

The Gaviced logo is rendered in a stylized, blue-outlined font with a yellow-to-orange gradient fill. The letters are bold and slightly italicized, with a registered trademark symbol (®) at the end.

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.

## 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



Tsing Ma Bridge - Hong Kong



Airport Terminal 3 - Dubai



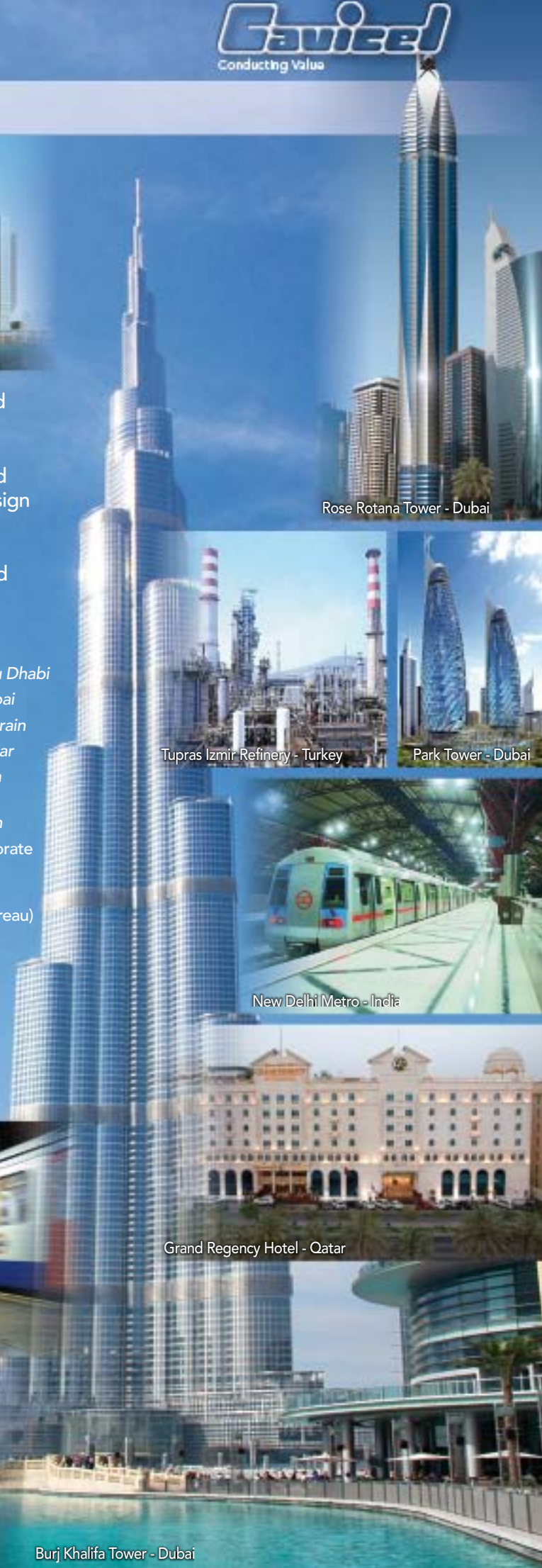
Scottish Exhibition & Conference Centre - Glasgow - UK



London Underground - UK



Atlantis Hotel - Palm Jumeirah - Dubai



Burj Khalifa 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**.

FIRECEL	Standard SR 114H	Enhanced 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 necessary. 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





### Standard Cable 300/500 V

BS 5839-1:2013 Clause 26.2d
BS EN 50200:2006 (PH 30 - PH 60 - 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 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, certificate N° 217f

### 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

### 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)
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

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 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	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 (mm <sup>2</sup> )	Size of conductors (n°/mm)	Size of earth wire (n°/mm)	Outer diameter (mm)	Weight (kg/km)	P clips type
<b>1 mm<sup>2</sup> solid</b>					
2x1.0	1/1.13	1/1.13	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
<b>1.5 mm<sup>2</sup> solid</b>					
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	
<b>1.5 mm<sup>2</sup> stranded</b>					
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
<b>2.5 mm<sup>2</sup> solid</b>					
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
<b>2.5 mm<sup>2</sup> stranded</b>					
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
<b>4 mm<sup>2</sup> stranded</b>					
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

\* drain wire

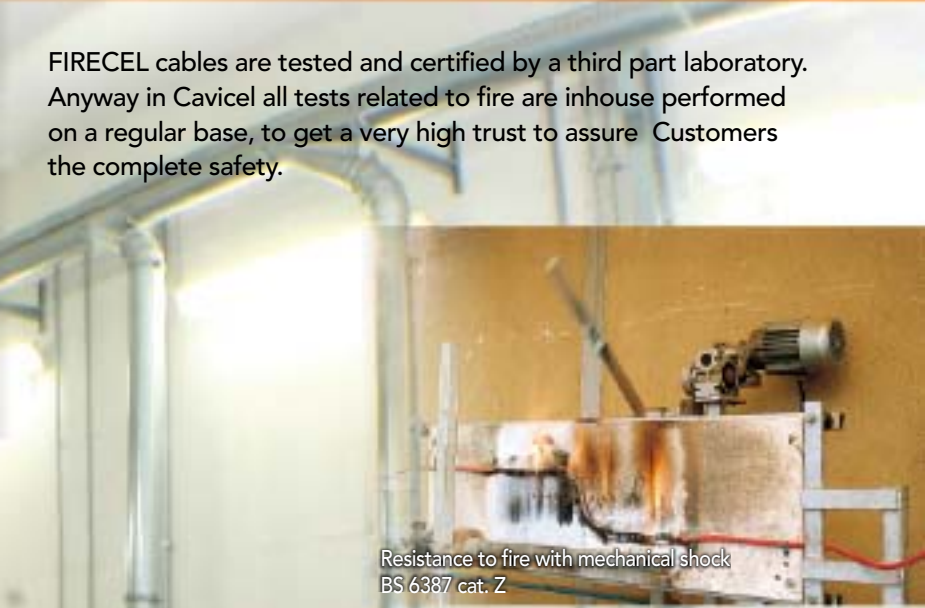
approximate values

6 **Fire Tests**

FIRECEL cables are tested and certified by a third part laboratory. Anyway in Caviced 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



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



Smoke density test  
BS EN 61034-2



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 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 EN 50200**



830 °C 15'

830 °C 30'

830 °C 60'

830 °C 90'

830 °C 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 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		<b>BS 6387:2013 Cat. C</b>															180 min.
✓	✓	650 °C	+	<b>BS 6387:2013 Cat. W</b>				30 min.											15 min.
✓	✓	950 °C	+	<b>BS 6387:2013 Cat. Z</b>				15 min.											15 min. (1 impact/30 sec.)
✓	✓	830 °C	+	<b>BS EN 50200:2006</b>				PH 30			PH 60			PH 90			PH 120		120 min. 120 min. (1 impact/5 min.)
✓	✓	830 °C	+  +	<b>BS EN 50200:2006 + Annex E</b>				30 min.											30 min. (1 impact/5 min.) 15 min.
	✓	930 °C	+  +	<b>BS 8434-2:2003 + A2:2009</b>															120 min. 120 min. (1 impact/5 min.) 60 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 (MΩ×km at 20 °C)	300	300	300	300
Nominal Capacitance (pF/m)				
<b>SR 114H</b>				
- core/core	100	110	130	160
- core/screen	170	190	220	270
<b>SR 114E</b>				
- core/core	95	100	120	150
- core/screen	160	170	200	250

## Current Ratings and Voltage Drop<sup>1</sup>

Size of conductor (sqmm)	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	
	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
	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

<sup>1</sup> 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:



## 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**

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