Gavicel

Conducting Value

FIRECEL®

The Last Cable Standing

SR 114H | SR 114E

Fire Resistant Cables for Fire Alarm Systems, Fire Detection and Emergency Lighting

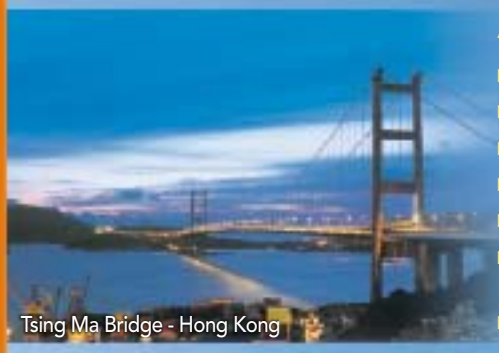
SR 114 in the World


Reebok Stadium - Bolton - UK


Financial Center - Abu Dhabi


Combined-Cycle Power Plant
Komotini - Greece

FIRECEL cables are installed all over the world.
New projects are coming.
Cavicel has been committed since 1970 to the study, design and manufacture of highly reliable fire resistant cables.
Designed and manufactured in Italy.


Tsing Ma Bridge - Hong Kong

Approvals

- Civil Defence - *Abu Dhabi*
- Civil Defence - *Dubai*
- Civil Defence - *Bahrain*
- Civil Defence - *Qatar*
- Saso - *Saudi Arabia*
- Royal Oman Police *Sultanate Of Oman*
- Fire Service Directorate *Kuwait*
- Fire Service Dept. (Fire Protection Bureau) *Hong Kong*


Airport Terminal 3 - Dubai


Scottish Exhibition & Conference Centre - Glasgow - UK


London Underground - UK


Atlantis Hotel - Palm Jumeirah - Dubai

Burj Khalifa Tower - Dubai

Rose Rotana Tower - Dubai

Tupras Izmir Refinery - Turkey

Park Tower - Dubai

New Delhi Metro - India

Grand Regency Hotel - Qatar

Standards

According to **BS 5839-1:2013** *"Fire detection and fire alarm systems for buildings – Part 1: Code of practice for system design, installation, commissioning and maintenance"*, two different levels of cable fire resistance are specified.
For most application **"standard"** fire resistant cables can be used. However, for other applications, such as unsprinklered premises or buildings, in which the designer or specifier require an improved fire resistance, **"enhanced"** cables must be used.
Enhanced cables meet the most severe fire tests as they survive fire at the highest temperature of **930 °C**, with water and mechanical shocks for **120 min**.

	Standard	Enhanced
FIRECEL	**SR 114H**	**SR 114E**
Code of Practice	BS 5839-1:2013 Clause 26.2d	BS 5839-1:2013 Clause 26.2e
Circuit Integrity	BS EN 50200:2006 (PH 30 - PH 60 - PH 120) 830°C fire and mechanical shocks	BS EN 50200:2006 (PH 120) 830°C fire and mechanical shocks
	BS EN 50200:2006 + Annex E 830°C - 30 min. (15 min. fire and mechanical shocks + 15 min. fire mechanical shocks and water spray)	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 - Category CWZ	
	IEC 60331-21:1999	
Fire Propagation	BS EN 60332-3:2009, BS EN 60332-1:2004	
Acid Gas Emission	BS EN 50267:1999, IEC 60754:2011	
Smoke Density	BS EN 61034-2: 2005	
Basic Design	BS 7629-1:2008	

BS 5839-1 recommends **"enhanced"** fire resistant cables for the following applications:

- in unsprinklered buildings (or parts of buildings) in which the fire strategy involves evacuation of occupants in four or more phases;
- in unsprinklered buildings of greater than 30 m in height;
- in unsprinklered premises and sites in which a fire in one area could affect cables of critical signal paths associated with areas remote from fire, in which it is envisaged people will remain in occupation during the course of the fire;
- in any other buildings in which the designer, specifier or regulatory authority, on the basis of a fire risk assessment that takes fire engineering considerations into account, considers that the use of enhanced fire resisting cables is necessary.

BS 8519:2010 *"Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting application"*

- Category 1 - 30 minutes survival time: Tested to EN 50200 PH 30 + Annex E as per requirements for **"standard"** control cables.
- Category 2 - 60 minutes survival time: Tested to EN 50200 PH 60 + BS 8434-2 as per requirements for **"enhanced"** control cables.
- Category 3 - 120 minutes survival time: Tested to EN 50200 PH 120 + BS 8491 as per requirements for **"enhanced"** control cables.

BS 8519 does not cover the wiring of fire detection and fire alarm systems which are still covered by the BS 5839-1, BS 5839-8 and BS 5839-9 and emergency lighting systems which are still covered by the BS 5266-1.

For more information we recommend to consult BS 5839-1 Par.26 and BS 8519:2010 and BS 8491.

Features and Advantages

Flexible
Very flexible construction that makes the installation easier in all conditions.

LSZH (Low Smoke Zero Halogen)
Combustion gases with very low toxicity, low smoke emission, and no corrosive gas, for the safeguard of human life and electronic equipment.

Flame retardant
Limiting the spread of the fire along the cable run, flame barriers can be avoided or reduced.

Protected against electrostatic noise
Cable is fully screened and conductors are twisted.

Moisture resistant
No special terminals are required to prevent moisture absorption. It can be installed in damp environments.

Suitable for data transmission
Twisting of conductors make the cable suitable for clear data transmission.

Low cost installation
Neither special tools, nor special training are neccessary. A cheap and effective cable stripper is available on request to simplify installation.
Easy to handle.

Quality Assurance
In order to satisfy QA requirements, traceability is assured by batch number printed on outer jacket.
Test reports for all batches are available on request.

Applications

- Hotels
- Theatres and cinemas
- Museums
- Hospitals
- Shopping centres
- Offices
- Schools
- Airports
- Undergrounds and tunnels
- Railway stations
- High-rise buildings
- Data communication centres
- Public address systems
- Traffic control systems
- Fire fighting systems

Quality System Certification
Assessed to ISO 9001: 2008
Certificate No. 217

Product Certification
assessed to BS 7629-1 and BS 5839-1
Certificate No. 217f / 217g

FIRECEL SR 114E

Conducting Value

Mica/Silicone Insulation, Overall Screen, Solid & Stranded Conductor

Enhanced Cable	300/500 V
BS 5839-1:2013 Clause 26.2e	
BS EN 50200:2006 (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 and water @ 650°C - 15 + 15 min. Cat. Z fire and mechanical shocks @ 950°C - 15 min.	

Cables up to 4 cores approved by LPCB, certicate N° 217g

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

Applicable Standards

Basic design	BS 7629-1
Fire resistant	BS 6387 (cat. C-W-Z) BS EN 50200 (class PH120) BS EN 50200 annex E (fire, mechanical shock and water spray) BS 8434-2 (120 min)
Flame retardant	BS EN 60332-1-2 BS EN 60332-3-24 cat. C
Acid gas emission	BS EN 50267-2-1 amd. 2
Smoke density	BS EN 61034-2

Cable construction

Conductors

Plain annealed copper wire, solid class 1 or stranded class 2 according to BS 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

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		blue - brown
3 cores		brown - black - grey
4 cores		blue - brown - black - grey
7 cores*	centre:	brown
	1st layer:	brown - black - 4 cores white
12 cores*	centre:	brown - black - white
	1st layer:	brown - black - 7 cores white
19 cores*	centre:	brown
	1st layer:	brown - black - 4 cores white
	2nd layer:	brown - black - 10 cores white

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

N° of cond. x cross section (mm²)	*Size of conductors (n°/mm)*	*Size of earth wire (n°/mm)*	*Outer diameter (mm)*	*Weight (kg/km)*	*P clips type*
1 mm² solid					
2x1.0	1/1.13	1/1.13	7.9	85	AC8
3x1.0	1/1.13	1/1.13	8.4	105	AC9
4x1.0	1/1.13	1/1.13	9.3	125	AC9
7x1.0	1/1.13	1/0.80*	10.9	175	AC11
12x1.0	1/1.13	1/0.80*	14.5	300	AC14
19x1.0	1/1.13	1/0.80*	17.0	470	AC18
1.5 mm² solid					
2x1.5	1/1.38	1/1.38	8.8	105	AC8
3x1.5	1/1.38	1/1.38	9.3	130	AC9
4x1.5	1/1.38	1/1.38	10.3	165	AC11
7x1.5	1/1.38	1/0.80*	12.1	230	AC12
12x1.5	1/1.38	1/0.80*	16.0	380	AC16
19x1.5	1/1.38	1/0.80*	19.0	590	AC19
1.5 mm² stranded					
2x1.5	7/0.53	7/0.53	9.2	110	AC9
3x1.5	7/0.53	7/0.53	9.7	135	AC11
4x1.5	7/0.53	7/0.53	10.5	170	AC11
2.5 mm² solid					
2x2.5	1/1.75	1/1.75	10.2	150	AC11
3x2.5	1/1.75	1/1.75	10.8	190	AC11
4x2.5	1/1.75	1/1.75	12.0	240	AC12
2.5 mm² stranded					
2x2.5	7/0.67	7/0.67	10.6	155	AC11
3x2.5	7/0.67	7/0.67	11.3	190	AC11
4x2.5	7/0.67	7/0.67	12.5	250	AC12
4 mm² stranded					
2x4	7/0.85	7/0.85	12.2	220	AC12
3x4	7/0.85	7/0.85	13.0	280	AC13
4x4	7/0.85	7/0.85	14.4	350	AC14

* drain wire

approximate values

Fire Tests

FIRECEL cables are tested and certified by a third part laboratory. Anyway in Cavicel all tests related to fire are inhouse performed on a regular base, to get a very high trust to assure Customers the complete safety.


Ongoing fire test


Resistance to fire with mechanical shock
BS 6387 cat. Z


Flame retardant test on bunched cables
IEC 60332-3


Smoke density test
BS EN 61034-2

Flame retardant test on single wire
IEC 60332-1, BS 4066 pt. 1


Smoke corrosivity
BS EN 50267-2-2, IEC 60754-2


Resistance to fire with water spray
BS 6387 cat. W


HCl emission
BS EN 50267-2-1, IEC 60754-1

FIRECEL SR 114 withstand the following tests:

BS 6387

cat. C — 950 °C — 180′

cat. W — 650 °C — 15′ + 15′

cat. Z — 950 °C — 15′

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.

BS EN 50200

830 °C — 15′ | 30′ | 60′ | 90′ | 120′

This test is carried out to verify the circuit integrity of cables exposed to fire at 830°C and mechanical shocks.
During the tests the cables are maintained at their rated voltage.

BS EN 50200 Annex E

830 °C — 15′ + 15′

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.
During the tests the cables are maintained at their rated voltage.

BS 8434-2

930 °C — 60′ + 60′

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.
During the tests the cables are maintained at their rated voltage.

SR 114H	SR 114E	Flame temperature	Test conditions	Time 10′ 15′ 20′ 30′ 40′ 50′ 60′ 70′ 80′ 90′ 100′ 110′ 120′ ... 180′
✓	✓	950 °C	Fire	BS 6387:2013 Cat. C — 180 min.
✓	✓	650 °C	Fire + Water	BS 6387:2013 Cat. W — 30 min. / 15 min.
✓	✓	950 °C	Fire + Mechanical Shock	BS 6387:2013 Cat. Z — 15 min. / 15 min. (1 impact/30 sec.)
✓	✓	830 °C	Fire + Mechanical Shock	BS EN 50200:2006 — PH 30 / PH 60 / PH 90 / PH 120 — 120 min. / 120 min. (1 impact/5 min.)
✓	✓	830 °C	Fire + Water + Mechanical Shock	BS EN 50200:2006 + Annex E — 30 min. / 30 min. (1 impact/5 min.) / 15 min.
	✓	930 °C	Fire + Water + Mechanical Shock	BS 8434-2:2003 + A2:2009 — 120 min. / 120 min. (1 impact/5 min.) / 60 min.

Fire · Water · Mechanical Shock

Electrical Characteristics

Voltage rating		single or three phase circuit up to 300/500 V r.m.s. or up to 750 V d.c. circuit			
Temperature rating - for insulated conductors only		–40 ÷ +90 °C max +200 °C			
Cross section (sq mm)		1	1.5	2.5	4
Conductor resistance (Ω/km at 20 °C)		18.1	12.1	7.41	4.61
Insulation resistance (MΩxkm at 20 °C)		300	300	300	300
Nominal Capacitance (pF/m)					
SR 114H	*- core/core*	100	110	130	160
	- core/screen	170	190	220	270
SR 114E	*- core/core*	95	100	120	150
	- core/screen	160	170	200	250

Current Ratings and Voltage Drop[1]

	installation method: clipped direct				*installation method: in conduit or in cable tray*			
	1 two-core cable		1 three/four-core cable		1 two-core cable		1 three/four-core cable	
Size of conductor	*current rating*	*voltage drop x A x m cos w = 1*	*current rating*	*voltage drop x A x m cos w = 1*	*current rating*	*voltage drop x A x m cos w = 1*	*current rating*	*voltage drop x A x m cos w = 1*
(sqmm)	A	mV	A	mV	A	mV	A	mV
1.0	19	45	17	39	17	45	15	39
1.5	24	30	22	26	22	30	19.5	26
2.5	33	18	30	15	30	18	26	15
4.0	45	11	40	10	40	11	35	10

1 Conductor operating temperature: 90 °C; Ambient temperature: 30 °C.

Rating Factors

Ambient temp. (°C)	25	30	35	40	45	50	55	60	65
Rating factor	1.04	1.00	0.95	0.90	0.85	0.80	0.74	0.67	0.60

For grouping												
Number of cables	2	3	4	5	6	8	10	12	14	16	18	20
Rating factor	0.80	0.70	0.65	0.60	0.57	0.52	0.48	0.45	0.43	0.41	0.39	0.38

Armouring

FIRECEL cables can be supplied with:

SWA Steel Wire Armour

SWB Steel Wire Braid

Cable Installation

Ambient Temperature

FIRECEL cables are easy to install also at temperature as low as –10 °C.
Storage temperature: –40 °C to +80 °C.

Bending Radius

Minimum 6 times the nominal diameter of the cable.

Installation

Cable is easy to handle and easy to install without special tools.
Cable can be fixed directly to a surface using LSZH coated copper P clips or Saddle clips, available together with cables.
Plastic clips must not be used.
Cable can also be installed in cable tray or in conduits, or direct buried in plaster.
Suitable for outdoor installation too, in appropriate protected environments.

Glands

For standard installation, general purpose nylon glands can be used.
In explosion proof area suitable proof glands can be used with armoured cables.

Available colours: white/red.

Conducting Value

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DUBAI BRANCH OFFICE

Cavicel firmly believes in the importance of the quality of its products and it undertakes itself to produce them using clean technologies for the respect and the protection of the environment.

ISO 14001
CSQ
ecc
n. 9191.CVCL