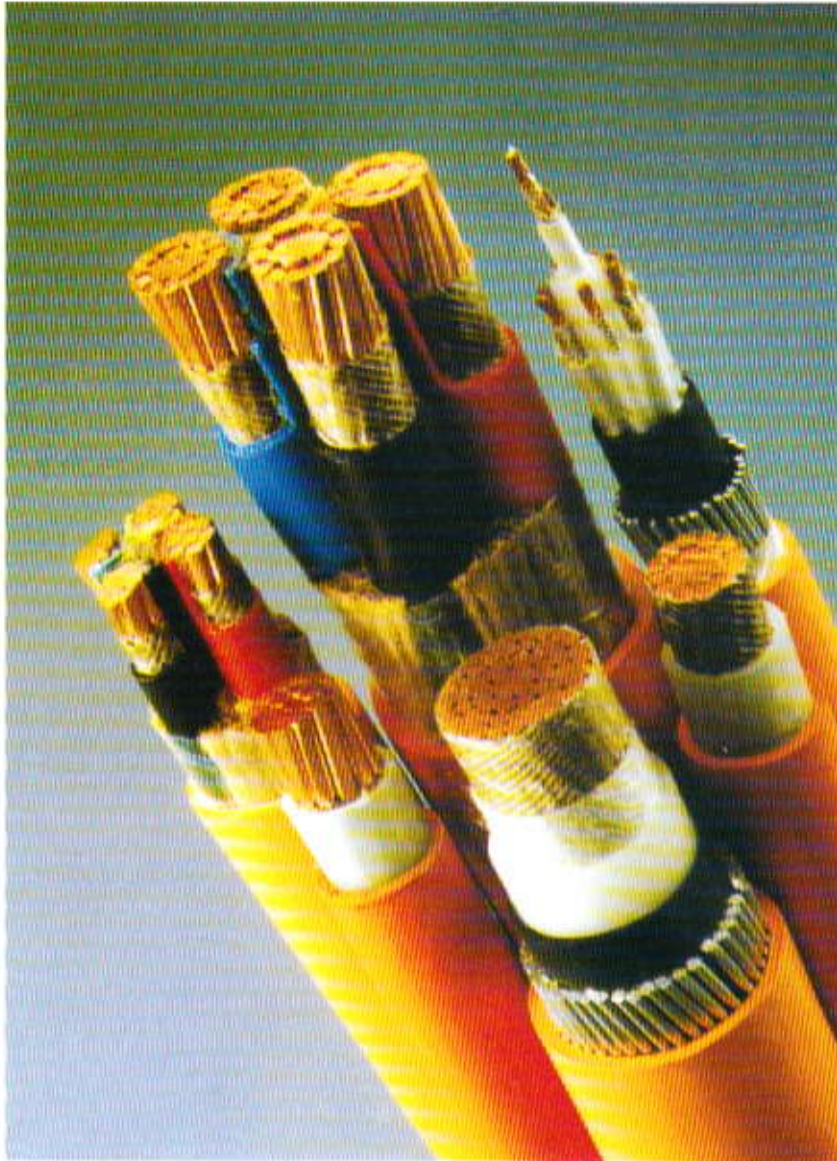




"Tsunagu" Technology

Fujikura Federal Cables Sdn. Bhd.

(Company No.: 77903-A)



FIRE RESISTANT CABLES

C O N T E N T

Introduction	2
Projects using FFC Fire Resistant Cables	4
Application of Fire Resistant Cables	5
300/500V PE/PVC Sheathed Fire Resistant Cable	6
600/1000V XLPE/PVC Sheathed Fire Resistant Cable	9
600/1000V XLPE/LSZH Sheathed Fire Resistant Cable	13
600/1000V XLPE/LSZH/AWA/LSZH Fire Resistant LSZH Cable	18
600/1000V XLPE/LSZH/SWA/LSZH Fire Resistant LSZH Cable	20
Technical Data	23

INTRODUCTION

In this modern world of industrialisation, more and more higher buildings are sprouting up with in which we both live and work. Major accidents which have resulted in the deaths of many innocent people, make us realise that the safety features designed to prevent and protect loss of life and damage to property should be installed.

The use of Fire Resistant Cables are for the installation of safety systems, including sprinkler system, fire alarms, emergency lighting, PA systems, emergency power supplies and smoke detectors.

Fujikura Federal Cables (FFC) has more than 10 years of knowledge and experience in the design and manufacturing of Fire Resistant (FRC) Cables for a wide variety of industries and applications, including control instrumentation, data transmission and low voltage power cables for use in public, commercial and industrial environments, for example KLIA, Petronas Twin Tower, hospitals, offices and factories like Petronas Gas Processing Plants 3,4,5 and 6, Kertih Aromatics, Kertih Vinyl Chloride Plants, etc.

Fire Resisting Cables safeguarding human lives. FFC's FRC Cables of low smoke emission, zero halogen, flame retardant, low toxicity of combustion gases have also been supplied to the petrochemical plants in Kertih. Apart from maintaining these features, in addition FFC's FRC Cables also provides circuit integrity in a fire, conforming with BS 6387 categories C, W and Z, thus, giving increased protection to life and property.

As a leading manufacturer of a wide range of cables and wire related products for the energy and telecommunication industries, FFC is committed to achieve excellence in its products and services to customers.

FFC is committed to quality and testimony of this is the award of ISO 9001:2000 Certification by SGS, UK in April 2003 and also obtained approval from BOMBA. The company was also awarded the Electrical Safety Certificate by the Ministry of Internal Trade & Industry, Japan, in 1996.

The objective of FFC is to provide for customers' satisfaction in all aspects of their requirements in relation to products quality, timely delivery, competitive pricing and services.

To ensure customer satisfaction, FFC shall:

- Operate within a well-defined quality management system based on ISO 9001 standard.
- Continuously review, update and improve the quality of its products and services to meet customers' requirements.
- Train and develop employees' work and related skills, recognising the essential contribution of training to the continuous growth of the Company.

Projects Using FFC Fire Resistant Cables



GPP 5 and 6, Paka.



Petronas Fertiliser Kedah Project, Gurun.

Projects Using FFC Fire Resistant Cables



Petronas Twin Tower, K.L.



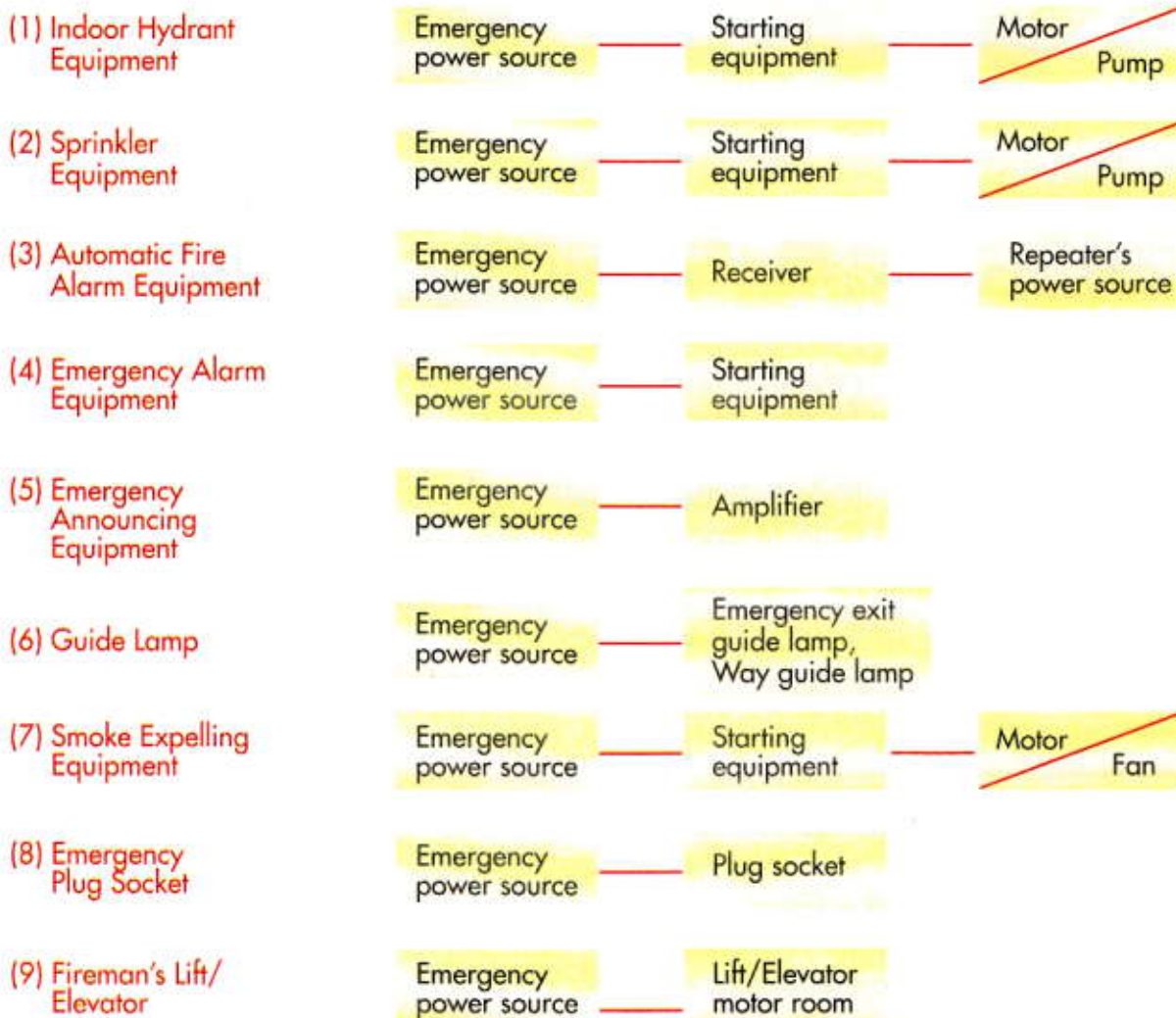
KLIA, Sepang.

APPLICABLE STANDARDS

- IEC 60331 : Fire-resisting characteristics of electric cables
 IEC 60332-1 : Test on electric cables under fire conditions
 "test on a single vertical insulated wire and cable"

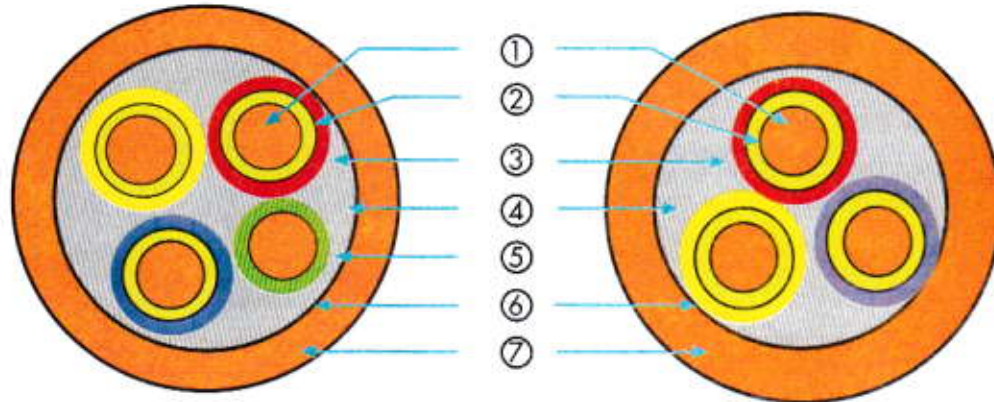
APPLICATION OF FIRE RESISTANT CABLE

Our Fire Resistant Cables are recommended for general application in power and signal wirings and not only for emergency circuits but for the areas wherever maintaining circuit and/or control of fire spreading are deemed desirable. The followings are examples of application where use of Fire Resistant Cable is deemed essential.



Notes: _____; Fire Resistant Cables

300/500V PE/PVC SHEATHED FIRE RESISTANT CABLE



CONSTRUCTION

- | | |
|---------------------|--|
| 1. Conductor | : Annealed copper wire, stranded |
| 2. Fire proof layer | : Fire proof mica tape |
| 3. Insulation | : Polyethylene |
| 4. Filler | : Suitable filler |
| 5. Earth conductor | : Earth continuity conductor
(Polyethylene insulated) |
| 6. Binder tape | : Suitable tape |
| 7. Sheath | : Fire retardant PVC |

CORE IDENTIFICATION

The cores shall be identified as follows:

- | | |
|----------|------------------------------------|
| 2-core+E | : Red, Black + Green |
| 3-core+E | : Red, Yellow, Blue + Green |
| 4-core+E | : Red, Yellow, Blue, Black + Green |

FIRE RESISTING CHARACTERISTICS (IEC 60331)

Step	Test method	Performance requirement
1 st step	Flame of 750 °C and test voltage of the rated voltage of the cable shall be applied for 3 hours.	No failure of any of the 3A fuses occurs, nor any lamp extinguished and capable of withstanding the rated voltage of the cable.
2 nd step	After flame extinguished and after 12 hours later, test voltage of the rated voltage of the cable shall be applied for 3 hours.	

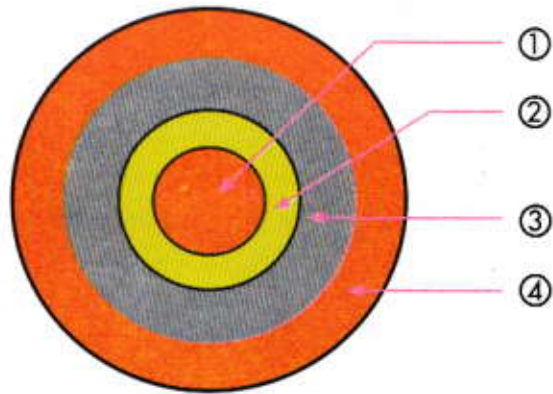
300/500V PE/PVC Fire Resistant Cables with Earth Conductor

No. of cores	Conductor			Earth continuity conductor No./mm	Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20 °C Ω/km	Minimum insulation resistance @ 20 °C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm							
2C+E	1.5	7/0.50	1.50	7/0.50	0.55	0.5	8	2.0	13.6	2600
2C+E	2.5	7/0.67	2.01	7/0.67	0.55	0.5	9	2.0	7.41	2100
3C+E	1.5	7/0.50	1.50	7/0.50	0.55	0.5	9	2.0	13.6	2600
3C+E	2.5	7/0.67	2.01	7/0.67	0.55	0.5	10	2.0	7.41	2100
4C+E	1.5	7/0.50	1.50	7/0.50	0.55	0.5	10	2.0	13.6	2600
4C+E	2.5	7/0.67	2.01	7/0.67	0.55	0.5	11	2.0	7.41	2100

300/500V PE/PVC Fire Resistant Cables without Earth Conductor

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20 °C Ω/km	Minimum insulation resistance @ 20 °C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
1	1.0	7/0.40	1.20	0.55	0.5	4	2.0	21.2	2800
1	1.5	7/0.50	1.50	0.55	0.5	4.5	2.0	13.6	2600
1	2.5	7/0.67	2.01	0.55	0.5	5	2.0	7.41	2100
1	4	7/0.85	2.55	0.55	0.5	5.5	2.0	4.61	2200
2	1.0	7/0.40	1.20	0.55	0.5	7	2.0	21.2	2800
2	1.5	7/0.50	1.50	0.55	0.5	7.5	2.0	13.6	2600
2	2.5	7/0.67	2.01	0.55	0.5	8.5	2.0	7.41	2100
2	4	7/0.85	2.55	0.55	0.5	9.5	2.0	4.61	2200
3	1.0	7/0.40	1.20	0.55	0.5	7	2.0	21.2	2800
3	1.5	7/0.50	1.50	0.55	0.5	8	2.0	13.6	2600
3	2.5	7/0.67	2.01	0.55	0.5	9	2.0	7.41	2100
3	4	7/0.85	2.55	0.55	0.5	10	2.0	4.61	2200
4	1.0	7/0.40	1.20	0.55	0.5	8	2.0	21.2	2800
4	1.5	7/0.50	1.50	0.55	0.5	9	2.0	13.6	2600
4	2.5	7/0.67	2.01	0.55	0.5	10	2.0	7.41	2100
4	4	7/0.85	2.55	0.55	0.5	11	2.0	4.61	2200

600/1000V XLPE/PVC SHEATHED FIRE RESISTANT CABLE



CONSTRUCTION

- | | |
|--------------------|--|
| 1. Conductor | : Annealed copper wire, stranded or compact round stranded |
| 2. Fire proof tape | : Fire proof mica tape |
| 3. Insulation | : Cross-linked Polyethylene (XLPE) |
| 4. Sheath | : Fire retardant PVC (Orange colour) |

CORE IDENTIFICATION

The core shall be identified as follows:

- 1-core : Natural colour of XLPE compound

FIRE RESISTING CHARACTERISTICS (IEC 60331)

Step	Test method	Performance requirement
1 st step	Flame of 750 °C and test voltage of the rated voltage of the cable shall be applied for 3 hours.	No failure of any of the 3A fuses occurs, nor any lamp extinguished and capable of withstanding the rated voltage of the cable.
2 nd step	After flame extinguished and after 12 hours later, test voltage of the rated voltage of the cable shall be applied for 3 hours.	

600/1000V XLPE/PVC Fire Resistant Cables

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20 °C Ω/km	Minimum insulation resistance @ 20 °C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
1	1.5	7/0.53	1.59	0.7	1.4	7	3.5	12.1	2200
1	2.5	7/0.67	2.01	0.7	1.4	7	3.5	7.41	2100
1	4	7/0.85	2.55	0.7	1.4	8	3.5	4.61	1800
1	6	7/1.04	3.12	0.7	1.4	8	3.5	3.08	1500
1	10	7/1.35	4.05	0.7	1.4	10	3.5	1.83	1200
1	16	*	4.7	0.7	1.4	10	3.5	1.15	1100
1	25	*	5.9	0.9	1.4	12	3.5	0.727	1100
1	35	* *	7.0	0.9	1.4	13	3.5	0.524	1000
1	50	*	8.0	1.0	1.4	14	3.5	0.387	900
1	70	*	9.7	1.1	1.4	16	3.5	0.268	900
1	95	*	11.4	1.1	1.5	18	3.5	0.193	800
1	120	*	12.8	1.2	1.5	20	3.5	0.153	700
1	150	*	14.3	1.4	1.6	22	3.5	0.124	800
1	185	*	15.8	1.6	1.6	24	3.5	0.0991	800
1	240	*	18.3	1.7	1.7	27	3.5	0.0754	700
1	300	*	20.5	1.8	1.8	30	3.5	0.0601	700
1	400	*	23.3	2.0	1.9	33	3.5	0.0470	700
1	500	*	26.4	2.2	2.0	37	3.5	0.0366	700
1	630	127/2.52	32.76	2.4	2.2	42	3.5	0.0283	600
1	800	127/2.85	37.05	2.6	2.3	49	3.5	0.0221	600
1	1000	127/3.20	41.6	2.8	2.4	54	3.5	0.0176	600

* Compacted round

600/1000V XLPE/PVC Fire Resistant Cables

2-cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20°C Ω/km	Minimum insulation resistance @ 20°C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
2	1.5	7/0.53	1.59	0.7	1.8	12	3.5	12.1	2200
2	2.5	7/0.67	2.01	0.7	1.8	13	3.5	7.41	2100
2	4	7/0.85	2.55	0.7	1.8	14	3.5	4.61	1800
2	6	7/1.04	3.12	0.7	1.8	15	3.5	3.08	1500
2	10	7/1.35	4.05	0.7	1.8	17	3.5	1.83	1200
2	16	*	4.7	0.7	1.8	18	3.5	1.15	1100
2	25	*	5.9	0.9	1.8	22	3.5	0.727	1100
2	35	*	7.0	0.9	1.8	24	3.5	0.524	1000
2	50	*	8.0	1.0	1.8	26	3.5	0.387	900
2	70	*	9.7	1.1	1.8	30	3.5	0.268	900
2	95	*	11.4	1.1	2.0	34	3.5	0.193	800
2	120	*	12.8	1.2	2.1	37	3.5	0.153	700
2	150	*	14.3	1.4	2.2	41	3.5	0.124	800
2	185	*	15.8	1.6	2.3	47	3.5	0.0991	800
2	240	*	18.3	1.7	2.5	53	3.5	0.0754	700
2	300	*	20.5	1.8	2.7	58	3.5	0.0601	700
2	400	*	23.3	2.0	2.9	65	3.5	0.0470	700

3-cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20°C Ω/km	Minimum insulation resistance @ 20°C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
3	1.5	7/0.53	1.59	0.7	1.8	12	3.5	12.1	2200
3	2.5	7/0.67	2.01	0.7	1.8	13	3.5	7.41	2100
3	4	7/0.85	2.55	0.7	1.8	14	3.5	4.61	1800
3	6	7/1.04	3.12	0.7	1.8	16	3.5	3.08	1500
3	10	7/1.35	4.05	0.7	1.8	18	3.5	1.83	1200
3	16	*	4.7	0.7	1.8	19	3.5	1.15	1100
3	25	*	5.9	0.9	1.8	22	3.5	0.727	1100
3	35	*	7.0	0.9	1.8	25	3.5	0.524	1000
3	50	*	8.0	1.0	1.8	28	3.5	0.387	900
3	70	*	9.7	1.1	1.9	32	3.5	0.268	900
3	95	*	11.4	1.1	2.0	36	3.5	0.193	800
3	120	*	12.8	1.2	2.1	40	3.5	0.153	700
3	150	*	14.3	1.4	2.3	44	3.5	0.124	800
3	185	*	15.8	1.6	2.4	50	3.5	0.0991	800
3	240	*	18.3	1.7	2.6	57	3.5	0.0754	700
3	300	*	20.5	1.8	2.8	62	3.5	0.0601	700
3	400	*	23.3	2.0	3.1	70	3.5	0.0470	700

* Compacted round

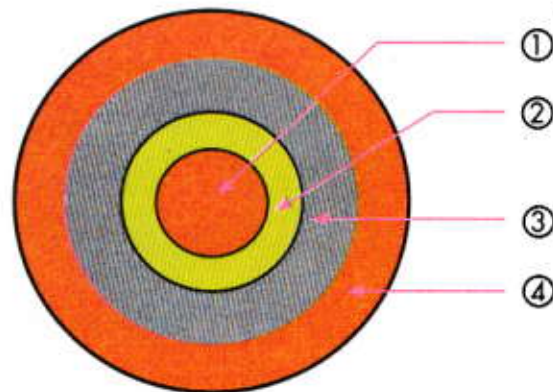
600/1000V XLPE/PVC Fire Resistant Cables

4-cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20°C Ω/km	Minimum insulation resistance @ 20°C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
4	1.5	7/0.53	1.59	0.7	1.8	13	3.5	12.1	2200
4	2.5	7/0.67	2.01	0.7	1.8	14	3.5	7.41	2100
4	4	7/0.85	2.55	0.7	1.8	16	3.5	4.61	1800
4	6	7/1.04	3.12	0.7	1.8	17	3.5	3.08	1500
4	10	7/1.35	4.05	0.7	1.8	19	3.5	1.83	1200
4	16	*	4.7	0.7	1.8	21	3.5	1.15	1100
4	25	*	5.9	0.9	1.8	25	3.5	0.727	1100
4	35	*	7.0	0.9	1.8	28	3.5	0.524	1000
4	50	*	8.0	1.0	1.9	31	3.5	0.387	900
4	70	*	9.7	1.1	2.0	36	3.5	0.268	900
4	95	*	11.4	1.1	2.1	40	3.5	0.193	800
4	120	*	12.8	1.2	2.3	44	3.5	0.153	700
4	150	*	14.3	1.4	2.4	49	3.5	0.124	800
4	185	*	15.8	1.6	2.6	56	3.5	0.0991	800
4	240	*	18.3	1.7	2.8	63	3.5	0.0754	700
4	300	*	20.5	1.8	3.0	69	3.5	0.0601	700
4	400	*	23.3	2.0	3.3	77	3.5	0.0470	700

* Compacted round

600/1000V XLPE/LSZH SHEATHED FIRE RESISTANT CABLE



CONSTRUCTION

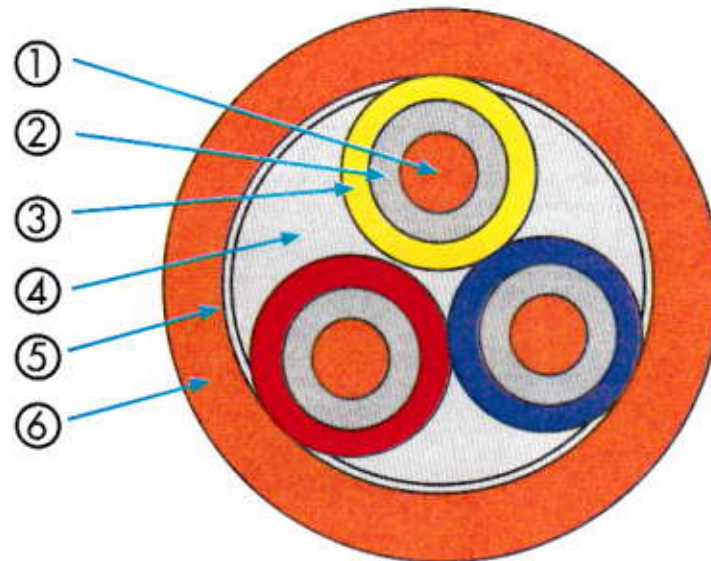
- | | |
|--------------------|--|
| 1. Conductor | : Annealed copper wire, stranded or compact round stranded |
| 2. Fire proof tape | : Fire proof mica tape |
| 3. Insulation | : Cross-linked Polyethylene (XLPE) |
| 4. Sheath | : Flame retardant low smoke zero halogen (Orange colour) |

CORE IDENTIFICATION

The core shall be identified as follows:

- 1-core : Natural colour of XLPE compound

**600/1000V XLPE insulated, low smoke zero halogen sheathed fire resistant cable
(multi cores)**



CONSTRUCTION

- | | |
|---------------------|--|
| 1. Conductor | : Annealed copper wire |
| 2. Fire proof layer | : Fire proof mica tape |
| 3. Insulation | : Cross-linked Polyethylene |
| 4. Filler | : Suitable filler |
| 5. Binder tape | : Suitable tape |
| 6. Outer sheath | : Flame retardant low smoke zero halogen |

CORE IDENTIFICATION

The core shall be identified as follows:

- | | |
|--------|----------------------------|
| 2-core | : Red, Black |
| 3-core | : Red, Yellow, Blue |
| 4-core | : Red, Yellow, Blue, Black |

FEATURES

Fully complies with BS 6387 Cat. C, W, Z and IEC 60331 fire resistance tests

Reduced flame propagation - IEC 60332-3 Cat. A, B, C

Low smoke emission - IEC 61034

Low acid gas emission - IEC 60754 part 1 : < 0.5% acid gas

FIRE RESISTING CHARACTERISTICS
(BS 6387 Cat. C,W & Z for overall diameter <20mm)
(BS 7846 Cat F2 for overall diameter >20mm)

Category	Test method	Performance requirement
C	Flame of 950 °C and test voltage of the rated voltage of the cable shall be applied for 3 hours.	No failure of any of the 3A fuses occurs, nor any lamp extinguished and capable of withstanding the rated voltage of the cable.
W	Flame of 650 °C and test voltage of the rated voltage of the cable shall be applied for 15 min. water shall be sprayed on burnt area and flame shall be applied for a further 15 min.	
Z, F2	Flame of 950 °C and test voltage of the rated voltage of the cable shall be applied for 15 min. During this duration a shock producing device is applied for striking the wall on which the cable is mounted.	

600/1000V XLPE/LSZH Fire Resistant Cables

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20 °C Ω/km	Minimum insulation resistance @ 20 °C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
1	2.5	7/0.67	2.01	0.7	1.4	8	3.5	7.41	2100
1	4	7/0.85	2.55	0.7	1.4	9	3.5	4.61	1800
1	6	7/1.04	3.12	0.7	1.4	9	3.5	3.08	1500
1	10	7/1.35	4.05	0.7	1.4	11	3.5	1.83	1200
1	16	*	4.7	0.7	1.4	12	3.5	1.15	1100
1	25	*	5.9	0.9	1.4	13	3.5	0.727	1100
1	35	*	7.0	0.9	1.4	14	3.5	0.524	1000
1	50	*	8.0	1.0	1.4	15	3.5	0.387	900
1	70	*	9.7	1.1	1.4	17	3.5	0.268	900
1	95	*	11.4	1.1	1.5	19	3.5	0.193	800
1	120	*	12.8	1.2	1.5	21	3.5	0.153	700
1	150	*	14.3	1.4	1.6	23	3.5	0.124	800
1	185	*	15.8	1.6	1.6	25	3.5	0.0991	800
1	240	*	18.3	1.7	1.7	27	3.5	0.0754	700
1	300	*	20.5	1.8	1.8	30	3.5	0.0601	700
1	400	*	23.3	2.0	1.9	33	3.5	0.0470	700
1	500	*	26.4	2.2	2.0	37	3.5	0.0366	700
1	630	127/2.52	32.76	2.4	2.2	44	3.5	0.0283	600
1	800	127/2.85	37.05	2.6	2.3	49	3.5	0.0221	600
1	1000	127/3.20	41.6	2.8	2.4	54	3.5	0.0176	600

* Compacted round

600/1000V XLPE/LSZH Fire Resistant Cables

2-cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20°C Ω/km	Minimum insulation resistance @ 20°C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
2	2.5	7/0.67	2.01	0.7	1.8	14	3.5	7.41	2100
2	4	7/0.85	2.55	0.7	1.8	15	3.5	4.61	1800
2	6	7/1.04	3.12	0.7	1.8	16	3.5	3.08	1500
2	10	7/1.35	4.05	0.7	1.8	18	3.5	1.83	1200
2	16	*	4.7	0.7	1.8	20	3.5	1.15	1100
2	25	*	5.9	0.7	1.8	23	3.5	0.727	1100
2	35	*	7.0	0.7	1.8	25	3.5	0.524	1000
2	50	*	8.0	1.0	1.8	28	3.5	0.387	900
2	70	*	9.7	1.1	1.8	31	3.5	0.268	900
2	95	*	11.4	1.1	2.0	35	3.5	0.193	800
2	120	*	12.8	1.2	2.1	39	3.5	0.153	700
2	150	*	14.3	1.4	2.2	43	3.5	0.124	800
2	185	*	15.8	1.6	2.3	47	3.5	0.0991	800
2	240	*	18.3	1.7	2.5	53	3.5	0.0754	700
2	300	*	20.5	1.8	2.7	58	3.5	0.0601	700
2	400	*	23.3	2.0	2.9	65	3.5	0.0470	700

3-cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20°C Ω/km	Minimum insulation resistance @ 20°C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
3	2.5	7/0.67	2.01	0.7	1.8	14	3.5	7.41	2100
3	4	7/0.85	2.55	0.7	1.8	15	3.5	4.61	1800
3	6	7/1.04	3.12	0.7	1.8	17	3.5	3.08	1500
3	10	7/1.35	4.05	0.7	1.8	19	3.5	1.83	1200
3	16	*	4.7	0.7	1.8	21	3.5	1.15	1100
3	25	*	5.9	0.9	1.8	24	3.5	0.727	1100
3	35	*	7.0	0.9	1.8	27	3.5	0.524	1000
3	50	*	8.0	1.0	1.8	29	3.5	0.387	900
3	70	*	9.7	1.1	1.9	34	3.5	0.268	900
3	95	*	11.4	1.1	2.0	37	3.5	0.193	800
3	120	*	12.8	1.2	2.1	41	3.5	0.153	700
3	150	*	14.3	1.4	2.3	46	3.5	0.124	800
3	185	*	15.8	1.6	2.4	51	3.5	0.0991	800
3	240	*	18.3	1.7	2.6	57	3.5	0.0754	700
3	300	*	20.5	1.8	2.8	62	3.5	0.0601	700
3	400	*	23.3	2.0	3.1	70	3.5	0.0470	700

* Compacted round

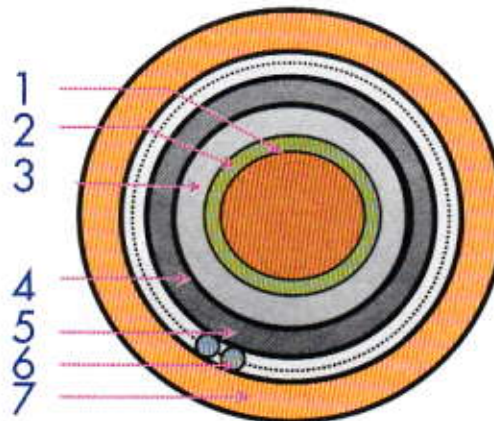
600/1000V XLPE/LSZH Fire Resistant Cables

4-cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20°C Ω/km	Minimum insulation resistance @ 20°C MΩ-km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm						
4	2.5	7/0.67	2.01	0.7	1.8	16	3.5	7.41	2100
4	4	7/0.85	2.55	0.7	1.8	17	3.5	4.61	1800
4	6	7/1.04	3.12	0.7	1.8	18	3.5	3.08	1500
4	10	7/1.35	4.05	0.7	1.8	21	3.5	1.83	1200
4	16	*	4.7	0.7	1.8	23	3.5	1.15	1100
4	25	*	5.9	0.9	1.8	27	3.5	0.727	1100
4	35	*	7.0	0.9	1.8	29	3.5	0.524	1000
4	50	*	8.0	1.0	1.9	33	3.5	0.387	900
4	70	*	9.7	1.1	2.0	37	3.5	0.268	900
4	95	*	11.4	1.1	2.1	42	3.5	0.193	800
4	120	*	12.8	1.2	2.1	46	3.5	0.153	700
4	150	*	14.3	1.4	2.3	51	3.5	0.124	800
4	185	*	15.8	1.6	2.4	57	3.5	0.0991	800
4	240	*	18.3	1.7	2.6	63	3.5	0.0754	700
4	300	*	20.5	1.8	2.8	70	3.5	0.0601	700
4	400	*	23.3	2.0	3.3	78	3.5	0.0470	700

* Compacted round

600/1000V XLPE/LSZH/AWA/LSZH FIRE RESISTANT CABLE (SINGLE - CORE)



CONSTRUCTION

- | | |
|----------------------|--|
| 1. Conductor | : Annealed copper wire, stranded |
| 2. Fire proof layer | : Fire proof mica tape |
| 3. Insulation | : Cross-linked Polyethylene |
| 4. Binder tape | : Suitable tape |
| 5. Separation Sheath | : Flame retardant low smoke zero halogen |
| 6. Armour | : Aluminium wire |
| 7. Outer sheath | : Flame retardant low smoke zero halogen |

CORE IDENTIFICATION

The core shall be identified as follows:

- 1-core : Natural colour of XLPE compound

FEATURES

- Fully complies with BS 6387 Cat. C, W, Z and IEC 60331 fire resistance tests.
- Reduced flame propagation - IEC 60332 part 3 Cat. A, B, C.
- Low smoke emission - IEC 61034.
- Low acid gas emission - IEC 60754 part 1 : < 0.5% acid gas.

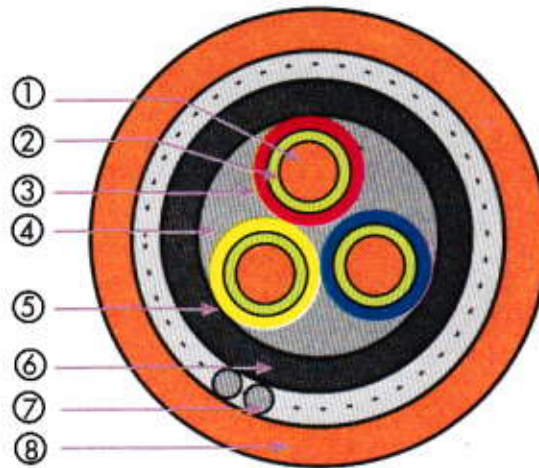
600/1000V XLPE/LSZH/AWA/LSZH Fire Resistant Cables

1-core cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of separation sheath mm	Armour wire diameter mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20°C Ω/km	Minimum insulation resistance @ 20°C MΩ-km	A.C. resistance @ 90°C Ω/km	Reactance @ 60Hz Ω/km	Capacitance μF/km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm											
1	6	7/1.04	3.12	0.7	1.2	1.6	1.8	14	3.5	3.08	1500	3.93	0.186	0.30
1	10	7/1.35	4.05	0.7	1.2	1.6	1.8	15	3.5	1.83	1200	2.33	0.175	0.32
1	16	*	4.7	0.7	1.2	1.6	1.8	17	3.5	1.15	1100	1.47	0.171	0.35
1	25	*	5.9	0.9	1.2	1.6	1.8	18	3.5	0.727	1100	0.927	0.160	0.38
1	35	*	7.0	0.9	1.2	1.6	1.8	19	3.5	0.524	1000	0.669	0.148	0.42
1	50	*	8.0	1.0	1.2	1.6	1.8	21	3.5	0.387	900	0.494	0.142	0.45
1	70	*	9.7	1.1	1.2	1.6	1.8	22	3.5	0.268	900	0.343	0.134	0.49
1	95	*	11.4	1.1	1.2	1.6	1.8	24	3.5	0.193	800	0.248	0.129	0.55
1	120	*	12.8	1.2	1.2	1.6	1.8	26	3.5	0.153	700	0.197	0.126	0.57
1	150	*	14.3	1.4	1.2	1.6	1.8	28	3.5	0.124	800	0.160	0.123	0.57
1	185	*	15.8	1.6	1.2	1.6	1.8	30	3.5	0.0991	800	0.129	0.121	0.55
1	240	*	18.3	1.7	1.2	1.6	1.9	33	3.5	0.0754	700	0.0998	0.116	0.60
1	300	*	20.5	1.8	1.2	2.0	2.0	36	3.5	0.0601	700	0.0812	0.114	0.62
1	400	*	23.3	2.0	1.2	2.0	2.2	40	3.5	0.0470	700	0.0657	0.122	0.64
1	500	*	26.4	2.2	1.2	2.0	2.3	43	3.5	0.0366	700	0.0618	0.107	0.66
1	630	127/2.52	32.76	2.4	1.3	2.5	2.4	51	3.5	0.0283	600	0.0504	0.105	0.70
1	800	127/2.85	37.05	2.6	1.3	2.5	2.6	56	3.5	0.0221	600	0.0456	0.102	0.89
1	1000	127/3.20	41.60	2.8	1.4	2.5	2.7	62	3.5	0.0176	600	0.0379	0.101	0.12

* Compacted round

600/1000V XLPE/LSZH/SWA/LSZH FIRE RESISTANT CABLE



CONSTRUCTION

- | | |
|----------------------|--|
| 1. Conductor | : Annealed copper wire, stranded |
| 2. Fire proof layer | : Fire proof mica tape |
| 3. Insulation | : Cross-linked Polyethylene |
| 4. Filler | : Suitable filler |
| 5. Binder tape | : Suitable tape |
| 6. Separation Sheath | : Flame retardant low smoke zero halogen |
| 7. Armour | : Galvanised steel wire |
| 8. Outer sheath | : Flame retardant low smoke zero halogen |

CORE IDENTIFICATION

The core shall be identified as follows:

- | | |
|--------|----------------------------|
| 2-core | : Red, Black |
| 3-core | : Red, Yellow, Blue |
| 4-core | : Red, Yellow, Blue, Black |

FEATURES

- Fully complies with BS 6387 Cat. C, W, Z and IEC 60331 fire resistance tests.
- Reduced flame propagation - IEC 60332 part 3 Cat. A, B, C.
- Low smoke emission - IEC 61034.
- Low acid gas emission - IEC 60754 part 1 : < 0.5% acid gas.

FIRE RESISTING CHARACTERISTICS
(BS 6387 Cat. C,W & Z for overall diameter < 20mm)
(BS 7846 Cat F2 for overall diameter > 20mm)

Category	Test method	Performance requirement
C	Flame of 950 °C and test voltage of the rated voltage of the cable shall be applied for 3 hours.	No failure of any of the 3A fuses occurs, nor any lamp extinguished and capable of withstanding the rated voltage of the cable.
W	Flame of 650 °C and test voltage of the rated voltage of the cable shall be applied for 15 min. water shall be sprayed on burnt area and flame shall be applied for a further 15 min.	
Z, F2	Flame of 950 °C and test voltage of the rated voltage of the cable shall be applied for 15 min. During this duration a shock producing device is applied for striking the wall on which the cable is mounted.	

600/1000V XLPE/LSZH/SWA/LSZH Fire Resistant Cables

2 - cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of separation sheath mm	Armour wire diameter mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20 °C Ω/km	Minimum insulation resistance @ 20 °C MΩ-km	A.C. resistance @ 90°C Ω-km	Reactance @ 60Hz MΩ-km	Capacitance uF/km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm											
2	1.5	7/0.53	1.59	0.7	1.2	0.9	1.8	17	3.5	12.1	2200	15.43	0.119	0.23
2	2.5	7/0.67	2.01	0.7	1.2	0.9	1.8	18	3.5	7.41	2100	9.45	0.112	0.25
2	4	7/0.85	2.55	0.7	1.2	0.9	1.8	19	3.5	4.61	1800	5.88	0.105	0.27
2	6	7/1.04	3.12	0.7	1.2	1.25	1.8	21	3.5	3.08	1500	3.93	0.100	0.30
2	10	7/1.35	4.05	0.7	1.2	1.25	1.8	23	3.5	1.83	1200	2.33	0.0942	0.32
2	16	*	4.7	0.7	1.2	1.25	1.8	24	3.5	1.15	1100	1.47	0.0913	0.35
2	25	*	5.9	0.9	1.2	1.6	1.8	28	3.5	0.727	1100	0.927	0.0922	0.38
2	35	*	7.0	0.9	1.2	1.6	1.8	30	3.5	0.524	1000	0.669	0.0892	0.42
2	50	*	8.0	1.0	1.2	1.6	1.9	33	3.5	0.387	900	0.494	0.0887	0.45
2	70	*	9.7	1.1	1.2	2.0	2.0	38	3.5	0.268	900	0.343	0.0872	0.49
2	95	*	11.4	1.1	1.2	2.0	2.1	41	3.5	0.193	800	0.248	0.0850	0.55
2	120	*	12.8	1.2	1.2	2.0	2.3	45	3.5	0.153	700	0.197	0.0846	0.57
2	150	*	14.3	1.4	1.3	2.5	2.4	50	3.5	0.124	800	0.160	0.0850	0.57
2	185	*	15.8	1.6	1.3	2.5	2.6	55	3.5	0.0991	800	0.129	0.0854	0.55
2	240	*	18.3	1.7	1.4	2.5	2.7	60	3.5	0.0754	700	0.0998	0.0843	0.60
2	300	*	20.5	1.8	1.5	2.5	2.9	66	3.5	0.0601	700	0.0812	0.0836	0.62
2	400	*	23.3	2.0	1.7	2.5	3.2	73	3.5	0.0470	700	0.0657	0.0833	0.64

* Compacted round

3 - cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of separation sheath mm	Armour wire diameter mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20 °C Ω/km	Minimum insulation resistance @ 20 °C MΩ·km	A.C. resistance @ 90°C Ω/km	Reactance @ 60Hz MΩ/km	Capacitance uF/km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm											
3	1.5	7/0.53	1.59	0.7	1.2	0.9	1.8	17	3.5	12.1	2200	15.43	0.119	0.23
3	2.5	7/0.67	2.01	0.7	1.2	0.9	1.8	18	3.5	7.41	2100	9.45	0.112	0.25
3	4	7/0.85	2.55	0.7	1.2	1.25	1.8	20	3.5	4.61	1800	5.88	0.105	0.27
3	6	7/1.04	3.12	0.7	1.2	1.25	1.8	22	3.5	3.08	1500	3.93	0.100	0.30
3	10	7/1.35	4.05	0.7	1.2	1.25	1.8	24	3.5	1.83	1200	2.33	0.0942	0.32
3	16	*	4.7	0.7	1.2	1.6	1.8	26	3.5	1.15	1100	1.47	0.0913	0.35
3	25	*	5.9	0.9	1.2	1.6	1.8	30	3.5	0.727	1100	0.927	0.0922	0.38
3	35	*	7.0	0.9	1.2	1.6	1.8	32	3.5	0.524	1000	0.669	0.0892	0.42
3	50	*	8.0	1.0	1.2	1.6	2.0	35	3.5	0.387	900	0.494	0.0887	0.45
3	70	*	9.7	1.1	1.2	2.0	2.1	40	3.5	0.268	900	0.343	0.0872	0.49
3	95	*	11.4	1.1	1.2	2.0	2.2	44	3.5	0.193	800	0.248	0.0850	0.55
3	120	*	12.8	1.2	1.2	2.0	2.3	48	3.5	0.153	700	0.197	0.0846	0.57
3	150	*	14.3	1.4	1.3	2.5	2.5	53	3.5	0.124	800	0.160	0.0850	0.57
3	185	*	15.8	1.6	1.4	2.5	2.7	58	3.5	0.0991	800	0.129	0.0854	0.55
3	240	*	18.3	1.7	1.5	2.5	2.9	65	3.5	0.0754	700	0.0998	0.0843	0.60
3	300	*	20.5	1.8	1.6	2.5	3.0	70	3.5	0.0601	700	0.0812	0.0836	0.62
3	400	*	23.3	2.0	1.8	3.15	3.4	80	3.5	0.0470	700	0.0657	0.0833	0.64

* Compacted round

4 - cores cable

No. of cores	Conductor			Nominal thickness of insulation mm	Nominal thickness of separation sheath mm	Armour wire diameter mm	Nominal thickness of sheath mm	Approx. overall diameter mm	Test voltage kV/5min	Maximum conductor resistance @ 20 °C Ω/km	Minimum insulation resistance @ 20 °C MΩ·km	A.C. resistance @ 90°C Ω/km	Reactance @ 60Hz MΩ/km	Capacitance uF/km
	Nominal sectional area mm ²	No./dia. of wire No./mm	Approx. outer diameter mm											
4	1.5	7/0.53	1.59	0.7	1.2	0.9	1.8	19	3.5	12.1	2200	15.43	0.119	0.23
4	2.5	7/0.67	2.01	0.7	1.2	1.25	1.8	20	3.5	7.41	2100	9.45	0.112	0.25
4	4	7/0.85	2.55	0.7	1.2	1.25	1.8	22	3.5	4.61	1800	5.88	0.105	0.27
4	6	7/1.04	3.12	0.7	1.2	1.25	1.8	23	3.5	3.08	1500	3.93	0.100	0.30
4	10	7/1.35	4.05	0.7	1.2	1.25	1.8	26	3.5	1.83	1200	2.33	0.0942	0.32
4	16	*	4.7	0.7	1.2	1.6	1.8	28	3.5	1.15	1100	1.47	0.0913	0.35
4	25	*	5.9	0.9	1.2	1.6	1.8	32	3.5	0.727	1100	0.927	0.0922	0.38
4	35	*	7.0	0.9	1.2	1.6	1.9	35	3.5	0.524	1000	0.669	0.0892	0.42
4	50	*	8.0	1.0	1.2	1.6	2.1	39	3.5	0.387	900	0.494	0.0887	0.45
4	70	*	9.7	1.1	1.2	2.0	2.2	43	3.5	0.268	900	0.343	0.0872	0.49
4	95	*	11.4	1.1	1.2	2.0	2.3	48	3.5	0.193	800	0.248	0.0850	0.55
4	120	*	12.8	1.2	1.3	2.5	2.5	53	3.5	0.153	700	0.197	0.0846	0.57
4	150	*	14.3	1.4	1.4	2.5	2.7	58	3.5	0.124	800	0.160	0.0850	0.57
4	185	*	15.8	1.6	1.5	2.5	2.8	64	3.5	0.0991	800	0.129	0.0854	0.55
4	240	*	18.3	1.7	1.6	2.5	3.1	71	3.5	0.0754	700	0.0998	0.0843	0.60
4	300	*	20.5	1.8	1.7	2.5	3.3	77	3.5	0.0601	700	0.0812	0.0836	0.62
4	400	*	23.3	2.0	1.9	3.15	3.6	87	3.5	0.0470	700	0.0657	0.0833	0.64

* Compacted round

TECHNICAL DATA

CURRENT RATING DATA CORRECTION FACTORS

Table 4B1
16th Edition,
IEE Wiring Regulations

Correction factors for groups of more than one circuit of single-core cables, or more than one multicore cable (to be applied to the corresponding current-carrying capacity for a single circuit in Tables 4D1 to 4D4, 4E1 to 4E4, 4F1 and 4F2, 4J1, 4K1 to 4K4, 4L1 to 4L4)**

REFERENCE METHOD OF INSTALLATION (SEE TABLE 4 A)	CORRECTION FACTOR (C_g)													
	NUMBER OF CIRCUITS OR MULTICORE CABLES													
	2	3	4	5	6	7	8	9	10	12	14	16	18	20
Enclosed (Method 3 or 4) or bunched and clipped direct to a non-metallic surface (Method 1)	0.80	0.70	0.65	0.60	0.57	0.54	0.52	0.50	0.48	0.45	0.43	0.41	0.39	0.38
Single layer clipped to a non metallic surface (Method 1)	Touching	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70	-	-	-	-	-
	Spaced*	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Single layer multicore on a perforated metal cable tray, vertical or horizontal (Method 11)	Touching	0.86	0.81	0.77	0.75	0.74	0.73	0.73	0.72	0.71	0.70	-	-	-
	Spaced*	0.91	0.89	0.88	0.87	0.87	-	-	-	-	-	-	-	-
Single layer single-core on a perforated metal cable tray, touching (Method 11)	Horizontal	0.90	0.85	-	-	-	-	-	-	-	-	-	-	-
	Vertical	0.85	-	-	-	-	-	-	-	-	-	-	-	-
Single layer multicore touching on ladder supports (Method 13)	0.86	0.82	0.80	0.79	0.78	0.78	0.78	0.77	-	-	-	-	-	-

- * Spaced by a clearance between adjacent surfaces of at least one cable diameter (D_c). Where the horizontal clearances between adjacent cables exceeds $2D_c$, no correction factor need be applied.
- ** When cables having differing conductor operating temperatures are grouped together, the current rating shall be based upon the lowest operating temperature of any cable in the group.

Notes to Table 4B1

1. The factors in the table are applicable to groups of cables all of one size. The value of current derived from application of the appropriate factors is the maximum current to be carried by any of the cables in the group.
2. If, due to known operating conditions, a cable is expected to carry not more than 30% of its grouped rating, it may be ignored for the purpose of obtaining the rating factor for the rest of the group. For example, a group of N loaded cables would normally require a group reduction factor of C_g applied to the tabulated I_c , however, if M cables in the group carry loads which are not greater than $0.3 C_g I_c$ amperes the other cables can be sized by using the group rating factor corresponding to $(N-M)$ cables.

Table derived from IEE copyright information.

SINGLE CORE CABLES HAVING XLPE INSULATION, NON-ARMOURED, WITH OR WITHOUT SHEATH COPPER CONDUCTORS

Table 4E1A
Current-Carrying Capacity (Amperes):
16th Edition,
IEE Wiring Regulations

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

Conductor Cross Sectional Area	Reference Method 4 (Enclosed in conduit in thermally insulating wall etc)		Reference Method 3 (Enclosed in conduit on a wall or in trunking etc)		Reference Method 1 (Clipped Direct)		Reference Method 11 (On a perforated cable tray horizontal or vertical)		Reference Method 12 (Free Air)		
	2 Cables, Single-Phase A.C. or D.C.	3 or 4 Cables Three-Phase A.C.	2 Cables, Single-Phase A.C. or D.C.	3 or 4 Cables Three-Phase A.C.	2 Cables, Single-Phase A.C. or D.C. Flat and Touching	3 or 4 Cables Three-Phase A.C. Flat and Touching or Trefoil	2 Cables, Single-Phase A.C. or D.C. Flat and Touching	3 or 4 Cables Three-Phase A.C. Flat and Touching or Trefoil	Horizontal Flat Spaced	Vertical Flat Spaced	Trefoil
1	2	3	4	5	6	7	8	9	10	11	12
mm ²	A	A	A	A	A	A	A	A	A	A	A
1	14	13	17	15	19	17.5	-	-	-	-	-
1.5	18	17	22	19	25	23	-	-	-	-	-
2.5	24	23	30	26	34	31	-	-	-	-	-
4	33	30	40	35	46	41	-	-	-	-	-
6	43	39	51	45	59	54	-	-	-	-	-
10	58	53	71	63	81	74	-	-	-	-	-
16	76	70	95	85	109	99	-	-	-	-	-
25	100	91	126	111	143	130	158	140	183	163	138
35	124	111	156	138	176	161	195	176	226	203	171
50	149	135	189	168	228	209	293	215	274	246	209
70	189	170	240	214	293	268	308	279	351	318	270
95	228	205	290	259	355	326	375	341	426	389	330
120	263	235	336	299	413	379	436	398	495	453	385
150	300	270	375	328	476	436	505	461	570	524	445
185	341	306	426	370	545	500	579	530	651	600	511
240	400	358	500	433	644	590	686	630	769	711	606
300	459	410	513	493	743	681	794	730	886	824	701
400	-	-	683	584	868	793	915	849	1065	984	820
500	-	-	783	666	990	904	1044	973	1228	1150	936
630	-	-	900	764	1130	1033	1191	1115	1423	1338	1069
800	-	-	-	-	1288	1179	1358	1275	1581	1485	1214
1000	-	-	-	-	1443	1323	1520	1436	1775	1671	1349

NOTE: Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see Item 6.2 of the preface to appendix 4 of 16th Edition of the IEE Wiring Regulations.

The current-carrying capacity in columns 2 to 5 are also applicable to flexible cables to BS 7211 Table 3(b) where the cables are used in fixed installations.

For cable in rigid p.v.c. conduit the values stated in Table 4D1 of the 16th Edition of the IEE Wiring Regulations are applicable (See Regulations 521-05).

Where a conductor operates at a temperature exceeding 70 °C it shall be ascertained that the equipment connected to the conductor is suitable for the operating temperature (See Regulation 512-02 of the 16th Edition of the IEE Wiring Regulations).

Table derived from IEE copyright information.

SINGLE CORE CABLES HAVING XLPE INSULATION, NON-ARMOURED, WITH OR WITHOUT SHEATH COPPER CONDUCTORS

Table 4E1B
Voltage Drop Per Ampere Per Meter (mV):
16th Edition,
IEE Wiring Regulations

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

Conductor Cross-Sectional Area 1	2 Cables DC	2 Cables-Single-Phase A.C.								
		Reference Method 3&4 (Enclosed in conduit etc in or on a wall) 3			Reference Method 1 & 11 (Clipped direct or on Trays, Touching) 4			Reference Method 12 (Spaced*) 5		
mm ²	mV	mV			mV			mV		
1	46	46			46			46		
1.5	31	31			31			31		
2.5	19	19			19			19		
4	12	12			12			12		
6	7.9	7.9			7.9			7.9		
10	4.7	4.7			4.7			4.7		
16	2.9	2.9			2.9			2.9		
		r	x	z	r	x	z	r	x	z
25	1.85	1.85	0.31	1.90	1.85	0.190	1.85	1.85	0.28	1.85
35	1.35	1.35	0.29	1.35	1.35	0.180	1.35	1.35	0.27	1.35
50	0.99	1.00	0.29	1.05	0.99	0.180	1.00	0.99	0.27	1.00
70	0.68	0.70	0.28	0.75	0.68	0.175	0.71	0.68	0.26	0.73
95	0.49	0.51	0.27	0.58	0.49	0.170	0.52	0.49	0.26	0.56
120	0.39	0.41	0.26	0.48	0.39	0.165	0.43	0.39	0.25	0.47
150	0.32	0.33	0.26	0.43	0.32	0.165	0.36	0.32	0.25	0.41
185	0.25	0.27	0.26	0.37	0.26	0.165	0.30	0.25	0.25	0.36
240	0.190	0.21	0.26	0.33	0.20	0.160	0.25	0.195	0.25	0.31
300	0.155	0.175	0.25	0.31	0.160	0.160	0.22	0.155	0.25	0.29
400	0.120	0.140	0.25	0.29	0.130	0.155	0.20	0.125	0.24	0.27
500	0.093	0.120	0.25	0.28	0.105	0.155	0.185	0.098	0.24	0.26
630	0.072	0.100	0.25	0.27	0.086	0.155	0.175	0.078	0.24	0.25
800	0.056	-	-	-	0.072	0.150	0.170	0.064	0.24	0.25
1000	0.045	-	-	-	0.063	0.150	0.165	0.054	0.24	0.24

Conductor Cross-Sectional Area 1	3 or 4 cables-Three-Phase A.C.											
	Reference Methods 3&4 (Enclosed in conduit etc in or on a wall) 6			Reference Methods 1,11 & 12 (In Trefoil) 7			Reference Methods 1 & 11 (Flat and Touching) 8			Reference Method 12 (Flat Spaced*) 9		
mm ²	mV			mV			mV			mV		
1	40			40			40			40		
1.5	27			27			27			27		
2.5	16			16			16			16		
4	10			10			10			10		
6	6.8			6.8			6.8			6.8		
10	4.0			4.0			4.0			4.0		
16	2.5			2.5			2.5			2.5		
	r	x	z	r	x	z	r	x	z	r	x	z
25	1.60	0.27	1.65	1.60	0.165	1.60	1.60	0.190	1.60	1.60	0.27	1.65
35	1.15	0.25	1.15	1.15	0.155	1.15	1.15	0.180	1.15	1.15	0.26	1.20
50	0.87	0.25	0.90	0.86	0.155	0.87	0.86	0.180	0.87	0.86	0.26	0.89
70	0.60	0.24	0.65	0.59	0.150	0.61	0.59	0.175	0.62	0.59	0.25	0.65
95	0.44	0.23	0.50	0.43	0.145	0.45	0.43	0.170	0.46	0.43	0.25	0.49
120	0.35	0.23	0.42	0.34	0.140	0.37	0.34	0.165	0.38	0.34	0.24	0.42
150	0.29	0.23	0.37	0.28	0.140	0.31	0.28	0.165	0.32	0.28	0.24	0.37
185	0.23	0.23	0.32	0.22	0.140	0.26	0.22	0.165	0.28	0.22	0.24	0.33
240	0.185	0.22	0.29	0.170	0.140	0.22	0.170	0.165	0.24	0.170	0.24	0.29
300	0.150	0.22	0.27	0.140	0.140	0.195	0.135	0.160	0.21	0.135	0.24	0.27
400	0.125	0.22	0.25	0.110	0.135	0.175	0.110	0.160	0.195	0.110	0.24	0.26
500	0.100	0.22	0.24	0.090	0.135	0.160	0.088	0.160	0.180	0.085	0.24	0.25
630	0.088	0.21	0.23	0.074	0.135	0.150	0.071	0.160	0.170	0.068	0.23	0.24
800	-	-	-	0.062	0.130	0.145	0.059	0.155	0.165	0.055	0.23	0.24
1000	-	-	-	0.055	0.130	0.140	0.050	0.155	0.165	0.047	0.23	0.24

NOTE: Spacings larger than those specified in Method 12 (see Table 4A of the 16th Edition of the IEE Wiring Regulations) will result in larger volt drops.
Table derived from IEE copyright information.

SINGLE CORE CABLES HAVING XLPE INSULATION, (NON-MAGNETIC ARMoured), COPPER CONDUCTORS

Table 4E3A
Current-Carrying Capacity (Amperes):
16th Edition,
IEE Wiring Regulations

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

Conductor Cross-Sectional Area 1	Reference Method I (Clipped direct)		Reference Method II (On a perforated cable tray)		Reference Method 12 (Free Air)						
	2 Cables, Single-Phase A.C. or D.C. Flat & Touching 2	3 or 4 Cables Three-Phase A.C. Flat & Touching 3	2 Cables, Single-Phase A.C. or D.C. Flat & Touching 4	3 or 4 Cables Three-Phase A.C. Flat & Touching 5	2 Cables Single Phase A.C.		2 Cables D.C.		3 or 4 Cables, Three Phase A.C.		
					Horizontal Flat Spaced 6	Vertical Flat Spaced 7	Horizontal Spaced 8	Vertical Spaced 9	Horizontal Flat Spaced 10	Vertical Flat Spaced 11	3 Cables Trefoil 12
1	2	3	4	5	6	7	8	9	10	11	12
mm ²	A	A	A	A	A	A	A	A	A	A	A
50	237	220	253	232	282	266	284	270	288	266	222
70	303	277	322	293	357	337	356	349	358	331	285
95	367	333	389	352	436	412	446	426	425	393	346
120	425	383	449	405	504	477	519	497	485	449	402
150	488	437	516	462	566	539	600	575	549	510	463
185	557	496	587	524	643	614	688	660	618	574	529
240	656	579	689	612	749	714	815	782	715	666	625
300	755	662	792	700	842	805	943	906	910	755	720
400	853	717	899	767	929	889	1137	1094	848	797	815
500	962	791	1016	851	1032	989	1314	1266	923	871	918
630	1082	861	1146	935	1139	1092	1528	1474	992	940	1027
800	1170	904	1246	987	1204	1155	1809	1744	1042	978	1119
1000	1261	961	1345	1055	1289	1238	2100	2026	1110	1041	1214

- Notes: 1. Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to appendix 4 of the IEE Wiring Regulations, 16th Edition.
2. Where a conductor operates at a temperature exceeding 70 °C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (See Regulation 512-02, of the IEE Wiring Regulations, 16th Edition).

Table derived from IEE copyright information.

SINGLE CORE CABLES HAVING XLPE INSULATION, NON-ARMOURED, WITH OR WITHOUT SHEATH COPPER CONDUCTORS

Table 4E3B

Voltage Drop Per Ampere Per Metre (mV):

16th Edition,

IEE Wiring Regulations

Conductor operating temperature: 90°C

Conductor Cross- Sectional Area 1	2 Cables DC 2	2 Cables-Single-Phase A.C.						3 or 4 Cables-Three Phase A.C.								
		Reference Methods 1 & 11 (Touching) 3			Reference Methods 12 (Spaced*) 4			Reference Methods 1, 11 and 12 (In Trefoil Touching) 5			Reference Methods 1&11 (Flat Touching) 6			Reference Methods 12 (Flat spaced) 7		
		mV			mV			mV			mV			mV		
mm ²	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	
50	0.98	0.99	0.21	1.00	0.98	0.29	1.00	0.86	0.180	0.87	0.84	0.25	0.88	0.84	0.33	0.90
70	0.67	0.68	0.200	0.71	0.69	0.29	0.75	0.59	0.170	0.62	0.60	0.25	0.65	0.62	0.32	0.70
95	0.49	0.51	0.195	0.55	0.53	0.28	0.60	0.44	0.170	0.47	0.46	0.24	0.52	0.49	0.31	0.58
120	0.39	0.41	0.190	0.45	0.43	0.27	0.51	0.35	0.165	0.39	0.38	0.24	0.44	0.41	0.30	0.51
150	0.31	0.33	0.185	0.38	0.36	0.27	0.45	0.29	0.160	0.33	0.31	0.23	0.39	0.34	0.29	0.45
185	0.25	0.27	0.185	0.33	0.30	0.26	0.40	0.23	0.160	0.28	0.26	0.23	0.34	0.29	0.29	0.41
240	0.195	0.21	0.180	0.28	0.24	0.26	0.35	0.180	0.155	0.24	0.21	0.22	0.30	0.24	0.28	0.37
300	0.155	0.170	0.175	0.25	0.195	0.25	0.32	0.145	0.150	0.21	0.170	0.22	0.28	0.20	0.27	0.34
400	0.115	0.145	0.170	0.22	0.180	0.24	0.30	0.125	0.150	0.195	0.160	0.21	0.27	0.20	0.27	0.33
500	0.093	0.125	0.170	0.21	0.165	0.24	0.29	0.105	0.145	0.180	0.145	0.20	0.25	0.190	0.24	0.31
630	0.073	0.105	0.165	0.195	0.150	0.23	0.27	0.092	0.145	0.170	0.135	0.195	0.24	0.175	0.23	0.29
800	0.056	0.090	0.160	0.190	0.145	0.23	0.27	0.086	0.140	0.165	0.130	0.180	0.23	0.175	0.195	0.26
1000	0.045	0.092	0.155	0.180	0.140	0.21	0.25	0.080	0.135	0.155	0.125	0.170	0.21	0.165	0.180	0.24

*Note: Spacings larger than those specified in Method 12 (See Table 4A of the IEE Wiring Regulations, 16th Edition) will result in larger voltage drop.

Tables derived from IEE copyright information.

MULTICORE ARMoured CABLES HAVING XLPE INSULATION, COPPER CONDUCTORS

Table 4E4A
Current-Carrying Capacity (Amperes):
16th Edition,
IEE Wiring Regulations

Conductor operating temperature: 90°C

Conductor Cross-Sectional Area 1	Reference Method I (Clipped direct)		Reference Method II (On a perforated horizontal or vertical cable tray) or Reference Method 13 (free air)	
	1 Two-Core Cable, Single Phase A.C. or D.C. 2	1 Three or Four Core Cable, Three-Phase A.C. 3	1 Two-Core Cable, Single Phase A.C. or D.C. 4	1 Three or Four Core Cable, Three-Phase A.C. 5
mm ²	A	A	A	A
1.5	27	23	29	25
2.5	36	31	39	33
4	49	42	52	44
6	62	53	66	56
10	85	73	90	78
16	110	94	115	99
25	146	124	152	131
35	180	154	188	162
50	219	187	228	197
70	279	238	291	251
95	338	289	354	304
120	392	335	410	353
150	451	386	472	406
185	515	441	539	463
240	607	520	636	546
300	698	599	732	628
400	787	673	847	728

- Notes: 1. Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to appendix 4 of the IEE Wiring Regulations, 16th Edition.
 2. Where a conductor operates at a temperature exceeding 70 °C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (See Regulation 512-02, of the IEE Wiring Regulations, 16th Edition).

Table 4E4B
Voltage Drop Per Ampere Per Metre (mV):
16th Edition,
IEE Wiring Regulations

Conductor operating temperature: 90°C

Conductor Cross-Sectional Area 1	Two-Core Cable D.C.	Two-Core Cable Single Phase A.C.			Three or Four-Core Cable Three-Phase A.C.		
	2	3			4		
mm ²	mV	mV			mV		
1.5	31	31			27		
2.5	19	19			16		
4	12	12			10		
6	7.9	7.9			6.8		
10	4.7	4.7			4.0		
16	2.9	2.9			2.5		
		r	x	z	r	x	z
25	1.85	1.85	0.160	1.90	1.60	0.140	1.65
35	1.35	1.35	0.155	1.35	1.15	0.135	1.15
50	0.98	0.99	0.155	1.00	0.86	0.135	0.87
71	0.67	0.67	0.150	0.69	0.59	0.130	0.60
95	0.49	0.50	0.150	0.52	0.43	0.130	0.45
120	0.39	0.40	0.145	0.42	0.34	0.130	0.37
150	0.31	0.32	0.145	0.35	0.28	0.125	0.30
185	0.25	0.26	0.145	0.29	0.22	0.125	0.26
240	0.195	0.20	0.140	0.24	0.175	0.125	0.21
300	0.155	0.16	0.140	0.21	0.140	0.120	0.185
400	0.120	0.13	0.145	0.195	0.115	0.125	0.170

Tables derived from IEE copyright information.

CABLES HAVING PE INSULATION, NON-ARMOURED COPPER CONDUCTORS

Voltage Drop Per Ampere Per Metre (mV):

Ambient temperature: 30°C
Conductor operating temperature: 75°C

Conductor Cross-Sectional Area	Clipped direct to a surface or on a cable tray, bunched and unenclosed				
	One cable	2 Cables, single-phase A.C. or D.C.		3 or 4 cables, Three-phase A.C.	
	Current rating	Current rating	Volt drop per ampere per meter	Current rating	Volt drop per ampere per meter
mm ²	A	A	mV	A	mV
1	21	18	43	17	37
1.5	27	23	29	21	25
2.5	38	32	17	30	15
4	49	42	11	39	9.7
6	64	54	7.5	51	6.5
10	88	75	4.5	70	3.9
16	115	98	2.8	92	2.4
25	150	125	1.8	120	1.5
35	190	160	1.3	150	1.1
50	235	200	0.97	185	0.84
70	295	250	0.69	235	0.59
95	350	295	0.52	280	0.45
120	415	350	0.43	330	0.37
150	485	410	0.37	385	0.32
185	540	460	0.32	430	0.28
240	640	545	0.27	510	0.24
300	745	635	0.25	595	0.22
400	880	750	0.22	700	0.19
500	1000	850	0.21	800	0.18
630	1190	1010	0.20	950	0.17

Conductor Cross-Sectional Area	Installation in air			Insulation in conduit		
	Single Conductor	Twin Conductors	Three Conductors	Single Conductor	Twin Conductors	Three Conductors
	3 Cables S=2d	1 Cable	1 Cable	(In Trefoil)	1 Cable	1 Cable
mm ²	A mV	A mV	A mV	A mV	A mV	A mV
1	20 (38)	18 (44)	16 (38)	16 (38)	14 (44)	12 (38)
1.5	26 (25)	22 (30)	20 (25)	20 (25)	19 (30)	15 (25)
2.5	36 (16)	31 (18)	27 (16)	27 (16)	25 (18)	21 (16)
4	47 (9.7)	43 (11)	36 (9.7)	36 (9.7)	33 (11)	29 (9.7)
6	61 (6.5)	54 (7.5)	46 (6.5)	45 (6.5)	42 (7.5)	36 (6.5)
10	84 (3.9)	74 (4.5)	63 (3.9)	61 (3.9)	57 (4.5)	49 (3.9)
16	110 (2.4)	97 (2.8)	83 (2.4)	81 (2.4)	75 (2.8)	65 (2.4)
25	145 (1.6)	130 (1.8)	105 (1.6)	105 (1.6)	98 (1.8)	85 (1.6)
35	180 (1.1)	155 (1.3)	135 (1.1)	125 (1.1)	120 (1.3)	100 (1.1)
50	225 (0.86)	195 (1.0)	160 (0.83)	160 (0.83)	150 (1.0)	120 (0.83)
70	280 (0.62)	245 (0.67)	205 (0.58)	195 (0.59)	190 (0.67)	155 (0.58)
95	335 (0.48)	305 (0.50)	265 (0.43)	240 (0.44)	230 (0.50)	195 (0.43)
120	395 (0.41)	350 (0.40)	290 (0.35)	280 (0.36)	270 (0.40)	230 (0.35)
150	460 (0.36)	405 (0.34)	340 (0.29)	320 (0.30)	310 (0.34)	265 (0.29)
185	515 (0.33)	450 (0.29)	395 (0.25)	370 (0.26)	360 (0.29)	305 (0.25)
240	610 (0.30)	530 (0.24)	460 (0.21)	440 (0.22)	415 (0.24)	360 (0.21)
300	710 (0.28)	610 (0.21)	535 (0.18)	515 (0.20)	485 (0.21)	415 (0.18)

 **"Tsunagu" Technology**
Fujikura Federal Cables Sdn. Bhd.
(Company No.: 77903-A)

Reg. Office, Main Office	:	5097, Mak Mandin Industrial Estate, 13400 Butterworth.
	&	P.O. Box 70, 12700 Butterworth, Penang, Malaysia.
Main Sales Office	:	Tel : 04-3315577 , 04-3325603 (Sales)
		Fax: 04-3318641 , 04-3328801 (Sales)
		Email: sle@ffcpg.com.my
		Website: www.ffcpg.com.my
PJ Sales Office	:	3.03 Level 3, Wisma Academy, No. 4A, Jalan 19/1,
		46300 Petaling Jaya, Selangor Darul Ehsan, Malaysia.
		Tel : 03-79561566 , 03-79561623
		Fax: 03-79568909 , 03-79573304
		Email: ffc_pj@streamyx.com