

Loss Prevention Standards

Fire Doors, Fire Shutters and Fire Dampers

Introduction

The following information applies to all fire doors, fire shutters, fire dampers etc., and for the purposes of this document whilst the reference will only say fire door or door, it does in fact relate to all the aforementioned devices. Appropriately installed fire doors are an essential part of the overall fire safety design of a building which together with automatic sprinkler systems, heat and smoke venting systems and fire compartmentation etc., is vital to property protection and life safety.

The primary objective of a fire door is to resist the passage of fire and the products of combustion spreading from one fire compartment to another. Fire doors together with their frames and fittings should be of the correct performance criteria for their application and are installed to protect an opening within a fire compartment wall.

The benefits of fire doors are:

- Reduction in risk to the building occupants by resisting fire, heat and smoke spread.
- Containing the fire size and spread which will assist in fire fighting operations.
- Minimising the damage to the building and its contents, together with the resultant disruption caused to the occupants or business.

Fire door specifications will vary according to the nature of the opening(s) within a fire compartmentation wall that the door is designed to protect, such as:

- Common walls of different adjoining buildings.
- Walls within an individual building divided into separate parts and/or occupancies.
- Construction around places of special hazard or operational areas which are critical to the organisation.

In the UK the Building Regulations detail the legal requirements covering the construction and extension of buildings, although this focuses primarily on life safety and means of escape. This should always be the absolute minimum standard provided although it is not discussed within this document. However, it is important to recognise that this can be inadequate in satisfying the needs of property owners, businesses and insurers in the protection of assets and ensuring business resilience. It is therefore important that additional measures are considered which may include:

- Increasing the fire resistance, integrity and insulation of the door.
- Creation of a clear zone on either side of the door.
- Providing a second door in tandem or a secondary air lock compartment.
- Protecting the door with automatic sprinkler protection.



Fire Resistance

The fire resistance rating of the door and all its components should be at least consistent with the fire resistance rating of the fire compartment wall, e.g.:

- A 2 hour rated fire compartment wall with a 1 hour rated fire door is a 1 hour rated wall.
 - The fire isn't selective about where it will traverse the wall and the under rated door is the weakness.
- A 2 hour door and frame with a 30 minute vision panel is a 30 minute door.
 - Once the vision panel fails the door is compromised.
- If the occupancy is of a sensitive nature or the values/business exposed is large, there are instances when 2 x fire doors in tandem may be required with an intermediary air lock.
 - This helps ensure the arrangement is more reliable, i.e. if one door fails, one can still actuate, and the assets are protected.

Fire resistance is measured in minutes and is the ability of the fire door and assembly, i.e. door frame and requisite hardware, to maintain its integrity in resisting the passage of fire, hot gases and smoke in accordance with specified performance criteria. A door will have a designation in minutes, for example, FD60 is a fire door with 60 minutes fire resistance. Where enhanced smoke leakage resistance is required at ambient temperatures, fire doors with a designation suffix 'S' should be used, for example, FD60S.

Uninsulated fire doors, i.e. doors that only provide integrity and not thermal insulation, can reduce the effectiveness of a fire compartment wall by allowing radiated and conductive heat transfer in the event of fire. A fire on one side of a wall can radiate or conduct heat via the uninsulated door that could ignite combustible materials, linings, surfaces etc. on the other side of the door to the fire. In this instance:

- The separation/clear distance of such materials from the vicinity of the door should be increased.
- The uninsulated door should be replaced with an insulated fire door (or provide doors in tandem).

Types of Fire Doors

There are various types of fire doors and some have more universal applications than others. These include:

- Timber and mineral cored, timber faced doors.
- Hinged steel doors.
- Roller shutter and lateral operating shutters.
- Folding shutter doors.
- Sliding doors.
- Lift landing doors.
- Escalator shutters.
- Conveyor system closures.

The choice of fire door will depend on the location, its application and its purpose, for example, means of escape, personnel access, conveyor opening, vehicle or stock movement, etc.

Fire Door Installation

It is important to ensure that all doors within fire compartment walls are suitable for the stated purpose. This includes existing openings, planned new openings, alterations or changes, etc.

Reference should be made to the Building Regulations and/or fire test reports as appropriate.

As with all fire protection equipment, all products and installers should be approved and certified for their intended use. Refer to [Red Book Live](#) for examples of approved products and installers.

It is also advisable to consult with insurers and other interested parties.

Fire doors should comply with all of the following:

- Fire resistant to the passage of fire, hot gases and smoke to the required fire resistance rating in minutes.
- Smoke resistant, where enhanced protection is required.
- Strong and impact resistant - suitable for the intended traffic use, impact protection from equipment, etc.
- Durable – suitable for ambient conditions of use during anticipated life of the doorset.
- Should not contribute to fire growth – beyond specified test parameters.

The components of the fire door, including the doorset, frame, glazing, beading, sealants, hardware and fittings should be compatible with the door, as specified by the door's manufacturer, and must not compromise the door's protection. The fire door should be installed in accordance with the manufacturer's guidance.

Fire resistance can be significantly compromised by any weaknesses or omissions of the above elements.

Records should be retained for future reference and maintenance purposes. Any subsequent alterations should also be recorded.

Note: If there are liquids in the occupancy that can be released and flow below any closed fire door, then some degree of liquid retention needs to be provided at the plane of the fire compartment wall/fire door closure. This is particularly important for combustible or flammable liquids. This containment should be based on the expected volume of liquid, the expected amount of fire water, liquid/water miscibility, etc.

Fire Door Actuation

If doors are maintained normally open, then in a fire situation these need to close as soon as possible. This should be automatically as a minimum but can have a manual override as a back up.

When selecting the actuation mechanism, many issues need to be considered, including:

- Fire signature expected.
- Automatic fire detection.
- Manual fire alarm device.
- Ceiling/roof height.
- Location of the actuating device, etc.

If a fusible element or frangible/quartzoid bulb actuating device is used then this needs to be located on both sides of the fire compartment wall, at high level close to the roof or ceiling deck. It is not acceptable to have the actuating device near to the top of the door installation, as seen in so many installations.

During a fire heat rises and collects at the roof/ceiling, and actuation elements located at a distance from the roof/ceiling deck will be significantly delayed in their operation, meaning that any fire or smoke could have passed through the opening before the door closes.

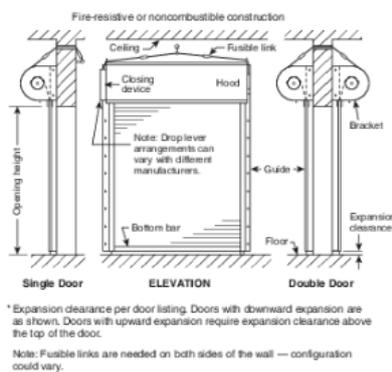


FIGURE A.4.7.4.2(k) Rolling Steel Doors — Surface Mounted.

Source: NFPA 80 – Standard for Fire Doors and other Opening Protectives

Historically, the reliability of automatically actuated roller shutter doors is around 50-70% success. Failures in preventing fire spread include: delay in actuation (e.g. actuating device too low from ceiling); no actuation (e.g. actuation device painted or impaired); shutter door not fully closed (e.g. track pinched, storage or other objects below the shutter); fire spread before door closed (e.g. storage too close on either side of door – fire spread before the door shut); penetrations around door frame, etc.

Inspection, Testing and Maintenance

It is essential to have a documented inspection, testing and maintenance programme for all fire doors, which should be undertaken by competent individuals, i.e. someone who has the required level of knowledge, experience and training to carry out the required duties. Maintenance and servicing should be undertaken by competent, qualified engineers, in accordance with the manufacturer's specifications, and as part of a preventative maintenance programme. Where damage or deterioration has occurred to any fire door, frame, actuation device, etc., it should be remedied as a matter of urgency. This should be considered as a Fire Protection Equipment Impairment.

Attention should be paid to:

- Actuation devices.
- Painted or damaged fusible elements or frangible/quartzoid bulbs.
- Frames and runners being damaged, bent or pinched.
- Painted intumescent or smoke seals on doors or door frames.
- Gaps or penetrations around door frames or runners.
- Cracked or broken glazing in the door.
- Glazing beading or sealant loose, missing or broken.
- Damaged hinges or other door furniture.
- Interlocks and cause & effects not operating as they should, e.g. door not closing upon fire alarm actuation, etc.
- Doors wedged or blocked open.
- Doors will not close when released: grounding out or will not seat correctly in frame.

Summary

Properly installed fire doors consistent with the building's fire compartmentation philosophy will help prevent or minimise any loss due to the effects of fire, heat and smoke spreading. Appropriately installed and maintained fire doors are an essential part of the fire compartment risk management strategy of a building.

Checklist

A generic Fire Doors, Fire Shutters and Fire Dampers Checklist is presented in Appendix 1 which can be tailored to your own organisation.

Additional Information

- [Approved Document B: Fire Safety \(Volume 2 - Buildings other than dwelling houses\) Incorporating Insurer's Requirements for Property Protection](#)
- [FPA Design Guide for the Fire Protection of Buildings – Core Document Compartmentation](#)
- [Details of LPCB approved installers and products](#)
- [Loss Prevention Certification Board LPS 1056 Requirements for the LPCB approval and listing of fire doorsets, lift landing doors and shutters](#)
- [NFPA 80 – Standard for Fire Doors and other Opening Protectives](#)
- Aviva Loss Prevention Standard: Smoke Contamination
- Aviva Loss Prevention Standard: Fire Compartmentation

Further risk management information can be obtained from [Aviva Risk Management Solutions](#)

Please Note

This document contains general information and guidance and is not and should not be relied on as specific advice. The document may not cover every risk, exposure or hazard that may arise and Aviva recommend that you obtain specific advice relevant to the circumstances. AVIVA accepts no responsibility or liability towards any person who may rely upon this document.



Appendix 1 – Fire Doors, Fire Shutters and Fire Dampers Checklist

| | |
|--------------------------------------|--|
| Location | |
| Date | |
| Completed by (name and signature) | |

| | Fire Doors, Fire Shutters and Fire Dampers Checklist | Y/N | Comments |
|----|--|-----|----------|
| 1. | Are there accurate fire compartmentation wall/floor drawings for the site? | | |
| 2. | Is the fire compartmentation and use of fire doors consistent with the needs of the site? <ul style="list-style-type: none"> • Life safety? • Property values? • Business impact/interruption? • Smoke sensitivity? | | |
| 3. | Are all fire doors, shutters, dampers, etc. identified on the fire compartmentation documentation? Including within ventilations systems, ducting systems, etc.? | | |
| 4. | Are only third party accredited/certified: <ul style="list-style-type: none"> • Organisations used for any design/installation/maintenance activities, etc. ? • Manufacturers/products used for all equipment, etc.? | | |
| 5. | Is each fire door, shutter, damper, etc., frame and all fixtures and fittings rated consistently with the fire resistance rating of the fire compartment wall? <ul style="list-style-type: none"> • Integrity? • Insulation? • Including glazed elements? | | |
| 6. | Are all fire doors, shutters, dampers, etc. listed with: <ul style="list-style-type: none"> • Own unique identifier? • Fire resistance rating? • Any smoke protection enhancement? • Method of automatic actuation? | | |
| 7. | For each fire door, shutter or damper, etc. should enhanced smoke leakage resistance be provided? | | |



| | Fire Doors, Fire Shutters and Fire Dampers Checklist Contd. | Y/N | Comments |
|-----|---|-----|----------|
| 8. | Are fire doors, shutters, dampers, etc. included in regular site self-inspections by a competent person, e.g. daily or weekly housekeeping checks? | | |
| 9. | Are more formal and documented fire door inspections completed by a competent person: <ul style="list-style-type: none"> • Monthly? • Quarterly? Does this include closing doors, rolling shutters down, checking door frames, runners, tracks, etc.? | | |
| 10. | Are any doors actuated by fusible element or frangible bulbs? <p>Are the bulbs/fusible elements:</p> <ul style="list-style-type: none"> • Located close to the roof/ceiling deck on both sides of the compartment wall? • Checked for damage, painting, etc.? | | |
| 11. | Can any fusible link or frangible bulb actuation be replaced with faster acting automatic fire detection with devices located on both sides of the fire compartment wall? <p>If the occupancy of the building is sensitive to smoke damage/smoke contamination, then this should be considered a high priority.</p> | | |
| 12. | Are formal fire door, shutter and damper audits and maintenance schedules completed annually? <p>Does this include formal trip test, drop test, actuation with the automatic means?</p> | | |
| 13. | Is the automatic closing operation of fire doors overridden or delayed for evacuation purposes? <p>If 'yes', could alternative routes or additional means of escape doors be fitted and this door closure delay removed?</p> | | |
| 14. | Is there any damage, deterioration, wear and tear or alterations to any of the doors? | | |



| | Fire Doors, Fire Shutters and Fire Dampers Checklist Contd. | Y/N | Comments |
|-----|---|-----|----------|
| 15. | Are intumescent strips or smoke seals in good condition, not painted and not damaged? | | |
| 16. | Can all fire doors and shutters close freely as intended without any obstructions? | | |
| 17. | Are any fire doors propped or wedged open at any time? If 'yes' consider automatic door closures linked to the fire alarm. | | |
| 18. | Are any doors that close automatically upon automatic fire alarm actuation verified during routine fire alarm tests? | | |
| 19. | Are any doors that can be manually released with a push-button verified on a quarterly basis? | | |
| 20. | Are any fire doors prone to damage or wear and tear? If so, are these appropriately protected? | | |
| 21. | Is a clear space/sterile area of at least 2m in all directions maintained on either side of every fire door? <ul style="list-style-type: none"> Kept clear of stock, contents and other combustible materials? | | |
| 22. | Is there the potential for combustible or flammable liquids to be released and pass under a closed fire door? <ul style="list-style-type: none"> Including on the surface of any fire water involved in a fire event? Is this clearly identified in the fire risk assessment? Are liquid retention/flow prevention measures in place at the plane of the fire compartment wall/door enclosure to prevent this from happening? | | |
| 23. | Are conveyors, production lines passing through a fire compartment wall opening interlocked to shut down/clear of materials before the fire door closes? <ul style="list-style-type: none"> So contents on the conveyor do not block fire door operation? Is the conveyor/production line segmented to enable fire door closure? | | |



| | Fire Doors, Fire Shutters and Fire Dampers Checklist Contd. | Y/N | Comments |
|-----|--|-----|----------|
| 24. | Are all normally open fire doors, shutters and dampers closed when the premises are vacated/at the end of the working day? | | |
| 25. | Additional comments: | | |

