

# FIRECEL

The Last Cable Standing

## SR 114H | SR 114E

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











According to **BS 5839-1:2017** "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	S R 114H	SR 114E					
Code of Practice	BS 5839-1:2017	BS 5839-1:2017					
	Clause 26.2d	Clause 26.2e					
Circuit Integrity	BS EN 50200:2015	BS EN 50200:2015					
	(PH 30 - PH 60 - PH 120)	(PH 120)					
	830°C fire and	830°C fire and					
	mechanical shocks	mechanical shocks					
	BS EN 50200:2015	BS 8434-2:2003					
	+ Annex E	+A2:2009					
	830°C - 30 min.	930°C - 120 min.					
	(15 min. fire and mechanical	(60 min. fire and					
	shocks	mechanical shocks					
	+ 15 min. fire mechanical	+ 60 min. fire					
	shocks and water spray)	mechanical shocks and					
		water spray)					
	BS 6387:2013 - Ca	ategory CWZ					
	IEC 60331-21:1999						
Fire Propagation	BS EN 60332-3:2009, BS EN 60332-1:2004						
Acid Gas Emission	BS EN 60754-1/2:2014						
Smoke Density	BS EN 61034-2:2005 + A1:2013						
Basic Design	BS 7629:	2015					

**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.

All drums are delivered with our internal TEST REPORT that can be seen or download through QR Code on top right of the label.

## **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 and Environmental Certifications



ISO 9001:2015 Certificate No. CS1-249



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

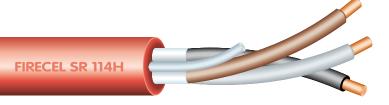


ISO 9001:2015 n. 9125.CAVL





Silicone Insulation / Overall Screen Solid & Stranded conductor



#### **Applicable Standards**

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 and water @ 650°C - 15 + 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 firefighting application - Category 1

#### **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 PH30 - PH60 - PH120)

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

Size of

Size of

Outer

Weight P clips type

IEC 60331 Flame retardant

BS EN 60332-1-2

BS EN 60332-3-24 cat. C

BS EN 60754-1

BS EN 60754-2

Smoke densi BS EN 61034-2

No of cond.

#### **CABLE CONSTRUCTION**

#### Conductors

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

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

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 mm<sup>2</sup> 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)

x cross section (mm <sup>2)</sup>	conductors (n°/mm)	earth wire (n°/mm)	diameter (mm)	(kg/km)	
1 mm² solid					
2x1.0	1/1.13 1/1.13 7.1		7.1	70	AC7
3x1.0*	1/1.13	1/1.13	7.6	85	AC8
4x1.0*	1/1.13	1/1.13	8.3	110	AC8
7x1.0	1/1.13	1/0.80**	10.0	165	AC11
12x1.0	1/1.13	1/0.80**	12.5	255	AC12
19x1.0	1/1.13	1/0.80**	15.0	380	AC16
1.5 mm² solid					
2x1.5	1/1.38	1/1.38	8.0	95	AC8
3x1.5	1/1.38	1/1.38	8.5	115	AC8
4x1.5	1/1.38	1/1.38	9.4	140	AC9
7x1.5	1/1.38	1/0.80**	11.3	225	AC11
12x1.5	1/1.38	1/0.80**	14.5	340	AC14
19x1.5	1/1.38	1/0.80**	17.0	520	AC16
1.5 mm² stranded					
2x1.5	7/0.53	7/0.53	8.4	100	AC8
3x1.5	7/0.53	7/0.53	8.9	125	AC9
4x1.5	7/0.53	7/0.53	9.8	155	AC11
2.5 mm² solid					
2x2.5	1/1.75	1/1.75	9.4	130	AC9
3x2.5	1/1.75	1/1.75	10.0	170	AC11
4x2.5	1/1.75	1/1.75	11.0	210	AC11
2.5 mm² stranded					
2x2.5	7/0.67	7/0.67	9.9	145	AC11
3x2.5	7/0.67	7/0.67	10.3	180	AC11
4x2.5	7/0.67	7/0.67	11.7	230	AC11
4 mm² stranded					
2x4	7/0.85	7/0.85	11.5	200	AC11
3x4	7/0.85	7/0.85	12.2	260	AC12
4x4	7/0.85	7/0.85	13.5	330	AC13
approximate values					

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

\*\* drain wire



Mica/Silicone Insulation / Overall Screen Solid & Stranded conductor

# FIRECEL SR 114E

#### **Applicable Standards**

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 and water @ 650°C - 15 + 15 min.

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





LPCB ref. 217a (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

#### 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)

IEC 60331

Flame retardant

BS EN 60332-1-2

BS EN 60332-3-24 cat. C

Acid gas emission

BS EN 60754-1

BS EN 60754-2

Smoke density BS EN 61034-2

NIO of sond

#### **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 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)

N° of cond. x cross section (mm²)			Outer	Weight (kg/km)	P clips type
X Group Goodfort (ITIIIT )	(n°/mm)	(n°/mm)	(mm)	(kg/kiii)	
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
aproximate values					

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

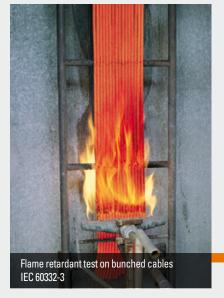
## **FIRE TESTS**

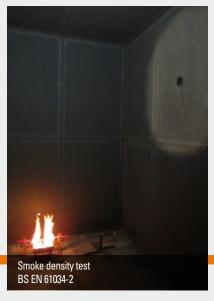


FIRECEL CABLES ARE TESTED AND CERTIFIED
BY THIRD-PARTY INSPECTION COMPANIES: **LPCB-BRE** AND **BASEC**.
ANYWAY IN CAVICEL ALL TESTS RELATED TO FIRE ARE INHOUSE
PERFORMED ON A REGULAR BASE, TO GET A VERY HIGH TRUST
TO ASSURE CUSTOMERS THE COMPLETE SAFETY.



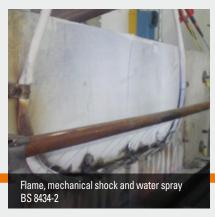














## FIRECEL SR 114 WITHSTAND THE FOLLOWING TESTS:



cal shocks.











650 °C





Total duration of test: 30'





Cat. Z

950 °C





## BS EN 50200 ANNEX E



fire. The cable is exposed to a flame at 830°C and mechanical shocks for 15 minutes and additional 15 minutes to flame, cables are maintained at their



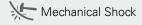
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Total duration of test: 30'

10' 20' 30' 40' 50' **SR 114H** Time **SR 114E** 15' BS 6387:2013 Cat. C 950°C BS 6387:2013 Cat. W 650°C 30 min. 15 min. BS 6387:2013 Cat. Z 950°C 15 min. 15 min. (1 impact/30 sec.) BS EN 50200:2015 1 × 830°C PH 30 BS EN 50200:2015 + Annex E 30 min. 830°C 30 min. (1 impact/5 min.) 15 min. BS 8434-2:2003 + A2:2009 930°C









## BS EN 50200



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.

#### PH 15

PH 30

PH 60

PH 90

PH 120

830 °C

830 °C

830 °C

830 °C

830 °C























## BS 8434-2



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.

930 °C















.....



Total duration of test: 120'

60	0′ 7(	0′ 8	0′ 90	0′ 10	00′ 11	0′ 12	0′	. 18	0'
									180 min.
PH 60			PH 90			PH 120	15/30/60/90	/ 120 min	
11100			11130			111120		/ 120 min. (1 impar	et/5 min.)
							120 min.		
							120 min. (1 impa 60 min.	ct/5 min.)	

## **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<sup>1</sup>

		INSTALLATIO CLIPPED	ON METHOD DIRECT	D:	INSTALLATION METHOD: IN CONDUIT OR IN CABLE TRAY				
	two-co	re cable	three/four	-core cable	two-co	re cable	three/four-core cabl		
		voltage drop		voltage drop		voltage drop		voltage drop	
Size of	current	x A x m	current	x A x m	current	x A x m	current	x A x m	
conductor	rating	$\cos w = 1$	rating	$\cos w = 1$	rating	$\cos w = 1$	rating	$\cos w = 1$	
(sqmm)	Α	mV	Α	mV	Α	mV	Α	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	

<sup>1</sup> Conductor operating temperature: 90 °C; Ambient temperature: 30 °C.

## **Rating Factors**

Ambient temp. (°C)	25	30		35	40	45	)	50	55	б	U	65
Rating factor	1.04	1.00	0 0	).95	0.90	8.0	5	0.80	0.74	0.6	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
		3	

### Cable Installation

#### **Ambient Temperature**

FIRECEL cables are easy to install also at temperature as low as  $-10\ ^{\circ}\text{C}.$ 

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.

#### 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).







#### Conducting Value

#### **CAVICEL SpA**

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