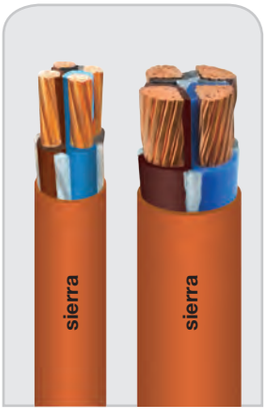
Type		: Cu/XLPE/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page -"CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm^2	mm	mm	mm	Ω/km	kg/km
Two Core					
2 x 1.5	0.6	1.3	8.5	12.1	86
2 x 2.5	0.7	1.4	9.9	7.41	120
2 x 4	0.7	1.4	11.0	4.61	158
2 x 6	0.7	1.4	12.1	3.08	206
2 x 10	0.7	1.5	14.2	1.83	306
2 x 16	0.7	1.5	16.3	1.15	436
2 x 25	0.9	1.6	19.9	0.727	661
2 x 35	0.9	1.7	22.6	0.524	881
Three Core					
3 x 1.5	0.6	1.3	8.9	12.1	107
3 x 2.5	0.7	1.4	10.5	7.41	153
3 x 4	0.7	1.4	11.6	4.61	206
3 x 6	0.7	1.4	12.9	3.08	274
3 x 10	0.7	1.5	15.1	1.83	416
3 x 16	0.7	1.6	17.5	1.15	613
3 x 25	0.9	1.7	21.5	0.727	937
3 x 35	0.9	1.8	24.3	0.524	1255

2.1.8
Four Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular & Shaped Conductor

Specifications

Type		: Cu/XLPE/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour



Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ºC	Approx. Weight
mm²	mm	mm	mm	Ω/km	kg/km
Circular Stranded Conductor					
4 x 1.5	0.6	1.3	9.6	12.1	130
4 x 2.5	0.7	1.4	11.4	7.41	188
4 x 4	0.7	1.4	12.6	4.61	258
4 x 6	0.7	1.5	14.2	3.08	353
4 x 10	0.7	1.5	16.5	1.83	530
4 x 16	0.7	1.6	19.2	1.15	787
4 x 25	0.9	1.7	23.6	0.727	1209
4 x 35	0.9	1.8	26.8	0.524	1625
Shaped Stranded Conductor					
4 x 35	0.9	1.8	23.0	0.524	1565
4 x 50	1.0	1.9	26.7	0.387	2068
4 x 70	1.1	2.1	31.1	0.268	2965
4 x 95	1.1	2.2	35.1	0.193	4013
4 x 120	1.2	2.3	38.9	0.153	5133
4 x 150	1.4	2.4	43.3	0.124	6089
4 x 185	1.6	2.6	48.1	0.0991	7714
4 x 240	1.7	2.7	53.9	0.0754	9885
4 x 300	1.8	2.9	59.6	0.0601	12473
4 x 400	2.0	3.2	68.3	0.0470	15478

2.1. LSHF - Copper

2.1.9
Five Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Conductor

Specifications

Type		: Cu/XLPE/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page -"CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	mm	mm	mm	Ω/km	kg/km
5 x 1.5	0.6	1.4	10.6	12.1	159
5 x 2.5	0.7	1.4	12.3	7.41	223
5 x 4	0.7	1.5	13.9	4.61	317
5 x 6	0.7	1.5	15.5	3.08	426
5 x 10	0.7	1.6	18.2	1.83	654
5 x 16	0.7	1.7	21.3	1.15	973
5 x 25	0.9	1.8	26.1	0.727	1497
5 x 35	0.9	1.9	29.6	0.524	2013
5 x 50	1.0	2.0	33.7	0.387	2676
5 x 70	1.1	2.2	39.5	0.268	3797

2.1.10
Multi Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Auxiliary Cable

Specifications

Type		: Cu/XLPE/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: White with black numbering
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. of wires	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ºC	Approx. Weight
mm²	x/mm	mm	mm	mm	Ω/km	kg/km
7 x 1.5	7/0.53	0.6	1.4	11.5	12.1	202
12 x1.5	7/0.53		1.5	14.9		325
19 x 1.5	7/0.53		1.6	17.5		480
27 x 1.5	7/0.53		1.7	20.9		664
37 x 1.5	7/0.53		1.7	23.3		868
48 x 1.5	7/0.53		1.8	26.6		1111
7 x 2.5	7/0.67	0.7	1.4	13.3	7.41	288
12 x2.5	7/0.67		1.6	17.7		478
19 x 2.5	7/0.67		1.7	20.8		713
27 x 2.5	7/0.67		1.8	24.9		990
37 x 2.5	7/0.67		1.8	27.8		1303
48 x 2.5	7/0.67		2.0	32.1		1688
7 x 4	7/0.85	0.7	1.5	15.2	4.61	413
12 x4	7/0.85		1.6	19.9		678
19 x 4	7/0.85		1.7	23.5		1024
27 x 4	7/0.85		1.9	28.4		1443
37 x 4	7/0.85		2.0	32.0		1930
48 x 4	7/0.85		2.1	36.7		2477

2.1. LSHF - Copper

2.1.11
Single Core XLPE Insulated and LSHF Sheathed Armoured - Circular Conductor

Specifications

Type		: Cu/XLPE/AWA/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. Of wires	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Al Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ^{0}C	Approx. Weight
mm^2	x/mm	mm	mm	mm	mm	mm	Ω/km	kg/km
50	19/1.78	1.0	0.8	0.9	1.5	17.5	0.387	716
70	19/2.14	1.1	0.8	1.25	1.5	20.2	0.268	997
95	19/2.52	1.1	0.8	1.25	1.6	22.3	0.193	1297
120	37/2.03	1.2	0.8	1.25	1.6	24.2	0.153	1569
150	37/2.25	1.4	1.0	1.6	1.7	27.4	0.124	1976
185	37/2.52	1.6	1.0	1.6	1.8	30.0	0.0991	2411
240	61/2.25	1.7	1.0	1.6	1.8	32.8	0.0754	3027
300	61/2.52	1.8	1.0	1.6	1.9	35.6	0.0601	3696
400	61/2.85	2.0	1.2	2.0	2.0	40.5	0.0470	4753
500	61/3.20	2.2	1.2	2.0	2.1	44.2	0.0366	5848
630	91/2.98	2.4	1.2	2.0	2.2	48.8	0.0283	7373
800	91/3.35	2.6	1.4	2.5	2.4	55.4	0.0221	9378
1000	91/3.74	2.8	1.4	2.5	2.5	60.6	0.0176	11448

2.1.12
Two & Three Core XLPE Insulated and LSHF Sheathed Armoured - Circular Conductor

Specifications

Type		: Cu/XLPE/SWA/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ^{0}C	Approx. Weight
mm^2	mm	mm	mm	mm	mm	Ω/km	kg/km
Two Core							
2 x 1.5	0.6	0.8	0.9	1.3	12.1	12.1	276
2 x 2.5	0.7	0.8	0.9	1.4	13.6	7.41	338
2 x 4	0.7	0.8	0.9	1.4	14.7	4.61	399
2 x 6	0.7	0.8	0.9	1.4	15.9	3.08	470
2 x 10	0.7	0.8	0.9	1.5	18.0	1.83	611
2 x 16	0.7	0.8	1.25	1.5	20.4	1.15	900
2 x 25	0.9	0.8	1.25	1.6	24.1	0.727	1221
2 x 35	0.9	1.0	1.6	1.7	27.7	0.524	1707
Three Core							
3 x 1.5	0.6	0.8	0.9	1.3	12.6	12.1	307
3 x 2.5	0.7	0.8	0.9	1.4	14.1	7.41	382
3 x 4	0.7	0.8	0.9	1.4	15.3	4.61	460
3 x 6	0.7	0.8	0.9	1.4	16.6	3.08	554
3 x 10	0.7	0.8	1.25	1.5	19.5	1.83	847
3 x 16	0.7	0.8	1.25	1.6	21.6	1.15	1108
3 x 25	0.9	1.0	1.6	1.7	26.7	0.727	1723
3 x 35	0.9	1.0	1.6	1.8	29.4	0.524	2136

2.1. LSHF - Copper

2.1.13
Four Core XLPE Insulated and LSHF Sheathed Armoured - Circular & Shaped Conductor

Specifications

Type		: Cu/XLPE/SWA/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	mm	mm	mm	mm	mm	Ω/km	kg/km
Circular Stranded Conductor							
4 x 1.5	0.6	0.8	0.9	1.3	13.3	12.1	345
4 x 2.5	0.7	0.8	0.9	1.4	15.0	7.41	436
4 x 4	0.7	0.8	0.9	1.4	16.4	4.61	533
4 x 6	0.7	0.8	1.25	1.5	18.7	3.08	761
4 x 10	0.7	0.8	1.25	1.5	21.1	1.83	999
4 x 16	0.7	0.8	1.25	1.6	23.4	1.15	1328
4 x 25	0.9	1.0	1.6	1.7	28.9	0.727	2070
4 x 35	0.9	1.0	1.6	1.8	31.9	0.524	2592
Shaped Stranded Conductor							
4 x 35	0.9	1.0	1.6	1.8	28.6	0.524	2403
4 x 50	1.0	1.0	1.6	1.9	32.0	0.387	3030
4 x 70	1.1	1.2	2.0	2.1	37.7	0.268	4366
4 x 95	1.1	1.2	2.0	2.2	41.7	0.193	5584
4 x 120	1.2	1.4	2.5	2.3	47.1	0.153	7320
4 x 150	1.4	1.4	2.5	2.4	51.4	0.124	8505
4 x 185	1.6	1.4	2.5	2.6	56.6	0.0991	10371
4 x 240	1.7	1.6	2.5	2.7	63.0	0.0754	12922
4 x 300	1.8	1.6	2.5	2.9	68.8	0.0601	15812
4 x 400	2.0	1.8	3.15	3.2	78.1	0.0470	20238

2.1.14
Five Core XLPE Insulated and LSHF Sheathed Armoured - Circular Conductor

Specifications

Type		: Cu/XLPE/SWA/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm^2	mm	mm	mm	mm	mm	Ω/km	kg/km
5 x 1.5	0.6	0.8	0.9	1.4	14.3	12.1	392
5 x 2.5	0.7	0.8	0.9	1.4	16.1	7.41	491
5 x 4	0.7	0.8	0.9	1.5	17.8	4.61	617
5 x 6	0.7	0.8	1.25	1.5	20.0	3.08	869
5 x 10	0.7	0.8	1.25	1.6	22.9	1.83	1168
5 x 16	0.7	1.0	1.6	1.7	26.6	1.15	1752
5 x 25	0.9	1.0	1.6	1.8	31.5	0.727	2440
5 x 35	0.9	1.0	1.6	1.9	34.8	0.524	3074
5 x 50	1.0	1.2	2.0	2.0	40.4	0.387	4198
5 x 70	1.1	1.2	2.0	2.2	46.3	0.268	5559

2.1. LSHF - Copper

2.1.15
Multi Core XLPE Insulated and LSHF Sheathed Armoured - Circular Auxiliary Cable

Specifications

Type		: Cu/XLPE/SWA/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: White with black numbering
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. Of wires	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	x/mm	mm	mm	mm	mm	mm	Ω/km	kg/km
7 x 1.5	7/0.53	0.6	0.8	0.9	1.4	15.2	12.1	453
12 x1.5	7/0.53		0.8	1.25	1.5	19.4		751
19 x 1.5	7/0.53		0.8	1.25	1.6	22.2		973
27 x 1.5	7/0.53		1.0	1.6	1.7	26.7		1430
37 x 1.5	7/0.53		1.0	1.6	1.7	29.0		1716
48 x 1.5	7/0.53		1.0	1.6	1.8	32.7		2074
7 x 2.5	7/0.67	0.7	0.8	0.9	1.4	17.1	7.41	577
12 x2.5	7/0.67		0.8	1.25	1.6	22.4		977
19 x 2.5	7/0.67		1.0	1.6	1.7	26.6		1475
27 x 2.5	7/0.67		1.0	1.6	1.8	30.7		1891
37 x 2.5	7/0.67		1.0	1.6	1.8	33.8		2304
48 x 2.5	7/0.67		1.2	2.0	2.0	39.3		3139
7 x 4	7/0.85	0.7	0.8	1.25	1.5	19.7	4.61	846
12 x4	7/0.85		1.0	1.6	1.6	25.7		1416
19 x 4	7/0.85		1.0	1.6	1.7	29.3		1879
27 x 4	7/0.85		1.0	1.6	1.9	34.4		2462
37 x 4	7/0.85		1.2	2.0	2.0	39.2		3375
48 x 4	7/0.85		1.2	2.0	2.1	44.1		4122

2.2.1
Single Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Conductor

Specifications

Type		: Al/XLPE/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Stranded Aluminum Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. Of wires	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	x/mm	mm	mm	mm	Ω/km	kg/km
50	19/1.78	1.0	1.5	13.9	0.641	265
70	19/2.14	1.1	1.5	15.9	0.443	352
95	19/2.52	1.1	1.6	18.0	0.320	460
120	37/2.03	1.2	1.6	19.8	0.253	552
150	37/2.25	1.4	1.7	22.0	0.206	675
185	37/2.52	1.6	1.8	24.4	0.164	836
240	61/2.25	1.7	1.8	27.3	0.125	1042
300	61/2.52	1.8	1.9	30.1	0.100	1278
400	61/2.85	2.0	2.0	33.7	0.0778	1604
500	61/3.20	2.2	2.1	37.4	0.0605	1988
630	91/2.98	2.4	2.2	42.0	0.0469	2517
800	91/3.35	2.6	2.3	46.9	0.0367	3148
1000	91/3.74	2.8	2.5	51.7	0.0291	3857

2.2. LSHF - Aluminium

2.2.2
Two & Three Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Conductor

Specifications

Type		: Al/XLPE/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Stranded Aluminium Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ⁰C	Approx. Weight
mm²	mm	mm	mm	Ω/km	kg/km
Two Core					
2 x 16	0.7	1.5	16.3	1.91	234
2 x 25	0.9	1.6	19.9	1.20	341
2 x 35	0.9	1.7	22.6	0.868	438
Three Core					
3 x 16	0.7	1.6	17.5	1.91	310
3 x 25	0.9	1.7	21.4	1.20	457
3 x 35	0.9	1.8	24.3	0.868	589

2.2.3
Four Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular & Shaped Conductor

Specifications

Type		: Al/XLPE/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Stranded Aluminium Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ⁰C	Approx. Weight
mm²	mm	mm	mm	Ω/km	kg/km
Circular Stranded Conductor					
4 x 16	0.7	1.6	19.2	1.91	383
4 x 25	0.9	1.7	23.6	1.20	570
4 x 35	0.9	1.8	26.8	0.868	738
Shaped Stranded Conductor					
4 x 35	0.9	1.8	23.0	0.868	683
4 x 50	1.0	1.9	26.8	0.641	888
4 x 70	1.1	2.1	31.1	0.443	1238
4 x 95	1.1	2.2	35.1	0.320	1618
4 x 120	1.2	2.3	39.0	0.253	2034
4 x 150	1.4	2.4	43.3	0.206	2421
4 x 185	1.6	2.6	48.1	0.164	3049
4 x 240	1.7	2.7	53.9	0.125	3837
4 x 300	1.8	2.9	59.6	0.100	4782

2.2. LSHF - Aluminium

2.2.4
Single Core XLPE Insulated and LSHF Sheathed Armoured - Circular Conductor

Specifications

Type		: Al/XLPE/AWA/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Stranded Aluminium Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. of wires	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Al Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	x/mm	mm	mm	mm	mm	mm	Ω/km	kg/km
50	19/1.78	1.0	0.8	0.9	1.5	16.3	0.641	417
70	19/2.14	1.1	0.8	1.25	1.5	18.7	0.443	566
95	19/2.52	1.1	0.8	1.25	1.6	20.6	0.320	698
120	37/2.03	1.2	0.8	1.25	1.6	22.1	0.253	813
150	37/2.25	1.4	1.0	1.6	1.7	25.2	0.206	1047
185	37/2.52	1.6	1.0	1.6	1.8	27.4	0.164	1246
240	61/2.25	1.7	1.0	1.6	1.8	29.9	0.125	1495
300	61/2.52	1.8	1.0	1.6	1.9	32.4	0.100	1774
400	61/2.85	2.0	1.2	2.0	2.0	37.1	0.0778	2294
500	61/3.20	2.2	1.2	2.0	2.1	40.4	0.0605	2749
630	91/2.98	2.4	1.2	2.0	2.2	43.8	0.0469	3363
800	91/3.35	2.6	1.4	2.5	2.3	49.1	0.0367	4282
1000	91/3.74	2.8	1.4	2.5	2.5	54.4	0.0291	5132

2.2.5
Two & Three Core XLPE Insulated and LSHF Sheathed Armoured - Circular Conductor

Specifications

Type		: Al/XLPE/SWA/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Stranded Aluminium Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - “CABLE CORE COLOURS”
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ^{0}C	Approx. Weight
mm^2	mm	mm	mm	mm	mm	Ω/km	kg/km
Two Core							
2 x 16	0.7	0.8	1.25	1.5	19.1	1.91	699
2 x 25	0.9	0.8	1.25	1.6	22.4	1.20	902
2 x 35	0.9	1.0	1.6	1.7	25.7	0.868	1264
Three Core							
3 x 16	0.7	0.8	1.25	1.6	20.3	1.91	805
3 x 25	0.9	1.0	1.6	1.7	24.9	1.20	1243
3 x 35	0.9	1.0	1.6	1.8	27.3	0.868	1471

2.2. LSHF - Aluminium

2.2.6
Four Core XLPE Insulated and LSHF Sheathed Armoured - Circular & Shaped Conductor

Specifications

Type		: Al/XLPE/SWA/LSHF
Standard		: BS 6724
Nominal Voltage		: 600/1000V
Conductor		: Stranded Aluminium Wires
Insulation	Material	: XLPE
	Colour	: Refer last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material-LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ⁰C	Approx. Weight
mm²	mm	mm	mm	mm	mm	Ω/km	kg/km
Circular Stranded Conductor							
4 x 16	0.7	0.8	1.25	1.6	21.8	1.91	924
4 x 25	0.9	1.0	1.6	1.7	26.9	1.20	1430
4 x 35	0.9	1.0	1.6	1.8	29.5	0.868	1705
Shaped Stranded Conductor							
4 x 35	0.9	1.0	1.6	1.8	27.0	0.868	1520
4 x 50	1.0	1.0	1.6	1.9	30.0	0.641	1850
4 x 70	1.1	1.2	2.0	2.1	35.3	0.443	2640
4 x 95	1.1	1.2	2.0	2.2	39.0	0.320	3188
4 x 120	1.2	1.4	2.5	2.3	44.0	0.253	4221
4 x 150	1.4	1.4	2.5	2.4	47.9	0.206	4836
4 x 185	1.6	1.4	2.5	2.6	52.7	0.164	5706
4 x 240	1.7	1.6	2.5	2.7	58.5	0.125	6874
4 x 300	1.8	1.6	2.5	2.9	63.8	0.100	8121

Fire Resistant Cables

The Resistance-to-fire is the term used to describe how long a cable continues to operate in a fire. This may be of primary concern, for instance, in life safety of fire fighting installations.

The best safety and rescue equipment cannot work without secured power supply. If the power supply is adversely affected, the systems themselves will have no power to provide their own critical functions. Fire resistant cables are designed to maintain circuit integrity of those vital safety and rescue equipment during the fire. In addition to maintaining circuit integrity under fire conditions, fire resistant cables have limited evolution of smoke and corrosive gases when affected by fire, thus safeguarding human life and protecting equipment.

Fire resistant cables are intended for applications requiring circuit integrity during a fire, such as;

1. Booster pump systems
2. Sprinkler systems
3. Emergency lighting - speakers
4. Fire and smoke detector systems
5. Rescue elevators
6. Alarm horns
7. Smoke exhaust system for aeration and ventilation.

Fire Resistant Cable Testing

In addition to the tests decribed for LSHF cables following tests are intended to evaluate the circuit integrity of the cable.

Fire Resistance Test: (IEC 60331, BS 6387)

The test establishes whether a cable can maintain electrical circuit integrity for a time up to 3 hours at temperatures ranging from 650 °C up to in excess of 950 °C.

These categories can be summarized as follows:

Resistance to Fire Alone

IEC 60331-21: Cables are subjected to fire at 750 °C for 90 minutes followed by a 15 min cooling period.

BS 6387 (Category A): Cables are subjected to fire at 650 °C for 180 minutes.

BS 6387 (Category B): Cables are subjected to fire at 750 °C for 180 minutes.

BS 6387 (Category C): Cables are subjected to fire at 950 °C for 180 minutes.

BS 6387 (Category S): Cables are subjected to fire at 950 °C for 20 minutes (short duration).

3. Fire Resistant Cables

Resistance to Fire with Water

BS 6387 (Category W): Cables are subjected to fire at 650 °C for 15 minutes, then at 650°C with water spray for further 15 minutes.

Resistance to Fire with Mechanical Shock

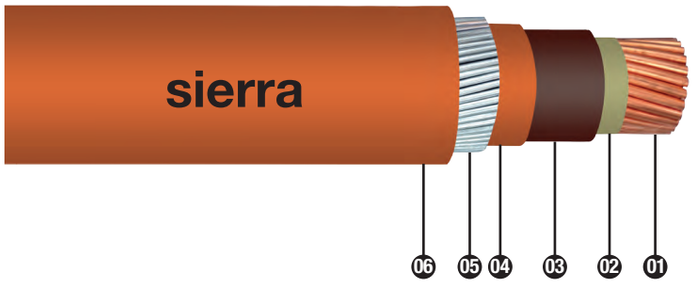
IEC 60331-31: Cables are subjected to fire at least 830 ^{0}C with mechanical shock for 120 minutes.

BS 6387 (Category X): Cables are subjected to fire at 650 °C with mechanical shock for 15 minutes.

BS 6387 (Category Y): Cables are subjected to fire at 750 °C with mechanical shock for 15 minutes.

BS 6387 (Category Z): Cables are subjected to fire at 950 °C with mechanical shock for 15 minutes.

Basic Construction Pattern of Fire Resistant Cables (Armoured Cable)



01. Conductor
02. Fire Resistant Barrier
03. Insulation
04. Inner Sheath
05. Armour
06. Outer Sheath

3.1
Single Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Conductor

Specifications

Type		: Cu/FR Barrier/XLPE/LSHF
Standard		: IEC 60502-1
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - ST_8
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. Of Wires	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm^2	x/mm	mm	mm	mm	Ω/km	kg/km
1.5	7/0.53	0.7	1.4	6.2	12.10	59
2.5	7/0.67	0.7	1.4	6.6	7.41	72
4	7/0.85	0.7	1.4	7.2	4.61	92
6	7/1.04	0.7	1.4	7.7	3.08	116
10	7/1.35	0.7	1.4	8.7	1.83	164
16	7/1.70	0.7	1.4	9.7	1.15	229
25	7/2.14	0.9	1.4	11.4	0.727	337
35	19/1.53	0.9	1.4	12.7	0.524	441
50	19/1.78	1	1.4	14.1	0.387	573
70	19/2.14	1.1	1.4	16.1	0.268	793
95	19/2.52	1.1	1.5	18.2	0.193	1068
120	37/2.03	1.2	1.5	20.0	0.153	1324
150	37/2.25	1.4	1.6	22.2	0.124	1620
185	37/2.52	1.6	1.6	24.4	0.0991	2005
240	61/2.25	1.7	1.7	27.5	0.0754	2597
300	61/2.52	1.8	1.8	30.3	0.0601	3224
400	61/2.85	2.0	1.9	33.9	0.0470	4089
500	61/3.20	2.2	2	37.6	0.0366	5114
630	91/2.98	2.4	2.2	42.4	0.0283	6577

3. Fire Resistant Cables

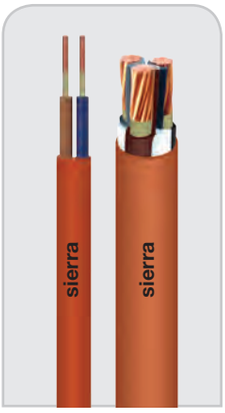
3.2
Multi Core LSHF Insulated and LSHF Sheathed Cable- Circular Conductor

Specifications

Type		: Cu/FR Barrier/LSHF/LSHF
Standard		: BS 7629
Nominal Voltage		: 300/500V
Conductor		: Class 1 or Class 2 Annealed Copper Wires
Insulation	Material	: LSHF material - EI 5
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 3
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No. & Dia. Of Wires	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ^{0}C	Approx. Weight
mm^2	x/mm	mm	mm	mm	Ω/km	kg/km
Two Core Cable						
2x1.0	1/1.13	0.6	0.9	8.0	18.1	88
2x1.5	7/0.53	0.7	0.9	8.5	12.1	120
2x2.5	7/0.67	0.8	1.0	10.5	7.41	160
2x4.0	7/0.85	0.8	1.1	12.5	4.61	210
Three Core Cable						
3x1.0	1/1.13	0.6	0.9	8.0	18.1	109
3x1.5	7/0.53	0.7	0.9	9.5	12.1	156
3x2.5	7/0.67	0.8	1.0	12.0	7.41	210
3x4.0	7/0.85	0.8	1.1	13.5	4.61	278
Four Core Cable						
4x1.0	1/1.13	0.6	1.0	9.0	18.1	136
4x1.5	7/0.53	0.7	1.0	10.5	12.1	189
4x2.5	7/0.67	0.8	1.1	13.0	7.41	258
4x4.0	7/0.85	0.8	1.2	15.0	4.61	352
Seven Core Cable						
7x1.0	1/1.13	0.6	1.0	11.0	18.1	195
7x1.5	7/0.53	0.7	1.1	12.5	12.1	277
7x2.5	7/0.67	0.8	1.2	15.0	7.41	385
Twelve Core Cable						
12x1.5	7/0.53	0.7	1.2	16.0	12.1	429
12x2.5	7/0.67	0.8	1.4	20.0	7.41	616
Nineteen Core Cable						
19x1.5	7/0.53	0.7	1.3	19.0	12.1	642
19x2.5	7/0.67	0.8	1.5	24.0	7.41	912

3.3
Two & Three Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Conductor



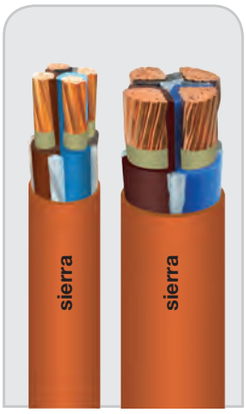
Specifications

Type		: Cu/FR Barrier/XLPE/LSHF
Standard		: BS 7846
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ^{0}C	Approx. Weight
mm^2	mm	mm	mm	Ω/km	kg/km
Two Core					
2x1.5	0.6	1.3	9.3	12.10	99
2x2.5	0.7	1.4	10.7	7.41	135
2x4	0.7	1.4	11.8	4.61	175
2x6	0.7	1.4	12.9	3.08	224
2x10	0.7	1.5	15.0	1.83	327
2x16	0.7	1.5	17.1	1.15	460
2x25	0.9	1.6	20.7	0.727	688
2x35	0.9	1.7	23.4	0.524	910
Three Core					
3x1.5	0.6	1.3	9.8	12.10	125
3x2.5	0.7	1.4	11.3	7.41	173
3x4	0.7	1.4	12.5	4.61	229
3x6	0.7	1.4	13.7	3.08	299
3x10	0.7	1.5	15.9	1.83	445
3x16	0.7	1.6	18.4	1.15	646
3x25	0.9	1.7	22.3	0.727	974
3x35	0.9	1.8	25.2	0.524	1296

3. Fire Resistant Cables

3.4
Four Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular & Shaped Conductor



Specifications

Type		: Cu/FR Barrier/XLPE/LSHF
Standard		: BS 7846
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	mm	mm	mm	Ω/km	kg/km
Circular stranded conductor					
4x1.5	0.6	1.3	10.6	12.10	153
4x2.5	0.7	1.4	12.3	7.41	214
4x4	0.7	1.4	13.6	4.61	287
4x6	0.7	1.5	15.2	3.08	386
4x10	0.7	1.5	17.5	1.83	568
4x16	0.7	1.6	20.2	1.15	829
4x25	0.9	1.7	24.6	0.727	1258
4x35	0.9	1.8	27.7	0.524	1678
Shaped stranded conductor					
4x35	0.9	1.8	23.4	0.524	1636
4x50	1.0	1.9	27.2	0.387	2150
4x70	1.1	2.1	31.5	0.268	3062
4x95	1.1	2.2	35.5	0.193	4126
4x120	1.2	2.3	39.4	0.153	5261
4x150	1.4	2.4	43.7	0.124	6228
4x185	1.6	2.6	48.5	0.0991	7870
4x240	1.7	2.7	54.3	0.0754	10062
4x300	1.8	2.9	60.1	0.0601	12672
4x400	2.0	3.2	68.7	0.0470	15700

3.5
Five Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Conductor

Specifications

Type		: Cu/FR Barrier/XLPE/LSHF
Standard		: BS 7846
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ⁰C	Approx. Weight
mm²	mm	mm	mm	Ω/km	kg/km
5x1.5	0.6	1.4	11.7	12.10	187
5x2.5	0.7	1.4	13.4	7.41	255
5x4	0.7	1.5	15.0	4.61	353
5x6	0.7	1.5	16.6	3.08	467
5x10	0.7	1.6	19.3	1.83	701
5x16	0.7	1.7	22.3	1.15	1025
5x25	0.9	1.8	27.2	0.727	1557
5x35	0.9	1.9	30.7	0.524	2078
5x50	1.0	2.0	34.8	0.387	2744
5x70	1.1	2.2	40.6	0.268	3869

3. Fire Resistant Cables

3.6
Multi Core XLPE Insulated and LSHF Sheathed Unarmoured - Circular Auxiliary Cable

Specifications

Type		: Cu/FR Barrier/XLPE/LSHF
Standard		: BS 7846
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No.& Dia. Of Wires	Nominal Insulation Thickness	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ^{0}C	Approx. Weight
mm^2	x/mm	mm	mm	mm	Ω/km	kg/km
7 x 1.5	7/0.53	0.6	1.4	12.7	12.1	238
12 x 1.5	7/0.53		1.5	16.6	12.1	385
19 x 1.5	7/0.53		1.6	19.5	12.1	572
27 x 1.5	7/0.53		1.7	23.3	12.1	792
37 x 1.5	7/0.53		1.7	26.0	12.1	1038
48 x 1.5	7/0.53		1.8	29.9	12.1	1330
7 x 2.5	7/0.67	0.7	1.4	14.5	7.41	330
12 x 2.5	7/0.67		1.6	19.3	7.41	549
19 x 2.5	7/0.67		1.7	22.8	7.41	820
27 x 2.5	7/0.67		1.8	27.3	7.41	1140
37 x 2.5	7/0.67		1.8	30.6	7.41	1503
48 x 2.5	7/0.67		2.0	35.4	7.41	1948
7 x 4	7/0.85	0.7	1.5	16.4	4.61	461
12 x 4	7/0.85		1.6	21.6	4.61	758
19 x 4	7/0.85		1.7	25.5	4.61	1147
27 x 4	7/0.85		1.9	30.9	4.61	1617
37 x 4	7/0.85		2.0	34.8	4.61	2164
48 x 4	7/0.85		2.1	40.0	4.61	2778

3.7
Single Core XLPE Insulated and LSHF Sheathed Armoured - Circular Conductor

Specifications

Type		: Cu/FR Barrier/XLPE/AWA/LSHF
Standard		: IEC 60502-1
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - ST_8
	Colour	: Orange, Black or any other colour

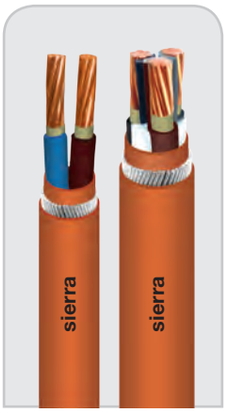
Nominal Cross Sectional Area	No. & Dia. Of Wires	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	x/mm	mm	mm	mm	mm	mm	Ω/km	kg/km
Circular stranded conductor								
1.5	7/0.53	0.7	1	0.9	1.4	10.0	12.10	146
2.5	7/0.67	0.7	1	0.9	1.4	10.4	7.41	164
4	7/0.85	0.7	1	0.9	1.4	11.0	4.61	189
6	7/1.04	0.7	1	0.9	1.4	11.5	3.08	220
10	7/1.35	0.7	1	0.9	1.4	12.5	1.83	278
16	7/1.70	0.7	1	0.9	1.4	13.5	1.15	355
25	7/2.14	0.9	1	1.25	1.4	17.0	0.727	537
35	19/1.53	0.9	1	1.25	1.4	17.2	0.524	635
50	19/1.78	1	1	1.25	1.4	18.6	0.387	787
70	19/2.14	1.1	1	1.25	1.5	20.8	0.268	1044
95	19/2.52	1.1	1	1.6	1.6	23.6	0.193	1398
120	37/2.03	1.2	1	1.6	1.6	25.4	0.153	1683
150	37/2.25	1.4	1	1.6	1.7	27.6	0.124	2013
185	37/2.52	1.6	1	1.6	1.7	29.8	0.0991	2434
240	61/2.25	1.7	1	1.6	1.8	32.9	0.0754	3074
300	61/2.52	1.8	1	2.0	1.9	36.5	0.0601	3837
400	61/2.85	2	1.2	2.0	2.0	40.5	0.0470	4810
500	61/3.20	2.2	1.2	2.0	2.1	44.2	0.0366	5909
630	91/2.98	2.4	1.2	2.0	2.3	49.0	0.0283	7463

3. Fire Resistant Cables

3.8
Two & Three Core XLPE Insulated and LSHF Sheathed Armoured - Circular Conductor

Specifications

Type		: Cu/FR Barrier/XLPE/SWA/LSHF
Standard		: BS 7846
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour



Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	mm	mm	mm	mm	mm	Ω/km	kg/km
Two Core							
2x1.5	0.6	0.8	0.9	1.3	13.1	12.1	306
2x2.5	0.7	0.8	0.9	1.4	14.6	7.41	370
2x4	0.7	0.8	0.9	1.4	15.7	4.61	432
2x6	0.7	0.8	0.9	1.4	16.9	3.08	505
2x10	0.7	0.8	0.9	1.5	19.0	1.83	649
2x16	0.7	0.8	1.25	1.5	21.4	1.15	946
2x25	0.9	0.8	1.25	1.6	25.1	0.727	1270
2x35	0.9	1.0	1.6	1.7	28.7	0.524	1764
Three Core							
3x1.5	0.6	0.8	0.9	1.3	13.7	12.10	343
3x2.5	0.7	0.8	0.9	1.4	15.2	7.41	421
3x4	0.7	0.8	0.9	1.4	16.4	4.61	501
3x6	0.7	0.8	0.9	1.4	17.7	3.08	597
3x10	0.7	0.8	1.25	1.5	20.6	1.83	900
3x16	0.7	0.8	1.25	1.6	22.7	1.15	1164
3x25	0.9	1.0	1.6	1.7	27.8	0.727	1791
3x35	0.9	1.0	1.6	1.8	30.5	0.524	2207

3.9
Four Core XLPE Insulated and LSHF Sheathed Armoured - Circular & Shaped Conductor

Specifications

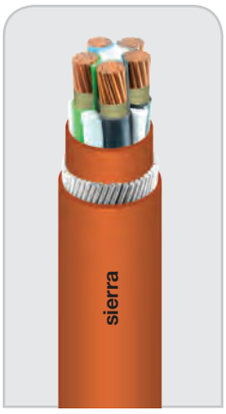
Type		: Cu/FR Barrier/XLPE/SWA/LSHF
Standard		: BS 7846
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 °C	Approx. Weight
mm²	mm	mm	mm	mm	mm	Ω/km	kg/km
Circular stranded conductor							
4x1.5	0.6	0.8	0.9	1.3	14.5	12.1	321
4x2.5	0.7	0.8	0.9	1.4	16.2	7.41	382
4x4	0.7	0.8	0.9	1.4	17.6	4.61	435
4x6	0.7	0.8	1.25	1.5	19.9	3.08	612
4x10	0.7	0.8	1.25	1.5	22.3	1.83	732
4x16	0.7	0.8	1.25	1.6	24.6	1.15	892
4x25	0.9	1.0	1.6	1.7	30.1	0.727	1362
4x35	0.9	1.0	1.6	1.8	33.1	0.524	1605
Shaped stranded conductor							
4x35	0.9	1.0	1.6	1.8	29.8	0.524	1050
4x50	1.0	1.0	1.6	1.9	33.2	0.387	1263
4x70	1.1	1.2	2.0	2.1	38.9	0.268	1797
4x95	1.1	1.2	2.0	2.2	42.9	0.193	2167
4x120	1.2	1.4	2.5	2.3	48.3	0.153	2861
4x150	1.4	1.4	2.5	2.4	52.6	0.124	3260
4x185	1.6	1.4	2.5	2.6	57.8	0.0991	3848
4x240	1.7	1.6	2.5	2.7	64.2	0.0754	4644
4x300	1.8	1.6	2.5	2.9	70.0	0.0601	5503
4x400	2.0	1.8	3.15	3.2	79.3	0.0470	7193

3.10
Five Core XLPE Insulated and LSHF Sheathed Armoured - Circular Conductor

Specifications

Type		: Cu/FR Barrier/XLPE/SWA/LSHF
Standard		: BS 7846
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour



Nominal Cross Sectional Area	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ⁰C	Approx. Weight
mm²	mm	mm	mm	mm	mm	Ω/km	kg/km
Circular stranded conductor							
5x1.5	0.6	0.8	0.9	1.4	15.6	12.1	442
5x2.5	0.7	0.8	0.9	1.4	17.4	7.41	545
5x4	0.7	0.8	0.9	1.5	19.1	4.61	675
5x6	0.7	0.8	1.25	1.5	21.3	3.08	939
5x10	0.7	0.8	1.25	1.6	24.2	1.83	1244
5x16	0.7	1.0	1.60	1.7	27.9	1.15	1842
5x25	0.9	1.0	1.6	1.8	32.8	0.727	2538
5x35	0.9	1.0	1.6	1.9	36.1	0.524	3177
5x50	1.0	1.2	2.0	2.0	41.7	0.387	4313
5x70	1.1	1.2	2.0	2.2	47.6	0.268	5678

3.11
Multi Core XLPE Insulated and LSHF Sheathed Armoured - Circular Auxiliary Cable

Specifications

Type		: Cu/FR Barrier/XLPE/SWA/LSHF
Standard		: BS 7846
Nominal Voltage		: 600/1000V
Conductor		: Class 2 Annealed Copper Wires
Insulation	Material	: XLPE
	Colour	: Refer the last page - "CABLE CORE COLOURS"
Sheathing	Material	: LSHF material - LTS 1
	Colour	: Orange, Black or any other colour

Nominal Cross Sectional Area	No.& Dia. Of Wires	Nominal Insulation Thickness	Nominal Bedding Thickness	Nominal Steel Armour Wire Diameter	Nominal Sheathing Thickness	Approx. Overall Diameter	Max. d.c. Resistance at 20 ⁰C	Approx. Weight
mm²	x/mm	mm	mm	mm	mm	mm	Ω/km	kg/km
7 x 1.5	7/0.53	0.6	0.8	0.9	1.4	16.7	12.1	514
12 x 1.5	7/0.53		0.8	1.25	1.5	21.5	12.1	857
19 x 1.5	7/0.53		0.8	1.25	1.6	24.7	12.1	1118
27 x 1.5	7/0.53		1.0	1.60	1.7	29.8	12.1	1643
37 x 1.5	7/0.53		1.0	1.60	1.7	32.5	12.1	1983
48 x 1.5	7/0.53		1.0	1.60	1.8	36.8	12.1	2406
7 x 2.5	7/0.67	0.7	0.8	0.9	1.4	18.6	7.41	644
12 x 2.5	7/0.67		0.8	1.25	1.6	24.5	7.41	1093
19 x 2.5	7/0.67		1.0	1.6	1.7	29.1	7.41	1652
27 x 2.5	7/0.67		1.0	1.6	1.8	33.8	7.41	2126
37 x 2.5	7/0.67		1.0	1.6	1.8	36.3	7.41	2602
48 x 2.5	7/0.67		1.2	2.0	2.0	43.4	7.41	3540
7 x 4	7/0.85	0.7	0.8	1.25	1.5	21.2	4.61	927
12 x 4	7/0.85		1.0	1.6	1.6	27.8	4.61	1554
19 x 4	7/0.85		1.0	1.6	1.7	31.8	4.61	2072
27 x 4	7/0.85		1.0	1.6	1.9	37.5	4.61	2721
37 x 4	7/0.85		1.2	2.0	2.0	42.7	4.61	3730
48 x 4	7/0.85		1.2	2.0	2.1	48.2	4.61	4564

4. Cable Selection

4.1
Technical Data for Cable Selection (For Copper Cables)

Table X1
Single-core 70 ⁰C thermoplastic (PVC) insulated cables,non-armoured, with or without sheath (COPPER CONDUCTORS)

Ambient temperature: 30 ⁰C
CURRENT-CARRYING CAPACITY (amperes): Conductor operating temperature:70 ⁰C

Conductor cross - sectional area	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		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)				
							Touching			Spaced by one 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.	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	
										Horizontal	Vertical
1	2	3	4	5	6	7	8	9	10	11	12
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	11	10.5	13.5	12	15.5	14	-	-	-	-	-
1.5	14.5	13.5	17.5	15.5	20	18	-	-	-	-	-
2.5	20	18	24	21	27	25	-	-	-	-	-
4	26	24	32	28	37	33	-	-	-	-	-
6	34	31	41	36	47	43	-	-	-	-	-
10	46	42	57	50	65	59	-	-	-	-	-
16	61	56	76	68	87	79	-	-	-	-	-
25	80	73	101	89	114	104	131	114	110	146	130
35	99	89	125	110	141	129	162	143	137	181	162
50	119	108	151	134	182	167	196	174	167	219	197
70	151	136	192	171	234	214	251	225	216	281	254
95	182	164	232	207	284	261	304	275	264	341	311
120	210	188	269	239	330	303	352	321	308	396	362
150	240	216	300	262	381	349	406	372	356	456	419
185	273	245	341	296	436	400	463	427	409	521	480
240	321	286	400	346	515	472	546	507	485	615	569
300	367	328	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
800	-	-	-	-	1030	943	1086	1020	971	1265	1188
1000	-	-	-	-	1154	1058	1216	1149	1079	1420	1337

NOTE: For cables having flexible conductors, see Table X17 for adjustment factors for current-carrying capacity and voltage drop.

4.1 Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X2

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:70 ⁰C

Conductor Cross - Sectional Area	2 cables d.c.	2 Cables, single-Phase a.c.									3 or 4 Cables, Three-Phase a.c.											
		Reference Methods A & B (enclosed in conduit or on trunking)			Reference Methods C & F (clipped direct, on tray or in free air)						Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C & F (clipped direct, on tray or in free air)								
					Cables Touching			Cables Spaced*						Cables Touching, Trefoil			Cables Touching, Flat			Cables Spaced*, Flat		
1	2	3			4			5			6			7			8			9		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
1	44	44			44			44			38			38			38			38		
1.5	29	29			29			29			25			25			25			25		
2.5	18	18			18			18			15			15			15			15		
4	11	11			11			11			9.5			9.5			9.5			9.5		
6	7.3	7.3			7.3			7.3			6.4			6.4			6.4			6.4		
10	4.4	4.4			4.4			4.4			3.8			3.8			3.8			3.8		
16	2.8	2.8			2.8			2.8			2.4			2.4			2.4			2.4		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	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	0.066	0.28	0.29
800	0.053	-	-	-	0.068	0.150	0.165	0.061	0.24	0.25	-	-	-	0.060	0.130	0.145	0.060	0.21	0.22	0.053	0.28	0.29
1000	0.042	-	-	-	0.059	0.150	0.160	0.050	0.24	0.24	-	-	-	0.052	0.130	0.140	0.052	0.20	0.21	0.044	0.28	0.28

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

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X3
Multicore 70 ⁰C thermoplastic insulated and thermoplastic sheathed cables, non-armoured (COPPER CONDUCTORS)

Ambient temperature: 30 ⁰C
CURRENT-CARRYING CAPACITY (amperes): Conductor operating temperature:70 ⁰C

Conductor Cross-Sectional Area	Reference Method A (enclosed in conduit in thermally insulating wall,etc.)		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-Core Cable* or 1 Four-Core Cable, Three-Phase a.c.	1 Two Core Cable*, Single-Phase a.c. or d.c.	1 Three-Core Cable* or 1 Four-Core Cable, Three-Phase a.c.	1 Two-Core Cable*, Single-Phase a.c. or d.c.	1 Three-Core Cable* or 1 Four-Core Cable, Three-Phase a.c.	1 Two-Core Cable*, Single-Phase a.c. or d.c.	1 Three-Core Cable* or 1 Four-Core Cable, Three-Phase a.c.
1	2	3	4	5	6	7	8	9
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	11	10	13	11.5	15	13.5	17	14.5
1.5	14	13	16.5	15	19.5	17.5	22	18.5
2.5	18.5	17.5	23	20	27	24	30	25
4	25	23	30	27	36	32	40	34
6	32	29	38	34	46	41	51	43
10	43	39	52	46	63	57	70	60
16	57	52	69	62	85	76	94	80
25	75	68	90	80	112	96	119	101
35	92	83	111	99	138	119	148	126
50	110	99	133	118	168	144	180	153
70	139	125	168	149	213	184	232	196
95	167	150	201	179	258	223	282	238
120	192	172	232	206	299	259	328	276
150	219	196	258	225	344	299	379	319
185	248	223	294	255	392	341	434	364
240	291	261	344	297	461	403	514	430
300	334	298	394	339	530	464	593	497
400	-	-	470	402	634	557	715	597

*** With or without a protective conductor.**

NOTE: For cables having flexible conductors, see Table X17 for adjustment factors for current-carrying capacity and voltage drop.

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X4

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:70 ^{0}C

Conductor Cross-Sectional Area	Two-Core Cable, d.c.	Two-Core Cable, Single Phase a.c.			Three or Four-Core Cable, Three Phase a.c.		
1	2	3			4		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1	44	44			38		
1.5	29	29			25		
2.5	18	18			15		
4	11	11			9.5		
6	7.3	7.3			6.4		
10	4.4	4.4			3.8		
16	2.8	2.8			2.4		
		r	x	z	r	x	z
25	1.75	1.75	0.170	1.75	1.50	0.145	1.50
35	1.25	1.25	0.165	1.25	1.10	0.145	1.10
50	0.93	0.93	0.165	0.94	0.80	0.140	0.81
70	0.63	0.63	0.160	0.65	0.55	0.140	0.57
95	0.46	0.47	0.155	0.50	0.41	0.135	0.43
120	0.36	0.38	0.155	0.41	0.33	0.135	0.35
150	0.29	0.30	0.155	0.34	0.26	0.130	0.29
185	0.23	0.25	0.150	0.29	0.21	0.130	0.25
240	0.180	0.190	0.150	0.24	0.165	0.130	0.21
300	0.145	0.155	0.145	0.21	0.135	0.130	0.185
400	0.105	0.115	0.145	0.185	0.100	0.125	0.160

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X5
Single-core armoured 70 ⁰C thermoplastic insulated cables (non-magnetic armour)
(COPPER CONDUCTORS)

Ambient temperature:30 ⁰C
CURRENT-CARRYING CAPACITY (Amperes) Conductor operating temperature:70 ⁰C

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. Ttrefoil	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
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	193	179	205	189	181	229	216	229	217	230	212
70	245	225	259	238	231	294	279	287	272	286	263
95	296	269	313	285	280	357	340	349	332	338	313
120	342	309	360	327	324	415	396	401	383	385	357
150	393	352	413	373	373	479	458	449	429	436	405
185	447	399	469	422	425	548	525	511	489	490	456
240	525	465	550	492	501	648	622	593	568	566	528
300	594	515	624	547	567	748	719	668	640	616	578
400	687	575	723	618	657	885	851	737	707	674	632
500	763	622	805	673	731	1035	997	810	777	721	676
630	843	669	891	728	809	1218	1174	893	856	771	723
800	919	710	976	777	886	1441	1390	943	905	824	772
1000	975	737	1041	808	945	1685	1627	1008	967	872	816

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X6

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:70 ^{0}C

Conductor Cross - Sectional Area	2 Cables d.c.	Reference Methods C & F (clipped direct, on tray or free air)														
		2 Cables, Single-Phase a.c.						3 or 4 Cables, Three-Phase a.c.								
		Touching			Spaced*			Trefoil and Touching			Flat and Touching			Flat and Spaced*		
1	2	3			4			5			6			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	0.93	0.93	0.22	0.95	0.92	0.30	0.97	0.80	0.190	0.82	0.79	0.26	0.84	0.79	0.34	0.86
70	0.63	0.64	0.21	0.68	0.66	0.29	0.72	0.56	0.180	0.58	0.57	0.25	0.62	0.59	0.32	0.68
95	0.46	0.48	0.20	0.52	0.51	0.28	0.58	0.42	0.175	0.45	0.44	0.25	0.50	0.47	0.31	0.57
120	0.36	0.39	0.195	0.43	0.42	0.28	0.50	0.33	0.170	0.37	0.36	0.24	0.43	0.40	0.30	0.50
150	0.29	0.31	0.190	0.37	0.34	0.27	0.44	0.27	0.165	0.32	0.30	0.24	0.38	0.34	0.30	0.45
185	0.23	0.26	0.190	0.32	0.29	0.27	0.39	0.22	0.160	0.27	0.25	0.23	0.34	0.29	0.29	0.41
240	0.180	0.20	0.180	0.27	0.23	0.26	0.35	0.175	0.160	0.23	0.20	0.23	0.30	0.24	0.28	0.37
300	0.145	0.160	0.180	0.24	0.190	0.26	0.32	0.140	0.155	0.21	0.165	0.22	0.28	0.20	0.28	0.34
400	0.105	0.140	0.175	0.22	0.180	0.24	0.30	0.120	0.130	0.195	0.160	0.21	0.26	0.21	0.25	0.32
500	0.086	0.120	0.170	0.21	0.165	0.23	0.29	0.105	0.145	0.180	0.145	0.20	0.25	0.190	0.24	0.30
630	0.068	0.105	0.165	0.195	0.150	0.22	0.27	0.091	0.145	0.170	0.135	0.195	0.23	0.175	0.22	0.28
800	0.053	0.095	0.160	0.185	0.145	0.21	0.25	0.082	0.140	0.160	0.125	0.180	0.22	0.170	0.195	0.26
1000	0.042	0.091	0.155	0.180	0.140	0.190	0.24	0.079	0.135	0.155	0.125	0.165	0.21	0.165	0.170	0.24

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

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X7
Multicore armoured 70 ⁰C thermoplastic insulated cables
(COPPER CONDUCTORS)

Ambient temperature:30 ⁰C
Ground ambient temperature:20 ⁰C
Conductor operating temperature:70 ⁰C

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 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	21	18	22	19	22	18
2.5	28	25	31	26	29	24
4	38	33	41	35	37	30
6	49	42	53	45	46	38
10	67	58	72	62	60	50
16	89	77	97	83	78	64
25	118	102	128	110	99	82
35	145	125	157	135	119	98
50	175	151	190	163	140	116
70	222	192	241	207	173	143
95	269	231	291	251	204	169
120	310	267	336	290	231	192
150	356	306	386	332	261	217
185	405	348	439	378	292	243
240	476	409	516	445	336	280
300	547	469	592	510	379	316
400	621	540	683	590	-	-

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X8

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:70 ^{0}C

Conductor Cross-Sectional Area	Two-Core Cable, d.c.	Two-Core Cable, Single-Phase a.c.			Three or Four Core Cable, Three-Phase a.c.		
1	2	3			4		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1.5	29	29			25		
2.5	18	18			15		
4	11	11			9.5		
6	7.3	7.3			6.4		
10	4.4	4.4			3.8		
16	2.8	2.8			2.4		
		r	x	z	r	x	z
25	1.75	1.75	0.170	1.75	1.50	0.145	1.50
35	1.25	1.25	0.165	1.25	1.10	0.145	1.10
50	0.93	0.93	0.165	0.94	0.80	0.140	0.81
70	0.63	0.63	0.160	0.65	0.55	0.140	0.57
95	0.46	0.47	0.155	0.50	0.41	0.135	0.43
120	0.36	0.38	0.155	0.41	0.33	0.135	0.35
150	0.29	0.30	0.155	0.34	0.26	0.130	0.29
185	0.23	0.25	0.150	0.29	0.21	0.130	0.25
240	0.180	0.190	0.150	0.24	0.165	0.130	0.21
300	0.145	0.155	0.145	0.21	0.135	0.130	0.185
400	0.105	0.115	0.145	0.185	0.100	0.125	0.160

4. Cable Selection

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X9
Single -core 90 ⁰C thermosetting insulated cables, non-armoured, with or without sheath (COPPER CONDUCTORS)

Ambient temperature:30 ⁰C
CURRENT-CARRYING CAPACITY (Amperes): Conductor operating temperature:90 ⁰C

Conductor Cross-Sectional Area	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		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.	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	
										Horizontal	Vertical
1	2	3	4	5	6	7	8	9	10	11	12
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	14	13	17	15	19	17.5	-	-	-	-	-
1.5	19	17	23	20	25	23	-	-	-	-	-
2.5	26	23	31	28	34	31	-	-	-	-	-
4	35	31	42	37	46	41	-	-	-	-	-
6	45	40	54	48	59	54	-	-	-	-	-
10	61	54	75	66	81	74	-	-	-	-	-
16	81	73	100	88	109	99	-	-	-	-	-
25	106	95	133	117	143	130	161	141	135	182	161
35	131	117	164	144	176	161	200	176	169	226	201
50	158	141	198	175	228	209	242	216	207	275	246
70	200	179	253	222	293	268	310	279	268	353	318
95	241	216	306	269	355	326	377	342	328	430	389
120	278	249	354	312	413	379	437	400	383	500	454
150	318	285	393	342	476	436	504	464	444	577	527
185	362	324	449	384	545	500	575	533	510	661	605
240	424	380	528	450	644	590	679	634	607	781	719
300	486	435	603	512	743	681	783	736	703	902	833
400	-	-	683	584	868	793	940	868	823	1085	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 it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cables should be rated at the maximum operating temperature of the equipment or accessory.
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any of the cables in the group.
3. For cables having flexible conductors see Table X17 for adjustment factors for current-carrying capacity and voltage drop.

4.1 Technical Data for Cable Selection (For Copper Cables) - (Continued)

VOLTAGE DROP (per ampere per meter):

Table X10

Conductor operating temperature:90 °C

Conductor Cross-Sectonal Area	2 cables, d.c.	2 Cables, Single-Phase a.c.									3 or 4 Cables, Three-Phase a.c.											
		Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C,F & G (clipped direct or on tray or in free air)						Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C,F & G (clipped direct, on tray or in free air)								
					Cable Touching			Cables Spaced*						Cables Touching, Trefoil			Cables Touching, Flat			Cables Spaced*,Flat		
1	2	3			4			5			6			7			8			9		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
1	46	46			46			46			40			40			40			40		
1.5	31	31			31			31			27			27			27			27		
2.5	19	19			19			19			16			16			16			16		
4	12	12			12			12			10			10			10			10		
6	7.9	7.9			7.9			7.9			6.8			6.8			6.8			6.8		
10	4.7	4.7			4.7			4.7			4.0			4.0			4.0			4.0		
16	2.9	2.9			2.9			2.9			2.5			2.5			2.5			2.5		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
25	1.85	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	1.60	0.27	1.65
35	1.35	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	1.15	0.26	1.20
50	0.99	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	0.86	0.26	0.89
70	0.68	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	0.59	0.25	0.65
95	0.49	0.51	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	0.43	0.25	0.49
120	0.39	0.41	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	0.34	0.24	0.42
150	0.32	0.33	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	0.28	0.24	0.37
185	0.25	0.27	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	0.22	0.24	0.33
240	0.190	0.21	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	0.170	0.24	0.29
300	0.155	0.175	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	0.135	0.24	0.27
400	0.120	0.140	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	0.110	0.24	0.26
500	0.093	0.120	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	0.085	0.24	0.25
630	0.072	0.100	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	0.068	0.23	0.24
800	0.056		-		0.072	0.150	0.170	0.064	0.24	0.25		-		0.062	0.130	0.145	0.059	0.155	0.165	0.055	0.23	0.24
1000	0.045		-		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.

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X11
Multicore 90 ⁰C thermosetting insulated and thermoplastic sheathed cables, non-armoured (COPPER CONDUCTORS)

Ambient temperature:30 ⁰C
CURRENT-CARRYING CAPACITY (Amperes) Conductor operating temperature:90 ⁰C

Conductor Cross-Sectional Area	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct.)		Reference Method E (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 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	8	9
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	14.5	13	17	15	19	17	21	18
1.5	18.5	16.5	22	19.5	24	22	26	23
2.5	25	22	30	26	33	30	36	32
4	33	30	40	35	45	40	49	42
6	42	38	51	44	58	52	63	54
10	57	51	69	60	80	71	86	75
16	76	68	91	80	107	96	115	100
25	99	89	119	105	138	119	149	127
35	121	109	146	128	171	147	185	158
50	145	130	175	154	209	179	225	192
70	183	164	221	194	269	229	289	246
95	220	197	265	233	328	278	352	298
120	253	227	305	268	382	322	410	346
150	290	259	334	300	441	371	473	399
185	329	295	384	340	506	424	542	456
240	386	346	459	398	599	500	641	538
300	442	396	532	455	693	576	741	621
400	-	-	625	536	803	667	865	741

* With or without a protective conductor.

NOTES:

1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cables should be rated at the maximum operating temperature of the equipment or accessory.

2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any of the cables in the group.

3. For cables having flexible conductors see Table X17 for adjustment factors for current-carrying capacity and voltage drop.

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X12

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:90 ^{0}C

Conductor Cross-Sectional Area	Two-Core Cable, d.c.	Two-Core Cable, Single-Phase, a.c.			Three or Four-Core Cable, Three-Phase a.c.		
1	2	3			4		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1	46	46			40		
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

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X13
Single-core armoured 90 ^{0}C thermosetting insulated cables (non-magnetic armour)
(COPPER CONDUCTORS)

CURRENT-CARRYING CAPACITY (Amperes)

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:

1. Where it is intended to connect the cables in this table to equipment or accessories design to operate at a temperature lower than the maximum operating temperature of the cable, the cables should be rated at the maximum operating temperature of the equipment or accessory.

2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any of the cables in the group.

4.1 Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X14

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:90 ^{0}C

Conductor Cross - Sectional Area	2 Cables d.c.	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			Spaced *			Trefoil and Touching			Flat and Touching			Flat and Spaced*		
1	2	3			4			5			6			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	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	0.17	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.

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X15
Multicore-armoured 90 ⁰C thermosetting insulated cables
(COPPER CONDUCTORS)

Ambient temperature:30 ⁰C
Ground ambient temperature:20 ⁰C
Conductor operating temperature:90 ⁰C

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	2	3	4	5	6	7
(mm²)	(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 it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cables should be rated at the maximum operating temperature of the equipment or accessory.

2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any of the cables in the group.

4.1
Technical Data for Cable Selection (For Copper Cables) - (Continued)

Table X16

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:90 ^{0}C

Conductor Cross-Sectional Area	Two-Core Cable, d.c.	Two-Core Cable, Single-Phase a.c.			Three or Four-Core Cable, Three-Phase a.c.		
1	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	0.19	0.115	0.120	0.165

Table X17

NOTE: The current carrying capacities and voltage drops tabulated above are based on cables having solid (class 1 or class 2) conductors.To obtain current carrying capacities and voltage drops for flexible conductors (class 5), the tabulated values are multiplied by the following factors.

Cable Size	Current Carrying Capacity	Voltage Drop
≤ 16mm^2	0.95	1.10
≥ 25mm^2	0.97	1.06

4.2 Technical Data for Cable Selection (For Aluminium Cables)

Table Y1

Single-core 70 ⁰C thermoplastic insulated cables, non-armoured, with or without sheath
(ALUMINIUM CONDUCTORS)

Ambient temperature:30 ⁰C
Conductor operating temperature:70 ⁰C

CURRENT-CARRYING CAPACITY (Amperes):

Conductor Cross-Sectional Area	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method F (in free air on a perforated cable tray, horizontal or vertical)				
							Touching			Spaced by one 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	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	
										Horizontal	Vertical
1	2	3	4	5	6	7	8	9	10	11	12
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	93	84	118	104	125	110	149	133	128	169	152
70	118	107	150	133	160	140	192	173	166	217	196
95	142	129	181	161	195	170	235	212	203	265	241
120	164	149	210	186	226	197	273	247	237	308	282
150	189	170	234	204	261	227	316	287	274	356	327
185	215	194	266	230	298	259	363	330	316	407	376
240	252	227	312	269	352	305	430	392	375	482	447
300	289	261	358	306	406	351	497	455	434	557	519
380	-	-	413	352	511	472	543	502	507	625	584
480	-	-	477	405	591	546	629	582	590	726	680
600	-	-	545	462	679	626	722	669	680	837	787
740	-	-	-	-	771	709	820	761	776	956	902
960	-	-	-	-	900	823	953	886	907	1125	1066
1200	-	-	-	-	1022	926	1073	999	1026	1293	1229

4.2 Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y2

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:70 ^{0}C

Conductor Cross-Sectional Area	2 Cables, d.c.	2 Cables, Single-Phase a.c.									3 or 4 Cables, Three -Phase a.c.											
		Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C & F (clipped direct, on tray or in free air)						Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C & F (clipped direct, on tray or in free air)								
					Cables Touching			Cables Spaced*						Cables Touching, Trefoil			Cables Touching, Flat			Cable Spaced*,Flat		
1	2	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)			(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	1.55	1.60	0.30	1.60	1.55	0.190	1.55	1.55	0.28	1.55	1.35	0.26	1.40	1.35	0.165	1.35	1.35	0.24	1.35	1.35	0.32	1.40
70	1.05	1.10	0.30	1.15	1.05	0.185	1.05	1.05	0.27	1.10	0.94	0.26	0.97	0.91	0.160	0.92	0.91	0.24	0.94	0.91	0.31	0.96
95	0.77	0.81	0.29	0.86	0.77	0.185	0.79	0.77	0.27	0.82	0.70	0.25	0.74	0.67	0.160	0.69	0.67	0.23	0.71	0.67	0.31	0.74
120	0.61	0.64	0.29	0.70	0.61	0.180	0.64	0.61	0.27	0.67	0.55	0.25	0.61	0.53	0.155	0.55	0.53	0.23	0.58	0.53	0.31	0.61
150	0.49	0.51	0.28	0.59	0.49	0.175	0.52	0.49	0.26	0.55	0.45	0.24	0.51	0.42	0.155	0.45	0.42	0.23	0.48	0.42	0.30	0.52
185	0.39	0.42	0.28	0.50	0.40	0.175	0.43	0.39	0.26	0.47	0.36	0.24	0.44	0.34	0.150	0.37	0.34	0.23	0.41	0.34	0.30	0.46
240	0.30	0.32	0.27	0.42	0.30	0.170	0.35	0.30	0.26	0.40	0.28	0.24	0.37	0.26	0.150	0.30	0.26	0.22	0.35	0.26	0.30	0.40
300	0.24	0.26	0.27	0.37	0.24	0.170	0.30	0.24	0.26	0.35	0.23	0.23	0.32	0.21	0.145	0.26	0.21	0.22	0.31	0.21	0.30	0.36
380	0.190	0.22	0.27	0.35	0.195	0.165	0.26	0.195	0.25	0.32	0.190	0.23	0.30	0.170	0.145	0.22	0.170	0.22	0.28	0.170	0.29	0.34
480	0.150	0.18	0.26	0.32	0.155	0.165	0.23	0.155	0.25	0.29	0.155	0.23	0.27	0.140	0.140	0.195	0.140	0.22	0.26	0.135	0.29	0.32
600	0.120	0.150	0.26	0.30	0.130	0.160	0.21	0.125	0.25	0.28	0.125	0.22	0.26	0.110	0.140	0.180	0.110	0.22	0.24	0.110	0.29	0.31
740	0.099	-	-	-	0.105	0.160	0.190	0.100	0.25	0.27	-	-	-	0.094	0.135	0.165	0.094	0.21	0.23	0.089	0.29	0.30
960	0.075	-	-	-	0.086	0.155	0.180	0.082	0.24	0.26	-	-	-	0.077	0.135	0.155	0.077	0.21	0.22	0.071	0.29	0.29
1200	0.060	-	-	-	0.074	0.155	0.170	0.068	0.24	0.25	-	-	-	0.066	0.135	0.150	0.066	0.21	0.22	0.059	0.28	0.29

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

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y3
Multi-core 70 °C thermoplastic insulated & thermoplastic sheathed cables, non-armoured (ALUMINIUM CONDUCTORS)

CURRENT-CARRYING CAPACITY (Amperes):

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

Conductor Cross - Sectional Area	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on 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 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	8	9
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
16	44	41	54	48	66	59	73	61
25	58	53	71	62	83	73	89	78
35	71	65	86	77	103	90	111	96
50	86	78	104	92	125	110	135	117
70	108	98	131	116	160	140	173	150
95	130	118	157	139	195	170	210	183
120	-	135	-	160	-	197	-	212
150	-	155	-	176	-	227	-	245
185	-	176	-	199	-	259	-	280
240	-	207	-	232	-	305	-	330
300	-	237	-	265	-	351	-	381

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y4

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:70 ^{0}C

Conductor Cross-Sectional Area	Two-Core Cable, d.c.	Two-Core Cable, Single-Phase a.c.			Three- or Four-Core Cable, Three-Phase a.c.		
1	2	3			4		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
16	4.5	4.5			3.9		
		r	x	z	r	x	z
25	2.9	2.9	0.175	2.9	2.5	0.150	2.5
35	2.1	2.1	0.170	2.1	1.80	0.150	1.80
50	1.55	1.55	0.170	1.55	1.35	0.145	1.35
70	1.05	1.05	0.165	1.05	0.90	0.140	0.92
95	0.77	0.77	0.160	0.79	0.67	0.140	0.68
120	-	-	-	-	0.53	0.135	0.55
150	-	-	-	-	0.42	0.135	0.44
185	-	-	-	-	0.34	0.135	0.37
240	-	-	-	-	0.26	0.130	0.30
300	-	-	-	-	0.21	0.130	0.25

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y5
Single-core armoured 70 °C thermoplastic insulated cables (non-magnetic armour)
(ALUMINIUM CONDUCTORS)

Ambient temperature:30 ^{0}C
CURRENT-CARRYING CAPACITY (Amperes): Conductor operating temperature:70 ^{0}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	143	133	152	141	131	167	157	168	159	169	155
70	183	168	194	178	168	214	202	212	200	213	196
95	221	202	234	214	205	261	247	259	245	255	236
120	255	233	270	246	238	303	288	299	285	293	272
150	294	267	310	282	275	349	333	340	323	335	312
185	334	303	352	319	315	400	382	389	371	379	354
240	393	354	413	374	372	472	452	457	437	443	415
300	452	405	474	427	430	545	523	520	498	505	475
380	518	452	543	479	497	638	613	583	559	551	518
480	586	501	616	534	568	742	715	655	629	604	568
600	658	550	692	589	642	859	828	724	696	656	618
740	728	596	769	642	715	986	952	802	770	707	666
960	819	651	868	706	808	1171	1133	866	832	770	726
1200	893	692	952	756	880	1360	1317	938	902	822	774

4.2 Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y6

VOLTAGE DROP (per ampere per meter):

Conductor operating temperature:70 ^{0}C

Conductor Cross-Section Area	2 Cables, d.c.	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			Spaced*			Trefoil and Touching			Flat and Touching			Flat and Spaced*		
1	2	3			4			5			6			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	1.55	1.55	0.23	1.55	1.55	0.31	1.55	1.35	0.195	1.35	1.35	0.27	1.35	1.30	0.34	1.35
70	1.05	1.05	0.22	1.10	1.05	0.30	1.10	0.92	0.190	0.93	0.93	0.26	0.96	0.95	0.33	1.00
95	0.77	0.78	0.21	0.81	0.81	0.29	0.86	0.68	0.185	0.70	0.70	0.25	0.75	0.73	0.32	0.80
120	0.61	0.62	0.21	0.66	0.65	0.29	0.71	0.54	0.180	0.57	0.57	0.25	0.62	0.60	0.32	0.68
150	0.49	0.50	0.20	0.54	0.53	0.28	0.60	0.44	0.175	0.47	0.46	0.24	0.52	0.50	0.31	0.58
185	0.39	0.41	0.195	0.45	0.44	0.28	0.52	0.35	0.170	0.39	0.38	0.24	0.45	0.42	0.30	0.51
240	0.30	0.32	0.190	0.37	0.34	0.27	0.44	0.28	0.165	0.32	0.30	0.23	0.38	0.33	0.29	0.44
300	0.24	0.26	0.185	0.32	0.28	0.26	0.39	0.22	0.160	0.27	0.24	0.23	0.34	0.28	0.29	0.40
380	0.190	0.22	0.185	0.28	0.26	0.25	0.36	0.185	0.155	0.24	0.22	0.22	0.32	0.27	0.26	0.38
480	0.150	0.180	0.180	0.25	0.22	0.25	0.33	0.155	0.155	0.22	0.195	0.22	0.29	0.24	0.25	0.35
600	0.120	0.150	0.175	0.23	0.195	0.24	0.31	0.130	0.150	0.200	0.170	0.21	0.27	0.21	0.24	0.32
740	0.097	0.135	0.170	0.22	0.180	0.23	0.29	0.115	0.145	0.185	0.160	0.20	0.26	0.200	0.22	0.30
960	0.075	0.115	0.160	0.200	0.165	0.21	0.27	0.100	0.140	0.175	0.150	0.185	0.24	0.190	0.195	0.27
1200	0.060	0.110	0.155	0.190	0.160	0.180	0.24	0.094	0.140	0.170	0.145	0.160	0.22	0.185	0.165	0.25

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

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y7
Multi-core armoured 70 °C thermoplastic insulated cables.
(ALUMINIUM CONDUCTORS)

Ambient temperature:30 ^{0}C
Ground ambient temperature: 20°C
Conductor operating temperature:70 ^{0}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	68	58	71	61		
25	89	76	94	80	77	64
35	109	94	115	99	93	77
50	131	113	139	119	109	91
70	165	143	175	151	135	112
95	199	174	211	186	159	132
120	-	202	-	216	-	150
150	-	232	-	250	-	169
185	-	265	-	287	-	190
240	-	312	-	342	-	218
300	-	360	-	399	-	247

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y8

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:70 ^{0}C

Conductor Cross-Sectional Area	Two-Core Cable, d.c.	Two-Core Cable, Single-Phase a.c.			Three- or Four-Core Cable, Three-Phase a.c.		
1	2	3			4		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
16	4.5	4.5			3.9		
		r	x	z	r	x	z
25	2.9	2.9	0.175	2.9	2.5	0.150	2.5
35	2.1	2.1	0.170	2.1	1.80	0.150	1.80
50	1.55	1.55	0.170	1.55	1.35	0.145	1.35
70	1.05	1.05	0.165	1.05	0.90	0.140	0.92
95	0.77	0.77	0.160	0.79	0.67	0.140	0.68
120	-	-	-	-	0.53	0.135	0.55
150	-	-	-	-	0.42	0.135	0.44
185	-	-	-	-	0.34	0.135	0.37
240	-	-	-	-	0.26	0.130	0.30
300	-	-	-	-	0.21	0.130	0.25

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y9
Single-core 90 °C thermosetting insulated cables, non-armoured with or without sheath (ALUMINIUM CONDUCTORS)

Ambient temperature:30 ^{0}C
Conductor operating temperature:90 ^{0}C

CURRENT-CARRYING CAPACITY (Amperes):

Conductor Cross - Sectional Area	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		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.	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 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	125	113	157	140	154	136	184	165	159	210	188
70	158	142	200	179	198	174	237	215	206	271	244
95	191	171	242	217	241	211	289	264	253	332	300
120	220	197	281	251	280	245	337	308	296	387	351
150	253	226	307	267	324	283	389	358	343	448	408
185	288	256	351	300	371	323	447	413	395	515	470
240	338	300	412	351	439	382	530	492	471	611	561
300	387	344	471	402	508	440	613	571	544	708	652
380	-	-	-	-	658	594	679	628	638	798	742
480	-	-	-	-	765	692	786	728	743	927	865
600	-	-	-	-	871	791	903	836	849	1058	990
740	-	-	-	-	1001	911	1025	951	979	1218	1143
960	-	-	-	-	1176	1072	1191	1108	1151	1440	1355
1200	-	-	-	-	1333	1217	1341	1249	1307	1643	1550

NOTES:

1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cables should be rated at the maximum operating temperature of the equipment or accessory.

2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any of the cables in the group.

4.2 Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y10

VOLTAGE DROP (per ampere per meter): Conductor operating temperature:90 ^{0}C

Conductor Cross-Section Area	2 Cables, d.c.	2 Cables, Single-Phase a.c.									3 or 4 cables, three -phase a.c.											
		Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C,F & G (clipped direct, on tray or in free air)						Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C & F (clipped direct, on tray or in free air)								
					Cables touching			Cables spaced*						Cables Touching, Trefoil			Cables Touching, Flat			Cable Spaced*,Flat		
1	2	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)			(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	0.175	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
380	0.20	-	-	-	0.21	0.165	0.27	0.21	0.25	0.33	0.20	0.23	0.31	0.180	0.145	0.23	0.180	0.22	0.28	0.180	0.29	0.34
480	0.160	-	-	-	0.170	0.165	0.23	0.165	0.25	0.30	0.165	0.23	0.28	0.150	0.140	0.20	0.150	0.22	0.27	0.145	0.29	0.32
600	0.130	-	-	-	0.140	0.160	0.21	0.135	0.25	0.28	0.135	0.22	0.26	0.120	0.140	0.185	0.120	0.22	0.25	0.120	0.29	0.31
740	0.105	-	-	-	0.115	0.160	0.19	0.110	0.25	0.27	-	-	-	0.100	0.135	0.170	0.100	0.21	0.23	0.095	0.29	0.30
960	0.080	-	-	-	0.092	0.155	0.18	0.087	0.24	0.26	-	-	-	0.082	0.135	0.160	0.082	0.21	0.23	0.076	0.29	0.30
1200	0.064	-	-	-	0.079	0.155	0.17	0.073	0.24	0.25	-	-	-	0.070	0.135	0.150	0.070	0.21	0.22	0.063	0.28	0.29

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

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y11
Multi-core 90 °C thermosetting insulated & thermoplastic sheathed cables, non-armoured (ALUMINIUM CONDUCTORS)

Ambient temperature:30 ^{0}C
CURRENT-CARRYING CAPACITY (Amperes): Conductor operating temperature:90 ^{0}C

Conductor Cross-Sectional Area	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method E (in free air 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 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	8	9
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
16	60	55	72	64	84	76	91	77
25	78	71	94	84	101	90	108	97
35	96	87	115	103	126	112	135	120
50	115	104	138	124	154	136	164	146
70	145	131	175	156	198	174	211	187
95	175	157	210	188	241	211	257	227
120	-	180	-	216	-	245	-	263
150	-	206	-	240	-	283	-	304
185	-	233	-	272	-	323	-	347
240	-	273	-	318	-	382	-	409
300	-	313	-	364	-	440	-	471

NOTES:

1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cables should be rated at the maximum operating temperature of the equipment or accessory.
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any of the cables in the group.

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y12

VOLTAGE DROP (per ampere per meter): Conductor operating temperature: 90 ^{0}C

Conductor Cross-Sectional Area	Two-Core Cable, d.c.	Two-Core Cable, Single-Phase a.c.			Three- or Four-Core Cable, Three-Phase a.c.		
1	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

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y13
Single-core Armoured 90 °C thermosetting insulated cables (non-magnetic armour)
(ALUMINIUM CONDUCTORS)

Ambient Temperature:30 ^{0}C
CURRENT-CARRYING CAPACITY (Amperes): Conductor operating temperature:90 ^{0}C

Conductor Cross-Sectional Area	Reference Method C (clipped direct)		Reference Method F (in free air 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	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	267	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
380	655	573	688	608	625	812	780	735	704	693	649
480	747	642	786	685	714	942	906	825	790	765	717
600	836	706	880	757	801	1076	1036	909	872	832	780
740	934	764	988	824	897	1250	1205	989	950	890	835
960	1056	838	1121	911	1014	1488	1435	1094	1052	970	911
1200	1163	903	1236	990	1118	1715	1658	1187	1141	1043	980

NOTES:

1. Where it is intended to connect the cables in this table to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory.

2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any of the cables in the group.

4.2 Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y14

VOLTAGE DROP (per ampere per meter): Conductor operating temperature: 90 °C

Conductor Cross-Sectional Area	2 Cables, d.c.	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			Spaced*			Trefoil and Touching			Flat and Touching			Flat and Spaced*		
1	2	3			4			5			6			7		
(mm²)	(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
380	0.21	0.23	0.180	0.29	0.26	0.25	0.36	0.195	0.155	0.25	0.23	0.22	0.32	0.27	0.27	0.38
480	0.160	0.185	0.175	0.25	0.23	0.25	0.34	0.160	0.155	0.22	0.20	0.21	0.29	0.24	0.26	0.35
600	0.130	0.160	0.175	0.24	0.20	0.24	0.31	0.135	0.150	0.20	0.175	0.21	0.27	0.22	0.25	0.33
740	0.105	0.140	0.170	0.22	0.190	0.22	0.29	0.120	0.145	0.190	0.165	0.195	0.26	0.21	0.22	0.30
960	0.080	0.120	0.160	0.20	0.170	0.21	0.27	0.105	0.140	0.175	0.150	0.180	0.24	0.195	0.195	0.28
1200	0.064	0.105	0.160	0.190	0.155	0.20	0.25	0.093	0.135	0.165	0.140	0.175	0.22	0.180	0.185	0.26

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

4.2
Technical Data for Cable Selection (For Aluminium Cables) - (Continued)

Table Y15
Multi-core armoured 90 °C thermosetting insulated cables,
(ALUMINIUM CONDUCTORS)

Ambient temperature: 30 ^{0}C
Ground ambient temperature: 20°C
Conductor operating temperature: 90 ^{0}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 it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory.

2. Where it is intended to group a cable in this cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any of the cables in the group .

4.2
Technical Data for Cable Selection (For Aluminium Cables)- (Continued)

Table Y16

VOLTAGE DROP (per ampere per meter): Conductor operating temperature: 90 ^{0}C

Conductor Cross-Sectional Area	Two-Core Cable, d.c.	Two-Core Cable, Single-Phase a.c.			Three- or Four-Core Cable, Three-Phase a.c.		
1	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

4.3
Technical Data for Cable Installation

Voltage Drop in Consumers' Installations

The voltage drop between the origin of an installation and any load point should not be greater than the values in the table below expressed with respect to the value of the nominal voltage of the installation.

The calculated voltage drop should include any effects due to harmonic currents.

Voltage drop

	Lighting	Other uses
(i) Low voltage installations supplied directly from a public low voltage distribution system	3%	5%
(ii) Low voltage installation supplied from private LV supply(*)	6%	8%
(*) The voltage drop within each final circuit should not exceed the values given in (i). Where the wiring systems of the installation are longer than 100m, the voltage drops indicated above may be increased by 0.005% per metre of the wiring system beyond 100m, without this increase being greater than 0.5%. The voltage drop is determined from the demand of the current-using equipment, applying diversity factors where applicable, or from the value of the design current of the circuit.		

NOTE 1: A greater voltage drop may be acceptable for a motor circuit during starting and for other equipment with a high inrush current, provided that in both cases it is ensured that the voltage variations remain within the limits specified in the relevant equipment standard.

NOTE 2: The following temporary conditions are excluded:
- voltage transients
- voltage variations due to abnormal operation.

METHODS OF INSTALLATION

Table A1 lists the methods of installation for which this appendix provides guidance for the selection of the appropriate cable size. Table A2 lists the appropriate tables for selection of current ratings for specific cable constructions. The Reference Methods are those methods of installation for which the current-carrying capacities given in Tables X1 to Y15 have been determined (see Reference Methods below). The use of other methods is not precluded and in that case the evaluation of current-carrying capacity may need to be based on experimental work.

Reference Methods

The Reference Methods are those methods of installation for which the current-carrying capacity has been determined by test or calculation.

NOTE 1: It is impractical to calculate and publish current ratings for every installation method, since many would result in the same current rating. Therefore a suitable (limited) number of current ratings have been calculated which cover all of the installation methods stated in Table A1 and have been called Reference Methods.

Reference Method A, for example, Installation Methods 1 and 2 of Table A1 (non-sheathed cables and multicore cables in conduit in a thermally insulated wall).

The wall consists of an outer weatherproof skin, thermal insulation and an inner skin of wood or wood-like material having a thermal conductance of at least 10 W/m^2K. The conduit is fixed such that it is close to, but not necessarily touching, the inner skin. Heat from the cables is assumed to escape through the inner skin only. The conduit can be metal or plastic.

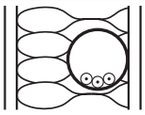
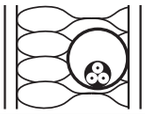
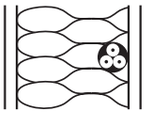
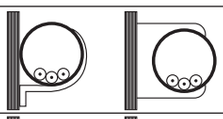
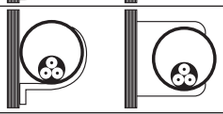
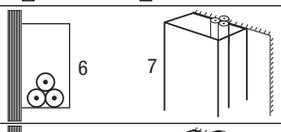
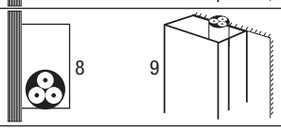
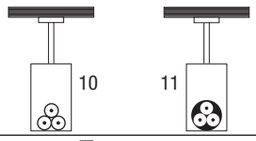
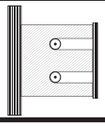
Reference Method B, for example, Installation Method 4 of Table A1 (non-sheathed cables in conduit mounted on a wooden or masonry wall) and Installation Method 5 of Table A1 (multicore cable in conduit on a wooden or masonry wall).

The conduit is mounted on a wooden wall such that the gap between the conduit and the surface is less than 0.3 times the conduit diameter. The conduit can be metal or plastic. Where the conduit is fixed to a masonry wall the current-carrying capacity of the non-sheathed or sheathed cable may be higher.

TABLE A1

Schedule of installation methods of cables (including Reference Methods) for determining current-carrying capacity

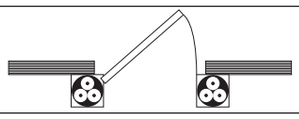
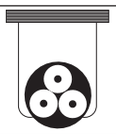
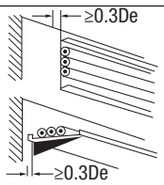
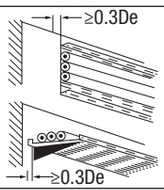
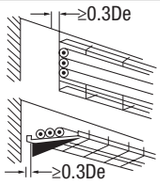
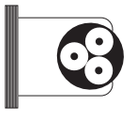
NOTE 1: The illustrations are not intended to depict actual product or installation practices but are indicative of the method described.
NOTE 2: The installation and reference methods stated are in line with IEC. However, not all methods have a corresponding rating for all cable types.

Installation Method			Reference Method to be used to determine current-carrying capacity
Number	Examples	Description	
1	 Room	Non-sheathed cables in conduit in a thermally insulated wall with an inner skin having a thermal conductance of not less than 10 W/m²K [c]	A
2	 Room	Multicore cable in conduit in a thermally insulated wall with an inner skin having a thermal conductance of not less than 10 W/m²K [c]	A
3	 Room	Multicore cable direct in a thermally insulated wall with an inner skin having a thermal conductance of not less than 10 W/m²K [c]	A
4		Non-sheathed cables in conduit on a wooden or masonry wall or spaced less than 0.3 × conduit diameter from it [c]	B
5		Multicore cable in conduit on a wooden or masonry wall or spaced less than 0.3 × conduit diameter from it [c]	B
6 7		Non-sheathed cables in cable trunking on a wooden or masonry wall 6 - run horizontally [b] 7 - run vertically [b, c]	B
8 9		Multicore cable in cable trunking on a wooden or masonry wall 8 - run horizontally [b] 9 - run vertically [b,c]	B*
10		Non-sheathed cables run in suspended cable trunking [b]	B
11		Multicore cable in suspended cable trunking [b]	B
12		Non-sheathed cables run in mouldings [c, e]	A

b Values given for Installation Method B are for a single circuit. Where there is more than one circuit in the trunking the group rating factor given in Table C1 is applicable,irrespective of the presence of an internal barrier or partition.
c Care is needed where the cable runs vertically and ventilation is restricted. The ambient temperature at the top of the vertical section can be much higher.
e The thermal resistivity of the enclosure is assumed to be poor because of the material of construction and possible air spaces. Where the construction is thermally equivalent to Installation Methods 6 or 7, Reference Method B may be used.

* Still under consideration in IEC.

TABLE A1 - Continued

Installation Method			Reference Method to be used to determine current-carrying capacity
Number	Examples	Description	
13 14		Deleted by BS 7671:2008 Amendment No 1	
15		Non-sheathed cables in conduit or single-core or multicore cable in architrave[c, f]	A
16		Non-sheathed cables in conduit or single-core or multicore cable in window frames [c, f]	A
20		Single-core or multicore cables: - fixed on (clipped direct) or spaced less than 0.3 × cable diameter from a wooden or masonry wall [c]	C
21		Single-core or multicore cables: - fixed directly under a wooden or masonry ceiling	C (higher than standard ambient temperatures may occur with this installation method)
22		Single-core or multicore cables: - spaced from a ceiling	E, F or G* (higher than standard ambient temperatures may occur with this installation method)
23		Not used	
30		Single-core or multicore cables: - on unperforated tray run horizontally or vertically [c, h]	C with item 2 of Table C1
31		Single-core or multicore cables: - on perforated tray run horizontally or vertically [c.h]	E or F
32		Single-core or multicore cables: - on brackets or on a wire mesh tray run horizontally or vertically [c, h]	E or F
33		Single-core or multicore cables: - spaced more than 0.3 times the cable diameter from a wall	E, F or G[g]

c Care is needed where the cable runs vertically and ventilation is restricted. The ambient temperature at the top of the vertical section can be much higher.

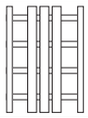
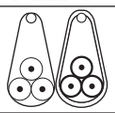
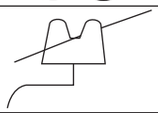
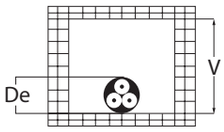
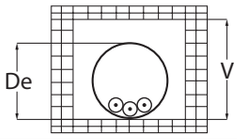
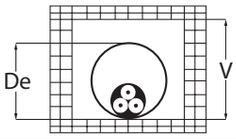
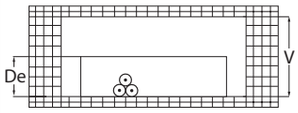
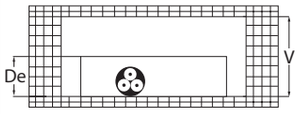
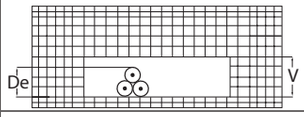
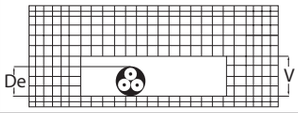
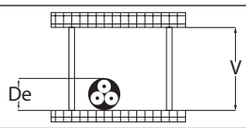
f The thermal resistivity of the enclosure is assumed to be poor because of the material of construction and possible air spaces. Where the construction is thermally equivalent to Installation Methods 6, 7, 8 or 9, Reference Method B may be used.

g The factors in Table C1 may also be used.

h D_e = the external diameter of a multicore cable:
- 2.2 x the cable diameter when three single-core cables are bound in trefoil, or
- 3 x the cable diameter when three single-core cables are laid in flat formation.

* Still under consideration in IEC.

TABLE A1 - Continued

Installation Method			Reference Method to be used to determine current-carrying capacity
Number	Examples	Description	
34		Single-core or multicore cables: - on a ladder [c]	E or F
35		Single-core or multicore cable suspended from or incorporating a support wire or harness	E or F
36		Bare or non-sheathed cables on insulators	G
40		Single-core or multicore cable in a building void [c,h,i]	Where 1.5 $D_e \leq V < 20\ D_e$ use B
41		Non- sheathed cables in conduit in a building void in masonry having a thermal resistivity not greater than 2 K.m/W [c,i,j]	Where 1.5 $D_e \leq V$ use B
42		Single-core or multicore cable in conduit in a building void, in masonry having a thermal resistivity not greater than 2 K.m/W [c,j]	Where 1.5 $D_e \leq V$ use B
43		Non-sheathed cables in cable ducting in a building void in masonry having a thermal resistivity not greater than 2 K.m/W [c,i,j]	Where 1.5 $D_e \leq V$ use B
44		Single-core or multicore cable in cable ducting in a building void in masonry having a thermal resistivity not greater than 2 K.m, W [c,i,j]	Where 1.5 $D_e \leq V$ use B
45		Non-sheathed cables in cable ducting in masonry having a thermal resistivity not greater than 2 K.m, W [c,i,j]	Where 1.5 $D_e \leq V < 50\ D_e$ use B
46		Single-core or multicore cable in cable ducting in masonry having a thermal resistivity not greater than 2 K.m/W [c,h,i]	Where 1.5 $D_e \leq V < 50\ D_e$ use B
47		Single-core or multicore cable: - in ceiling void - in a suspended floor [h,i]	Where 1.5 $D_e \leq V < 50\ D_e$ use B

c Care is needed where the cable runs vertically and ventilation is restricted. The ambient temperature at the top of the vertical section can be much higher.

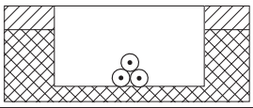
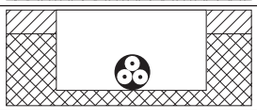
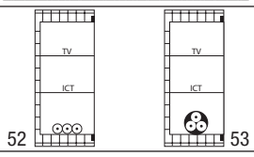
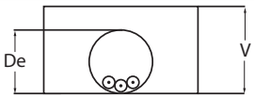
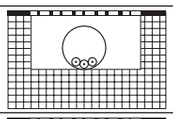
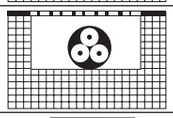
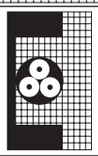
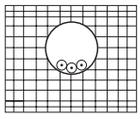
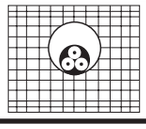
g The factors in Table C1 may also be used.

h D_e =the external diameter of a multicore cable:
- 2.2 x the cable diameter when three single-core cables are bound in trefoil, or
- 3 x the cable diameter when three sinlgle-core cables are laid in flat formation.

i V = the smaller dimension or diameter of a masonry duct or void, or the vertical depth of a rectangular duct, floor or ceiling void or channel.

j D_e = external diameter of conduit or vertical depth of cable ducting.

TABLE A1 - Continued

Installation Method			Reference Method to be used to determine current-carrying capacity
Number	Examples	Description	
50		Non-sheathed cables in flush cable trunking in the floor	B
51		Multicore cable in flush cable trunking in the floor	B
52		Non-sheathed cables in flush trunking [c]	B
53		Multicore cable in flush trunking [c]	B
54		Non-sheathed cables or single-core cables in conduit in an unventilated cable channel run horizontally or vertically [c,i,k,m]	Where 1.5 $D_e \leq V$ use B
55		Non-sheathed cables in conduit in an open or ventilated cable channel in the floor [l,m]	B
56		Sheathed single-core or multicore cable in an open or ventilated cable channel run horizontally or vertically [m]	B
57		Single-core or multicore cable direct in masonry having a thermal resistivity not greater than 2 K.m/W -without added mechanical protection [n,o]	C
58		Single-core or multicore cable direct in masonry having a thermal resistivity not greater than 2 K.m/W - with added mechanical protection [n,o] (e.g. capping)	C
59		Non-sheathed cables or single-core cables in conduit in masonry having a thermal resistivity not greater than 2 K.m/W [o]	B
60		Multicore cables in conduit in masonry having a thermal resistivity not greater than 2 K.m/W[o]	B

c Care is needed where the cable runs vertically and ventilation is restricted. The ambient temperature at the top of the vertical section can be much higher.

k De = external diameter of conduit.

i V =the smaller dimension or diameter of a masonry duct or void, or the vertical depth of a rectangular duct, floor or ceiling void or channel. The depth of the channel is more important than the width.

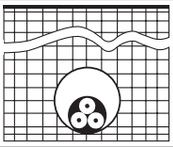
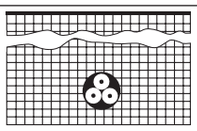
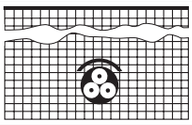
l For multicore cable installed as Method 55, use current-carrying capacity for Reference Method B.

m It is recommended that these Installation Methods are used only in areas where access is restricted to authorized persons so that the reduction in current-carrying capacity and the fire hazard due to the accumulation of debris can be prevented.

n For cables having conductors not greater than 16 mm^2, the current-carrying capacity may be higher.

o Thermal resistivity of masonry is not greater than 2 K.m/W . The term masonry is taken to include brickwork, concrete, plaster and the like (excludes thermally insulating materials).

TABLE A1 - Continued

Installation Method			Reference Method to be used to determine current-carrying capacity
Number	Examples	Description	
70		Multicore armoured cable in conduit or in cable ducting in the ground	D For multicore armoured cable only
71		Deleted by BS 7671:2008 Amendment No 1	
72		Sheathed, armoured or multicore cables direct in the ground: -without added mechanical protection (see note)	D
73		Sheathed, armoured or multicore cables direct in the ground: - with added mechanical protection (e.g. cable covers) (see note)	D

NOTE: The inclusion of directly buried cables is satisfactory where the soil thermal resistivity is of the order of 2.5 K.m/W. For lower soil resistivities, the current-carrying capacity for directly buried cables is appreciably higher than for cables in ducts.

TABLE A1 - Continued

(Installation Methods for cables enclosed in floor concrete troughs)

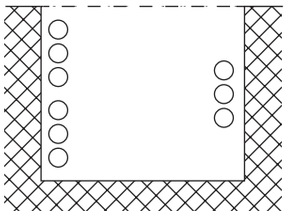
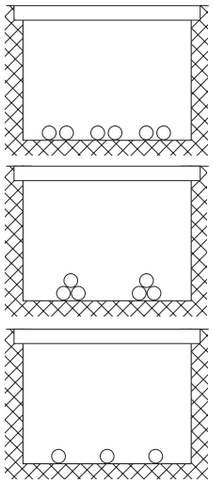
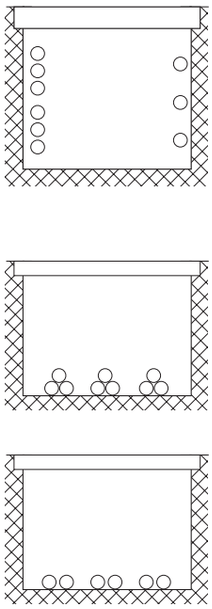
Installation Method			Reference Method to be used to determine current-carrying capacity
Number	Examples	Description	
117		Cables supported on the wall of an open or ventilated infloor concrete trough with spacing as follows: - Sheathed single-core cables in free air (any supporting metalwork under the cables occupying less than 10% of plan area). - Two or three cables vertically one above the other, minimum distance between cable surfaces equal to the overall cable diameters, distance from the wall not less than 1/2 the cable diameter. - Two or three cables horizontally with spacing as above.	E or F
118		Cables in enclosed trench 450 mm wide by 300 mm deep (minimum dimensions) including 100 mm cover - Two to six single-core cables with surfaces separated by a minimum of one cable diameter - One or two groups of three single-core cables in trefoil formation - One to four 2-core cables or one to three cables of 3 or 4 cores with all cables separated by a minimum of 50 mm	E or F using rating factors in Table C6
119		Cables enclosed in an infloor concrete trough 450 mm wide by 600 mm deep (minimum dimensions) including 100 mm cover. Six to twelve single-core cables arranged in flat groups of two or three on the vertical trench wall with cables separated by one cable diameter and a minimum of 50 mm between groups. or two to four groups of three single-core cables in trefoil formation with a minimum of 50 mm between trefoil formations. or four to eight 2-core cables or three to six cables of 3 or 4 cores with cables separated by a minimum of 75 mm. All cables spaced at least 25 mm from trench wall.	E or F using rating factors in Table C6

TABLE A1 - Continued
(Installation methods for cables enclosed in floor concrete troughs)

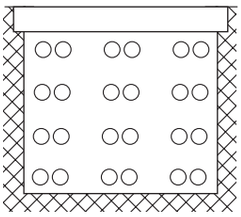
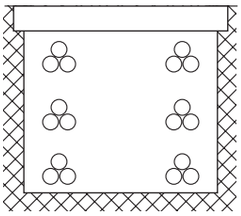
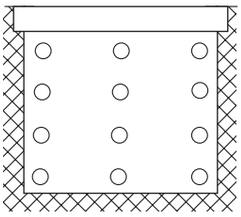
Installation Method			Reference Method to be used to determine current-carrying capacity
Number	Examples	Description	
120		Cables enclosed in an infloor concrete trough 600 mm wide by 760 mm deep (minimum dimensions) including 100 mm cover. Twelve to twenty four single-core cables arranged in either flat formation of two or three cables in a group with cables separated by one cable diameter and each cable group separated by a minimum of 50 mm either horizontally or vertically	E or F using rating factors in Table C6
		or single-core cables in trefoil formation with each group or trefoil formation separated by a minimum of 50 mm either horizontally or vertically	
		or eight to sixteen 2-core cables or six to twelve cables of 3 or 4 cores with cables separated by a minimum of 75 mm either horizontally or vertically. All cables spaced at least 25 mm from trench wall	

TABLE A2

Schedule of cable specifications and current rating tables

Specification number	Specification title	Applicable current rating tables	Conductor operating temperature
BS 5467	Electric cables -Thermosetting insulated, armoured cables for voltages of 600/1000 V and 1900/3300 V.	X13, X14, X15, X16, Y13, Y14, Y15, Y16	90 ºC
BS 6004	Electric cables -PVC insulated, non-armoured cables for voltages up to and including 450/750 V, for electric power, lighting and internal wiring (fixed installation). Low temperature PVC insulated and sheathed flexible cable (flexible cables).	X1, X2, X3, X4	70 ºC 60 ºC
BS 6231	Deleted by BS 7671 Amendment 3 -.		
BS 6346 (withdrawn) Retained here for historical purposes	Electric cables- PVC insulated, armoured cables for voltages of 600/1000 V and 1900/3300 V.	X5, X6, X7, X8 Y5, Y6, Y7, Y8, Y13, Y14, Y15, Y16	70 ºC
BS 6500	Deleted by BS 7671 Amendment 3 -.		
BS 6724	Electric cables- Thermosetting insulated, armoured cables for voltages of 600/1000 V and 1900/3300 V, having low emission of smoke and corrosive gases when affected by fire.	X13, X14, X15, X16, Y13, Y14, Y15, Y16	90 °C
BS 7211	Electric cables-Thermosetting insulated, non-armoured cables for voltages up to and including 450/750 V, for electric power, lighting and internal wiring and having low emission of smoke and corrosive gases when affected by fire.	X9, X10, X11, X12	90 °C
BS 7629-1	Electric cables- Specification for 300/500 V fire-resistant electric cables having low emission of smoke and corrosive gases when affected by fire - Part 1: Multicore cables.	X3, X4	70 ºC
BS 7846	Electric cables- Thermosetting insulated, armoured, fire-resistant cables of rated voltage 600/ 1000 V having low emission of smoke and corrosive gases when affected by fire. Specification	X13, X14, X15, X16	90 ºC
BS 7889	Electric cables- Thermosetting insulated, PVC sheathed, unarmoured cables for a voltage of 600/1000 V.	X9, X10, X11, X12	90 °C
BS 7919	Deleted by BS 7671 Amendment 3 -.		
BS 8436	Electric cables-300/500 V screened electric cables having low emission of smoke and corrosive gases when affected by fire, for use in walls, partitions and building voids-multicore cables.	X3, X4	70 °C
BS 8573	Electric cables- Thermosetting insulated. non-armoured cables with a voltage of 600/1000 V, for fixed installations, having low emission of smoke and corrosive gases when affected by fire.	X9, X10, X11, X12	90 °C
BS EN 50525-2-31,3-41	Electric cables-Low voltage energy cables of rated voltages up to and including 450/750 V (fixed installation)	X1, X2, X9, X10	70 °C. 90 °C

** Sheath operating temperature.

TABLE B1

Rating factors (C_a) for ambient air temperatures other than 30 ⁰C

Ambient temperature [a] ⁰C	Insulation				
				Mineral [a]	
	60 °C thermosetting	70 °C thermoplastic	90 °C thermosetting	Thermoplastic covered or bare and exposed to touch 70 °C	Bare and not exposed to touch 105 °C
25	1.04	1 .03	1 .02	1 .07	1 .04
30	1 .00	1.00	1 .00	1 .00	1 .00
35	0.91	0.94	0.96	0.93	0.96
40	0.82	0.87	0.91	0.85	0.92
45	0.71	0.79	0.87	0.78	0.88
50	0.58	0.71	0.82	0.67	0.84
55	0.41	0.61	0.76	0.57	0.80
60	-	0.50	0.71	0.45	0.75
65	-	-	0.65	-	0.70
70	-	-	0.58	-	0.65
75	-	-	0.50	-	0.60
80	-	-	0.41	-	0.54
85	-	-	-	-	0.47
90	-	-	-	-	0.40
95	-	-	-	-	0.32

a- For higher ambient temperatures, consult manufacturer.

TABLE B2

Rating factors (C_a) for ambient ground temperatures other than 20 ⁰C

Ground temperature ⁰C	Insulation	
	70 ⁰C thermoplastic	90 ⁰C thermosetting
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
50	0.63	0.76
55	0.55	0.71
60	0.45	0.65
65	-	0.60
70	-	0.53
75	-	0.46
80	-	0.38

TABLE B3

Rating factors (C_s) 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

Thermal resistivity, K.m/W	0.5	0.8	1	1.2	1 .5	2	2.5	3
Rating factor for cables in buried ducts	1.28	1.20	1.18	1.13	1.1	1.05	1	0.96
Rating factor for direct buried cables	1.88	1.62	1.5	1.40	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. The overall accuracy of rating factors is within ± 5%.
NOTE 2: 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 0.8 m.

TABLE B4

Rating factors (C_d) for depths of laying other than 0.7 m for direct buried cables and cables in buried ducts

Depth of laying, m	Buried direct	In buried ducts
0.5	1 .03	1 . 02
0.7	1 .00	1 .00
1	0.97	0.98
1 .25	0.95	0.96
1 .5	0.94	0.95
1 .75	0.93	0.94
2	0.92	0.93
2.5	0.90	0.92
3	0.89	0.91

TABLE B5

Rating factors for cables having more than 4 loaded cores

Number of loaded cores	5	6	7	10	12	14	19
Rating factor	0.72	0.67	0.63	0.56	0.53	0.51	0.45
Number of loaded cores	24	27	30	37	44	46	48
Rating factor	0.42	0.40	0.39	0.36	0.34	0.33	0.33

NOTE 1: The current-carrying capacity for a cable in the size range 1.5 to 4 mm^2, having more than 4 loaded cores, is obtained by multiplying the current-carrying capacity of a 2-core, having the same insulation type, by the factor selected from this table. The current-carrying capacity for the 2-core cable is that for the installation condition to be used for the multicore cable.
NOTE 2: If, due to known operating conditions, a core is expected to carry not more than 30% of its current-carrying capacity in the multicore cable it may be ignored for the purpose of determining the number of cores in the cable.
NOTE 3: If, due to known operating conditions, a core is expected to carry not more than 30% of it's rating, after applying the rating factor for the total number of current-carrying cores, it may be ignored for the purpose of obtaining the rating factor for the number of loaded cores.

For example, the current-carrying capacity of a cable having N loaded cores would normally be obtained by multiplying the current-carrying capacity of a 2-core, having the same insulation type, by the factor selected from this table for N cores. That is

$$I_{zlc} = I_{t2c} \times C_{gN}$$

where:

I_{zlc} is the current-carrying capacity of the multicore cable after applying the rating factor for the total number of current-carrying cores

I_{t2c} is the tabulated current-carrying capacity of a 2-core cable, having the same insulation type as the multi-core cable

C_{gN} is the rating factor from Table B5 for the total number of current-carrying cores. However, if M cores in the cable carry loads which are not greater than 0.3 x I_{t2c} x C_{gN}, the current-carrying capacity can be obtained by using the rating factor corresponding to (N-M) cores.
The "not greater than 0.3 x I_{t2c} x C_{gN}" calculation should be applied before the adjacent multicore cable grouping factor, if applicable, from Table C1. The 30% rule should not be further applied to any adjacent cable grouping factor calculations.

I_{zlc} should be greater than or equal to I_n or I_b as appropriate, divided by the relevant rating factor(s) C, that is $I_{zlc} \geq I_n$ or I_b / C

TABLE C1

Rating factors for one circuit or one multicore cable or for a group of circuits, or a group of multicore cables, to be used with current-carrying capacities of Tables X1 to Y15

Item	Arrangement (cables touching)	Number of circuits or multicore cables												To be used with current-carrying capacities, Reference Method
		1	2	3	4	5	6	7	8	9	12	16	20	
1	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	A to F
2	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	C
3	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	E
4	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 need be applied.

NOTE 3: The same factors are applied to:
- groups of two or three single-core cables;
- multi core cables.

NOTE 4: If a group 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 installation included in Tables X1 to Y15 and 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 for example Tables C4 and C5.

NOTE 8: Where 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.

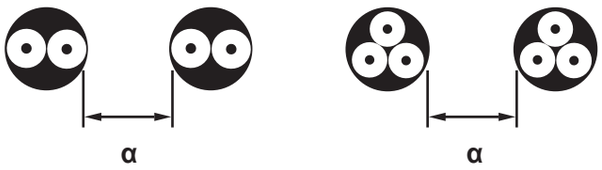
For example, a group or N loaded cables would normally require a group rating factor of C_g applied to the tabulated I_t. However, if M cables in the group carry loads which are not greater than 0.3 C_g I_t amperes the other cables can be sized by using the group rating factor corresponding to (N-M) cables.

TABLE C2

Rating factors for more than one circuit, cables buried directly in the ground Reference Method D in Tables X7 to Y15 multicore cables

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



NOTE 1: Values given apply to an installation depth of 0.7 m and a soil thermal resistivity of 2.5 K.m/W. These are average values for the range of cable sizes and types quoted for Tables X7 to Y15. The process of averaging, together with rounding off, can result in some cases in errors of up to ±10%. (Where more precise values are required they may be calculated by methods given in BS 7769 (BS IEC 60287).)

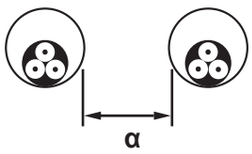
NOTE 2: In case of a thermal resistivity lower than 2.5 K.m/W the rating factors can, in general, be increased and can be calculated by the methods given in BS 7769 (BS IEC 60287).

TABLE C3

Rating factors for more than one circuit, single cables in ducts buried in the ground Reference Method D in Tables X7 to Y15 (Multicore cables in single-way ducts)

Number of ducts	Duct-to-duct clearance (*a*)			
	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

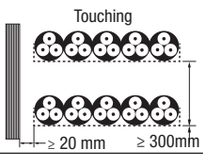
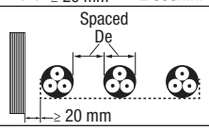
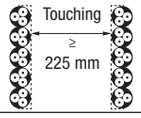
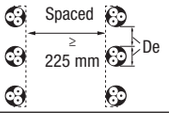
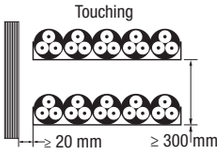
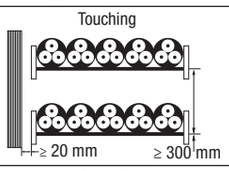
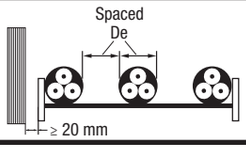


NOTE 1: Values given apply to an installation depth of 0.7 m and a soil thermal resistivity of 2.5 K.m/W. They are average values for the range of cable sizes and types quoted for Tables X7 to Y15. The process of averaging, together with rounding off, can result in some cases in errors of up to ±10%. (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 C4

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 in Tables X3 to Y15

Installation Method in Table A1			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		1	See item 3 of Table C1					
			2	1.00	0.87	0.80	0.77	0.73	0.68
			3	1.00	0.86	0.79	0.76	0.71	0.66
			6	1.00	0.84	0.77	0.73	0.68	0.64
			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		1	See item 3 of Table C1					
			2	1.00	0.88	0.81	0.76	0.71	0.70
			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		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 33		1	See item 4 of Table C1					
			2	1 .00	0.86	0.80	0.78	0.76	0.73
			3	1 .00	0.85	0.79	0.76	0.73	0.70
			6	1 .00	0.84	0.77	0.73	0.68	0.64
	34		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	-

NOTE 1: Values given are averages for the cable types and range of conductor sizes considered in Tables X3 to Y15. The spread of values is generally less than 5%.

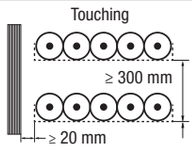
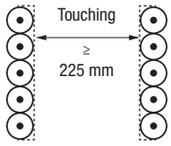
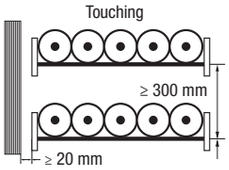
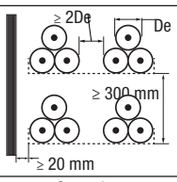
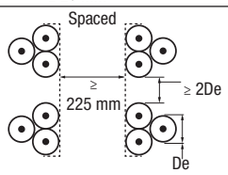
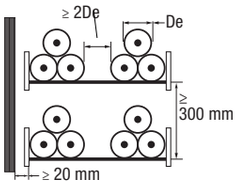
NOTE 2: Factors apply to single layer groups of cables as shown above and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and must be determined by an appropriate method.

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 C5

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 cables in free air - reference method F in Tables X1 to Y13

Installation Method in Table A1			Number of trays or ladders	Number of 3 phase circuits per tray or ladder			Use as a multiplier to rating for
				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 cleates, 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 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 considered in Tables X1 to Y13. 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.

TABLE C6

Rating factors for cables enclosed in infloor concrete troughs
(Installation Methods 118 to 120 of Table A1)

The rating factors tabulated below relate to the disposition of cables illustrated in items 118 to 120 of Table A1 and are applicable to the current-carrying capacities for Reference Methods E and F as given in the relevant tables of this appendix.

Conductor cross-sectional area	Rating factor									
	Installation method 118				Installation method 119			Installation method 120		
	2 single-core cables, or 1 three- or four-core cables	3 single-core cables, or 2 two-core cables	4 single-core cables, or 2 three- or four-core cables	6 single-core cables, 4 two-core cables, or 3 three- or four-core cables	6 single-core cables, 4 two-core cables, or 3 three- or four-core cables	8 single-core cables, or 4 three- or four-core cables	12 single-core cables, 8 two-core cables, or 6 three- or four-core cables	12 single-core cables, 8 two-core cables, or 6 three- or four-core cables	18 single-core cables, 12 two-core cables, or 9 three- or four-core cables	24 single core cables, 16 two-core cables, or 12 three- or four-core cables
1	2	3	4	5	6	7	8	9	10	11
(mm^2)										
4	0.93	0.90	0.87	0.82	0.86	0.83	0.76	0.81	0.74	0.69
6	0.92	0.89	0.86	0.81	0.86	0.82	0.75	0.80	0.73	0.68
10	0.91	0.88	0.85	0.80	0.85	0.80	0.74	0.78	0.72	0.66
16	0.91	0.87	0.84	0.78	0.83	0.78	0.71	0.76	0.70	0.64
25	0.90	0.86	0.82	0.76	0.81	0.76	0.69	0.74	0.67	0.62
35	0.89	0.85	0.81	0.75	0.80	0.74	0.68	0.72	0.66	0.60
50	0.88	0.84	0.79	0.74	0.78	0.73	0.66	0.71	0.64	0.59
70	0.87	0.82	0.78	0.72	0.77	0.72	0.64	0.70	0.62	0.57
95	0.86	0.81	0.76	0.70	0.75	0.70	0.63	0.68	0.60	0.55
120	0.85	0.80	0.75	0.69	0.73	0.68	0.61	0.66	0.58	0.53
150	0.84	0.78	0.74	0.67	0.72	0.67	0.59	0.64	0.57	0.51
185	0.83	0.77	0.73	0.65	0.70	0.65	0.58	0.63	0.55	0.49
240	0.82	0.76	0.71	0.63	0.69	0.63	0.56	0.61	0.53	0.48
300	0.81	0.74	0.69	0.62	0.68	0.62	0.54	0.59	0.52	0.46
400	0.80	0.73	0.67	0.59	0.66	0.60	0.52	0.57	0.50	0.44
500	0.78	0.72	0.66	0.58	0.64	0.58	0.51	0.56	0.48	0.43
630	0.77	0.71	0.65	0.56	0.63	0.57	0.49	0.54	0.47	0.41

NOTES:

1. The factors in Table C6 are applicable to groups of cables all of one size. The value of current derived from application of the appropriate factors is the maximum current to be carried by any of the cables in the group.
2. 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.
3. Where cables having different conductor operating temperatures are grouped together the current rating should be based on the lowest operating temperature of any cable in the group.
4. When the number of cables used differs from those stated in the table, the rating factor for the next higher stated number of cables should be used.

4.4
Selection of Protective Conductor

4.4.1
Cross Sectional Areas

$$S = \frac{\sqrt{I^2t}}{k}$$

NOTE: This equation is an adiabatic equation and is applicable for disconnection times not exceeding 5s.
where:
S - is the nominal cross-sectional area of the conductor in mm^2
I - is the value in amperes (rms for a.c.) of fault current for a fault of negligible impedance, which can flow through the associated protective device, due account being taken off the current limiting effect of the circuit impedances and the limiting capability (I^2t) of that protective device
t - is the operating time of the protective device in seconds corresponding to the fault current **I** amperes
k - is a factor taking account of the resistivity, temperature coefficient and heat capacity of the conductor material, and the appropriate initial and final temperatures.
Values of k for protective conductors in various use or service are as given in Tables D1 to D5. The values are based on the initial and final temperatures indicated in each table.

Where the application of the formula produces a non-standard size, a conductor having the nearest larger standard cross-sectional area shall be used.

TABLE D1
values of k for insulated protective conductor not incorporated in a cable and not bunched with cables, or for separate bare protective conductor in contact with cable covering but not bunched with cables, where the assumed initial temperature is 30 °C

Material of conductor	Insulation of protective conductor or cable covering		
	70 °C thermoplastic	90 °C thermoplastic	90 °C thermosetting
Copper	143/133*	143/133*	176
Aluminium	95/88*	95/88*	116
Steel	52	52	64
Assumed initial temperature	30 °C	30 °C	30 °C
Final temperature	160 °C/140 °C*	160 °C/140 °C*	250 °C

* Above 300 mm^2

TABLE D2
values of k for protective conductor incorporated in a cable or bunched with cables, where the assumed initial temperature is 70 °C or greater

Material of conductor	Insulation material		
	70 °C thermoplastic	90 °C thermoplastic	90 °c thermosetting
Copper	115/103*	100/86*	143
Aluminium	76/68*	66/57*	94
Assumed initial temperature	70 °C	90°C	90 °C
Final temperature	160 °C/140 °C*	160 °C/140 °C*	250 °C

* Above 300 mm^2

TABLE D3

values of k for protective conductor as a the sheath or armour of a cable as the protective conductor

Material of conductor	Insulation material		
	70 °C thermoplastic	90 °C thermoplastic	90 °C thermosetting
Aluminium	93	85	85
Steel	51	46	46
Lead	26	23	23
Assumed initial temperature	60 °C	80 °C	80 °C
Final temperature	200 °C	200 °C	200 °C

TABLE D4

Values of k for steel conduit, ducting and trunking as the protective conductor

Material of protective conductor	Insulation material		
	70 °C thermoplastic	90 °C thermoplastic	90 °C thermosetting
Steel conduit, ducting and trunking	47	44	58
Assumed initial temperature	50 °C	60 °C	60 °C
Final temperature	160 °C	160 °C	250 °C

TABLE D5

Values of k for bare conductor where there is no risk of damage to any neighbouring material by the temperatures indicated

NOTE: The temperatures indicated are valid only where they do not impair the quality of the connections.

Material of conductor	Insulation material		
	Visible and in restricted areas	Normal conditions	Fire risk
Copper	228	159	138
Aluminium	125	105	91
Steel	82	58	50
Assumed initial temperature Final temperature	30 °C	30 °C	30 °C
Copper conductor	500 °C	200 °C	150 °C
Aluminium conductor	300 °C	200 °C	150 °C
Steel conductor	500 °C	200 °C	150 °C

Where it is desired not to calculate the minimum cross-sectional area of a protective conductor in accordance with equation at 4.4.1 the cross-sectional area may be determined in accordance with Table D6.

Where the application of Table D6 produces a non-standard size, a conductor having the nearest larger standard cross-sectional area shall be used.

TABLE D6

Minimum cross-sectional area of protective conductor in relation to the cross-sectional area of associated line conductor

Cross-sectional area of line conductor S	Minimum cross-sectional area of the corresponding protective conductor	
	If the protective conductor is of the same material as the line conductor	If the protective conductor is not of the same material as the line conductor
(mm^2)	(mm^2)	(mm^2)
$S \leq 16$	S	$\frac{k_1}{k_2} \times S$
$16 < S \leq 35$	16	$\frac{k_1}{k_2} \times 16$
$S > 35$	$\frac{S}{2}$	$\frac{k_1}{k_2} \times \frac{S}{2}$

where:

k_1 is the value of k for the line conductor, selected from Table D7 according to the materials of both conductor and insulation.

k_2 is the value of k for the protective conductor, selected from Tables D1 to D5, as applicable.

TABLE D7

Values of k for common materials, for calculation of effects of fault current for disconnection times to 5 seconds

	Conductor insulation					
	Thermoplastic				Thermosetting	
	90		70 °C		90 °C	60 °C
Conductor cross sectional area/ mm^2	≤ 300	> 300	≤ 300	> 300	-	-
Initial temperature / °C	90		70		90	60
Final temperature / °C	160	140	160	140	250	200
Copper conductor	K=100	K=86	K=115	K=103	K=143	K=141
Aluminium conductor	K=66	K=57	K=76	K=68	K=94	K=93

5
Cable Core Colours

Cables to BS 7211			
Cable Type	**Voltage Designation**	**Core Colours**	
Single Core - non sheathed	450/750V	Green/Yellow, Blue or Other Colours	
Single Core - non sheathed	300/500V	Green, Yellow,Green/Yellow, Blue or Other Colours	
Single Core - sheathed	450/750V	Bown or Blue	
Multi Core - sheathed	450/750V or 300/500V	Twin	Brown and Blue
		Three Core	Brown, Black and Grey
		Four Core	Blue, Brown, Black and Grey
		Five Core	Green/Yellow, Blue, Brown, Black and Grey
Cables to BS 6724, BS 7629, BS 7846, IEC 60502-1			
Cable Type	**Voltage Designation**	**Core Colours**	
Single Core	600/1000V	Bown or Blue	
Two Core	600/1000V	Brown and Blue	
Three Core	600/1000V	Brown, Black and Grey	
Four Core	600/1000V	Blue, Brown, Black and Grey	
Five Core	600/1000V	Green/Yellow, Blue, Brown, Black and Grey	

Cores more than five are identified by numbers marked on the insulation unless otherwise specified.

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