



Low Voltage Aluminium Cables

Product Catalogue
Malaysia



TAI SIN ELECTRIC LIMITED



TAI SIN ELECTRIC CABLES (MALAYSIA) SDN BHD



TAI SIN ELECTRIC CABLES (VIETNAM) CO LTD

INTRODUCTION



Tai Sin Electric Limited was incorporated in 1980 and has built a successful cable and wire business serving a diverse range of industries for both the private and public sectors in all categories of industrial, commercial, residential and offshore & marine projects. To cater for the robust growth in the regional market, Tai Sin operates three cable manufacturing plants, which are located in Singapore, Malaysia and Vietnam. All of which are fully equipped with the latest manufacturing facilities and technologies to meet increasing demands.



Over the years, Tai Sin has expanded and diversified steadily to become the Tai Sin Group of Companies, which is now public listed on the Main Board of Singapore Stock Exchange (SGX-ST).

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



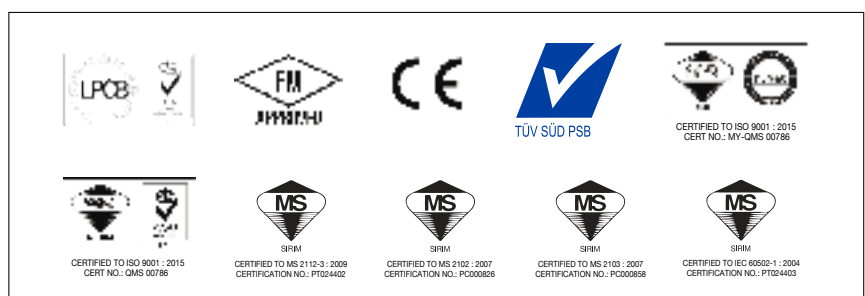
Tai Sin Electric Cables (Malaysia) Sdn. Bhd. is principally engaged in the manufacturing and trading of electric wires and cables. Since its incorporation in 1999, Tai Sin Electric Cables (Malaysia) Sdn. Bhd. has grown steadily over the years, building on the philosophy of providing quality products with excellent customer service and support. We have been catering to the cable needs and requirements of both large and small customers from wide range of industries. Our company supplies to electrical dealers, wholesalers and contractors for both private and public construction of infrastructure, industrial and commercial as well as residential properties.

Our products, marketed under the brand name "Tai Sin", are renowned for its quality and conform to recognized manufacturing standards including the Malaysian Standards (MS), Singapore Standards (SS), British Standards (BS) and the International Electrotechnical Commission Standard (IEC).

Tai Sin firmly believes in continuously improving on our quality and our factory is capable of manufacturing both standard as well as customized electric wires and cables made to specific requirements. As testimony of our entrenched commitment to the pursuit of excellence and in our drive to continuously improve our quality, Tai Sin obtained the ISO Quality Management System certification as well as the Products Certification licence from SIRIM QAS International Sdn. Bhd.

Further attestations of our beliefs to continuously improve in our quality as well as cater to the needs and requirements of our customers, has resulted in our products being awarded the Singapore Quality Mark by the Singapore Productivity and Standards Boards (PSB) and relevant approval from Syarikat Sesco Berhad was also obtained for our East Malaysian Market.

With the loyal support of our customer and suppliers, we are committed to further improve the quality of our products through research and development and serving our customers with faster turnaround time.



LOW VOLTAGE POWER CABLES & WIRES



- Single Core PVC Insulated Cables, 450/750V to SS358-3 or MS 2112-3 or IEC60227-3 / BS EN50525-2-31
- Single PVC / PVC Cables, 600/1000V to IEC60502-1
- PVC Insulated Unarmoured / Armoured Power Cables, 600/1000V to MS 2102 / MS 2103 / IEC60502-1
- Single XLPE / PVC Cables, 600/1000V to IEC60502-1
- XLPE Insulated Unarmoured / Armoured Power Cables, 600/1000V to IEC60502-1
- Single XLPE / LSZH FRT Cables, 600/1000V to IEC60502-1 & IEC60332-3-22 Cat. A, other customer's requirements if any
- XLPE Insulated Unarmoured / Armoured FRT Cables, 600/1000V to IEC60502-1 & IEC60332-3-22 Cat. A, other customer's requirements if any
- XLPE Insulated Unarmoured / Armoured LSZH Cables, 600/1000V to IEC60502-1 & IEC60332-3-22 Cat. A, IEC60754-2 & IEC61034

INSTRUMENTATION & CONTROL CABLES



- PVC Insulated PVC Sheathed Control Cables, 600/1000V to MS2102 / IEC60502-1
- PVC Insulated Armoured PVC Sheathed Control Cables, 600/1000V to MS 2103 / IEC60502-1
- PVC Insulated Unarmoured / Armoured PVC Sheathed Instrumentation Cables, 300/500V to BS EN50288-7
- PE Insulated Unarmoured / Armoured PVC Sheathed Instrumentation Cables, 300/500V to BS EN50288-7
- XLPE Insulated Unarmoured / Armoured PVC Sheathed Instrumentation Cables, 300/500V to BS EN50288-7
- XLPE Insulated Unarmoured / Armoured LSZH Sheathed Instrumentation Cables, 300/500V to BS EN50288-7

FIRE RESISTANT CABLES



- FR-H 110 Single Core Mica Taped, Cross-linked Polyolefin LSZH insulated Cables, 600/1000V to BS EN50525-3-41
- FR-XH Single Core Mica Taped, XLPE Insulated, LSZH Sheathed Cables, 600/1000V to IEC60502-1
- FR-XH 2 – 5 Cores Mica Taped, XLPE Insulated, LSZH Sheathed Cables, 600/1000V to IEC60502-1
- FR-XH Multicore Mica Taped, XLPE Insulated, LSZH Sheathed Cables, 600/1000V, to IEC60502-1
- FR-XAH Single Core Mica Taped, XLPE Insulated, LSZH Bedded, Aluminum Wire Armoured, LSZH Sheathed Cables, 600/1000V to IEC60502-1
- FR-XSH 2 – 5 Cores Mica Taped, XLPE Insulated, LSZH Bedded, Galvanised Steel Wire Armoured, LSZH Sheathed Cables, 600/1000V to BS7846
- FR-XSH Multicore Mica Taped, XLPE Insulated, LSZH Bedded, Galvanised Steel Wire Armoured, LSZH Sheathed Cables, 600/1000V to BS7846
- FR-XL Multicore Mica Taped, XLPE Insulated, LSZH Sheathed Cables, 300/500V to BS EN50288-7
- FR-XOL Single Core Mica Taped, XLPE Insulated, Overall Aluminum Foil Screened, LSZH Sheathed Cables, 300/500V to BS EN50288-7

HOW TO READ THIS CATALOGUE



This catalogue consists of two types of Low Voltage Cables and they are categorized into two different sections, PVC & XLPE Insulated Cables. In each section, the cables are further categorized by its electrical component and conductor sizes, which ranges from 16mm² to 1000mm², armoured and non- armoured.

In this catalogue we have given each cable a name accompanied with the various short and long descriptions based on its material used.

For example:

XSP

AL / XLPE / PVC / SWA / PVC (2 CORES - 4 CORES) ← *This is the short description*
XLPE Insulated, PVC Bedded, Galvanised Steel Wire Armoured, ← *Full description on the third line*
PVC Sheathed Cable, 600/1000V, MS 2107

To better understand the contents of the cable, we have included a 3-dimensional image plus a cross-sectional image of the cable for easy reference of its structure and components. The technical specifications and figures are provided by our quality team to ensure the accurate use of our products. Technical properties such as Current Rating Factor and Voltage drop, and other essential technical details are provided in the Appendices at the last section of this catalogue. The latest Cable Installation Methods as well as the new harmonized wiring colour codes (as per IEE Wiring Regulations, 17th Edition) are also provided in our Appendices for your easy reference.

For all other enquiries, please feel free to contact our friendly customer service hotline for further assistance.

APPLICABLE STANDARDS

Below are the applicable standards that are used as reference in the construction of our low voltage cables.

BS6346

(withdrawn with no replacement) Electric cables, PVC insulated, armoured cables for voltage of 600/1000V and 1900/3300V.

BS6360

(withdrawn and replaced by BS EN 60228:2005) Specification for conductors in insulated cables and cords.

BS EN50525-2-31

Single core non-sheathed cables with thermoplastic PVC insulation.

IEC60227-3

Polyvinyl Chloride insulated cables of rated voltages up to and including 450/750V Part 3: Non-sheathed cables for fixed wiring.

IEC60228 / BS EN60228

Conductors of insulated cables.

IEC60332-1 / BS EN60332-1

Tests on electric cables under fire conditions.

Part 1: Method of test on a single vertical insulated wire or cable.

IEC60502-1

Power cables with extruded insulation and their accessories for rated voltages from 1kV up to 30kV.

Part 1: Cables for Rated Voltages of 1kV and 3kV.

APPLICABLE STANDARDS

Below are the applicable standards that are used as reference in the construction of our low voltage cables.



MS 2100

Electrical cable and wire : 600/1000V ($U_m = 1200V$) single core PVC insulated cable - non-armoured

MS 2101

Electrical cable and wire : 600/1000V ($U_m = 1200V$) single core PVC insulated cable - armoured

MS 2102

Electrical cable and wire : 600/1000V ($U_m = 1200V$) multi core PVC insulated cable - non-armoured

MS 2103

Electrical cable and wire : 600/1000V ($U_m = 1200V$) multi core PVC insulated cable - armoured

MS 2104

Electrical cable and wire : 600/1000V ($U_m = 1200V$) single core XPLE insulated cable - non-armoured

MS 2105

Electrical cable and wire : 600/1000V ($U_m = 1200V$) single core XLPE insulated cable - armoured

MS 2106

Electrical cable and wire : 600/1000V ($U_m = 1200V$) multi core XLPE insulated cable - non-armoured

MS 2107

Electrical cable and wire : 600/1000V ($U_m = 1200V$) multi core XLPE insulated cable - armoured

PVC INSULATED ALUMINIUM CABLES

PVC	AL / PVC (SINGLE CORE) <i>PVC Insulated, Non-Sheathed Cable, 450/750V, IEC60227-3, BS 6004</i>	1
PPS	AL / PVC / PVC (SINGLE CORE) <i>PVC Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2100</i>	2
PPM	AL / PVC / PVC (2 CORES - 4 CORES) <i>PVC Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2102</i>	3
PAP	AL / PVC / PVC / AWA / PVC (SINGLE CORE) <i>PVC Insulated, PVC Bedded, Aluminium Wire Armoured, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2101</i>	5
PSP	AL / PVC / PVC / SWA / PVC (2 CORES - 4 CORES) <i>PVC Insulated, PVC Bedded, Galvanised Steel Wire Armoured, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2103</i>	6

XLPE INSULATED ALUMINIUM CABLES

XP	AL / XLPE / PVC (SINGLE CORE) <i>XLPE Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2104</i>	8
XP	AL / XLPE / PVC (2 CORES - 4 CORES) <i>XLPE Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2106</i>	9
XAP	AL / XLPE / PVC / AWA / PVC (SINGLE CORE) <i>XLPE Insulated, PVC Bedded, Aluminium Wire Armoured, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2105</i>	11
XSP	AL / XLPE / PVC / SWA / PVC (2 CORES - 4 CORES) <i>XLPE Insulated, PVC Bedded, Galvanised Steel Wire Armoured, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2107</i>	12

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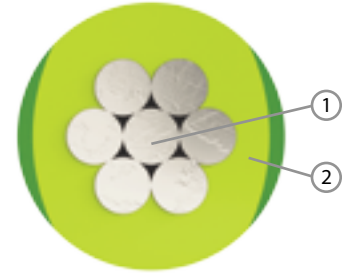
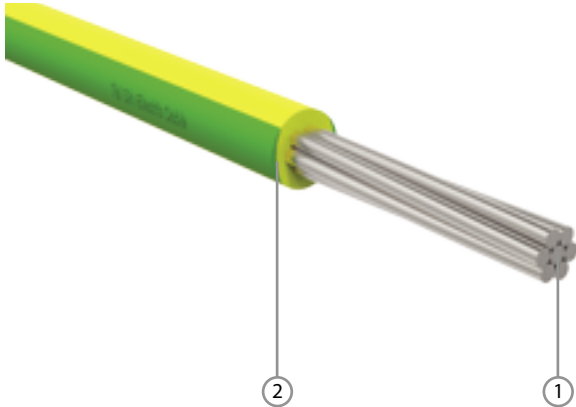
TERMS & CONDITIONS OF SALE

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PVC

AL / PVC (SINGLE CORE)

PVC Insulated, Non-Sheathed Cable, 450/750V, IEC60227-3, BS 6004



Component
1. Plain Annealed Aluminium Wire
2. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Polyvinyl Chloride (PVC) Compound Type PVC/C
Insulation Colour:	Brown., Black, Grey, Blue, Green/Yellow or as per order

REFERENCE STANDARDS

Design Specification:	IEC60227-3, BS 6004
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

ELECTRICAL CHARACTERISTICS

Operating Voltage, U ₀ /U:	450/750V
Operating Temperature:	-15°C to 70°C
Final Short Circuit Temperature:	160°C for cable ≤ 300mm ² 140°C for cable > 300mm ²
Test Voltage:	2.5kV for 5 minutes

INSTALLATION REFERENCE

Min. Bending Radius (mm):	6 x cable overall diameter
Max. Pulling Tension (N/mm ²):	50

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
SINGLE CORE	1 x 16	7 / 1.70	1.0	7.3	82
	1 x 25	7 / 2.14	1.2	8.8	126
	1 x 35	7 / 2.52	1.2	9.9	164
	1 x 50	19 / 1.78	1.4	11.7	214
	1 x 70	19 / 2.14	1.4	13.5	290
	1 x 95	19 / 2.52	1.6	15.8	397
	1 x 120	37 / 2.03	1.6	17.4	477
	1 x 150	37 / 2.25	1.8	19.4	588
	1 x 185	37 / 2.52	2.0	21.6	735
	1 x 240	61 / 2.25	2.2	24.7	995
	1 x 300	61 / 2.52	2.4	27.5	1183
	1 x 400	61 / 2.85	2.6	30.9	1495
	1 x 500	61 / 3.20	2.8	34.4	1863
	1 x 630	127 / 2.52	2.8	38.4	2324

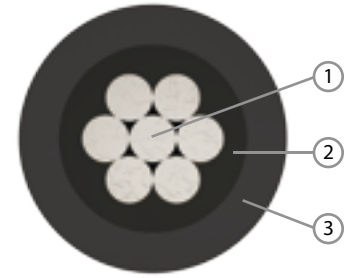
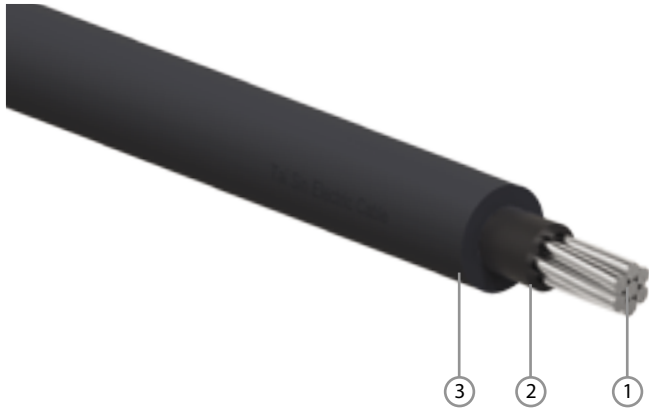
For current rating and voltage drop, please refer to Table B1.1 and B2.1.

Table 1

PPS

AL / PVC / PVC (SINGLE CORE)

PVC Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2100



Component
 1. Plain Annealed Aluminium Wire
 2. PVC Compound
 3. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Polyvinyl Chloride (PVC) Compound Type PVC/A
Insulation Colour:	Black or as per order
Outer Sheath:	Polyvinyl Chloride (PVC) Compound Type PVC/ST1
Outer Sheath Colour:	Black or as per order

REFERENCE STANDARDS

Design Specification:	IEC60502-1, MS 2100
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

INSTALLATION REFERENCE

Min. Bending Radius (mm):	6 x cable overall diameter
Max. Pulling Tension (N/mm ²):	50

ELECTRICAL CHARACTERISTICS

Operating Voltage, U ₀ /U:	600/1000V
Operating Temperature:	-15°C to 70°C
Final Short Circuit Temperature:	160°C for cable ≤ 300mm ² 140°C for cable > 300mm ²
Test Voltage:	3.5kV for 5 minutes

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
SINGLE CORE	1 x 16	7 / 1.70	1.0	10.3	144
	1 x 25	7 / 2.14	1.2	12.0	201
	1 x 35	7 / 2.52	1.2	13.2	246
	1 x 50	19 / 1.78	1.4	14.9	309
	1 x 70	19 / 2.14	1.4	16.9	405
	1 x 95	19 / 2.52	1.6	19.4	538
	1 x 120	37 / 2.03	1.6	21.0	632
	1 x 150	37 / 2.25	1.8	23.2	769
	1 x 185	37 / 2.52	2.0	25.6	948
	1 x 240	61 / 2.25	2.2	28.9	1198
	1 x 300	61 / 2.52	2.4	31.9	1478
	1 x 400	61 / 2.85	2.6	35.5	1839
	1 x 500	61 / 3.20	2.8	39.2	2263
	1 x 630	127 / 2.52	2.8	43.6	2808
	1 x 800	127 / 2.85	2.8	48.1	3452
	1 x 1000	127 / 3.20	3.0	53.4	4283

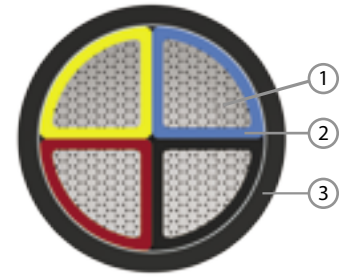
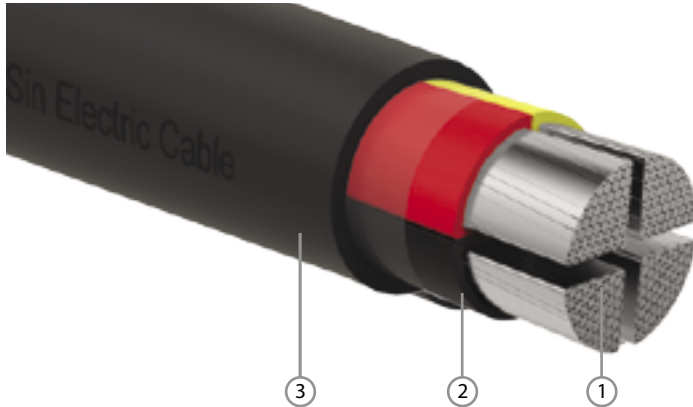
For current rating and voltage drop, please refer to Table B1.1 and B2.1.

Table 2

PPM

AL / PVC / PVC (2 CORES - 4 CORES)

PVC Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2102



Component
 1. Plain Annealed Aluminium Wire
 2. PVC Compound
 3. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Polyvinyl Chloride (PVC) Compound Type PVC/A
Insulation Colour:	2 Cores: Brown, Blue or Black, Red 3 Cores: Brown, Black, Grey or Red, Yellow, Blue 4 Cores: Brown, Black, Grey, Blue or Red, Yellow, Blue, Black
Outer Sheath:	Polyvinyl Chloride (PVC) Compound Type PVC/ST1
Outer Sheath Colour:	Black or as per order

ELECTRICAL CHARACTERISTICS

Operating Voltage, U _o /U:	600/1000V
Operating Temperature:	-15°C to 70°C
Final Short Circuit Temperature:	160°C for cable ≤ 300mm ² 140°C for cable > 300mm ²
Test Voltage:	3.5kV for 5 minutes

REFERENCE STANDARDS

Design Specification:	IEC60502-1, MS 2102
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

INSTALLATION REFERENCE

Min. Bending Radius (mm):	8 x cable overall diameter
Max. Pulling Tension (N/mm ²):	50

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
2 CORES	2 x 16	7 / 1.70	1.0	18.1	447
	2 x 25	7 / 2.14	1.2	21.7	649
	2 x 35	7 / 2.52	1.2	24.0	802
	2 x 50 (S)	19 / 1.78	1.4	22.5	681
	2 x 70 (S)	19 / 2.14	1.4	25.7	869
	2 x 95 (S)	19 / 2.52	1.6	28.5	1132
	2 x 120 (S)	37 / 2.03	1.6	31.5	1344
	2 x 150 (S)	37 / 2.25	1.8	35.0	1639
	2 x 185 (S)	37 / 2.52	2.0	39.0	2037
	2 x 240 (S)	61 / 2.25	2.2	43.3	2548
	2 x 300 (S)	61 / 2.52	2.4	47.7	3125
	2 x 400 (S)	61 / 2.85	2.6	54.2	3916

Note: (S) - Sectoral Stranded Conductors

For current rating and voltage drop, please refer to Table B1.3 and B2.3.

Table 3

PPM

AL / PVC / PVC (2 CORES - 4 CORES)

PVC Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2102



	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
3 CORES	3 x 16	7 / 1.70	1.0	19.3	517
	3 x 25	7 / 2.14	1.2	23.2	756
	3 x 35	7 / 2.52	1.2	25.6	939
	3 x 50 (S)	19 / 1.78	1.4	24.5	916
	3 x 70 (S)	19 / 2.14	1.4	28.3	1191
	3 x 95 (S)	19 / 2.52	1.6	31.9	1571
	3 x 120 (S)	37 / 2.03	1.6	35.3	1871
	3 x 150 (S)	37 / 2.25	1.8	39.0	2297
	3 x 185 (S)	37 / 2.52	2.0	43.6	2850
	3 x 240 (S)	61 / 2.25	2.2	48.8	3614
	3 x 300 (S)	61 / 2.52	2.4	53.9	4457
	3 x 400 (S)	61 / 2.85	2.6	60.4	5584
4 CORES	4 x 16	7 / 1.70	1.0	21.1	624
	4 x 25	7 / 2.14	1.2	25.5	918
	4 x 35	7 / 2.52	1.2	28.3	1144
	4 x 50 (S)	19 / 1.78	1.4	28.1	1184
	4 x 70 (S)	19 / 2.14	1.4	32.2	1524
	4 x 95 (S)	19 / 2.52	1.6	36.0	2019
	4 x 120 (S)	37 / 2.03	1.6	39.9	2415
	4 x 150 (S)	37 / 2.25	1.8	44.5	2955
	4 x 185 (S)	37 / 2.52	2.0	49.4	3662
	4 x 240 (S)	61 / 2.25	2.2	55.1	4646
	4 x 300 (S)	61 / 2.52	2.4	61.1	5733
	4 x 400 (S)	61 / 2.85	2.6	68.5	7176

Note: (S) - Sectoral Stranded Conductors

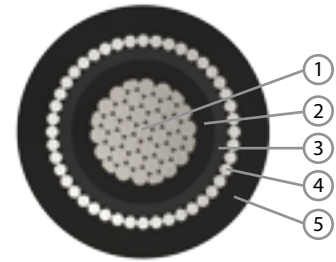
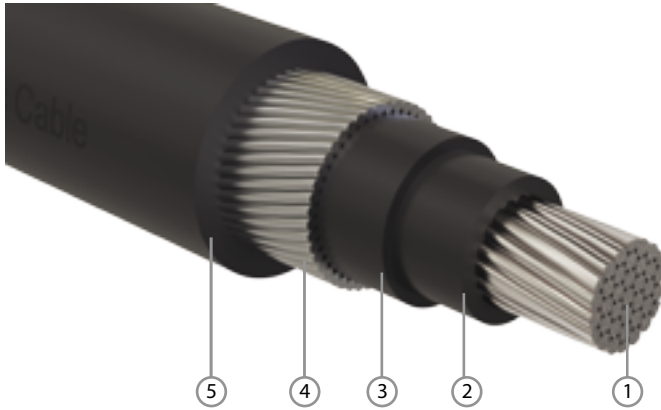
For current rating and voltage drop, please refer to Table B1.3 and B2.3.

Table 4

PAP

AL / PVC / PVC / AWA / PVC (SINGLE CORE)

PVC Insulated, PVC Bedded, Aluminium Wire Armoured, PVC Sheathed Cable,
600/1000V, IEC60502-1, BS 6346, MS 2101



- Component**
1. Plain Annealed Aluminium Wire
 2. PVC Compound
 3. PVC Compound
 4. Aluminium Wired Armoured
 5. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Polyvinyl Chloride (PVC) Compound Type PVC/A
Insulation Colour:	Black or as per order
Bedding:	Polyvinyl Chloride (PVC) Compound Type PVC/TM1
Bedding Colour:	Black
Armour:	Aluminium Wire Armoured (AWA)
Outer Sheath:	Polyvinyl Chloride (PVC) Compound Type PVC/TM1
Outer Sheath Colour:	Black or as per order

ELECTRICAL CHARACTERISTICS

Operating Voltage, U ₀ /U:	600/1000V
Operating Temperature:	-15°C to 70°C
Final Short Circuit Temperature:	160°C for cable ≤ 300mm ² 140°C for cable > 300mm ²
Test Voltage:	3.5kV for 5 minutes

REFERENCE STANDARDS

Design Specification:	IEC60502-1, BS 6346, MS 2101
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

INSTALLATION REFERENCE

Min. Bending Radius (mm):	8 x cable overall diameter
Max. Pulling Tension (N/mm ²):	50

SINGLE CORE	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
		1 x 50	19 / 1.78	1.4	20.0
	1 x 70	19 / 2.14	1.4	22.0	686
	1 x 95	19 / 2.52	1.6	25.0	899
	1 x 120	37 / 2.03	1.6	26.8	1029
	1 x 150	37 / 2.25	1.8	29.0	1195
	1 x 185	37 / 2.52	2.0	31.2	1415
	1 x 240	61 / 2.25	2.2	35.3	1812
	1 x 300	61 / 2.52	2.4	38.9	2209
	1 x 400	61 / 2.85	2.6	42.5	2641
	1 x 500	61 / 3.20	2.8	47.4	3315
	1 x 630	127 / 2.52	2.8	52.0	3980
	1 x 800	127 / 2.85	2.8	56.7	4766
	1 x 1000	127 / 3.20	3.0	62.4	5782

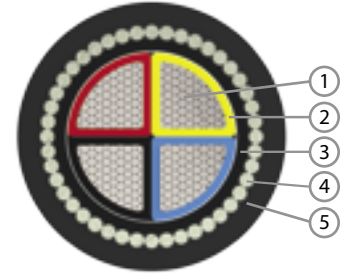
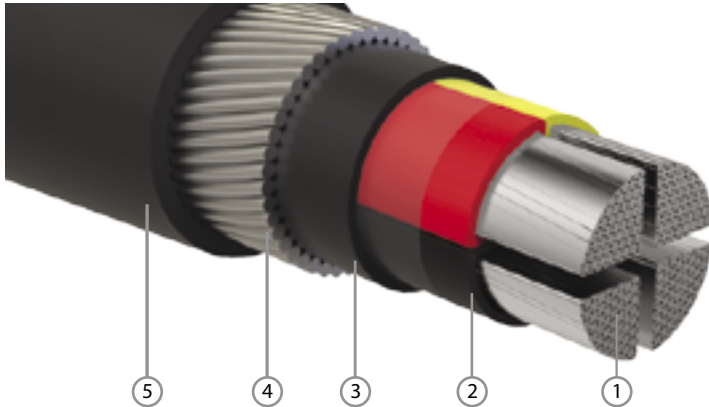
For current rating and voltage drop, please refer to Table B1.2 and B2.2.

Table 5

PSP

AL / PVC / PVC / SWA / PVC (2 CORES - 4 CORES)

PVC Insulated, PVC Bedded, Galvanised Steel Wire Armoured, PVC Sheathed Cable, 600/1000V, IEC60502-1, BS 6346, MS 2103



- Component**
1. Plain Annealed Aluminium Wire
 2. PVC Compound
 3. PVC Compound
 4. Galvanised Steel Wire Armoured
 5. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Polyvinyl Chloride (PVC) Compound Type PVC/A
Insulation Colour:	2 Cores: Brown, Blue or Black, Red 3 Cores: Brown, Black, Grey or Red, Yellow, Blue 4 Cores: Brown, Black, Grey, Blue or Red, Yellow, Blue, Black
Bedding:	Polyvinyl Chloride (PVC) Compound Type PVC/TM1
Bedding Colour:	Black or as per order
Armour:	Galvanised Steel Wire Armoured (SWA)
Outer Sheath:	Polyvinyl Chloride (PVC) Compound Type PVC/TM1
Outer Sheath Colour:	Black or as per order

ELECTRICAL CHARACTERISTICS

Operating Voltage, U ₀ /U:	600/1000V
Operating Temperature:	-15°C to 70°C
Final Short Circuit Temperature:	160°C for cable ≤ 300mm ² 140°C for cable > 300mm ²
Test Voltage:	3.5kV for 5 minutes

REFERENCE STANDARDS

Design Specification:	IEC60502-1, BS 6346, MS 2103
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

INSTALLATION REFERENCE

Min. Bending Radius (mm):	8 x cable overall diameter
Max. Pulling Tension (N/mm ²):	70

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
2 CORES	2 x 16	7 / 1.70	1.0	22.9	981
	2 x 25	7 / 2.14	1.2	27.2	1585
	2 x 35	7 / 2.52	1.2	29.5	1871
	2 x 50 (S)	19 / 1.78	1.4	28.1	1484
	2 x 70 (S)	19 / 2.14	1.4	32.1	2004
	2 x 95 (S)	19 / 2.52	1.6	35.5	2438
	2 x 120 (S)	37 / 2.03	1.6	38.5	2778
	2 x 150 (S)	37 / 2.25	1.8	43.0	3552
	2 x 185 (S)	37 / 2.52	2.0	47.4	4219
	2 x 240 (S)	61 / 2.25	2.2	51.9	4966
	2 x 300 (S)	61 / 2.52	2.4	56.5	5813
	2 x 400 (S)	61 / 2.85	2.6	63.2	6985

Note: (S) - Sectoral Stranded Conductors

For current rating and voltage drop, please refer to Table B1.4 and B2.4.

Table 6

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
3 CORES	3 x 16	7 / 1.70	1.0	24.1	1101
	3 x 25	7 / 2.14	1.2	28.7	1620
	3 x 35	7 / 2.52	1.2	31.1	1909
	3 x 50 (S)	19 / 1.78	1.4	30.3	1829
	3 x 70 (S)	19 / 2.14	1.4	35.3	2493
	3 x 95 (S)	19 / 2.52	1.6	38.9	3031
	3 x 120 (S)	37 / 2.03	1.6	42.3	3436
	3 x 150 (S)	37 / 2.25	1.8	47.6	4507
	3 x 185 (S)	37 / 2.52	2.0	52.2	5309
	3 x 240 (S)	61 / 2.25	2.2	58.0	6446
	3 x 300 (S)	61 / 2.52	2.4	63.1	7549
	3 x 400 (S)	61 / 2.85	2.6	71.1	9847
4 CORES	4 x 16	7 / 1.70	1.0	26.6	1418
	4 x 25	7 / 2.14	1.2	31.0	1885
	4 x 35	7 / 2.52	1.2	33.8	2205
	4 x 50 (S)	19 / 1.78	1.4	35.3	2496
	4 x 70 (S)	19 / 2.14	1.4	39.4	3029
	4 x 95 (S)	19 / 2.52	1.6	44.4	4059
	4 x 120 (S)	37 / 2.03	1.6	48.7	4736
	4 x 150 (S)	37 / 2.25	1.8	53.5	5551
	4 x 185 (S)	37 / 2.52	2.0	58.8	6566
	4 x 240 (S)	61 / 2.25	2.2	64.7	7890
	4 x 300 (S)	61 / 2.52	2.4	70.7	9294
	4 x 400 (S)	61 / 2.85	2.6	80.0	12129

Note: (S) - Sectoral Stranded Conductors

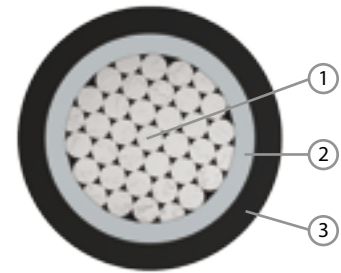
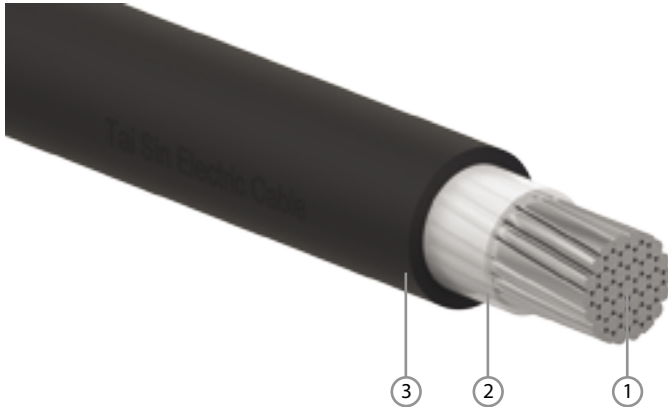
For current rating and voltage drop, please refer to Table B1.4 and B2.4.

Table 7

XP

AL / XLPE / PVC (SINGLE CORE)

XLPE Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2104



- Component**
1. Plain Annealed Aluminium Wire
 2. Cross-linked Polyethylene Compound
 3. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Cross-linked Polyethylene (XLPE) Compound
Insulation Colour:	Natural or as per order
Outer Sheath:	Polyvinyl Chloride (PVC) Compound Type ST2
Outer Sheath Colour:	Black or as per order

REFERENCE STANDARDS

Design Specification:	IEC60502-1, MS 2104
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

INSTALLATION REFERENCE

Min. Bending Radius (mm):	8 x cable overall diameter
Max. Pulling Tension (N/mm ²):	50

ELECTRICAL CHARACTERISTICS

Operating Voltage, U ₀ /U:	600/1000V
Operating Temperature:	-15°C to 90°C
Final Short Circuit Temperature:	250°C
Test Voltage:	3.5kV for 5 minutes

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
SINGLE CORE	1 x 16	7 / 1.70	0.7	9.6	118
	1 x 25	7 / 2.14	0.9	11.3	166
	1 x 35	7 / 2.52	0.9	12.4	207
	1 x 50	19 / 1.78	1.0	14.0	258
	1 x 70	19 / 2.14	1.1	16.0	342
	1 x 95	19 / 2.52	1.1	18.1	447
	1 x 120	37 / 2.03	1.2	19.9	539
	1 x 150	37 / 2.25	1.4	22.1	660
	1 x 185	37 / 2.52	1.6	24.3	806
	1 x 240	61 / 2.25	1.7	27.4	1028
	1 x 300	61 / 2.52	1.8	30.2	1262
	1 x 400	61 / 2.85	2.0	33.8	1585
	1 x 500	61 / 3.20	2.2	37.5	1965
	1 x 630	127 / 2.52	2.4	42.3	2490

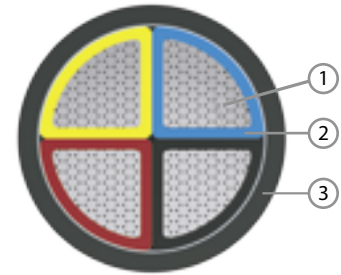
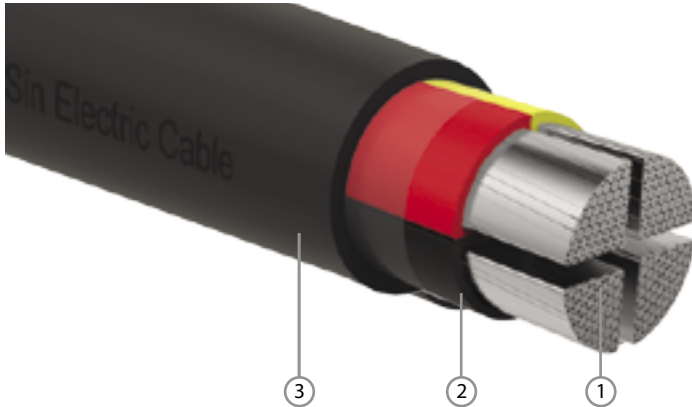
For current rating and voltage drop, please refer to Table B1.5 and B2.5.

Table 8

XP

AL / XLPE / PVC (2 CORES - 4 CORES)

XLPE Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2106



- Component**
1. Plain Annealed Aluminium Wire
 2. Cross-linked Polyethylene Compound
 3. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Cross-linked Polyethylene (XLPE) Compound
Insulation Colour:	2 Cores: Brown, Blue or Black, Red 3 Cores: Brown, Black, Grey or Red, Yellow, Blue 4 Cores: Brown, Black, Grey, Blue or Red, Yellow, Blue, Black
Outer Sheath:	Polyvinyl Chloride (PVC) Compound Type ST2
Outer Sheath Colour:	Black or as per order

ELECTRICAL CHARACTERISTICS

Operating Voltage, U ₀ /U:	600/1000V
Operating Temperature:	-15°C to 90°C
Final Short Circuit Temperature:	250°C
Test Voltage:	3.5kV for 5 minutes

REFERENCE STANDARDS

Design Specification:	IEC60502-1, MS 2106
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

INSTALLATION REFERENCE

Min. Bending Radius (mm):	8 x cable overall diameter
Max. Pulling Tension (N/mm ²):	50

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
2 CORES	2 x 16	7 / 1.70	0.7	17.0	365
	2 x 25	7 / 2.14	0.9	20.5	529
	2 x 35	7 / 2.52	0.9	22.7	663
	2 x 50 (S)	19 / 1.78	1.0	22.4	569
	2 x 70 (S)	19 / 2.14	1.1	25.4	730
	2 x 95 (S)	19 / 2.52	1.1	28.2	932
	2 x 120 (S)	37 / 2.03	1.2	31.2	1127
	2 x 150 (S)	37 / 2.25	1.4	34.9	1395
	2 x 185 (S)	37 / 2.52	1.6	38.1	1717
	2 x 240 (S)	61 / 2.25	1.7	43.2	2181
	2 x 300 (S)	61 / 2.52	1.8	47.4	2674
	2 x 400 (S)	61 / 2.85	2.0	54.1	3426

Note: (S) - Sectoral Stranded Conductors

For current rating and voltage drop, please refer to Table B1.6 and B2.6.

Table 9

XP

AL / XLPE / PVC (2 CORES - 4 CORES)

XLPE Insulated, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2106



	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
3 CORES	3 x 16	7 / 1.70	0.7	18.83	422
	3 x 25	7 / 2.14	0.9	22.0	613
	3 x 35	7 / 2.52	0.9	24.4	770
	3 x 50 (S)	19 / 1.78	1.0	25.0	756
	3 x 70 (S)	19 / 2.14	1.1	28.9	1040
	3 x 95 (S)	19 / 2.52	1.1	32.6	1346
	3 x 120 (S)	37 / 2.03	1.2	35.8	1649
	3 x 150 (S)	37 / 2.25	1.4	40.4	2091
	3 x 185 (S)	37 / 2.52	1.6	45.0	2582
	3 x 240 (S)	61 / 2.25	1.7	50.5	3310
	3 x 300 (S)	61 / 2.52	1.8	54.6	4106
	3 x 400 (S)	61 / 2.85	2.0	63.7	5242
4 CORES	4 x 16	7 / 1.70	0.7	20.8	536
	4 x 25	7 / 2.14	0.9	24.1	758
	4 x 35	7 / 2.52	0.9	26.9	961
	4 x 50 (S)	19 / 1.78	1.0	27.0	941
	4 x 70 (S)	19 / 2.14	1.1	31.4	1297
	4 x 95 (S)	19 / 2.52	1.1	35.3	1701
	4 x 120 (S)	37 / 2.03	1.2	39.1	2122
	4 x 150 (S)	37 / 2.25	1.4	44.8	2613
	4 x 185 (S)	37 / 2.52	1.6	49.8	3251
	4 x 240 (S)	61 / 2.25	1.7	57.1	4192
	4 x 300 (S)	61 / 2.52	1.8	63.4	5195
	4 x 400 (S)	61 / 2.85	2.0	72.8	6582

Note: (S) - Sectoral Stranded Conductors

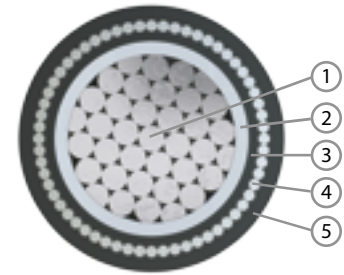
For current rating and voltage drop, please refer to Table B1.6 and B2.6.

Table 10

XAP

AL / XLPE / PVC / AWA / PVC (SINGLE CORE)

XLPE Insulated, PVC Bedded, Aluminium Wire Armoured, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2105



- Component**
1. Plain Annealed Aluminium Wire
 2. Cross-linked Polyethylene Compound
 3. PVC Compound
 4. Aluminium Wire Armoured
 5. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Cross-linked Polyethylene (XLPE) Compound
Insulation Colour:	Natural or as per order
Bedding:	Polyvinyl Chloride (PVC) Compound Type ST2
Bedding Colour:	Black
Armour:	Aluminium Wire Armoured (AWA)
Outer Sheath:	Polyvinyl Chloride (PVC) Compound Type ST2
Outer Sheath Colour:	Black or as per order

ELECTRICAL CHARACTERISTICS

Operating Voltage, U ₀ /U:	600/1000V
Operating Temperature:	-15°C to 90°C
Final Short Circuit Temperature:	250°C
Test Voltage:	3.5kV for 5 minutes

REFERENCE STANDARDS

Design Specification:	IEC60502-1, MS 2105
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

INSTALLATION REFERENCE

Min. Bending Radius (mm):	8 x cable overall diameter
Max. Pulling Tension (N/mm ²):	50

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
SINGLE CORE	1 x 50	19 / 1.78	1.0	19.2	510
	1 x 70	19 / 2.14	1.1	21.2	623
	1 x 95	19 / 2.52	1.1	23.3	748
	1 x 120	37 / 2.03	1.2	26.0	975
	1 x 150	37 / 2.25	1.4	28.0	1100
	1 x 185	37 / 2.52	1.6	30.4	1300
	1 x 240	61 / 2.25	1.7	33.5	1582
	1 x 300	61 / 2.52	1.8	37.1	1877
	1 x 400	61 / 2.85	2.0	41.3	2421
	1 x 500	61 / 3.20	2.2	45.0	2893
	1 x 630	127 / 2.52	2.4	49.8	3531
	1 x 800	127 / 2.85	2.6	56.3	9690
	1 x 1000	127 / 3.20	2.8	61.4	11937

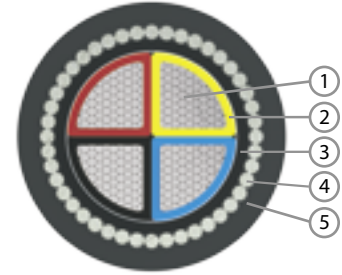
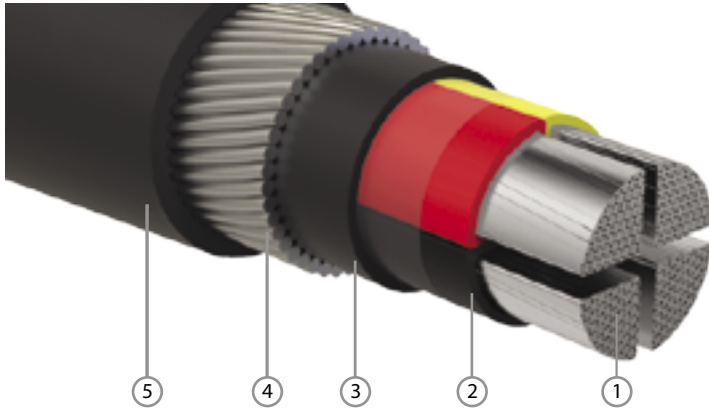
For current rating and voltage drop, please refer to Table B1.7 and B2.7.

Table 11

XSP

AL / XLPE / PVC / SWA / PVC (2 CORES - 4 CORES)

XLPE Insulated, PVC Bedded, Galvanised Steel Wire Armoured, PVC Sheathed Cable, 600/1000V, IEC60502-1, MS 2107



- Component**
1. Plain Annealed Aluminium Wire
 2. Cross-linked Polyethylene Compound
 3. PVC Compound
 4. Galvanised Steel Wire Armoured
 5. PVC Compound

CONSTRUCTION

Conductor:	Plain Annealed Aluminium, Class 2 Stranded Circular or Compacted
Insulation:	Cross-linked Polyethylene (XLPE) Compound
Insulation Colour:	2 Cores: Brown, Blue or Black, Red 3 Cores: Brown, Black, Grey or Red, Yellow, Blue 4 Cores: Brown, Black, Grey, Blue or Red, Yellow, Blue, Black
Bedding:	Polyvinyl Chloride (PVC) Compound Type ST2
Bedding Colour:	Black
Armour:	Galvanised Steel Wire Armoured (SWA)
Outer Sheath:	Polyvinyl Chloride (PVC) Compound Type ST2
Outer Sheath Colour:	Black or as per order

ELECTRICAL CHARACTERISTICS

Operating Voltage, U ₀ /U:	600/1000V
Operating Temperature:	-15°C to 90°C
Final Short Circuit Temperature:	250°C
Test Voltage:	3.5kV for 5 minutes

REFERENCE STANDARDS

Design Specification:	IEC60502-1, MS 2107
Conductor:	IEC60228, BS EN60228
Flame Retardancy:	IEC60332-1, BS EN60332-1

INSTALLATION REFERENCE

Min. Bending Radius (mm):	8 x cable overall diameter
Max. Pulling Tension (N/mm ²):	50

	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
2 CORES	2 x 16	7 / 1.70	0.7	21.6	855
	2 x 25	7 / 2.14	0.9	25.9	1341
	2 x 35	7 / 2.52	0.9	28.1	2525
	2 x 50 (S)	19 / 1.78	1.0	28.3	2439
	2 x 70 (S)	19 / 2.14	1.1	31.7	1730
	2 x 95 (S)	19 / 2.52	1.1	35.3	1981
	2 x 120 (S)	37 / 2.03	1.2	38.3	2342
	2 x 150 (S)	37 / 2.25	1.4	41.8	3140
	2 x 185 (S)	37 / 2.52	1.6	46.8	4078
	2 x 240 (S)	61 / 2.25	1.7	52.9	4760
	2 x 300 (S)	61 / 2.52	1.8	57.1	5581
	2 x 400 (S)	61 / 2.85	2.0	62.7	6635

Note: (S) - Sectoral Stranded Conductors
For current rating and voltage drop, please refer to Table B1.8 and B2.8.

Table 12

XSP

AL / XLPE / PVC / SWA / PVC (2 CORES - 4 CORES)

XLPE Insulated, PVC Bedded, Galvanised Steel Wire Armoured, PVC Sheathed Cable,
600/1000V, IEC60502-1, MS 2107



	Nominal Conductor Area (mm ²)	No. and Diameter of Wires (no./mm)	Radial Thickness of Insulation (mm)	Approximate Cable Overall Diameter (mm)	Approximate Weight (kg/km)
3 CORES	3 x 16	7 / 1.70	0.7	22.7	1003
	3 x 25	7 / 2.14	0.9	27.1	1478
	3 x 35	7 / 2.52	0.9	29.7	1713
	3 x 50 (S)	19 / 1.78	1.0	31.1	1667
	3 x 70 (S)	19 / 2.14	1.1	35.8	2032
	3 x 95 (S)	19 / 2.52	1.1	39.7	2805
	3 x 120 (S)	37 / 2.03	1.2	42.9	3285
	3 x 150 (S)	37 / 2.25	1.4	48.5	4246
	3 x 185 (S)	37 / 2.52	1.6	53.1	5035
	3 x 240 (S)	61 / 2.25	1.7	60.2	6052
	3 x 300 (S)	61 / 2.52	1.8	64.5	7023
	3 x 400 (S)	61 / 2.85	2.0	60.7	8281
4 CORES	4 x 16	7 / 1.70	0.7	25.4	1294
	4 x 25	7 / 2.14	0.9	29.3	1634
	4 x 35	7 / 2.52	0.9	32.0	1851
	4 x 50 (S)	19 / 1.78	1.0	33.3	1968
	4 x 70 (S)	19 / 2.14	1.1	38.5	2766
	4 x 95 (S)	19 / 2.52	1.1	42.4	3336
	4 x 120 (S)	37 / 2.03	1.2	47.2	4402
	4 x 150 (S)	37 / 2.25	1.4	54.5	5128
	4 x 185 (S)	37 / 2.52	1.6	59.5	6023
	4 x 240 (S)	61 / 2.25	1.7	66.8	7330
	4 x 300 (S)	61 / 2.52	1.8	73.1	8623
	4 x 400 (S)	61 / 2.85	2.0	83.8	11239

Note: (S) - Sectoral Stranded Conductors

For current rating and voltage drop, please refer to Table B1.8 and B2.8.

Table 13

APPENDIX A

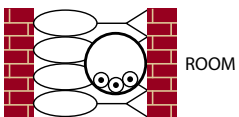
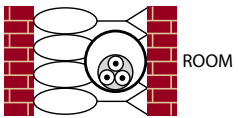
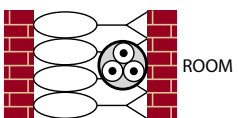
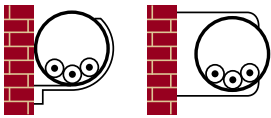
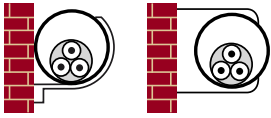
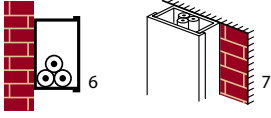
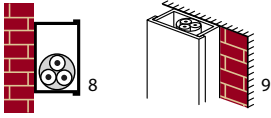

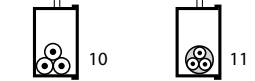
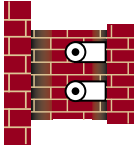
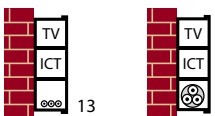
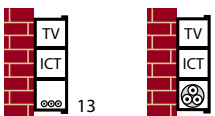
Table A1.1

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



NOTE 1: The illustrations are not intended to depict actual product or installation practices but are indicative of the method described.

NOTE 2: The installation and reference methods stated are in line with IEC. However, not all methods have a corresponding rating for all cable types.

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

^b Values given for Installation Method B in Appendix A are for a single circuit. Where there is more than one circuit in the trunking the group rating factor given in Table C2.1 is applicable, irrespective of the presence of an internal barrier or partition.

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

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

* Still under consideration in IEC.

APPENDIX A

Table A1.2

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



NOTE 1: The illustrations are not intended to depict actual product or installation practices but are indicative of the method described.

NOTE 2: The installation and reference methods stated are in line with IEC. However, not all methods have a corresponding rating for all cable types.

Number	Examples	Installation Method	Description	Reference Method to be used to determine current-carrying capacity
20		Single-core or multicore cables:	Fixed on (clipped direct), or spaced less than 0.3 x cable diameter from a wooden or masonry wall ^c	C
21		Single-core or multicore cables:	Fixed directly under wooden or masonry ceiling	B <i>(Higher than standard ambient temperatures may occur with this installation method)</i>
22		Single-core or multicore cables:	Spaced from a ceiling	E, F or G* <i>(Higher than standard ambient temperatures may occur with this installation method)</i>
30		Single-core or multicore cables:	On unperforated tray run horizontally or vertically ^{c,h}	C with item 2 of Table C2.1
31		Single-core or multicore cables:	On unperforated tray run horizontally or vertically ^{c,h}	E or F
32		Single-core or multicore cables:	On brackets or on a wire mesh tray run horizontally or vertically ^{c,h}	E or F
33		Single-core or multicore cables:	Spaced more than 0.3 x the cable diameter from a wall	E, F or G ^g
34		Single-core or multicore cables:	On a ladder ^c	E or F
35		Single-core or multicore cable	suspended from or incorporating a support wire or harness	E or F

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

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

^g The factor in Table C2.1 may also be used.

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

* Still under consideration in IEC.

APPENDIX A

Table A1.3

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



NOTE 1: The illustrations are not intended to depict actual product or installation practices but are indicative of the method described.

NOTE 2: The installation and reference methods stated are in line with IEC. However, not all methods have a corresponding rating for all cable types.

Number	Examples	Installation Method	Description	Reference Method to be used to determine current-carrying capacity
36		Bare or non-sheathed cables on insulators		G
40		Single-core or multicore cables: In a building void ^{c, h, i}		Where $1.5 D_e \leq V \leq 20 D_e$ Use B
41		Non-sheathed cables: - In conduit - In a building void - In masonry having a thermal resistivity not greater than 2 K.m/W ^{c, i, j}		Where $1.5 D_e \leq V$ Use B
42		Single-core or multicore cables: - In conduit - In a building void - In masonry having a thermal resistivity not greater than 2 K.m/W ^{c, j}		Where $1.5 D_e \leq V$ Use B
43		Non-sheathed cables: - In cable ducting - In a building void - In masonry having a thermal resistivity not greater than 2 K.m/W ^{c, i, j}		Where $1.5 D_e \leq V$ Use B
44		Single-core or multicore cables: - In cable ducting - In a building void - In masonry having a thermal resistivity not greater than 2 K.m/W ^{c, i, j}		Where $1.5 D_e \leq V$ Use B
45		Non-sheathed cables: - In cable ducting - In masonry having a thermal resistivity not greater than 2 K.m/W ^{c, h, i}		Where $1.5 D_e \leq V \leq 50 D_e$ Use B
46		Single-core or multicore cables: - In cable ducting - In masonry having a thermal resistivity not greater than 2 K.m/W ^{c, h, i}		Where $1.5 D_e \leq V \leq 50 D_e$ Use B
47		Single-core or multicore cables: - In a ceiling void - In a suspended floor ^{h, i}		Where $1.5 D_e \leq V \leq 50 D_e$ Use B
50		Non-sheathed cables in flush cable trunking in the floor		B

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

g The factor in Table C2.1 may also be used.

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

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

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

APPENDIX A

Table A1.4

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



NOTE 1: The illustrations are not intended to depict actual product or installation practices but are indicative of the method described.

NOTE 2: The installation and reference methods stated are in line with IEC. However, not all methods have a corresponding rating for all cable types.

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

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

^k D_e = the external diameter of conduit.

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

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

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

ⁿ For cables having conductors not greater than 16mm², the current carrying capacity may be higher.

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

APPENDIX A





Table A1.5

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



NOTE 1: The illustrations are not intended to depict actual product or installation practices but are indicative of the method described.

NOTE 2: The installation and reference methods stated are in line with IEC. However, not all methods have a corresponding rating for all cable types.

Number	Examples	Description	Reference Method to be used to determine current-carrying capacity
70		Multicore unarmoured cable in conduit or in cable ducting in the ground	D
71		Single-core unarmoured cable in conduit or in cable ducting in the ground	D
72		Sheathed, armoured or multicore cables direct in the ground – Without added mechanical protection (see note)	D
73		Sheathed, armoured or multicore cables direct in the ground – With added mechanical protection (eg. cable covers) (see note)	D

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

APPENDIX B

Table B1.1: Current Carrying Capacity (IN AMPERES)

Single-core 70°C PVC insulated, non-armoured, with or without sheathed cables
 Ambient air temperature: 30°C, Conductor operating temperature: 70°C
 Soil thermal resistivity (cable buried in ground): 2.5K.m/W

IEC 60227-3
 IEC 60502-1
 BS 6004
 MS 2100



Conductor Cross-Sectional Area mm ²	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method F (in free air or on a perforated cable tray horizontal or vertical etc)			Reference Method G (in free air)	
	2 Cables, Single-Phase a.c. or d.c.	3 or 4 Cables, 3-Phase a.c.	2 Cables, Single-Phase a.c. or d.c.	3 or 4 Cables, 3-Phase a.c.	2 Cables, Single-Phase a.c. or d.c. Flat and Touching	3 or 4 Cable 3-Phase a.c. Flat and Touching or Trefoil	Touching			Spaced by one cable diameter	
							2 Cables, Single-Phase a.c. or d.c. Flat	3 Cables, 3-Phase a.c. Flat	3 Cables, 3-Phase a.c. Trefoil	Horizontal	Vertical
A	A	A	A	A	A	A	A	A	A	A	A
50	93	84	118	104	125	110	149	133	128	169	152
70	118	107	150	133	160	140	192	173	166	217	196
95	142	129	181	161	195	170	235	212	203	265	241
120	164	149	210	186	226	197	273	247	237	308	282
150	189	170	234	204	261	227	316	287	274	356	327
185	215	194	266	230	298	259	363	330	316	407	376
240	252	227	312	269	352	305	430	392	375	482	447
300	289	261	358	306	406	351	497	455	434	557	519
400	-	-	413	352	511	472	543	502	507	625	584
500	-	-	477	405	591	546	629	582	590	726	680
630	-	-	545	462	679	626	722	699	680	837	787
800	-	-	-	-	771	709	820	761	776	956	902
1000	-	-	-	-	900	823	953	886	907	1125	1066

Note: 1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory (see BS 7671 Regulation 512.1.5).
 2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any cables in the group (see BS 7671 Regulation 512.1.5).

Table B2.1: Voltage Drop (IN mV/A/m)

Single-core 70°C PVC insulated, non-armoured, with or without sheathed cables
 Ambient temperature: 30°C
 Conductor operating temperature: 70°C

Conductor Cross-Sectional Area mm ²	2 Cables, Single-Phase a.c.									3 or 4 Cables, 3-Phase a.c.												
	2 Cables d.c.	Reference Methods A & B (enclosed in conduit or trunking)			Reference Methods C, F & G (clipped direct, on tray or in free air)						Reference Methods A & B (enclosed in conduit or trunking)	Reference Methods C, F & G (clipped direct, on tray or in free air)										
		mV/A/m	mV/A/m			Cables Touching			Cables Spaced*			Cables Touching, Trefoil			Cables Touching, Flat			Cables Spaced*, Flat				
r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z		
50	1.55	1.60	0.30	1.60	1.55	0.190	1.55	1.55	0.28	1.55	1.35	0.26	1.40	1.35	0.165	1.35	1.35	0.24	1.35	1.35	0.32	1.40
70	1.05	1.10	0.30	1.21	1.05	0.185	1.05	1.05	0.27	1.15	0.94	0.26	0.97	0.91	0.160	0.92	0.91	0.24	0.94	0.91	0.31	0.96
95	0.77	0.81	0.29	0.91	0.77	0.185	0.79	0.77	0.27	0.94	0.70	0.25	0.74	0.67	0.160	0.69	0.67	0.23	0.71	0.67	0.31	0.74
120	0.61	0.64	0.29	0.74	0.61	0.180	0.64	0.61	0.27	0.70	0.35	0.25	0.61	0.53	0.155	0.55	0.53	0.23	0.58	0.53	0.31	0.61
150	0.49	0.51	0.28	0.61	0.49	0.175	0.52	0.49	0.26	0.58	0.45	0.24	0.51	0.42	0.155	0.45	0.42	0.23	0.48	0.42	0.30	0.52
185	0.39	0.42	0.28	0.53	0.40	0.175	0.43	0.39	0.26	0.49	0.36	0.24	0.44	0.34	0.150	0.37	0.34	0.23	0.41	0.34	0.30	0.46
240	0.30	0.32	0.27	0.43	0.30	0.170	0.35	0.30	0.26	0.41	0.28	0.24	0.37	0.26	0.150	0.30	0.26	0.22	0.35	0.26	0.30	0.40
300	0.24	0.26	0.27	0.38	0.24	0.170	0.30	0.24	0.26	0.36	0.23	0.23	0.32	0.21	0.145	0.26	0.21	0.22	0.31	0.21	0.30	0.36
400	0.190	0.22	0.27	0.35	0.195	0.165	0.26	0.195	0.25	0.33	0.190	0.23	0.30	0.170	0.145	0.220	0.170	0.22	0.28	0.170	0.29	0.34
500	0.150	0.18	0.26	0.32	0.155	0.165	0.23	0.155	0.25	0.30	0.155	0.23	0.27	0.140	0.140	0.195	0.140	0.22	0.26	0.140	0.29	0.32
630	0.120	0.15	0.26	0.30	0.130	0.160	0.21	0.125	0.25	0.28	0.125	0.22	0.26	0.110	0.140	0.180	0.110	0.22	0.24	0.110	0.29	0.31
800	0.099	-	-	-	0.105	0.160	0.19	0.100	0.25	0.27	-	-	-	0.094	0.135	0.165	0.094	0.21	0.23	0.089	0.29	0.30
1000	0.075	-	-	-	0.086	0.155	0.18	0.082	0.24	0.26	-	-	-	0.077	0.135	0.155	0.077	0.21	0.22	0.071	0.29	0.29

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

APPENDIX B

IEC 60502-1
BS 6346
MS 2101



Table B1.2: Current Carrying Capacity (IN AMPERES)

Single-core, 70°C PVC insulated, armoured (non-magnetic armour), thermoplastic (PVC / LSZH) sheathed cables
Ambient air temperature: 30°C, Conductor operating temperature: 70°C,
Soil thermal resistivity (cable buried in ground): 2.5K.m/W

Conductor Cross-Sectional Area mm ²	Reference Method C (clipped direct)					Reference Method F (in free air or on a perforated cable tray horizontal or vertical)					
	Touching		Touching			Spaced by One Cable Diameter					
	2 Cables, Single-Phase a.c. or d.c. flat	3 or 4 Cables, 3-Phase a.c. flat	2 Cables, Single-Phase a.c. or d.c. flat	3 Cables, 3-Phase a.c. flat	3 Cables, 3-Phase a.c. trefoil	2 Cables, d.c.		2 Cables, Single-Phase a.c.		3 or 4 Cables, 3-Phase a.c.	
	A	A	A	A	A	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
50	143	133	152	141	131	167	157	168	159	169	155
70	183	168	194	178	168	214	202	212	200	213	196
95	221	202	234	214	205	261	247	259	245	325	236
120	255	233	270	246	238	303	288	299	285	293	272
150	294	267	310	282	275	349	333	240	323	335	312
185	334	303	352	319	315	400	382	389	371	379	354
240	393	354	413	374	372	472	452	457	437	443	415
300	452	405	474	427	430	545	523	520	498	505	475
400	518	452	543	479	497	638	613	583	559	551	518
500	586	501	616	534	568	742	715	655	629	604	568
630	658	550	692	589	642	859	828	724	696	656	618
800	728	596	769	642	715	986	952	802	770	707	666
1000	819	651	868	706	808	1171	1133	866	832	770	726

Note: 1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory (see BS 7671 Regulation 512.1.5).
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any cables in the group (see BS 7671 Regulation 512.1.5).

Table B2.2: Voltage Drop (IN mV/A/m)

Single-core aluminium conductor, 90°C PVC insulated, armoured (non-magnetic armour), thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor Cross-Sectional Area mm ²	2 Cables, d.c. mV/A/m	Reference Method C & F (clipped direct, on tray or in free air)														
		2 Cables, Single-Phase a.c.						3 or 4 Cables, 3-Phase a.c.								
		Touching			Spaced*			Trefoil and Touching			Flat and Touching			Flat and Spaced*		
		mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m
50	1.55	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
70	1.05	1.55	0.23	1.55	1.05	0.31	1.10	0.92	0.195	0.93	0.93	0.27	1.35	1.30	0.34	1.35
95	0.77	1.05	0.22	1.10	0.81	0.29	0.86	0.68	0.185	0.70	0.70	0.25	0.96	0.95	0.33	1.00
120	0.61	0.78	0.21	0.81	0.65	0.29	0.71	0.54	0.180	0.57	0.57	0.25	0.62	0.60	0.32	0.68
150	0.49	0.62	0.21	0.66	0.53	0.28	0.60	0.44	0.175	0.47	0.46	0.24	0.52	0.50	0.31	0.58
185	0.39	0.50	0.20	0.54	0.44	0.28	0.52	0.35	0.170	0.39	0.38	0.24	0.45	0.42	0.30	0.51
240	0.30	0.41	0.195	0.45	0.34	0.27	0.44	0.28	0.165	0.32	0.30	0.23	0.38	0.33	0.29	0.44
300	0.24	0.32	0.190	0.37	0.28	0.26	0.39	0.22	0.160	0.27	0.24	0.23	0.34	0.28	0.29	0.40
400	0.190	0.26	0.185	0.32	0.26	0.25	0.36	0.185	0.155	0.24	0.22	0.22	0.32	0.270	0.26	0.38
500	0.150	0.22	0.185	0.28	0.22	0.25	0.33	0.155	0.155	0.22	0.20	0.22	0.29	0.240	0.25	0.35
630	0.120	0.180	0.180	0.25	0.195	0.24	0.31	0.130	0.150	0.20	0.170	0.21	0.27	0.210	0.24	0.32
800	0.097	0.150	0.175	0.23	0.180	0.23	0.29	0.115	0.145	0.185	0.160	0.20	0.26	0.200	0.22	0.30
1000	0.075	0.135	0.170	0.22	0.165	0.21	0.27	0.100	0.140	0.175	0.150	0.185	0.24	0.190	0.195	0.27

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

APPENDIX B

IEC 60502-1
MS 2102



Table B1.3: Current Carrying Capacity (IN AMPERES)

Multi-core 70°C PVC insulated, non-armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C, Ground Ambient Temperature: 20°C, Conductor operating temperature: 70°C
Soil Thermal Resistivity (cable buried in ground): 2.5K.m/W

Conductor Cross-Sectional Area mm ²	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated cable tray etc, horizontal or vertical)	
	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable*, 3-Phase a.c.
	A	A	A	A	A	A	A	A
16	44	41	54	48	66	59	73	61
25	58	53	71	62	83	73	89	78
35	71	65	86	77	103	90	111	96
50	86	78	104	92	125	110	135	117
70	108	98	131	116	160	140	173	150
95	130	118	157	139	195	170	210	183
120	-	135	-	160	-	197	-	212
150	-	155	-	179	-	227	-	245
185	-	176	-	199	-	259	-	280
240	-	207	-	232	-	305	-	330
300	-	237	-	265	-	351	-	381
400	-	274	-	307	-	407	-	441

Note: 1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory (see BS 7671 Regulation 512.1.5).
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any cables in the group (see BS 7671 Regulation 512.1.5).

Table B2.3: Voltage Drop (IN mV/A/m)

Multi-core 70°C PVC insulated, non-armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor Cross-Sectional Area mm ²	2-Core Cable, d.c.	2-Core Cable, Single-Phase a.c.			3 or 4-Core Cable, 3-Phase a.c.		
	mV/A/m	r	x	z	r	x	z
16	4.5						
25	2.9	2.90	0.175	2.9	2.50	0.150	2.5
35	2.1	2.10	0.170	2.1	1.80	0.150	1.80
50	1.55	1.55	0.170	1.55	1.35	0.145	1.35
70	1.05	1.05	0.165	1.05	0.90	0.140	0.92
95	0.77	0.77	0.160	0.79	0.67	0.140	0.68
120	-	-	-	-	0.53	0.135	0.55
150	-	-	-	-	0.42	0.135	0.44
185	-	-	-	-	0.34	0.135	0.37
240	-	-	-	-	0.26	0.130	0.30
300	-	-	-	-	0.21	0.130	0.25
400	-	-	-	-	0.165	0.130	0.21

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

APPENDIX B

IEC 60502-1
BS 6346
MS 2103



Table B1.4: Current Carrying Capacity (IN AMPERES)

Multi-core 70°C PVC insulated, armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C, Ground Ambient Temperature: 20°C, Conductor operating temperature: 70°C
Soil Thermal Resistivity (cable buried in ground): 2.5K.m/W

Conductor Cross-Sectional Area	Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated cable tray etc, horizontal or vertical)		Reference Method D (direct in ground or in ducting in ground, in or around buildings)	
	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.
	A	A	A	A	A	A
mm ²						
16	68	58	71	61	-	-
25	89	76	94	80	77	64
35	109	94	115	99	93	77
50	131	113	139	119	109	91
70	165	143	175	151	135	112
95	199	174	211	186	159	132
120	-	202	-	216	-	150
150	-	232	-	250	-	169
185	-	265	-	287	-	190
240	-	312	-	342	-	218
300	-	360	-	399	-	247
400	-	418	-	462	-	286

- Note: 1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory (see BS 7671 Regulation 512.1.5).
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any cables in the group (see BS 7671 Regulation 512.1.5).

Table B2.4: Voltage Drop (IN mV/A/m)

Multi-core 70°C PVC insulated, armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor Cross-Sectional Area	2-Core Cable, d.c.	2-Core Cable, Single-Phase a.c.			3 or 4-Core Cable, 3-Phase a.c.		
	mV/A/m	r	x	z	r	x	z
mm ²							
16	4.5						
25	2.9	2.90	0.175	2.9	2.50	0.150	2.50
35	2.1	2.10	0.170	2.1	1.80	0.150	1.80
50	1.55	1.55	0.170	1.55	1.35	0.145	1.35
70	1.05	1.05	0.165	1.05	0.90	0.140	0.92
95	0.77	0.77	0.160	0.79	0.67	0.140	0.68
120	-	-	-	-	0.53	0.135	0.55
150	-	-	-	-	0.42	0.135	0.44
185	-	-	-	-	0.34	0.135	0.37
240	-	-	-	-	0.26	0.130	0.30
300	-	-	-	-	0.21	0.130	0.25
400	-	-	-	-	0.165	0.130	0.21

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

APPENDIX B

IEC 60502-1
MS 2104



Table B1.5: Current Carrying Capacity (IN AMPERES)

Single-core 90°C XLPE / Cross-Linked LSZH / EPR insulated, non-armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C, Conductor operating temperature: 90°C
Soil thermal resistivity (cable buried in ground): 2.5K.m/W

Conductor Cross-Sectional Area mm ²	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method F (in free air or on a perforated cable tray horizontal or vertical etc)			Reference Method G (in free air)	
	2 Cables, Single-Phase a.c. or d.c.	3 or 4 Cables, 3-Phase a.c.	2 Cables, Single-Phase a.c. or d.c.	3 or 4 Cables, 3-Phase a.c.	2 Cables, Single-Phase a.c. or d.c. Flat and Touching	3 or 4 Cables, 3-Phase a.c. Flat and Touching or Trefoil	Touching			Spaced by one cable diameter	
							2 Cables, Single-Phase a.c. or d.c. Flat	3 Cables, 3-Phase a.c. Flat	3 Cables, 3-Phase a.c. Trefoil	2 Cables, Single-Phase a.c. or d.c., or 3 Cables, 3-Phase a.c. Flat	Horizontal
A	A	A	A	A	A	A	A	A	A	A	A
50	125	113	157	140	154	136	184	165	159	210	188
70	158	142	200	179	198	174	237	215	206	271	244
95	191	171	242	217	241	211	289	264	253	332	300
120	220	197	281	251	280	245	337	308	296	387	351
150	253	226	307	267	324	283	389	358	343	448	408
185	288	256	351	300	371	323	447	413	395	515	470
240	338	300	412	351	439	382	530	492	471	611	561
300	387	344	471	402	508	440	613	571	544	708	652
400	-	-	-	-	658	594	679	628	638	798	742
500	-	-	-	-	765	692	786	728	743	927	865
630	-	-	-	-	871	791	903	836	849	1058	990
800	-	-	-	-	1001	911	1025	951	979	1218	1143
1000	-	-	-	-	1176	1072	1191	1108	1151	1440	1355

Note: 1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory (see BS 7671 Regulation 512.1.5).
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any cables in the group (see BS 7671 Regulation 512.1.5).

Table B2.5: Voltage Drop (IN mV/A/m)

Single-core 90°C XLPE / Cross-Linked LSZH / EPR insulated, non-armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor Cross-Sectional Area mm ²	2 Cables, Single-Phase a.c.										3 or 4 Cables, 3-Phase a.c.											
	2 Cables d.c.	Reference Methods A & B (enclosed in conduit or trunking)						Reference Methods C, F & G (clipped direct, on tray or in free air)				Reference Methods A & B (enclosed in conduit or trunking)	Reference Methods C, F & G (clipped direct, on tray or in free air)									
		Cables Touching	Cables Spaced*	Cables Touching, Trefoil	Cables Touching, Flat	Cables Spaced*, Flat	Cables Touching, Trefoil	Cables Touching, Flat	Cables Spaced*, Flat	Cables Touching, Trefoil	Cables Touching, Flat		Cables Spaced*, Flat									
r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z		
50	1.65	1.70	0.30	1.72	1.65	0.190	1.66	1.65	0.28	1.68	1.44	0.26	1.46	1.44	0.165	1.45	1.44	0.24	1.46	1.44	0.32	1.48
70	1.13	1.17	0.30	1.21	1.12	0.185	1.14	1.12	0.27	1.15	1.00	0.26	1.04	0.97	0.160	0.98	0.97	0.24	1.00	0.97	0.31	1.02
95	0.82	0.86	0.29	0.91	0.82	0.185	0.84	0.82	0.27	0.94	0.75	0.25	0.79	0.71	0.160	0.73	0.71	0.23	0.75	0.71	0.31	0.78
120	0.65	0.68	0.29	0.74	0.65	0.180	0.67	0.65	0.27	0.70	0.59	0.25	0.64	0.57	0.155	0.59	0.57	0.23	0.61	0.57	0.31	0.64
150	0.53	0.54	0.28	0.61	0.52	0.175	0.55	0.52	0.26	0.58	0.48	0.24	0.54	0.45	0.155	0.47	0.45	0.23	0.50	0.45	0.30	0.54
185	0.42	0.45	0.28	0.53	0.43	0.175	0.46	0.42	0.26	0.49	0.38	0.24	0.45	0.36	0.150	0.39	0.36	0.23	0.43	0.36	0.30	0.47
240	0.32	0.34	0.27	0.43	0.32	0.170	0.36	0.32	0.26	0.41	0.30	0.24	0.38	0.28	0.150	0.32	0.28	0.22	0.35	0.28	0.30	0.41
300	0.26	0.28	0.27	0.38	0.26	0.170	0.31	0.26	0.26	0.36	0.25	0.23	0.34	0.22	0.145	0.27	0.22	0.22	0.31	0.22	0.30	0.37
400	0.20	-	-	-	0.21	0.165	0.27	0.21	0.25	0.33	0.20	0.23	0.31	0.180	0.145	0.23	0.180	0.22	0.28	0.180	0.29	0.34
500	0.160	-	-	-	0.170	0.165	0.23	0.165	0.25	0.30	0.165	0.23	0.28	0.150	0.140	0.20	0.150	0.22	0.27	0.145	0.29	0.32
630	0.130	-	-	-	0.140	0.160	0.21	0.135	0.25	0.28	0.135	0.22	0.26	0.120	0.140	0.185	0.120	0.22	0.25	0.120	0.29	0.31
800	0.105	-	-	-	0.115	0.160	0.19	0.110	0.25	0.27	-	-	-	0.100	0.135	0.170	0.100	0.21	0.23	0.095	0.29	0.30
1000	0.080	-	-	-	0.092	0.155	0.18	0.087	0.24	0.26	-	-	-	0.082	0.135	0.160	0.082	0.21	0.23	0.076	0.29	0.30

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

APPENDIX B

IEC 60502-1
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Table B1.6: Current Carrying Capacity (IN AMPERES)

Multi-core 90°C XLPE / Cross-Linked LSZH / EPR insulated, non-armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C, Ground Ambient Temperature: 20°C, Conductor operating temperature: 90°C
Soil Thermal Resistivity (cable buried in ground): 2.5K.m/W

Conductor Cross-Sectional Area mm ²	Reference Method A (enclosed in conduit in thermally insulating wall etc.)		Reference Method B (enclosed in conduit on a wall or in trunking etc.)		Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated cable tray etc, horizontal or vertical)	
	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable*, 3-Phase a.c.
	A	A	A	A	A	A	A	A
16	60	55	72	64	84	76	91	77
25	78	71	94	84	101	90	108	97
35	96	87	115	103	126	112	135	120
50	115	104	138	124	154	136	164	146
70	145	131	175	156	198	174	211	187
95	175	157	210	188	241	211	257	227
120	-	180	-	216	-	245	-	263
150	-	206	-	240	-	283	-	304
185	-	233	-	272	-	323	-	347
240	-	273	-	218	-	382	-	409
300	-	313	-	364	-	440	-	471
400	-	363	-	422	-	510	-	546

Note: 1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory (see BS 7671 Regulation 512.1.5).
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any cables in the group (see BS 7671 Regulation 512.1.5).

Table B2.6: Voltage Drop (IN mV/A/m)

Multi-core 90°C XLPE / Cross-Linked LSZH / EPR insulated, non-armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor Cross-Sectional Area mm ²	2-Core Cable, d.c.	2-Core Cable, Single-Phase a.c.			3 or 4-Core Cable, 3-Phase a.c.		
	mV/A/m	r	x	z	r	x	z
	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m
16	4.8						
25	3.1	3.10	0.165	3.1	2.70	0.140	2.75
35	2.2	2.20	0.165	2.2	1.90	0.140	1.95
50	1.60	1.65	0.160	1.65	1.40	0.135	1.45
70	1.10	1.10	0.155	1.15	0.96	0.135	0.97
95	0.82	0.82	0.150	0.84	0.71	0.130	0.72
120	-	-	-	-	0.56	0.130	0.58
150	-	-	-	-	0.45	0.130	0.47
185	-	-	-	-	0.37	0.130	0.39
240	-	-	-	-	0.28	0.125	0.31
300	-	-	-	-	0.23	0.125	0.26
400	-	-	-	-	0.185	0.099	0.21

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

APPENDIX B

IEC 60502-1
MS 2105



Table B1.7: Current Carrying Capacity (IN AMPERES)

Single-core 90°C XLPE / Cross-Linked LSZH / EPR insulated, armoured (non-magnetic armour), thermoplastic (PVC / LSZH) sheathed cables

Ambient temperature: 30°C, Conductor operating temperature: 90°C, Soil thermal resistivity (cable buried in ground): 2.5K.m/W

Conductor Cross-Sectional Area mm ²	Reference Method C (clipped direct)					Reference Method F (in free air or on a perforated cable tray horizontal or vertical)					
	Touching		Touching			Spaced by One Cable Diameter					
	2 Cables, Single-Phase a.c. or d.c. flat	3 or 4 Cables, 3-Phase a.c. flat	2 Cables, Single-Phase a.c. or d.c. flat	3 Cables, 3-Phase a.c. flat	3 Cables, 3-Phase a.c. trefoil	2 Cables, d.c.		2 Cables, Single-Phase a.c.		3 or 4 Cables, 3-Phase a.c.	
	A	A	A	A	A	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
50	179	165	192	176	162	216	197	212	199	215	192
70	228	209	244	222	207	275	253	269	254	270	244
95	276	252	294	267	252	332	307	328	310	324	296
120	320	291	340	308	292	384	357	378	358	372	343
150	368	333	390	352	337	441	411	429	409	424	394
185	419	378	444	400	391	511	480	490	467	477	447
240	494	443	521	468	465	605	576	576	549	554	523
300	568	508	597	536	540	701	666	654	624	626	595
400	655	573	688	608	625	812	780	735	704	693	649
500	747	642	786	685	714	942	906	825	790	765	717
630	836	706	880	757	801	1076	1036	909	872	832	780
800	934	764	988	824	897	1250	1205	989	950	890	835
1000	1056	838	1121	911	1014	1488	1435	1094	1052	970	911

Note: 1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory (see BS 7671 Regulation 512.1.5).
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any cables in the group (see BS 7671 Regulation 512.1.5).

Table B2.7: Voltage Drop (IN mV/A/m)

Single-core 90°C XLPE / Cross-Linked LSZH / EPR insulated, armoured (non-magnetic armour), thermoplastic (PVC / LSZH) sheathed cables

Ambient temperature: 30°C

Conductor operating temperature: 90°C

Conductor Cross-Sectional Area mm ²	2 Cables, d.c. mV/A/m	Reference Method C & F (clipped direct, on tray or in free air)														
		2 Cables, Single-Phase a.c.						3 or 4 Cables, 3-Phase a.c.								
		Touching			Spaced*			Trefoil and Touching			Flat and Touching			Flat and Spaced*		
		mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m	mV/A/m
50	1.60	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
70	1.10	1.60	0.22	1.60	1.60	0.30	1.60	1.40	0.185	1.40	1.40	0.26	1.40	1.35	0.34	1.4
95	0.82	1.10	0.21	1.15	1.10	0.29	1.15	0.96	0.180	0.98	0.97	0.25	1.00	0.99	0.33	1.05
120	0.66	0.83	0.20	0.85	0.85	0.29	0.90	0.71	0.175	0.74	0.74	0.25	0.78	0.76	0.32	0.83
150	0.52	0.66	0.20	0.69	0.69	0.28	0.74	0.57	0.170	0.60	0.60	0.24	0.64	0.63	0.31	0.7
185	0.43	0.53	0.195	0.57	0.56	0.28	0.62	0.46	0.170	0.49	0.49	0.24	0.54	0.52	0.30	0.60
240	0.32	0.43	0.190	0.47	0.46	0.27	0.54	0.38	0.165	0.41	0.40	0.24	0.47	0.44	0.30	0.53
300	0.26	0.27	0.185	0.39	0.37	0.27	0.45	0.29	0.160	0.34	0.32	0.23	0.39	0.35	0.29	0.46
400	0.21	0.28	0.185	0.33	0.30	0.26	0.40	0.24	0.160	0.29	0.26	0.23	0.34	0.29	0.29	0.41
500	0.160	0.23	0.180	0.29	0.26	0.25	0.36	0.195	0.155	0.25	0.23	0.22	0.32	0.270	0.27	0.38
630	0.130	0.185	0.175	0.25	0.23	0.25	0.34	0.160	0.155	0.22	0.20	0.21	0.29	0.240	0.26	0.35
800	0.105	0.160	0.175	0.24	0.20	0.24	0.31	0.135	0.150	0.20	0.175	0.21	0.27	0.220	0.23	0.33
1000	0.080	0.140	0.170	0.22	0.190	0.22	0.29	0.120	0.145	0.190	0.165	0.195	0.26	0.210	0.22	0.30
		0.120	0.160	0.20	0.170	0.21	0.27	0.105	0.140	0.175	0.150	0.180	0.24	0.195	0.195	0.28

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



Table B1.8: Current Carrying Capacity (IN AMPERES)

Multi-core 90°C XLPE / Cross-Linked LSZH / EPR insulated, armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C, Ground Ambient Temperature: 20°C, Conductor operating temperature: 90°C
Soil Thermal Resistivity (cable buried in ground): 2.5K.m/W

Conductor Cross-Sectional Area	Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated cable tray etc, horizontal or vertical)		Reference Method D (direct in ground or in ducting in ground, in or around buildings)	
	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.	One 2-Core Cable, Single-Phase a.c. or d.c.	One 3 or 4-Core Cable, 3-Phase a.c.
	A	A	A	A	A	A
mm ²						
16	82	71	85	74	71	59
25	108	92	112	98	90	75
35	132	113	138	120	108	90
50	159	137	166	145	128	106
70	201	174	211	185	159	130
95	242	214	254	224	186	154
120		249		264		174
150		284		305		197
185		328		350		220
240		386		418		263
300		441		488		286
400		522		551		383

Note: 1. Where it is intended to connect the cables in this table to equipment or accessories designed to operate at a temperature lower than the maximum operating temperature of the cable, the cable should be rated at the maximum operating temperature of the equipment or accessory (see BS 7671 Regulation 512.1.5).
2. Where it is intended to group a cable in this table with other cables, the cable should be rated at the lowest of the maximum operating temperatures of any cables in the group (see BS 7671 Regulation 512.1.5).

Table B2.8B: Voltage Drop (IN mV/A/m)

Multi-core 90°C XLPE / Cross-Linked LSZH / EPR insulated, armoured, thermoplastic (PVC / LSZH) sheathed cables
Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor Cross-Sectional Area	2-Core Cable, d.c.	2-Core Cable, Single-Phase a.c.			3 or 4-Core Cable, 3-Phase a.c.		
	mV/A/m	r	x	z	r	x	z
mm ²							
16	4.8						
25	3.1	3.10	0.165	3.1	2.70	0.140	2.75
35	2.2	2.20	0.165	2.2	1.90	0.140	1.95
50	1.60	1.65	0.160	1.65	1.40	0.135	1.45
70	1.10	1.10	0.155	1.15	0.96	0.135	0.97
95	0.82	0.82	0.150	0.84	0.71	0.130	0.72
120	-	-	-	-	0.56	0.130	0.58
150	-	-	-	-	0.45	0.130	0.47
185	-	-	-	-	0.37	0.130	0.39
240	-	-	-	-	0.28	0.125	0.31
300	-	-	-	-	0.23	0.125	0.26
400	-	-	-	-	0.185	0.099	0.21

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

APPENDIX B

Table B3.1: Short Circuit Rating

Short Circuit Ratings for XLPE (Aluminium Conductor)



Nominal Conductor Area (mm ²)	Short Circuit Rating for 1 second (kA)
1.5	0.14
2.5	0.24
4	0.38
6	0.57
10	0.94
16	1.51
25	2.36
35	3.31
50	4.72
70	6.61
95	8.89
120	11.34
150	14.17
185	17.48
240	22.68
300	28.34
400	37.79
500	47.24
630	59.52
800	75.58
1000	94.48

Note:

For any other duration "t" seconds, please divide the given value by \sqrt{t}

$$I = \frac{94.48 \times \text{size}(\text{mm}^2)}{\sqrt{t}}$$

APPENDIX C

Rating Factor for Ambient Temperature

The current-carrying capacities in this work standard are based upon the following reference ambient temperatures:

- For non-sheathed and sheathed cables in air, irrespective of the installation method : 30°C
- For buried cables, either directly in the soil or in ducts in the ground : 20°C

When the ambient temperature in the intended location of the non-sheathed or sheathed cables differs from the reference ambient temperature, please refer to the appropriate rating factors as below table (Table C1.1 and C1.2).

Table C1.1

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

Ambient Temperature °C	PVC	XLPE
25	1.03	1.02
30	1.00	1.00
35	0.94	0.96
40	0.87	0.91
45	0.79	0.87
50	0.71	0.82
55	0.61	0.76
60	0.50	0.71
65	-	0.65
70	-	0.58
75	-	0.50
80	-	0.41
85	-	-
90	-	-
95	-	-

Table C1.2

Rating factors for ambient ground temperatures other than 20°C to be applied to the current-carrying capacities for cables buried to ground.

Ground Temperature °C	PVC	XLPE
10	1.10	1.07
15	1.05	1.04
20	1.00	1.00
25	0.95	0.96
30	0.89	0.93
35	0.84	0.89
40	0.77	0.85
45	0.71	0.80
50	0.63	0.76
55	0.55	0.71
60	0.45	0.65
65	-	0.60
70	-	0.53
75	-	0.46
80	-	0.38

APPENDIX C

Table C1.3 Rating Factor for Soil Thermal Resistivities

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



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

Note:

1. The rating factors given have been averaged over the range of conductor sizes and types of installation included in the relevant tables in this appendix. The overall accuracy of rating factors is within $\pm 5\%$.
2. The rating factors are applicable to cables drawn into buried ducts For cables laid direct in the ground the rating factors for thermal resistivities less than 2.5 K.m/W will be higher. Where more precise values, are required they may be calculated by methods given in BS 7769 (BS IEC 60287).
3. The rating factors are applicable to ducts buried at depths of up to 0.8 m.

Table C2.1

Rating factors for one circuit or one multicore cable or for a group of circuits, or a group of multicore cables, to be used with current-carrying capacities of Tables B1.1 to Tables B1.8.

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

Note:

1. These factors are applicable to uniform groups of cables, equally loaded.
2. Where horizontal clearances between adjacent cables exceeds twice their overall diameter, no rating factor need be applied.
3. The same factors are applied to:
 - groups of two or three single-core cables;
 - multicore cables.
4. If a system consists of both two- and three-core cables, the total number of cables is taken as the number of circuits, and the corresponding factor is applied to the tables for two loaded conductors for the two-core cables, and to the Tables for three loaded conductors for the three-core cables.
5. If a group consists of n single-core cables it may either be considered as n/2 circuits of two loaded conductors or n/3 circuits of three loaded conductors.
6. The rating factors given have been averaged over the range of conductor sizes and types of installation included in Tables B1.1 to B1.8 the overall accuracy of tabulated values is within 5%.
7. For some installations and for other methods not provided for in the above table, it may be appropriate to use factors calculated for specific uses, see for example Table C3.1 to C3.2.
8. When Cables having differing conductor operating temperature are grouped together, the current rating is to be based upon the lowest operating temperature of any cable in the group.
9. If, due to known operating conditions, a cable is expected to carry not more than 30 % of its grouped rating, it may be ignored for the purpose of obtaining the rating factor for the rest of the group. For example, a group of N loaded cables would normally required a group rating factor of C_g applied to the tabulated I_t. However, if M cables in the group carry loads which are not greater than 0.3 C_gI_t amperes the other cables can be sized by using the group rating factor corresponding to (N-M) cables.

APPENDIX C

Table C2.2

Rating factors for more than one circuit, cables laid directly in the ground
 - Reference Method D in Tables A1.1 to A1.5 (Single-core or multicore cables)

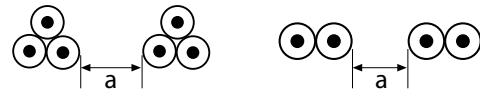


Number of circuits	Cable-to-cable clearance (a)				
	Nil (cables touching)	One cable diameter	0.125m	0.25m	0.5m
2	0.75	0.80	0.85	0.90	0.90
3	0.65	0.70	0.75	0.80	0.85
4	0.60	0.60	0.70	0.75	0.80
5	0.55	0.55	0.65	0.70	0.80
6	0.50	0.55	0.60	0.70	0.80

Multicores Cables



Single-Core Cables



Note:

- Values given apply to an installation depth of 0.7m and a soil thermal resistivity of 2.5K.m/W. These are average values for the range of cable sizes and types quoted for Table B1.1 to B1.8. The process of averaging, together with rounding off, can result in some cases in errors of up to $\pm 10\%$. (Where more precise values are required they may be calculated by methods given in BS 7769 (BS IEC 60287)).
- In case of a thermal resistivity lower than 2.5 K.m/W the rating factors can, in general, be increased and can be calculated by the methods given in BS 7769 (BS IEC 60287).

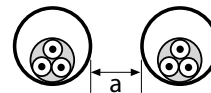
Table C2.3

Rating factors for more than one circuit, cables laid in ducts in the ground
 - Reference Method D in Tables B1.1 to B1.8

i. Multicores Cables in a Single-Way Ducts

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

Multicores Cables



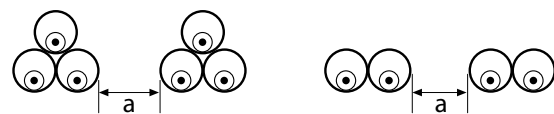
Note:

- Values given apply to an installation depth of 0.7m and a soil thermal resistivity of 2.5K.m/W. These are average values for the range of cable sizes and types quoted for Table B1.1 to B1.8. The process of averaging, together with rounding off, can result in some cases in errors of up to $\pm 10\%$. (Where more precise values are required they may be calculated by methods given in BS 7769 (BS IEC 60287)).
- In case of a thermal resistivity lower than 2.5 K.m/W the rating factors can, in general, be increased and can be calculated by the methods given in BS 7769 (BS IEC 60287).

ii. Single-Core Cables in Non-Ferrous Single-Way Ducts

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

Single-Cores Cables



Note:

- Values given apply to an installation depth of 0.7m and a soil thermal resistivity of 2.5K.m/W. These are average values for the range of cable sizes and types quoted for Table B1.1 to B1.8. The process of averaging, together with rounding off, can result in some cases in errors of up to $\pm 10\%$. (Where more precise values are required they may be calculated by methods given in BS 7769 (BS IEC 60287)).
- In case of a thermal resistivity lower than 2.5 K.m/W the rating factors can, in general, be increased and can be calculated by the methods given in BS 7769 (BS IEC 60287).

APPENDIX C

Table C3.1

Rating factors for groups of more than one multicore cables, to be applied to reference current-carrying capacities for multicore cables in free air
 - Reference Method E in Tables B 1.1 to B1.8



Installation Method in Table A1.1 to A1.5		Number of trays or ladders	Number of cables per tray or ladder					
			1	2	3	4	6	9
Perforated cable tray systems (Note 3)		1	See item 4 of Table C2.1					
		2	1.00	0.87	0.80	0.77	0.73	0.68
		3	1.00	0.86	0.79	0.76	0.71	0.66
		6	1.00	0.84	0.77	0.73	0.68	0.64
Perforated cable tray systems (Note 3)		1	1.00	1.00	0.98	0.95	0.91	-
		2	1.00	0.99	0.96	0.92	0.87	-
		3	1.00	0.98	0.95	0.91	0.85	-
Vertical perforated cable tray systems (Note 4)		1	See item 4 of Table C2.1					
		2	1.00	0.88	0.81	0.76	0.71	0.70
Vertical perforated cable tray systems (Note 4)		1	1.00	0.91	0.89	0.88	0.87	-
		2	1.00	0.91	0.88	0.87	0.85	-
Unperforated cable tray systems		1	0.97	0.84	0.78	0.75	0.71	0.68
		2	0.97	0.83	0.76	0.72	0.68	0.63
		3	0.97	0.82	0.75	0.71	0.66	0.61
		6	0.97	0.81	0.73	0.69	0.63	0.58
Cable ladder systems, cleats, wire mesh tray, etc (Note 3)		1	See item 4 of Table C2.1					
		2	1.00	0.86	0.80	0.78	0.76	0.73
		3	1.00	0.85	0.79	0.76	0.73	0.70
		6	1.00	0.84	0.77	0.73	0.68	0.64
Cable ladder systems, cleats, wire mesh tray, etc (Note 3)		1	1.00	1.00	1.00	1.00	1.00	-
		2	1.00	0.99	0.98	0.97	0.96	-
		3	1.00	0.98	0.97	0.96	0.93	-

- Note 1: Values given are averages for the cable types and range of conductor sizes considered in Tables B1.1 to B1.8. The spread of values is generally less than 5%.
- Note 2: Factors apply to single layer groups of cables as shown above and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and must be determined by an appropriate method.
- Note 3: Values are given for the vertical spacing between cable trays of 300mm and at least 20mm between cable trays and wall. For closer spacing the factors should be reduced.
- Note 4: Values are given for horizontal spacing between cable trays of 225mm with cable trays mounted back to back. For closer spacing the factors should be reduced.

APPENDIX C

Table C3.2

Rating factors for groups of one or more circuits of single-core cables to be applied to reference current-carrying capacity for one circuit of single-core cables in free air
- Reference Method F in Tables B1.1 to B1.8



Installation Method in Table A1.1 to A1.5		Number of trays or ladders	Number of Three-Phase circuits per tray or ladder			Use as a multiplier to rating for:	
			1	2	3		
Perforated cable tray systems (Note 3)	31		1	0.98	0.91	0.87	Three cables in horizontal formation
			2	0.96	0.87	0.81	
			3	0.95	0.85	0.78	
Vertical perforated cable tray systems (Note 4)	31		1	0.96	0.86	-	Three cables in vertical formation
Cable ladder systems, cleats, wire mesh tray, etc. (Note 3)	32, 33, 34		1	1.00	0.97	0.96	Three cables in horizontal formation
			2	0.98	0.93	0.89	
			3	0.97	0.90	0.86	
Perforated cable tray systems (Note 3)	31		1	1.00	0.98	0.96	Three cables in trefoil formation
			2	0.97	0.93	0.89	
			3	0.96	0.92	0.86	
Vertical perforated cable tray systems (note 4)	31		1	1.00	0.91	0.89	Three cables in trefoil formation
			2	1.00	0.90	0.86	
Cable ladder systems, cleats, wire mesh tray, etc. (Note 3)	32, 33, 34		1	1.00	1.00	1.00	Three cables in trefoil formation
			2	0.97	0.95	0.93	
			3	0.96	0.94	0.90	

- Note 1: Values given are averages for the cable types and range of conductor sizes considered in Tables B1.1 to B1.8. The spread of values is generally less than 5%.
- Note 2: Factors apply to single layer groups of cables as shown above and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and must be determined by an appropriate method.
- Note 3: Values are given for the vertical spacing between cable trays of 300mm and at least 20mm between cable trays and wall. For closer spacing the factors should be reduced.
- Note 4: Values are given for horizontal spacing between cable trays of 225mm with cable trays mounted back to back. For closer spacing the factors should be reduced.
- Note 5: For circuits having more than one cable in parallel per phase, each three-phase set of conductors is to be considered as a circuit for the purpose of this table.

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

- 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.
- Delivery shall be deemed to have made if Seller delivers the goods to the location specified by the Buyer and Delivery Order is endorsed by any person present thereat. Seller is 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.
- 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.
- 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.
- Off loading and/or handling will in all events be the responsibility of the Buyer.
- 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.
- 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 of work done or goods sold in accordance with Buyer's specifications which involve infringement of any patents, registered designs or trademarks.

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