LORIENT

Regulatory Reform
(Fire Safety) Order 2005

Fire Door Considerations

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Introduction

Since August 2006, new legislation has been implemented, requiring building owners and managers to undertake the responsibility for the fire safety of properties under their control. Fire Risk Assessments are now required to be carried out – a function which was previously carried out by the Fire Prevention Units of the Fire Brigade.

While compliance with the RRO is mandatory, most of the guidance given in the document itself is advisory, rather than specific.

This leaflet is designed to provide practical interpretation of the requirements, in the specialist field of fire door assemblies. It sets out to help with the assessment of existing doors and gives appropriate guidance on their up-grading, should they fall short in critical areas. Further advice is given on achieving compliance with closely related parts of the Approved Documents to the Building Regulations – Document B [Fire Safety] – Document M [Ease of Access] – Document E [Acoustics].

Background Information

The “Order” is subdivided into a number of sections dealing with different types of buildings and the relevant fire safety considerations are given for each category – residential care, sleeping accommodation, educational facilities, etc.

Each section incorporates an identical “Appendix B”, which is significant as far as fire / smoke doors are concerned.

Recommendations in Appendix B are easily followed but cover only the very basic considerations for fire and smoke protection. They do not consider current requirements with respect to architectural door specification, taking into account Approved Document M, in particular, and also Approved Document E.

Assessment of existing door assemblies

A fire resistant door assembly is normally required to demonstrate its capacity for resisting the passage of flames and hot gases under the conditions of a strictly controlled test in accordance with British or European standards. The assembly is composed of a number of critical elements – the leaf – the frame – the glazing aperture – ironmongery, such as hinges, hydraulic closer, latch, etc – and the perimeter sealing system.

It is vital that each of these components is in good condition – any element that is not in a satisfactory state can cause the whole assembly to fall short of expectations. Damaged items can often be replaced with new ones, of course, but in some cases it is probably better to replace the whole assembly – this will ensure that all the new components are compatible with each other and that the new assembly fully complies with all the current performance requirements.

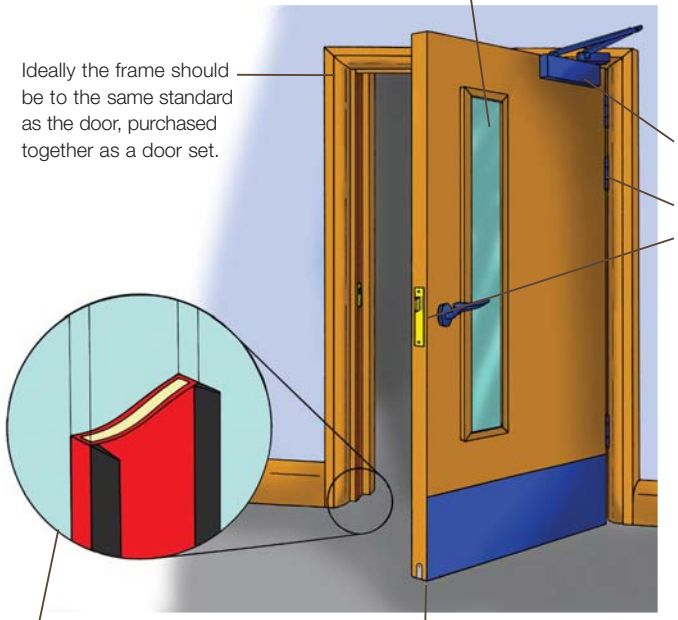
Demands on today’s fire doors go considerably beyond the requirement to pass a fire resistance test. Practically every fire door assembly in a commercial building is also required to resist the passage of smoke, for example, and will furthermore need to comply with regulations for accessibility for disabled persons. Depending on its location in a building, the door may also need to have a designated standard of acoustic performance.

All these factors must be taken into account, whether considering refurbishment or replacement of a door assembly.

Vital considerations for acoustic, smoke and fire containment

The vision panel should be fire resistant glazing. The Lorient range of fire resistant glazing systems can be used to specify and manufacture glazed doors and screens which provide fire resistance from 30 minutes up to 120 minutes.

Ideally the frame should be to the same standard as the door, purchased together as a door set.



Lorient offers a range of intumescent kits for use with:

- concealed hydraulic door closers
- hinges
- locks and latches

The **DS seal** provides the complete solution for acoustic, smoke and fire containment; and accessibility, to meet the requirements of Approved Documents B, E and M.

An unsealed threshold presents a serious smoke hazard, as cold smoke from a distant fire will infiltrate first at the threshold. **The IS8005 si Automatic Threshold Seal** provides acoustic and smoke containment; its compact design means that it can be used to upgrade existing fire and non-fire rated doors without cutting into the door's core.

The following recommendations apply to half-hour fire and smoke resisting door assemblies, [FD30S] of the single leaf / single swing type. For 1-hour assemblies and for other configurations, such as double leaf or double swing, please refer to the Lorient technical services dept.

The door leaf

- Check that the door leaf is in good condition – not damaged and not twisted or bowed – replace if necessary.
- The leaf should be a minimum of 44mm in thickness – replace if necessary.
- The clearance gap between the leaf and the threshold should be no more than 3mm, the maximum allowable for a fire/smoke door – replace the leaf if necessary.
- If located on an escape route, the door leaf must open in the direction of egress.

The door frame

- Check that the door frame and stop are in good condition – replace if necessary.
- Check that the frame is securely installed with respect to the wall and that there are no obvious gaps through which flames or smoke could penetrate – repair or replace if necessary and re-caulk with Lorient Mastic.

The hinges

- Check that the hinges are in good condition – not loose on bearings or screw fixings; not stiff or mis-aligned – hinges can be replaced if necessary but it is not always a straightforward task due to variations in dimensions and screw locations.

The hydraulic closer

- Check that the hydraulic closer is in good condition – not leaking fluid – fully capable of overcoming latching resistance or maintaining the door in the closed position if a latch is not fitted.
- Any replacement closer must be at least “class 3”.

The latch

- Check that the latch is in good condition and has not previously been replaced, perhaps leaving an unseen void within the door leaf.
- Any replacement latch must have a lever handle that complies with Approved Document M for its shape and other properties.
- The latch should be "Grade 1", subject to satisfactory assessment of the contribution of the lock or latch to the fire resistance of specified fire/smoke resisting door assemblies.

The sealing system

All fire door assemblies depend on the sealing system for achievement of their performance with respect to fire and smoke. Additionally, the sealing system may be required to deliver a degree of acoustic performance in accordance with Approved Document E and offer minimal resistance to opening and closing, in accordance with Approved Document M.

In all cases, it is imperative that the system is capable of providing its performance attributes over an extended period of time in conditions of frequent everyday service. Approval under relevant independent performance appraisal schedules is therefore highly advisable.

Fire seals

For a large part of their performance, fire door assemblies depend on an intumescent seal around the perimeter. This seal is designed to expand under the action of extreme heat and prevent premature breakdown of the assembly in the most vulnerable area, which is the interface between the door leaf and the frame.

- Check that the seals are in good condition – not damaged and continuous around the perimeter except for interruptions at ironmongery positions.
- The minimum seal width should be 10mm but in recent years it has become more common to use a 15mm width to provide a better factor of safety.
- Some door leaves have the intumescent sealing material embedded under the lipping of the construction. This can be identified by the presence of a two-colour plug with a green centre, inserted in the hinge stile, or, an informative label attached to either the head or the hinge stile. In this case, there is no requirement for any additional, surface mounted fire seal, but it will still be necessary to have a smoke seal present – see below.
- Generally speaking, it is not necessary to have an intumescent seal at the foot of the door leaf but, again, a smoke seal will need to be incorporated – see below.

Smoke seals

In a fire situation, the majority of deaths and serious injuries occur from exposure to smoke, rather than flames. This is because smoke travels faster than the flames and it also travels over greater distances within the confines of a building.

Smoke can occur at any temperature, depending on how far it has travelled from the seat of the fire and exposure to smoke, even at 1% concentration, is life-threatening, regardless of its temperature.

UK building codes only require protection in door assemblies against the transfer of ambient temperature smoke but Lorient sealing systems are designed to provide comprehensive protection across the whole spectrum.

Perimeter seals

- Check that the perimeter seal is in good condition – not damaged; the flexible element intact and fully bridging the gap between the door leaf and the frame at every point.
- The seal must not prevent the door from latching properly and, in order to comply with the requirements of Approved Document M, it must offer minimal resistance to opening and closing in everyday service.

Threshold seals

By definition, smoke at ambient temperature cannot be buoyant and, therefore, the consideration of leakage at the threshold area is vitally important. An unsealed threshold, even with just a 3mm gap, will allow unacceptable quantities of ambient temperature smoke to pass through – sufficient to easily negate the contribution of the entire sealing system on the remainder of the perimeter.

- The door leaf should be fitted with a threshold seal and the seal must make contact with the floor covering when the door is closed.
- The seal must not prevent the door from latching properly.
- In order to comply with the requirements of Approved Document M, the threshold seal must offer minimal resistance to opening and closing in everyday service. If a threshold plate is fitted, it must not impede wheelchair traffic and must not represent a trip hazard.
- Automatic threshold seals are strongly recommended in order to achieve the above requirements and may be face-fixed or concealed within the bottom rail of the door leaf.

Acoustic seals

Many fire door assemblies, because of their location, are also required to have a minimum acoustic rating of 29 dB Rw. This rating is easily achieved with a conventional fire door assembly but particular attention to the sealing system is required. For further information, please refer to the Lorient Acoustic Sealing Systems for Door Assemblies brochure.

While the typical “brush / pile” smoke seal will make some contribution to reducing the transfer of airborne sound, it is not capable of meeting the performance requirement of 29 dB Rw laid down in Approved Document E.

Perimeter seals

- Must be un-interrupted at hinge and other hardware positions to achieve the required level of performance.
- The seal must not prevent the door from latching properly.
- In order to comply with the requirements of Approved Document M, the perimeter seal must offer minimal resistance to opening and closing in everyday service.

Threshold seals

- Threshold seals are essential in order to achieve the 29 dB Rw requirement. Automatic threshold seals are strongly recommended and may be face-fixed or concealed within the bottom rail of the door leaf.
- In order to comply with the requirements of Approved Document M, the threshold seal must offer minimal resistance to opening and closing in everyday service. If a threshold plate is fitted, it must not impede wheelchair traffic and must not represent a trip hazard.

Recommended replacement products

For comprehensive and cost-effective protection against the transfer of flames, hot gases, smoke at all temperatures and airborne sound waves, the recommended sealing system consists of

- Lorient LP1504DS combined acoustic, smoke and fire seal together with IS8005 si automatic threshold seal.

  or

- Lorient LP1504 fire seal combined with IS1212 “Batwing” non-intumescent acoustic and smoke seal together with IS8005 si automatic threshold seal.

Credentials

- Each system tested in accordance with BS 476: Pt. 20/22: 1987 – fire resistance.
- Each system tested in accordance with BS 476 Pt 31.1:1983 – smoke – meets requirements of BS 5588 and Approved Document B.
- Each system carries Certifire approvals CF136, CF330 and CF341.
- Each system carries BBA approvals – 92/2841.
- Each system centres on a unique collection of seals which provide the highest standard of protection against acoustics, smoke at all temperatures and fire; while providing low frictional resistance for ease of operation, to help meet the accessibility requirements of Document M.
- Each system has been tested for durability and successfully achieved over 1-million operational cycles without failure.

Availability

- Available in a range of standard colours and foil finishes.

Glazing

- The leaf should be glazed unless the door forms the entrance to accommodation such as a bedroom.
- In order to comply with Approved Document M, glazing must extend below the waist-line of the leaf, either as a single pane or as two panes.
- Unless the glass is of the safety wired type, there must be some verification, such as an etched marking, that the glass is fire resistant and complies with BS 6206 for impact resistance.
- Glazing should be off-set, away from the position of the hydraulic closer.
- Pilkington Pyroshield™ (GWPP) glass can be incorporated in a typical architectural door leaf, without compromising the acoustic performance. Lorient can provide the complete glazing solution system for 30 minute fire doors, we would advise that this is fitted with the recommended Lorient perimeter/threshold sealing system.

Recommended replacement product

- Lorient System 321.

Credentials

- Successfully tested to both BS 476: Pt. 22 1987 and BS EN 1634-1: 2000.
- Certifire approved – CF325.

Availability

- Available in standard sizes of 500mm x 200mm, 750mm x 200mm and 600mm x 600mm.
- Choice of clear Pilkington Pyrodur™ Plus or wired Pilkington Pyroshield™ fire-resistant glass.
- Available in light and dark hardwood finishes.

Air transfer grilles

The Building Regulations require large buildings to be sub-divided into smaller volumes or areas bounded by building elements which resist the spread of fire and smoke. Building a fire resistant wall or floor is a relatively simple task. However, systems of natural and mechanical ventilation require the movement of air through ducts and grilles formed in fire resistant constructions. Ensuring these airways remain open and yet provide protection against fire, hot smoke and cold smoke is a more complex problem.

Recommended replacement products

- LVN 20 / LVN 20S / LVV 40

Credentials

- Tested in accordance with BS 476: Pt. 20/22: 1987 – fire resistance
- Tested in accordance with BS 476 Pt 31.1:1983 – smoke – meets requirements of BS 5588 and Approved Document B

Availability

- LVN 20/LVN 20S Width 100mm – 600mm (in 50mm increments)
  Height 100mm – 600mm (in 50mm increments)
- LVV 40 Width 100mm – 600mm (in 25mm increments)
  Height 100mm – 600mm (in 25mm increments)
- LVN 20/LVN 20S Materials and finishes: PVC, silver as standard also available in white
- LVV 40 Materials and finishes: PVC, silver as standard

Installation and workmanship

Lorient provides free technical support for the design, specification and installation of its products; and comprehensive fitting instructions are supplied with each product. Careful fitting and attention to detail are essential, given the importance of the protection provided. Periodic inspection/cleaning is recommended for all types of seals – worn or damaged seals should be replaced without delay.

Further references

Approved Document B
The requirements for fire and smoke containment with respect to “means of escape” are contained in Approved Document B to the Building Regulations (England and Wales), section 2 of the Scottish Technical Handbooks and Technical Booklet E to the Building Regulations (Northern Ireland).

BS 5588: Fire precautions in the design and construction of buildings
An Approved Document for compliance with Building Regulations.

Approved Document M
Approved Document M to the Building Regulations (England and Wales), section 4 of the Technical Handbooks, and Technical Booklet R to the Building Regulations (Northern Ireland) relate to accessibility for all persons entering and using buildings. These Documents specify the size and location for glazed panels in doors in various situations, in order to promote safety and accessibility. Visual contrast on the leading edge of doors is also included, as are opening and closing forces for ease of door operation, threshold height and door width requirements.

Approved Document E
Approved Document E to the Building Regulations (England and Wales) now gives specific acoustic performance requirements for door assemblies in a number of situations. Requirement E1 states that, “dwelling-houses, flats and rooms for residential purposes, shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings.” Acoustic Containment is also covered in Section 5 of the Scottish Technical Handbooks and Technical Booklets G and G1 to the Building Regulations (Northern Ireland).