



*FEC Cables (M) Sdn. Bhd.*



***Fire Resistant Cables***

# CORPORATE HISTORY

FEC Cables (M) Sdn. Bhd. was first established in 1967 and was previously known as Furukawa Electric Cables (M) Sdn. Bhd. In all the years until 2003, the company had been under the management and control of Furukawa Electric Co. Ltd. of Japan.

In 2003, the company was renamed FEC Cables (M) Sdn. Bhd. following the acquisition of its major equity stake by Permodalan Nasional Berhad, Malaysia's government-owned premier multi-billion dollar investment institution.

The Company had started a technical collaboration from world renowned cable manufacturer, The Furukawa Electric Co. Ltd Japan (Furukawa Japan).

FEC Cables has benefited enormously from the technical collaboration and the subsequent technology transfer with Furukawa Japan. FEC Cables inherited from Furukawa Japan not only its advanced technology and technical know-how but also the disciplines of producing quality products using material conforming to the international standards of manufacturing cables.

Today FEC Cables plays a prominent role as a forerunner in the cable industry.

FEC Cables has been actively involved in serving various industrial sectors, namely the power, telecommunications, construction as well as the oil and gas sectors.

# INTRODUCTION OF COMPANY

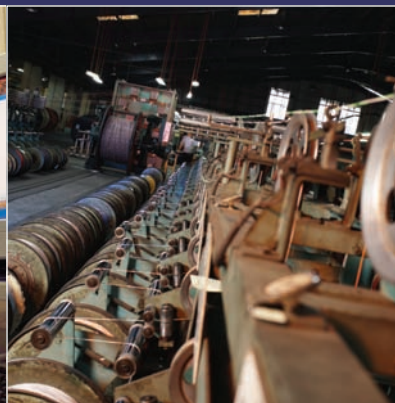
When there is talk of high quality electric wires and cables, the one company that comes to mind is FEC Cables (Malaysia) Sdn. Bhd. FEC is a subsidiary of Permodalan Nasional Berhad and was formerly known as Furukawa Electric Cables (M) Sdn. Bhd. Having established its Shah Alam plant in 1967 on a 7-acre site at the Shah Alam Industrial Estate, Furukawa has come a long way.

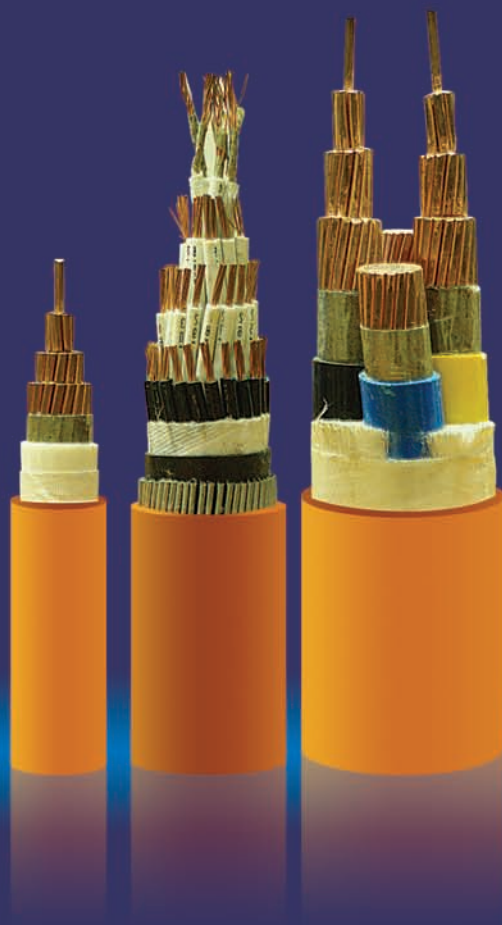
The technical collaboration with our Japanese counterpart, Furukawa Japan, has brought about an amazing success for us. In terms of quality, we have climbed the ladders of product manufacturing, steadily and successfully, pushing FEC towards the pinnacle of excellence.

Putting our customers' demands and needs as our number one priority, we opened our second plant in 1995, on a 27-acre freehold land site in Bukit Raja Industrial area, Klang. In our quest for excellence, we equip the plant with the latest technological aids for the manufacture of a wide range of low and medium voltage cables.

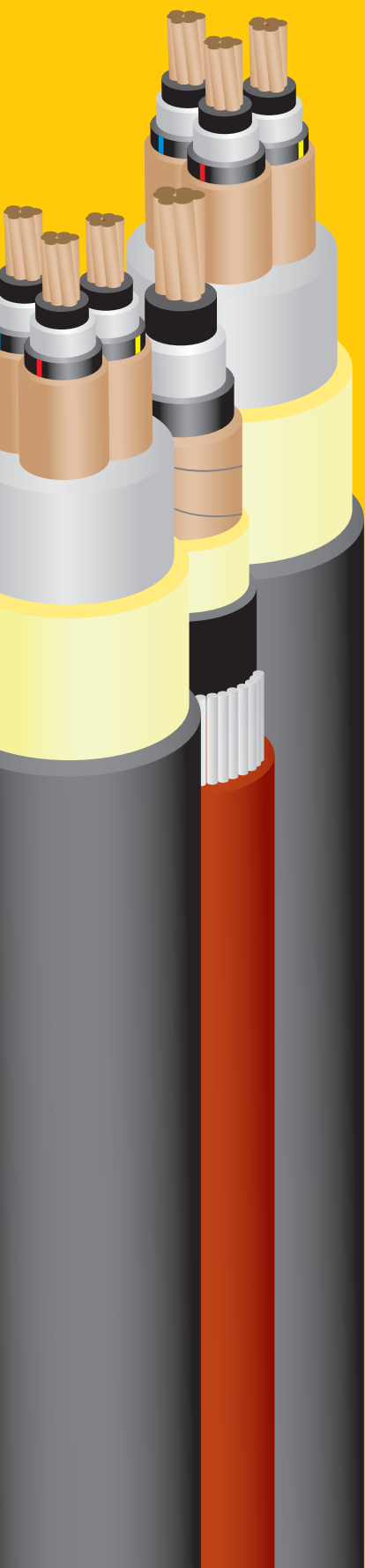
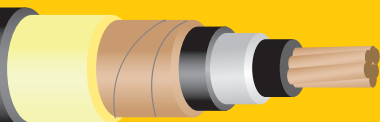
The certification of the ISO 9001 for both plants only proves that we do not compromise on quality and customer satisfaction. Our dedicated and hard-working employees are the backbone of our success. This was greatly helped by the state-of-the-art technology equipment which has led us towards excellence.

Moving towards a new century, we pledge to continually strive towards progressive and dynamic growth as FEC Cables continues its efforts in contributing to the development Malaysia.





## Fire Resistant Cables



INTRODUCTION	5
FIRE TEST PHOTO	5
APPLICATIONS	6
APPLICABLE STANDARDS - SPECIFICATIONS	7
KPA FIRE RESISTANT CABLE	9-15
KPA-1 & KPA 2 - NON-ARMOURED CABLES 600/1000 V	
KPA-1 & KPA 2 - ARMOURED CABLES 600/1000 V	
KPA-3 - NON-ARMOURED CABLES 300/500 V	
FT-8 FIRE RESISTANT CABLE	16-21
FT-8 - NON-ARMOURED CABLES 600/1000 V	
FT-8 - ARMOURED CABLES 600/1000 V	
FT-8 - NON-ARMOURED CABLES 300/500 V	
MIFR FIRE RESISTANT CABLE	22-27
MIFR - NON-ARMOURED CABLES 600/1000 V	
MIFR - ARMOURED CABLES 600/1000 V	
MIFR - NON-ARMOURED CABLES 450/750 V	
TECHNICAL DATA	28

**INTRODUCTION**

**Fire Resistant Cable – Keeps a Safety of Human Life...**

Fire in high rise in urban area are recently becoming a big social problem throughout the world. Major accidents as occurred in the past which have resulted in the deaths of many people would have been avoided if there had been effective fire preventive feature designed and installed to minimize such injuries and damages and to save and protect human life and properties.



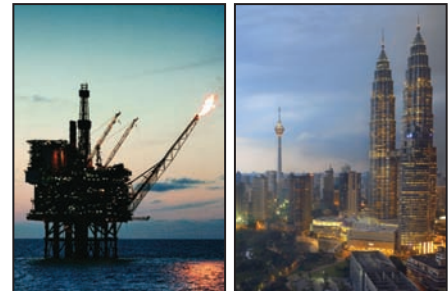
**History**

Since 1985, FEC Cables were the first cable manufacturer to manufacture fire resistant cables in Malaysia. With 20 years of knowledge and experience in designing and manufacturing of Fire Resistant Cables, now we provide complete product range complying with industry standard and applications, including instrumentation, control and low voltage power cables. For safeguarding the human life and as well as protecting the equipment, FEC's Fire Resistant Cables when burnt during a fire, produce very low quantities of smoke and acidic gases.



**Applications**

The FEC's Fire Resistant Cables are specially designed to maintain circuit integrity in a fire, conforming with BS 6387 categories C,W and Z. It's widely use for the installation of safety systems, including lift, smoke exhaust, smoke and fire shutter, fire alarms, emergency lighting, PA systems, hydrants and emergency power supply which used in wide variety of public access building and industrial complexes. For example project using FEC fire resistant cables are Putrajaya and Petronas Twin Tower.



**Quality**

FEC fire resistant cables are manufactured under an ISO 9001 quality system certified by BVQI. We also obtained approval from other accreditation bodies such as BOMBA, SIRIM, JKR, PETRONAS and PSB of Singapore. This proves that we do not compromise on quality and customer satisfaction. Our policy is to meet the requirements of customers by continually :

- Upgrading the skills and productivity of our human resources
- Maintaining the equipment and factory in peak form and performance
- Sourcing cost effective materials
- Improving and effectively implementing our quality management system in accordance to ISO 9001:2000 standard
- Maintaining a harmonious workforce which is dedicated and committed to production of quality cables.

We believe in giving the best ! There is no compromise !

**FIRE TEST PHOTO**

**Fire Test Category CWZ (BS6387) And Flame Propagation Test (IEC 60332-3 Cat. A,B,C)**



FIRE TEST CATEGORY C



FIRE AND WATER TEST CATEGORY W

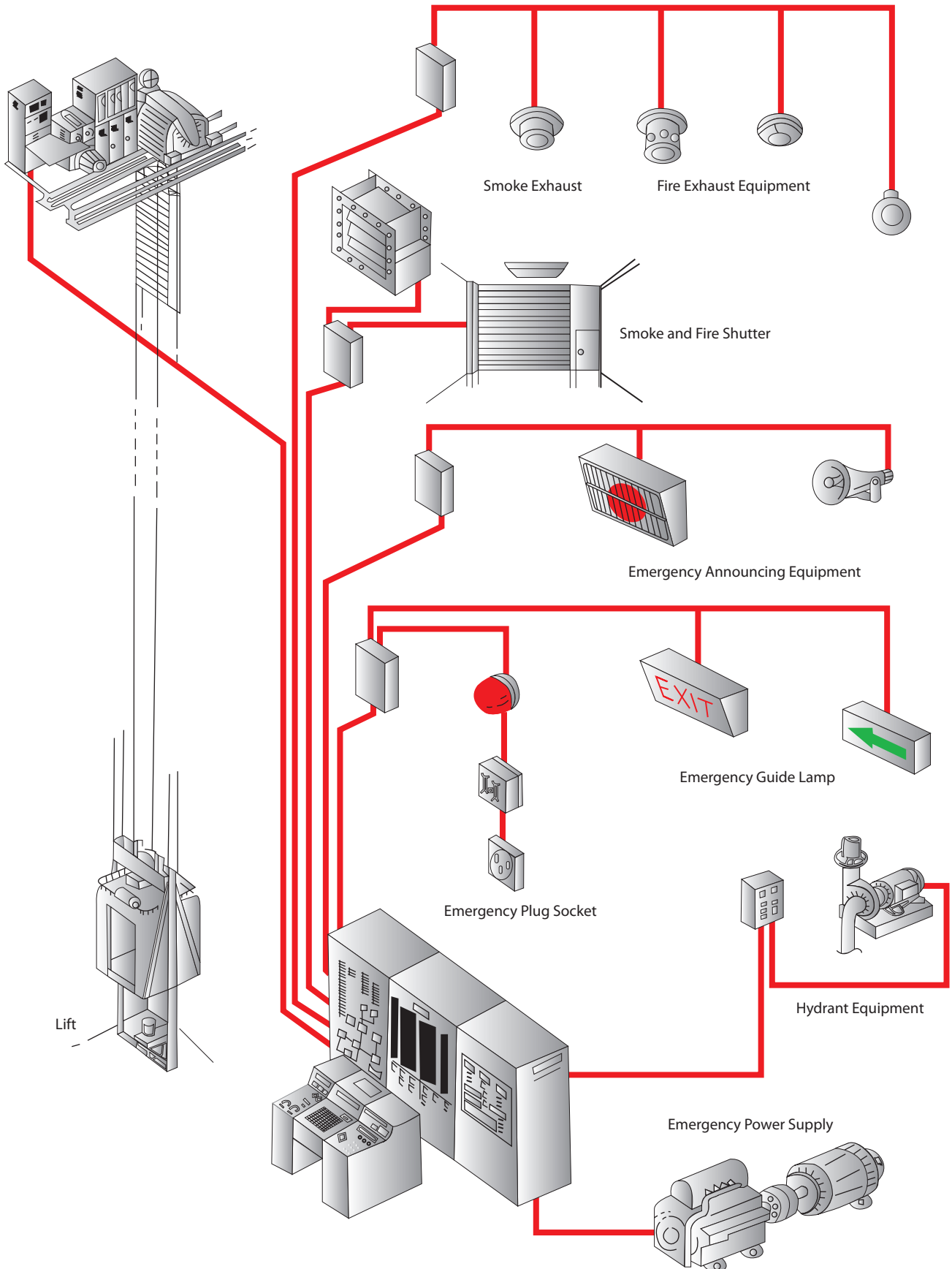


FIRE AND IMPACT TEST CATEGORY Z



CABLES DURING IEC 60332 PART 3 TEST

APPLICATIONS



APPLICABLE STANDARDS - SPECIFICATIONS

**Fire Resistant Test**

**BS 6387, SS 299 Pt. 1, IEC 60331**

Specification for performance requirements for cables required to maintain circuit integrity under fire conditions.

**Resistant to fire alone (BS 6387, SS 299)**

Category A - Cables are subjected to fire at 650°C for 3 hours

Category B - Cables are subjected to fire at 750°C for 3 hours

Category C - Cables are subjected to fire at 950°C for 3 hours

Note : For IEC 60331, cables are subjected to fire at 750°C for 3 hours. In not less than 12 hours after the test, the cable shall again be energized, and there shall not be any breakdown.

**Resistant to fire with water**

Category W - Cables are subjected to fire at 650°C for 15 minutes, then water spray and falme for further 15 minutes.

**Resistant to fire with mechanical shock (BS 6387, SS 299)**

Category X - Cables are subjected to fire at 650°C with mechanical shock for 15 mins.

Category Y - Cables are subjected to fire at 750°C with mechanical shock for 15 mins.

Category Z - Cables are subjected to fire at 950°C with mechanical shock for 15 mins.

During the test, the flame and test voltage shall be applied continuously for a period of 3 hours and no 3A fuse shall ruptured.

**Flame Retardant Test**

**IEC 60332-1**

Tests on a single vertical insulated wire or cable.

**IEC 60332-3**





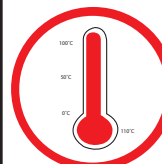


Tests for vertical flame spread of vertically mounted bunched wires and cables.

Category A - 7 litres of combustible material per meter shall be bunched on a ladder exposed to flame for 40 minutes.

Category B - 3.5 litres of combustible material per meter shall be bunched on a ladder exposed to flame for 40 minutes.

Category C - 1.5 litres of combustible material per meter shall be bunched on a ladder exposed to flame for 20 minutes.

The cables specimens are placed vertically next to each other and than exposed to flame for a specific period of time. After the burning has ceased, the charred portion should not exceed a height of 2.5 meters.

						
<p>Fire Resistant tested to IEC 60331/ SS 299/ BS 6387 CWZ</p>	<p>Flame Retardant tested to IEC 60332 - 1&amp;3 Cat. ABC</p>	<p>Zero Halogen tested to IEC 60754 - 1&amp;2</p>	<p>Low Smoke Emission tested to IEC 61034</p>	<p>Temperature Range -25 ~ + 90°C</p>	<p>Acid Gas Emission</p>	<p>Anti Termite &amp; Rodent</p>

APPLICABLE STANDARDS - SPECIFICATION

**Smoke Emission Test**

**IEC 61034**

Measurement of smoke density of electric cables burning under defined conditions.

A one meter length of sample cable is placed in a 3m smoke chamber. Sample of cable are subjected to the flame of burning alcohol. A smoke is then produced within the chamber is measured by a photocell. The minimum light transmittance is recorded and the minimum value is 60% is acceptable.

**Acid Gas Emission Test**

**IEC 60754-1**

Determination of the amount of halogen acid gas evolved during combustion of material from cables.

**IEC 60754-2**

Determination of degree of acidity of gases evolved during combustion of materials taken from electric cables by measuring pH and conductivity.

This standard requires the weighted pH value should not be less than 4.3 when related to 1 litre of water and the weighted value of conductivity should not exceed 10µS/mm.





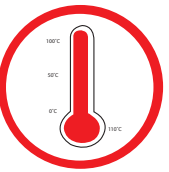


**General Standards**

**IEC 60502-1**

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

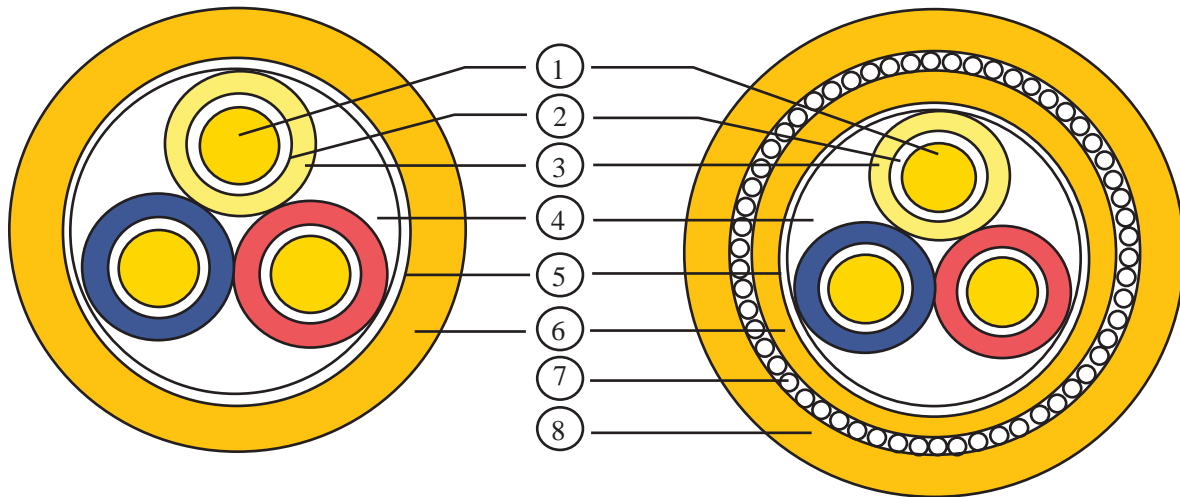
**BS 6004**

PVC insulated cables for electrical power and lighting.

 <p>Fire Resistant tested to IEC 60331/ SS 299/ BS 6387 CWZ</p>	 <p>Flame Retardant tested to IEC 60332 - 1&amp;3 Cat. ABC</p>	 <p>Zero Halogen tested to IEC 60754 - 1&amp;2</p>	 <p>Low Smoke Emission tested to IEC 61034</p>	 <p>Temperature Range -25 ~ + 90°C</p>	 <p>Acid Gas Emission</p>	 <p>Anti Termite &amp; Rodent</p>
---	---	---	---	--	--	--

**KPA FIRE RESISTANT CABLE**

- (1) PE Insulated, PVC FR Sheathed - 600/1000V (KPA-1)**
- (2) PE Insulated, LSNHFR Sheathed - 600/1000V (KPA-2)**



**Cable Construction for KPA-1 & KPA-2**

- |                             |  |
|-----------------------------|--|
| 1. Conductor                | : Plain Annealed Copper Wires, circular non-compacted or compacted stranded.           |
| 2. Fire Proof Layer         | : Mica Tape.   |
| 3. Insulation               | : Extruded Polyethylene (PE)   |
| 4. Filler                   | : Non-hygroscopic fillers ( If necessary).   |
| 5. Binder Tape              | : Non-hygroscopic tape.  |
| 6. Sheath<br>(Inner Sheath) | : Extruded Flame Retardant PVC or Low Smoke Non-halogen Flame Retardant Thermoplastic. |
| 7. Armouring                | : Multi-core - Galvanized Steel Wire<br>Single-core - Hard Drawn Aluminium Wire        |
| 8. Outer Sheath             | : Extruded Flame Retardant PVC or Low Smoke Non-halogen Flame Retardant Thermoplastic. |

**Core Identification**

- |                    |   |
|--------------------|---|
| Single-core        | : Natural or Black  |
| 2 – core           | : Red , Black   |
| 3 – core           | : Red , Yellow , Blue                                       |
| 4 – core           | : Red , Yellow , Blue , Black                               |
| 5 – core and above | : Black , White ( Numbering – black printing on white core) |

Note : Other colour combination as per requirements.

LSNHFR – Low Smoke Non-halogen Flame Retardant

KPA-1(750°C) are fully complies to IEC 60331, IEC 60332-1

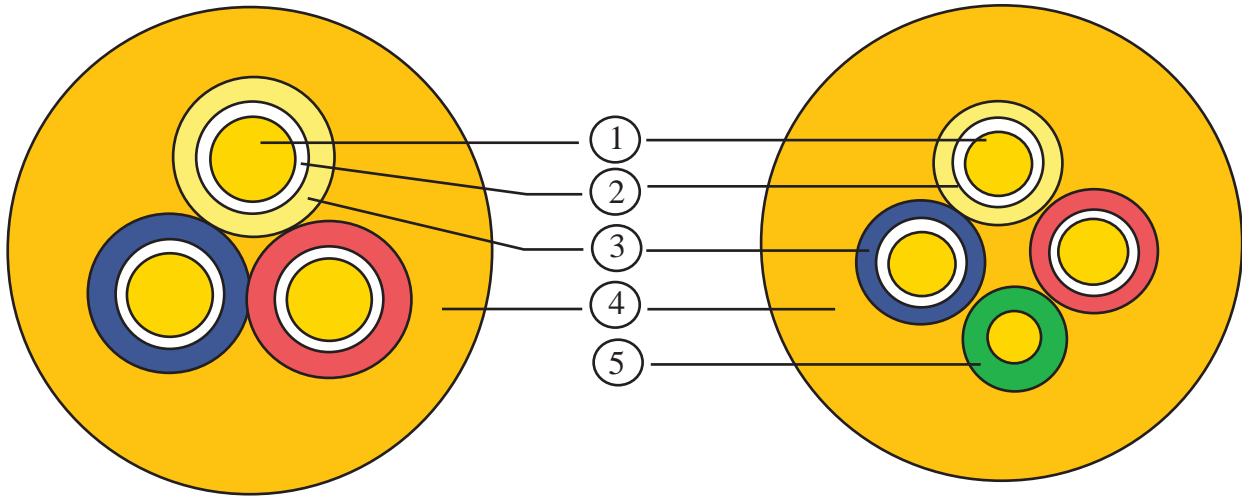
KPA-1(950°C) are fully complies to IEC 60331, IEC 60332-1, BS 6387, SS 299-1

KPA-2(750°C) are fully complies to IEC 60331, IEC 60332-1, IEC 61034, IEC 60754

KPA-2(950°C) are fully complies to IEC 60331, IEC 60332-1, BS 6387, SS 299-1, IEC 61034, IEC 60754

**KPA FIRE RESISTANT CABLE**

**(3) PE Insulated, PVC FR Sheathed - 300/500V (KPA-3)**



**Cable Construction for KPA-3**

- |                     |  |
|---------------------|--|
| 1. Conductor        | : Plain Annealed Copper Wires, circular non-compacted. |
| 2. Fire Proof Layer | : Mica Tape.   |
| 3. Insulation       | : Extruded Polyethylene (PE).                          |
| 4. Sheath           | : Extruded Flame Retardant PVC.                        |
| 5. Protective Earth |  |
| 5.1. Conductor      | : Plain Annealed Copper Wires, circular non compacted. |
| 5.2. Insulation     | : Extruded Polyethylene (PE)                           |

**Core Identification**

- |                    |   |
|--------------------|---|
| Single-core        | : Natural or Black  |
| 2 – core           | : Red , Black   |
| 3 – core           | : Red , Yellow , Blue                                       |
| 4 – core           | : Red , Yellow , Blue , Black                               |
| 5 – core and above | : Black , White ( Numbering – black printing on white core) |
| Protective Earth   | : Green   |

Note : Other colour combination as per requirements.  
KPA-3 are fully complies to IEC 60331, IEC 60332-1

**KPA -1 & KPA-2: NON-ARMOURED CABLES 600/1000V**

**Table 1 : Single - Core (1C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Insulation Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.8	1.4	7	60
2.5	0.8	1.4	7.5	75
4	1.0	1.4	8.5	100
6	1.0	1.4	9	120
10	1.0	1.4	9.5	160
16	1.0	1.4	10.5	230
25	1.2	1.4	12	330
35	1.2	1.4	13.5	430
50	1.4	1.4	15	570
70	1.4	1.4	16.5	780
95	1.6	1.5	19	1050
120	1.6	1.5	20.5	1300
150	1.8	1.6	22.5	1550
185	2.0	1.7	24.5	1950
240	2.2	1.8	28	2500
300	2.4	1.9	30.5	3100
400	2.6	2.0	34	4050
500	2.8	2.1	38	5050
630	2.8	2.2	42	6450
800	2.8	2.3	48.5	8100
1000	3.0	2.5	54	10200

**Table 2 : Two - Core (2C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Diameter (mm)
1.5	0.8	1.8	11.5	130
2.5	0.8	1.8	12.5	160
4	1.0	1.8	14.5	220
6	1.0	1.8	15.5	280
10	1.0	1.8	17	380
16	1.0	1.8	18.5	520
25	1.2	1.8	22	750
35	1.2	1.8	24	980
50	1.4	1.8	27	1,250
70	1.4	1.9	30.5	1,700
95	1.6	2.0	35.5	2,350
120	1.6	2.1	38.5	2,900
150	1.8	2.2	43	3,600
185	2.0	2.4	47	4,400
240	2.2	2.5	53	5,600
300	2.4	2.7	58.5	7,000

**KPA-1 & KPA-2: NON-ARMoured CABLES 600/1000V**
**Table 3 : Three-Core (3C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.8	1.8	12.5	160
2.5	0.8	1.8	13	200
4	1.0	1.8	15.5	280
6	1.0	1.8	16.5	360
10	1.0	1.8	18	500
16	1.0	1.8	20	690
25	1.2	1.8	23.5	1,000
35	1.2	1.8	25.5	1,300
50	1.4	1.8	29	1,700
70	1.4	1.9	32.5	2,400
95	1.6	2.1	38	3,300
120	1.6	2.2	41	4,100
150	1.8	2.3	46	5,000
185	2.0	2.5	50.5	6,300
240	2.2	2.7	57	8,000
300	2.4	2.8	62.5	9,900

**Table 4 : Four - Core (4C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.8	1.8	13.5	200
2.5	0.8	1.8	14.5	250
4	1.0	1.8	16.5	350
6	1.0	1.8	18	450
10	1.0	1.8	19.5	630
16	1.0	1.8	22	890
25	1.2	1.8	25.5	1,300
35	1.2	1.8	28.5	1,700
50	1.4	1.9	32	2,300
70	1.4	2.0	36.5	3,150
95	1.6	2.2	42	4,300
120	1.6	2.3	46	5,400
150	1.8	2.5	51.5	6,600
185	2.0	2.6	56	8,200
240	2.2	2.9	63.5	10,400
300	2.4	3.1	70	13,100

**KPA-1 & KPA-2: ARMoured CABLES 600/1000V**

**Table 5 : Single - Core (1C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.8	1.0	6	0.90	1.8	11.5	150
2.5	0.8	1.0	6.5	0.90	1.8	12	170
4	1.0	1.0	7.5	0.90	1.8	13	210
6	1.0	1.0	8	0.90	1.8	13.5	240
10	1.0	1.0	8.5	0.90	1.8	14	290
16	1.0	1.0	9.5	0.90	1.8	15	360
25	1.2	1.0	11	0.90	1.8	16.5	480
35	1.2	1.0	12	1.25	1.8	18.5	630
50	1.4	1.0	13.5	1.25	1.8	20	790
70	1.4	1.0	15.5	1.25	1.8	21.5	1,000
95	1.6	1.0	17.5	1.60	1.8	24.5	1,350
120	1.6	1.0	19	1.60	1.8	26	1,550
150	1.8	1.0	21	1.60	1.8	28	1,900
185	2.0	1.0	23	1.60	1.9	30	2,300
240	2.2	1.0	26	1.60	1.9	33	2,850
300	2.4	1.0	28.5	2.00	2.1	36.5	3,600
400	2.6	1.2	32	2.00	2.2	40.5	4,600
500	2.8	1.2	36	2.00	2.3	44.5	5,650
630	2.8	1.2	39.5	2.50	2.4	49.5	7,250
800	2.8	1.4	46.5	2.50	2.6	57	9,200
1000	3.0	1.4	51.5	2.50	2.7	62	11,400

**Table 6 : Two - Core (2C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.8	1.0	10.5	0.90	1.8	15.5	400
2.5	0.8	1.0	11.5	0.90	1.8	16.5	450
4	1.0	1.0	13	0.90	1.8	18	550
6	1.0	1.0	14.5	1.25	1.8	20	730
10	1.0	1.0	15.5	1.25	1.8	21.5	870
16	1.0	1.0	17.5	1.25	1.8	23.5	1,050
25	1.2	1.0	20.5	1.60	1.8	27	1,500
35	1.2	1.0	23	1.60	1.8	29.5	1,800
50	1.4	1.0	26	1.60	1.9	32.5	2,200
70	1.4	1.0	29	2.00	2.0	36.5	3,000
95	1.6	1.2	34	2.00	2.2	42	3,900
120	1.6	1.2	37	2.00	2.3	45	4,600
150	1.8	1.2	41	2.50	2.4	50.5	5,800
185	2.0	1.4	45	2.50	2.6	55	7,000
240	2.2	1.4	51	2.50	2.8	61	8,500
300	2.4	1.6	56.5	2.50	2.9	67	10,200

**KPA-1 & KPA-2: ARMoured CABLES 600/1000V**
**Table 7 : Three-Core (3C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.8	1.0	11	0.90	1.8	16	440
2.5	0.8	1.0	12	0.90	1.8	17	500
4	1.0	1.0	14	1.25	1.8	19.5	720
6	1.0	1.0	15	1.25	1.8	21	830
10	1.0	1.0	16.5	1.25	1.8	22.5	1,000
16	1.0	1.0	19	1.25	1.8	24.5	1,200
25	1.2	1.0	22	1.60	1.8	28.5	1,800
35	1.2	1.0	24.5	1.60	1.8	31	2,200
50	1.4	1.0	27.5	1.60	2.0	34.5	2,800
70	1.4	1.2	31.5	2.00	2.1	39.5	3,900
95	1.6	1.2	36.5	2.00	2.2	44.5	5,000
120	1.6	1.2	39.5	2.00	2.3	48	5,900
150	1.8	1.4	44.5	2.50	2.5	54	7,500
185	2.0	1.4	48.5	2.50	2.7	58.5	9,000
240	2.2	1.6	55	2.50	2.9	65.5	11,100
300	2.4	1.6	60.5	2.50	3.1	71.5	13,300

**Table 8 : Four - Core (4C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.8	1.0	12	0.90	1.8	17	500
2.5	0.8	1.0	13	0.90	1.8	18	570
4	1.0	1.0	15.5	1.25	1.8	21	840
6	1.0	1.0	16.5	1.25	1.8	22.5	970
10	1.0	1.0	18.5	1.25	1.8	24	1,200
16	1.0	1.0	21	1.60	1.8	27	1,600
25	1.2	1.0	24.5	1.60	1.8	31	2,200
35	1.2	1.0	27	1.60	1.9	33.5	2,700
50	1.4	1.2	31	2.00	2.1	39	3,700
70	1.4	1.2	35	2.00	2.2	43	4,800
95	1.6	1.2	40.5	2.50	2.4	50	6,600
120	1.6	1.4	44.5	2.50	2.5	54	7,900
150	1.8	1.4	49.5	2.50	2.7	59.5	9,400
185	2.0	1.6	54.5	2.50	2.8	64.5	11,200
240	2.2	1.6	61	2.50	3.1	72	13,900
300	2.4	1.6	67.5	3.15	3.3	80	17,700

## KPA -3: NON-ARMoured CABLES 300/500V

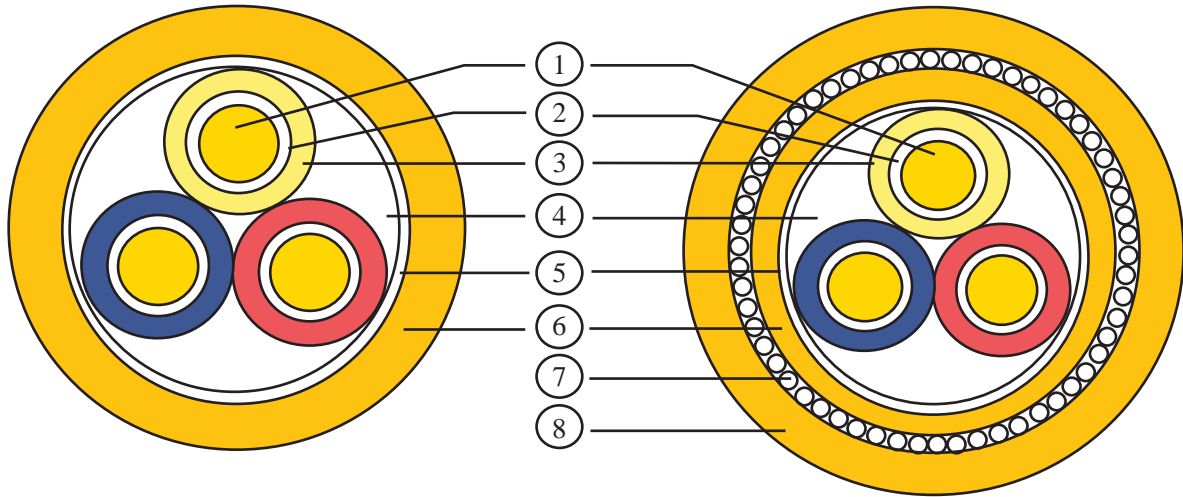
Table 9

No of Core	Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1C	1.5	0.55	0.5	4	25
	2.5			4.5	40
	4			5.5	55
2C	1.5	0.55	0.5	7	70
	2.5			8	100
	4			9.5	140
3C	1.5	0.55	0.5	7.5	90
	2.5			9	130
	4			10	180
4C	1.5	0.55	0.5	8.5	110
	2.5			9.5	160
	4			11	230
2C + PE	1.5	0.55	0.5	7.5	90
	2.5			9	130
	4			10	190
3C + PE	1.5	0.55	0.5	8.5	110
	2.5			9.5	160
	4			11	240
4C + PE	1.5	0.55	0.5	9.5	130
	2.5			10.5	200
	4			12	290

P.E : Protective Earth core

**FT-8 FIRE RESISTANT CABLE**

**XLPE Insulated, LSNHFR Sheathed – 600/1000V**



**Cable Construction for FT-8**

- |                             |   |
|-----------------------------|---|
| 1. Conductor                | : Plain Annealed Copper Wires, circular non-compacted or compacted stranded.    |
| 2. Fire Proof Layer         | : Mica Tape.  |
| 3. Insulation               | : Extruded Cross-linked Polyethylene (XLPE).                                    |
| 4. Filler                   | : Non-hygroscopic fillers ( If necessary).                                      |
| 5. Binder Tape              | : Non-hygroscopic tape.   |
| 6. Sheath<br>(Inner Sheath) | : Extruded Low Smoke Non-halogen Flame Retardant Thermoplastic                  |
| 7. Armouring                | : Multi-core - Galvanized Steel Wire<br>Single-core - Hard Drawn Aluminium Wire |
| 8. Outer Sheath             | : Extruded Low Smoke Non-halogen Flame Retardant Thermoplastic                  |

**Core Identification**

- |                    |   |
|--------------------|---|
| Single-core        | : Natural or Black  |
| 2 – core           | : Red , Black   |
| 3 – core           | : Red , Yellow , Blue                                       |
| 4 – core           | : Red , Yellow , Blue , Black                               |
| 5 – core and above | : Black , White ( Numbering – black printing on white core) |

Note : Other colour combination as per requirements.

FT-8 Cables are fully complies to BS 6387, SS 299-1, IEC 60331, IEC 60332-1, IEC 61034, IEC 60754

**FT-8: NON-ARMoured CABLES 600/1000V**

**Table 10 : Single - Core (1C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.4	7	60
2.5	0.7	1.4	7.5	70
4	0.7	1.4	8	90
6	0.7	1.4	8.5	110
10	0.7	1.4	9	160
16	0.7	1.4	10	220
25	0.9	1.4	11.5	320
35	0.9	1.4	12.5	420
50	1.0	1.4	14	550
70	1.1	1.4	16	760
95	1.1	1.5	17.5	1,000
120	1.2	1.5	19.5	1,250
150	1.4	1.6	21.5	1,550
185	1.6	1.6	23.5	1,900
240	1.7	1.7	26.5	2,450
300	1.8	1.8	29	3,050
400	2.0	1.9	32.5	3,950
500	2.2	2.0	36.5	4,950
630	2.4	2.2	41	6,400
800	2.6	2.3	48.5	8,100
1000	2.8	2.4	53.5	10,150

**Table 11 : Two - Core (2C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.8	11.5	140
2.5	0.7	1.8	12.5	170
4	0.7	1.8	13.5	210
6	0.7	1.8	15	260
10	0.7	1.8	16.5	370
16	0.7	1.8	18.5	510
25	0.9	1.8	21.5	740
35	0.9	1.8	24	960
50	1.0	1.8	26.5	1,200
70	1.1	1.8	30	1,700
95	1.1	1.9	33.5	2,250
120	1.2	2.0	37	2,850
150	1.4	2.2	41.5	3,500
185	1.6	2.3	46	4,350
240	1.7	2.5	51.5	5,550
300	1.8	2.6	56.5	6,900

**FT-8: NON-ARMoured CABLES 600/1000V**
**Table 12 : Three - Core (3C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.8	12.5	160
2.5	0.7	1.8	13.5	200
4	0.7	1.8	14.5	260
6	0.7	1.8	15.5	340
10	0.7	1.8	17.5	480
16	0.7	1.8	19.5	680
25	0.9	1.8	23	1,000
35	0.9	1.8	25.5	1,300
50	1.0	1.8	28	1,700
70	1.1	1.9	32	2,400
95	1.1	2.0	36	3,200
120	1.2	2.1	39.5	4,000
150	1.4	2.3	44.5	4,950
185	1.6	2.4	49.5	6,150
240	1.7	2.6	55.5	7,850
300	1.8	2.7	61	9,750

**Table 13 : Four - Core (4C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.8	13.5	200
2.5	0.7	1.8	14.5	250
4	0.7	1.8	15.5	330
6	0.7	1.8	17	420
10	0.7	1.8	19	610
16	0.7	1.8	21.5	870
25	0.9	1.8	25.5	1,250
35	0.9	1.8	28	1,700
50	1.0	1.8	31	2,200
70	1.1	2.0	36	3,100
95	1.1	2.1	40	4,200
120	1.2	2.3	44.5	5,300
150	1.4	2.4	49.5	6,500
185	1.6	2.6	55	8,100
240	1.7	2.8	62	10,300
300	1.8	3.0	68	12,850

**FT-8: ARMoured CABLES 600/1000V**

**Table 14 : Single - Core (1C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.0	5.5	0.90	1.8	11	150
2.5	0.7	1.0	6	0.90	1.8	11.5	170
4	0.7	1.0	6.5	0.90	1.8	12.5	200
6	0.7	1.0	7.5	0.90	1.8	13	230
10	0.7	1.0	8	0.90	1.8	13.5	280
16	0.7	1.0	9	0.90	1.8	14.5	350
25	0.9	1.0	10.5	0.90	1.8	16	470
35	0.9	1.0	11.5	0.90	1.8	17	580
50	1.0	1.0	13	1.25	1.8	19	760
70	1.1	1.0	14.5	1.25	1.8	21	1,000
95	1.1	1.0	16.5	1.25	1.8	22.5	1,250
120	1.2	1.0	18	1.60	1.8	25	1,550
150	1.4	1.0	20	1.60	1.8	27	1,850
185	1.6	1.0	22	1.60	1.8	29	2,300
240	1.7	1.0	25	1.60	1.9	32	2,850
300	1.8	1.0	27	1.60	1.9	34.5	3,450
400	2.0	1.2	30.5	2.00	2.1	39	4,550
500	2.2	1.2	34.5	2.00	2.2	43	5,650
630	2.4	1.2	38.5	2.00	2.3	47.5	7,100
800	2.6	1.4	46	2.50	2.5	56	9,150
1000	2.8	1.4	51	2.50	2.7	61.5	11,400

**Table 15 : Two - Core (2C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.0	10.5	0.90	1.8	15.5	400
2.5	0.7	1.0	11.5	0.90	1.8	16.5	450
4	0.7	1.0	12.5	0.90	1.8	17.5	520
6	0.7	1.0	13.5	0.90	1.8	18.5	600
10	0.7	1.0	15.5	1.25	1.8	21	840
16	0.7	1.0	17.5	1.25	1.8	23	1,000
25	0.9	1.0	20.5	1.60	1.8	27	1,450
35	0.9	1.0	22.5	1.60	1.8	29	1,750
50	1.0	1.0	25	1.60	1.8	31.5	2,150
70	1.1	1.0	28.5	1.60	2.0	35.5	2,750
95	1.1	1.2	32.5	2.00	2.1	40.5	3,750
120	1.2	1.2	35.5	2.00	2.2	44	4,500
150	1.4	1.2	40	2.00	2.3	48	5,300
185	1.6	1.4	44.5	2.50	2.5	54	6,850
240	1.7	1.4	49.5	2.50	2.7	60	8,300
300	1.8	1.6	55	2.50	2.8	65	10,000

**FT-8: ARMoured CABLES 600/1000V**
**Table 16 : Three - Core (3C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.0	11	0.90	1.8	16	440
2.5	0.7	1.0	12	0.90	1.8	17	500
4	0.7	1.0	13	0.90	1.8	18	590
6	0.7	1.0	14.5	1.25	1.8	20	790
10	0.7	1.0	16.5	1.25	1.8	22	990
16	0.7	1.0	18.5	1.25	1.8	24	1,200
25	0.9	1.0	21.5	1.60	1.8	28	1,800
35	0.9	1.0	24	1.60	1.8	30.5	2,200
50	1.0	1.0	27	1.60	1.9	33.5	2,700
70	1.1	1.0	30.5	2.00	2.0	38.5	3,750
95	1.1	1.2	35	2.00	2.2	43	4,800
120	1.2	1.2	38	2.00	2.3	46.5	5,750
150	1.4	1.4	43	2.50	2.5	53	7,400
185	1.6	1.4	47.5	2.50	2.6	57.5	8,850
240	1.7	1.6	53.5	2.50	2.8	64	10,900
300	1.8	1.6	59	2.50	3.0	69.5	13,100

**Table 17 : Four - Core (4C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.0	12	0.90	1.8	17	500
2.5	0.7	1.0	13	0.90	1.8	18	570
4	0.7	1.0	14.5	1.25	1.8	20	780
6	0.7	1.0	16	1.25	1.8	21.5	920
10	0.7	1.0	18	1.25	1.8	23.5	1,150
16	0.7	1.0	20.5	1.60	1.8	27	1,600
25	0.9	1.0	24	1.60	1.8	30.5	2,150
35	0.9	1.0	26.5	1.60	1.9	33.5	2,700
50	1.0	1.0	30	1.60	2.0	36.5	3,300
70	1.1	1.2	34.5	2.00	2.2	42.5	4,700
95	1.1	1.2	38.5	2.00	2.3	47	6,000
120	1.2	1.4	43	2.50	2.5	52.5	7,700
150	1.4	1.4	48	2.50	2.6	58	9,150
185	1.6	1.4	53	2.50	2.8	63.5	11,100
240	1.7	1.6	59.5	2.50	3.0	70.5	13,650
300	1.8	1.6	65.5	2.50	3.2	76.5	16,550

## FT-8: NON-ARMoured CABLES 300/500V

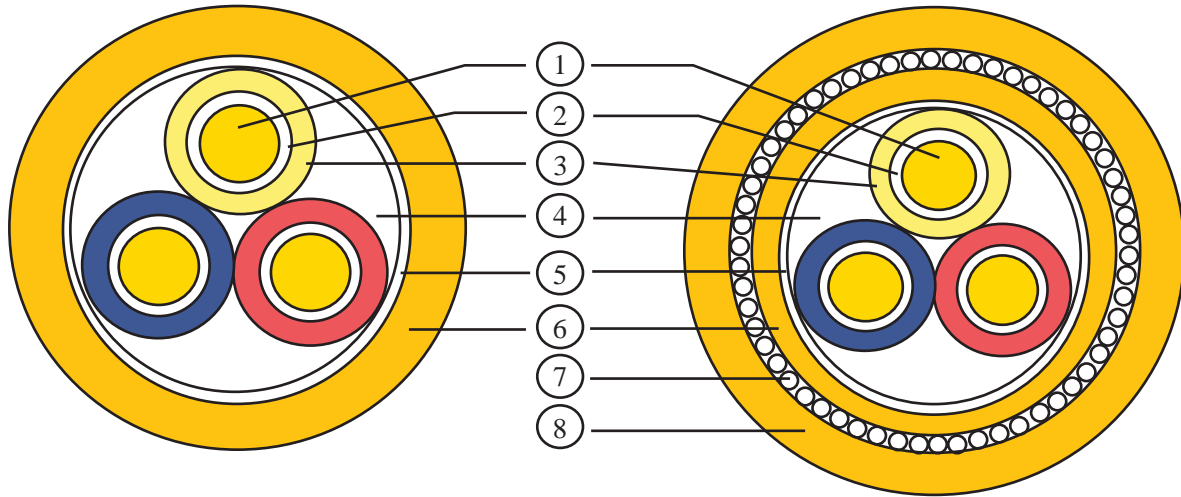
Table 18

No of Core	Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1C	1.5	0.55	0.5	4.5	35
	2.5			5	45
	4			5.5	60
2C	1.5	0.55	0.5	9	85
	2.5			10	100
	4			11	140
3C	1.5	0.55	0.5	9.5	100
	2.5			10.5	140
	4			12	190
4C	1.5	0.55	0.5	10.5	130
	2.5			11.5	170
	4			13	250
2C + PE	1.5	0.55	0.5	9.5	100
	2.5			10.5	130
	4			12	190
3C + PE	1.5	0.55	0.5	10.5	130
	2.5			11.5	170
	4			13	240
4C + PE	1.5	0.55	0.5	11.5	160
	2.5			13	210
	4			14.5	300

P.E : Protective Earth core

**MIFR FIRE RESISTANT CABLE**

**XLPEFR Insulated, LSNHFR Sheathed – 600/1000V**  
**XLPEFR Insulated, Non-Sheathed Cables – 450/750V**



**Cable Construction for MIFR**

- |                             |   |
|-----------------------------|---|
| 1. Conductor                | : Plain Annealed Copper Wires, circular non-compacted or compacted stranded.    |
| 2. Fire Proof Layer         | : Mica Tape.  |
| 3. Insulation               | : Extruded Flame Retardant Cross-linked Polyethylene (XLPEFR).                  |
| 4. Filler                   | : Non-hygrosopic fillers (If necessary).  |
| 5. Binder Tape              | : Non-hygrosopic tape.  |
| 6. Sheath<br>(Inner Sheath) | : Extruded Low Smoke Non-halogen Flame Retardant Mineral Filled compound.       |
| 7. Armouring                | : Multi-core - Galvanized Steel Wire<br>Single-core - Hard Drawn Aluminium Wire |
| 8. Outer Sheath             | : Extruded Low Smoke Non-halogen Flame Retardant Mineral Filled compound.       |

**Core Identification**

- |                    |   |
|--------------------|---|
| Single-core        | : Natural or Black  |
| 2 – core           | : Red , Black   |
| 3 – core           | : Red , Yellow , Blue                                       |
| 4 – core           | : Red , Yellow , Blue , Black                               |
| 5 – core and above | : Black , White ( Numbering – black printing on white core) |

Note : Other colour combination as per requirements.

MIFR Cables are fully complies to BS 6387, SS 299-1, IEC 60331, IEC 60332-3(A,B,C), IEC 60332-1, IEC 61034, IEC 60754

For 450/750V Cables, the insulation colour as per requirements.

**MIFR: NON-ARMOURED CABLES 600/1000V**

**Table 19 : Single - Core (1C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.4	7.5	75
2.5	0.7	1.4	8	85
4	0.7	1.4	8.5	100
6	0.7	1.4	9	130
10	0.7	1.4	9.5	180
16	0.7	1.4	10.5	240
25	0.9	1.4	12	350
35	0.9	1.4	13	450
50	1.0	1.4	14.5	590
70	1.1	1.4	16.5	810
95	1.1	1.5	18	1,050
120	1.2	1.5	20	1,300
150	1.4	1.6	22	1,600
185	1.6	1.6	24	2,000
240	1.7	1.7	27	2,550
300	1.8	1.8	29.5	3,200
400	2.0	1.9	33	4,100
500	2.2	2.0	37	5,150
630	2.4	2.2	41.5	6,600
800	2.6	2.3	49	8,350
1000	2.8	2.4	54	10,500

**Table 20 : Two - Core (2C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.8	12	160
2.5	0.7	1.8	12.5	190
4	0.7	1.8	13.5	230
6	0.7	1.8	15	290
10	0.7	1.8	16	390
16	0.7	1.8	18	540
25	0.9	1.8	21	780
35	0.9	1.8	23.5	1,000
50	1.0	1.8	26	1,250
70	1.1	1.8	29.5	1,750
95	1.1	1.9	33	2,350
120	1.2	2.0	36.5	2,900
150	1.4	2.2	41	3,600
185	1.6	2.3	45.5	4,500
240	1.7	2.5	51	5,750
300	1.8	2.6	56.5	7,100

**MIFR: NON-ARMOURED CABLES 600/1000V**

**Table 21 : Three - Core (3C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.8	12.5	190
2.5	0.7	1.8	13.5	230
4	0.7	1.8	14.5	300
6	0.7	1.8	15.5	370
10	0.7	1.8	17	510
16	0.7	1.8	19.5	720
25	0.9	1.8	22.5	1,050
35	0.9	1.8	25	1,350
50	1.0	1.8	27.5	1,750
70	1.1	1.9	32	2,450
95	1.1	2.0	35.5	3,300
120	1.2	2.1	39.5	4,150
150	1.4	2.3	44.5	5,100
185	1.6	2.4	49	6,400
240	1.7	2.6	55	8,100
300	1.8	2.7	60.5	10,050

**Table 22 : Four - Core (4C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.8	13.5	230
2.5	0.7	1.8	14.5	280
4	0.7	1.8	15.5	370
6	0.7	1.8	17	470
10	0.7	1.8	19	650
16	0.7	1.8	21	920
25	0.9	1.8	25	1,350
35	0.9	1.8	27.5	1,750
50	1.0	1.8	30.5	2,300
70	1.1	2.0	35.5	3,250
95	1.1	2.1	39.5	4,350
120	1.2	2.3	44	5,450
150	1.4	2.4	49	6,700
185	1.6	2.6	54.5	8,400
240	1.7	2.8	61.5	10,650
300	1.8	3.0	67.5	13,250

**MIFR: ARMoured CABLES 600/1000V**

**Table 23 : Single - Core (1C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Insulation Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.0	5.5	0.90	1.8	11	160
2.5	0.7	1.0	6	0.90	1.8	11.5	180
4	0.7	1.0	6.5	0.90	1.8	12.5	210
6	0.7	1.0	7.5	0.90	1.8	13	240
10	0.7	1.0	8	0.90	1.8	13.5	290
16	0.7	1.0	9	0.90	1.8	14.5	370
25	0.9	1.0	10.5	0.90	1.8	16	490
35	0.9	1.0	11.5	0.90	1.8	17	610
50	1.0	1.0	13	1.25	1.8	19	790
70	1.1	1.0	14.5	1.25	1.8	21	1,000
95	1.1	1.0	16.5	1.25	1.8	22.5	1,300
120	1.2	1.0	18	1.60	1.8	25	1,600
150	1.4	1.0	20	1.60	1.8	27	1,950
185	1.6	1.0	22	1.60	1.8	29	2,350
240	1.7	1.0	25	1.60	1.9	32	2,950
300	1.8	1.0	27	1.60	1.9	34.5	3,550
400	2.0	1.2	30.5	2.00	2.1	39	4,700
500	2.2	1.2	34.5	2.00	2.2	43	5,800
630	2.4	1.2	38.5	2.00	2.3	47.5	7,300
800	2.6	1.4	46	2.50	2.5	56	9,450
1000	2.8	1.4	51	2.50	2.7	61.5	11,700

**Table 24 : Two - Core (2C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Insulation Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.0	10.5	0.90	1.8	15.5	430
2.5	0.7	1.0	11.5	0.90	1.8	16.5	480
4	0.7	1.0	12.5	0.90	1.8	17.5	550
6	0.7	1.0	13.5	0.90	1.8	18.5	630
10	0.7	1.0	15	1.25	1.8	20.5	870
16	0.7	1.0	17	1.25	1.8	22.5	1,050
25	0.9	1.0	20	1.60	1.8	26.5	1,500
35	0.9	1.0	22	1.60	1.8	28.5	1,800
50	1.0	1.0	24.5	1.60	1.8	31	2,200
70	1.1	1.0	28.5	1.60	2.0	35	2,800
95	1.1	1.2	32	2.00	2.1	40	3,850
120	1.2	1.2	35.5	2.00	2.2	43.5	4,550
150	1.4	1.2	39.5	2.00	2.3	48	5,400
185	1.6	1.4	44	2.50	2.5	54	7,050
240	1.7	1.4	49.5	2.50	2.7	59.5	8,550
300	1.8	1.6	54.5	2.50	2.8	65	10,200

**MIFR: ARMoured CABLES 600/1000V**
**Table 25 : Three - Core (3C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.0	11	0.90	1.8	16	470
2.5	0.7	1.0	12	0.90	1.8	17	540
4	0.7	1.0	13	0.90	1.8	18.5	630
6	0.7	1.0	14.5	1.25	1.8	20	830
10	0.7	1.0	16	1.25	1.8	21.5	1,000
16	0.7	1.0	18	1.25	1.8	24	1,250
25	0.9	1.0	21.5	1.60	1.8	27.5	1,850
35	0.9	1.0	23.5	1.60	1.8	30	2,250
50	1.0	1.0	26.5	1.60	1.9	33	2,750
70	1.1	1.0	30.5	2.00	2.0	38	3,850
95	1.1	1.2	34.5	2.00	2.2	42.5	4,900
120	1.2	1.2	38	2.00	2.3	46	5,900
150	1.4	1.4	43	2.50	2.5	52.5	7,550
185	1.6	1.4	47.5	2.50	2.6	57	9,050
240	1.7	1.6	53.5	2.50	2.8	63.5	11,150
300	1.8	1.6	58.5	2.50	3.0	69	13,400

**Table 26 : Four - Core (4C)**

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Inner Sheath Nom. Thickness (mm)	Approx. Diameter Over Inner Sheath (mm)	Armour Wire Nom. Diameter (mm)	Outer Sheath Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	1.0	12	0.90	1.8	17	530
2.5	0.7	1.0	13	0.90	1.8	18	610
4	0.7	1.0	14.5	1.25	1.8	20	820
6	0.7	1.0	16	1.25	1.8	21.5	970
10	0.7	1.0	17.5	1.25	1.8	23.5	1,150
16	0.7	1.0	20	1.60	1.8	26.5	1,650
25	0.9	1.0	23.5	1.60	1.8	30	2,200
35	0.9	1.0	26	1.60	1.9	33	2,750
50	1.0	1.0	29.5	1.60	2.0	36	3,400
70	1.1	1.2	34	2.00	2.2	42	4,850
95	1.1	1.2	38	2.00	2.3	46.5	6,100
120	1.2	1.4	42.5	2.50	2.5	52	7,850
150	1.4	1.4	47.5	2.50	2.6	57.5	9,400
185	1.6	1.4	52.5	2.50	2.8	63	11,350
240	1.7	1.6	59	2.50	3.0	70	14,050
300	1.8	1.6	65	2.50	3.2	76	16,950

## MIFR: NON-SHEATHED CABLES 450/750V

Table 27

Conductor Size (mm <sup>2</sup> )	Insulation Nom. Thickness (mm)	Approx. Overall Diameter (mm)	Approx. Overall Weight (kg/km)
1.5	0.7	4	25
2.5	0.8	4.5	40
4	0.8	5.0	55
6	0.8	5.5	75
10	1.0	6.5	120
16	1.0	7.5	180
25	1.2	9	280
35	1.2	10	380
50	1.4	11.5	510
70	1.4	13.5	710
95	1.6	15.5	980
120	1.6	17	1,200
150	1.8	19	1,450
185	2.0	20.5	1,850
240	2.2	24	2,400
300	2.4	26.5	3,000
400	2.6	29.5	3,850
500	2.8	33	4,850
630	2.8	37	6,200

**TECHNICAL DATA**
**Electrical Characteristics For Single Core Cable**

Cond. Size (mm <sup>2</sup> )	Conductor Resistance (ohm/km)		Reactance at 50 Hz (ohm/km)		Current Rating in Air at 40 °C (A)			Short-circuit Current (kA)	
	D.C at 20 °C	A.C at 90 °C	Flat	Trefoil	Flat		Trefoil	1 sec.	2 sec.
					2 cables	3 cables			
1.5	12.1	15.4	0.169	0.154	27	23	20	0.20	0.15
2.5	7.41	9.45	0.158	0.142	38	32	30	0.35	0.25
4	4.61	5.88	0.147	0.133	52	44	43	0.57	0.40
6	3.08	3.93	0.139	0.124	65	56	55	0.85	0.61
10	1.83	2.33	0.132	0.117	88	77	75	1.43	1.01
16	1.15	1.47	0.123	0.109	115	100	99	2.28	1.62
25	0.727	0.927	0.118	0.104	155	135	130	3.57	2.53
35	0.524	0.669	0.113	0.0989	190	170	165	5.00	3.54
50	0.387	0.494	0.109	0.0948	230	205	200	7.15	5.06
70	0.268	0.342	0.106	0.0916	290	265	255	10.0	7.08
95	0.193	0.247	0.102	0.0877	360	325	315	13.5	9.61
120	0.153	0.196	0.103	0.0887	415	380	370	17.1	12.1
150	0.124	0.160	0.102	0.0879	480	440	430	21.4	15.2
185	0.0991	0.128	0.101	0.0864	555	510	495	26.4	18.7
240	0.0754	0.0988	0.0993	0.0848	660	615	595	34.3	24.3
300	0.0601	0.0801	0.0979	0.0834	760	710	690	42.9	30.3
400	0.0470	0.0643	0.0976	0.0830	940	830	805	57.2	40.5
500	0.0366	0.0521	0.0968	0.0823	1010	960	930	71.5	50.6
630	0.0283	0.0428	0.0952	0.0807	1170	1110	1080	90.0	63.7
800	0.0221	0.0363	0.0932	0.0787	1360	1300	1260	114	81
1000	0.0176	0.0317	0.0920	0.0775	1510	1450	1400	143	101

**Voltage Drop Per Ampere Per Meter For Single Core Cable**

Cond. Size (mm <sup>2</sup> )	Two cables		Three cables, three phase A.C		Four cables, three phase A.C	
	D.C (mV)	Single phase A.C (mV)	Flat (mV)	Trefoil (mV)	Flat (mV)	Trefoil (mV)
1.5	30.0	30.0	26.0	26.7	15.0	26.7
2.5	18.0	18.0	16.0	16.3	9.4	16.3
4	11.7	11.7	10.1	10.1	5.9	10.1
6	7.83	7.84	6.8	6.8	3.92	6.8
10	6.06	4.66	4.03	4.04	2.32	4.04
16	2.93	2.94	2.54	2.54	1.47	2.54
25	1.84	1.86	1.61	1.61	0.933	1.61
35	1.34	1.35	1.18	1.16	0.678	1.16
50	0.986	1.01	0.875	0.860	0.505	0.860
70	0.682	0.716	0.620	0.599	0.357	0.599
95	0.491	0.533	0.463	0.435	0.266	0.435
120	0.390	0.443	0.383	0.349	0.220	0.349
150	0.316	0.378	0.329	0.287	0.190	0.287
185	0.253	0.326	0.282	0.235	0.163	0.234
240	0.192	0.280	0.243	0.186	0.140	0.186
300	0.153	0.253	0.219	0.157	0.126	0.156
400	0.120	0.234	0.202	0.132	0.117	0.130
500	0.0933	0.220	0.190	0.114	0.110	0.113
630	0.0722	0.209	0.181	0.102	0.104	0.0996
800	0.0563	0.200	0.173	0.0931	0.100	0.0903
1000	0.0449	0.195	0.169	0.0879	0.0973	0.0847

TECHNICAL DATA

Electrical Characteristics For Multi Core Cable

Cond. Size (mm <sup>2</sup> )	Conductor Resistance (ohm/km)			Reactance at 50 Hz (ohm/km)	Current Rating in air at 40 °C (A)		Short circuit Current (kA)	
	D.C at 20 °C	A.C at 90 °C			2 core	3,4 core	1 sec.	2 sec.
		2 core	3,4 core					
1.5	12.1	15.4	15.4	0.120	28	24	0.21	0.15
2.5	7.41	9.45	9.45	0.111	37	31	0.36	0.25
4	4.61	5.88	5.88	0.103	49	41	0.57	0.40
6	3.08	3.93	3.93	0.0967	62	52	0.86	0.61
10	1.83	2.33	2.33	0.0920	84	71	1.43	1.01
16	1.15	1.47	1.47	0.0865	110	95	2.29	1.62
25	0.727	0.927	0.927	0.0851	150	125	3.58	2.53
35	0.524	0.669	0.669	0.0818	180	155	5.01	3.54
50	0.387	0.494	0.494	0.0807	220	190	7.15	5.06
70	0.268	0.342	0.343	0.0785	280	240	10.01	7.08
95	0.193	0.247	0.248	0.0760	345	295	13.59	9.61
120	0.153	0.196	0.197	0.0769	405	345	17.16	12.13
150	0.124	0.160	0.160	0.0766	460	395	21.45	15.17
185	0.0991	0.128	0.129	0.0762	535	460	26.46	18.71
240	0.0754	0.0987	0.0996	0.0750	635	545	34.32	24.27
300	0.0601	0.0798	0.0809	0.0739	725	625	42.9	30.33

Voltage Drop Per Ampere Per Meter For Multi Core Cable

Cond. Size (mm <sup>2</sup> )	2 core cable		3 core cable, three phase A.C. (mV)	4 core cable, three phase A.C. (mV)
	D.C. (mV)	Single phase A.C (mV)		
1.5	30.0	30.0	26.0	26.0
2.5	18.0	18.0	16.0	16.0
4	11.7	11.7	10.1	10.1
6	7.83	7.84	6.8	6.8
10	4.66	4.66	4.03	4.03
16	2.93	2.94	2.54	2.54
25	1.84	1.86	1.61	1.61
35	1.34	1.35	1.17	1.17
50	0.986	1.01	0.867	0.867
70	0.682	0.704	0.609	0.609
95	0.491	0.517	0.449	0.449
120	0.390	0.421	0.366	0.366
150	0.316	0.354	0.307	0.307
185	0.253	0.298	0.259	0.259
240	0.192	0.248	0.216	0.216
300	0.153	0.218	0.190	0.190

**TECHNICAL DATA**

**Applicable Conditions For Continuous And Short-Circuit Current Rating**

1. Maximum rated conductor temperature

Normal operation : 90 °C  
 Short circuit : 250 °C

2. Correction factor for continuous current rating

Ambient Temp.(°C)	15	20	25	30	35	40	45	50	55
Rating Factor	1.22	1.18	1.14	1.10	1.05	1.00	0.95	0.89	0.84

3. Correction factor for continuous current rating of grouped cables

3.1 Single core cables on tray, flat formation and no spacing between cables

No. of cables	4	6	9	12	Above 12
Rating Factor	0.82	0.76	0.70	0.70	0.65
Applied value	As per 2 cables of Technical data for single core				

3.2 Multi core cables on tray, flat formation and no spacing between cables

No. of cables	2	3	4	6	9
Rating Factor	0.85	0.78	0.75	0.72	0.70

Note : Where the spacing between grouped cables exceeds twice the overall diameter, reduction factor need not be applied.

4. Short-circuit current for copper conductor

The following formula is applied for a duration of up to 5 seconds.

$$I_s = \frac{0.143 \times S}{\sqrt{t}} \quad (kA)$$

where, S : Conductor size in mm<sup>2</sup>  
 t : Short-circuit duration in second (s)





*FEC Cables (M) Sdn. Bhd.*  
(7293-W)

Factory 1 :

Persiaran Raja Muda, 40000 Shah Alam, Selangor Darul Ehsan, Malaysia.

(P.O. Box 7006, 40700 Shah Alam)

Tel : 603-5519 1110/3/4, 5519 1258, 5519 5814/5/7

Fax : 603-5519 1296

Factory 2 :

No. 16, Jalan Keluli 2, Bukit Raja Industrial Area, 40150 Klang, Selangor Darul Ehsan, Malaysia.

Tel : 603-3343 5837/9/40, 3343 7727

Fax : 603-3343 5843, 3343 9262

Sales Office :

Persiaran Raja Muda, 40000 Shah Alam, Selangor Darul Ehsan, Malaysia.

(P.O. Box 7006, 40700 Shah Alam)

Tel : 603-5519 1110 (Hotline)

Fax : 603-5519 1296, 5513 8688

Website : [www.furukawa.com.my](http://www.furukawa.com.my)

e-mail : [sales@fecm.com.my](mailto:sales@fecm.com.my)

[www.fec.com.my](http://www.fec.com.my)