

BS 7273-4:2015+A2:2023



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Code of practice for the operation of fire protection measures

Part 4: Actuation of release mechanisms for doors



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Summary of pages

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Foreword

Publishing information

This part of [BS 7273](#) is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 June 2015. It was prepared by Technical Committee FSH/12, *Fire detection and alarm systems*. A list of organizations represented on this committee can be obtained on request to the committee manager.

Supersession

BS 7273-4:2015+A2:2023 supersedes BS 7273-4:2015+A1:2021, which is withdrawn.

Relationship with other publications

[BS 7273](#) is published in the following parts:

- *Part 1: Electrical actuation of gaseous total flooding extinguishing systems;*
- *Part 2: Mechanical actuation of gaseous total flooding and local application extinguishing systems;*
- *Part 3: Electrical actuation of pre-action watermist and sprinkler systems;*
- *Part 4 (this part): Actuation of release mechanisms for doors;*
- *Part 5: Electrical actuation of watermist systems (except pre-action systems);*
- **A1** *Part 6: Fire detection and fire alarm systems – Interface with ancillary systems and equipment **A1**.*

Recommendations for the design, installation, commissioning and maintenance of fire detection and fire alarm systems are given in [BS 5839-1](#). In order to conform to this part of [BS 7273](#), such systems are, for the most part, expected to conform to [BS 5839-1](#). However, some of the recommendations given in [BS 5839-1](#) (e.g. in respect of provision and siting of fire detectors) are modified by recommendations given in this part of [BS 7273](#). Where this is the case, the recommendations given in this part of [BS 7273](#) take precedence for the purposes of actuation of door release mechanisms.

Information about this document

This is a full revision of the standard and introduces the following principal changes:

- To make the standard more straightforward to use and the recommendations more succinct, the text has been shortened and simplified; some of the commentary has been moved to new informative annexes and some of the previous text has been tabulated e.g. a new [Table 1](#) has been introduced, which, for all three categories of actuation, describes and contrasts the conditions under which the interface with a door release mechanism is fail-safe.
- The diagrams relating to the location of smoke detectors in relation to electrically held-open fire doors have been revised. This is intended to make the recommendations clearer and to remove possible confusion where a single diagram has been used to convey several principles applying to detector siting and spacing.
- There have been changes in terminology to assist users of the standard. The designations, A, B and C for categories of actuation are now referred to as “Critical”, “Standard” and “Indirect”. These better describe the suitability of the different categories of actuation in relation to particular applications.

- The guidance in [BS 7273-4:2007](#), Annex A of the previous standard is now normative and, therefore, the standard includes recommendations (in tables in [Annex B](#) of this version) as to which category of actuation is appropriate for a particular application.

Text introduced by or altered by Amendment No. 1 and No. 2, respectively, is indicated in the text by tags **A1** **A1** and **A2** **A2**. Minor editorial changes are not tagged.

Amendment A2 introduces changes to remove any conflict between this standard and BS EN 13637.

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at bsigroup.com/standards, or by contacting the Customer Services team.

Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

Use of this document

As a code of practice, this part of [BS 7273](#) takes the form of recommendations and guidance. It is not to be quoted as if it were a specification. Users are expected to ensure that claims of compliance are not misleading.

Users may substitute any of the recommendations in this part of [BS 7273](#) with practices of equivalent or better outcome. Any user claiming compliance with this part of [BS 7273](#) is expected to be able to justify any course of action that deviates from its recommendations.

Presentational conventions

The provisions of this document are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

The word “should” is used to express recommendations of this document. The word “may” is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word “can” is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this document. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

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Introduction

It is commonplace for there to be an interface(s) between a fire detection and fire alarm system and various forms of door hardware. The devices actuated by the arrangements described in this part of [BS 7273](#) are frequently used, in the event of fire, to open, release, or unlock doors that form part of the means of escape in the event of fire, or that prevent the spread of smoke and fire into escape routes. Their use might also be required to make buildings, and circulation routes within buildings, accessible for some groups of people, such as those with certain forms of disability.

Typically, the facilities with which it is often necessary to interface the fire detection and fire alarm system comprise of:

- a) devices to hold open self-closing fire-resisting doors (e.g. electromagnetic, and acoustically and/or radio-actuated, hold-open devices);
- b) devices to secure doors on means of escape (e.g. electromagnetically held locking devices and solenoid-operated locks);
- c) powered sliding doors on means of escape, which might be required to open permanently on operation of the fire detection and fire alarm system.

Applications for these facilities are discussed in [Annex A](#). In this standard, the generic term “release mechanism” (see [3.32](#)) is used to describe the devices or arrangements described in a) to c).

It is essential that the actuation of the door hardware occurs reliably, as a failure to operate might seriously impede the escape of people from fire by, for example, failing to unlock fire exit doors, or by permitting spread of fire or smoke into escape routes. Failure of electronically secured doors to open in the event of fire can also hamper fire-fighting and rescue operations by the fire and rescue service.

There is often an assumption that the arrangements for actuation of the devices and facilities to which this standard refers will be fail-safe. The assumption is made that, in the event of a failure of the fire detection and fire alarm system, doors will be released. This cannot always be assured. For example, if the power supply to an electromagnet fails, the electromagnet will cease to operate, mirroring the situation required in the event of fire.

However, on total failure of the main and standby power supplies to the control and indicating equipment (CIE), the power supply to the electromagnet might not necessarily be interrupted, because the supply to the electromagnet can be independent of the supply to the CIE.

No fire protection equipment or facility is totally immune to failure. The level of reliability of the actuation arrangements needs to be commensurate with the risk to people in the event of fire and simultaneous failure of the actuation arrangements to operate (see [Clause 4](#)).

In specifying measures for the interface between door release mechanisms and fire detection and fire alarm systems this standard takes into account the risk to occupants:

- 1) if the facilities fail to operate in the event of operation of the fire detection and fire alarm system; and
- 2) if actuation of release mechanisms occurs as a result of events other than fire.

In the case of 2), account might also need to be taken of the risk to persons other than occupants (e.g. the general public). In the case of electronically secured doors, this British Standard assumes that the only means of releasing the locks is the electronic arrangement, and that there is no provision for mechanical release of locks by building occupants (e.g. by means of a thumb-turn or handle). Where such mechanical means of releasing locks is provided, the full application of all recommendations in this part of [BS 7273](#) might not be necessary.

NOTE A1 In blocks of flats, it is common for electronic locking to be fitted to the main entrance doors to the blocks. As a result of modern purpose-built blocks of flats having a “stay-put” strategy, there is normally no fire detection and fire alarm system with which electronic locking can be interfaced. To facilitate means of escape from the block, the electronic locking is released either by mechanical means (e.g. a lever handle), or by a manual release control that is used for normal egress (e.g. a mushroom head push-button); in the latter case, a further manual release control conforming to the recommendations of [11.2](#) of this British Standard is provided for emergency use. As, in such cases, there is no fire detection and fire alarm system, the electronic locking is outside the scope of this part of [BS 7273](#).

However, attention is drawn to [BS 8220-1](#), which recommends that, in medium and high-rise blocks of dwellings (i.e. dwellings within a block of flats), where electric strikes or magnets are installed, they need to be fail-safe (open) devices in the event of simultaneous failure of the normal, and any standby, power supply. This also enhances the reliability of access to the block by the fire and rescue service, for whom a facility for access (e.g. a “drop key” facility) is normally provided. This is not a requirement of either building regulations (in relation to new buildings) or fire safety legislation relevant to existing buildings (given that the entrance door to the block could, otherwise, be locked with a mechanical lock, operated by an “easy opening device”, such as a lever handle, on the inside, and by a key that would not be held by the fire and rescue service on the outside).

However, provision of “fail-safe to open” is good practice, in that it capitalizes on the provision of electronic locking by facilitating easy access to the block for the fire and rescue service. Equally, the latter facility might impact on the security of the block because the access facility for the fire and rescue service is commonly operated by a key (e.g. a “drop key”) that is readily available to members of the public and, hence, criminals. A1

Throughout the United Kingdom, adequate means of escape in the event of fire, and adequate access to buildings, are required under the relevant national building regulations: the Building Regulations 2010 [\[1\]](#), the Building Regulations (Northern Ireland) 2012 [\[2\]](#), and the Building (Scotland) Regulations 2004 [\[3\]](#) and subsequent amendments. Building regulations apply to new building work including, amongst other things, material alterations to means of escape in the event of fire in virtually all existing buildings. Accordingly, approval to fit devices actuated by the arrangements described in this part of [BS 7273](#) might need approval by the relevant building control body.

In England and Wales, adequate means of escape in the event of fire in existing buildings are required under the Regulatory Reform (Fire Safety) Order 2005 [\[4\]](#). Guidance on this legislation in England and Wales, including the use of release mechanisms for doors, is published by the Department for Communities and Local Government (www.gov.uk). Similar requirements are imposed by equivalent legislation in Scotland¹⁾ and Northern Ireland²⁾. In each case, the legislation requires that fire precautions, including provisions relating to means of escape, be based on a fire risk assessment. Throughout Great Britain, the Equality Act 2010 [\[9\]](#), and similar legislation in Northern Ireland, requires that, in most buildings, reasonable adjustments to the physical features of premises are carried out to overcome physical barriers to access. Certain devices actuated by the arrangements described in this part of [BS 7273](#) are used to overcome such physical barriers.

Although this part of [BS 7273](#) gives recommendations for the design of the interface between a fire detection and fire alarm system and devices that open, unlock or release doors in the event of fire, this does not necessarily mean that such devices will be acceptable (e.g. under legislation) in all circumstances in all premises. Guidance on this matter can be found in the guidance documents that support legislation and in other relevant British Standards. Often, the acceptability of the devices, and of the type of device used, will be determined by a risk assessment carried out by a competent person. Building control bodies and fire and rescue authorities can give advice in particular circumstances.

¹⁾ The Fire (Scotland) Act 2005 [\[5\]](#) and the Fire Safety (Scotland) Regulations 2006 [\[6\]](#). Guidance on the Scottish legislation is published by Scottish Government (www.scotland.gov.uk).

²⁾ The Fire and Rescue Services (Northern Ireland) Order 2006 [\[7\]](#) and Fire Safety Regulations (Northern Ireland) 2010 [\[8\]](#). Guidance on the legislation in Northern Ireland is published by Department of Health, Social Services and Public Safety (dhsspsni.gov.uk).

1 Scope

This part of [BS 7273](#) gives recommendations for the design, installation, commissioning and maintenance of electrical control arrangements for actuation of mechanisms that unlock, release or open doors in the event of fire. It applies to all aspects of the interface between these mechanisms and a fire detection and fire alarm system, including interfaces that incorporate acoustic coupling and radio transmission. It does not recommend whether the above mechanisms should, or should not, be used in any given premises, or in any particular circumstances.

The interface arrangements to which this part of [BS 7273](#) applies, include any such arrangements that are designed in the event of fire to:

- a) release fire-resisting doors that are normally held in the open position;
- b) unlock doors that are normally locked; or
- c) cause powered sliding doors to open.

A1 This British Standard does not apply to electrically controlled systems that form part of a smoke venting system.

*NOTE 1 Recommendations for the interface between these systems and a fire detection and fire alarm system are given in BS 7273-6. **A1***

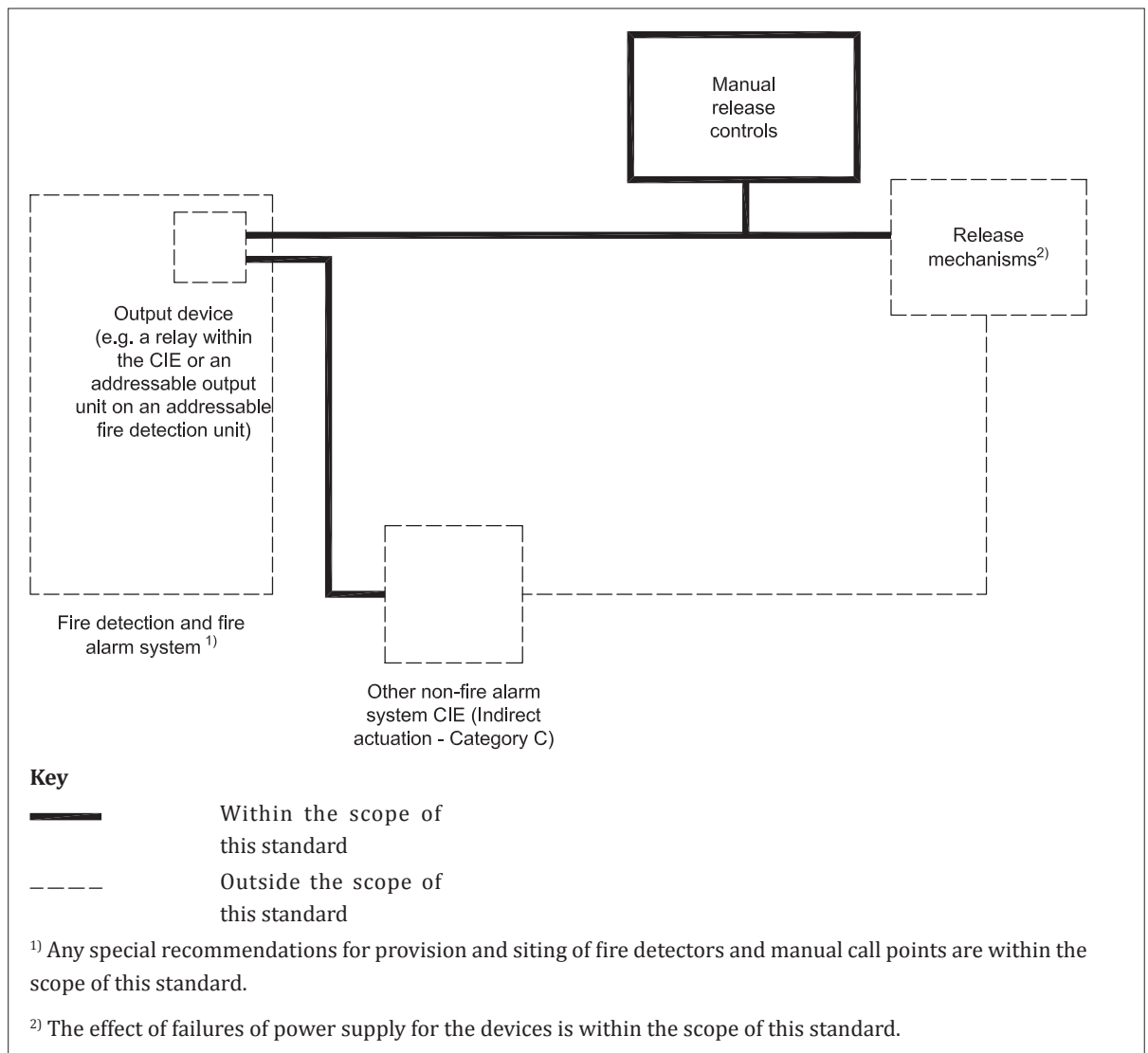
This part of [BS 7273](#) does not generally apply to the equipment that holds, releases, locks or unlocks the doors, or that facilitates the opening of powered sliding doors.

NOTE 2 Recommendations are given, where appropriate, for the standards to which some of this equipment needs to conform.

This part of [BS 7273](#) does not apply to products used within the fire detection and fire alarm system that initiate the signal to actuate the door locking or release mechanisms, nor to aspects of the fire detection and fire alarm system concerned with its primary function to give warning in the event of fire.

NOTE 3 Recommendations for the design, installation, commissioning and maintenance of fire detection and fire alarm systems are given in [BS 5839-1](#), which refers normatively to [BS 7273](#) for the interface between a fire detection and fire alarm system and other fire protection systems and equipment.

The scope of this part of [BS 7273](#) is shown diagrammatically in [Figure 1](#).

Figure 1 — Scope of BS 7273-4

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions, or limits the application, of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced standard (including any amendments) applies.

BS 4422, *Fire – Vocabulary*

A1 Text deleted **A1**

[BS 5839-1:2013](#), *Fire detection and fire alarm systems for buildings – Part 1: Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises*

[BS 5839-3](#), *Fire detection and alarm systems for buildings – Part 3: Specification for automatic release mechanisms for certain fire protection equipment*

[BS 5839-6:2013](#), *Fire detection and fire alarm systems for buildings – Part 6: Code of practice for the design, installation and maintenance of fire detection and fire alarm systems in domestic premises*

[BS 6724](#), *Electric cables – Thermosetting insulated, armoured cables for voltages of 600/1 000 V and 1 900/3 300 V, having low emission of smoke and corrosive gases when affected by fire – Specification*

[BS 7671](#), *Requirements for electrical installations – IET Wiring Regulations*

[BS 7846](#), *Electric cables – Thermosetting insulated, armoured fire-resistant cables of rated voltage 600/1 000 V, having low emission of smoke and corrosive gases when affected by fire – Specification*

BS EN 54-2, *Fire detection and fire alarm systems – Part 2: Control and indicating equipment*

BS EN 54-11:2001, *Fire detection and fire alarm systems – Part 11: Manual call points*

BS EN 1155, *Building hardware – Electrically powered hold-open devices for swing doors – Requirements and test methods*

BS EN 1527:2013, *Building hardware – Hardware for sliding doors and folding doors – Requirements and test methods*

BS EN 12209:2003, *Building hardware – Locks and latches – Mechanically operated locks, latches and locking plates – Requirements and test methods*

 BS EN 13637, *Building hardware – Electrically controlled exit systems for use on escape routes – Requirements and methods* 

BS EN 16005, *Power operated pedestrian doorsets – Safety in use – Requirements and tests methods*

BS EN 61386-1, *Conduit systems for cable management – Part 1: General requirements*

BS EN 60839-11-1, *Alarm and electronic security systems – Part 11-1: Electronic access control systems – System and components requirements*

BS EN 50133-2-1, *Alarm systems – Access control systems for use in security applications – Part 2-1: General requirements for components*

BS EN 60702-1, *IEC 60702-1, Mineral insulated cables and their terminations with a rated voltage not exceeding 750 V – Part 1: Cables*

BS EN ISO 7010:2012, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

ETSI EN 300-220-1, *Electromagnetic compatibility and radio spectrum matters (ERM) – Short range devices (SRD) – Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels up to 500 mW – Part 1: Technical characteristics and test methods*

ETSI EN 300-220-2, *Electromagnetic compatibility and radio spectrum matters (ERM) – Short range devices (SRD) – Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels up to 500 mW – Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive*

ETSI EN 300-220-3, *Electromagnetic compatibility and radio spectrum matters (ERM) – Short range devices (SRD) – Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels up to 500 mW – Part 3: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive*

3 Terms and definitions

For the purposes of this document, the terms and definitions in BS 4422 and the following apply.

3.1 alarm zone

geographical subdivision of the protected premises, in which the fire alarm warning can be given separately to, and independently of, a fire alarm warning in any other alarm zone

3.2 automatic fire detection and fire alarm system

system (other than a single self-contained smoke or fire alarm) in which an alarm of fire can be initiated automatically

3.3 automatic release mechanism

device that can be used for holding a door in the open position against the action of a door closer ([3.10](#)), and automatically releasing under conditions recommended in this part of [BS 7273](#)

3.4 cause and effect

relationship between one or more events. The “cause” gives rise to, or triggers, one or more other events, and the “effect” is the consequence of those events

3.5 circuit

assembly of components supplied from a single source and protected against overcurrent by the same protective device(s) or current limitation arrangements

3.6 commissioning

process by which it is determined that the installed system meets the appropriate requirements

3.7 competent person

person with the relevant current training and experience, and with access to the requisite tools, equipment and information, and capable of carrying out a defined task

[SOURCE: [BS 5839-1:2013](#), 3.12]

3.8 control and indicating equipment (CIE)

component(s) of a fire detection and alarm system through which other components are supplied with power

3.9 critical signal path

all interconnections and communications between a fire alarm system and the input terminals on, or within (a) device(s) provided to open, release or unlock a door, or between CIE and other control equipment by which such devices are controlled (see [Figure 1](#))

NOTE 1 This definition is not the definition of critical signal path given in [BS 5839-1](#).

NOTE 2 Examples of other control equipment include the control equipment of an access control system.

NOTE 3 In the case of acoustically actuated systems (see [Clause 15](#)), fire alarm sounder circuits are not considered to be part of the critical signal path.

3.10 door closer

mechanism attached to a door that automatically closes the door provided that the closing force is not overcome by an automatic release mechanism or obstacle

NOTE This device is often described as a self-closing mechanism.

3.11 electric door magnet

device which uses only magnetic attraction to effect or enable locking and/or unlocking

3.12 electrically controlled hold-open system

combination of compatible components which has the function to hold open self-closing fire/smoke control doors, and, in the case of fire, to release these doors for self-closing, at the earliest practicable moment

NOTE This is also known as a "hold-open system".

3.13 electrically powered free-swing door closer

door closer (3.10) that allows the door, after an initial opening to a predetermined position, to swing freely anywhere from that position to its closed position without any resistance or damping, and which upon removal of the electrical supply returns the door to the closed position

3.14 electrically powered hold-open device

component of a hold-open system that allows a self-closing fire/smoke control door to remain open at either a preset or a chosen angle until electrically released

NOTE 1 Examples of suitable devices include electromagnets.

NOTE 2 This is also known as a "hold-open device".

3.15 electromagnetic automatic release mechanism

automatic release mechanism (3.3) in which electrical energy is converted into a magnetic force that acts directly as the holding force

3.16 electromechanical automatic release mechanism

mechanical holding device that is operated by electrical energy

3.17 electromechanical lock

device using electrically operated means to effect or enable locking and/or unlocking

3.18 electromechanical strike

locking plate using electrically operated means to effect or enable locking and/or unlocking

3.19 fail-safe

electrically controlled actuation arrangements for release mechanism(s) designed such that specified failures result in the release of the door from its pre-actuation state (i.e. held open or locked)

3.20 fire alarm device

component of a fire alarm system, not incorporated in the CIE (3.8), which is used to give a warning of fire

NOTE For example, a sounder or visual indicator.

3.21 fire alarm sounder

audible fire alarm device (3.20)

3.22 fire risk

combination of the probability of fire occurring and the magnitude of the consequences of fire

3.23 fire signal

signal intended to indicate the occurrence of a fire

3.24 installer

person or organization having responsibility for all or part of the process of installing the measures to which this standard relates

3.25 maintenance

work of inspection, servicing and repair necessary in order to maintain the efficient operation of the measures to which this standard relates

3.26 manual call point

component of a fire detection and fire alarm system that is used for the manual initiation of an alarm

3.27 maximum alarm load

maximum load imposed on a fire alarm system power supply under fire conditions

NOTE This comprises the power required for simultaneous operation of all fire alarm devices, fire signals from all automatic fire detectors and manual call points in the building, any power drawn by other systems and equipment in the alarm condition (including systems and equipment required for compliance with this standard) and any power required for transmission of fire signals to an alarm receiving centre (if a facility for this is provided).

3.28 normal supply

supply from which the fire alarm system is expected to obtain its power usually derived from the public electricity supply system under normal conditions

3.29 pre-alarm warning

early warning of conditions which might (or might not) represent a fire

3.30 protection

presence of one or more automatic fire detector(s) able to initiate actions needed for the safety of life or property in the event of a fire and for actuation of automatic release mechanisms ([3.3](#))

3.31 purchaser

person or organization taking primary responsibility for acceptance of, and payment for, the measures to which this standard relates

3.32 release mechanism

device, mechanism or arrangement which:

- a) holds open a self-closing door, but releases it on occurrence of a fire signal ([3.23](#));
- b) secures a door, but causes it to unlock on occurrence of a fire signal; or
- c) causes a powered sliding door to open on occurrence of a fire signal

NOTE These actions can also occur in the event of circumstances other than a fire signal (e.g. a fault indication at the CIE of the fire detection and fire alarm system).

3.33 servicing

routine process of work on the measures to which this standard relates, carried out at predetermined intervals

3.34 short circuit isolator

device, which might be connected into a transmission path of a fire detection and fire alarm system, to limit the consequences of low parallel resistance faults between the lines of this transmission path

NOTE A short circuit isolating device can be a physically separate device or it can be incorporated into another device (e.g. integrated into a smoke detector or detector base).

3.35 smoke alarm

device containing within one housing all the components (except possibly the energy source) necessary for detecting smoke and giving an audible alarm

3.36 staff alarm

restricted alarm, following the operation of a manual call point or automatic fire detector, given to certain staff in the premises to permit investigation prior to evacuation and/or summoning of the fire and rescue service

3.37 staged fire alarm system

fire alarm system in which two or more stages of alarm can be given within a given area

NOTE 1 Examples of staged alarm systems are a two-stage system capable of giving “alert” or “evacuate” signals, or a three-stage alarm system capable of giving “staff alarm”, “alert” or “evacuate” signals.

NOTE 2 The normal condition, under which no alarm is given, is not counted as a stage of alarm.

3.38 standby supply

electricity supply, commonly from a rechargeable battery, which is automatically connected to the fire alarm system when the normal supply fails

3.39 user

person or organization having control of a building (or part of a building) in which the measures to which this standard relates are installed

4 Categories of actuation

COMMENTARY ON CLAUSE 4

The facilities to which this standard refers might be used in a number of applications in buildings, for reasons of:

- a) convenience;*
- b) accessibility; and/or*
- c) security.*

See [Annex A](#) for further details on reasons that mechanisms for unlocking and releasing doors are used.

Recommendations on the use and method of actuation of release mechanisms are contained in other British Standards and in guidance on fire legislation. These advise that in principle, actuation of release mechanisms is intended/designed to occur in response to any failure of the fire detection and alarm system, including system error (e.g. failure of the central processing unit) and any electrical failure. In practice, for release mechanisms to fail-safe under any conceivable fault condition, while technically possible, is onerous and in some cases impracticable. All electronic systems have the potential to fail. However, if the recommendations of this standard are followed, the likelihood of failure of a release mechanism to operate correctly on demand is expected to be very low. Since a fire in a building is uncommon, the likelihood of failure of a release mechanism at the time of a fire is then so low as to constitute a tolerable risk in most circumstances.

In the design of the interface between the release mechanism and the fire detection and fire alarm system, account is taken of, at least, a single failure of the equipment or power supplies.

In specifying measures for the interface between door release mechanisms and fire detection and fire alarm systems this standard takes into account the risk to occupants:

- 1) if the facilities fail to operate in the event of operation of the fire detection and fire alarm system; or*
- 2) if actuation of release mechanisms occurs as a result of events other than fire.*

In the case of 2), account might also need to be taken of the risk to persons other than occupants (e.g. the general public).

In some circumstances, in which the fire risk is high and/or the consequences of failure of the electrical actuation arrangements are greatest, account might need to be taken of the possibility of two independent, simultaneous failures of equipment or power supplies at the time of a fire. In these circumstances, the use of release mechanisms might need to be limited or restricted, or additional safeguards might need to be incorporated.

Normally, the release mechanisms to which this standard applies are actuated directly by an output signal generated at the CIE (3.8) of a fire detection and fire alarm system (e.g. change of state of a relay or initiation of an acoustic signal from fire alarm sounders). However, in some cases, the output signal is generated by another system or its control equipment (e.g. the control equipment of an access control system, or control equipment of an electrically controlled hold-open system). In these cases, the additional complexity introduced inherently reduces the reliability of the actuation arrangements. Again, the use of this form of interface might need to be limited or restricted, or additional safeguards might need to be incorporated.

As a result of these considerations, the actuation arrangements to which this standard refers are divided into three categories – “Critical” actuation (Category A), “Standard” actuation (Category B) and “Indirect” actuation (Category C). Recommendations on the selection of which category is appropriate are given in 4.1. The conditions under which each category is fail-safe are given in 4.2.

4.1 Selection of category

COMMENTARY ON 4.1

“Standard” actuation (Category B) is the category that is likely to be suitable in many situations in which release mechanisms for doors are employed. In these situations, this category of actuation will ensure that the release mechanism will fail-safe when there is either a loss of power to the release mechanism or a fault in the critical signal path.

However, there are situations where the fire risk or the consequences resulting from failure suggest that a more robust arrangement is needed that will fail-safe under a much broader range of fault conditions, including loss of the normal and/or standby power supplies to the fire alarm CIE. In these situations, the more suitable category is “Critical” actuation (Category A).

Equally, there are situations in which “Indirect” actuation (Category C) will suffice; in such arrangements, there is no direct communications path between the fire alarm CIE and the release mechanism and the inherent reliability of such an arrangement is, by comparison, reduced.

[Annex B](#) gives recommendations on the category of actuation that is appropriate for various situations. In a particular building, a mixture of categories might be appropriate and acceptable.

While a particular category of actuation might be desirable, the category of actuation might not be technically achievable or reasonably practicable in existing buildings; this might preclude the use of certain door release mechanisms in particular circumstances, alternatively, consideration might be given to acceptance of a variation, subject to the agreement of all interested parties (see [Clause 6](#)).

- 4.1.1** The category of actuation that should be adopted in any particular circumstance should be determined from [Annex B](#).

- 4.1.2** Any specification for actuation of a release mechanism(s) should clearly state the category of actuation required.
- 4.1.3** The purchaser of the system or their agent should inform the designer of the system as to the category of actuation that is required (e.g. in purchase or tender specifications).
- 4.1.4** If the designer is not informed as to the category of actuation required, the designer should select the category of actuation from [Annex B](#) and should make clear, to the purchaser or their agent, the category of actuation that the designer proposes.
- 4.1.5** The system commissioning certificate (see [Clause 20](#)) should clearly state the category of actuation that has been installed.

4.2 Description of categories

4.2.1 Critical actuation (Category A)

Where actuation is fail-safe under the following conditions it should be deemed as Critical actuation (Category A):

- a) indication at the CIE of any fault condition required to be indicated by BS EN 54-2 (within the time period specified in BS EN 54-2 plus 120 s); and
- b) any of the additional conditions given in [Table 1](#).

NOTE 1 Actuation of the release mechanism of doors might not have to occur in the event of a failure or disconnection that affects one or more detectors or call points on which the door release does not depend for its correct operation. Depending on the fire strategy for the building e.g. it is unlikely that in the event of a fault affecting fire detectors on one floor of a building cross corridor doors on other floors of the building need to close.

NOTE 2 Acoustically-actuated systems (see [Clause 15](#)) are not suitable for this category, as, in the event of fault conditions, fire alarm sounders do not operate.

NOTE 3 Reference to 120 s in [4.2.1a](#) and [Table 1](#) is to facilitate automatic operation of door release mechanisms in the event of faults in arrangements for door release that rely on radio transmission.

4.2.2 Standard actuation (Category B)

Standard actuation (Category B) should be deemed fail-safe as given in [Table 1](#).

NOTE 1 A fail-safe situation on occurrence of any other fault conditions is not precluded, but the risk to occupants as a result of the unnecessary opening, releasing or unlocking of a door would need to be considered [see commentary text to [Clause 4](#)].

NOTE 2 Acoustically-actuated systems (see [Clause 15](#)) might be suitable for this category, as faults on the fire detection and fire alarm system need not be taken into account.

4.2.3 Indirect actuation (Category C)

Indirect actuation (Category C) should be deemed fail-safe as given in [Table 1](#).

Table 1 — Conditions under which the interface with door release mechanisms is fail-safe

Description	Critical actuation (Category A)	Standard actuation (Category B)	Indirect actuation (Category C)
a) open or short circuit of wiring that forms part of the critical signal path (within 120 s of occurrence);	Yes	Yes	Yes
b) reduction of power supply voltage to below the level at which the door release mechanism can operate correctly in the event of fire (within 3 s of occurrence, except in the case of self-closing fire doors, for which a time of 60 s is acceptable) ^{A)} unless the operating principle of a door release mechanism inherently causes doors to release on failure of power supply;	Yes	Yes	Yes
c) the simultaneous occurrence of a failure of the normal and standby power supplies of any part of the fire detection and fire alarm system on which the release mechanism depends for its correct operation in the event of fire (within 120 s of occurrence) ^{B)} ;	Yes	No	No
d) short circuit or open circuit between the fire alarm CIE and other non-fire alarm control equipment on which the correct operation of the release mechanism depends (within 120 s of occurrence);	n/a	n/a	Yes
e) a short circuit or open circuit between separate fire alarm CIE, if the fault could prevent correct operation of the release mechanism in the event of fire (within 120 s of occurrence);	Yes	No	No
f) disablement (e.g. using a control required by BS EN 54-2) of any single manual call point or fire detector (or detection zone), on which the release mechanism depends for its correct operation in the event of fire (within 120 s of occurrence);	Yes	No	No
g) in the case of radio-actuated systems:	Yes (within 6 mins occurrence)	Yes (within 120 mins occurrence)	Yes (within 120 mins occurrence)
1) a failure of radio communication between the transmission equipment and the release mechanism;	Yes	Yes	Yes
2) short or open circuit of any circuit between the transmission equipment and the fire alarm CIE, external to an enclosure (within 120 s of occurrence)	Yes	Yes	Yes

NOTE A fail-safe situation on occurrence of any other fault conditions is not precluded, but there might be a risk to occupants as a result of the unnecessary opening, releasing or unlocking of a door.

^{A)} BS EN 1155 requires that, upon removal of the electrical supply, and when the applied voltage is reduced to 10% of the rated supply voltage, the device shall release and allow the door to close under the control of the door closing device. BS EN 1155 also requires that the hold-open device shall release within 3 s of the supply being disconnected.

^{B)} Where the actuation of a release mechanism relies on change of state of a relay within the fire detection and fire alarm system, care should be taken to ensure that this condition is satisfied (see commentary on [Clause 9](#)).