

Power, Control & Instrumentation Cables

Product Catalogue



Tai Sin[®]

The Electric Solutions Specialist For Asia Since 1958



Since its incorporation in 1980 as Tai Sin Electric Cables Manufacturer Limited, the Company has expanded and diversified over the past three decades to establish itself as the present Tai Sin Electric Limited (“Tai Sin”). Listed on the Stock Exchange of Singapore Catalist (formerly known as SESDAQ) in 1998, the Group’s exceptional growth and operational excellence was rewarded with a transfer to the SGX Main Board in 2005.

Over time, the Tai Sin Group of Companies has built strong business competencies that has served as a solid foundation for the exponential growth that saw it expand into many new markets. Today, it is only one of a few enterprises that combine the manufacturing of cables, switchboards and lamps, with a successful network distributing electrical and control products, devices and accessories. This fast growing network is beginning to exert a global reach, with subsidiaries and offices strengthening existing businesses and exploring new opportunities in Singapore, Malaysia, Brunei, Vietnam, New Zealand and the UAE.



Tai Sin’s Cable business builds its success on the aggressive development and marketing of a comprehensive range of high quality cables through a distribution network serving a diverse range of industries, while maintaining strong partnerships with reputed consultants and main contractors. Working together, we provide competitive electrical cabling and wiring solutions for both the private and public sectors in all categories of industrial, commercial, residential, offshore and marine projects.

To cater for the robust growth in the regional market, Tai Sin now operates three cable manufacturing plants. They are located in Singapore, Malaysia and Vietnam, all of which are fully equipped with the latest manufacturing facilities and technologies to meet increasing demands.

Tai Sin is strongly committed to making continual advancements in technology and innovation, both of which are our greatest strengths. Our ISO 9001 certification and conformance with various world-class quality test bodies are solid testimonies to our untiring efforts to achieve excellent quality in both our manufacturing process and our end products.

For 30 years, we have grown steadily based on a sound business philosophy of providing quality products using leading edge technology, backed by unflinching excellence in customer service and faster turnaround time to maintain customer loyalty. These are the beliefs and values that give us the strength and confidence to continue to grow, excel and succeed in the exciting years ahead.



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Insulating Materials Used in Cables

Qualities of a good insulating material

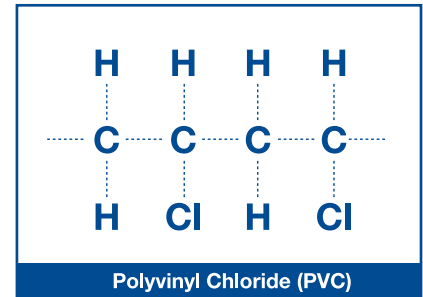
Safety and reliability are the two most important factors that need to be addressed in the manufacturing of electric cables. The materials used need to possess certain essential qualities, such as stability, reliability, durability and safe usage. This is even more so for the insulation, which must be fabricated from materials that meet the following requirements:

- Achieves safe insulation of the line conductors with minimal loss in electrical energy
- Maintains good and stable mechanical properties under standard conditions
- Maintains consistent electrical and mechanical properties over extended use and wide temperature ranges
- Possesses inert chemical properties that make them resistant to chemicals

Polyvinyl Chloride (PVC)

Polyvinyl Chloride, also commonly known as PVC, is one of the most widely used thermoplastic polymers suitable for a huge range of applications. PVC is produced through the polymerization of the monomer vinyl chloride. Because some 57% of its mass is made up of chlorine, the production process requires less petroleum, making it more cost effective as a material other than polymers.

PVC is outstanding in its versatility and although most commonly used for piping, it is now also found in building materials and a wide range of consumer products. It is both waterproof and flame retardant, making it an ideal material for the insulation of electric wires.



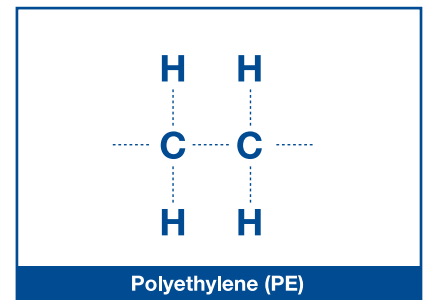
Polyethylene (PE)

Extensive research has shown that polyethylene displays certain characteristics:

- Strong electrical insulator
- Good and stable mechanical properties
- Resistance to chemical corruption

With such properties, polyethylene has become an important insulating material especially for low voltage power cables. However, it is not suitable for use in high temperatures because of its molecular structure.

Polyethylene is made up of linear chains of independent polyethylene molecules loosely held together by weak molecular bonds. These bonds break easily when subject to temperatures above 70°C, resulting in the molecules sliding over one another. The polyethylene polymer will then change in its shape and consistency, becoming soft and plastic-like.



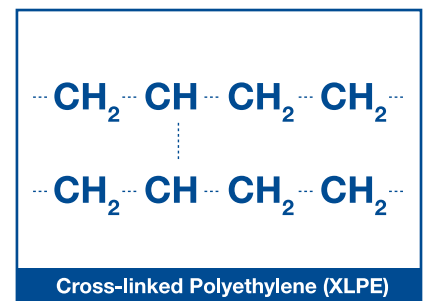
Cross-linked Polyethylene (XLPE)

Polyethylene can be converted into a more thermally stable compound by the process of cross-linking. In the process, perpendicular chemical bonds are formed to link parallel chains of polyethylene molecules. The original loose two-dimensional molecular structure is thereby converted into a stronger three-dimensional cellular structure. The new compound, cross-linked polyethylene (XLPE), thus exhibits the superior insulation properties of polyethylene minus all its inferior qualities.

Advantages of XLPE

XLPE is a compound that offers many advantages over conventional thermoplastic insulating materials and it has the following features:

- Outstanding durability and long lifespan
- Heat-resistant over long durations
- High thermal short circuit rating (250°C)
- Excellent electrical properties over wide temperature range
- Resistant to deformation at high temperatures
- Water-resistant and low permeability
- Excellent chemical resistance
- Halogen free



These properties have made XLPE the preferred insulation for all kinds of cables and wires in the electrical industry. Besides using PVC and PE, Tai Sin also offers low voltage cables with XLPE insulation for the best performance, safety and durability.

Comparison of XLPE and Various Kinds of Cables

General characteristics

Table 1

Properties		XLPE Cable	PE Cable	EPR Cable	PVC Cable
Rated Temperature (°C)	Normal	90	70	90	70
	Overload	130	90	130	100
	Short circuit	250	200	250	160
Tensile strength (kg/mm ²)		1.9	1.4	0.95	1.0 – 2.5
Elongation (%)		200 – 350	600 – 650	250 – 550	200 – 450
Volume resistivity at 20°C (Ω .cm)		10 ¹⁶	10 ¹⁶	10 ¹⁵	10 ¹³
Dielectric constant, 1KHz		2.3	2.3	3	4.5 – 9
Dielectric strength (kV/mm)		20	20	15 – 20	15 - 20
Aging Resistance	100°C	+++	++	+++	++
	120°C	+++	---	++	---
	150°C	++	---	+	---
Resistance to heat deformation		++	---	+++	---
Solvent Resistance		++	++	---	---
Resistance to weather		++	++	+++	++
Resistance to oil		+++	+++	+	++
Resistance to organic chemicals		+++	+++	+	++
Resistance to inorganic chemicals		+++	+++	++	+++

+++ Excellent ++ Good + Fair --- Poor

Comparison between different insulation materials for 600/1000V power cable with steel wire armoured

	PVC (General Purpose)	Paper	XLPE	XLPE
1. Conductor Size	4c x 150mm ²	4c x 150mm ²	4c x 150mm ²	4c x 120mm ²
2. Conductor Type	Copper	Copper	Copper	Copper
3. Operating Temperature	70°C	80°C	90°C	90°C
4. Insulation Thickness	1.8mm	0.9mm	1.4mm	1.2mm
5. Approximate OD (mm)	53	53.3	52.5	48
6. Cable Weight (kg/km)	8760	11200	8620	7480
7. Current Rating (A)	345	375	405	360
8. #Short Circuit Rating (KA)				
1 Second	17.2	16.2	21.4	17.1
0.5 Second	24.3	22.9	30.2	24.1
0.1 Second	54.5	51.2	67.6	54.0
9. Exposure To Moisture	---	Deteriorate rapidly	---	---

· Buried underground

Based on the cable being fully loaded at the start of short circuit (90°C) and final conductor temperature of 250°C



Conductor :
Minimum Bending Radius :

Plain Annealed Copper
3D for $D < 10\text{mm}$
4D for $10\text{mm} < D < 25\text{ mm}$
6D for $D > 25\text{mm}$

Stranded Plain Annealed Copper Conductor BS 6360, IEC 60228

Table 1

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Nominal Diameter of Conductor (mm)	Maximum Conductor Resistance at 20°C (Ω/km)	Nominal Weight per km of Conductor (kg/km)
1.0	7 / 0.43	1.29	18.1	9.2
1.5	7 / 0.53	1.59	12.1	14.0
2.5	7 / 0.67	2.01	7.41	22.4
4	7 / 0.85	2.55	4.61	36.1
6	7 / 1.04	3.12	3.08	54
10	7 / 1.35	4.05	1.83	90.8
16	7 / 1.70	5.10	1.15	145
25	7 / 2.14	6.42	0.727	229
35	7 / 2.52	7.56	0.524	317
50	19 / 1.78	8.90	0.387	429
70	19 / 2.14	10.70	0.268	620
95	19 / 2.52	12.60	0.193	860
120	37 / 2.03	14.21	0.153	1086
150	37 / 2.25	15.75	0.124	1334
185	37 / 2.52	17.64	0.0991	1673
240	61 / 2.25	20.25	0.0754	2199
300	61 / 2.52	22.68	0.0601	2759
400	61 / 2.85	25.65	0.0470	3528
500	61 / 3.20	28.80	0.0366	4448
630	127 / 2.52	32.76	0.0283	5744
800	127 / 2.85	37.05	0.0221	7346
1000	127 / 3.20	41.60	0.0176	9260



**SS358, BS 6004,
IEC 60227**

BS 6231

Conductor :
Insulation :
Colour :

Voltage U₀/U :
Conductor Stranding :

Operating Temperature :
Minimum Bending Radius :

Fire Performance :

Plain Annealed Copper
PVC Compound Type C
Red, Yellow, Blue, Black,
Brown, Grey, Green
White, or Green / Yellow

450 / 750 V
Class 2 stranded circular
or compacted conductors
-15°C to 70°C
3D for D < 10mm
4D for 10mm < D < 25 mm
6D for D > 25mm
IEC 60332-1

Plain Annealed Copper
PVC Compound Type TI1, TI3
Red, Yellow, Blue, Black,
Brown, Grey, Green
White, or Green / Yellow

600 / 1000 V
Class 5 stranded circular
-15°C to 70°C, -15°C to 90°C (UL 105°C)
3D for D < 10mm
4D for 10mm < D < 25 mm
6D for D > 25mm
IEC 60332-1

PVC Cables SS 358, BS 6004, IEC 60227

Table 2.1

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Mean Overall Diameter (Upper Limit) (mm)	Approx. Weight (kg/km)	Minimum Insulation Resistance at 70°C (MΩ/km)
1.5	7 / 0.53	0.7	3.4	22.7	0.010
2.5	7 / 0.67	0.8	4.2	34.0	0.009
4	7 / 0.85	0.8	4.8	50.0	0.0077
6	7 / 1.04	0.8	5.4	70.9	0.0065
10	7 / 1.35	1.0	6.8	117.5	0.0065
16	7 / 1.70	1.0	8.0	177.4	0.0050
25	7 / 2.14	1.2	9.8	279.5	0.0050
35	7 / 2.52	1.2	11.0	372.0	0.0040
50	19 / 1.78	1.4	13.0	504.5	0.0045
70	19 / 2.14	1.4	15.0	710.6	0.0035
95	19 / 2.52	1.6	17.0	980.8	0.0035
120	37 / 2.03	1.6	19.0	1216.0	0.0032
150	37 / 2.25	1.8	21.0	1498.0	0.0032
185	37 / 2.52	2.0	23.5	1874.0	0.0032
240	61 / 2.25	2.2	26.5	2444.4	0.0032
300	61 / 2.52	2.4	29.5	3059.5	0.0030
400	61 / 2.85	2.6	33.5	3897.0	0.0028
500	61 / 3.20	2.8	37.0	4940.0	0.0028
630	127 / 2.52	2.8	41.0	6295.0	0.0025

Switchgear Wires BS 6231

Table 2.2

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Mean Overall Diameter (Upper Limit) (mm)	Approx. Weight (kg/km)	Minimum Insulation Resistance at 70°C & 90°C (MΩ/km)
0.5	16 / 0.2	0.8	2.6	11.3	0.0161
0.75	24 / 0.2	0.8	2.8	14.5	0.0141
1.0	32 / 0.2	0.8	3.0	17.5	0.0128
1.5	30 / 0.25	0.8	3.3	23.0	0.0111
2.5	50 / 0.25	0.8	3.7	34.0	0.0094
4	56 / 0.3	0.8	4.3	50.2	0.0077
6	84 / 0.3	0.8	4.9	71.0	0.0059
10	80 / 0.4	1.0	6.3	119.3	0.0058
16	128 / 0.4	1.0	7.4	181.3	0.0048
25	200 / 0.4	1.2	9.1	280.9	0.0047
35	280 / 0.4	1.2	10.3	382.3	0.004
50	400 / 0.4	1.4	12.2	544.1	0.0039
70	356 / 0.5	1.4	13.8	739.9	0.0033
95	485 / 0.5	1.6	16.1	1005.2	0.0032
120	614 / 0.5	1.6	17.6	1255.7	0.0029
150	765 / 0.5	1.8	19.7	1565.6	0.0029
185	994 / 0.5	2.0	22.3	2028.7	0.0029
240	1125 / 0.5	2.2	23.9	2304.1	0.0028

PVC / PVC
(single core, 2-4 & multi-cores)

1 & 2 cores



3 & 4 cores



multi-cores



1 & 2 cores

3 & 4 cores

multi-cores

Conductor :
Insulation :
Sheath :
Colour :

Plain Annealed Copper
PVC Compound Type A
PVC Compound Type ST1
Insulation: 1 Core - Black
2 Cores - Red & Black or
Brown & Blue
Sheath: 1 Core - Grey
2 Cores - Black

Plain Annealed Copper
PVC Compound Type A
PVC Compound Type ST1
Insulation: 3 Cores - Red, Yellow & Blue
or Brown, Black & Grey
4 Cores - Red, Yellow, Blue
& Black or Brown,
Black, Grey & Blue
Sheath: Black

Plain Annealed Copper
PVC Compound Type A
PVC Compound Type ST1
Insulation: White with Black
numberings
Sheath: Black

Voltage U₀/U :
Conductor Stranding :

600 / 1000 V
Class 2 stranded circular or
compacted conductors
-15°C to 70°C
1 Core - 8D for 1.5 mm² to 1000mm²
2 Cores - 8D for 1.5 mm² to 300mm²

600 / 1000 V
Class 2 standard circular or
compacted conductors
-15°C to 70°C
8D for 1.5 mm² to 300mm²

600 / 1000 V
Class 2 stranded circular or
compacted conductors
-15°C to 70°C
3D for D < 10mm
4D for 10mm < D < 25mm
6D for D > 25mm
IEC 60332-1

Fire Performance :

IEC 60332-1

IEC 60332-1

PVC / PVC Power Cables IEC 60502

Table 3

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Approx. Overall Diameter (mm)	Approx. Weight (kg/km)
1.5	7 / 0.53	0.8	6.3	55
2.5	7 / 0.67	0.8	6.7	70
4	7 / 0.85	1.0	7.6	100
6	7 / 1.04	1.0	8.2	125
10	7 / 1.35	1.0	9.2	175
16	7 / 1.70	1.0	10.2	240
25	7 / 2.14	1.2	11.9	350
35	7 / 2.52	1.2	13.1	460
50	19 / 1.78	1.4	14.8	595
70	19 / 2.14	1.4	16.6	810
95	19 / 2.52	1.6	19.2	1110
120	37 / 2.03	1.6	20.8	1360
150	37 / 2.25	1.8	23.0	1670
185	37 / 2.52	2.0	25.4	2070
240	61 / 2.25	2.2	28.7	2690
300	61 / 2.52	2.4	31.7	3340
400	61 / 2.85	2.6	35.3	4230
500	61 / 3.20	2.8	39.5	5290
630	127 / 2.52	2.8	43.2	6680
800	127 / 2.85	2.8	47.7	8460
1000	127 / 3.20	3.0	53.0	10545
2 x 1.5	7 / 0.53	0.8	10.4	145
2 x 2.5	7 / 0.67	0.8	11.2	180
2 x 4	7 / 0.85	1.0	13.1	255
2 x 6	7 / 1.04	1.0	14.2	285
2 x 10	7 / 1.35	1.0	16.1	395
2 x 16	7 / 1.70	1.0	18.2	590
2 x 25	7 / 2.14	1.2	21.8	900
2 x 35	7 / 2.52	1.2	24.0	1160
2 x 50 (S)	19 / 1.78	1.4	23.0	1260
2 x 70 (S)	19 / 2.14	1.4	26.0	1700
2 x 95 (S)	19 / 2.52	1.6	30.0	2310
2 x 120 (S)	37 / 2.03	1.6	32.0	2880
2 x 150 (S)	37 / 2.25	1.8	36.0	3520
2 x 185 (S)	37 / 2.52	2.0	40.0	4290
2 x 240 (S)	61 / 2.25	2.2	44.0	5570
2 x 300 (S)	61 / 2.52	2.4	49.0	6970

Note: (S) - Sectoral Stranded Conductors.

PVC / PVC Power Cables IEC 60502

Table 4

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Approx. Overall Diameter (mm)	Approx. Weight (kg/km)
3 x 1.5	7 / 0.53	0.8	10.9	165
3 x 2.5	7 / 0.67	0.8	11.8	210
3 x 4	7 / 0.85	1.0	13.8	305
3 x 6	7 / 1.04	1.0	15.0	370
3 x 10	7 / 1.35	1.0	17.1	515
3 x 16	7 / 1.70	1.0	19.3	740
3 x 25	7 / 2.14	1.2	23.2	1160
3 x 35	7 / 2.52	1.2	25.7	1520
3 x 50 (S)	19 / 1.78	1.4	26.0	1750
3 x 70 (S)	19 / 2.14	1.4	29.0	2435
3 x 95 (S)	19 / 2.52	1.6	34.0	3360
3 x 120 (S)	37 / 2.03	1.6	37.0	4140
3 x 150 (S)	37 / 2.25	1.8	40.0	5070
3 x 185 (S)	37 / 2.52	2.0	45.0	6330
3 x 240 (S)	61 / 2.25	2.2	51.2	8265
3 x 300 (S)	61 / 2.52	2.4	56.0	10355
4 x 1.5	7 / 0.53	0.8	11.7	200
4 x 2.5	7 / 0.67	0.8	12.8	255
4 x 4	7 / 0.85	1.0	15.0	375
4 x 6	7 / 1.04	1.0	16.4	455
4 x 10	7 / 1.35	1.0	18.6	665
4 x 16	7 / 1.70	1.0	21.2	930
4 x 25	7 / 2.14	1.2	25.6	1465
4 x 35	7 / 2.52	1.2	28.4	1920
4 x 35 (S)	7 / 2.52	1.2	26.0	1740
4 x 50 (S)	19 / 1.78	1.4	29.0	2320
4 x 70 (S)	19 / 2.14	1.4	33.0	3215
4 x 95 (S)	19 / 2.52	1.6	39.0	4400
4 x 120 (S)	37 / 2.03	1.6	42.5	5440
4 x 150 (S)	37 / 2.25	1.8	47.0	6675
4 x 185 (S)	37 / 2.52	2.0	52.0	8360
4 x 240 (S)	61 / 2.25	2.2	58.2	10870
4 x 300 (S)	61 / 2.52	2.4	65.0	13650

Note: (S) - Sectoral Stranded Conductors.

PVC / PVC Control Cables - In-house Standard

Table 5

No. of Cores	Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Approx. Overall Diameter (mm)	Approx. Weight (kg/km)
2	1.5	7 / 0.53	0.6	8.8	109
3		7 / 0.53	0.6	9.2	129
4		7 / 0.53	0.6	10.0	154
5		7 / 0.53	0.6	10.8	190
7		7 / 0.53	0.6	11.7	240
10		7 / 0.53	0.6	14.8	330
12		7 / 0.53	0.6	15.2	385
19		7 / 0.53	0.6	17.9	560
27		7 / 0.53	0.6	21.4	770
37		7 / 0.53	0.6	24.0	1015
48		7 / 0.53	0.6	27.6	1300
2	2.5	7 / 0.67	0.7	10.0	148
3		7 / 0.67	0.7	10.6	171
4		7 / 0.67	0.7	11.5	218
5		7 / 0.67	0.7	12.7	270
7		7 / 0.67	0.7	13.7	340
10		7 / 0.67	0.7	17.4	490
12		7 / 0.67	0.7	18.0	560
19		7 / 0.67	0.7	21.2	820
27		7 / 0.67	0.7	25.4	1135
37		7 / 0.67	0.7	28.6	1560
48		7 / 0.67	0.7	33.0	1930
2	4	7 / 0.85	0.8	11.5	205
3		7 / 0.85	0.8	12.2	252
4		7 / 0.85	0.8	13.3	315
5		7 / 0.85	0.8	14.7	415
7		7 / 0.85	0.8	16.2	535
10		7 / 0.85	0.8	20.6	720
12		7 / 0.85	0.8	21.3	850
19		7 / 0.85	0.8	25.1	1260
27		7 / 0.85	0.8	30.4	1740
37		7 / 0.85	0.8	34.2	2300
48		7 / 0.85	0.8	39.3	2900

PVC / AWA / PVC
(single core)

PVC / SWA / PVC
(2-4 & multi-cores)

single core



2-4 cores



multi-cores



single core

2-4 cores

multi-cores

Conductor :
Insulation :
Bedding :

Armour :
Sheath :
Colour :

Voltage U₀/U :
Conductor Stranding :

Operating Temperature :
Minimum Bending Radius :

Fire Performance :

Plain Annealed Copper
PVC Compound Type T11
PVC Compound Type TM1

Aluminium Wire
PVC Compound Type TM1
Insulation: Black
Sheath: Black

600 / 1000 V
Class 2 stranded circular or
compacted conductors
-15°C to 70°C
6D for 50mm² to 1000mm²

IEC 60332-1

Plain Annealed Copper
PVC Compound Type T11
PVC Compound Type TM1
or Lapped PVC Tape
Galvanised Steel Wire
PVC Compound Type TM1

Insulation: 2 Cores - Red & Black or
Brown & Blue
3 Cores - Red, Yellow & Blue
or Brown, Black & Grey
4 Cores - Red, Yellow, Blue &
Black or Brown, Black,
Grey & Blue

Sheath : Black
600 / 1000 V
Class 2 stranded circular or
compacted conductors
-15°C to 70°C
6D for 1.5mm² to 16mm²
8D for 25mm² and above
IEC 60332-1

Plain Annealed Copper
PVC Compound Type T11
PVC Compound Type TM1
or Lapped PVC Tape
Galvanised Steel Wire
PVC Compound Type TM1
Insulation: White with Black
numberings
Sheath: Black

600 / 1000 V
Class 2 stranded circular
conductors
-15°C to 70°C
6D for 1.5mm² to 4mm²

IEC 60332-1

PVC / AWA / PVC Cables BS 6346

Table 6

Nominal Conductor Area (mm²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Approx. Overall Diameter (mm)	Approx. Weight (kg/km)
50	19 / 1.78	1.4	19.1	760
70	19 / 2.14	1.4	21.1	1010
95	19 / 2.52	1.6	23.4	1330
120	37 / 2.03	1.6	26.3	1690
150	37 / 2.25	1.8	28.3	2010
185	37 / 2.52	2.0	30.8	2450
240	61 / 2.25	2.2	34.1	3120
300	61 / 2.52	2.4	37.0	3810
400	61 / 2.85	2.6	42.0	4890
500	61 / 3.20	2.8	45.6	5990
630	127 / 2.52	2.8	49.7	7510
800	127 / 2.85	2.8	55.8	9590
1000	127 / 3.20	3.0	61.0	11820

PVC / SWA / PVC Cables BS 6346

Table 7

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Approx. Overall Diameter (mm)	Approx. Weight (kg/km)
2 x 1.5	7 / 0.53	0.6	12.3	270
2 x 2.5	7 / 0.67	0.7	13.6	340
2 x 4	7 / 0.85	0.8	15.1	450
2 x 6	7 / 1.04	0.8	16.5	550
2 x 10	7 / 1.35	1.0	20.1	750
2 x 16	7 / 1.70	1.0	21.9	960
2 x 25	7 / 2.14	1.2	26.7	1400
2 x 35	7 / 2.52	1.2	29.4	1750
2 x 50 (S)	19 / 1.78	1.4	27.4	1990
2 x 70 (S)	19 / 2.14	1.4	30.0	2500
2 x 95 (S)	19 / 2.52	1.6	34.7	2460
2 x 120 (S)	37 / 2.03	1.6	37.2	4120
2 x 150 (S)	37 / 2.25	1.8	40.5	4890
2 x 185 (S)	37 / 2.52	2.0	45.2	6250
2 x 240 (S)	61 / 2.25	2.2	50.0	7860
2 x 300 (S)	61 / 2.52	2.4	54.8	9480
3 x 1.5	7 / 0.53	0.6	12.8	350
3 x 2.5	7 / 0.67	0.7	14.1	400
3 x 4	7 / 0.85	0.8	15.8	520
3 x 6	7 / 1.04	0.8	18.0	730
3 x 10	7 / 1.35	1.0	21.2	1010
3 x 16	7 / 1.70	1.0	23.1	1180
3 x 25	7 / 2.14	1.2	28.2	1760
3 x 35	7 / 2.52	1.2	30.8	2170
3 x 50 (S)	19 / 1.78	1.4	30.1	2560
3 x 70 (S)	19 / 2.14	1.4	34.2	3520
3 x 95 (S)	19 / 2.52	1.6	38.5	4640
3 x 120 (S)	37 / 2.03	1.6	41.4	5500
3 x 150 (S)	37 / 2.25	1.8	46.3	6970
3 x 185 (S)	37 / 2.52	2.0	50.7	8400
3 x 240 (S)	61 / 2.25	2.2	56.2	10550
3 x 300 (S)	61 / 2.52	2.4	61.6	12800
4 x 1.5	7 / 0.53	0.6	13.5	345
4 x 2.5	7 / 0.67	0.7	15.0	440
4 x 4	7 / 0.85	0.8	17.8	710
4 x 6	7 / 1.04	0.8	19.2	810
4 x 10	7 / 1.35	1.0	22.8	1130
4 x 16	7 / 1.70	1.0	26.3	1550
4 x 25	7 / 2.14	1.2	30.7	2150
4 x 35	7 / 2.52	1.2	33.7	2670
4 x 35 (S)	7 / 2.52	1.2	29.9	2510
4 x 50 (S)	19 / 1.78	1.4	34.6	3410
4 x 70 (S)	19 / 2.14	1.4	38.4	4400
4 x 95 (S)	19 / 2.52	1.6	43.5	5830
4 x 120 (S)	37 / 2.03	1.6	48.1	7400
4 x 150 (S)	37 / 2.25	1.8	52.4	8810
4 x 185 (S)	37 / 2.52	2.0	57.4	10660
4 x 240 (S)	61 / 2.25	2.2	64.1	13430
4 x 300 (S)	61 / 2.52	2.4	70.4	16330

Note: (S) - Sectoral Stranded Conductors.

PVC / SWA / PVC Cables BS 6346

Table 8

No. of Cores	Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Approx. Overall Diameter (mm)	Approx. Weight (kg/km)
5	1.5	7 / 0.53	0.6	14.3	357
7		7 / 0.53	0.6	15.2	416
10		7 / 0.53	0.6	19.0	446
12		7 / 0.53	0.6	19.4	716
19		7 / 0.53	0.6	22.2	938
27		7 / 0.53	0.6	26.7	1380
37		7 / 0.53	0.6	29.2	1689
48		7 / 0.53	0.6	32.9	2048
5	2.5	7 / 0.67	0.7	16.3	465
7		7 / 0.67	0.7	18.0	557
10		7 / 0.67	0.7	21.9	878
12		7 / 0.67	0.7	22.4	955
19		7 / 0.67	0.7	26.6	1455
27		7 / 0.67	0.7	30.7	1885
37		7 / 0.67	0.7	34.0	2340
48		7 / 0.67	0.7	39.5	3190
5	4	7 / 0.85	0.8	19.0	750
7		7 / 0.85	0.8	20.5	905
10		7 / 0.85	0.8	26.1	1405
12		7 / 0.85	0.8	26.8	1530
19		7 / 0.85	0.8	30.5	2060
27		7 / 0.85	0.8	37.1	3025
37		7 / 0.85	0.8	40.8	3900
48		7 / 0.85	0.8	46.0	4800

Flexible Cable, Circular Sheathed, Metric Unit BS 6500

Table 9.1

Conductor		Thickness of Insulation (mm)	2 Cores	
Nominal Area (mm ²)	Construction (no./mm)		Approx. Overall Diameter (mm)	Approx. Net Weight (kg/km)
0.5	16 / 0.20	0.6	6.1	55
0.75	24 / 0.20	0.6	6.6	65
1.0	32 / 0.20	0.6	6.9	75
1.25	40 / 0.20	0.7	7.6	80
1.5	30 / 0.25	0.7	7.8	90
2.5	50 / 0.25	0.8	9.6	135
4.0	56 / 0.30	0.8	11.0	135

Flexible Cable, Circular Sheathed, Metric Unit BS 6500

Table 9.2

Conductor		Thickness of Insulation (mm)	3 Cores	
Nominal Area (mm ²)	Construction (no./mm)		Approx. Overall Diameter (mm)	Approx. Net Weight (kg/km)
0.5	16 / 0.20	0.6	6.5	60
0.75	24 / 0.20	0.6	6.9	75
1.0	32 / 0.20	0.6	7.3	85
1.25	40 / 0.20	0.7	8.3	100
1.5	30 / 0.25	0.7	8.5	110
2.5	50 / 0.25	0.8	10.4	170
4.0	56 / 0.30	0.8	11.8	215

Flexible Cable, Circular Sheathed, Metric Unit BS 6500

Table 9.3

Conductor		Thickness of Insulation (mm)	4 Cores	
Nominal Area (mm ²)	Construction (no./mm)		Approx. Overall Diameter (mm)	Approx. Net Weight (kg/km)
0.5	16 / 0.20	0.6	7.1	75
0.75	24 / 0.20	0.6	7.6	90
1.0	32 / 0.20	0.6	8.2	110
1.25	40 / 0.20	0.6	-	-
1.5	30 / 0.25	0.7	9.5	140
2.5	50 / 0.25	0.8	11.4	205
4.0	56 / 0.30	0.8	12.9	275

Construction

1. Conductor : Plain Annealed Copper
2. Insulation : PVC Compound Type T12
3. Assembly : 2, 3 & 4 Cores are Twisted Together
4. Sheath : PVC Compound Type TM2
5. Colour : Insulation : 2 cores - Brown, Blue
3 cores - Brown, Blue & Green / Yellow
4 cores - Brown, Black, Grey & Blue

Sheath : Grey

Technical Data

- Voltage U₀/U : 300 / 500 V
 Conductor Stranding : Class 5
 Operating Temperature : 70°C

Power Cables

SINGLE CORE

Flexible Cord, Twin Twisted Non-Sheathed, Imperial Unit BS 2004

Flexible Cord, Twin Twisted Non-Sheathed, Imperial Unit BS 2004

Table 10

Conductor		Thickness of Insulation (mm)	Twin Twisted	
Nominal Area (mm ²)	Construction (no./in)		Approx. Overall Diameter (mm)	Approx. Net Weight (kg/100yd)
0.41	14 / 0.0076	0.64	2.1	1.7
0.67	23 / 0.0076	0.64	2.4	2.3
1.17	40 / 0.0076	0.64	2.7	3.1

Construction

1. Conductor : Plain Annealed Copper
2. Insulation : PVC Compound Type T11
3. Assembly : Two Cores Twisted
4. Colour : Insulation: Red & Black

Technical Data

- Voltage U₀/U : 250 / 440 V
 Conductor Stranding : Class 5
 Operating Temperature : 70°C

Power Cables

1-4 CORES

Flexible Cable, Circular Sheathed, Imperial Unit BS 2004

Flexible Cable, Circular Sheathed, Imperial Unit BS 2004

Table 11.1

Conductor		Thickness of Insulation (mm)	1 Core		2 Cores	
Nominal Area (mm ²)	Construction (no./in)		Approx. Overall Diameter (mm)	Approx. Net Weight (kg/100y)	Approx. Overall Diameter (mm)	Approx. Net Weight (kg/100yd)
0.41	14 / 0.0076	0.64	4.2	2.1	6.3	4.8
0.67	23 / 0.0076	0.64	4.4	2.5	6.8	6.0
1.17	40 / 0.0076	0.64	4.8	3.2	7.5	7.5
2.05	70 / 0.0076	0.64	5.2	4.2	9.0	10.0
3.22	110 / 0.0076	0.64	5.7	5.4	10.0	12.9
4.74	162 / 0.0076	0.76	6.4	7.3	11.3	17.4

Flexible Cable, Circular Sheathed, Imperial Unit BS 2004

Table 11.2

Conductor		Thickness of Insulation (mm)	3 Cores		4 Cores	
Nominal Area (mm ²)	Construction (no./in)		Approx. Overall Diameter (mm)	Approx. Net Weight (kg/100y)	Approx. Overall Diameter (mm)	Approx. Net Weight (kg/100yd)
0.41	14 / 0.0076	0.64	6.6	5.6	7.2	6.2
0.67	23 / 0.0076	0.64	7.1	6.2	7.7	7.9
1.17	40 / 0.0076	0.64	7.9	8.9	9.2	10.0
2.05	70 / 0.0076	0.64	9.5	12.7	10.3	15.4
3.22	110 / 0.0076	0.64	10.5	16.6	11.4	20.4
4.74	162 / 0.0076	0.76	12.2	22.9	13.2	28.3

Construction

1. Conductor : Plain Annealed Copper
 2. Insulation : PVC Compound Type T11
 3. Assembly : 1, 2, 3 or 4 Cores Twisted Together
 4. Sheath : PVC Compound Type T6
 5. Colours : Insulation: 1 core - Various
 2 cores - Blue, Brown
 3 cores - Blue, Brown, Green / Yellow
 4 cores - Blue, Brown, Black, Green / Yellow
- Sheath: Grey

Technical Data

- Voltage U₀/U : 250 / 440 V
 Conductor Stranding : Class 5
 Operating Temperature : 70°C

XLPE / PVC
(single core,
2-4 & multi-cores)
XLPE / AWA / PVC
(single core)
XLPE / SWA / PVC
(2-4 & multi-cores)

single core

2-4 cores

multi-cores



single core

2-4 cores

multi-cores

Conductor :
Insulation :
Bedding :

Armour :
Sheath :
Colour :

Voltage Uo/U :
Conductor Stranding :

Operating Temperature :
Minimum Bending Radius :

Fire Performance :

Plain Annealed Copper
XLPE Compound
PVC Compound Type ST2

Aluminium Wire
PVC Compound Type ST2
Insulation: Natural
Sheath: Black

600 / 1000 V
Class 2 stranded circular or
compacted conductors
Maximum 90°C
Unarmoured: 8D for 16mm²
to 1000mm²
Armoured: 10D for 25mm²
to 1000mm²
IEC 60332-1

Plain Annealed Copper
XLPE Compound
PVC Compound Type ST2
or Lapped PVC Tape

Galvanised Steel Wire
PVC Compound Type ST2
Insulation: 2 Cores - Red & Black or
Brown & Blue
3 Cores - Red, Yellow & Blue
or Brown, Black &
Grey
4 Cores - Red, Yellow, Blue
& Black or Brown,
Black, Grey & Blue

Sheath: Black
600 / 1000 V
Class 2 stranded circular or compacted
conductors
Maximum 90°C
Unarmoured: 6D for 1.5mm² to 300mm²
Armoured: 8D for 1.5mm² to 300mm²

IEC 60332-1

Plain Annealed Copper
XLPE Compound
PVC Compound Type ST2
or Lapped PVC Tape

Galvanised Steel Wire
PVC Compound Type ST2
Insulation: White with Black
numberings
Sheath: Black

600 / 1000 V
Class 2 stranded circular

Maximum 90°C
Unarmoured: 6D for 1.5mm²
to 4mm²
Armoured: 8D for 1.5mm²
to 4mm²
IEC 60332-1

XLPE / PVC & XLPE / AWA / PVC Cables IEC 60502

Table 12

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	XP		XAP			Approx. Weight (kg/km)
			Cable Overall Diameter (mm)	Approx. Weight (kg/km)	Diameter Under Armour (mm)	Armour Wire Diameter (mm)	Cable Overall Diameter (mm)	
16	7 / 1.70	0.7	9.6	205	-	-	-	-
25	7 / 2.14	0.9	11.3	309	10.6	0.9	16.0	470
35	7 / 2.52	0.9	12.5	412	11.8	0.9	17.2	581
50	19 / 1.78	1.0	14.0	540	13.3	1.25	19.4	800
70	19 / 2.14	1.1	16.1	760	15.4	1.25	21.5	960
95	19 / 2.52	1.1	18.2	1020	17.3	1.25	23.4	1240
120	37 / 2.03	1.2	20.0	1270	19.1	1.6	25.9	1650
150	37 / 2.25	1.4	22.2	1560	21.0	1.60	27.9	1970
185	37 / 2.52	1.6	24.4	1930	23.3	1.60	30.1	2390
240	61 / 2.25	1.7	27.5	2510	26.1	1.6	33.2	3040
300	61 / 2.52	1.8	30.3	3120	28.7	1.6	35.8	3790
400	61 / 2.85	2.0	33.9	3970	32.1	2.0	40.9	4790
500	61 / 3.20	2.2	37.6	4980	35.7	2.0	44.6	5880
630	127 / 2.52	2.4	42.4	6400	40.4	2.0	49.2	7400
800	127 / 2.85	2.6	47.3	8190	45.1	2.5	55.7	9500
1000	127 / 3.20	2.8	52.4	10265	50.1	2.5	61.0	11750

XLPE / PVC & XLPE / SWA / PVC Cables IEC 60502

Table 13

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	XP		XSP			Approx. Weight (kg/km)
			Cable Overall Diameter (mm)	Approx. Weight (kg/km)	Diameter Under Armour (mm)	Armour Wire Diameter (mm)	Cable Overall Diameter (mm)	
2 x 1.5	7 / 0.53	0.7	10.0	130	8.5	0.9	13.9	350
2 x 2.5	7 / 0.67	0.7	10.8	165	9.3	0.9	14.7	400
2 x 4	7 / 0.85	0.7	11.9	210	10.4	0.9	15.8	475
2 x 6	7 / 1.04	0.7	13.0	270	11.5	0.9	16.9	560
2 x 10	7 / 1.35	0.7	14.9	390	13.4	1.25	19.5	810
2 x 16	7 / 1.70	0.7	17.0	450	15.5	1.25	21.6	980
2 x 25	7 / 2.14	0.9	20.4	820	18.9	1.6	25.7	1410
2 x 35	7 / 2.52	0.9	22.7	1065	21.2	1.6	28.0	1930
2 x 50 (S)	19 / 1.78	1.0	21.0	1140	19.2	1.6	26.0	1880
2 x 70 (S)	19 / 2.14	1.1	24.0	1560	22.3	1.6	29.5	2420
2 x 95 (S)	19 / 2.52	1.1	26.9	2130	25.3	2.0	33.5	3360
2 x 120 (S)	37 / 2.03	1.2	29.9	2640	28.1	2.0	36.5	3980
2 x 150 (S)	37 / 2.25	1.4	33.4	3270	30.9	2.0	39.5	4730
2 x 185 (S)	37 / 2.52	1.6	37.1	4040	36.0	2.0	45.0	6245
2 x 240 (S)	61 / 2.25	1.7	45.0	5150	41.6	2.5	52.0	7820
2 x 300 (S)	61 / 2.52	1.8	50.0	6560	47.4	2.5	58.0	9390
3 x 1.5	7 / 0.53	0.7	10.5	150	9.0	0.9	14.4	390
3 x 2.5	7 / 0.67	0.7	11.4	195	9.9	0.9	15.3	450
3 x 4	7 / 0.85	0.7	12.5	255	11.0	0.9	16.4	540
3 x 6	7 / 1.04	0.7	13.8	330	12.3	0.9	17.7	745
3 x 10	7 / 1.35	0.7	15.8	490	14.3	1.25	20.4	950
3 x 16	7 / 1.70	0.7	18.0	700	16.5	1.25	22.6	1250
3 x 25	7 / 2.14	0.9	21.7	1000	20.2	1.6	27.0	1840
3 x 35	7 / 2.52	0.9	24.2	1300	23.0	1.6	29.8	2280
3 x 50 (S)	19 / 1.78	1.0	25.0	1600	23.0	1.6	30.0	2550
3 x 70 (S)	19 / 2.14	1.1	29.0	2240	27.0	2.0	35.0	3500
3 x 95 (S)	19 / 2.52	1.1	32.0	3050	30.1	2.0	38.5	4500
3 x 120 (S)	37 / 2.03	1.2	36.5	3800	34.4	2.0	43.0	5700
3 x 150 (S)	37 / 2.25	1.4	39.0	4640	37.5	2.5	47.5	6800
3 x 185 (S)	37 / 2.52	1.6	44.0	5870	41.3	2.5	51.5	8200
3 x 240 (S)	61 / 2.25	1.7	49.0	7670	46.4	2.5	57.0	10300
3 x 300 (S)	61 / 2.52	1.8	55.0	9460	52.0	2.5	63.0	12500
4 x 1.5	7 / 0.53	0.7	11.3	175	10.0	0.9	15.4	430
4 x 2.5	7 / 0.67	0.7	12.3	225	10.8	0.9	16.2	505
4 x 4	7 / 0.85	0.7	13.6	305	12.1	0.9	17.5	710
4 x 6	7 / 1.04	0.7	15.0	405	13.5	1.25	19.6	855
4 x 10	7 / 1.35	0.7	17.2	600	15.7	1.25	21.8	1120
4 x 16	7 / 1.70	0.7	19.7	870	18.2	1.6	25.0	1600
4 x 25	7 / 2.14	0.9	23.9	1325	22.4	1.6	29.2	2160
4 x 35	7 / 2.52	0.9	26.6	1760	25.1	1.6	32.1	2750
4 x 35 (S)	7 / 2.52	0.9	25.0	1600	24.0	1.6	31.0	2500
4 x 50 (S)	19 / 1.78	1.0	28.5	2200	26.8	1.6	34.0	3100
4 x 70 (S)	19 / 2.14	1.1	32.0	3050	30.6	2.0	39.0	4400
4 x 95 (S)	19 / 2.52	1.1	37.0	4070	34.4	2.0	43.0	5610
4 x 120 (S)	37 / 2.03	1.2	42.0	5195	36.0	2.5	46.0	7400
4 x 150 (S)	37 / 2.25	1.4	46.0	6350	38.3	2.5	48.5	8300
4 x 185 (S)	37 / 2.52	1.6	50.0	7890	46.4	2.5	57.0	10400
4 x 240 (S)	61 / 2.25	1.7	55.0	10400	51.0	2.5	62.0	13000
4 x 300 (S)	61 / 2.52	1.8	63.0	12810	56.6	2.5	68.0	15900

Note: (S) - Sectoral Stranded Conductors.

XLPE / PVC & XLPE / SWA / PVC Cables IEC 60502

Table 14

No. of Cores	Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	XP		XSP		Cable Overall Diameter (mm)	Approx. Weight (kg/km)
				Cable Overall Diameter (mm)	Approx. Weight (kg/km)	Diameter Under Armour (mm)	Armour Wire Diameter (mm)		
5	1.5	7 / 0.53	0.7	11.9	214.5	10.5	0.9	15.9	493.9
7		7 / 0.53	0.7	12.9	235.5	11.5	0.9	16.9	560.7
12		7 / 0.53	0.7	16.5	391.1	15.1	1.25	21.2	903.9
19		7 / 0.53	0.7	19.4	522.0	17.7	1.25	23.8	1167.8
37		7 / 0.53	0.7	25.4	981.0	23.3	1.6	30.1	1872.0
5	2.5	7 / 0.67	0.7	13.1	280.4	11.7	0.9	17.1	586.8
7		7 / 0.67	0.7	14.1	317.5	12.7	0.9	18.1	676.1
12		7 / 0.67	0.7	18.4	500.0	16.8	1.25	22.9	1095.8
19		7 / 0.67	0.7	21.4	737.0	19.8	1.6	26.6	1593.2
37		7 / 0.67	0.7	28.4	1327.0	27.0	1.6	33.8	2361.0
5	4	7 / 0.85	0.7	14.5	381.6	13.1	1.25	19.2	823.0
7		7 / 0.85	0.7	16.0	470.0	14.3	1.25	20.4	906.0
12		7 / 0.85	0.7	20.6	709.0	18.6	1.25	24.7	1293.0
19		7 / 0.85	0.7	24.1	1051.0	22.0	1.6	28.8	1904.0
37		7 / 0.85	0.7	32.2	1989.0	30.1	1.6	36.9	2919.0

XLPE / CT / AWA / PVC
(single core)

XLPE / CT / SWA / PVC
(4 cores & 3 cores + 3 earth)

single core



4 cores



3 cores
+
3 earth



single core

4 cores

3 cores + 3 earth

Conductor :
Insulation :
Bedding :

Screen :
Armour :
Sheath :
Colour :

Voltage U₀/U :
Conductor Stranding :

Operating Temperature :

Minimum Bending Radius :
Fire Performance :

Plain Annealed Copper
XLPE Compound
PVC Compound Type ST2 or
Lapped PVC Tape
Copper Tape
Aluminum Wire
PVC Compound Type ST2
Insulation: Natural

Sheath: Black
600 / 1000 V
Class 2 stranded circular
or compacted conductors
Maximum 90°C

12D for 70mm² to 1000mm²
IEC 60332-1

Plain Annealed Copper
XLPE Compound
PVC Compound Type ST2 or
Lapped PVC Tape
Copper Tape
Galvanised Steel Wire
PVC Compound Type ST2
Insulation: Red, Yellow, Blue &
Green/Yellow or
Brown, Black, Grey &
Green/Yellow

Sheath: Black
600 / 1000 V
Class 2 (stranded circular)
or compacted conductors
Maximum 90°C

12D for 1.5mm² to 300mm²
IEC 60332-1

Plain Annealed Copper
XLPE Compound

Copper Tape
Galvanised Steel Wire
PVC Compound Type ST2
Insulation: Red, Yellow, Blue & Green/
Yellow(x3) or Brown, Black,
Grey & Green/Yellow(x3)

Sheath: Black
600 / 1000 V
Class 2 (stranded circular)

Maximum 90°C for XLPE
Maximum 110°C for XLEVA
10D for unarmoured cable
IEC 60332-1

XLPE / CT / AWA / PVC Cables IEC 60502

Table 15

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Approximate Diameter				Approx. Weight (kg/km)
			Under Screen (mm)	Over Bedding (mm)	Over Armour (mm)	Over All (mm)	
70	19 / 2.14	1.1	15.2	17.6	20.1	23.9	1400
95	19 / 2.52	1.1	17.1	19.5	22.0	25.8	1700
120	37 / 2.03	1.2	19.0	20.8	24.0	27.8	2000
150	37 / 2.25	1.4	21.0	22.8	26.0	29.8	2400
185	37 / 2.52	1.6	23.2	25.0	28.2	32.0	2800
240	61 / 2.25	1.7	26.1	27.9	31.1	35.1	3500
300	61 / 2.52	1.8	28.7	30.5	33.7	37.9	4200
400	61 / 2.85	2.0	32.5	34.3	38.3	42.7	5400
500	61 / 3.20	2.2	36.0	37.8	41.8	46.4	6500
630	127 / 2.52	2.4	40.4	42.2	46.2	51.0	8200
800	127 / 2.85	2.6	45.5	47.3	52.3	57.5	10400
1000	127 / 3.20	2.8	50.4	52.2	57.2	62.4	13000

XLPE / CT / SWA / PVC Cables IEC 60502

Table 16

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Approximate Diameter				Approx. Weight (kg/km)
			Under Screen (mm)	Over Bedding (mm)	Over Armour (mm)	Over All (mm)	
4 x 1.5	7 / 0.53	0.7	9.7	12.1	13.9	17.7	640
4 x 2.5	7 / 0.67	0.7	10.7	13.1	14.9	18.7	730
4 x 4	7 / 0.85	0.7	12.0	14.4	16.2	20.0	870
4 x 6	7 / 1.04	0.7	13.4	15.8	18.3	22.1	1180
4 x 10	7 / 1.35	0.7	15.6	18.0	20.5	24.3	1490
4 x 16	7 / 1.70	0.7	18.1	20.5	23.7	27.5	2070
4 x 25	7 / 2.14	0.9	22.3	24.1	27.3	31.1	2790
4 x 35 (S)	7 / 2.52	0.9	25.0	26.8	30.0	33.8	2940
4 x 50 (S)	19 / 1.78	1.0	27.8	29.6	32.8	37.0	3500
4 x 70 (S)	19 / 2.14	1.1	31.6	33.4	37.4	42.0	5000
4 x 95 (S)	19 / 2.52	1.1	35.4	37.2	41.2	46.0	6300
4 x 120 (S)	37 / 2.03	1.2	39.0	40.8	45.8	51.0	8200
4 x 150 (S)	37 / 2.25	1.4	42.0	43.8	48.8	54.2	9600
4 x 185 (S)	37 / 2.52	1.6	47.8	49.6	54.6	60.4	11500
4 x 240 (S)	61 / 2.25	1.7	54.0	55.8	60.8	67.0	14400
4 x 300 (S)	61 / 2.52	1.8	58.0	59.8	64.8	71.4	17200

Note: (S) - Sectoral Stranded Conductors.

XLPE / CT / PVC Cables IEC 60502

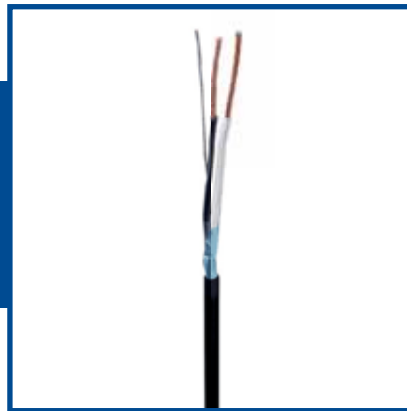
Table 17

Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Combined Earth Size (mm)	Radial Thickness of Insulation (mm)	Radial Thickness of Sheath (mm)	Unarmoured	
					Cable Overall Diameter (mm)	Approx. Weight (kg/km)
3 x 1.5	7 / 0.53	4.5 (3 x 1.5)	0.7	1.8	13.6	325
3 x 2.5	7 / 0.67	4.5 (3 x 1.5)	0.7	1.8	14.8	380
3 x 4	7 / 0.85	4.5 (3 x 1.5)	0.7	1.8	15.8	440
3 x 6	7 / 1.04	7.5 (3 x 2.5)	0.7	1.8	16.9	550
3 x 10	7 / 1.35	12 (3 x 4)	0.7	1.8	18.6	750
3 x 16	7 / 1.70	18 (3 x 6)	0.7	1.8	20.8	1000
3 x 25	7 / 2.14	30 (3 x 10)	0.9	1.8	24.0	1470
3 x 35	7 / 2.52	30 (3 x 10)	0.9	1.8	25.6	1890
3 x 50	19 / 1.78	30 (3 x 10)	1.0	1.9	31.1	2300
3 x 70	19 / 2.14	48 (3 x 16)	1.1	2.0	34.6	3200
3 x 95	19 / 2.52	48 (3 x 16)	1.1	2.2	39.3	4200
3 x 120	37 / 2.03	75 (3 x 25)	1.2	2.3	44.0	5400
3 x 150	37 / 2.25	75 (3 x 25)	1.4	2.5	49.0	6400
3 x 185	37 / 2.52	105 (3 x 35)	1.6	2.6	54.0	7900
3 x 240	61 / 2.25	150 (3 x 50)	1.7	2.8	61.0	10200
3 x 300	61 / 2.52	150 (3 x 50)	1.8	3.0	67.0	12300

multi-cores



single-pair



multi-pairs



multi-cores

single-pair

multi-pairs

<p>Conductor : Insulation : Lay Up :</p> <p>Individual: Screen</p> <p>Wrap Film : Collective : Screen</p> <p>Bedding : (Optional)</p> <p>Armouring : (Optional)</p> <p>Sheath : Colour :</p> <p>Reference Standards : Voltage Uo/U : Conductor Stranding : Operating Temperature : Testing Voltage : Fire Performance :</p>	<p>Plain Annealed Copper PVC Compound Grade TI51 Cores are stranded in Reverse Layer Technique forming a Concentric Cable</p> <p>Polyester Binder Tape Aluminium/Polyester Tape, with a Tinned Copper Drain Wire 0.5mm² (7/0.3mm) PVC Compound Grade TM51</p> <p>Galvanised Steel Wire</p> <p>PVC Compound Grade TM51 Insulation: Yellow or White with Black numberings or refer to BS 5308 colour code</p> <p>Sheath: Black or Blue BS EN 50288-7* 300 / 500 V Class 2 and 5 -15°C to 70°C 2 kV / 1 Minute IEC 60332-1</p>	<p>Plain Annealed Copper PVC Compound Grade TI51 Cores are paired, pairs are twisted in Reverse Layer Technique forming a Concentric Cable</p> <p>Polyester Binder Tape Aluminium/Polyester Tape, with a Tinned Copper Drain Wire 0.5mm² (7/0.3mm) PVC Compound Grade TM51</p> <p>Galvanised Steel Wire</p> <p>PVC Compound Grade TM51 Insulation: White and Black with numberings or refer to BS 5308 colour code</p> <p>Sheath: Black or Blue BS EN 50288-7* 300 / 500 V Class 2 and 5 -15°C to 70°C 2 kV / 1 Minute IEC 60332-1</p>	<p>Plain Annealed Copper PVC Compound Grade TI51 Cores are paired, pairs are twisted in Reverse Layer Technique forming a Concentric Cable Aluminium/Polyester Tape, with a Tinned Copper Drain Wire 0.5mm² (7/0.3mm) Polyester Binder Tape Aluminium/Polyester Tape, with a Tinned Copper Drain Wire 0.5mm² (7/0.3mm) PVC Compound Grade TM51</p> <p>Galvanised Steel Wire</p> <p>PVC Compound Grade TM51 Insulation: White and Black with numberings or refer to BS 5308 colour code</p> <p>Sheath: Black or Blue BS EN 50288-7* 300 / 500 V Class 2 and 5 -15°C to 70°C 2 kV / 1 Minute IEC 60332-1</p>
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Note * : Previously known as BS 5308.

IN-POP & IN-POSP Cables BS EN 50288-7

Table 18

Size			IN-POP Unarmoured		IN-POSP Armoured			Approx. Weight (kg/km)
Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Cable Overall Diameter (mm)	Approx. Weight (kg/km)	Diameter Under Armour (mm)	Armour Wire Diameter (mm)	Cable Overall Diameter (mm)	
2C x 0.5	7 / 0.3	0.6	6.9	61	7.1	0.9	11.6	256
3C x 0.5	7 / 0.3	0.6	7.3	74	7.5	0.9	12.0	281
4C x 0.5	7 / 0.3	0.6	7.8	88	8.1	0.9	12.6	310
6C x 0.5	7 / 0.3	0.6	9.1	117	9.4	0.9	14.1	376
10C x 0.5	7 / 0.3	0.6	11.5	180	11.6	0.9	16.3	489
20C x 0.5	7 / 0.3	0.6	14.6	316	14.5	1.25	20.0	803
30C x 0.5	7 / 0.3	0.6	17.2	452	16.9	1.25	22.4	1005
40C x 0.5	7 / 0.3	0.6	19.2	577	19.0	1.25	24.6	1205
80C x 0.5	7 / 0.3	0.6	26.4	1097	25.8	1.25	31.8	1929
2C x 0.75	7 / 0.37	0.6	7.3	69	7.6	0.9	12.1	277
3C x 0.75	7 / 0.37	0.6	7.7	85	7.9	0.9	12.4	301
4C x 0.75	7 / 0.37	0.6	8.3	103	8.6	0.9	13.1	333
6C x 0.75	7 / 0.37	0.6	9.7	139	10.0	0.9	14.7	412
10C x 0.75	7 / 0.37	0.6	12.3	215	12.4	0.9	17.1	545
20C x 0.75	7 / 0.37	0.6	15.7	383	15.7	1.25	21.1	907
30C x 0.75	7 / 0.37	0.6	18.5	551	18.3	1.25	23.9	1155
40C x 0.75	7 / 0.37	0.6	21.0	719	20.5	1.25	26.3	1386
80C x 0.75	7 / 0.37	0.6	28.8	1369	28.0	1.25	34.2	2267
2C x 1.0	7 / 0.43	0.6	7.7	77	7.9	0.9	12.4	293
3C x 1.0	7 / 0.43	0.6	8.1	96	8.3	0.9	12.8	320
4C x 1.0	7 / 0.43	0.6	8.8	117	9.0	0.9	13.7	368
6C x 1.0	7 / 0.43	0.6	10.5	165	10.5	0.9	15.2	447
10C x 1.0	7 / 0.43	0.6	13.1	249	13.1	0.9	17.8	594
20C x 1.0	7 / 0.43	0.6	16.7	449	16.6	1.25	22.1	999
30C x 1.0	7 / 0.43	0.6	19.7	648	19.4	1.25	25.2	1289
40C x 1.0	7 / 0.43	0.6	22.3	847	21.8	1.25	27.6	1553
80C x 1.0	7 / 0.43	0.6	30.7	1623	29.8	1.25	36.0	2582
2C x 1.5	7 / 0.53	0.6	8.3	92	8.4	0.9	13.0	322
3C x 1.5	7 / 0.53	0.6	8.7	117	8.9	0.9	13.6	368
4C x 1.5	7 / 0.53	0.6	9.5	144	9.6	0.9	14.4	411
6C x 1.5	7 / 0.53	0.6	11.4	205	11.3	0.9	16.1	508
10C x 1.5	7 / 0.53	0.6	14.5	321	14.2	1.25	19.9	797
20C x 1.5	7 / 0.53	0.6	18.5	584	18.0	1.25	23.9	1187
30C x 1.5	7 / 0.53	0.6	21.8	845	21.1	1.25	27.0	1538
40C x 1.5	7 / 0.53	0.6	24.7	1107	23.7	1.25	29.9	1888
80C x 1.5	7 / 0.53	0.6	34.2	2144	32.6	1.6	39.9	3417
2C x 2.5	7 / 0.67	0.7	9.5	122	9.8	0.9	14.5	389
3C x 2.5	7 / 0.67	0.7	10.3	166	10.3	0.9	15.0	441
4C x 2.5	7 / 0.67	0.7	11.2	205	11.2	0.9	15.9	508
6C x 2.5	7 / 0.67	0.7	13.4	295	13.3	0.9	18.2	649
10C x 2.5	7 / 0.67	0.7	17.1	465	16.8	1.25	22.5	1030
20C x 2.5	7 / 0.67	0.7	22.0	857	21.5	1.25	27.5	1565
30C x 2.5	7 / 0.67	0.7	26.2	1261	25.3	1.25	31.5	2083
40C x 2.5	7 / 0.67	0.7	29.6	1652	28.6	1.25	34.8	2559
80C x 2.5	7 / 0.67	0.7	41.1	3206	39.9	1.6	47.4	4775

• Other core configurations are available upon request.
• Class 5 conductors are available upon request.

IN-POP & IN-POSP Cables BS EN 50288-7

Table 19

Nominal Conductor Area (mm ²)	Size		IN-POP Unarmoured		IN-POSP Armoured			Approx. Weight (kg/km)
	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Cable Overall Diameter (mm)	Approx. Weight (kg/km)	Diameter Under Armour (mm)	Armour Wire Diameter (mm)	Cable Overall Diameter (mm)	
1P x 0.5	7 / 0.3	0.6	7.0	60	7.1	0.9	11.7	256
2P (Quad) x 0.5	7 / 0.3	0.6	8.0	88	8.0	0.9	12.5	310
2P x 0.5	7 / 0.3	0.6	10.6	104	8.6	0.9	15.5	398
5P x 0.5	7 / 0.3	0.6	13.6	195	13.5	0.9	18.3	553
10P x 0.5	7 / 0.3	0.6	19.2	360	18.7	1.25	24.4	972
15P x 0.5	7 / 0.3	0.6	22.0	495	21.5	1.25	27.4	1205
20P x 0.5	7 / 0.3	0.6	24.7	639	24.0	1.25	30.1	1428
30P x 0.5	7 / 0.3	0.6	29.2	915	28.3	1.25	34.4	1828
50P x 0.5	7 / 0.3	0.6	37.4	1474	36.1	1.6	43.3	2867
1P x 0.75	7 / 0.37	0.6	7.4	68	7.5	0.9	12.1	277
2P (Quad) x 0.75	7 / 0.37	0.6	8.5	103	8.5	0.9	13.0	333
2P x 0.75	7 / 0.37	0.6	11.5	126	11.4	0.9	16.2	430
5P x 0.75	7 / 0.37	0.6	14.8	239	14.5	1.25	20.2	726
10P x 0.75	7 / 0.37	0.6	20.7	433	20.2	1.25	26.1	1096
15P x 0.75	7 / 0.37	0.6	23.9	611	23.3	1.25	29.2	1360
20P x 0.75	7 / 0.37	0.6	26.9	791	26.0	1.25	32.1	1628
30P x 0.75	7 / 0.37	0.6	31.8	1136	30.7	1.25	37.0	2120
50P x 0.75	7 / 0.37	0.6	40.7	1830	39.6	1.6	47.0	3400
1P x 1.0	7 / 0.43	0.6	7.8	77	7.9	0.9	12.5	293
2P (Quad) x 1.0	7 / 0.43	0.6	8.9	117	9.0	0.9	13.7	368
2P x 1.0	7 / 0.43	0.6	12.2	143	12.1	0.9	16.9	466
5P x 1.0	7 / 0.43	0.6	15.7	276	15.4	1.25	21.1	787
10P x 1.0	7 / 0.43	0.6	22.0	503	21.5	1.25	27.4	1214
15P x 1.0	7 / 0.43	0.6	25.4	714	24.8	1.25	30.9	1527
20P x 1.0	7 / 0.43	0.6	28.6	927	27.7	1.25	33.8	1813
30P x 1.0	7 / 0.43	0.6	34.1	1353	32.8	1.6	39.8	2611
50P x 1.0	7 / 0.43	0.6	43.6	2182	42.3	2.0	50.7	4199
1P x 1.5	7 / 0.53	0.6	8.4	92	8.5	0.9	13.1	323
2P (Quad) x 1.5	7 / 0.53	0.6	9.5	144	9.7	0.9	14.4	411
2P x 1.5	7 / 0.53	0.6	13.3	172	13.2	0.9	17.9	518
5P x 1.5	7 / 0.53	0.6	17.1	344	16.8	1.25	22.5	904
10P x 1.5	7 / 0.53	0.6	24.3	648	23.6	1.25	29.7	1424
15P x 1.5	7 / 0.53	0.6	28.2	924	27.3	1.25	33.3	1798
20P x 1.5	7 / 0.53	0.6	31.6	1201	30.6	1.25	36.8	2175
30P x 1.5	7 / 0.53	0.6	37.7	1757	36.2	1.6	43.4	3149
50P x 1.5	7 / 0.53	0.6	48.4	2866	46.7	2.0	55.3	5066
1P x 2.5	7 / 0.67	0.7	9.6	123	9.7	0.9	14.5	390
2P (Quad) x 2.5	7 / 0.67	0.7	11.3	205	11.2	0.9	15.9	508
2P x 2.5	7 / 0.67	0.7	15.7	243	15.4	1.25	21.0	754
5P x 2.5	7 / 0.67	0.7	20.3	497	19.8	1.25	25.7	1148
10P x 2.5	7 / 0.67	0.7	29.1	956	28.0	1.25	34.3	1857
15P x 2.5	7 / 0.67	0.7	33.7	1369	32.4	1.6	39.6	2628
20P x 2.5	7 / 0.67	0.7	37.9	1782	36.8	1.6	44.2	3252
30P x 2.5	7 / 0.67	0.7	45.1	2607	43.7	2.0	52.0	4660
50P x 2.5	7 / 0.67	0.7	58.2	4284	56.3	2.5	66.3	7499

• Other pair, triad and quad configurations are available upon request.
• Class 5 conductors are available upon request.

IN-PIOP & IN-PIOSP Cables BS EN 50288-7

Table 20

Size			IN-PIOP Unarmoured		IN-PIOSP Armoured			Approx. Weight (kg/km)
Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Cable Overall Diameter (mm)	Approx. Weight (kg/km)	Diameter Under Armour (mm)	Armour Wire Diameter (mm)	Cable Overall Diameter (mm)	
1P x 0.5	7 / 0.3	0.6	6.9	60	7.1	0.9	11.7	256
2P x 0.5	7 / 0.3	0.6	11.1	124	11.1	0.9	15.9	425
5P x 0.5	7 / 0.3	0.6	14.2	238	14.1	0.9	19.1	616
10P x 0.5	7 / 0.3	0.6	20	440	19.6	1.25	25.5	1088
15P x 0.5	7 / 0.3	0.6	22.9	609	22.5	1.25	28.6	1377
20P x 0.5	7 / 0.3	0.6	25.8	789	25.2	1.25	31.3	1632
30P x 0.5	7 / 0.3	0.6	30.7	1157	29.7	1.25	36.0	2144
50P x 0.5	7 / 0.3	0.6	39.2	1852	38.3	1.6	45.9	3457
1P x 0.75	7 / 0.37	0.6	7.3	67	7.6	0.9	12.2	278
2P x 0.75	7 / 0.37	0.6	11.8	142	11.9	0.9	16.7	461
5P x 0.75	7 / 0.37	0.6	15.2	276	15.1	1.25	20.7	785
10P x 0.75	7 / 0.37	0.6	21.5	514	21.0	1.25	27.1	1227
15P x 0.75	7 / 0.37	0.6	24.9	730	24.3	1.25	30.4	1538
20P x 0.75	7 / 0.37	0.6	28	946	27.1	1.25	33.4	1855
30P x 0.75	7 / 0.37	0.6	33.3	1380	32.1	1.6	39.3	2669
50P x 0.75	7 / 0.37	0.6	42.7	2244	41.4	1.6	48.7	3940
1P x 1.0	7 / 0.43	0.6	7.7	76	7.9	0.9	12.5	292
2P x 1.0	7 / 0.43	0.6	12.4	158	12.5	0.9	17.3	491
5P x 1.0	7 / 0.43	0.6	16.1	313	15.9	1.25	21.5	847
10P x 1.0	7 / 0.43	0.6	22.8	587	22.3	1.25	28.4	1338
15P x 1.0	7 / 0.43	0.6	26.4	836	25.7	1.25	32.0	1712
20P x 1.0	7 / 0.43	0.6	29.7	1086	28.8	1.25	35.1	2057
30P x 1.0	7 / 0.43	0.6	35.3	1588	34.4	1.6	41.8	3029
50P x 1.0	7 / 0.43	0.6	45.4	2587	43.9	2.0	52.5	4759
1P x 1.5	7 / 0.53	0.6	8.3	91	8.4	0.9	13.0	318
2P x 1.5	7 / 0.53	0.6	13.7	195	13.4	0.9	18.5	561
5P x 1.5	7 / 0.53	0.6	17.7	392	17.2	1.25	23.2	980
10P x 1.5	7 / 0.53	0.6	25.1	736	24.2	1.25	30.3	1550
15P x 1.5	7 / 0.53	0.6	29.1	1052	27.9	1.25	34.2	1991
20P x 1.5	7 / 0.53	0.6	32.9	1385	31.2	1.6	38.7	2642
30P x 1.5	7 / 0.53	0.6	39.1	2022	37.5	1.6	45.3	3589
50P x 1.5	7 / 0.53	0.6	50.2	3291	48.6	2.0	57.4	5732
1P x 2.5	7 / 0.67	0.7	9.5	121	9.8	0.9	14.6	394
2P x 2.5	7 / 0.67	0.7	16.1	268	15.8	1.25	21.4	789
5P x 2.5	7 / 0.67	0.7	20.9	548	20.4	1.25	26.5	1240
10P x 2.5	7 / 0.67	0.7	29.9	1051	28.9	1.25	35.2	1993
15P x 2.5	7 / 0.67	0.7	34.7	1506	33.8	1.6	41.2	2908
20P x 2.5	7 / 0.67	0.7	39.2	1981	38.0	1.6	45.6	3537
30P x 2.5	7 / 0.67	0.7	46.6	2894	45.4	2.0	54.2	5179
50P x 2.5	7 / 0.67	0.7	60	4744	58.5	2.5	68.9	8312

- Other pair, triad and quad configurations are available upon request.
- Class 5 conductors are available upon request.

**IN-XOP, IN-XOSP,
IN-XIOP & IN-XIOSP**

single-pair



multi-pairs



single-pair

multi-pairs

Conductor :
Insulation :
Lay Up :

Individual:
Screen

Wrap Film :
Collective :
Screen

Bedding :
(Optional)
Armouring :
(Optional)
Sheath :
Colour :

Reference Standards :
Voltage U₀/U :
Conductor Stranding :
Operating Temperature :
Testing Voltage :
Fire Performance :

Plain Annealed Copper
XLPE Compound
Cores are paired, pairs are twisted in
Reverse Layer Technique forming a
Concentric Cable

Polyester Binder Tape
Aluminium/Polyester Tape, with a
Tinned Copper Drain Wire 0,5mm²
(7/0,3mm)
PVC Compound Grade TM51

Galvanised Steel Wire

PVC Compound Grade TM51
Insulation: White and Black with
numberings or refer to colour code

Sheath: Black or Blue
BS EN 50288-7*
300 / 500 V
Class 2
-15°C to 70°C
2 kV / 1 Minute
IEC 60332-1

Plain Annealed Copper
XLPE Compound
Cores are paired, pairs are twisted in
Reverse Layer Technique forming a
Concentric Cable

Aluminium/Polyester Tape, with a
Tinned Copper Drain Wire 0,5mm²
(7/0,3mm)
Polyester Binder Tape
Aluminium/Polyester Tape, with a
Tinned Copper Drain Wire 0,5mm²
(7/0,3mm)
PVC Compound Grade TM51

Galvanised Steel Wire

PVC Compound Grade TM51
Insulation: White and Black with
numberings or refer to colour code

Sheath: Black or Blue
BS EN 50288-7*
300 / 500 V
Class 2
-15°C to 70°C
2 kV / 1 Minute
IEC 60332-1

Note * : Previously known as BS 5308.

IN-XOP & IN-XOSP Cables BS EN 50288-7

Table 21

Size			IN-XOP Unarmoured		IN-XOSP Armoured			Approx. Weight (kg/km)
Nominal Conductor Area (mm ²)	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Cable Overall Diameter (mm)	Approx. Weight (kg/km)	Diameter Under Armour (mm)	Armour Wire Diameter (mm)	Cable Overall Diameter (mm)	
1P x 0.5	7 / 0.3	0.6	7.0	56	7.1	0.9	11.7	251
2P (Quad) x 0.5	7 / 0.3	0.6	8.0	79	8.0	0.9	12.5	300
2P x 0.5	7 / 0.3	0.6	10.6	94	10.7	0.9	15.5	388
5P x 0.5	7 / 0.3	0.6	13.6	174	13.5	0.9	18.3	533
10P x 0.5	7 / 0.3	0.6	19.2	317	18.7	1.25	24.4	932
15P x 0.5	7 / 0.3	0.6	22.0	430	21.5	1.25	27.4	1146
20P x 0.5	7 / 0.3	0.6	24.7	554	24.0	1.25	30.1	1348
30P x 0.5	7 / 0.3	0.6	29.2	788	28.3	1.25	34.4	1706
50P x 0.5	7 / 0.3	0.6	37.4	1262	36.1	1.6	43.3	2670
1P x 0.75	7 / 0.37	0.6	7.4	63	7.5	0.9	12.1	271
2P (Quad) x 0.75	7 / 0.37	0.6	8.5	92	8.5	0.9	13.0	323
2P x 0.75	7 / 0.37	0.6	11.5	115	11.4	0.9	16.2	418
5P x 0.75	7 / 0.37	0.6	14.8	216	14.5	1.25	20.2	703
10P x 0.75	7 / 0.37	0.6	20.7	385	20.2	1.25	25.4	1059
15P x 0.75	7 / 0.37	0.6	23.9	540	23.2	1.25	29.1	1295
20P x 0.75	7 / 0.37	0.6	26.9	697	26.0	1.25	32.1	1541
30P x 0.75	7 / 0.37	0.6	31.8	995	30.7	1.25	37.0	1990
50P x 0.75	7 / 0.37	0.6	40.7	1597	39.6	1.6	47.0	3183
1P x 1.0	7 / 0.43	0.6	7.8	71	7.9	0.9	12.5	286
2P (Quad) x 1.0	7 / 0.43	0.6	8.9	106	9.0	0.9	13.7	357
2P x 1.0	7 / 0.43	0.6	12.2	132	12.1	0.9	16.9	453
5P x 1.0	7 / 0.43	0.6	15.7	250	15.4	1.25	21.1	763
10P x 1.0	7 / 0.43	0.6	22.0	451	21.5	1.25	27.4	1166
15P x 1.0	7 / 0.43	0.6	25.4	637	24.7	1.25	30.8	1456
20P x 1.0	7 / 0.43	0.6	28.6	825	27.7	1.25	33.8	1719
30P x 1.0	7 / 0.43	0.6	34.1	1201	32.8	1.6	39.8	2471
50P x 1.0	7 / 0.43	0.6	43.6	1930	42.3	2.0	50.7	3966
1P x 1.5	7 / 0.53	0.6	8.4	85	8.5	0.9	13.1	315
2P (Quad) x 1.5	7 / 0.53	0.6	9.5	131	9.7	0.9	14.4	398
2P x 1.5	7 / 0.53	0.6	13.2	160	13.1	0.9	17.9	503
5P x 1.5	7 / 0.53	0.6	17.1	315	16.8	1.25	22.5	877
10P x 1.5	7 / 0.53	0.6	24.3	589	23.6	1.25	29.7	1371
15P x 1.5	7 / 0.53	0.6	28.1	837	27.2	1.25	33.3	1719
20P x 1.5	7 / 0.53	0.6	31.6	1087	30.5	1.25	36.8	2071
30P x 1.5	7 / 0.53	0.6	37.7	1586	36.2	1.6	43.4	2992
50P x 1.5	7 / 0.53	0.6	48.4	2582	46.7	2.0	55.3	4806
1P x 2.5	7 / 0.67	0.7	9.6	112	9.7	0.9	14.5	379
2P (Quad) x 2.5	7 / 0.67	0.7	11.3	188	11.2	0.9	15.9	490
2P x 2.5	7 / 0.67	0.7	15.6	225	15.3	1.25	21.0	737
5P x 2.5	7 / 0.67	0.7	20.3	455	19.8	1.25	25.7	1109
10P x 2.5	7 / 0.67	0.7	29.1	871	28.0	1.25	34.3	1780
15P x 2.5	7 / 0.67	0.7	33.7	1243	32.4	1.6	39.6	2514
20P x 2.5	7 / 0.67	0.7	37.9	1615	36.8	1.6	44.2	3100
30P x 2.5	7 / 0.67	0.7	45.1	2360	43.7	2.0	52.0	4433
50P x 2.5	7 / 0.67	0.7	58.2	3872	56.3	2.5	66.3	7122

• Other pair, triad and quad configurations are available upon request.
• Class 5 conductors are available upon request.

IN-XIOP & IN-XIOSP Cables BS EN 50288-7

Instrumentation Cables multi-pairs

IN-XIOP & IN-XIOSP Cables BS EN 50288-7

Table 22

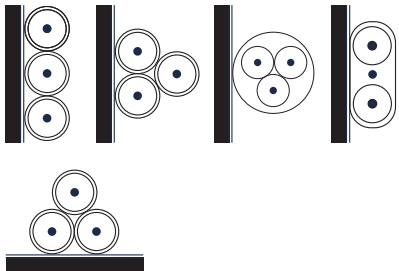
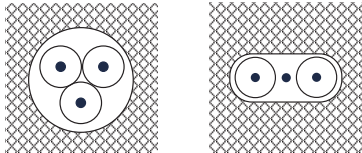
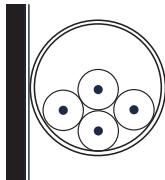
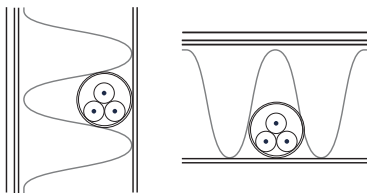
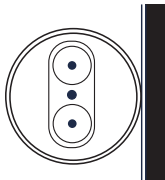
Nominal Conductor Area (mm ²)	Size		IN-XIOP Unarmoured		IN-XIOSP Armoured			Approx. Weight (kg/km)
	No. and Diameter of Wire (no./mm)	Radial Thickness of Insulation (mm)	Cable Overall Diameter (mm)	Approx. Weight (kg/km)	Diameter Under Armour (mm)	Armour Wire Diameter (mm)	Cable Overall Diameter (mm)	
1P x 0.5	7 / 0.3	0.6	6.9	56	7.1	0.9	11.7	251
2P x 0.5	7 / 0.3	0.6	11.1	117	11.1	0.9	15.9	413
5P x 0.5	7 / 0.3	0.6	14.2	221	14.0	0.9	19.0	591
10P x 0.5	7 / 0.3	0.6	20	406	19.4	1.25	25.3	1038
15P x 0.5	7 / 0.3	0.6	22.9	558	22.3	1.25	28.4	1302
20P x 0.5	7 / 0.3	0.6	25.8	722	25.0	1.25	31.1	1530
30P x 0.5	7 / 0.3	0.6	30.7	1050	29.5	1.25	35.8	1993
50P x 0.5	7 / 0.3	0.6	39.2	1685	38.0	1.6	45.6	3214
1P x 0.75	7 / 0.37	0.6	7.3	63	7.5	0.9	12.1	271
2P x 0.75	7 / 0.37	0.6	11.8	132	11.8	0.9	16.6	449
5P x 0.75	7 / 0.37	0.6	15.2	257	15.0	1.25	20.7	758
10P x 0.75	7 / 0.37	0.6	21.5	477	20.9	1.25	27.0	1172
15P x 0.75	7 / 0.37	0.6	24.9	674	24.1	1.25	30.2	1457
20P x 0.75	7 / 0.37	0.6	28	872	27.0	1.25	33.3	1745
30P x 0.75	7 / 0.37	0.6	33.3	1269	31.9	1.6	39.1	2504
50P x 0.75	7 / 0.37	0.6	42.7	2058	41.1	1.6	48.7	3665
1P x 1.0	7 / 0.43	0.6	7.7	71	7.9	0.9	12.5	286
2P x 1.0	7 / 0.43	0.6	12.4	147	12.4	0.9	17.2	478
5P x 1.0	7 / 0.43	0.6	16	292	15.8	1.25	21.5	818
10P x 1.0	7 / 0.43	0.6	22.8	546	22.2	1.25	28.3	1279
15P x 1.0	7 / 0.43	0.6	26.4	775	25.6	1.25	31.9	1623
20P x 1.0	7 / 0.43	0.6	29.7	1005	28.7	1.25	35.0	1939
30P x 1.0	7 / 0.43	0.6	35.3	1466	34.3	1.6	41.7	2852
50P x 1.0	7 / 0.43	0.6	45.4	2385	43.8	2.0	52.4	4464
1P x 1.5	7 / 0.53	0.6	8.3	85	8.5	0.9	13.1	315
2P x 1.5	7 / 0.53	0.6	13.7	186	13.5	0.9	18.5	548
5P x 1.5	7 / 0.53	0.6	17.7	369	17.3	1.25	23.2	947
10P x 1.5	7 / 0.53	0.6	25.1	690	24.3	1.25	30.4	1484
15P x 1.5	7 / 0.53	0.6	29.1	983	28.1	1.25	34.4	1893
20P x 1.5	7 / 0.53	0.6	32.9	1293	31.5	1.6	38.7	2510
30P x 1.5	7 / 0.53	0.6	39.1	1884	37.7	1.6	45.3	3392
50P x 1.5	7 / 0.53	0.6	50.2	3062	48.6	2.0	57.4	5403
1P x 2.5	7 / 0.67	0.7	9.5	112	9.7	0.9	14.5	379
2P x 2.5	7 / 0.67	0.7	16.1	254	15.7	1.25	21.4	771
5P x 2.5	7 / 0.67	0.7	20.9	514	20.3	1.25	26.4	1194
10P x 2.5	7 / 0.67	0.7	29.9	983	28.7	1.25	35.0	1901
15P x 2.5	7 / 0.67	0.7	34.7	1404	33.7	1.6	41.1	2770
20P x 2.5	7 / 0.67	0.7	39.2	1845	37.8	1.6	45.4	3353
30P x 2.5	7 / 0.67	0.7	46.6	2690	45.2	2.0	54.0	4903
50P x 2.5	7 / 0.67	0.7	60	4403	58.2	2.5	68.6	7852

- Other pair, triad and quad configurations are available upon request.
- Class 5 conductors are available upon request.

Schedule of Installation Methods of Cables

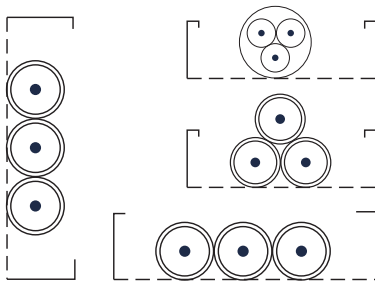
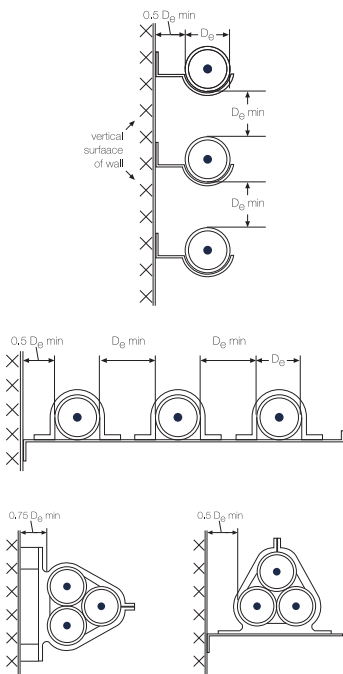
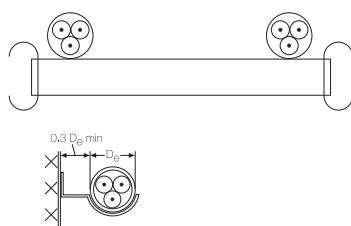

(including reference methods)

Schedule of Installation Methods of Cables (Including Reference Methods) Technical Table 1.1

Installation Method	Examples	Appropriate Reference Method for Determining Current-Carrying Capacity
Description		
OPEN AND CLIPPED DIRECT:		
<p>Sheathed cables clipped direct to or lying on a non-metallic surface</p>		<p>Method 1</p>
CABLES EMBEDDED DIRECT IN BUILDING MATERIALS:		
<p>Sheathed cables embedded directly in masonry, brickwork, concrete, plaster or the like (other than thermally insulating materials)</p>		<p>Method 1</p>
IN CONDUIT:		
<p>Single core non-sheathed cables in metallic or non-metallic conduit on a wall or ceiling</p>		<p>Method 3</p>
<p>† Single core non-sheathed cables in metallic or non-metallic conduit in a thermally insulating wall or above a thermally insulating ceiling, the conduit being in contact with a thermally conductive surface on one side</p>		<p>Method 4</p>
<p>Multi core cables having non-metallic sheath, in metallic or non-metallic conduit on a wall or ceiling</p>		<p>Method 3</p>

† The wall is assumed to consist of an outer weatherproof skin, thermal insulation and an inner skin of plasterboard or wood-like material having a coefficient of heat transfer not less than 10 W/m²K. The conduit is fixed so as to be close to, but not necessarily touching, the inner skin. Heat from the cables is assumed to escape through the inner skin only.

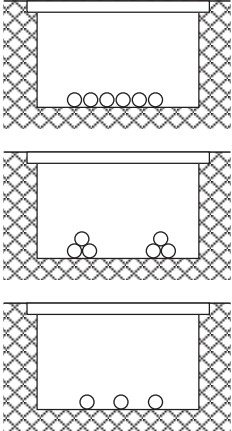
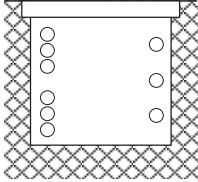
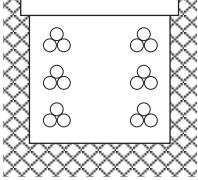
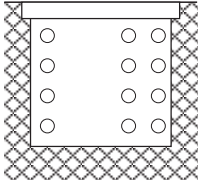
Schedule of Installation Methods of Cables (Including Reference Methods) Technical Table 1.2

Installation Method	Examples	Appropriate Reference Method for Determining Current-Carrying Capacity
Description		
ON TRAYS:		
<p>Sheathed cables on a perforated cable tray, bunched and unenclosed. A perforated cable tray is considered as a tray in which the holes occupy at least 30% of the surface area</p>		Method 11
IN FREE AIR, ON CLEATS, BRACKETS OR A LADDER:		
<p>Sheathed single-core cables in free air (any supporting metalwork under the cables occupying less than 10% of the plan area):</p> <p>Two or three cables vertically one above the other, minimum distance between cable surfaces equal to the overall cable diameter (D_c); distance from the wall not less than $0.5 D_c$</p> <p>Two or three cables horizontally, with spacings as above</p> <p>Three cables in trefoil, distance between wall and surface of nearest cable $0.5D_c$ or nearest cables $0.75D_c$</p>		Method 12
<p>Sheathed multicore cables on ladder or brackets, separation greater than $2D_c$</p> <p>Sheathed multicore cables in free air distance between wall and cable surface not less than $0.3D_c$</p> <p>Any supporting metalwork under the cables occupying less than 10% of the plan area</p>		Method 13
<p>Cables suspended from or incorporating a catenary wire</p>		Method 12 or 13, as appropriate

Schedule of Installation Methods of Cables

(including reference methods)

Schedule of Installation Methods of Cables (Including Reference Methods) Technical Table 1.3

Installation Method	Examples	Appropriate Reference Method for Determining Current-Carrying Capacity
Description		
CABLES IN TRENCHES:		
<p>Cables in enclosed trench 450 mm wide by 300 mm deep (minimum dimensions) including 100 mm cover</p>	 <p><i>Two single-core cables with surfaces separated by a minimum of one cable diameter</i></p> <p><i>Three single-core cables in trefoil and touching throughout</i></p> <p><i>Multicore cables or groups of single-core cables with surfaces separated by a minimum of 50 mm</i></p>	<p>Method 18 Use rating factors in Technical Table 3</p>
<p>Cables in enclosed trench 450 mm wide by 600 mm deep (minimum dimensions) including 100 mm cover</p>	<p><i>Single-core cables arranged in flat groups of two or three on the vertical trench wall with surfaces separated by one diameter with a minimum distance of 50 mm between groups. Multicore cables installed with surfaces separated by a minimum* of 75 mm. All cables spaced at least 25 mm from the trenched wall</i></p> 	<p>Method 19 Use rating factors in Technical Table 3</p>
<p>Cables in enclosed trench 600 mm wide by 760 mm deep (minimum dimensions) including 100 mm cover</p>	<p><i>Single-core cables arranged in groups of two or three in flat formation with the surfaces separated by one diameter or in trefoil formation with cables touching</i></p>  <p><i>Groups separated by a minimum* of 50 mm either horizontally or vertically. Multi core cables installed with surfaces separated by a minimum* of 75 mm either horizontally or vertically. All cables spaced at least 25 mm from the trench wall</i></p> 	<p>Method 20 Use rating factors in Technical Table 3</p>

* Larger spacing to be used where practicable

Correction Factors

Correction Factors For Groups of More than One Circuit of Single Core Cables, or More than One Multi-Cores Cable Technical Table 2

Reference Methods of Installation	Correction Factor (C _g)													
	Number of Circuits or Multi-Cores Cables													
	2	3	4	5	6	7	8	9	10	12	14	16	18	20
Enclosed (Method 3 or 4) or bunched and clipped direct to a non-metallic surface (Method 1)	0.80	0.70	0.65	0.60	0.57	0.54	0.52	0.50	0.48	0.45	0.43	0.41	0.39	0.38
Single layer clipped to a non-metallic surface (Method 1)	Touching	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70	-	-	-	-	-
	Spaced*	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Single layer multi-cores on a perforated metal cable tray, vertical or horizontal (Method 11)	Touching	0.86	0.81	0.77	0.75	0.74	0.73	0.73	0.72	0.71	0.70	-	-	-
	Spaced*	0.91	0.89	0.88	0.87	0.87	-	-	-	-	-	-	-	-
Single layer single core on a perforated metal cable tray, touching (Method 11)	Horizontal	0.90	0.85	-	-	-	-	-	-	-	-	-	-	-
	Vertical	0.85	-	-	-	-	-	-	-	-	-	-	-	-
Single layer multi-cores touching on ladder supports (Method 13)	0.86	0.82	0.80	0.79	0.78	0.78	0.78	0.77	-	-	-	-	-	-

* Spaced means a clearance between adjacent surfaces of at least one cable diameter (De). Where the horizontal clearance between adjacent cables exceeds 2 De, no correction factor need be applied.

- Notes: 1) The factors in the table are applicable to group of cables all of one size. The value of current derived from application of the appropriate factors is the maximum continuous 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.
For example, a group of N loaded cables would normally require a group reduction factor of C_g applied to the tabulated It. However, if M cables in the group carry loads which are not greater than 0.3C_gIt amperes, the other cables can be sized by using the group rating factor corresponding to (N-M) cables.
- 3) Factors are given for single layer of cables do not apply when cables are installed in more than one layer touching each other.
- 4) For circuits having more than one cable in parallel per phase, each set of three conductors should be considered as a circuit for the purpose of this table.

Correction Factors For Cables Installed in Enclosed Trenches Technical Table 3

Conductor cross-sectional area (mm ²)	Installation Method 18				Installation Method 19				Installation Method 20			
	2 1-core cables, or 1 3- or 4-core cables	3 1-core cables, or 2 2-core cables	4 1-core cables, or 2 3- or 4-core cables	6 1-core cables, 4 2-core cables, or 3 3- or 4-core cables	6 1-core cables, 4 2-core cables, or 3 3- or 4-core cables	8 1-core cables, or 4 3- or 4-core cables	12 1-core cables, 8 2-core cables, or 6 3- or 4-core cables	12 1-core cables, 8 2-core cables, or 6 3- or 4-core cables	18 1-core cables, 12 2-core cables, or 9 3- or 4-core cables	24 1-core cables, 16 2-core cables, or 12 3- or 4-core cables		
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		

The correction factors tabulated above relate to the disposition of cables illustrated in items 18 to 20 of Technical Table 1.3 and are applicable to the current-carrying capacities for Reference Methods 12 or 13 of Technical Table 1.2.

When cables having different conductor operating temperatures are grouped together the current rating shall be based on the lowest operating temperature of any cable in the group.

Correction Factors

Technical Data Rating Factors for Other Temperature Conditions

Technical Table 4

4.1 : Rating Factors for Other Ambient Air Temperatures (PVC Insulated)

Ambient Temperature	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C
Rating Factor	1.03	1.00	0.94	0.87	0.79	0.71	0.61	0.50	0.35	-

4.2 : Rating Factors for Other Ground Temperatures (PVC Insulated)

Ground Temperature	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C
Rating Factor	1.04	1.00	0.95	0.90	0.85	0.80	0.73	0.67	0.60

4.3 : Rating Factors for Other Ambient Air Temperatures (XLPE Insulated)

Ambient Air Temperature	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C	80°C	85°C
Rating Factor	1.02	1.00	0.96	0.91	0.87	0.82	0.76	0.71	0.65	0.58	0.50	0.41	0.29

4.4 : Rating Factors for Other Ground Temperatures (XLPE Insulated)

Ground Temperature	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C
Rating Factor	1.00	0.97	0.93	0.89	0.86	0.82	0.77	0.73

4.5 : Rating Factors for Other Ambient Air Temperatures (PVC Insulated)

Ambient Air Temperature	30°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C
PVC cords, non-heat resisting 1.00	0.96	0.92	0.87	0.71	0.50	-	-	-	-
PVC cords, heat resisting	1.00	-	-	-	1.00	0.96	0.83	0.67	0.47

4.6 : Group Rating Factors for Cables Installation

Group Rating Factors		Number of Circuits											
		2	3	4	5	6	7	8	9	10	11	12	
1	For circuits of 2 Single core cables laid flat touching horizontal formation, laid direct in ground	0.79	0.68	0.62	0.57	0.54	0.52	0.50	0.48	0.47	0.46	0.45	
2	For circuits of 3 Single core cables in trefoil touching, laid direct in the ground	0.78	0.66	0.61	0.56	0.53	0.50	0.49	0.47	0.46	0.44	0.43	
		Number of Cables in a Group											
		2	3	4	5	6	7	8	9	10	11	12	
3	For twin or multi-cores cables in horizontal formation, laid direct in ground	Spaced 0.15m	0.87	0.78	0.74	0.70	0.68	0.66	0.64	0.63	0.62	0.61	0.60
		Spaced 0.30m	0.91	0.84	0.81	0.78	0.77	0.75	0.75	0.74	0.73	0.73	0.72
		Number of Ducts in a Group											
		2	3	4	5	6	7	8	9	10	11	12	
4	For twin or multi-cores cables in single-way ducts horizontal formation spaced 0.30m apart	0.93	0.88	0.85	0.83	0.82	0.81	0.80	0.79	0.79	0.78	0.78	

Current Rating and Voltage Drop

PVC Insulated Cables SINGLE CORE

Technical Table 5.1 & 5.2 - 1- Core Cables having PVC Insulation, Unarmoured, With or Without Sheath (Copper Conductor) 450 / 750V or 600 / 1000V

Current-Carrying Capacities (Amp) PVC & PVC / PVC Cables

Technical Table 5.1

Conductor cross-sectional area (mm ²)	Reference Method 4 (Enclosed in conduit in thermally insulating wall etc)		Reference Method 3 (Enclosed in conduit on a wall or in trunking etc)		Reference Method 1 ('Clipped direct')		Reference Method 11 (on a perforated cable tray horizontal or vertical)		Reference Method 12 (free air)		
	2 cable, single-phase ac or dc (Amp)	3 or 4 cables, 3-phase ac (Amp)	2 cables, single-phase ac or dc (Amp)	3 or 4 cables, 3-phase ac (Amp)	2 cables, single-phase ac or dc (Amp)	3 or 4 cables, 3-phase ac (Amp)	2 cables, single-phase ac or dc or flat and touching (Amp)	3 cables, 3-phase ac flat and touching (Amp)	2 cables, single-phase ac or dc or 3 cables or trefoil (Amp)	2 cables, single-phase ac or dc or 3 cables 3-phase ac (Amp)	3 cables, trefoil 3-phase ac 3-phase ac (Amp)
1	11	10.5	13.5	12	15.5	14	-	-	-	-	-
1.5	14.5	13.5	17.5	15.5	20	18	-	-	-	-	-
2.5	19.5	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	126	112	146	130	110
35	99	89	125	110	141	129	156	141	181	162	137
50	119	108	151	134	182	167	191	172	219	197	167
70	151	136	192	171	234	214	246	223	281	254	216
95	182	164	232	207	284	261	300	273	341	311	264
120	210	188	269	239	330	303	349	318	396	362	308
150	240	216	300	262	381	349	404	369	456	419	356
185	273	245	341	296	436	400	463	424	521	480	409
240	320	286	400	346	515	472	549	504	615	569	485
300	367	328	458	394	594	545	635	584	709	659	561
400	-	-	546	467	694	634	732	679	852	795	656
500	-	-	626	533	792	723	835	778	982	920	749
630	-	-	720	611	904	826	953	892	1138	1070	855
800	-	-	-	-	1030	943	1086	1020	1265	1188	971
1000	-	-	-	-	1154	1058	1216	1149	1420	1337	1079

* With or without protective conductor

Note: Rating factors for ambient temperature other than 30°C please refer Technical Table 4.1
Group Rating Factor please refer to Technical Table 2

Voltage Drop (Per Amp Per Meter) PVC & PVC / PVC Cables

Technical Table 5.2

Conductor cross-sectional area (mm ²)	2 cables-single-phase ac									3 or 4 cables-three-phase ac												
	2 cables dc (mV/A/m)			Reference Methods 3 & 4 (Enclosed in conduit etc in or on a wall) (mV/A/m)			Reference Methods 1 & 11 (Clipped direct or on trays, touching) (mV/A/m)			Reference Methods 3 & 4 (Enclosed in conduit etc in or on a wall) (mV/A/m)			Reference Methods 1, 11 & 12 (in trefoil) (mV/A/m)			Reference Method 1, 11 (Flat touching) (mV/A/m)			Reference Methods 12 (Flat spaced*) (mV/A/m)			
	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	
1	44			44			44			38			38			38			38			
1.5	29			29			29			25			25			25			25			
2.5	18			18			18			15			15			15			15			
4	11			11			11			9.5			9.5			9.5			9.5			
6	7.3			7.3			7.3			6.4			6.4			6.4			6.4			
10	4.4			4.4			4.4			3.8			3.8			3.8			3.8			
16	2.8			2.8			2.8			2.4			2.4			2.4			2.4			
25	1.75	1.80	0.33	1.80	1.75	0.20	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	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: r = conductor resistance at operating temperature
z = impedance, x = reactance

Technical Table 6.1 & 6.2 - Multi-Core Cables having PVC Insulation, Unarmoured (Copper Conductor) 600 / 1000V

Current-Carrying Capacities (Amp) PVC / PVC Cables

Technical Table 6.1

Conductor cross-sectional area (mm ²)	Reference Method 4 (Enclosed in an insulated wall etc)		Reference Method 3 (Enclosed in conduit on a wall or ceiling, or in trunking)		Reference Method 1 (Clipped direct)		Reference Method 11 (on perforated cable tray), or Reference Method 13 (free air)	
	1	1	1	1	1	1	1	1
	2-core cable* single-phase ac or dc (Amp)	3-core cable* or 1 4-core cable 3-phase ac (Amp)	2-core cable* single-phase ac or dc (Amp)	3-core cable* or 1 4-core cable 3-phase ac (Amp)	2-core cable* single-phase ac or dc (Amp)	3-core cable* or 1 4-core cable 3-phase ac (Amp)	2-core cable* single-phase ac or dc (Amp)	3-core cable* or 1 4-core cable 3-phase ac (Amp)
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 protective conductor

Note: Rating factors for ambient temperature other than 30°C please refer Technical Table 4.1
Group Rating Factor please refer to Technical Table 2

Voltage Drop (Per Amp Per Meter) PVC / PVC Cables

Technical Table 6.2

Conductor cross-sectional (mm ²)	2-core cable ac (mV/A/m)	2-core cable single-phase ac (mV/A/m)			3 or 4-core cable 3-phase ac (mV/A/m)		
		r	x	z	r	x	z
1	44						38
1.5	29						25
2.5	18						15
4	11						9.5
6	7.3						6.4
10	4.4						3.8
16	2.8						2.4
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

Note: r = conductor resistance at operating temperature
z = impedance, x = reactance

Technical Table 7.1 & 7.2 – 1-Core Cables having PVC Insulation, Armoured, (Copper Conductor) 600 / 1000V

Current-Carrying Capacities (Amp) PVC / AWA / PVC Cables

Technical Table 7.1

Conductor cross-sectional area (mm ²)	Reference Method 1 (clipped direct)		Reference Method 11 (on perforated cable tray)		Reference Method 12 (free air)					Direct in Ground		In Single Way Ducts	
	2 cables single-phase ac or dc (Amp)	3 or 4 cables 3-phase ac (Amp)	2 cables single-phase ac flat & touching (Amp)	3 or 4 cables 3-phase flat & touching (Amp)	3 or 4 cables 3-phase ac			2 cables dc spaced		2 cables flat touching (Amp)	3 cables trefoil touching (Amp)	2 cables duct touching (Amp)	3 cables trefoil touching (Amp)
					Horizontal flat spaced (Amp)	Vertical flat spaced (Amp)	3 cables trefoils (Amp)	Horizontal (Amp)	Vertical (Amp)				
50	193	179	205	189	230	212	181	229	216	238	203	216	199
70	245	225	259	238	286	263	231	294	279	292	248	262	241
95	296	269	313	285	338	313	280	357	340	349	297	308	282
120	342	309	360	327	385	357	324	415	396	396	337	341	311
150	393	352	413	373	436	405	373	479	458	443	376	375	342
185	447	399	469	422	490	456	425	548	525	497	423	414	375
240	525	465	550	492	566	528	501	648	622	571	485	463	419
300	594	515	624	547	616	578	567	748	719	640	542	509	459
400	687	575	723	618	674	632	657	885	851	708	600	545	489
500	763	622	805	673	721	676	731	1035	997	780	660	585	523
630	843	669	891	728	771	723	809	1218	1174	856	721	632	563
800	919	710	976	777	824	772	886	1441	1390	895	756	662	587
1000	975	737	1041	808	872	816	945	1685	1627	939	797	703	621

Note: Rating factors for ambient temperature other than 30°C please refer Technical Table 4.1
 Rating factors for ground temperature other than 15°C please refer Technical Table 4.2
 Group rating factors please refer to Technical Table 4.6 & Technical Table 2

Voltage Drop (Per Amp Per Meter) PVC / AWA / PVC Cables

Technical Table 7.2

Conductor cross-sectional area (mm ²)	2 cables dc (mV/A/m)	2 cables-single-phase ac						3 or 4 cables-three-phase ac									Direct in Ground		Single Way Ducts	
		Reference Methods 1 & 11 (Touching) (mV/A/m)			Reference Methods 12 (space*) (mV/A/m)			Reference Methods 1,11 & 12 (in trefoil touching) (mV/A/m)			Reference Methods 1 & 11 (Flat touching) (mV/A/m)			Reference Methods 12 (Flat spaced*) (mV/A/m)			2 cables flat touching (mV/A/m)	3 cables trefoil touching (mV/A/m)	2 cables flat touching (mV/A/m)	3 cables trefoil touching (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	0.19	0.82	0.79	0.26	0.84	0.79	0.34	0.86	0.97	0.82	1.00	0.88
70	0.63	0.64	0.21	0.68	0.66	0.29	0.72	0.56	0.18	0.58	0.57	0.25	0.62	0.59	0.32	0.68	0.67	0.58	0.76	0.66
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	0.50	0.44	0.61	0.53
120	0.36	0.39	0.195	0.43	0.42	0.28	0.50	0.33	0.17	0.37	0.36	0.24	0.43	0.40	0.30	0.50	0.42	0.36	0.54	0.47
150	0.29	0.31	0.19	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	0.36	0.31	0.48	0.42
185	0.23	0.26	0.19	0.32	0.29	0.27	0.39	0.22	0.16	0.27	0.25	0.23	0.34	0.29	0.29	0.41	0.31	0.27	0.44	0.38
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	0.26	0.23	0.40	0.34
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	0.23	0.20	0.37	0.32
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	0.22	0.19	0.34	0.30
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	0.20	0.18	0.32	0.28
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	0.19	0.16	0.30	0.26
800	0.053	0.094	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	0.095	0.155	0.185	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: r = conductor resistance at operating temperature
 z = impedance, x = reactance

Technical Table 8.1 & 8.2 – Multi-Core Cables having PVC Insulation, Armoured, (Copper Conductor) 600 / 1000V

Current-Carrying Capacities (Amp) PVC / SWA / PVC Cables

Technical Table 8.1

Conductor cross-sectional area (mm ²)	Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated horizontal cable tray or Reference Method 13 (free air))		Direct in Ground		In Single Way Ducts	
	1 2-core cable single-phase ac or dc (Amp)	1 3- or 4-cable 3-phase ac or dc (Amp)	1 2-core cable single-phase ac or dc (Amp)	1 3- or 4-cable 3-phase ac or dc (Amp)	2 cores (Amp)	3 or 4 cores (Amp)	2 cores (Amp)	3 or 4 cores (Amp)
	1.5	21	18	22	19	32	27	26
2.5	28	25	31	26	41	35	34	29
4	38	33	41	35	55	47	45	38
6	49	42	53	45	69	59	57	48
10	67	58	72	62	92	78	76	64
16	89	77	97	83	119	101	98	83
25	118	102	128	110	158	132	129	107
35	145	125	157	135	190	159	154	126
50	175	151	190	163	225	188	183	153
70	222	192	241	207	277	233	225	190
95	269	231	291	251	332	279	271	228
120	310	267	336	290	377	317	309	260
150	356	306	386	332	422	355	346	292
185	405	348	439	378	478	401	393	331
240	476	409	516	445	551	462	455	382
300	547	469	592	510	616	517	510	428
400	621	540	683	590	693	580	574	490

Note: Rating factors for ambient temperature other than 30°C please refer Technical Table 4.1
Rating factors for ground temperature other than 15°C please refer Technical Table 4.2
Group rating factors please refer to Technical Table 4.6 & Table 2

Voltage Drop (Per Amp Per Meter) PVC / SWA / PVC Cables

Technical Table 8.2

Conductor cross-sectional area (mm ²)	2-core cable ac (mV/A/m)	2-core cable single-phase ac (mV/A/m)			3- or 4-core cable 3-phase ac (mV/A/m)			Direct in Ground		In Single Way Ducts	
		r	x	z	r	x	z	2-cores (mV/A/m)	3- or 4-cores (mV/A/m)	2-cores (mV/A/m)	3- or 4-cores (mV/A/m)
1.5	29			29			25	29	25	29	25
2.5	18			18			15	17	15	17	15
4	11			11			9.5	11	9.5	11	9.5
6	7.3			7.3			6.4	7.4	6.4	7.4	6.4
10	4.4			4.4			3.8	4.4	3.8	4.4	3.8
16	2.8			2.8			2.4	2.8	2.4	2.8	2.4
25	1.75	1.75	0.17	1.75	1.5	0.145	1.5	1.7	1.5	1.7	1.5
35	1.25	1.25	0.165	1.25	1.1	0.145	1.1	1.3	1.1	1.3	1.1
50	0.93	0.93	0.165	0.94	0.8	0.14	0.81	0.94	0.82	0.94	0.82
70	0.63	0.63	0.16	0.65	0.55	0.14	0.57	0.66	0.57	0.66	0.57
95	0.46	0.47	0.155	0.5	0.41	0.135	0.43	0.49	0.42	0.49	0.42
120	0.36	0.38	0.155	0.41	0.33	0.135	0.35	0.4	0.35	0.4	0.35
150	0.29	0.3	0.155	0.34	0.26	0.13	0.29	0.34	0.29	0.34	0.29
185	0.23	0.25	0.15	0.29	0.21	0.13	0.25	0.29	0.25	0.29	0.25
240	0.18	0.19	0.15	0.24	0.165	0.13	0.21	0.24	0.21	0.24	0.21
300	0.145	0.155	0.145	0.21	0.135	0.13	0.185	0.21	0.18	0.21	0.18
400	0.105	0.115	0.145	0.185	0.1	0.125	0.16	0.19	0.17	0.19	0.17

Note: r = conductor resistance at operating temperature
z = impedance, x = reactance

Technical Table 9.1 & 9.2 – 1-Core Cables having XLPE Insulation, Unarmoured, (Copper Conductor) 600 / 1000V

Current-Carrying Capacities (Amp) XLPE / PVC Cables

Technical Table 9.1

Size of Conductor	Reference Method 4 (enclosed in conduit in thermally insulating wall etc)		Reference Method 3 (enclosed in conduit on a wall or in trunking etc)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray, horizontal or vertical)			Reference Method 12 (free air)
	2 cables 1-phase ac or dc	3 or 4 cables 3-phase ac	2 cables 1-phase ac or dc	3 or 4 cables 3-phase ac	2 cables 1-phase ac or dc flat & touching	3 or 4 cables 3-phase ac flat & touching or trefoil	2 cables 1-phase ac or dc flat & touching	3 or 4 cables 3-phase ac flat & touching trefoil	3 cables trefoil 3-phase ac	
	2 A	3 A	4 A	5 A	6 A	7 A	8 A	9 A	10 A	
1 mm ²										
1.5	18	17	22	19	25	23	-	-	-	
2.5	24	23	30	26	34	31	-	-	-	
4	33	30	40	35	46	41	-	-	-	
6	43	39	51	45	59	54	-	-	-	
10	58	53	71	63	81	74	-	-	-	
16	76	70	95	85	109	99	-	-	-	
25	100	91	126	111	143	130	158	140	138	
35	124	111	156	138	176	161	195	176	171	
50	149	135	189	168	228	209	293	215	209	
70	189	170	240	214	293	268	308	279	270	
95	228	205	290	259	355	326	375	341	330	
120	263	235	336	299	413	379	436	398	385	
150	300	270	375	328	476	436	505	461	445	
185	341	306	426	370	545	500	579	530	511	
240	400	358	500	433	644	590	686	630	606	
300	459	410	573	493	743	681	794	730	701	
400	-	-	683	584	868	793	915	849	820	
500	-	-	783	666	990	904	1044	973	936	
630	-	-	900	764	1130	1033	1191	1115	1069	
800	-	-	-	-	1288	1179	1358	1275	1214	
1000	-	-	-	-	1443	1323	1520	1436	1349	

Note: Rating factors for ambient temperature other than 30°C please refer Technical Table 4.3
 Rating factors for ground temperature other than 15°C please refer Technical Table 4.4
 Group rating factors please refer to Technical Table 4.6 & Technical Table 2

Voltage Drop (Per Amp Per Meter) XLPE / PVC Cables

Technical Table 9.2

Size of Conductor	2 Cables dc	2 Cables, 1-phase ac						3 or 4 Cables, 3-phase ac												
		Reference Methods 3 & 4 (enclosed in conduit etc, in or on a wall)			Reference Methods 1 & 11 (clipped direct or on trays touching)			Reference Methods 3 & 4 (enclosed in conduit etc, in or on a wall)			Reference Methods 1, 11 & 12 (in trefoil)			Reference Methods 1 & 11 (flat and touching)						
		3 mV/A/m			4 mV/A/m			5 mV/A/m			6 mV/A/m			7 mV/A/m						
1 mm ²																				
1.5	31						31													
2.5	19						19													
4	12						12													
6	7.9						7.9													
10	4.7						4.7													
16	2.9						2.9													
		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	0.19	1.85	1.60	0.27	1.65	1.60	0.165	1.60	1.60	0.19	1.60	1.60	0.19	1.60	
35	1.35	1.35	0.29	1.35	1.35	0.18	1.35	1.15	0.25	1.15	1.15	0.155	1.15	1.15	0.18	1.15	1.15	0.18	1.15	
50	0.99	1.00	0.29	1.05	0.99	0.18	1.00	0.87	0.25	0.90	0.86	0.155	0.87	0.86	0.18	0.87	0.86	0.18	0.87	
70	0.68	0.70	0.28	0.75	0.68	0.175	0.71	0.60	0.24	0.65	0.59	0.150	0.61	0.59	0.175	0.62	0.60	0.175	0.62	
95	0.49	0.51	0.27	0.58	0.49	0.170	0.52	0.44	0.23	0.50	0.43	0.145	0.45	0.43	0.170	0.46	0.44	0.170	0.46	
120	0.39	0.41	0.26	0.48	0.39	0.165	0.43	0.35	0.23	0.42	0.34	0.140	0.37	0.34	0.165	0.38	0.35	0.165	0.38	
150	0.32	0.33	0.26	0.43	0.32	0.165	0.36	0.29	0.23	0.37	0.28	0.140	0.31	0.28	0.165	0.32	0.29	0.165	0.32	
185	0.25	0.27	0.26	0.37	0.26	0.165	0.30	0.23	0.23	0.32	0.22	0.140	0.26	0.22	0.165	0.28	0.23	0.165	0.28	
240	0.19	0.21	0.26	0.33	0.20	0.160	0.25	0.185	0.22	0.29	0.17	0.140	0.22	0.17	0.165	0.24	0.185	0.165	0.24	
300	0.155	0.175	0.25	0.31	0.16	0.160	0.22	0.15	0.22	0.27	0.14	0.140	0.195	0.135	0.160	0.21	0.15	0.160	0.21	
400	0.12	0.14	0.25	0.29	0.13	0.155	0.20	0.125	0.22	0.25	0.11	0.135	0.175	0.110	0.160	0.195	0.125	0.160	0.195	
500	0.093	0.12	0.25	0.28	0.105	0.155	0.185	0.100	0.22	0.24	0.09	0.135	0.160	0.088	0.160	0.180	0.100	0.160	0.180	
630	0.072	0.10	0.25	0.27	0.086	0.155	0.175	0.088	0.21	0.23	0.074	0.135	0.150	0.071	0.160	0.170	0.088	0.160	0.170	
800	0.056	-	-	-	0.072	0.150	0.170	-	-	-	0.062	0.130	0.145	0.059	0.155	0.165	-	0.155	0.165	
1000	0.045	-	-	-	0.063	0.150	0.165	-	-	-	0.055	0.130	0.140	0.050	0.155	0.165	-	0.155	0.165	

Note: r = conductor resistance at operating temperature
 z = impedance, x = reactance

Technical Table 10.1 & 10.2 – Multi-Core Cables having XLPE Insulation, Unarmoured, (Copper Conductor) 600 / 1000V

Current-Carrying Capacities (Amp) XLPE / PVC Cables

Technical Table 10.1

Size of Conductor	Reference Methods 4 (enclosed in conduit and in insulated wall etc)		Reference Method 3 (enclosed in conduit on a wall or ceiling, or in trunking)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) or Reference Method 13 (free air)	
	1 2-core cable single-phase ac or dc	1 3-or 4-cable 3-phase ac	1 2-core cable single-phase ac or dc	1 3-or 4-cable 3-phase ac	1 2-core cable single-phase ac or dc	1 3-or 4-cable 3-phase ac	1 2-core cable single-phase ac or dc	1 3-or 4-cable 3-phase ac
1 mm ²	2 A	3 A	4 A	5 A	6 A	7 A	8 A	9 A
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

Note: Rating factors for ambient temperature other than 30°C please refer Technical Table 4.3
 Rating factors for ground temperature other than 15°C please refer Technical Table 4.4
 Group rating factors please refer to Technical Table 4.6 & Technical Table 2

Voltage Drop (Per Amp Per Meter) XLPE / PVC Cables

Technical Table 10.2

Size of Conductor	2-core cable dc	2-core cable single-phase ac			3 or 4-core cable 3-phase ac		
	3 mV/A/m	3 mV/A/m			4 mV/A/m		
1 mm ²		r	x	z	r	x	z
1.5	31	1.85	0.16	1.9	1.6	0.14	1.65
2.5	19	1.35	0.155	1.35	1.15	0.135	1.15
4	12	0.99	0.155	1.00	0.86	0.135	0.87
6	7.9	0.67	0.150	0.69	0.59	0.130	0.60
10	4.7	0.50	0.150	0.52	0.43	0.130	0.45
16	2.9	0.40	0.145	0.42	0.34	0.130	0.37
25	1.85	0.32	0.145	0.35	0.28	0.125	0.30
35	1.35	0.26	0.145	0.29	0.22	0.125	0.26
50	0.98	0.20	0.140	0.24	0.175	0.125	0.21
70	0.67	0.16	0.140	0.21	0.140	0.120	0.185
95	0.49	0.13	0.140	0.19	0.115	0.120	0.165
120	0.39						
150	0.31						
185	0.25						
240	0.195						
300	0.155						
400	0.120						

Note: r = conductor resistance at operating temperature
 z = impedance, x = reactance

Technical Table 11.1 & 11.2 – 1-Core Cables having XLPE Insulation, Armoured, (Copper Conductor) 600 / 1000V

Current-Carrying Capacities (Amp) XLPE / AWA / PVC Cables

Technical Table 11.1

Size of Conductor	Reference Method 1 (clipped direct)		Reference Method 11 (on perforated cable tray)		Reference Method 12 (free air)	In single-way ducts		Laid direct in ground	
	2 cables 1-phase ac or dc flat & touching	3 or 4 cables 3-phase ac flat & touching	2 cables 1-phase ac or dc flat & touching	3 or 4 cables 3-phase ac flat & touching	3 or 4 cables 3-phase ac trefoil touching	2 cables 1-phase ac or dc ducts touching	3 or 4 cables 3-phase ac trefoil ducts touching	2 cables 1-phase ac or dc touching	3 or 4 cables 3-phase ac trefoil touching
1 mm ²	2 A	3 A	4 A	5 A	6 A	7 A	8 A	9 A	10 A
50	237	220	253	232	222	255	235	275	235
70	303	277	322	293	285	310	280	340	290
95	367	333	389	352	346	365	330	405	345
120	425	383	449	405	402	410	370	460	390
150	488	437	516	462	463	445	405	510	435
185	557	496	587	524	529	485	440	580	490
240	656	579	689	612	625	550	500	670	560
300	755	662	792	700	720	610	550	750	630
400	853	717	899	767	815	640	580	830	700
500	962	791	1016	851	918	690	620	910	770
630	1082	861	1146	935	1027	750	670	1000	840
800	1170	904	1246	987	1119	828	735	1117	931
1000	1261	961	1345	1055	1214	919	811	1254	1038

Note: Rating factors for ambient temperature other than 30°C please refer Technical Table 4.3
 Rating factors for ground temperature other than 15°C please refer Technical Table 4.4
 Group rating factors please refer to Technical Table 4.6 & Technical Table 2

Voltage Drop (Per Amp Per Meter) XLPE / AWA / PVC Cables

Technical Table 11.2

Size of Conductor	2 Cables dc	2 Cables, 1-phase ac			3 or 4 Cables, 3-phase ac						2 Cables, 1-phase ac		3 or 4 Cables, 3-phase ac, touching	
		Reference Methods 1 & 11 (touching)			Reference Methods 1, 11 or 12 (in trefoil touching)			Reference Methods 1 & 11 (flat & touching)			In ducts	In ground	In ducts	In ground
		3 mV/A/m			4 mV/A/m			5 mV/A/m			6 mV/A/m	7 mV/A/m	8 mV/A/m	9 mV/A/m
1 mm ²	2 mV/A/m	r	x	z	r	x	z	r	x	z				
50	0.98	0.99	0.21	1	0.86	0.18	0.87	0.84	0.25	0.88	1.10	0.99	0.93	0.86
70	0.67	0.68	0.20	0.71	0.59	0.17	0.62	0.6	0.25	0.65	0.80	0.70	0.70	0.61
95	0.49	0.51	0.195	0.55	0.44	0.17	0.47	0.46	0.24	0.52	0.65	0.53	0.56	0.46
120	0.39	0.41	0.190	0.45	0.35	0.165	0.39	0.38	0.24	0.44	0.55	0.43	0.48	0.37
150	0.31	0.33	0.185	0.38	0.29	0.160	0.33	0.31	0.23	0.39	0.50	0.37	0.43	0.32
185	0.25	0.27	0.185	0.33	0.23	0.160	0.28	0.26	0.23	0.34	0.45	0.31	0.39	0.27
240	0.195	0.21	0.180	0.28	0.18	0.155	0.24	0.21	0.22	0.30	0.40	0.26	0.35	0.23
300	0.155	0.17	0.175	0.25	0.145	0.150	0.21	0.17	0.22	0.28	0.37	0.24	0.32	0.21
400	0.115	0.145	0.170	0.22	0.125	0.150	0.195	0.160	0.21	0.27	0.35	0.21	0.30	0.19
500	0.093	0.125	0.170	0.21	0.105	0.145	0.180	0.145	0.20	0.25	0.33	0.20	0.28	0.18
630	0.073	0.105	0.165	0.195	0.092	0.145	0.170	0.135	0.195	0.24	0.30	0.19	0.26	0.17
800	0.056	0.09	0.160	0.190	0.086	0.140	0.165	0.130	0.180	0.23	0.28	0.18	0.24	0.16
1000	0.045	0.092	0.155	0.180	0.080	0.135	0.155	0.125	0.170	0.21	0.26	0.17	0.22	0.15

Note: r = conductor resistance at operating temperature
 z = impedance, x = reactance

Technical Table 12.1& 12.2 – Multi-Core Cables having XLPE Insulation, Armoured, (Copper Conductor) 600 / 1000 V

Current-Carrying Capacities (Amp) XLPE / SWA / PVC Cables

Technical Table 12.1

Size of Conductor	Reference Methods 1 (clipped direct)		Reference Method 11 (on perforated cable tray) or Reference Method 13 (free air)		In single-way ducts		Laid direct in ground	
	1 2-core cable single-phase ac or dc	1 3-or 4-cable 3-phase ac	1 2-core cable single-phase ac or dc	1 3-or 4-cable 3-phase ac	1 2-core cable single-phase ac or dc	1 3-or 4-cable 3-phase ac	1 2-core cable single-phase ac or dc	1 3-or 4-cable 3-phase ac
	2 A	3 A	4 A	5 A	6 A	7 A	8 A	9 A
1 mm ²								
1.5	27	23	29	25	-	23	-	28
2.5	36	31	39	33	-	30	-	36
4	49	42	52	44	-	40	-	48
6	62	53	66	56	-	50	-	60
10	85	73	90	78	-	65	-	80
16	110	94	115	99	115	94	140	115
25	146	124	152	131	145	125	180	150
35	180	154	188	162	175	150	215	180
50	219	187	228	197	210	175	255	215
70	279	238	291	251	260	215	315	265
95	338	289	354	304	310	260	380	315
120	392	335	410	353	355	300	430	360
150	451	386	472	406	400	335	480	405
185	515	441	539	463	455	380	540	460
240	607	520	636	546	520	440	630	530
300	698	599	732	628	590	495	700	590
400	787	673	847	728	660	560	790	670

Note: Rating factors for ambient temperature other than 30°C please refer Technical Table 4.3
 Rating factors for ground temperature other than 15°C please refer Technical Table 4.4
 Group rating factors please refer to Technical Table 4.6 & Technical Table 2

Voltage Drop (Per Amp Per Meter) XLPE / SWA / PVC Cables

Technical Table 12.2

Size of Conductor	2-Core Cables dc	2 Cables, 1-phase ac			3 & 4 Cables, 3-phase ac			2 Cables, 1-phase ac		3 or 4 Cables, 3-phase ac	
		3 mV/A/m			4 mV/A/m			In ducts	In ground	In ducts	In ground
		r	x	z	r	x	z	5 mV/A/m	6 mV/A/m	7 mV/A/m	8 mV/A/m
1 mm ²											
1.5	31	31			27			31	31	25	25
2.5	19	19			16			19	19	15	15
4	12	12			10			12	12	9.7	9.7
6	7.9	7.9			6.8			7.9	7.9	6.5	6.5
10	4.7	4.7			4.0			4.7	4.7	3.9	3.9
16	2.9	2.9			2.5			2.9	2.9	2.6	2.6
25	1.85	1.85	0.16	1.9	1.6	0.14	1.65	1.9	1.9	1.6	1.6
35	1.35	1.35	0.155	1.35	1.15	0.135	1.15	1.35	1.35	1.2	1.2
50	0.98	0.99	0.155	1.00	0.86	0.135	0.87	1.00	1.00	0.87	0.87
70	0.67	0.67	0.150	0.69	0.59	0.130	0.60	0.69	0.69	0.61	0.61
95	0.49	0.50	0.150	0.52	0.43	0.130	0.45	0.52	0.52	0.45	0.45
120	0.39	0.40	0.145	0.42	0.34	0.130	0.37	0.42	0.42	0.36	0.36
150	0.31	0.32	0.145	0.35	0.28	0.125	0.30	0.35	0.35	0.30	0.30
185	0.25	0.26	0.145	0.29	0.22	0.125	0.26	0.29	0.29	0.25	0.25
240	0.195	0.20	0.140	0.24	0.175	0.125	0.21	0.24	0.24	0.21	0.21
300	0.155	0.16	0.140	0.21	0.140	0.120	0.185	0.21	0.21	0.19	0.19
400	0.120	0.13	0.140	0.19	0.115	0.120	0.165	0.19	0.19	0.18	0.18

Note: r = conductor resistance at operating temperature
 z = impedance, x = reactance

Technical Data Flexible Cord, Imperial Sizes
Technical Table 13.1

Conductor		Current Rating	Volt Drop per 100FT		Maximum Weight supportable by twin flexible cord (lb)
Nominal Area (in ²)	Construction (no./in)	1 or 3 phase ac or dc (amp)	dc or 1 phase ac (V)	3 phase ac (V)	
0.0006	14 / 0.0076	3	8.9	7.7	3
0.0010	23 / 0.0076	6	11	9.4	5
0.0017	40 / 0.0076	13	14	12	10
0.0030	70 / 0.0076	18	12	10	10
0.0048	110 / 0.0076	24	9.6	8.3	10
0.0070	162 / 0.0076	31	8.4	7.3	10

Note : Rating factors for ambient temperature other than 30°C please refer Technical Table 4.5

Technical Data Flexible Cord, Metric Sizes
Technical Table 13.2

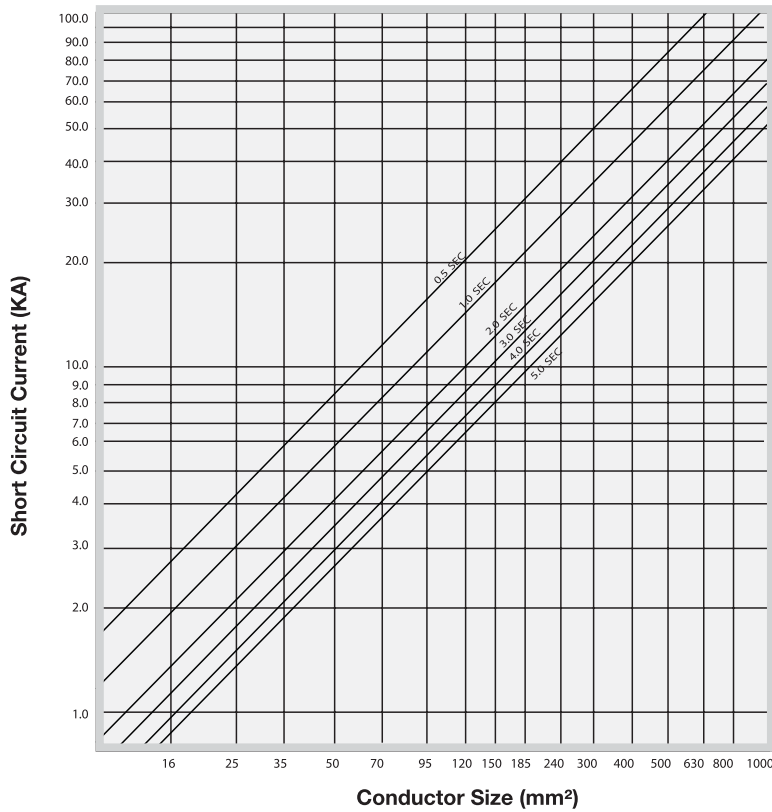
Conductor		Current Rating	Volt Drop		Maximum Weight supportable by twin flexible cord (kg)
Nominal Area (mm ²)	Construction (no./mm)	1 or 3 phase ac or dc (amp)	dc or 1 phase ac (mV/A/m)	3 phase ac (mV/A/m)	
0.50	16 / 0.2	3	83	72	2
0.75	24 / 0.2	6	56	48	3
1.00	32 / 0.2	10	43	37	5
1.25	40 / 0.2	13	35	29	5
1.50	30 / 0.25	15	31	26	5
2.50	50 / 0.25	20	18	16	5
4.00	56 / 0.3	25	11	9.6	5

Note : Rating factors for ambient temperature other than 30°C please refer Technical Table 4.5

Short Circuit Current for PVC Insulated & XLPE Insulated Cables

Allowable Short Circuit Currents for PVC Insulated Cables

Technical Table 14.1



Conductor : Copper

Insulation : PVC

Curves based on formula:

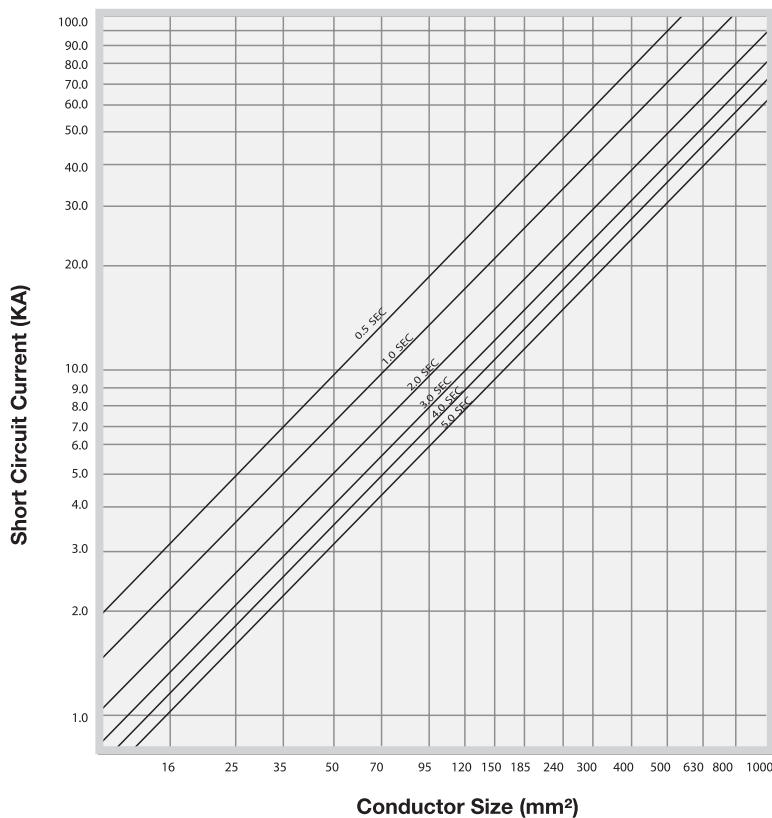
$$I = (0.115 A \div \sqrt{t})$$

Where :

- I - Short circuit current (KA)
- A - Conductor area (mm²)
- t - Time of short circuit (seconds)

Allowable Short Circuit Currents for XLPE Insulated Cables

Technical Table 14.2



Conductor : Copper

Insulation : Cross-linked polyethylene

Curves based on formula:

$$I = (0.143 A \div \sqrt{t})$$

Where :

- I - Short circuit (KA)
- A - Conductor area (mm²)
- t - Time of short circuit (seconds)

Short Circuit Ratings

Short Circuit Ratings for Power Cables

Technical Table 14.3

Cross-Sectional Area (mm ²)	Short Circuit Rating for 1 Second (KA)	Short Circuit Rating for 3 Seconds (KA)
1.5	0.2145	0.1238
2.5	0.3575	0.2064
4	0.5720	0.3302
6	0.8580	0.4954
10	1.4300	0.8256
16	2.2880	1.3210
25	3.5750	2.0640
35	5.0050	2.8896
50	7.1500	4.1281
70	10.0100	5.7793
95	13.5850	7.8433
120	17.1600	9.9073
150	21.4500	12.3842
185	26.4550	15.2738
240	34.3200	19.8147
300	42.9000	24.7683
400	57.2000	33.0244
500	71.5000	41.2805
630	90.0900	52.0135
800	114.4000	66.0489
1000	143.0000	82.5611

An important factor for the determination of the conductor size is the maximum allowable current during a short circuit when the maximum allowable conductor temperature is higher than during normal operation.

The maximum permissible short circuit current of cables up to 1 KV with copper conductors can be calculated with the following formula:

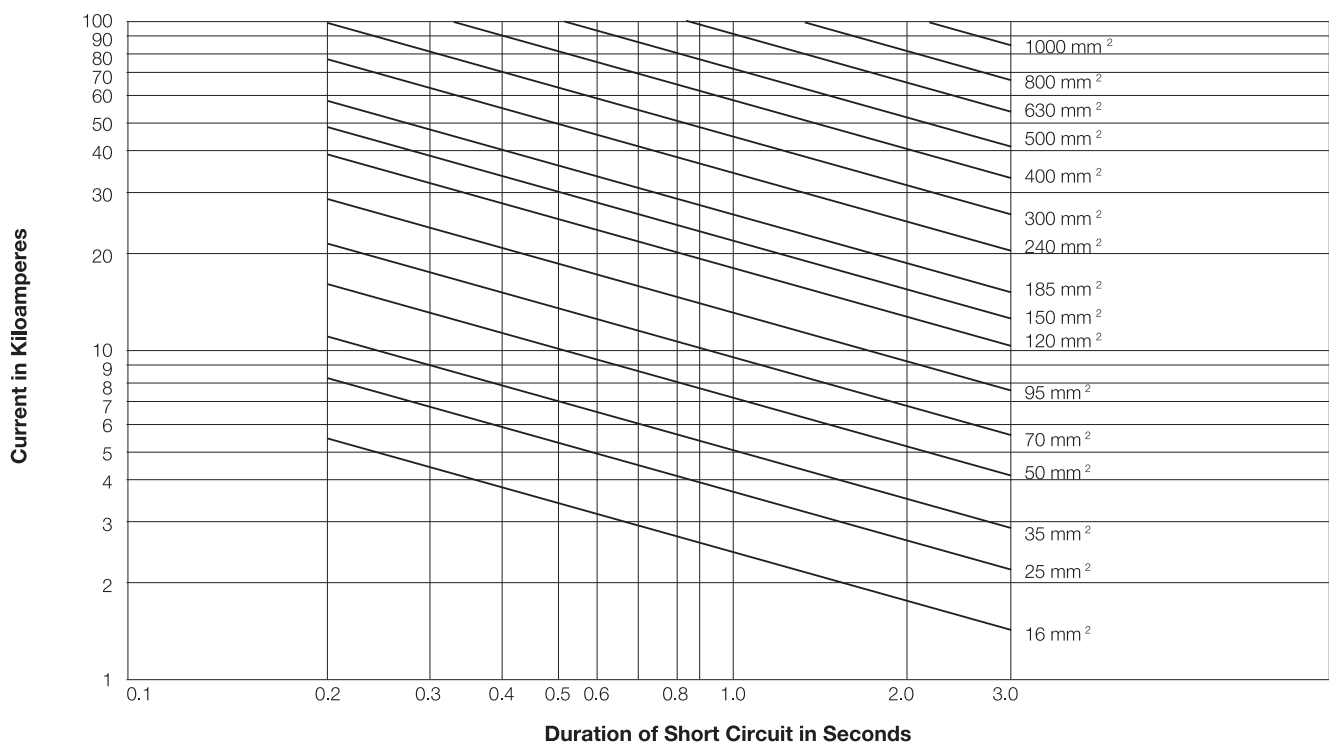
$$I = \frac{S}{\sqrt{t}} K$$

- Where
- I** = Short Circuit Rating (KA)
 - S** = Conductor Area (sq mm)
 - t** = Duration of Short Circuit (sec)
 - K** = Insulation material Specific Constant
K = 0.115 (PVC)
K = 0.143 (XLPE)

The above rating is calculated using the following formula: $I = \frac{0.143 S}{\sqrt{t}}$
 Where **I** = Short Circuit Rating (KA)
S = Conductor Area (sq mm)
t = Duration of Short Circuit (sec)

Copper Conductors

Technical Table 14.4



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

Additional Technical Information

Technical Table 15 - For all cable types of IN-POP, IN-POSP, IN-PIOP, IN-PIOSP & IN-XOP, IN-XOSP, IN-XIOP, IN-XIOSP, Instrumentations Cables

IN-POP, IN-POSP, IN-PIOP, IN-PIOSP & IN-XOP, IN-XOSP, IN-XIOP, IN-XIOSP	Technical Table 15
------------------------------------------------------------------------------------	---------------------------

1. Test Voltage: (2000 Vr.m.s. for 1 minute between each conductor in turn and all the other connected together)

2. Maximum DC Conductor Resistance at 20°C

Conductor Size	Multi-cores	Multi-pair
0.5 mm ²	36.0 Ω/km	36.7 Ω/km
0.75 mm ²	24.5 Ω/km	25.0 Ω/km
1.0 mm ²	18.1 Ω/km	18.5 Ω/km
1.5 mm ²	12.1 Ω/km	12.3 Ω/km
2.5 mm ²	7.41 Ω/km	7.6 Ω/km

3. Minimum Insulation Resistance at 20°C

	XLPE Insulated	PVC Insulated
Individual Conductor (between) each conductor and remaining bunched conductors/screen and/or armour	1000 MΩ.km	10 MΩ.km
Individual Screens (between screens)	1 MΩ.km	1 MΩ.km

4. Maximum Mutual Capacitance at 1 KHz (pF/m)

XLPE Insulated : 150nF/km
PVC Insulated : 250nF/km

5. Maximum Capacitance Unbalance at 1 KHz

PE Insulated Cables : 500pF/500m

6. Maximum L/R Ratio (For Adjacent Cores)

Conductor Size	Multi-core / Multi-pair
0.5 mm ²	25 μH/Ω
0.75 mm ²	25 μH/Ω
1.0 mm ²	25 μH/Ω
1.5 mm ²	40 μH/Ω
2.5 mm ²	60 μH/Ω

Maximum Conductor Resistance	Technical Table 16
-------------------------------------	---------------------------

Cross Section Area (S) (mm ²)	Conductor for Fixed Writing Class 1 (solid), Class 2 (stranded) (Ω/km)
0.50	36.0
0.75	24.5
1.00	18.1
1.50	12.1
2.50	7.41
4	4.61
6	3.08
10	1.83
16	1.15
25	0.727
35	0.524
50	0.387
70	0.268
95	0.193
120	0.153
150	0.124
185	0.0991
240	0.0754
300	0.0601
400	0.0470
500	0.0366
630	0.0283
800	0.0221
1000	0.0176

Electrical Characteristics	Technical Table 17
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Conductor Resistance Temperature Correction Factors	
Temp °C	Factor
10	0.961
11	0.965
12	0.969
13	0.972
14	0.976
15	0.980
16	0.984
17	0.988
18	0.992
19	0.996
20	1.000
21	1.004
22	1.008
23	1.012
24	1.016
25	1.020
30	1.039
35	1.059
40	1.079
45	1.098
50	1.118
55	1.138
60	1.157
65	1.177
70	1.196
75	1.216
80	1.236
85	1.255
90	1.275

Conversion Tables of Conductor Size

(mm² - CM - AWG / MCM)

Technical Table 18

Cross-Sectional Area		Conductor Size	Cross-Sectional Area		Conductor Size
(mm ²)	(CM)	(AWG / MCM)	(mm ²)	(CM)	(AWG / MCM)
0.324	640	22	107.2	211600	4/0
0.519	1020	20	*120	236820	-
0.653	1290	19	127	250000	250
0.823	1620	18	*150	296025	-
*1.0	1974	-	152	300000	300
1.04	2050	17	177	350000	350
1.31	2580	16	*185	365098	-
*1.5	2960	-	203	400000	400
1.65	3260	15	228	450000	450
2.08	4110	14	*240	473640	-
*2.5	4934	-	253	500000	500
2.63	5180	13	279	550000	550
3.31	6530	12	300	592050	-
*4.0	7894	-	304	600000	600
4.17	8230	11	329	650000	650
5.261	10380	10	355	700000	700
*6.0	11841	-	380	750000	750
6.631	13090	9	*400	789400	-
8.367	16510	8	405	800000	800
*10.0	19735	-	456	900000	900
10.55	20820	7	*500	986750	-
13.3	26240	6	507	1000000	1000
*16.6	31576	-	557	1100000	1100
16.77	33090	5	608	1200000	1200
21.15	41740	4	*630	1243305	-
*25.0	49338	-	633	1250000	1250
26.67	52620	3	659	1300000	1300
33.62	66360	2	709	1400000	1400
*35.0	69073	-	760	1500000	1500
42.41	83690	1	*800	1578800	-
*50.0	98675	-	811	1600000	1600
53.49	105600	1/0	861	1700000	1700
67.43	133100	2/0	887	1750000	1750
*70.0	138145	-	912	1800000	1800
85.01	167800	3/0	963	1900000	1900
*95.0	187483	-	*1000	1973500	-
			010	2000000	2000

Note : * British Standard
 * 127 mm² and larger is rounded off and not actual. CM area is actual.
 Conversion factors : mm² x 1973.5 = CM area, CM x 0.0005067 = mm².

AWG - America Wire Gauge. A standard measurement of the size of a conductor : 4/0 & smaller.

CM (Circular Mil) used to define cross-sectional areas of conductors. Area of circle 171000 inches in diameter. MCM - 1000 circular mils.

Terms & Conditions of Sales

1. APPLICATION OF TERMS & CONDITIONS

These conditions govern the sales and purchase of goods ordered by Buyer from Seller ("the goods") and shall override any terms and conditions whether previously or hereafter stipulated incorporated or referred to by Buyer whether orally in its purchase order or other documents.

2. DELIVERY

- a. Any time for delivery named by Seller is an estimate only and Seller is not liable to make good any damage or loss arising out of any such delay.
- b. Delivery shall be deemed to have been made if seller delivers the goods to the location specified by the Buyer and Delivery Order is endorsed by any person present thereat. Seller not responsible to ensure the goods have been delivered to or is collected by Buyer or its authorized personnel and shall not be liable for any loss or damage to Buyer by reason of unauthorized collection of the goods.
- c. Should Buyer fail to take delivery of goods, Seller shall be entitled (without derogation of its rights under Law) to charge Buyer for storage and insurance for the goods calculated from the date fixed for delivery.
- d. The Seller reserves the right to deliver goods by installments and each installment shall be deemed to have been sold under a separate contract. Failure to deliver any installment shall not entitle the buyer to repudiate the contract.
- e. Off loading and/or handling will in all events be the responsibility of the Buyer.
- f. If the goods to be delivered are, at the Buyer's discretion, delivered to the destination other than the Buyer's premises, the Seller will arrange such delivery for the Buyer and all costs for carriage and insurance will be to the Buyer's account.
- g. Availability of the goods when offered ex-stock is subject to such goods being sold in another transaction between the date when the Seller advises the goods are available, and the date when it receives the Buyer's order. Any delivery time offered for products made to special customer order is indicative only, and the Seller shall not be liable for any loss or damage whatsoever arising as a consequence or result of any such failure to deliver.

3. PRICE

The quoted price for the goods are subject to change in the event of any imposition or increase in taxes, levies or duties whatsoever on the goods, its components or raw materials.

4. PAYMENT

Payments for the goods shall be made within the time stipulated in the invoice. Interest at 1.5% per month will be charged on late payment.

5. TIME OF THE ESSENCE

Time within which the Buyer is to pay for the goods shall be of the essence of this Contract.

6. ACCEPTANCE

Buyer shall inspect the goods immediately upon delivery. Unless Seller receives notice that the goods are not in accordance with the Buyer's order and the goods returned to Seller within 24 hours from the date of delivery, the goods shall be deemed to have been accepted by the Buyer PROVIDED ALWAYS Seller will not accept return of used goods and Buyer shall not reject any goods which are in accordance with the Buyer's order.

7. DESCRIPTION

Notwithstanding any description of the goods given by the Seller or Buyer, no sale of goods shall constitute or be construed as a sale by description.

8. WARRANTIES

Save and except for written warranties (if any) given by Seller, the Seller does not give any warranties as to the quality, state, condition or fitness of the goods or their suitability for any purpose or for use under any specific conditions, notwithstanding that such purpose or condition may be known or made known to Seller.

9. DEFECTS

Save and except as notified pursuant to Clause 6) above, Seller shall be under no liability to Buyer either in contract or tort for loss, injury or damage sustained by Buyer or any third party by reason of defects in the goods whether latent or otherwise but Buyer will keep Seller indemnified against any such claim.

10. TITLE

Title to the goods remains vested in Seller receives the full purchase price. If such payment is overdue, the Seller may without prejudice to any other rights sue for the purchase price, recover or re-sell the goods and the Buyer grants the Seller, its servants/agents the right and/or license to enter the Buyer's premise and/or any other premise where the goods are stored. If any of the goods are sold by Buyer before title has passed to Buyer, Buyer shall hold the proceeds of sale and all rights against purchaser in trust for Seller.

11. RISK

Risk passes to Buyer upon delivery of goods to Buyer.

12. DEFAULT

If Buyer fail to pay Seller on due date, commits a breach of any of its obligation herein, becomes insolvent or commits an act of bankruptcy, Seller may without prejudice to its other rights and without giving any notice, suspend/cancel further deliveries, stop any delivery in transit under this Contract or any other contracts and/or limit/cancel the Buyer's credit as to time and/or amount for executed, executory or future orders, and/or request for securities or guarantees. Seller shall not be liable to Buyer for any damages which Buyer may suffer or incur by reason thereof.

13. CANCELLATION OF CREDIT

Notwithstanding anything herein contained, Seller reserves the right to limit/cancel the credit of the Buyer as to time and/or amount without giving any reasons thereof and to demand full settlement immediately of all sums that may be owing by Buyer notwithstanding that the credit period has not expired.

14. FORCE MAJEURE

Seller shall not be liable to Buyer for failure to deliver the goods by reason of any breakdown of plant, fire, explosion, Act of God, or outbreak of hostilities, national emergency, industrial disputes, shortage of labour, raw materials, energy or any causes beyond Seller's control and which seller is unable to prevent by the exercise of reasonable diligence, whether of the class of causes enumerated herein or not.

15. APPROPRIATION OF PAYMENTS

All payments received from the Buyer will be applied towards settlement of the Buyer's oldest debts comprising the earliest invoices, debit notes (including debit notes for overdue interest) and other charges howsoever arising PROVIDED ALWAYS Seller may appropriate any payments towards account of interest before principal in respect of any debt as the Seller shall in its absolute discretion deem fit.

16. STATEMENT OF ACCOUNT

All amounts stated in the invoices and statement of accounts of Seller shall be conclusive of the amounts due and owing by Buyer to Seller and shall be binding against Buyer in any legal proceedings.

17. RIGHTS OF SET-OFF

Seller entitled to set-off against Buyer's debts all monies now or hereafter standing to the credit of Buyer's account with Seller and for this purpose Buyer shall give irrevocable authority to Seller to collect on behalf of Buyer and give valid receipt and discharge in respect of all such monies owing to the Buyer.

18. WAIVER

No failure or delay by the Seller in exercising any rights hereunder shall operate as a waiver hereof nor shall any single or partial exercise of right preclude any further exercise thereof or the exercises of any other right.

19. SALE OF GOODS ACT ("the Act")

The terms and conditions in favour of the Seller hereunder shall be in addition to and not in substitution for any term condition warranty expressed or implied in favour of the Seller under the Act or any statutory and re-enactment thereto for the time being enforced.

20. INFRINGEMENT OF PATENTS DESIGNS

Buyer shall indemnify Seller against all damages, claims, costs and expenses which Seller may become liable as a result or work done or goods sold in accordance with Buyer's specifications which involve infringement of any patents, registered designs or trademarks.

21. NOTICES

Any notices, communications or demands shall be deemed to have been sufficiently given if sent by prepaid post to the address of the addressee stated herein or to the addressee's last known place of business and shall be presumed to have reached the address in ordinary course of post.

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