

Caviced

Conducting Value

FIRECEL

The Last Cable Standing

FIRE RESISTANT CABLES





CORPORATE VIDEO



ISO 9001:2015
Certificate No. CS1-249



Assessed to ISO 9001:2015
Cert/LPCB ref. 217



ISO 9001:2015
n. 9125.CAVL



ISO 14001:2015
n. 9191.CVCL

Our commitment to environmentally friendly products.

CAVICEL is committed to providing our customers with environmentally friendly products in compliance with the European Union (EU) RoHS Directive (Restriction of Hazardous Substances) and REACH Regulation (Registration, Evaluation, Authorization and Restriction of Chemicals).





FIRECEL

Fire Resistant Cables

The Last Cable Standing

CABLES VS FIRE

Fires have a high cost in terms of loss of human life and damages to plants and structures.

Fire is the major cause of destruction, but we must consider that one of the main causes of death are the inhalation of toxic gas that develop and the presence of dense smoke, interfering with the identification of escape routes.

It has to be kept into consideration, then, that even the most sophisticated alarm systems or emergency systems can be useless if their performances are compromised by the destruction of the cables caused by the fire. This is the reason why, over the last few years, the companies have strongly invested in design and development of insulation materials and cables granting the best performances in case of fire, while reducing fumes and acid gases emission and granting the circuit integrity even in case of fire.

Caviced has been present for more than 30 years onto the market with its own research, products and experience.

Experience is our Power.

With this catalogue we try to show you our experience, our way of thinking and operating in the creation of fire resistant cables.

We believe the cables you will see are good practical examples. When it comes to your own cable we can co-design it together: you let us know your specific situation and we will create your cable all around it.

Caviced can create it for you.



Fire Performance

CABLES HAVE TO BE PROPERLY DESIGNED,
MANUFACTURED AND ALSO TESTED.

The behavior of cables concerning flame presence covers various aspects.

A first feature is how the cable reacts in these circumstances.

This brought us to consider two performances:

FLAME RETARDANT

FIRE RESISTANT

Flame retardant cables can resist the spread of fire, but due to fire the cable is fully destroyed and no circuit integrity is assured. All the systems connected to cables are completely out of work.

Flame retardant cables are not intended to assure service during a fire but are chosen to prevent the flame spreading.

Fire resistant cables maintain circuit integrity and continue to work in the presence of fire. It is important for fire alarm systems, emergency lighting, voice alarm systems... In this case it is possible to assure building evacuation, alarm signals, activation of extinguishing systems.

Fire resistant cables are always as well Flame retardant as they assure the highest level of security during a fire.

GAS EMISSION / SMOKE DENSITY

Other features should be considered in this context. More precisely, these are the quality and the quantity of gas that are developed during the fire.

In fact, the cause of fire victims often doesn't only consist in the presence of fire, but it's also due to the gases that develop from the burning of materials.

One of the most popular material used for insulation and jacket for electrical cables is PVC.

This material can show excellent flame retardant properties, due to the presence of chlorine in the compound, that is a flame suppressant. On the other hand, chlorine is a corrosive and toxic gas and it develops a heavy smoke. All of these characteristics have to be avoided in case of fire.

This is why the following features have to be considered:

Absence of halogen (acid gas) in the cables

Low emission of smoke

Specific tests, according to different standards, are therefore defined to verify this performance.

The tests are part of R&D, an extremely strategic activity for a Company and this is the reason why CAVICEL has invested in this field.

You can find here the main tests concerning the behaviour of cables under fire conditions, and our main test equipments.

It is important to verify all required performances and give the customers the full compliance to the requirements.

CAVICEL is proud of its own laboratories and customers are always welcome to visit them.

FIRE RESISTANCE

CaviceL Fire Laboratory

BS 6387

Following tests are carried out to verify if a cable is capable of maintaining circuit integrity under fire condition, fire with water, and fire with mechanical shocks. During the tests the cables are maintained at their rated voltage.

► **Fire Resistance (CAT. A B C S)**

The cable is exposed to fire at the specified temperature and time.



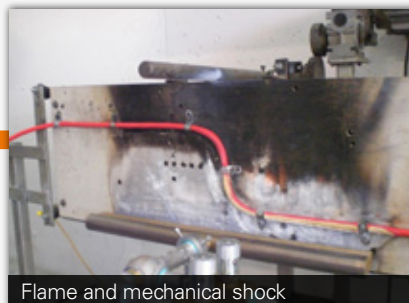
► **Fire and Water Resistance (CAT. W)**

The cable is exposed for 15 minutes to flame at 650°C and for additional 15 minutes to fire and water spray.



► **Fire Resistance with Mechanical Shocks (CAT. X Y Z)**

The cable is mounted on a vertical panel and shocked with a steel bar for 15 minutes while submitted to the action of a flame.



Performance Table

| TEST | CATEGORY |
|---------------------------|----------|
| Fire Resistance | |
| 650 °C for 3 hours | A |
| 750 °C for 3 hours | B |
| 950 °C for 3 hours | C |
| 950 °C for 20 minutes | S |

| TEST | CATEGORY |
|---|----------|
| Resistance to Fire and Water | |
| 650 °C | W |
| Resistance to Fire with Mechanical Shock | |
| 650 °C | X |
| 750 °C | Y |
| 950 °C | Z |

FIRE RESISTANCE

Cavice! Fire Laboratory

BS EN 50200

► **Fire Resistance**

This test is carried out to verify the circuit integrity of cables exposed to fire at 830°C and mechanical shocks.



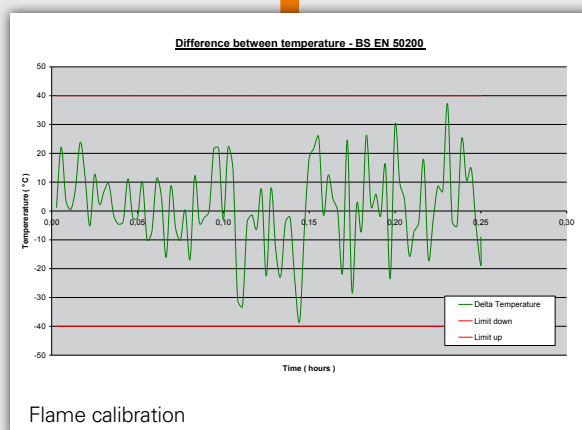
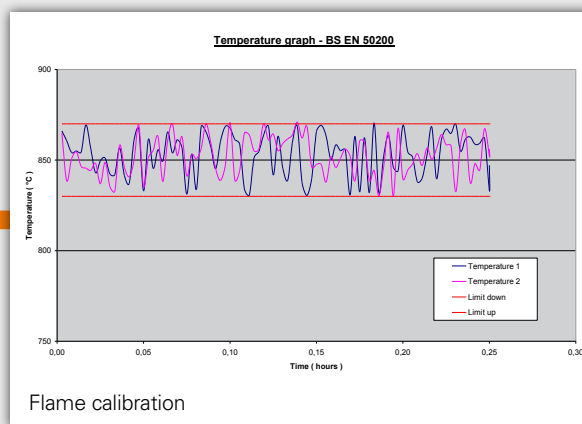
CLASSIFICATION

| | |
|--------|----------------------------|
| PH 15 | flame exposure for 15 min |
| PH 30 | flame exposure for 30 min |
| PH 60 | flame exposure for 60 min |
| PH 90 | flame exposure for 90 min |
| PH 120 | flame exposure for 120 min |

BS EN 50200 annex E (STANDARD CABLE - BS 5839-1 - CLAUSE 26.2D)

► **Fire Resistance**

This test is carried out to verify circuit integrity during a fire. The cable is exposed to a flame at 830°C and mechanical shocks for 15 minutes and additional 15 minutes to flame, mechanical shocks and water spray.



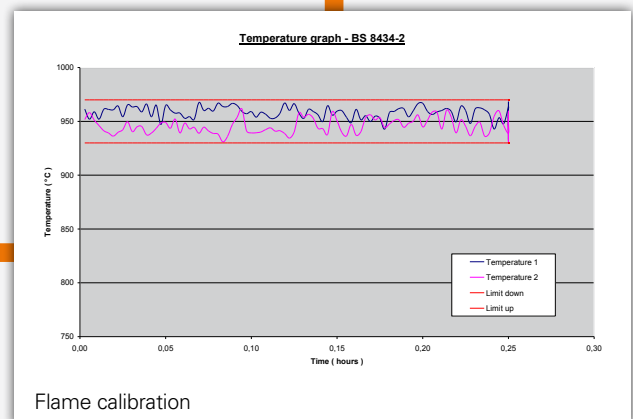
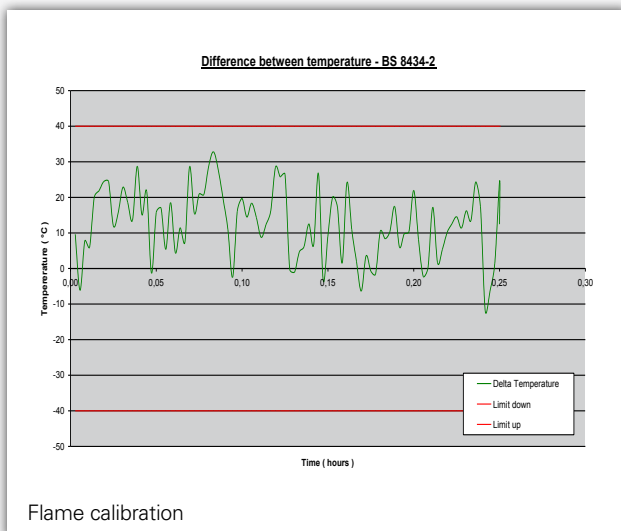
FIRE RESISTANCE

CaviceL Fire Laboratory

BS 8434-2 (ENHANCED CABLE - BS 5839-1 - CLAUSE 26.2E)

► **Fire Resistance**

This test is carried out to verify circuit integrity during a fire. The cable is exposed to a flame at 930°C and mechanical shocks for 60 minutes and additional 60 minutes to flame, mechanical shocks and water spray.



BS 8491:2008

► **Fire Resistance**

Method for assessment of fire integrity of large diameter power cables. This test is carried out to verify circuit integrity of cables exposed to fire, mechanical shock and water spray. A sample of cable is held on a flame about 830°C, for a minimum of 120 minutes. The sample is subject of a mechanical shock, directly on the cable, every 10 minutes. 5 minutes before the end of the test, the cable is run over by a strong jet of water (2,5 l/min.) for a period of 5 seconds, at intervals of 60 seconds.



FIRE RESISTANCE

CaviceL Fire Laboratory

IEC 60331, CEI 20-36

► **Fire Resistance**

This test is carried out to verify circuit integrity even during a fire. A sample of cable is held on a flame at about 750°C for a period of minimum 90 min, under rated voltage. No break or short circuit should occur.

The test can also be performed in more severe conditions, up to 1100 °C.

Fibre optic cables can be tested in same conditions, monitoring the attenuation of the signal of one or more fibres.

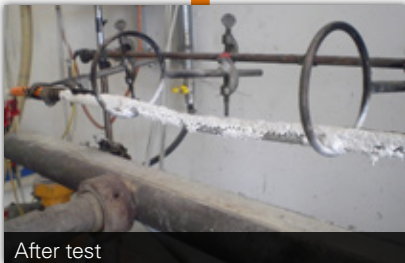
CLASSIFICATION

CEI 20-36/2-1 – IEC 60331-21 – Electrical cables up to 0,6/1 kV

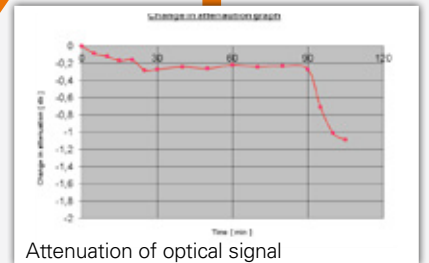
CEI 20-36/2-3 – IEC 60331-23 – Data cables

CEI 20-36/2-5 – IEC 60331-25 – Fibre optic cables

COPPER CABLE



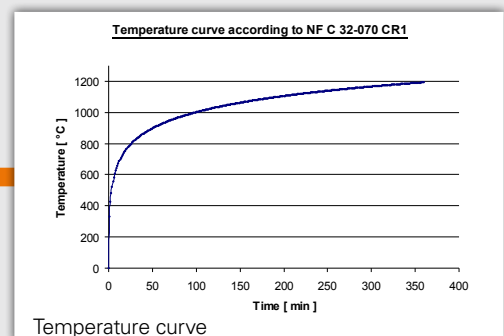
FIBER CABLE



NF C 32-070 CR1

► **Fire Resistance**

This test is carried out to verify circuit integrity during a fire. The cable is into a tubular oven with gradually increasing of temperature up to 920°C. The cable is stressed by mechanical shocks and subjected to tensile strength.





FIRE AND FLAME PROPAGATION

CaviceL Fire Laboratory

BS EN 60332-3 IEC 60332-3, CEI 20-22/3

► Fire propagation test on bunched cables

Samples of cables 3,5 m long in quantities required by standard are installed on a ladder inside a metallic cabinet. They are subjected to the action of a flame at 750°C for a specific time (20 or 40 minutes). Cables must not burn for more than 2,5 m.



BS EN 60332-1 IEC 60332-1, CEI 20-35/1

BS EN 60332-2 IEC 60332-2, CEI 20-35/2, for small diameter cables

► Flame Propagation Test on a Single Cable

A 60 cm long sample of cable is vertically fixed with two clamps inside a small cabin, open on the front. The cable is subjected to the action of a flame produced by a calibrated Bunsen burner. The application time of the flame is according to the cable diameter (60-480 seconds). At the end of the test the burnt portion of cable must not be 50 mm close to the higher clamp.





GAS EMISSION

Cavicel Fire Laboratory

BS EN 60754-1 IEC 60754-1, CEI 20-37/2-1

▶ HCl Emission

Each non metallic material of the cable (~1.0 g) is burnt into a tube furnace up to 800 °C. A controlled air flow rate absorbs the generated gases in a appropriate solution.
The titration of the solution allows to determine the developed hydrochloric acid (HCl) amount.



BS EN 60754-2 IEC 60754-2, CEI 20-37/2-2

▶ Gas Corrosivity

This test allows estimation of corrosiveness against metals of gases released when cables burn. Materials composing the cable are burnt into a tubular oven with temperature higher than 935 °C. A controlled air flow rate absorbs the generated gases in a specific distilled water solution. pH and conductivity are finally measured.



| STANDARD | REQUIRED VALUES |
|--|--|
| BS EN 50267-2-2, IEC 60754-2, CEI 20-37/2-2 | pH ≥ 4,3 Conductivity ≤ 100 µS.cm-1 |



SMOKE DENSITY

CaviceL Fire Laboratory

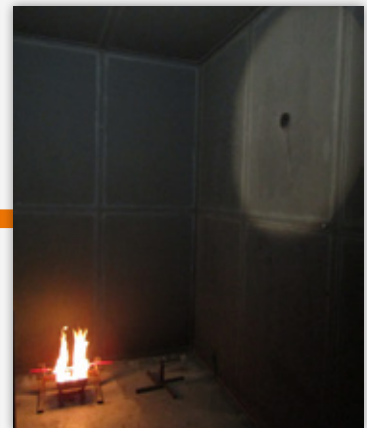
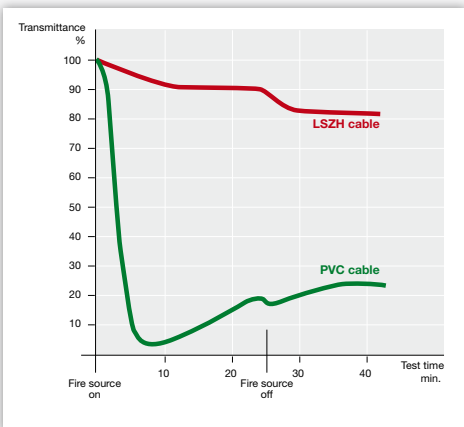
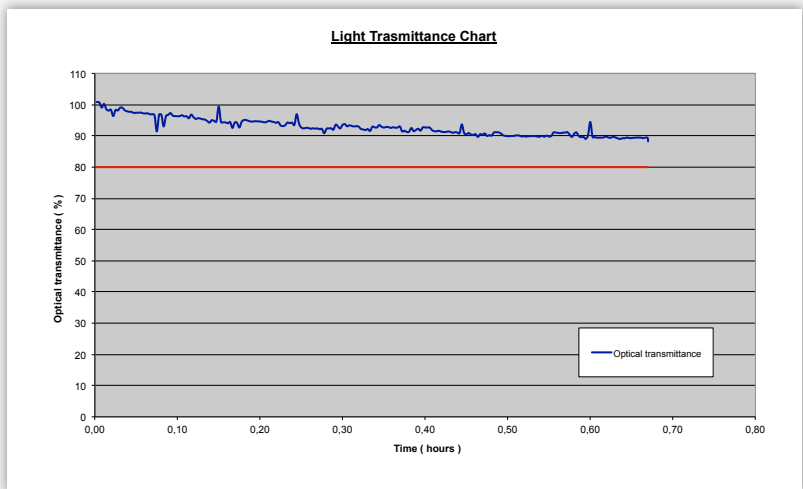
BS EN 61034-2 IEC 61034-2, CEI 20-37/3

Smoke Density



In a 3 m cube metal cabinet, samples of cables are burned by 100 cm³ of alcohol contained in a metal tray. A photometric system is based on a light source and a photocell placed horizontally in the mid vertical plane of the cube, at height of 2.15 m. Absorbance or light transmission are measured.

| STANDARD | REQUIRED VALUES |
|--|-----------------|
| BS EN 61034-2, IEC 61034-2, CEI 20-37/3 (Transmittance - LT) | ≥ 60% or 80%v |





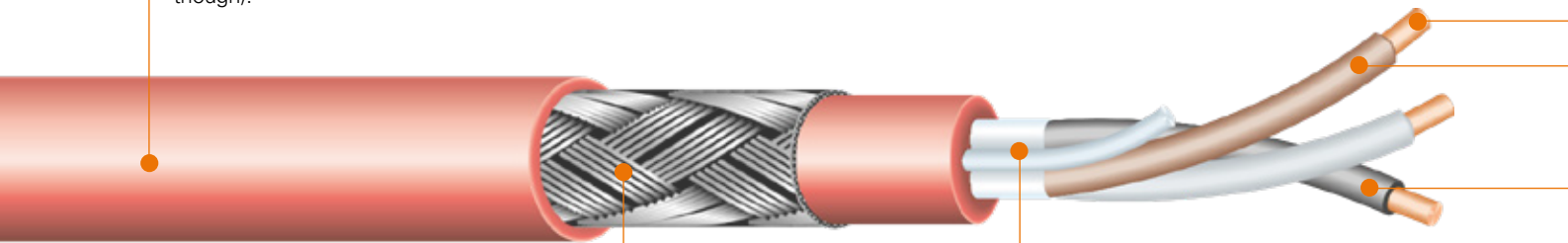
FIRE RESISTANT CABLES

CONSTRUCTION AND GENERAL INFORMATION

Sheath

To optimize the behaviour in case of fire, the sheath is made of LSZH (Lows Smoke Zero Halogen) materials since, thanks to that, fire is not propagated, toxic or corrosive gases are not developed and a minimum quantity of white fumes are emitted.

Other materials can obviously be used in case of specific installation requirements, such as: PVC, for example, where a higher resistance to oils and chemicals is required (but this material contains halogens, so it emits acid gas and smoke). PE, when a higher resistance to water and moisture is required (this material is no anti-flame, though).

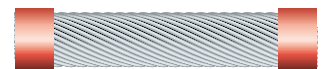


Armouring

Metallic armour are used when cables have to be installed by direct buried, or if mechanical protection is required. Following points must be considered:

- Required tensile load
- Expected pressure on cable during service
- Protection against rodent
- Protection against accidental damage
- Minimum required bending radius.

SWA: single layer of galvanized steel wires, with diameters according to relevant standards, coverage min. 90%. This armour assures a very good mechanical protection and tensile strength. An additional counterspiral tape increases solidity, if required.



GSWB: galvanized steel wire braid, diameter of wire: 0.20 - 0.25 - 0.30 - 0.40 mm, with coverage of >80%. It assures a good mechanical resistance, allowing a lower bending radius compared to other armour. It is preferable when there is movement or vibration.



For special application it is possible to use stainless steel, tinned copper or special alloy wires.

Conductors

Conductors can generally be according to EN 60228:



Type of conductors are chosen according to electrical characteristics, required flexibility, type of connection systems or specific installation conditions, for example:

- in presence of vibration or movement or reduced bending radius it is preferable class 5 flexible conductor,
- class 1 solid conductor is preferable for permanent installation, crimping termination,
- in presence of corrosive atmosphere, high temperature or to facilitate the soldering it is preferable tinned conductor.

Insulation

The most widespread technologies to guarantee the electric cables connection integrity during a fire is currently the following:

- ceramified silicone-rubber
- mica-glass tape and cross-linked polyolefine

The taping with mica tape is the most typical solution; it allows the use of several insulation materials since the fire resistance is guaranteed by the tape.

The silicone rubber is currently the most frequently used solution because it simplifies and speeds up the installation, thanks to the easy peeling and to the lack of tape.

MICA-GLASS TAPE

SILICONE RUBBER



Screening

Screens are often used in instrumentation cables to prevent or reduce possible interference in cables that can be caused by the following reasons:

- Cross-talk between adjacent pairs or triples;
- Interference induced by an external source such as electrical equipments, machinery, power line.

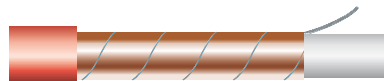
The most popular screen is:

ALUMINIUM/POLYESTER TAPE
with a tinned copper drain wire
or earth conductor



Following screens can also be used, when required:

COPPER/POLYESTER TAPE
with a tinned copper drain wire,
for a better screen effect



BARE COPPER BRAID
for electromagnetic interference
or when the cable is subject
to movements



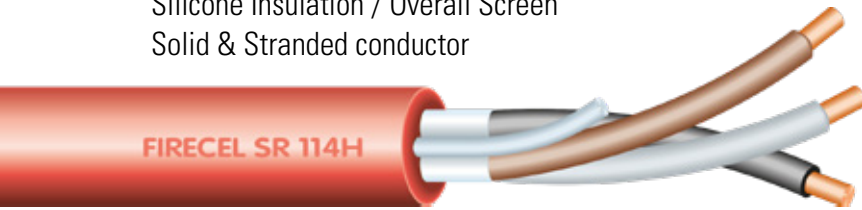
Cabling

Fire resistant cables generally can be laid-up in concentric construction and in pairs.

Twisting is important to reduce noise in circuits and also the lay of twist in some constructions must be carefully considered.

FIRECEL SR 114H

Silicone Insulation / Overall Screen
Solid & Stranded conductor



Standard Cable 300/500 V

BS 5839-1:2017 Clause 26.2d

BS EN 50200:2015 (PH 30 - PH 60 - PH 120) 830°C fire and mechanical shocks

BS EN 50200:2015 + Annex E 830°C - 30 min. (15 min. fire and mechanical shocks + 15 min. fire mechanical shocks and water spray)

BS 6387:2013

Cat. C fire @ 950°C - 180 min

Cat. W fire 15 min. + fire and water spray 15 min.

Cat. Z fire and mechanical shocks @ 950°C - 15 min. fire



LPCB ref. 217f

(cables up to 4 cores)

For the scope of the LPCB Approval see www.redbooklive.com



For the scope of the BASEC Approval see www.basec.org.uk

APPLICATIONS

FIRECEL SR 114H are primarily intended for general application.

Typical applications are:

BS 5839-1 for **standard** fire resistant cables in fire detection and fire alarm systems for building

BS 5839-8 for voice alarm systems

BS 5839-9 for emergency voice communication systems.

BS 5266-1 for emergency lighting of premises (PH60)

BS 8519 for fire-resistant control cable systems for life safety and fire-fighting application - Category 1

OPERATING TEMPERATURE

-40°C to +90°C

MINIMUM BENDING RADIUS

6 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, solid class 1 or stranded class 2 according to EN 60228.

Insulation

High performance fire resistant silicone rubber type EI2 to BS EN 50363-1.

Cabling

Insulated cores are cabled together.

Overall screen

Aluminium/polyester tape.

Circuit protective conductor or drain wire

Uninsulated tinned copper conductor of the same section and class as the insulated conductors in the 2-, 3- and 4-core cables. Drain wire of 0.5 mm² tinned copper conductor is provided in cables with more than 4 conductors.

Outer sheath

LSZH thermoplastic material type LTS3 to BS 7655-6.1.

Colour red or white (other colours on request).

COLOUR CODE UP TO 4 CORES TO HD 308

- 2 cores:** ● ●
- 3 cores:** ● ● ●
- 4 cores:** ● ● ● ●
- 7 cores:** centre ●
1st layer ● ● - 4 cores ● ● ● ●
- 12 cores:** centre ● ● ● ●
1st layer ● ● - 7 cores ● ● ● ● ● ● ● ●
- 19 cores:** centre ●
1st layer ● ● - 4 cores ● ● ● ●
2nd layer ● ● - 10 cores ● ● ● ● ● ● ● ● ● ●

(on request the cores can be one colour only, identified by printed numbers)

APPLICABLE STANDARDS

Basic design

BS 7629-1

Fire resistant

BS 6387 (cat. C-W-Z)

BS EN 50200 (PH30 - PH60 - PH120)

BS EN 50200 annex E (fire, mechanical shock and water spray)

IEC 60331

Flame retardant

BS EN 60332-1-2

Fire retardant

BS EN 60332-3-24 (cat. C)

Acid gas emission

BS EN 60754-1

Smoke density

BS EN 61034-2

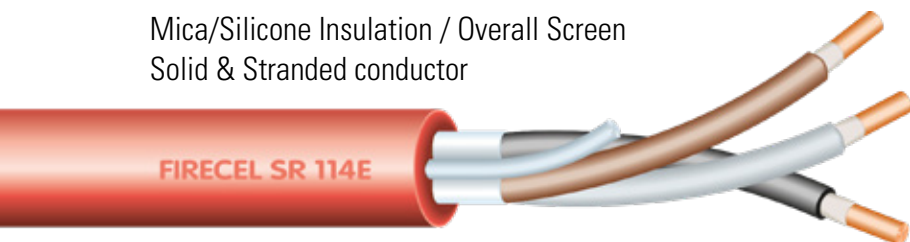
| N° of cond. x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) |
|--|---------------------|----------------|
| 1 mm² solid | | |
| 2x1.0 | 7.1 | 70 |
| 3x1.0* | 7.6 | 85 |
| 4x1.0* | 8.3 | 110 |
| 7x1.0 | 10.0 | 165 |
| 12x1.0 | 12.5 | 255 |
| 19x1.0 | 15.0 | 380 |
| 1.5 mm² solid | | |
| 2x1.5 | 8.0 | 95 |
| 3x1.5 | 8.5 | 115 |
| 4x1.5 | 9.4 | 140 |
| 7x1.5 | 11.3 | 225 |
| 12x1.5 | 14.5 | 340 |
| 19x1.5 | 17.0 | 520 |
| 1.5 mm² stranded | | |
| 2x1.5 | 8.4 | 100 |
| 3x1.5 | 8.9 | 125 |
| 4x1.5 | 9.8 | 155 |
| 2.5 mm² solid | | |
| 2x2.5 | 9.4 | 130 |
| 3x2.5 | 10.0 | 170 |
| 4x2.5 | 11.0 | 210 |
| 2.5 mm² stranded | | |
| 2x2.5 | 9.9 | 145 |
| 3x2.5 | 10.3 | 180 |
| 4x2.5 | 11.7 | 230 |
| 4 mm² stranded | | |
| 2x4 | 11.5 | 200 |
| 3x4 | 12.2 | 260 |
| 4x4 | 13.5 | 330 |

approximate values

* not included in BS 7629-1:2015 and in LPCB/BASEC approval.

FIRECEL SR 114E

Mica/Silicone Insulation / Overall Screen
Solid & Stranded conductor



Enhanced Cable 300/500 V

BS 5839-1:2017 Clause 26.2e

BS EN 50200:2015 (PH 120)

830°C fire and mechanical shocks

BS 8434-2:2003 +A2:2009 930°C - 120 min. (60 min. fire and mechanical shocks + 60 min. fire mechanical shocks and water spray)

BS 6387:2013

Cat. C fire @ 950°C - 180 min

Cat. W fire 15 min. + fire and water spray 15 min.

Cat. Z fire and mechanical shocks

@ 950°C - 15 min. fire



LPCB ref. 217g

(cables up to 4 cores)

For the scope of the LPCB

Approval see

www.redbooklive.com



For the scope of the BASEC

Approval see www.basec.org.uk

APPLICATIONS

FIRECEL SR 114E are primarily intended for use in fire detection and fire alarm systems, emergency lighting circuits or if cables need to properly operate when **fire resistance improvement is required**.

Typical applications are:

BS 5839-1 for **enhanced** fire resistant cables in fire detection and fire alarm systems for building

BS 5839-8 for voice alarm systems

BS 5839-9 for emergency voice communication systems.

BS 5266-1 for emergency lighting of premises

BS 8519 for fire-resistant control cable systems for life safety and fire-fighting application - Category 2

OPERATING TEMPERATURE

-40°C to +90°C

MINIMUM BENDING RADIUS

6 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, solid class 1 or stranded class 2 according to EN 60228.

Insulation

Mica/Glass fire resistant tape covered by high performance fire resistant silicone rubber type EI2 to BS EN 50363-1.

Cabling

Insulated cores are cabled together.

Overall screen

Aluminium/polyester tape.

Circuit protective conductor or drain wire

Uninsulated tinned copper conductor of the same section and class as the insulated conductors in the 2-, 3- and 4-core cables. Drain wire of 0.5 mm² tinned copper conductor is provided in cables with more than 4 conductors.

Outer sheath

LSZH thermoplastic material type LTS3 to BS 7655-6.1.

Colour red or white (other colours on request).

COLOUR CODE UP TO 4 CORES TO HD 308

2 cores: ● ●

3 cores: ● ● ●

4 cores: ● ● ● ●

7 cores: centre ●
1st layer ● ● - 4 cores ●

12 cores: centre ● ● ● ●
1st layer ● ● - 7 cores ●

19 cores: centre ●
1st layer ● ● - 4 cores ●
2nd layer ● ● - 10 cores ●

(on request the cores can be one colour only, identified by printed numbers)

APPLICABLE STANDARDS

Basic design

BS 7629-1

Fire resistant

BS 6387 (cat. C-W-Z)

BS EN 50200 (PH120)

BS EN 50200 annex E (fire, mechanical shock and water spray)

BS 8434-2 (120 min)

IEC 60331

Flame retardant

BS EN 60332-1-2

Fire retardant

BS EN 60332-3-24 (cat. C)

Acid gas emission

BS EN 60754-1

Smoke density

BS EN 61034-2

| N° of cond. x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) |
|--|---------------------|----------------|
| 1 mm² solid | | |
| 2x1.0 | 7.9 | 85 |
| 3x1.0* | 8.4 | 105 |
| 4x1.0* | 9.3 | 125 |
| 7x1.0 | 10.9 | 175 |
| 12x1.0 | 14.5 | 300 |
| 19x1.0 | 17.0 | 470 |
| 1.5 mm² solid | | |
| 2x1.5 | 8.8 | 105 |
| 3x1.5 | 9.3 | 130 |
| 4x1.5 | 10.3 | 165 |
| 7x1.5 | 12.1 | 230 |
| 12x1.5 | 16.0 | 380 |
| 19x1.5 | 19.0 | 590 |
| 1.5 mm² stranded | | |
| 2x1.5 | 9.2 | 110 |
| 3x1.5 | 9.7 | 135 |
| 4x1.5 | 10.5 | 170 |
| 2.5 mm² solid | | |
| 2x2.5 | 10.2 | 150 |
| 3x2.5 | 10.8 | 190 |
| 4x2.5 | 12.0 | 240 |
| 2.5 mm² stranded | | |
| 2x2.5 | 10.6 | 155 |
| 3x2.5 | 11.3 | 190 |
| 4x2.5 | 12.5 | 250 |
| 4 mm² stranded | | |
| 2x4 | 12.2 | 220 |
| 3x4 | 13.0 | 280 |
| 4x4 | 14.4 | 350 |

approximate values

*not included in BS 7629-1:2015 and in LPCB/BASEC approval.

FIRECEL SR 125H

Multi-pair Overall Screen/Silicone Insulation



SR/OS/LSZH 300/500 V

Not Armoured

SR/OS/LSZH/SWA/LSZH 300/500 V

Armoured

APPLICATIONS

Firecel SR 125H are designed, manufactured and tested as data transmission cables for emergency services. These are used for data and voice transmission when high frequency signal has to be assured also in the event of a fire.

OPERATING TEMPERATURE

-40°C to +90°C

MINIMUM BENDING RADIUS

Not armoured type

12 times the outer diameter.

Armoured type

15 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed electrolytic copper wire according to EN 60228 class 1(U) solid or class 2 (R) stranded.

Insulation

High performance fire resistant silicone rubber.

Twisting

The insulated cores shall be twisted in pairs for a good reduction of the electromagnetic noise.

Cabling

The pairs are cabled with suitable non hygroscopic fillers (when necessary) and wrapped with polyester tape if required.

Overall screen

Aluminium/polyester tape, coverage > 100%, aluminium in contact with tinned copper drain wire.

Armoured

Inner sheath: LSZH thermoplastic material.

Armour: Single layer of galvanized steel wires (SWA).

Outer sheath

LSZH thermoplastic material.

APPLICABLE STANDARDS

Basic design BS 7629

Fire resistant IEC 60331-23

Flame retardant IEC 60332-1-2

Fire retardant IEC 60332-3-24 (cat. C)

Halogen free properties IEC 60754-1

Low smoke emission IEC 61034-2

| UNARMOURED | | | ARMOURED | | |
|---|---------------------|----------------|------------------------------|---------------------|----------------|
| N° of conductors x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) | Diameter under armour (mm) | Outer diameter (mm) | Weight (kg/km) |
| 0,5 mm² solid | | | U-SR/OS/LSZH/SWA/LSZH | | |
| 1x2x0,5 | 6,5 | 56 | 6,5 | 10,7 | 235 |
| 2x2x0,5 | 9,5 | 94 | 9,5 | 14,5 | 381 |
| 3x2x0,5 | 10,5 | 118 | 10,5 | 15,2 | 472 |
| 5x2x0,5 | 12,0 | 167 | 12,0 | 18,4 | 550 |
| 6x2x0,5 | 13,0 | 197 | 13,0 | 18,5 | 574 |
| 10x2x0,5 | 16,5 | 273 | 16,5 | 22,3 | 760 |
| 15x2x0,5 | 20,5 | 410 | 20,5 | 24,2 | 941 |
| 20x2x0,5 | 22,6 | 520 | 22,6 | 27,1 | 1146 |
| 1 mm² stranded | | | R-SR/OS/LSZH/SWA/LSZH | | |
| 1x2x1 | 7,4 | 77 | 7,4 | 11,3 | 265 |
| 2x2x1 | 10,6 | 130 | 10,6 | 15,9 | 452 |
| 3x2x1 | 11,2 | 196 | 11,2 | 16,2 | 528 |
| 5x2x1 | 13,7 | 245 | 13,7 | 20,1 | 665 |
| 6x2x1 | 14,8 | 300 | 14,8 | 20,3 | 695 |
| 10x2x1 | 18,9 | 378 | 18,9 | 23,8 | 937 |
| 15x2x1 | 23,2 | 567 | 23,2 | 27,8 | 1368 |
| 20x2x1 | 26,2 | 831 | 26,2 | 30,9 | 1650 |
| 1,5 mm² stranded | | | R-SR/OS/LSZH/SWA/LSZH | | |
| 1x2x1,5 | 8,7 | 100 | 8,7 | 12,1 | 305 |
| 2x2x1,5 | 10,2 | 188 | 10,2 | 17,2 | 525 |
| 3x2x1,5 | 12,9 | 223 | 12,9 | 16,2 | 614 |
| 5x2x1,5 | 16,7 | 346 | 16,7 | 22,1 | 794 |
| 6x2x1,5 | 17,5 | 426 | 17,5 | 22,3 | 845 |
| 10x2x1,5 | 23,4 | 541 | 23,4 | 27,0 | 1315 |
| 15x2x1,5 | 28,9 | 892 | 28,9 | 30,7 | 1691 |
| 20x2x1,5 | 32,5 | 1182 | 32,5 | 34,4 | 2075 |

| ELECTRICAL CHARACTERISTICS | | | |
|----------------------------------|-----|-----|-----|
| Cross section (mm ²) | 0,5 | 1,0 | 1,5 |
| Capacitance (pF/m) | 90 | 100 | 110 |
| L/R (μH/Ohm) | 25 | 25 | 40 |

approximate values

FIRECEL SR 225 H

Multi-pair Overall Screen/Mica+XLPE Insulation



MXLPE/OS/LSZH 300/500 V

Not Armoured

MXLPE/OS/LSZH/SWA/LSZH 300/500 V

Armoured

APPLICATIONS

Firecel SR 225H are designed, manufactured and tested as data transmission cables for emergency services. These are used for data, voice and signal transmission when high frequency signal has to be assured also in the event of a fire.

OPERATING TEMPERATURE

-40°C to +90°C.

MINIMUM BENDING RADIUS

Not armoured type

12 times the outer diameter.

Armoured type

15 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed electrolytic copper wire according to EN 60228 class 2 (R) stranded.

Insulation

Mica/Glass tape plus XLPE.

Twisting

The insulated cores shall be twisted in pairs for a good reduction of the electromagnetic noise.

Cabling

The pairs are cabled with suitable non hygroscopic fillers (when necessary) and wrapped with polyester tape if required.

Overall screen

Aluminium/polyester tape, coverage >100%, aluminium in contact with tinned copper drain wire.

Armoured

Inner sheath: LSZH thermoplastic material.

Armour: Single layer of galvanized steel wires (SWA).

Outer sheath

LSZH thermoplastic material.

APPLICABLE STANDARDS

Basic design EN 50288-7

Fire resistant IEC 60331-23

Flame retardant IEC 60332-1-2

Fire retardant IEC 60332-3-24 (cat. C)

Halogen free properties IEC 60754-1

Low smoke emission IEC 61034-2

| N° of conductors x cross section (mm²) | UNARMoured | | ARMoured | | |
|--|---------------------|----------------|---------------------------|---------------------|----------------|
| | Outer diameter (mm) | Weight (kg/km) | Diameter under armour(mm) | Outer diameter (mm) | Weight (kg/km) |
| 0,75 mm² stranded | R-mXLPE/OS/LSZH | | R-mXLPE/OS/LSZH/SWA/LSZH | | |
| 1x2x0,75 | 7,8 | 64 | 7,8 | 12,3 | 292 |
| 2x2x0,75 | 10,7 | 118 | 10,7 | 15,5 | 504 |
| 5x2x0,75 | 14,8 | 218 | 14,8 | 22,2 | 703 |
| 10x2x0,75 | 20,1 | 380 | 20,1 | 25,8 | 1005 |
| 15x2x0,75 | 24,9 | 535 | 24,9 | 31,0 | 1434 |
| 20x2x0,75 | 28,2 | 680 | 28,2 | 34,6 | 1715 |
| 1 mm² stranded | R-mXLPE/OS/LSZH | | R-mXLPE/OS/LSZH/SWA/LSZH | | |
| 1x2x1 | 8,4 | 73 | 8,4 | 12,7 | 316 |
| 2x2x1 | 11,5 | 136 | 11,5 | 18,3 | 549 |
| 5x2x1 | 15,7 | 266 | 15,7 | 23,7 | 798 |
| 10x2x1 | 21,3 | 455 | 21,3 | 28,8 | 1279 |
| 15x2x1 | 26,5 | 646 | 26,5 | 32,9 | 1622 |
| 20x2x1 | 30,2 | 839 | 30,2 | 36,9 | 1971 |
| 1,5 mm² stranded | R-mXLPE/OS/LSZH | | R-mXLPE/OS/LSZH/SWA/LSZH | | |
| 1x2x1,5 | 9,3 | 87 | 9,3 | 13,7 | 346 |
| 2x2x1,5 | 13,0 | 165 | 13,0 | 19,6 | 622 |
| 5x2x1,5 | 18,1 | 342 | 18,1 | 25,5 | 927 |
| 10x2x1,5 | 24,8 | 606 | 24,8 | 31,3 | 1535 |
| 15x2x1,5 | 30,8 | 862 | 30,8 | 35,8 | 1954 |
| 20x2x1,5 | 34,9 | 1121 | 34,9 | 40,8 | 2631 |

ELECTRICAL CHARACTERISTICS

| Cross section (mm²) | 0,75 | 1 | 1,5 |
|---------------------|------|-----|-----|
| Capacitance (pF/m) | 150 | 150 | 150 |
| L/R (µH/Ohm) | 25 | 25 | 40 |

approximate values

FIRECEL SR 228 – PA/GA

Multi-pair Individual and Overall Screen/Mica+XLPE Insulation



F-MXLPE/IS/OS/LSZH 300/500 V

Not Armoured

F-MXLPE/IS/OS/LSZH/SWA/LSZH 300/500 V

Armoured

APPLICATIONS

Firecel SR 228 are designed, manufactured and tested for Public Address/General Alarm (PA/GA) system to significantly improve system integrity and functionality

OPERATING TEMPERATURE

-40°C to +90°C.

MINIMUM BENDING RADIUS

Not armoured type

12 times the outer diameter.

Armoured type

15 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Flexible annealed electrolytic copper wire according to EN 60228 .

Insulation

Mica/Glass tape plus XLPE.

Twisting

The insulated cores shall be twisted in pairs for a good reduction of the electromagnetic noise.

Individual screen

Aluminium/polyester tape, coverage >100%, aluminium in contact with tinned copper drain wire 0,5 mm².

Cabling

The screened pairs are cabled with suitable non hygroscopic fillers (when necessary) and wrapped with polyester tape if required.

Overall screen

Aluminium/polyester tape, coverage >100%, aluminium in contact with tinned copper drain wire 0,5 mm².

Armoured

Inner sheath: LSZH thermoplastic material.

Armour: Single layer of galvanized steel wires (SWA).

Outer sheath

LSZH thermoplastic material.

APPLICABLE STANDARDS

Basic design EN 50288-7

Fire resistant EN 50200 PH 120

Flame retardant IEC 60332-1-2

Fire retardant IEC 60332-3-24 (cat. C)

Halogen free properties IEC 60754-1

Low smoke emission IEC 61034-2

| UNARMoured | | | ARMoured | | |
|---|---------------------|----------------|-----------------------------|---------------------|----------------|
| N° of conductors x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) | Diameter under armour(mm) | Outer diameter (mm) | Weight (kg/km) |
| 2.5 mm² | F-mXLPE/IS/OS/LSZH | | F-mXLPE/IS/OS/LSZH/SWA/LSZH | | |
| 1x2x2,5 | 9,3 | 120 | 9,3 | 14,1 | 370 |
| 2x2x2,5 | 14,7 | 270 | 14,7 | 20,0 | 670 |
| 4 mm² | F-mXLPE/IS/OS/LSZH | | F-mXLPE/IS/OS/LSZH/SWA/LSZH | | |
| 2x2x4,0 | 16,7 | 370 | 16,7 | 22,0 | 820 |
| 4x2x4,0 | 19,8 | 600 | 19,8 | 25,2 | 1120 |
| 6x2x4,0 | 24,1 | 920 | 24,1 | 29,7 | 1570 |
| 6 mm² | F-mXLPE/IS/OS/LSZH | | F-mXLPE/IS/OS/LSZH/SWA/LSZH | | |
| 2x2x6,0 | 18,7 | 500 | 18,7 | 24,1 | 990 |

Others cross sections and formations are available on request

FIRECEL SR 118

Silicone Insulation



SR / LSZH 300/500 V

APPLICATIONS

FIRECEL SR 118 are designed, manufactured and tested as control cable for emergency services and fire circuit control.

OPERATING TEMPERATURE

- 40 °C / +90 °C

APPLICABLE STANDARDS

Basic design

EN 50288-7

Fire resistant

BS 6387 (cat. C-W-Z)

BS EN 50200 (class 50200 - PH 60)

IEC 60331-21

Flame retardant

BS EN 60332-1-2

IEC 60332-3-22 cat. A

Acid gas emission

BS EN 60754-1

BS EN 60754-2

Smoke density

BS EN 61034-2

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, solid class 1 or stranded class 2 according to EN 60228.

Insulation

High performance fire resistant silicone rubber type EI2 to BS EN 50363-1.

Cabling

Insulated cores are cabled together.

Outer sheath

LSZH thermoplastic material type LTS3 according BS 7655.
Colour red (other colours on request).

COLOUR CODE UP TO 4 CORES TO HD 308

- cores: ● ●
- 3 cores: ● ● ●
- 4 cores: ● ● ● ●

| N° of cores. x size | Size of conductors (n°/mm) | Outer diameter (mm) | Net Weight (kg/km) |
|------------------------------------|----------------------------|---------------------|--------------------|
| 1.5 mm² solid | | | |
| 2x1.5 | 1/1.38 | 7.4 | 80 |
| 3x1.5 | 1/1.38 | 7.8 | 100 |
| 4x1.5 | 1/1.38 | 8.5 | 130 |
| 1.5 mm² stranded | | | |
| 2x1.5 | 7/0.53 | 7.8 | 90 |
| 3x1.5 | 7/0.53 | 8.3 | 110 |
| 4x1.5 | 7/0.53 | 9.0 | 140 |
| 2.5 mm² solid | | | |
| 2x2.5 | 1/1.75 | 8.7 | 110 |
| 3x2.5 | 1/1.75 | 9.2 | 150 |
| 4x2.5 | 1/1.75 | 10.1 | 190 |
| 2.5 mm² stranded | | | |
| 2x2.5 | 7/0.67 | 9.2 | 120 |
| 3x2.5 | 7/0.67 | 9.8 | 160 |
| 4x2.5 | 7/0.67 | 10.7 | 200 |
| 4.0 mm² stranded | | | |
| 2x4 | 7/0.85 | 10.3 | 160 |
| 3x4 | 7/0.85 | 11.0 | 220 |
| 4x4 | 7/0.85 | 12.0 | 280 |

Cables with cross section 0.5, 0.75, 1.0 sqmm can be supplied on request. Please contact our Technical Dpt. for further information on characteristics.

FIRECEL SR 220

Mica/XLPE Insulation



R-mXLPE/LSZH 300/500 V

APPLICATIONS

FIRECEL SR 220 are designed, manufactured and tested for general application.

MINIMUM BENDING RADIUS

10 times the outer diameter.

OPERATING TEMPERATURE

-40°C to +90°C

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, stranded according to EN 60228 class 2.

Insulation

Mica/Glass fire resistant tape covered by extruded cross-linked XLPE compound.

Cabling

Insulated cores cabled together.

Outer sheath

LSZH thermoplastic material.
Colour orange or white (other colours on request).

COLOUR CODE TO HD 308

Without earth conductor

- 2** cores: ● ●
- 3** cores: ● ● ●
- 4** cores: ● ● ● ●
- 5** cores: ● ● ● ● ●
- Above 5** cores: ● numbered

With earth conductor

- 3** cores: ● ● ●/●
- 4** cores: ● ● ● ●/●
- 5** cores: ● ● ● ● ●/●
- Above 5** cores: ● numbered ●/●

APPLICABLE STANDARDS

Basic design

EN 50288-7

Fire resistant

IEC 60331-21

Flame retardant

EN 60332-1-2 / IEC 60332-1-2

Fire retardant

EN 60332-3-24 (cat. C)

IEC 60332-3-24 (cat. C)

Acid gas emission

EN 60754-1 / IEC 60754-1

EN 60754-2 / IEC 60754-2

Smoke density

EN 61034-2 / IEC 61034-2

| N° of cond. x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) |
|--|---------------------|----------------|
| 0.75 mm² stranded | R-mXLPE/LSZH | |
| 2x0.75 | 7.3 | 68 |
| 3x0.75 | 8.0 | 83 |
| 4x0.75 | 8.7 | 100 |
| 1 mm² stranded | R-mXLPE/LSZH | |
| 2x1 | 7.9 | 82 |
| 3x1 | 8.4 | 96 |
| 4x1 | 9.4 | 121 |
| 7x1 | 11.3 | 174 |
| 12x1 | 15.1 | 282 |
| 19x1 | 18.0 | 424 |
| 1.5 mm² stranded | R-mXLPE/LSZH | |
| 2x1.5 | 8.5 | 100 |
| 3x1.5 | 9.3 | 126 |
| 4x1.5 | 10.1 | 150 |
| 7x1.5 | 12.2 | 220 |
| 12x1.5 | 16.5 | 365 |
| 19x1.5 | 19.5 | 544 |
| 2.5 mm² stranded | R-mXLPE/LSZH | |
| 2x2.5 | 9.7 | 139 |
| 3x2.5 | 10.4 | 168 |
| 4x2.5 | 11.5 | 206 |
| 7x2.5 | 14.0 | 310 |
| 12x2.5 | 18.8 | 514 |
| 19x2.5 | 22.4 | 782 |

approximate values

FIRECEL SR 109

Flexible/Silicone Insulation
Overall Screen



F-SR/OS/LSZH 450/750 V

APPLICATIONS

FIRECEL SR 109 are designed, manufactured and tested for general application in power and signal wiring, for emergency circuit and fire circuit control where high rejection of electrostatic noise is needed.

OPERATING TEMPERATURE

40°C to +90°C

MINIMUM BENDING RADIUS

8 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, flexible according to EN 60228 class 5.

Insulation

High performance fire resistant silicone rubber.

Cabling

Insulated cores are cabled together.

Overall screen

Aluminium/polyester tape with tinned copper drain wire.

Outer sheath

LSZH thermoplastic material.

Colour red (other colours on request).

COLOUR CODE

Without earth conductor

2 cores: ● ●

3 cores: ● ● ●

4 cores: ● ● ● ●

7 cores and above: ● numbered

With earth conductor

3 cores: ● ● ●/●

4 cores: ● ● ● ●/●

5 cores: ● ● ● ● ●/●

7 cores and above: ● numbered ●/●

APPLICABLE STANDARDS

Fire resistant

CEI 20-36/2-1
EN 50200 (PH120)
IEC 60331-21

Flame retardant

EN 60332-1-2 / IEC 60332-1-2

Fire retardant

EN 60332-3-24 (cat.C)
IEC 60332-3-24 (cat.C)

Acid gas emission

EN 60754-1 / IEC 60754-1
EN 60754-2 / IEC 60754-2

Smoke density

EN 61034-2 / IEC 61034-2

| N° of cond. x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) |
|--|---------------------|----------------|
| 0.75 mm² flexible | | |
| F-SR/OS/LSZH | | |
| 2x0.75 | 7.6 | 69 |
| 3x0.75 | 8.0 | 84 |
| 4x0.75 | 8.7 | 103 |
| 1 mm² flexible | | |
| F-SR/OS/LSZH | | |
| 2x1 | 8.0 | 78 |
| 3x1 | 8.2 | 86 |
| 4x1 | 8.9 | 110 |
| 7x1 | 10.8 | 176 |
| 12x1 | 13.9 | 275 |
| 19x1 | 16.4 | 408 |
| 1.5 mm² flexible | | |
| F-SR/OS/LSZH | | |
| 2x1.5 | 8.3 | 88 |
| 3x1.5 | 8.8 | 112 |
| 4x1.5 | 9.8 | 141 |
| 7x1.5 | 11.7 | 218 |
| 12x1.5 | 15.3 | 352 |
| 19x1.5 | 18.2 | 535 |
| 2.5 mm² flexible | | |
| F-SR/OS/LSZH | | |
| 2x2.5 | 9.8 | 123 |
| 3x2.5 | 10.4 | 159 |
| 4x2.5 | 11.4 | 196 |
| 7x2.5 | 13.4 | 305 |
| 12x2.5 | 17.9 | 505 |
| 19x2.5 | 21.1 | 760 |

approximate values

FIRECEL SR 116H

Silicone Insulation



R-SR/LSZH 450/750 V

APPLICATIONS

FIRECEL SR 116H are designed, manufactured and tested for general application in power supply and signal wiring, for emergency circuit and fire circuit control.

OPERATING TEMPERATURE

-40°C to +90°C
(for insulated conductors only: max 200°C).

MINIMUM BENDING RADIUS

10 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, stranded according to EN 60228 class 2.

Insulation

High performance fire resistant silicone rubber.

Cabbling

Insulated cores are cabled together.

Outer sheath

LSZH thermoplastic material.

Colour red (other colours on request).

COLOUR CODE TO HD 308

Without earth conductor

2 cores: ● ●

3 cores: ● ● ●

4 cores: ● ● ● ●

5 cores: ● ● ● ● ●

Above 5 cores: ● numbered

With earth conductor

3 cores: ● ● ●

4 cores: ● ● ● ●

5 cores: ● ● ● ● ●

APPLICABLE STANDARDS

Fire resistant

CEI 20-36/2-1
EN 50200 (PH90)
IEC 60331-21

Flame retardant

EN 60332-1-2 / IEC 60332-1-2

Fire retardant

EN 60332-3-24 (cat. C)
IEC 60332-3-24 (cat. C)

Acid gas emission

EN 60754-1 / IEC 60754-1
EN 60754-2 / IEC 60754-2

Smoke density

EN 61034-2 / IEC 61034-2

| N° of cond. x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) |
|--|---------------------|----------------|
| 1.5 mm² stranded R-SR/LSZH | | |
| 2x1.5 | 7.8 | 96 |
| 3x1.5 | 8.3 | 116 |
| 4x1.5 | 9.3 | 147 |
| 5x1.5 | 10.5 | 180 |
| 2.5 mm² stranded R-SR/LSZH | | |
| 2x2.5 | 9.2 | 138 |
| 3x2.5 | 9.8 | 169 |
| 4x2.5 | 11.3 | 222 |
| 5x2.5 | 12.3 | 259 |
| 4 mm² stranded R-SR/LSZH | | |
| 2x4 | 10.5 | 189 |
| 3x4 | 11.6 | 246 |
| 4x4 | 12.5 | 299 |
| 5x4 | 14.0 | 359 |

approximate values

FIRECEL SR 112

Single Core
Mica/XLPE Insulation

FIRECEL SR 112X

Twin Core
Mica/XLPE Insulation



R-mXLSZH - 450/750V



LPCB ref. 217d
(only SR 112)

For the scope of the LPCB Approval
see www.redbooklive.com

APPLICATIONS

FIRECEL SR 112 are designed, manufactured and tested as cable fixed or protected installation for emergency power supply, lighting and control gear.

OPERATING TEMPERATURE

-20°C to +90°C

MINIMUM BENDING RADIUS

8 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, stranded according to EN 60228 class 2.

Insulation

Mica/Glass fire resistant tape covered by extruded cross-linked compound type EI5.

Twisting

Only for FIRECEL SR 112X two conductors are twisted.

COLOUR CODE

Single core: ● ● ● ● (other colours on request)

Twin core: ● ● (other colours on request)

APPLICABLE STANDARDS

Basic design

BS 8592

Fire resistant

IEC 60331-21
BS EN 50200 PH 120
BS EN 50200 + Annex E
BS 6387 Cat. C-W-Z
BS 8434-2
(tested in steel conduit)

Acid gas emission

EN 60754-1 / IEC 60754-1
EN 60754-2 / IEC 60754-2

Smoke density

EN 61034-2 / IEC 61034-2

| Cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) |
|----------------------------------|---------------------|----------------|
| SR 112 | | |
| R-mXLSZH | | |
| single core | | |
| 1.5 | 4.1 | 30 |
| 2.5 | 4.7 | 45 |
| 4 | 5.2 | 60 |
| 6 | 5.8 | 90 |
| 10 | 7.1 | 140 |
| 16 | 7.7 | 200 |
| 25 | 9.4 | 300 |
| SR 112X | | |
| R-mXLSZH | | |
| twin core | | |
| 2x1.5 | 8.2 | 60 |
| 2x2.5 | 9.4 | 90 |
| 2x4 | 10.4 | 120 |
| 2x6 | 11.6 | 180 |
| 2x10 | 14.2 | 280 |
| 2x16 | 15.4 | 400 |
| 2x25 | 18.8 | 600 |

approximate values

FIRECEL SR 206

Mica/XLPE Insulation



R-mXLPE/LSZH 0.6/1 kV

APPLICATIONS

Power supply and signal transmission, indoors or outdoors even wet environment. For fixed laying in free air, in pipe or conduit, on masonry and metal structures or suspended. In places where in case of fire people are exposed to serious risks due to the emission of smoke, toxic and corrosive gases and where you want to avoid damage to facilities, equipment, goods. Suitable for feeding of: emergency exits, alarm signals, warning of smoke or gas, escalators. Suitable for laying underground direct or indirect.

OPERATING TEMPERATURE

-40°C to +90°C

MINIMUM BENDING RADIUS

10 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, stranded according to EN 60228 class 2.

Insulation

Mica/Glass fire resistant tape covered by extruded cross-linked XLPE compound.

Cabling

Insulated cores are cabled together.

Outer sheath

LSZH thermoplastic material type ST8. Colour red (other colours on request).

COLOUR CODE TO HD 308

Without earth conductor

- 2 cores: ● ●
- 3 cores: ● ● ●
- 4 cores: ● ● ● ●
- 5 cores: ● ● ● ● ●

With earth conductor

- 3 cores: ● ● ●/●
- 4 cores: ● ● ● ●/●
- 5 cores: ● ● ● ● ●/●

APPLICABLE STANDARDS

Basic design IEC 60502-1

Fire resistant IEC 60331-21

Flame retardant IEC 60332-1-2

Fire retardant IEC 60332-3-24 (cat. C)

Acid gas emission IEC 60754-1

Smoke density IEC 61034-2

| N° of cond. x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) |
|---|---------------------|----------------|
| 1.5 mm² stranded R-mXLPE/LSZH | | |
| 2x1.5 | 10.4 | 145 |
| 3x1.5 | 10.9 | 167 |
| 4x1.5 | 11.8 | 196 |
| 5x1.5 | 12.9 | 226 |
| 2.5 mm² stranded R-mXLPE/LSZH | | |
| 2x2.5 | 11.2 | 180 |
| 3x2.5 | 11.8 | 209 |
| 4x2.5 | 12.8 | 250 |
| 5x2.5 | 14.0 | 289 |
| 4 mm² stranded R-mXLPE/LSZH | | |
| 2x4 | 12.3 | 230 |
| 3x4 | 13.0 | 275 |
| 4x4 | 14.1 | 331 |
| 5x4 | 15.5 | 387 |
| 6 mm² stranded R-mXLPE/LSZH | | |
| 2x6 | 14.6 | 329 |
| 3x6 | 15.5 | 397 |
| 4x6 | 16.9 | 482 |
| 5x6 | 18.6 | 565 |
| 10 mm² stranded R-mXLPE/LSZH | | |
| 2x10 | 16.4 | 450 |
| 3x10 | 17.4 | 554 |
| 4x10 | 19.1 | 682 |
| 5x10 | 21.0 | 805 |
| 16 mm² stranded R-mXLPE/LSZH | | |
| 2x16 | 18.5 | 619 |
| 3x16 | 19.7 | 777 |
| 4x16 | 20.3 | 1050 |
| 5x16 | 23.9 | 1208 |
| 25 mm² stranded R-mXLPE/LSZH | | |
| 2x25 | 22.0 | 914 |
| 3x25 | 23.5 | 1161 |
| 4x25 | 26.0 | 1500 |
| 5x25 | 28.7 | 1700 |

approximate values

FIRECEL SR 106H

Silicone Insulation



SR/LSZH 0.6/1 KV

APPLICATIONS

Power supply and signal transmission, indoor or outdoor even wet environment. For fixed laying in free air, in pipe or conduit, on masonry and metal structures or suspended. In places where in case of fire people are exposed to serious risks due to the emission of smoke, toxic and corrosive gases and where you want to avoid damage to facilities, equipment, goods. Suitable for feeding of: emergency exits, alarm signals, warning of smoke or gas, escalators. Suitable for laying underground direct or indirect.

OPERATING TEMPERATURE

-40°C to +90°C
(for insulated conductors only: max 200°C).

MINIMUM BENDING RADIUS

15 times the outer diameter

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, stranded class 2 for section up to 10 mm² or flexible class 5 for section above 10 mm² according to EN 60228.

Insulation

High performance fire resistant silicone rubber.

Cabling

Insulated cores are cabled together.

Outer sheath

Extruded LSZH thermoplastic material.
Colour red (other colours on request).

COLOUR CODE TO HD 308

Without earth conductor

- 2 cores: ● ●
3 cores: ● ● ●
4 cores: ● ● ● ●
5 cores: ● ● ● ● ●

With earth conductor

- 3 cores: ● ● ● / ●
4 cores: ● ● ● ● / ●
5 cores: ● ● ● ● ● / ●

APPLICABLE STANDARDS

Fire resistant EN 50200 (PH90) / IEC 60331-21 / BS 6387 (cat. C-W-Z) / SS 299 part 1

Flame retardant EN 60332-1-2 / IEC 60332-1-2

Fire retardant EN 60332-3-24 (cat. C) / IEC 60332-3-24 (cat. C)

Acid gas emission EN 60754-1 / IEC 60754-1
EN 60754-2 / IEC 60754-2

Smoke density EN 61034-2 / IEC 61034-2

| N° of cond. x cross section (mm ²) | Outer diameter (mm) | Weight (kg/km) |
|--|---------------------|----------------|
| 1.5 mm² stranded R-SR/LSZH | | |
| 2x1.5 | 9.2 | 124 |
| 3x1.5 | 9.8 | 148 |
| 4x1.5 | 10.6 | 176 |
| 5x1.5 | 11.5 | 214 |
| 2.5 mm² stranded R-SR/LSZH | | |
| 2x2.5 | 10.0 | 155 |
| 3x2.5 | 10.6 | 188 |
| 4x2.5 | 11.5 | 228 |
| 5x2.5 | 12.6 | 266 |
| 4 mm² stranded R-SR/LSZH | | |
| 2x4 | 11.2 | 207 |
| 3x4 | 12.1 | 263 |
| 4x4 | 13.6 | 332 |
| 5x4 | 14.5 | 399 |
| 6 mm² stranded R-SR/LSZH | | |
| 2x6 | 13.1 | 298 |
| 3x6 | 14.4 | 372 |
| 4x6 | 15.8 | 463 |
| 5x6 | 17.6 | 576 |
| 10 mm² stranded R-SR/LSZH | | |
| 2x10 | 15.9 | 441 |
| 3x10 | 16.8 | 541 |
| 4x10 | 18.5 | 680 |
| 5x10 | 20.5 | 850 |
| 16 mm² flexible F-SR/LSZH | | |
| 2x16 | 17.4 | 602 |
| 3x16 | 19.4 | 777 |
| 4x16 | 21.2 | 973 |
| 5x16 | 23.3 | 1202 |

approximate values

FIRECEL SR 140

Mica/XLPE Insulation. Armoured



R-mXLPE/LSZH/SWA/LSZH 0.6/1 kV

APPLICATIONS

Power supply and signal transmission, indoors or outdoors even wet environment. For fixed laying in free air, in pipe or conduit, on masonry and metal structures or suspended. In places where in case of fire people are exposed to serious risks due to the emission of smoke, toxic and corrosive gases and where you want to avoid damage to facilities, equipment, goods. Suitable for feeding of: emergency exits, alarm signals, warning of smoke or gas, escalators. Suitable for laying underground direct or indirect.

OPERATING TEMPERATURE

-40°C to +90°C

MINIMUM BENDING RADIUS

12 times the outer diameter.

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, stranded according to EN 60228 class 2.

Insulation

Mica/Glass fire resistant tape covered by extruded cross-linked XLPE compound.

Cabling

Insulated cores are cabled together.

Bedding

LSZH thermoplastic material.

Armour

Single layer of galvanized steel wires (SWA).

Outer sheath

LSZH thermoplastic material.

Colour black (other colours on request).

COLOUR CODE TO HD 308

- 2 cores: ● ●
 3 cores: ● ● ●
 4 cores: ● ● ● ●
 7 cores: ● numbered

APPLICABLE STANDARDS

Basic design BS 7846

Fire resistant

BS 7846 (cat. F2) / BS 6387 (cat. C-W-Z) /
 BS EN 50200 (PH60)
 BS 8491

Flame retardant EN 60332-1-2

Fire retardant EN 60332-3-24 (cat. C)

Acid gas emission EN 60754-1

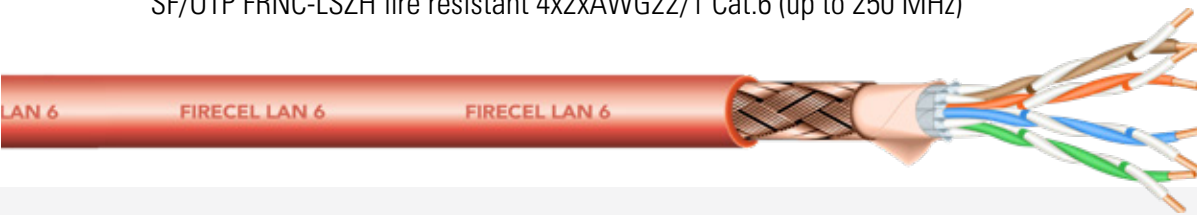
Smoke density EN 61034-2

| N° of cond. x cross section (mm ²) | Diameter under armour (mm) | Outer diameter (mm) | Weight (kg/km) |
|--|----------------------------|---------------------|----------------|
| 1.5 mm² stranded R-mXLPE/LSZH/SWA/LSZH | | | |
| 2x1.5 | 8.8 | 13.8 | 364 |
| 3x1.5 | 9.8 | 14.8 | 418 |
| 4x1.5 | 10.6 | 15.6 | 460 |
| 7x1.5 | 12.8 | 18.2 | 607 |
| 12x1.5 | 16.8 | 23.1 | 988 |
| 19x1.5 | 19.4 | 26.4 | 1390 |
| 27x1.5 | 23.3 | 30.5 | 1760 |
| 37x1.5 | 26.4 | 34.0 | 2175 |
| 2.5 mm² stranded R-mXLPE/LSZH/SWA/LSZH | | | |
| 2x2.5 | 9.6 | 14.6 | 416 |
| 3x2.5 | 10.7 | 15.7 | 480 |
| 4x2.5 | 11.2 | 16.2 | 514 |
| 7x2.5 | 13.8 | 19.9 | 818 |
| 12x2.5 | 18.2 | 25.4 | 1312 |
| 19x2.5 | 21.4 | 28.8 | 1705 |
| 27x2.5 | 25.8 | 33.4 | 2180 |
| 37x2.5 | 29.2 | 37.8 | 2950 |
| 4 mm² stranded R-mXLPE/LSZH/SWA/LSZH | | | |
| 2x4 | 11.1 | 16.1 | 510 |
| 3x4 | 11.8 | 16.8 | 570 |
| 4x4 | 12.9 | 17.9 | 649 |
| 7x4 | 15.6 | 21.7 | 1004 |
| 12x4 | 20.9 | 28.1 | 1642 |
| 6 mm² stranded R-mXLPE/LSZH/SWA/LSZH | | | |
| 2x6 | 12.3 | 17.3 | 600 |
| 3x6 | 13.1 | 18.1 | 680 |
| 4x6 | 14.4 | 20.5 | 927 |
| 10 mm² stranded R-mXLPE/LSZH/SWA/LSZH | | | |
| 2x10 | 14.9 | 19.9 | 800 |
| 3x10 | 16.1 | 22.2 | 1078 |
| 4x10 | 17.7 | 23.8 | 1256 |
| 16 mm² stranded R-mXLPE/LSZH/SWA/LSZH | | | |
| 2x16 | 17.1 | 22.5 | 1034 |
| 3x16 | 18.3 | 24.4 | 1354 |
| 4x16 | 20.2 | 26.5 | 1625 |
| 25 mm² stranded R-mXLPE/LSZH/SWA/LSZH | | | |
| 2x25 | 20.3 | 26.6 | 1530 |
| 3x25 | 21.8 | 28.8 | 1972 |
| 4x25 | 24.1 | 31.3 | 2355 |
| 35 mm² stranded R-mXLPE/LSZH/SWA/LSZH | | | |
| 2x35 | 22.7 | 29.9 | 2055 |
| 3x35 | 24.3 | 31.7 | 2450 |
| 4x35 | 27.0 | 34.4 | 2943 |

approximate values

FIRECEL LAN 6

SF/UTP FRNC-LSZH fire resistant 4x2xAWG22/1 Cat.6 (up to 250 MHz)



LPCB ref. 217m
For the scope of the LPCB Approval
see www.redbooklive.com

APPLICATIONS

Signal transmission, indoor installation in places where in case of fire people are exposed to serious risks for emission of smoke, toxic and corrosive gases and where you want to avoid damage to facilities, equipment, goods. This type of cable is used in structured cabling for computer networks such as Ethernet.

OPERATING TEMPERATURE

-20°C to 70°C

MINIMUM BENDING RADIUS

15 times the outer diameter

CABLE CONSTRUCTION

Conductors

Plain annealed copper wire, solid AWG22/1

Insulation

Polyolefin

Fire barrier

Special mineral glass tape, wrapped on each insulated conductor

Twisting

The insulated cores shall be twisted in pairs and wrapped with glass fibre tape.

Cabling

The pairs are cabled together around a central cross separator filler

Overall screen

Copper/polyester tape, outside in contact with a bare copper braid .

Outer sheath

LSZH thermoplastic material, red colour

Nom. Outer diameter

10.6 mm

COLOUR CODE TO HD 308

1st pair: ● / ●

2nd pair: ● / ●

3rd pair: ● / ●

4th pair: ● / ●

APPLICABLE STANDARDS

Standard reference IEC 61156-5; EN 50288-5-1; EN 50289-4-16; ISO/IEC 11801; EN 50173; EN 50200

Flame retardant IEC 60332-1-2

Fire retardant IEC 60332-3-24 (cat. C)

Fire resistant BS EN 50200 (class PH120)

Acid gas emission: BS EN 60754-1

BS EN 60754-2

Smoke density BS EN 61034-2

ELECTRICAL CHARACTERISTICS

Max DC conductor resistance 59,4 Ω/km

Max operating voltage 125 Vac

Min insulation resistance 2,0 GΩ x km

Capacitance @800 Hz 65 pF/m

Characteristic Impedance 100 Ω (± 15%)

Velocity of propagation 66%

Delay skew 20 nsec/100 m

SLO/MLO

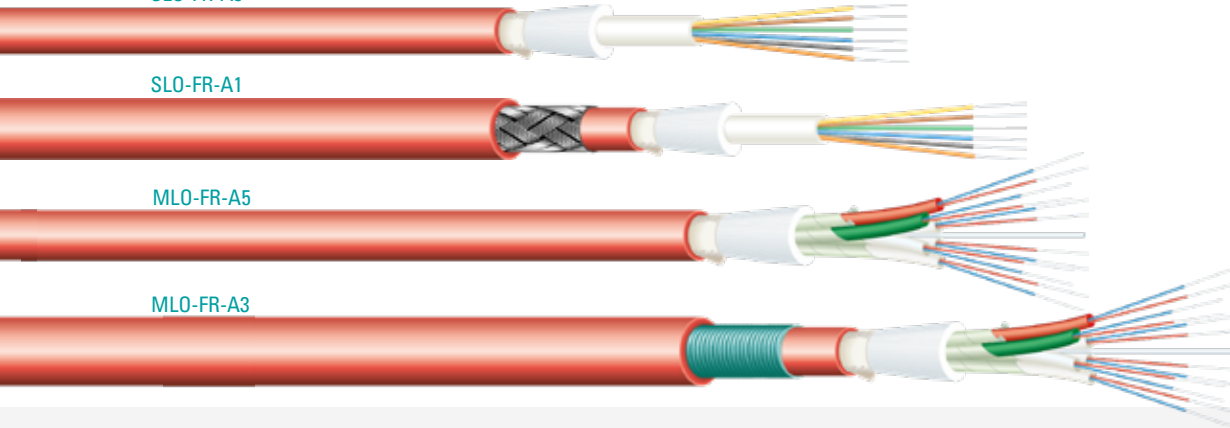
Loose Buffered Cables

SLO-FR-A5

SLO-FR-A1

MLO-FR-A5

MLO-FR-A3



SINGLE TUBE

SLO-000-**-M1-A5-FR
SLO-000-**-M1-A1-FR

MULTI TUBE

MLO-000-**-M1-A5-FR
MLO-000-**-M1-A3-FR

APPLICATIONS

These cables are used inside buildings, tunnels or closed areas in general, also for outdoor application for instrumentation and Oil & Gas applications.

OPERATING TEMPERATURE

-40°C to +90°C

MINIMUM BENDING RADIUS

10 times the outer diameter.

CABLE CONSTRUCTION

Fibres

Singlemode and multimode fibres, with loose technology coating.

Structure

- For type SLO-FR the jelly filled tube containing the fibres is reinforced with glass yarns and is wound with a flame resistant tape.
- For type MLO-FR the jelly filled tubes containing the fibres are individually wound with a mica tape and are cabled around a central steel or FRP (fibreglass reinforced plastic) element. When necessary glass yarn is the traction element. A flame resistant tape improves fire resistance.

Inner sheath

(only for A1 and A3 armoured cables)

LSZH thermoplastic compound.

Armouring

A1 Galvanized steel wire braid
A3 Corrugated steel tape
A5 Anti-rodent glass yarns

Outer sheath

LSZH thermoplastic compound.
Colour red (other colours on request).

APPLICABLE STANDARDS

- Basic design* BS 7629
- Fire resistant* BS 6387 – CWZ
- Fire resistant* IEC 60331-25
- Flame retardant* IEC 60332-1-2
- Fire retardant* IEC 60332-3-24 (cat. C)
- Acid gas emission:* BS EN 60754-1
BS EN 60754-2
- Smoke density* IEC 61034-2

AVAILABLE UPON REQUEST

Armouring

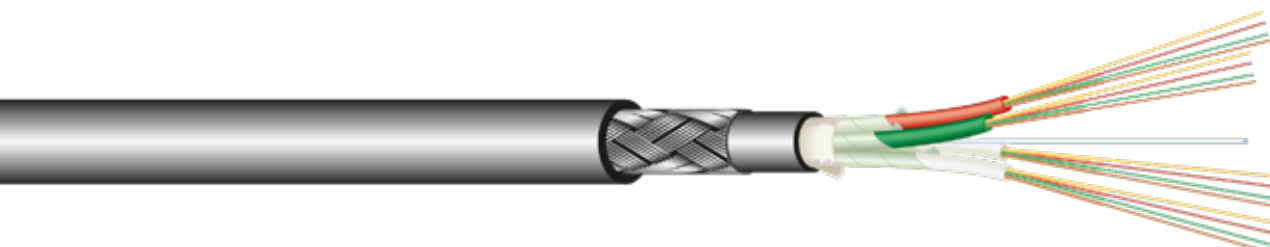
A7 - Steel wire armour

| | Tube diameter (mm) | Outer diameter (mm) | Weight (kg/km) |
|----------------------------------|--------------------|------------------------|----------------|
| -**- number of fibres | | SLO-000-**-M1-A5-FR | |
| 2 ÷ 12 | 2.7 | 8.0 | 70 |
| 16 ÷ 24 | 3.5 | 9.0 | 80 |
| -**- number of fibres | | SLO-000-**-M1-A1-FR | |
| 2 ÷ 12 | 2.7 | 11.5 | 160 |
| 16 ÷ 24 | 3.5 | 12.0 | 180 |
| -**- max number of fibres | | MLO-000-**(n)-M1-A5-FR | |
| 72 | 2.0 | 15.0 | 230 |
| 96 | 2.0 | 16.5 | 250 |
| 144 | 2.0 | 20.5 | 280 |
| -**- max number of fibres | | MLO-000-**(n)-M1-A3-FR | |
| 72 | 2.0 | 15.0 | 280 |
| 96 | 2.0 | 17.5 | 310 |
| 144 | 2.0 | 21.5 | 350 |

approximate values

QFCI/QFCU

Multiloose



Approved by:



MLO-000-**-M1-A1-FR-QFCI/QFCU

APPLICATIONS

- Safety Systems, Critical Connections and Fire Fighting Systems
- Outdoor installation in Off-shore, Oil & Gas and Marine applications
- Data transmission and telecommunication systems

OPERATING TEMPERATURE

-40 °C / + 70 °C (operating)
 -40 °C / + 70 °C (storage)
 -10 °C / + 70 °C (installation)

MINIMUM BENDING RADIUS

20 times overall diameter (dynamic)
 10 times overall diameter (static)

CABLE CONSTRUCTION

Fibres

Singlemode and multimode fibres, with loose technology coating.

Structure

The jelly filled tubes containing the fibres are individually wound with a mica tape and are cabled around a central steel or FRP (fibreglass reinforced plastic) element. A flame resistant tape improves fire resistance.

Inner sheath

LSZH (M1) compound.

Armouring

A1 Galvanized steel wire braid

Outer sheath

QFCI type: LSZH - SHF1 (M1) compound

QFCU type: oil and mud resistant LSZH - SHF2 (M1) compound

APPLICABLE STANDARDS

Optical fibre characteristics

IEC 60793-1

Optical fibre cable characteristics

IEC 60793-1

Fire Resistant

IEC 60331-25 EN 50200 PH30/PH120

Fire retardant

IEC 60332-3 EN 60332-3

Flame retardant

IEC 60332-1-2 EN 60332-1-2

Acid gas emission:

EN 60754-1 / IEC 60754-1

EN 60754-2 / IEC 60754-12

Smoke density

IEC 61034-2 EN 50268-2

Cables for offshore installation

NEK 606

| Type | Fibre (n° max) | Tube Diameter (mm) | Diameter (mm) | Weight (kg/km) | Tension load (N) | Crush (N/100mm) |
|----------------------------------|----------------|--------------------|---------------|----------------|------------------|-----------------|
| MLO-000-**(n)-M1-A1-FR-QFCI/QFCU | 4 | 2.0 | 13.5 | 230 | 1500 | 3000 |
| MLO-000-**(n)-M1-A1-FR-QFCI/QFCU | 8 | 2.0 | 13.5 | 230 | 1500 | 3000 |
| MLO-000-**(n)-M1-A1-FR-QFCI/QFCU | 12 | 2.0 | 13.5 | 230 | 1500 | 3000 |
| MLO-000-**(n)-M1-A1-FR-QFCI/QFCU | 24 | 2.0 | 13.5 | 230 | 1500 | 3000 |
| MLO-000-**(n)-M1-A1-FR-QFCI/QFCU | 48 | 2.0 | 13.5 | 230 | 1500 | 3000 |

approximate values



Conducting Value

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