

S11

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Security

Security of emergency exit doors
in non-residential premises



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▶ CONTENTS

1. Introduction	3
2. Scope	3
3. General principles	3
4. Security considerations	5
5. Additional security considerations	7
6. Enhanced security	7

➤ 1. INTRODUCTION

It is sometimes thought that the competing objectives of, on the one hand, allowing unhindered egress from a building in the event of an emergency and, on the other, preventing unwanted intrusion by criminals, are practically irreconcilable, and that one of these objectives must therefore be compromised in favour of the other. Naturally, life safety interests are judged to be paramount in any such consideration, but security against intrusion is all too often jeopardised to an unwarranted extent in the process.

However, it does not have to be such an unbalanced equation. Given that livelihoods, as well as property and profits, are often at risk in the event of serious crimes – such as arson and theft – it is vital that proper consideration be given to securing premises against intrusion, and that all potential weak spots in the building perimeter are protected to as high a standard as deemed necessary, without hindrance to life safety.

Whilst insurers may impose minimum physical security requirements on normal premises' entry/exit doors at commercial premises, they usually exempt any door designated as an emergency exit. Nonetheless, with the benefit of thorough risk assessments and careful planning, specifications can be devised to optimise the security of emergency exit doors through the use of specialised products and good quality materials. This document offers guidance on the types of security hardware suitable for use on emergency exit doors and best practice security solutions to reduce the particular vulnerabilities commonly associated with such doors.

➤ 2. SCOPE

These guidelines have been produced to assist specifiers and end users in selecting suitable means to secure buildings against intrusion via emergency exit doors.

They relate to commercial and public premises only, but not to dwellings (where different considerations apply), nor prisons, detention centres or secure hospitals (for which special provisions have to be made).

The guidance relates specifically to emergency exit doors. Windows and other openings, such as hatches, that may also be intended to offer emergency exit from a building, are outside the technical scope of this document; although the general principles outlined may, on occasion, be successfully applied to such openings.

Emergency escape is usually considered in the context of fire. As a potentially serious and large-scale event, the provisions made for adequate escape in the event of fire are also likely to be adequate in other circumstances, however this does not mean that those responsible for emergency escape do not also need to specifically consider emergency exits in the context of other possible reasons for building evacuation, eg bomb scares, crowd surges and flood.

➤ 3. GENERAL PRINCIPLES

When considering how to achieve the right level of security for the premises whilst providing adequate means of escape from it in the event of fire or other emergency, it is important to adhere to certain basic general principles, namely:

- all risks (and potential consequences) should be properly assessed in a structured and thorough manner;
- emergency exit doors must be capable of being readily and easily opened from the inside when premises are occupied;
- doors whose sole intended purpose is to provide a means of emergency exit, should not normally be used for other day-to-day purposes; and
- rigorous management systems must be in place to ensure that:
 - emergency exit is not prevented or impeded during hours of occupancy; and
 - security levels are not unduly diminished through misuse, neglect or lack of maintenance.

3.1 Risk assessment

The number and location of emergency exit routes from a building, together with decisions concerning the suitability of different types of security device and release mechanism, will typically be considered as part of building regulation approval and/or the fire risk assessment that is required to be completed for most non-domestic buildings by the:

- Regulatory Reform (Fire Safety) Order 2005 for premises in England and Wales;
- Fire (Scotland) Act 2005 for premises in Scotland; and
- Fire and Rescue Services (Northern Ireland) Order 2006 in Northern Ireland (imminent enactment expected).

In many commercial and public premises, doorways in everyday use, such as those used as main access routes for staff and customers, may be insufficient in number or distribution to allow for safe evacuation of all occupants in the event of a fire or other emergency, and additional doors in the building perimeter will have to be provided for the sole purpose of permitting emergency exit.

The risk assessment should recognise that different categories of occupants or users may have differing requirements to enable them to make an effective escape and this should be reflected in the types of emergency device chosen:

- in buildings frequented by the general public, it is important that emergency exit doors can be easily opened by people who have had no training in emergency procedures or in the use of the particular exit device, and no familiarity with the layout of the premises. Such people may panic in the rush to escape;
- other buildings may normally be occupied only by authorised personnel who are familiar with the layout of the premises and who will have been trained specifically in the procedures for escape. They are therefore less likely to panic in the event of an emergency exit being necessary; and
- it is also important when considering siting of, and hardware for, emergency exit doors, that the needs of the disabled are met.

It may be advisable, in cases where doubt persists as to the adequacy of emergency exit arrangements or suitability of door hardware, to consult architectural ironmongers, specialist access control providers and/or the local fire authority.

To ensure that a properly balanced solution is arrived at, a thorough assessment should also be made of the crime risks to which the premises, its occupants and contents are exposed. This should take account of:

- the potential for theft, arson and vandalism whilst the premises are unoccupied;
- the personal safety of staff, customers and visitors whilst the premises are occupied; and
- the possibility of pilferage of stocks or other contents via unlocked/unsupervised doors when the premises are occupied.

3.2 Ease of escape

When considering the suitability of existing or proposed emergency exit doors, it should be ensured that they:

- open in the direction of travel wherever possible (unless it is impracticable or unsafe to do so), and lead to the open air away from the workplace or to some other place of safety;
- are fitted with security devices that can be readily and easily released, without the use of a key, whilst the premises are occupied; and
- are fitted with a safety vision panel (where deemed necessary).

In a small number of cases, where particular circumstances exist, provision to open the door from the outside may also need to be made.

3.3 Designation and supervision of escape doors

One outcome of a carefully considered risk assessment will be the designation of those doors which will be necessary to provide all occupants with safe emergency exit from the premises.

Some such doors will invariably be those that are primarily intended as routine, day-to-day access doors for staff, customers, visitors etc. These doors will, from a normal crime prevention perspective, need to benefit from a degree of access control and/or supervision appropriate to the nature of the occupation.

Other doors may have been provided for no purpose other than to offer a means of emergency exit. In the interests of good security, these doors should be kept closed and properly fastened in normal circumstances. The inappropriate use of such doors (ie for routine, non-emergency purposes) can lead to security breaches, both at the time of misuse and subsequently.

Irrespective of their particular primary purpose, all doors designated as emergency exit doors must, as previously mentioned, always be capable of being readily and easily opened from the inside without the use of a key whilst the building is occupied.

3.4 Management systems

In common with almost all safety and security measures, the provision of suitable emergency exit doors and door hardware is not a simple matter of 'fit and forget'. Safety and security will each only be properly maintained if rigorous management systems are put in place to ensure that neither objective is undermined over time through, eg misuse of facilities or lack of maintenance.

In all cases, the management of the premises must operate an effective system to guarantee that emergency exit doors are always:

- available for emergency use when the premises are occupied; and
- adequately secured against intruders.

In particular, it must be ensured that:

- any additional locking device used to secure an emergency exit door against out-of-hours intrusion is:
 - immediately disengaged and/or removed at the outset of any period of occupancy; and
 - replaced (where applicable) and engaged as part of the final locking-up procedure at the end of any period of occupancy;
- emergency exit doors (and approaches to them) are never obstructed or blocked, either internally or externally (signage and floor-markings may be helpful in maintaining compliance);
- hardware on emergency exit doors is properly maintained in good working order. All such hardware (especially any that is not in routine use) should be regularly checked for correct action and the results should be recorded. The regular checks should, for example, ensure that boltwork continues to operate smoothly and that the floor socket for a panic bolt has not become clogged with dirt or waste material. They should also make certain that all electromagnetic and electromechanical locks and latches that are used to secure emergency exit doors will fail safe (ie the lock will be disengaged) when the power supply fails or is withdrawn. Alternatively, such devices may fail secure provided that other provisions exist for the door to be easily opened manually in such circumstances. Any defects or signs of deterioration should be addressed immediately and the inspection record should be annotated accordingly;
- unauthorised or inappropriate use of emergency exit doors – for example, for smokers' breaks or casual ventilation purposes – is discouraged; and
- the end-of-day security (locking-up) procedure includes a proper physical inspection of all emergency exit doors to ensure that the security hardware remains properly engaged.

4. SECURITY CONSIDERATIONS

4.1 Construction of emergency exit doors

There are a variety of doors that could be used as emergency exit doors, eg steel or timber sandwich construction in both single or double leaf configurations. But it is the combination of their construction, frame, fittings and locking arrangements that will determine their overall level of security.

Ideally, from a security viewpoint, all external doors should comply with a recognised security performance standard such as LPS 1175: **Specification for testing and classifying the building resistance of building components, strong-points and security enclosures** (<http://www.redbooklive.com>).

Timber doors, particularly those of lighter construction, eg panelled or semi-solid construction and/or filled with lightweight material, can be vulnerable to attack by intruders even when fitted with good quality locks and bolts. Door panels can be kicked-in or hand tools used to cut holes in the doors or around locks and for doors secured by a panic release handle or bar, a small hole is often all that is needed to allow intruders to insert a hook and operate the mechanism to gain entry.

Consideration should therefore be given to reinforcing vulnerable timber doors with sheet steel cladding fitted externally with edges returned around the perimeter of the door. The sheet steel should be:

- not less than 16 gauge (1.5mm) thick;
- fixed using dome-headed coach bolts of a minimum diameter of 6mm passing through the full thickness of the door and spaced at intervals not exceeding 150mm around the perimeter of the door and through any cross-bracing and centre rails; and
- have all securing nuts and washers on the inside of the door, with the nuts welded to the bolts, or alternatively, the ends of the bolts should be burred over, to hinder removal.

For added security anti-thrust plates, hinge plates, lockguards or door frame reinforcers may also be considered.

Doors with glazing that, if broken, may give access to the securing mechanism should be improved by the means mentioned later in this document (see 5.1).

Where a door is constructed of lightweight materials, and its construction does not lend itself to reinforcement with supplementary skins or panels (eg aluminium or plastic-framed doors), consideration should be given to replacing it with a door that complies with an appropriate Grade of LPS 1175.

4.2 Security hardware for emergency exit doors

As stated earlier, emergency exit doors must be capable of being opened from inside the premises without the use of a key when the premises are occupied. It is no longer considered to be safe practice to allow key-locked emergency exit doors with keys kept in glass fronted boxes adjacent to the door because:

- the key may be missing when it is required;
- the wrong key may be present;
- smoke may be present, obscuring the box and/or rendering the keyhole difficult to locate; and
- the key may be copied and thus allow security to be breached.

The fire and crime risk assessments at the premises should indicate what types of security and emergency release devices are appropriate for the emergency exit doors according to the categories of occupants using the building.

4.2.1. Small business, stable workforce, no public areas:

Devices that may be considered suitable for use on emergency exit doors intended to be used by a limited number of staff familiar with the layout of the premises and use of the devices in question include the following:

Door locks

Locks such as mortice deadlocks, sash-locks and rim deadlocks may be used provided that the locks selected allow for keyless exit during periods of occupation (eg locks certified to BS 8621: 2007: **Thief resistant lock assembly. Keyless egress**, where the lock bolt can be operated by handle or knob from the inside).

Note: Where primary entry doors are not kept locked during working hours (eg retailers' customer entrance doors) it is acceptable to fit conventional key-lockable security devices.

Emergency exit devices

These are intended for emergency exit-only doors (not for doors in day-to-day use). They are available in different forms, such as:

- panic and emergency exit devices described below (see 4.2.2) as being suitable for use in larger businesses;
- a glass panel or plastic dome which, when broken, gives access to a lever handle or turn-knob which can be operated to unfasten a door bolt; and
- a proprietary product consisting of a glass or ceramic tube holding a spring-loaded bolt which secures the door in the closed position. When the glass is broken (usually with a small hammer on a chain supplied for the purpose) the bolt may be withdrawn, releasing the door. Normally, a small padlock retains the glass/ceramic tube in position. If the tube is broken to open the door, a new tube must be obtained and installed (a spare for immediate use should be retained).

Electromagnetic locks

These must be designed and configured to permit direct and immediate override by people seeking emergency exit from the premises. (Note: this is normally achieved by interruption of the current locally, for example, by pressing an internal door release button sited adjacent to or on the door). They may, in addition, be released by:

- interruption of the current from a remote point; and
- the activation of a fire detection system.

4.2.2. Larger businesses and/or public access:

In all other cases, the choice of suitable emergency exit door hardware will normally be restricted to panic or emergency bolts and latches as outlined in:

- BS EN 1125: 1997: **Panic exit devices operated by a horizontal bar**; and
- BS EN 179: 1998: **Emergency exit devices operated by a lever handle or push pad**.

In general terms, where the public are freely admitted into premises, emergency exit doors should be fitted with devices that comply with BS EN 1125.

Furthermore, in respect of all commercial premises and places of assembly (whether the public are freely admitted) doors on escape routes from rooms with an occupant capacity of more than 60 should, if they need any security fastenings, only be fastened with BS EN 1125 devices (Building Regulations Approved Document B).



Fig 1: BS EN 1125 device with push-bar operation

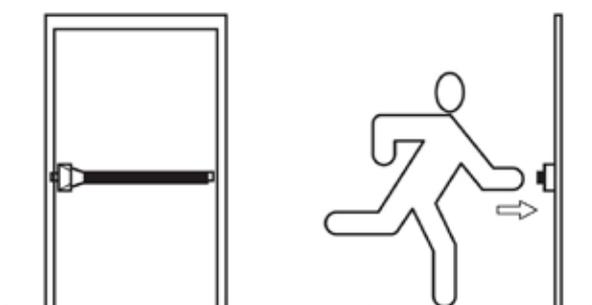


Fig 2: BS EN 1125 device with touch-bar operation

Where premises are normally occupied only by staff or other persons who are familiar with the premises' layout and have been trained in emergency escape procedures, emergency exit doors may alternatively be fitted with devices that comply with BS EN 179 (subject still to the 60 occupants capacity rule outlined in the previous paragraph).

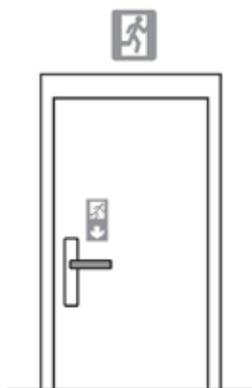


Fig 3: BS EN 179 device with lever handle operation

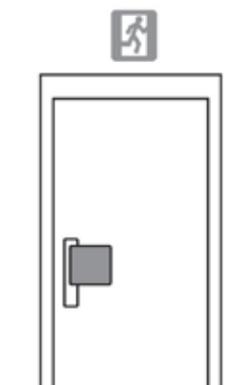


Fig 4: BS EN 179 device with push-pad operation

Both BS EN 1125 and BS EN 179 are concerned primarily with the quick and effective escape from a building. Such panic and emergency exit devices will, however, normally only provide a basic level of protection against intrusion. They are particularly susceptible to:

- surreptitious operation by anyone legitimately on site during business hours (either for immediate criminal purpose or for later intrusion having left the door unfastened but still in a closed and apparently secured state);
- manipulation from outside the premises with simply contrived tools (eg a bent wire hook) via a small breach created in the door or immediate surrounding building perimeter;
- accidental misoperation by staff following legitimate use, resulting in misalignment of the door and/or boltwork. Such risks are exacerbated by lack of maintenance; and
- failure to fully secure the door on closing (often caused by warping).

4.3 Door bolts for emergency exit doors

Only in exceptional circumstances will it be appropriate to fit bolts to emergency exit doors because:

- bolts may be difficult to locate or operate in an emergency;
- misalignment or wear may make them difficult to operate;
- distortion of the door by warping or the pressure of those trying to escape may impede their ease of operation; and
- some types, such as mortice bolts, require more than one operation to release them and their status – that is, whether engaged or retracted – may not be readily ascertained visually.

In particular, bolts that require the use of a key are not acceptable on emergency exit doors (see 4.2).

Where it is felt appropriate to use bolts, then they should ideally conform to the requirements of BS EN 12051: 2000: **Building hardware. Door and window bolts. Requirements and test methods** Grade 4 or Grade 5 and be:

- surface mounted;
- easy to use from within the premises; and
- sufficiently robust to resist forced entry.

➤ 5. ADDITIONAL SECURITY VULNERABILITIES

5.1 Glazing in, or adjacent to, doors

Where emergency exit doors contain glass panels, or there is glazing adjacent to such doors, it may be very easy to break the glass and thus gain external access to the door release hardware. For those risks that require a reasonable level of security, any glazing should offer a high degree of resistance to physical attack. At the very least, it should be of laminated glass to a thickness of 6.8mm and, ideally, it should comply with BS EN 356: 2000: **Glass in building: Security glazing: Testing and classification of resistance against manual attack.**

Where glazing is not of an attack-resistant quality and it is not practicable to replace it, then consideration should be given to the fitting of internal grilles or panels over the glazed areas with a mesh size sufficient to prevent access to internal electric lock release buttons and/or bolt release mechanisms.

5.2 Letter plate openings

Letter plate apertures should never be located in, or adjacent to, emergency exit doors as they might readily permit manipulation of the door release hardware, or access to internal electric lock release buttons, by persons outside the premises. If they have to remain they should be internally fitted with a robust enclosure – a mail holder, security hood or deflector plate, for example – to hinder access.

5.3 Hinge bolts

Emergency exit doors normally open outwards. Consequently, the knuckles of the hinges are exposed on the outside which makes them vulnerable to attack as a means of gaining entry to the premises. It is therefore advisable to fit hinge bolts (or a proprietary form of hinge which incorporates a dog bolt) to such doors. In no circumstances should lift-off hinges, or hinges with removable pins, be used.

➤ 6. ENHANCED SECURITY

6.1 General

In view of their inherent vulnerability to a range of attack methods, panic bolts and latches may not be suitable for use on some doors in high crime-risk buildings, such as banks, jewellers, warehouses containing hi-tech consumer goods etc. In these cases, a balanced risk assessment may conclude that it is necessary to provide more reliably secure means of:

- fastening the doors during business hours; and/or
- locking the doors out of business hours.

It is important that all staff are familiar with the alternative method employed and can operate it quickly in an emergency.

As suggested earlier, fire risk assessments for smaller businesses with few staff and no general public access may well conclude that entry/exit doors secured by conventional locking devices such as key or handle-operated mortice deadlocks are acceptable and that panic bolts and latches are not warranted in the circumstances. The better managed the risk – and the more rigorous the beginning and end-of-day procedures for unlocking and relocking the premises – the greater the possibility arises that enhanced locking security may be safely introduced for use during periods when the premises are unoccupied. This principle may equally be applied to larger businesses (even those with general public access) and it may be appropriate to apply enhanced locking and physical security using drop-in bars, padlocks or grilles and shutters if the circumstances are such that:

- the crime risk assessment indicates that enhanced (locking) security is needed on emergency exit doors;
- management quality is of a high standard and the safe removal of all such enhanced security (in a readily observable manner) will be assured at the outset of every period of occupation; and
- any fire or other risk assessment deems such enhanced measures acceptable.

6.2 Drop-in bars

If the risk assessment deems it appropriate and the position of existing door hardware permits, the security of emergency exit doors may be enhanced when the premises are unattended by the use of drop-in bars.

These should be of sturdy timber or metal construction, normally rectangular in cross-section and of sufficient length to extend beyond each vertical door-frame post. They should, nevertheless be sufficiently lightweight that they can be easily lifted into and out of position without the risk of personal injury. The bars are held in position horizontally by a series of open-topped metal brackets (normally two brackets on the inner face of the door and one bracket on either side of the door frame) set at a height of between 1m and 1.3m. Management procedures should be rigorously applied to ensure that the bars are always placed into position when the premises are locked up at the end of business hours and are always removed as part of the daily unlocking procedure.

6.3 Padlocks

Good quality padlocks, in conjunction with matching locking bars or sturdy steel chains, will considerably improve the security of emergency exit doors against intrusion during periods of unoccupancy. Any such padlock should be deployed on the internal face of the door so that its removal at the beginning of each period of occupancy can be readily checked as part of the daily management audit – for example, by being placed on a numbered padlock board in a manager’s or supervisor’s office.

In order to provide a good degree of resistance to criminal attack, padlocks should conform to BS EN 12320: 2001: **Building hardware. Padlocks and padlock fittings. Requirements and test methods**, minimum Grade 4.

6.4 Grilles, gates and shutters

Where physical security is required to be to the highest of standards, consideration may be given to additionally protecting external doors out of business hours by means of either internal or external security grilles, gates or roller shutters. As with padlocks and locking bars (or chains), it is vitally important that there are rigorously applied management procedures to ensure that the shutters or grilles are fully withdrawn or removed at all times that the premises is occupied. Internal and external security grilles or shutters should conform as a minimum to LPS 1175, Security Classification 3. Other security grilles and shutters should be secured by means of a close-shackle padlock that conforms to BS EN 12320, minimum Grade 4, or by integral locking devices that offer a similar level of security.

Note: If the highest standards of management control cannot be relied upon to ensure that the aforementioned enhanced security devices will always be safely removed or withdrawn when the premises are occupied, then these forms of additional protection should not be employed. In addition, apart from use on normal entry and exit doors that are also used as emergency exits, such devices should never be deployed on the outer face of an emergency exit door.

6.5 Intruder alarm systems

Local door alarm devices

Depending upon the circumstances, some emergency exit doors may benefit from provision of a local alarm in order to deter their misuse (eg abuse in connection with smokers’ breaks or for the pilferage of stock).

Some makes of panic bolts and latches are available with an integral stand-alone alarm sounding locally and/or communicating to a control panel located at a reception desk or security control room. In using these, care should be taken to avoid introducing multiple alarm tones which may confuse staff.

Premises’ intruder alarms

As emergency exit doors are usually perimeter doors, they will often benefit from being provided with general alarm protection in the form of door contacts, and/or vibration sensors and/or adjacent movement sensors linked to any premises’ intruder alarm system. The value of such protection is enhanced if an internal secondary gate or shutter is fitted to emergency doors, as forced opening of the external door will trip the alarm system before intruders are able to attack the inner barrier.

Door alarm contacts forming part of any premises alarm system may be programmed to operate on a 24-hour circuit – that is, to be active whilst the main alarm system is unset. Any alarms created by the opening of the door during periods that the premises are legitimately occupied may be monitored in an on-site security control room or simply produce a local audible alert. Such alarm signals should not normally be transmitted off-site when the premises are occupied, in view of the potential for false alarms.

6.6 CCTV

In heavier risk situations, closed-circuit television cameras may be used in conjunction with alarm detection to provide additional supervision of emergency exit routes – preferably through real-time monitoring (offering the possibility of immediate security response) or through the recording of images (to support detection, arrest and conviction in criminal cases, or disciplinary procedures in cases of staff misuse).

Detector-activated, remotely monitored CCTV systems are usually designed to transmit image(s) to a remote video response centre (RVRC). Such systems should be designed, installed, monitored and maintained in accordance with the British Standard code of practice BS 8418: 2003: **Installation and remote monitoring of detector activated CCTV systems**, by installers and RVRCs approved either by the National Security Inspectorate (NSI) or the Security Systems Alarm Inspection Board (SSAIB).

6.7 Access control/building management systems

It is increasingly common for commercial premises to install and use access control systems, either as stand-alone systems, or as part of a building management control system.

A well-designed and correctly managed electronic access control system can be a valuable component of an effective security plan for many businesses, offering enhanced and cost-effective protection during working hours.

The security of access controlled doors is normally achieved by the use of electromagnetic or electromechanical locks. As previously stated, fire and other risk assessments will normally determine that these should ‘fail safe’ in the event of removal or failure of the power supply.

It will frequently also be the case that, where the premises are fitted with a fire alarm system, any activation (whether initiated via a call-point or by an automatic detection device) will, through the interfacing of relevant systems, ensure that power is withdrawn from access control locking devices, thus releasing them and allowing unimpeded exit.

The requirement to fail safe thus introduces additional opportunities to deliberately compromise locking arrangements (or to take advantage of genuinely failed safe insecure openings), and for this reason access-controlled locking devices should not be relied upon as the sole means of securing emergency exit doors (or any other external doors) outside working hours.

As with other means of securing emergency escape doors, the type and functionality of any access control system to be deployed on such doors should only be determined as part of a detailed risk assessment programme.

The following guides may prove helpful in informing the correct decision according to the particular circumstances presented:

- **Guidance on the acceptance of electronic locks to doors required for means of escape**, Chief and Assistant Chief Fire Officers' Association in association with the Institution of Fire Engineers.
- **A guide to access control for offices**, British Security Industry Association.
- **A guide to access control for manufacturing sites**, *ibid.*
- **A specifier's guide to security classification of access control systems**, *ibid.*

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