

FP Guide to BS 5839-1



A guide

to the selection of cable type for
particular building applications in
accordance with

BS 5839:2013

“Fire detection and fire alarm systems
for buildings”

Part 1: Code of practice for system
design, installation, commissioning
and maintenance

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Contents

Introduction	Page 3
Use of fire resisting cables	Page 3
New test requirements for fire resisting cables	Page 3
Requirements for 'standard' and 'enhanced' cables	Page 4
Guidance on cable fixings and accessories	Page 4
Guidance on segregation	Page 4
Guidance on mechanical protection	Page 4
Restrictions on use of multicore cable	Page 4
Applications for 'standard' and 'enhanced' cable systems	Page 5
Key issues for specifiers	Page 5
Cables System Selection diagrams	Page 6 - 8
Notes	Page 9

Introduction

Compared with BS5839-1:1988, the 2002 edition introduced some significant changes significant changes affect that cable selection and they are retained in the 2013 version.

- > The use of fire resisting cables is now recommended for all manual call point and automatic fire detector circuits. The use of fire resisting cables is also recommended for all final mains power supply circuits
- > Two different levels of resistance of cables to damage during the course of fire are recognized, and recommendations for application of each type are provided
- > New test requirements for cables introduced
- > Recommendations for networked systems, particularly in respect of cable types, are included
- > New guidance on segregation
- > Restrictions on use of multicore cable
- > New guidance on cable fixings and accessories

The new code of practice was published in October 2002 and became effective from July 2003. This period was to allow for the necessary training in system design and installation practices and also to allow for the development and approval of new or modified products necessary to meet new requirements. Projects designed to the 1988 edition were allowed to be completed to that edition.

Use of fire resisting cables

The use of fire resisting cables is now recommended for all critical signal paths which are defined as 'all components and interconnections between every fire alarm initiation point (manual call point or automatic fire detector) and input terminals on, or within, each fire alarm device.'

New test requirements for fire resisting cables

Recognising that a higher level of fire resistance is desirable in certain systems in particular building types, whilst unnecessary for most systems, a recommendation for two new levels of fire resisting cable systems is made. These are named 'standard' and 'enhanced'.

The existing BS6387 based requirements no longer called up and the new requirements are based upon testing to a European standard EN50200 and a modification of EN50200 to include exposure to water spray. These new requirements require exposure of the cable simultaneously to flame, mechanical shock and water spray and overcome criticism of BS6387 that it is not an integrated test.

Cable test methods to support these new requirements have been developed and were published in August 2003 as BS8434-1 for 'standard' cables and BS8434-2 for 'enhanced' cables. In May 2006, EN50200 was reissued to include the BS8434-1 method as Annex E whereas BS8434-2 remains current as its tests parameters differ from those used in harmonised European standards. BS8434-1 has been withdrawn, superseded by BS EN 50200.

In addition to meeting the required tests for resistance to fire, cables are required to meet the appropriate product standard; BS7629-1, BS7846 (armoured cables) or BS EN60702-1 (MICS cables).

Product approvals are granted to conforming products, including Prysmian FP200Gold and FP PLUS, by independent certification bodies such as BASEC and LPCB.

Requirements for 'standard' and 'enhanced' cables

For most applications BS5839-1 recommends the use of 'standard' fire resisting cables with appropriate methods of support and jointing. However, for certain applications relating to large unsprinklered buildings or premises, the standard recommends the use of 'enhanced' fire resisting cables with appropriate methods of support and jointing.

The essential difference between the 'standard' and 'enhanced' requirement is survival time under the EN50200 and new integrated test conditions, 30 minutes for 'standard' and 120 minutes for 'enhanced'.

Guidance on cable fixings and accessories

The new standard recognises that methods of cable support should be such that circuit integrity will not be reduced below that afforded by the cable used, and should withstand a similar temperature and duration to that of cable, whilst maintaining adequate support. **Plastic cable clips, ties or trunking are unsuitable as means of cable support**, typically clips should be copper or steel.

Although cables should preferably be installed without external joints, terminals used to joint cable, except those within system components, should be constructed of materials that will withstand a similar temperature and duration to that of the cable. Manufacturers recommendations should be followed, but ceramic rather than plastic terminal blocks are necessary to meet the requirements.

Guidance on segregation

It is recognised that circuits of fire alarm systems need to be segregated from cables of other circuits to minimise any potential for these circuits to affect the fire alarm system through damage caused by a fault, electromagnetic interference, damage caused by installation work. To achieve this it is recommended that fire alarm cables should not be installed in the same conduit as other cables or if in common trunking should be within their own compartment. The use of cable to BS7629-1 BS7846 or BS EN 60702-1 (all of which have a screen or metallic layer) is considered to provide adequate segregation for tray or clipped installation. Any specific recommendations of the fire alarm equipment manufacturer in respect of separation of cables should be followed. Extended runs of fire alarm cables in close proximity to high current power cables should be avoided where practicable.

Guidance on mechanical protection

The new standard recognises that mechanical protection is needed in any areas in which mechanical damage or rodent attack is likely, unless cables to BS7846 or BS EN 60702-1 are used. However, protection is no longer required when using cables to BS7629-1. In relatively benign environments (e.g. offices, shops and similar premises), even in areas that are less than 2 metres above floor level.

Restrictions on use of multicore cable

The new standard precludes the use of multicore cable for certain applications in which the failure of more than one circuit as a result of a single fault is not allowed. This is because it is assumed that any fault in a multicore cable affects all conductors of the cable, so, twin circuits intended to satisfy certain recommendations should not use a common four core cable for example.

Applications for 'standard' and 'enhanced' cables systems

The standard makes recommendations for two levels of fire resistance of fire resisting cable systems, according to the type of building and fire alarm installed, on the basis:-

- > the use of 'standard' systems is recommended for general use
- > the use of 'enhanced' systems is recommended in particular building types in which cables might need to operate during a fire for periods in excess of those normally required for single phase evacuation. Examples would include unsprinklered high rise buildings with phased evacuation or premises of such a size or nature that areas remote from the fire could be occupied for prolonged periods during a fire that might damage cables serving the occupied areas fire alarm system.

The standard notes that with a networked system, 'standard' systems are sufficient as each self contained networked system will service a smaller part of the building.

The standard makes recommendations as to where 'enhanced' systems should generally be used:-

- > unsprinklered buildings involving evacuation in four or more phases except in a building with a networked system
- > unsprinklered buildings of greater than 30m in height
- > unsprinklered premises in which a fire in one area could affect cables of critical signal paths associated with areas remote from the fire in which it is envisaged people will remain during the course of the fire
- > on the basis of a fire risk assessment taking fire safety engineering considerations into account

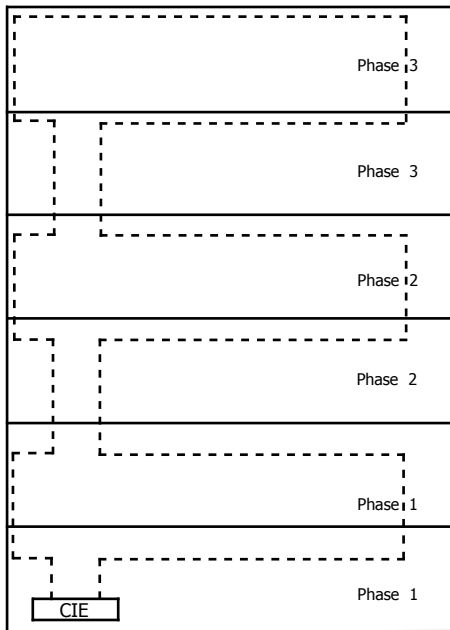
The recommendations of the standard in this area, which are illustrated on the following pages, are best taken as general guidance as the actual building, fire alarm system configuration and cable routing can all affect the cable choice.

Key issues for specifiers

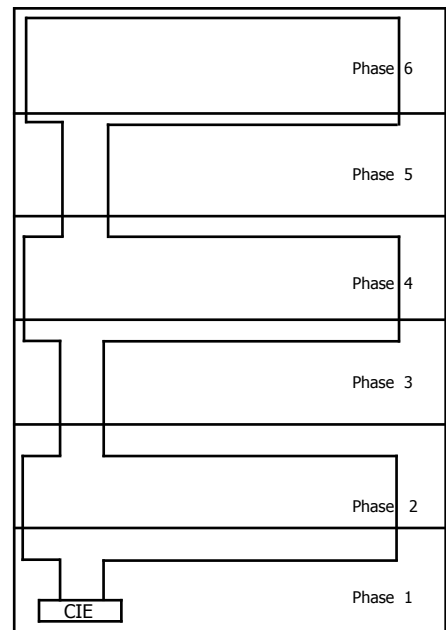
- > The choice of 'standard' or 'enhanced' cabling for any particular building requires careful consideration, taking into account both objectives and detail recommendations of the standard
- > 'Standard' cables will satisfy the majority of applications, including those in large unsprinklered buildings where networked systems are used
- > 'Standard' cables include some in previous use such as FP200 Gold[®]
- > 'Enhanced' cables include both some MICC types and newly developed easy to install extruded insulation cables such as FP PLUS[™]
- > The appropriate fire resistant fixings, trays, joints etc are needed to support the cable and must be fixed to an appropriate structure. Advice from the cable manufacturer should be followed
- > In conduit or trunking systems, the new recommendations on segregation should be followed
- > The new recommendations on mechanical protection eliminate the needs for protection in relatively benign environments
- > The fire alarm equipment manufacturer should supply any specific recommendations in respect of fire alarm cable separation in order to meet EMC requirements

BS 5839-1:2013 Cable System Selection

Unsprinklered buildings [clause 26.2. c)1] Non-networked



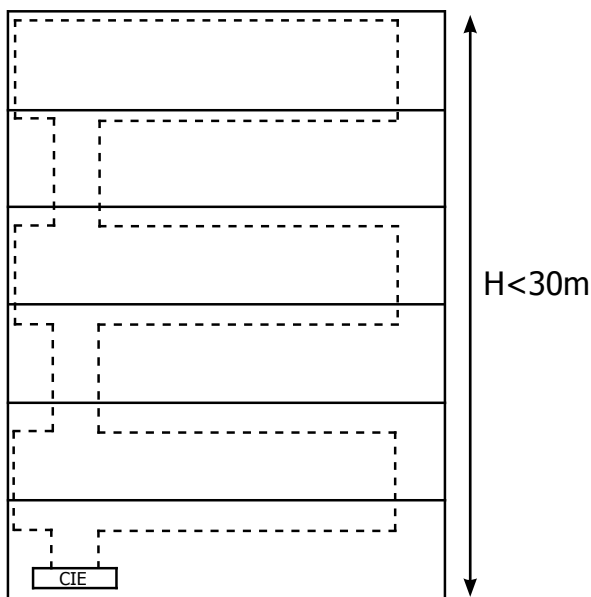
evacuation in less than 4 phases
 - - - standard cable



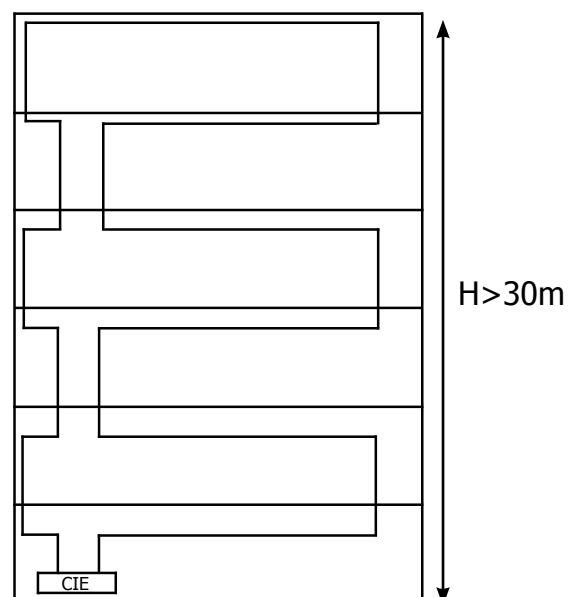
evacuation in 4 or more phases
 — enhanced cable

BS 5839-1:2013 Cable System Selection

Unsprinklered buildings [clause 26.2. c)2] Non-networked



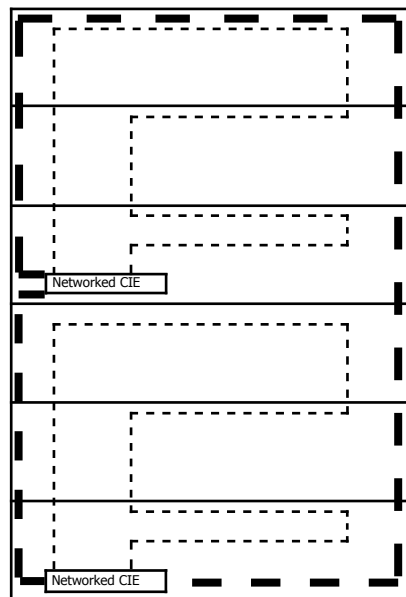
evacuation in less than 4 phases
 - - - standard cable



— enhanced cable

BS 5839-1:2013 Cable System Selection

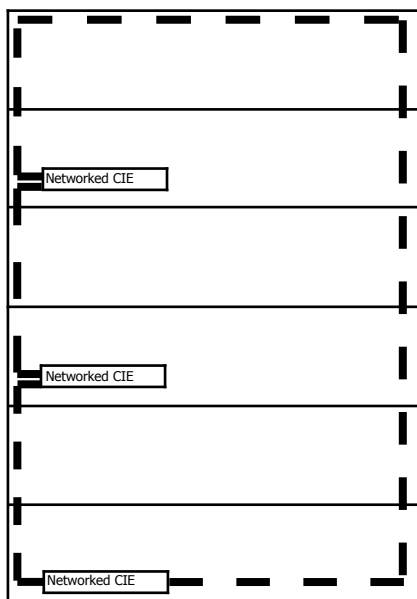
Unsprinklered buildings [clause 26.2. c)1 note 1] Networked system



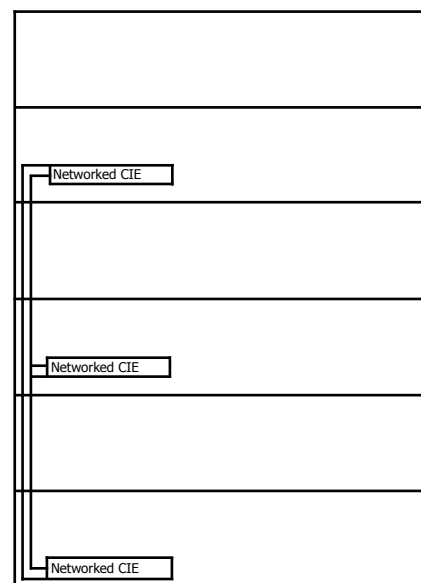
less than 4 evacuation phases per local network
 - - - - standard cable
 — — standard cable

BS 5839-1:2013 Cable System Selection

Unsprinklered buildings [clause 26.2. c)1 note 1] Networked cable loop wiring



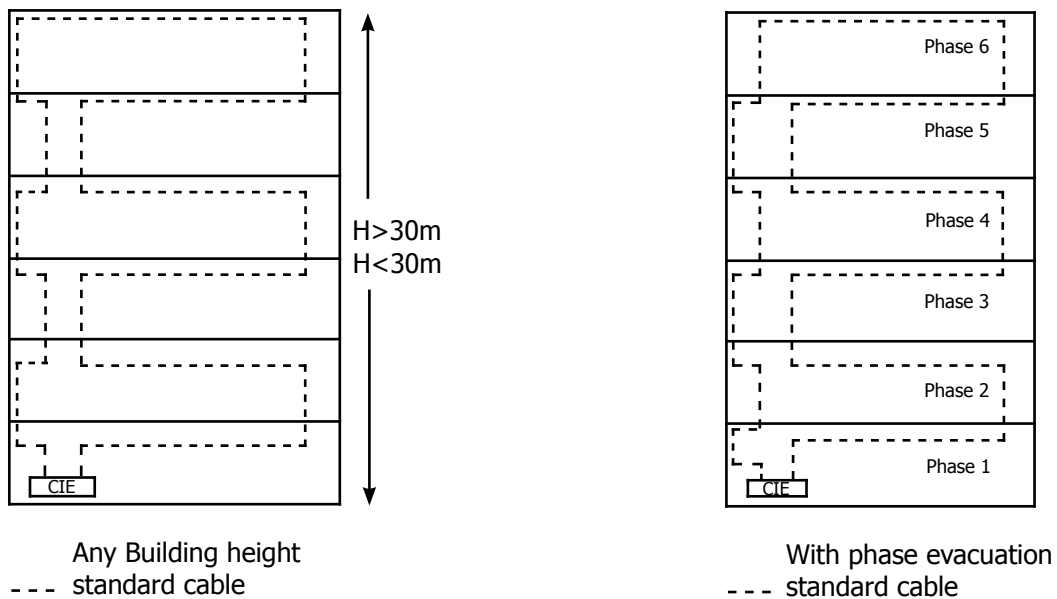
diverse routing
 - - - - standard cable



non diverse routing
 - - - - enhanced cable

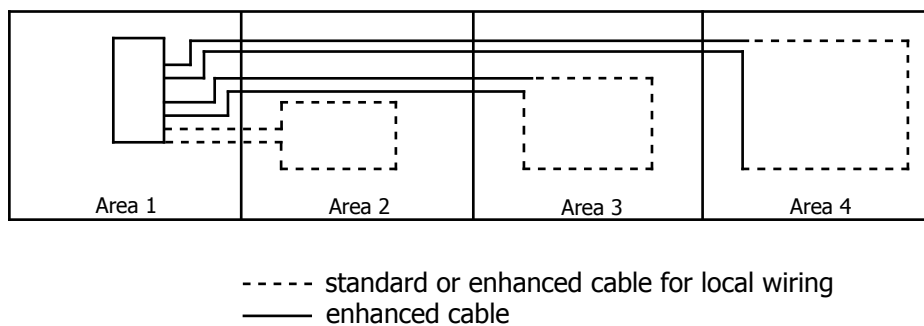
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Unsprinklered buildings [clause 26.2. c]



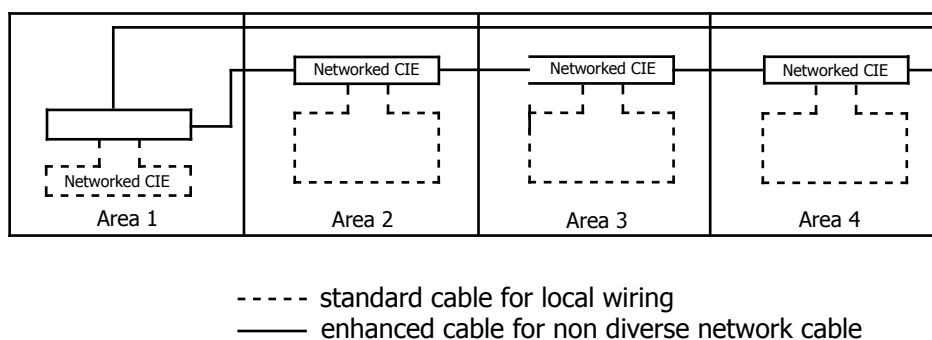
BS 5839-1:2013 Cable System Selection

Unsprinklered buildings - progressive horizontal evacuation [clause 26.2. c)3] Non-network



Unsprinklered building - progressive horizontal evacuation

[clause 26.2. c)3 note 2] Networked



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Should you have any concerns about unsafe, non-approved or counterfeit cable, please contact the ACI

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