2MKABLO

Fire Resistant Cables

LOSS PREVENTION CERTIFICATION BOARD
LPCB
Assessed to ISO 9001:2015
Cert/LPCB ref. 711

FireKab

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appli**Cable** to life...

About Us

Established in Istanbul in 1993, 2M Kablo, produces standard and special cables for energy, industry, petrochemical, transportation and building sectors, with its fully equipped, state of the art technology, expert employees and open perspective in development. 2M Kablo is a pioneering company for its sector by considering investment in employees as one of the most important objectives.

2M Kablo, which is located in Tekirdag with a total indoor area of 15.000 m^2, has been cooperated as the solution partner of many companies and projects both in Turkey and abroad since its establishment. Local sales offices are located in Istanbul, Ankara, and Adana. 2M Kablo also have 2 companies out of Turkey. One of them is located in Russia with a warehouse and sales office since 2005. Other one is located in Dubai and has been in service since 2018.

2M Kablo exports to more than 80 countries in 5 continents. 2M Kablo, which is one of Turkey's global brands in cable industry, and has the export volume increasing every year, received the Export Achievement Award in 2008 and Istanbul Mineral and Metals Exporters' Association (IMMIB) Export Honour Award in year 2011 and 2012. In 2016, 2M Kablo was listed among Turkey's top second group of 500 Industrial organizations, published by the Istanbul Chamber of Industry (ISO).

2M Kablo has quality management system documents which are OHSAS 18001/2014, ISO 9001/2015, ISO 14001/2015 and ISO 50001/2011. 2M Kablo has become a R&D center registered by the Ministry of Science, Industry and Technology. 2M Kablo is the first local Low-Voltage cable manufacturer with a registered R&D Center.


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R&D Innovation

Since 1993, 2M Kablo has been supporting its customers with new and user-specific product designs.

2M Kablo is the first locally-funded Low-Voltage cable manufacturer who is awarded with a R&D Centre License by Turkish Government.

With the Cable Builder design program, all data related to the product can be created quickly and accurately.

The professional engineers in 2M Kablo R&D department make design for 9 different product groups and also special cable types.

2M Kablo R&D activities are always customer oriented.

2M Kablo invests 5% of our revenue to generate resources for R&D activities.

The key factors, which create the success of 2M Kablo, are the high – quality products and technical support capabilities.

In the R&D center of 2M Kablo, we cooperate with the best research institutes and universities in various projects.


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Areas of Usage and Features

In many fire incidents experienced in the past, it has been seen that cables cause fire to spread and emit toxic gases. For this reason, Fire Resistant Cables should be places such as stadiums, schools, hospitals, meeting rooms, shopping centers, cinemas and theaters where safety regulations must be taken against fire. Fire Resistant Cables are used in systems that must continue to operate both in normal facilities and their functions in case of fire.

Fire Resistant Cables do not emit toxic gases as a result of combustion and they do not propagate the flame and they can self-extinguish by the special components used. In addition to the low smoke density, Fire Resistant Cables are capable of ensuring the circuit integrity for a certain time.

The features of low smoke emission, halogen-free, flame retardancy and fire resistance have to be considered to minimize the risk and to ensure the safety in buildings and facilities.

LPCB (**L**oss **P**revention **C**ertification **B**oard) is an organization based on product certification. LPCB approval process, Quality Management System (ISO 9001: 2015) consists of the tests and evaluation stages for compliance with the specified product quality standards. It provides third party approval and certificates as a unbiased organization. LPCB auditors carry out regular audits every year and maintain the validity of their certificates by complying with the standards. Each year, LPCB carries out random sampling from our factory stocks or approved products that are in the market and tests compliance controls according to standards. The approved product and company name is published in the BRE Global Red Book, which is available to users worldwide.


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Circuit Integrity Tests

IEC 60331

(Tests for electric cables under fire conditions – Circuit integrity)

The most common type is,
Part 21: Procedures and requirements – Cables of rated voltage up to and including 0.6/1kV Fire-alone test at high temperature. The cable is horizontally mounted and exposed to fire at the cable axis along the burner with the length of 500mm.

Temperature: min.750°C +40 **Duration:** min.90 mins generally known as 3hours.(incl. 15 min.cooling period) **Voltage:** Rated voltage of cable, **Current:** 0,25A **Acceptance:** No short circuit between the conductors or shield.

Part 1: Test method for fire with shock at a temperature of at least 830°C for cables of rated voltage up to and including 0.6/1kV and with an overall diameter exceeding 20mm.
Part 2: Test method for fire with shock at a temperature of at least 830°C for cables of rated voltage up to and including 0.6/1kV and with an overall diameter not exceeding 20mm.
Part 3: Test method for fire with shock at a temperature of at least 830°C for cables of rated voltage up to and including 0.6/1kV tested in a metal enclosure.
Part 23: Procedures and requirements – Electric data cables
Part 25: Procedures and requirements – Optical fibre cables

EN 50200

(Fire test with an indirect mechanical shock)

The cable is mounted on an incombustible plate as U form and exposed to fire along the burner with the length of 500mm. Incombustible plate is exposed to mechanical shocks every 5 minutes during the test. **Temperature:** 830°C +40°C **Duration:** Depending on classification (as spesified below) of the test (15, 30, 60,120 minutes) **Voltage:** Rated voltage of cable
Current: 0,25A **Acceptance:** No short circuit between the conductors or shield
Classifications: PH15, PH30, PH60, PH120

The cables are classified under the following classifications:

- PH15 - 15 minutes (duration)
- PH30 - 30 minutes (duration)
- PH60 - 60 minutes (duration)
- PH120 - 120 minutes (duration)

Circuit Integrity Tests

BS 6387 Protocol C

The cable is horizontally mounted and directly exposed to fire at the cable axis along the burner with the length of 610mm. **Temperature:** 950°C ±40°C **Duration:** 3 hours **Voltage:** Rated voltage of cable **Current:** 0,25A **Acceptance:** No short circuit between the conductors or shield.

BS 6387 Protocol W

(Fire and water test simulating a sprinkler system)

The cable is horizontally mounted and directly exposed to fire along the burner with the length of min.400mm. and exposed to direct water from sprinkler system. **Temperature:** 650°C ±40°C **Duration:** 30 minutes (0-15 minutes fire alone; 16-30 minutes fire with water) **Voltage:** Rated voltage of cable **Current:** 0,25A **Acceptance:** No short circuit between the conductors or shield

BS 6387 Protocol Z

(Fire test with an indirect mechanical shock)

The cable is mounted on an incombustible plate as Z form with a bending radius of 6D at 2 points and exposed to fire along the burner with the length of 500mm. Incombustible plate is exposed to mechanical shocks every 30 seconds during the test duration. **Temperature:** 950°C ±40°C **Duration:** 15 minutes **Voltage:** Rated voltage of cable **Current:** 0,25A **Acceptance:** No short circuit between the conductors or shield.

Annex E for EN 50200

(Fire test with an indirect mechanical shock with water spray)

The cable is mounted on an incombustible plate as U form and exposed to fire along the burner with the length of 500mm. Incombustible plate is exposed to mechanical shocks every 5 minutes during the test.

Temperature: 830°C+40°C **Duration:** minutes (0-15 minutes: fire with mechanical shock; 16-30 minutes: fire with mechanical shock and water) **Voltage:** Rated voltage of cable, **Current:** 0,25A **Acceptance:** No short circuit between the conductors or shield.

The cables are classified under the following classifications:

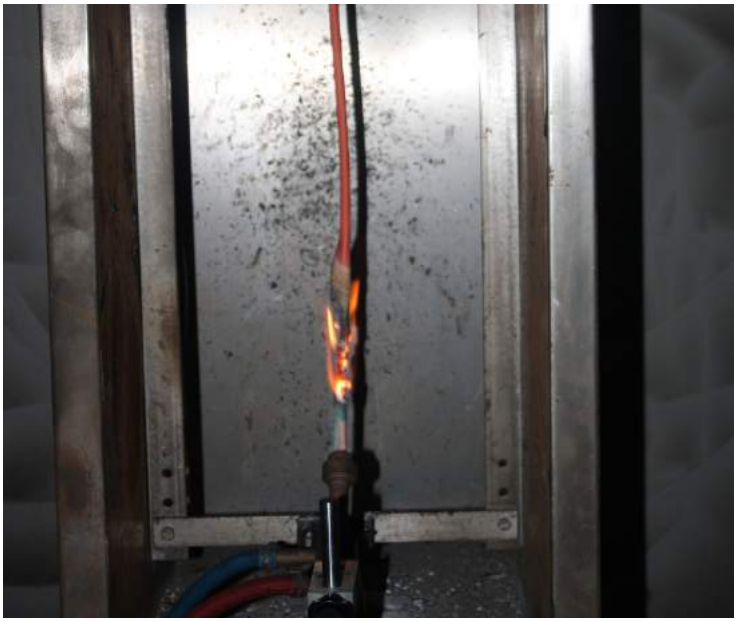
- Annex E (30) - 30 minutes

Flame Propagation Tests

IEC/EN 60332-1-2

The single cable is mounted vertically and exposed to a flame at an angle of 45° to the cable axis.

Temperature: Determined by the adjustment of burner flame. **Duration:** D ≤ 25 mm: 60 ± 2 sec 25 < D ≤ 50 mm: 120 ± 2 sec 50 < D < 75 mm: 240 ± 2 sec D > 75 mm: 480 ± 2 sec *Cable dimater (D) **Acceptance:** The cable surface shall be undamaged at least 50 mm below the upper fixing clamp.



IEC/EN 60332-3

The cables are mounted to a metal ladder as specified in standard depending on the type of fire

Temperature: Determined by the amount of propane and air. **Duration:** IEC Part 21: Category A F/R for special applications only

IEC Part 22: Category A (7 l non metallic material/m): 40 min
IEC Part 23: Category B (3.5 l non metallic material/m): 40 min
IEC Part 24: Category C (1.5 l non metallic material/m): 20 min
IEC Part 25: Category D (0.5 l non metallic material/m): 20 min

Acceptance: The damaged surface of the cable must not exceed 2.5 m in height from the bottom of the burner.

Halogen Content, Corrosive Gas and Smoke Density Tests

IEC/EN 60754-1

(Determination of the halogen acid gas content)

Determination of the halogen acid gas content of non-metallic materials of a cable.

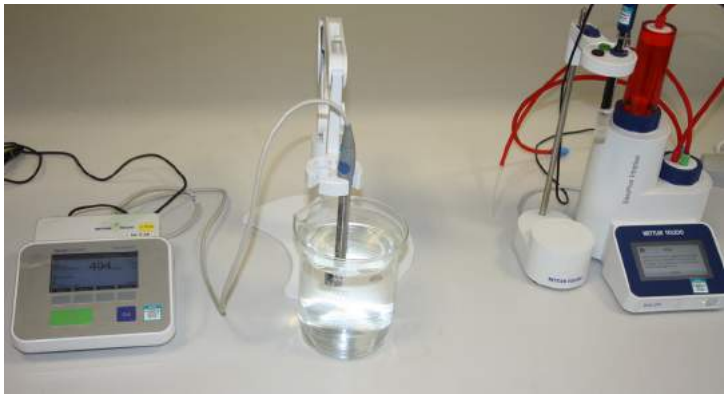
Temperature: 800 ± 10 °C **Duration:** 40 ± 5 minutes **Acceptance:** The amount of halogen acid, expressed as milligrams of hydrochloric acid per gram of test specimen taken. The amount of halogen acid shall be less than 5 mg/g.

IEC/EN 60754-2

(Determination of acidity (by pH measurement) and conductivity)

Determination of acidity (by pH measurement) and conductivity of non-metallic materials of a cable.

Temperature: min. 935 °C **Duration:** 30 min **Acceptance:** The weighted pH value should not be less than 4,3, the weighted value of conductivity should not exceed 10µS/mm.



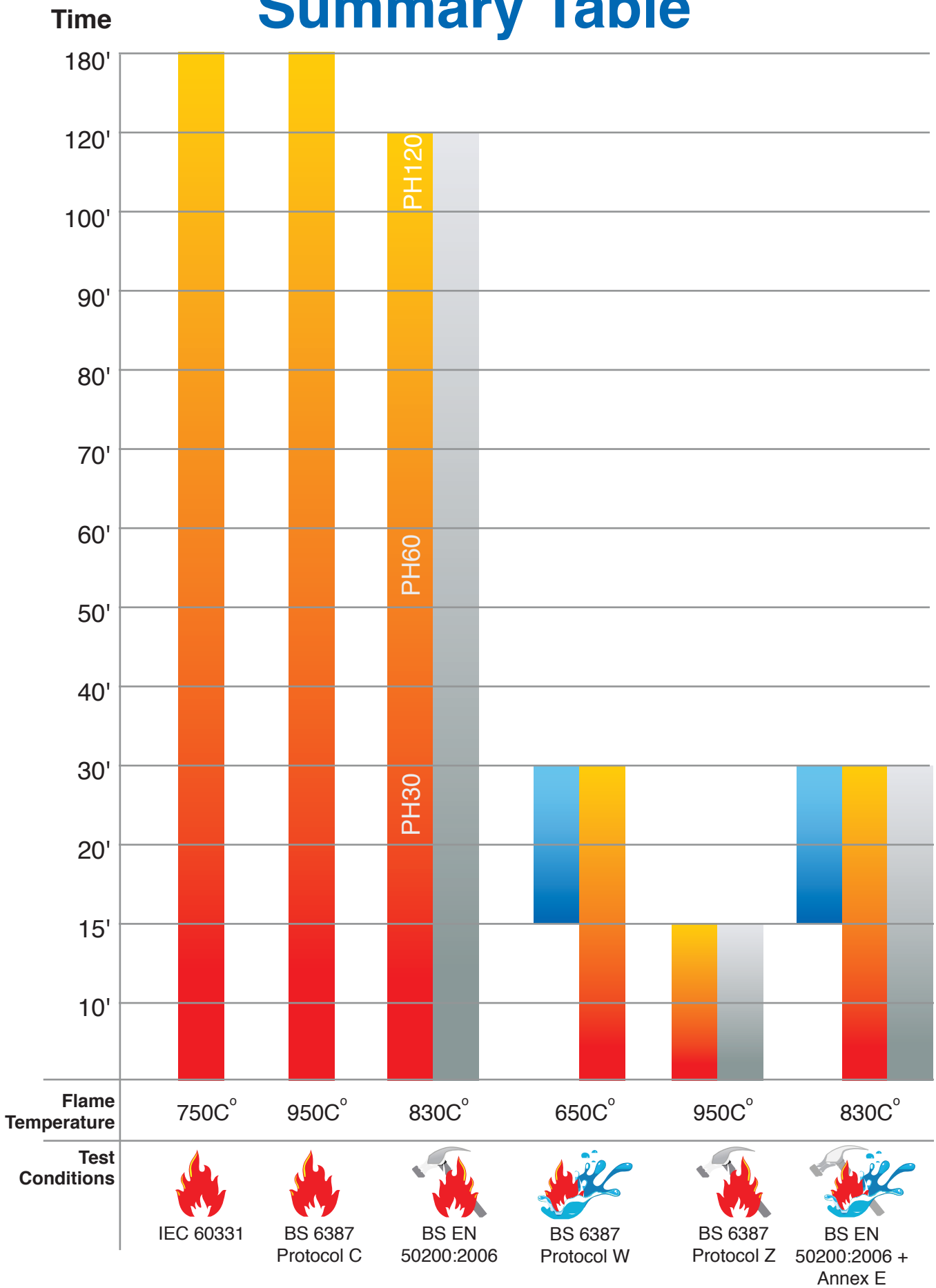
IEC/EN 61034-2

(Smoke Density)

A cable specimen is burnt in a closed chamber (3x3x3m; 27m³) using a flammable liquid. The light transmittance of the resulting smoke is measured optically.

Temperature: Determined by the quantity and composition of the fuel. **Duration:** 40 minutes **Acceptance:** The smoke must transmit the light. The recommendation of light transmission is 60% minimum.

Summary Table



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3 WHAT DO HOURS MEAN?

There are systems that must continue to operate during the fire. These are:

Fire alarm systems
Emergency lighting systems
Voice alarm systems
Fire water systems

Fire escape road lighting
Smoke and heat exhaust fans
Fireman lifts
Emergency safety circuits in buildings such as evacuation lifts.

Since it is very important for these systems to operate during the fire, electricity must not be cut of.
2M Kablo with signal and electrically conducting cables can operate during

180 minutes under fire!

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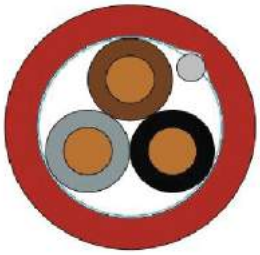
FireKab NGF FE180 PH30



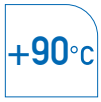
Certificate Number: 711c

Areas of Use

Used for communication and instrumentation purpose in electronic systems of marine vehicles. Screening layer protects the transmitting signal against electromagnetic interferences. Halogen Free and Flame Retardant construction ensures non-corrosive and highly visible environment during fire.

Cable Construction	
Conductor	Annealed Solid Copper (IEC/EN 60228 Class 1)
Insulation	Fire Resistant Silicon Rubber (BS 7655 EI2)
Core Colors	BS 7671, HD 308-S2*
Lay-up	Cores are stranded in layers
Separator	PET Foil
Drain Wire	0.80 mm Solid Tinned Copper
Screen	Al-PET Foil
Outer Sheath	Halogen Free Flame Retardant Compound (HFFR / LSZH / LSOH / FRNC, BS 7655-6 LTS3), RAL 3000 - Red or RAL 9003 - White

Technical Properties (at 20°C)	
Operating Voltage	300 / 500V
Test Voltage	2000V
Conductor Resistance	1.50 mm² - ≤12 Ω/km; 2.50 mm² - ≤7.4 Ω/km
Insulation Resistance	>200 M.Ωxkm
Temperature Range	Operation: -30 °C.....+90 °C, Installation: -5 °C .....+60 °C
Flame Retardancy	IEC/EN 60332-1, IEC/EN 60332-3-24
Fire Resistance	IEC 60331-21, BS 6387 C,W,Z, EN 50200 PH30
Smoke Density	IEC/EN 61034-1/2
Amaount of Halogen Acid Gas	IEC/EN 60754-1
Corrosive Gases Measurement	IEC/EN 60754-2
Min. Bending Radius	Operation: 8 x Cable Diameter, Installation: 15 x Cable Diameter



Max. Operating Temp.

Corrosive Gases


Flame Retardant


Fire Resistant

Cross Section

Configuration / Cross-section (mm²)	Cable Diameter(mm)(±5%)	Copper Weight (kg/km)	Cable Weight (kg/km)
2x1.5	6,7	31	67
3x1.5	7,1	43	85
4x1.5	7,9	56	109
2x2.5	7,9	49	96
3x2.5	8,5	70	128
4x2.5	9,2	93	160

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Certificate of Product Approval

Certificate Number: 711c Issue: 08

LOSS PREVENTION CERTIFICATION BOARD LPCB

2M KABLO SAN. VE TIC. A.S

Sancaktepe Mahallesi
Klas Sokak No:8
34580
Silivri
Istanbul
Turkey

is authorised to use the LPCB mark in association with the product(s) listed in this certificate and appendix having complied with the requirements of the standard(s) as detailed below:

Products
Cable Types as listed below:
Firekab NGF FE 180 PH30
See Certificate Appendix for details

Standards
BS 6387:2013 (Category CWZ)
EN 50200:2006 (Class PH30)

This Certificate is maintained and held in force through regular surveillance activities and subject to the corresponding ISO 9001 Certificate being maintained.

Damien Ward — Signed for LPCB
Damien Ward — Certification Scheme Manager
17 November 2016 — Date of issue
20 September 2010 — Date of First Issue

LPCB UKAS PRODUCT CERTIFICATION 0007

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bre

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Number Of Cores	*HD 308 S2 Color Code				
2	Blue	Brown			
3	Brown	Black	Grey		
4	Blue	Brown	Black	Grey	

FireKab BMK-SH FE180 PH120

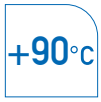
Certificate Number: 711a

Areas of Use

Used for communication and instrumentation purpose in electronic systems of marine vehicles. Screening layer protects the transmitting signal against electromagnetic interferences. Halogen Free and Flame Retardant construction ensures non-corrosive and highly visible environment during fire.

Cable Construction	
Conductor	Annealed Solid Copper (IEC/EN 60228 Class 1)
Insulation	Fire Resistant Silicon + HFFR
Core Colors	BS 7671 / HD 308 S2*
Lay-up	Cores are stranded in layers
Flame Barrier	Fiber Glass Tape
Drain Wire	Solid tinned copper with the same of conductor
Screen	Al-PET Foil
Outer Sheath	Halogen Free Flame Retardant Compound (HFFR / LSZH / LSOH / FRNC, BS 7655-6 LTS3), RAL 3000 - Red or RAL 9003 - White

Technical Properties (at 20°C)	
Operating Voltage	300 / 500 V
Test Voltage	2000V
Conductor Resistance	1.00 mm² - ≤18 Ω/km; 1.50 mm² - ≤12 Ω/km; 2.50 mm² - ≤7.4 Ω/km
Insulation Resistance	>200 M.Ωxkm
Temperature Range	Operation: -30 °C.....+90 °C, Installation: -5 °C .....+60 °C
Flame Retardancy	IEC/EN 60332-1, IEC/EN 60332-3-24
Fire Resistance	IEC 60331-21, BS 6387 C,W,Z, EN 50200 PH120
Smoke Density	IEC/EN 61034-1/2
Corrosive Gases Measurement	IEC/EN 60754-1
Amaount of Halogen Acid Gas	IEC/EN 60754-2
Min. Bending Radius	Operation: 8 x Cable Diameter, Installation: 15 x Cable Diameter



Max. Operating Temp.

Corrosive Gases


Flame Retardant


Fire Resistant

Cross Section

Configuration / Cross-section (mm²)	Cable Diameter(mm)(±5%)	Copper Weight (kg/km)	Cable Weight (kg/km)
2x1	7,5	27	76
3x1	7,9	36	92
4x1	8,5	45	110
2x1.5	8,2	39	95
3x1.5	8,7	52	117
4x1.5	9,4	65	138
5x1.5	10,2	78	169
7x1.5	11,0	104	209
2x2.5	9,8	66	142
3x2.5	10,4	88	178
4x2.5	11,4	110	219

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Certificate of Product Approval

Certificate Number: 711a Issue: 04

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Istanbul
Turkey

is authorised to use the LPCB mark in association with the product(s) listed in this certificate and appendix having complied with the requirements of the standard(s) detailed below:

Product(s)
Cable Types as listed below:
FireKab BMK-SH FE 180
See Certificate Appendix for details

Standard(s) (see Appendix for details)
BS 6387:2013 (Category CWZ)
EN 50200:2006 (Class PH120)

This Certificate is maintained and held in force through regular surveillance activities and subject to the corresponding ISO 9001 Certificate being maintained.

Signed for LPCB | David Hoare, Certification Manager | 22 April 2015, Date of Issue | 01 June 2005, Date of First Issue

BF1345 Rev. 0.3 Page 1 of 3 © BRE Global Ltd, 2015

Number Of Cores	*HD 308 S2 Color Code				
2	Blue	Brown			
3	Brown	Black	Grey		
4	Blue	Brown	Black	Grey	
5	Blue	Brown	Black	Grey	Black
7	Black (numbered)				

FireKab SFR FE180 PH120 Annex E (30 mins)

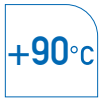
Certificate Number: 711d

Areas of Use

Used for communication and instrumentation purpose in electronic systems of marine vehicles. Screening layer protects the transmitting signal against electromagnetic interferences. Halogen Free and Flame Retardant construction ensures non-corrosive and highly visible environment during fire.

Cable Construction	
Conductor	Annealed Solid Copper (IEC/EN 60228 Class 1)
Insulation	Fire Resistant Silicon Rubber (BS 7655 EI2)
Core Colors	BS 7671, HD 308 S2*
Lay-up	Cores are stranded in layers
Separator	PET Foil
Drain Wire	Solid tinned copper with the same of conductor
Screen	Al-PET Foil
Outer Sheath	Halogen Free Flame Retardant Compound (HFFR / LSZH / LSOH / FRNC, BS 7655-6 LTS3), RAL 3000 - Red or RAL 9003 - White
Referance Standard	BS 7629 - 1: 2008

Technical Properties (at 20°C)	
Operating Voltage	300 / 500V
Test Voltage	2000V
Conductor Resistance	1.00 mm² - ≤18 Ω/km; 1.50 mm² - ≤12 Ω/km; 2.50 mm² - ≤7.4 Ω/km
Insulation Resistance	>200 M.Ωxkm
Temperature Range	Operation: -30 °C.....+90 °C, Installation: -5 °C .....+60 °C
Flame Retardancy	IEC/EN 60332-1, IEC/EN 60332-3-24
Fire Resistance	IEC 60331-21, BS 6387 C,W,Z, EN 50200 PH120, EN Annex E (30 min.)
Smoke Density	IEC/EN 61034-1/2
Amaount of Halogen Acid Gas	IEC/EN 60754-1
Corrosive Gases Measurement	IEC/EN 60754-2
Min. Bending Radius	Operation: 8 x Cable Diameter, Installation: 15 x Cable Diameter



Max. Operating Temp.

Corrosive Gases


Flame Retardant


Fire Resistant

Cross Section

Configuration / Cross-section (mm²)	Cable Diameter(mm)(±5%)	Copper Weight (kg/km)	Cable Weight (kg/km)
2x1	6,6	27	7
3x1	7,0	36	86
4x1	7,8	45	14
2x1.5	7,5	39	95
3x1.5	8,0	52	116
4x1.5	9,0	65	144
2x2.5	9,1	66	145
3x2.5	9,4	88	174
4x2.5	10,5	110	212

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Certificate of Product Approval

Certificate Number: 711d Issue: 04

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Products

Cable Types as listed below:
Firekab SFR FE 180

See Certificate Appendix for details

Standards

BS 7629-1:2008
BS 6387:2013 (CWZ)
EN 50200:2006 (Class PH120)
EN 50200:2006 Annex E (30 mins)
BS 5839-1:2013 (Clause 26.2d Standard)
BS 8519 (Clause 11)
BS 5266-1 (Clause 8.2.2a)
BS 5839-6 (Clause 16.2)
BS 5839-8 (Clause 27.6)

This Certificate is maintained and held in force through regular surveillance activities and subject to the corresponding ISO 9001 Certificate being maintained.

Damien Ward — Signed for LPCB
Damien Ward — Certification Scheme Manager
31 March 2017 — Date of Issue
23 September 2015 — Date of First Issue

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Number Of Cores	*HD 308 S2 Color Code				
2	Blue	Brown			
3	Brown	Black	Grey		
4	Blue	Brown	Black	Grey	

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