

Fire Doorsets

A guide to specifying, installing, maintaining and inspecting fire certified doorsets in residential and commercial buildings

Experience a safer
and more open world





Introduction

Poor specification, installation and maintenance can have devastating consequences in the event of a fire, as the UK witnessed with the Grenfell Tower tragedy in 2017. The ambiguity around responsibility for fire safety led to a catastrophic event, which potentially could have been avoided if the responsibility and repercussions for fire safety were clear and controlled.

Ultimately everyone is responsible for fire safety, from the architect and designers during the initial planning, to the manufacturers and contractors during the build and the landlords and tenants on an ongoing basis. Repercussion can range from unlimited fines to imprisonment, so it is vital that everyone understands their roles and responsibility when it comes to fire safety.

Following months of consultations, Dame Judith Hackitt released her 'Independent Review of Building Regulations and Fire Safety' in 2018. The key message that came from the review was that the failure of the system had allowed a culture of indifference to manifest in the industry.

The report highlighted the ambiguity over where responsibility lies, rising from the level of fragmentation within the industry. Emphasis was put on a dangerous 'race to the bottom' ethos, whereby things are done as quickly and cheaply as possible, rather than the focus being on delivering safe and quality buildings. This has largely risen from the absence of best practice and the lack of regulation, exasperated by ignorance and indifference.

It was this review that led to the publication of the 'Building a Safer Future: An Implementation Plan' from the Ministry of Housing, Communities and Local Government (MHCLG), which sets out how both the government and the industry will achieve the systematic overhaul required to improve building and fire safety.

The plan sets out a statement of intent for construction and manufacturing industries to take a comprehensive approach to fire safety products. Ensuring that, through third-party certification and standards, their safety requirements are integral – not just at the manufacturing stage, but during installation, inspection and through ongoing maintenance.

But whilst the focus has thus far been on building materials used in areas such as cladding for energy conservation or managing risk from power supplies, the role of fire doorsets and their ongoing upkeep – a vital lifeline in the event of a fire – has so far been less discussed.

Now the onus is on us as an industry to come together and ensure that the fire doorsets we specify, manufacture, supply, inspect and maintain are strictly compliant. This message is further reinforced in 'The Construction Playbook', released by the UK government in December 2020.

A result of extensive collaboration from across the public and private sectors, the Construction Playbook brings together expertise and best practices, building on the National Infrastructure Strategy and supporting the government's ambition to transform the UK's infrastructure networks over the next decade and beyond so we can build back better, faster and greener following the COVID-19 pandemic.

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"In my professional opinion, fire doors that do not provide the necessary fire performance do pose a risk to life." Dr Barbara Lane, Grenfell Tower – fire safety investigation¹



The construction sector is key to the UK economy. 

It contributed

£117 billion

to the economy in 2018 and supports over two million jobs.

We will continue to strive for a world class sector [...] This vision will only be achieved by working together and setting out clear requirements to reform the industry.

Alex Chisholm,
The Construction Playbook

PART 2

Fire doors

BS 9999:2017 definition states:

“A fire door or shutter [is] provided for the passage of persons, air or objects which, together with its frame and furniture as installed in a building is intended (when closed) to resist the passage of fire and/or gaseous products of combustion and is capable of meeting specified performance criteria to those ends.”

‘Fire Doorsets’ has been created by ASSA ABLOY Opening Solutions UK & Ireland to help inform all persons responsible for fire safety within both residential and commercial buildings, comprising but not limited to, architects and specifiers, installers, landlords, local authorities, building owners and facilities managers.

The information within this guide is based on the expertise of our FDIS trained fire doorset inspectors, and information obtained from various third-party accreditation bodies and trade associations such as dhf (Door & Hardware Federation), FIA (Fire Industry Association) and SBD (Secured by Design).



Fire doors comprise one of the most fundamental elements of a building’s passive fire protection, acting as the first line of defence in a fire. They provide those vital minutes for occupants to evacuate a building safely and they control the spread of the fire to allow for an easier and safer escape route.

There are many vital components of fire doors that distinguish them from conventional doors, ranging from specialised smoke seals around the frame to fire-resistant glazing. However, if just one of these components is incorrectly specified, or if they fail due to poor maintenance or damage, the performance of the door can be severely reduced.

Whilst the biggest gap in building fire safety is around the ongoing inspection of fire critical elements, another area highlighted in Dame Hackitt’s report was that all products, which are critical to building safety (of HRRBs) should be subject to independent third party certification.

This was designed to ensure the products installed meet the performance requirements set out in the initial specification, but what should also be considered here is how they perform ‘together’. Whilst an individual component may meet testing requirements, it may not act as required when in a building setting or combined with other components. This is why post-installation testing and ongoing maintenance are critical to building safety.

In the UK, current guidance states that public or private shared properties should be compartmentalised, which means spilt into smaller spaces with barriers preventing the spread of fire and smoke. The fire doors used to help create these compartments should be able to halt a fire for at least 30 minutes, with taller or higher occupancy buildings needing doors able to endure for at least 60 minutes.

It is therefore critical that specifying, supplying, installing and maintaining fire doors is handled responsibly by every person involved in each process.

Why doorsets?

A doorset is a whole system, often including but not limited to the door leaf, door frame, intumescents, smoke seals, hinges, hardware, signage, glazing, glazing system, door closer, fanlights and sidelights, jointly designed and tested to perform as one unit by the doorset manufacturer and certified as such.


It is recommended that a fire doorset is factory prepared, which means it is machined for components (tolerances included) prior to arriving on-site, and all components come from one source of supply.

All work is completed under factory production control and ideally audited by a third-party, thereby ensuring the complete specification of the doorset at the point of production. The doorset is manufactured to size (including tailored sizes for existing buildings) and importantly, produced within the test data remit of the manufacturer.

Selecting factory prepared doorsets is vitally important, as a complete doorset provided by the manufacturer is the end product for which the manufacturer is responsible, whereas a door assembly is reliant on components and materials derived from several sources and so the onus is on the person/s sourcing the door assembly to provide the correct end product and the correct evidence of performance.

A door assembly, which is often prepared on-site, comprises a door leaf with compatible items such as frame, hardware, glazing, intumescents and door closers, and is assembled together from several sources of supply. However, a door assembly is not the same as a factory prepared complete doorset. A factory prepared doorset from a single source is constructed to exacting standards and tolerances, which is critical for fire and security performance.

According to the Modern Methods of Construction report from the NHBC Foundation, factory prepared doorsets are one of the main types of off-site manufactured components used by the highest proportion of companies. Modern methods of construction (MMC, or 'smart construction') is a wide term, embracing a range of off-site manufacturing and on-site techniques that provide a way of working more effectively to achieve more without using more.



Fire doors save lives, but only when they are specified, manufactured and installed correctly

Standards and certification

Testing and certifying bodies

Testing and certification of all products that can impact on fire safety should be mandatory and through independent, third party testing, so that the process can be audited and maintained to the highest standards.

To meet the necessary standards, a fire doorset must pass one or a series of standardised tests, as well as be properly certified and rated to withstand fire for a set period of time. This testing should be conducted by an independent testing body, in accordance with the relevant British or European standards.

Many fire doorsets, particularly timber doors, are supplied into the market and supported by Global Assessments. This requires the manufacturers of such products to construct the door in accordance with the instructions provided by the door core supplier, who originally tested the assembly.

In flat entrance doorsets where the glazing is asymmetric, it must be tested from both sides as part of the doorset to demonstrate compliance with Approved Document B, appendix B Fire Doors.

Third party certification by a UKAS accredited certification body is paramount.

Regulatory Reform Order

The Regulatory Reform (Fire Safety) Order 2005 relates to fire safety in non-domestic premises and makes it a legal requirement to ensure that fire and escape doors are correctly installed and maintained so they are always fit for purpose.

It places responsibility for fire safety in buildings to whoever has day-to-day control of the premises, including owners, facilities managers and site managers. It also states that risk assessments should be undertaken to identify the general fire precautions needed to safeguard the safety of occupants in case of fire, including their safe means of escape.

These include ensuring procedures are in place to reduce the likelihood of fire, maintaining fire detection and alarm systems, and familiarising building occupants with emergency evacuation procedures.

The Fire Door Inspection Scheme (FDIS) discovered that more than

76%

of fire doorsets inspected in 2019 were condemned as not fit for purpose.



Compliance

FAILURE TO FULFIL FIRE SAFETY RESPONSIBILITIES IS A SERIOUS OFFENCE.

There are 20,000 commercial fires in the UK every year, resulting in 17 fatalities in 2019/20



and research suggests that the economy has lost

£1 billion

IN GDP AND 5,000 JOBS FROM PREVENTABLE FIRES IN COMMERCIAL PROPERTIES.

A study from Zurich Municipal, a leading insurer of schools in the UK, revealed that 480 primary and secondary schools endured fires in 2019, which equates to a staggering 40 incidents every month. Larger fires in schools cost on average £2.8 million to repair and in some cases over £20 million.

Of more than 1,000 school inspections carried out by Zurich, two thirds (66%) were rated as having 'poor' fixed fire protection systems, which are proven to significantly reduce the damage caused by fire.

The serious risks associated with non-compliance cannot be underestimated. Many of the fire safety products used in Grenfell Tower were found to have not performed as they should, with the fire safety investigation noting that:

"Fire doors containing multiple additional fixtures and fittings, unless expressly constructed and fire tested to prove its viability, [...] pose a serious risk of failure."

In fact, a BRE Global draft report shows that only 17% of the door closers installed at Grenfell were present and working, and nearly 50% were not working, demonstrating the importance of fire safety products performing as required.

It is therefore essential that a thorough study is completed to compare the expectations of each fire doorset – including all hardware – to ensure they are accurately covered through certification issued by a third-party accredited body. Validation should not be based on self-certification or claimed compliance.

The testing of complete doorsets or doorset components is mandatory, but fire doors are often installed on projects near to completion and it is often only in the closing stages of the project, immediately prior to handover, that product conformity information is requested and submitted.

By this time it is often too late to address any concerns with non-conformities or ambiguities, leading people to compromise or believe that liability lies elsewhere in the supply chain, rather than condemning and replacing the products. Fines for late building completion may result in this stage being overlooked or rushed through, ultimately putting occupants at risk.

Fire doorsets and escape exits save lives, and though compliance can be a minefield, it should be the top priority for every person in the supply chain. It is recommended to source certified doorsets as complete systems. However, should the door and door components come from separate suppliers, then there should be an audit trail to prove compliance and track performance at every stage.

In support of a more regulated process, some fire doorset manufacturers have adopted more stringent controls through auditable third-party accreditation schemes.

Security

The police initiative, Secured by Design (SBD), adopts principles to reduce crime and the fear of crime. To acquire SBD approval, a doorset must carry third-party certification for security and where the doorset also requires fire resistance, SBD has campaigned for dual certification. This applies for both existing residential buildings as well as for new buildings under Approved Document Q (ADQ) for Security in Dwellings.

In all instances, the design specification of the doorset that is fire tested must be identical to that of the samples which were subject to the security performance testing and throughout manufacture. This is because sometimes security features added to the door can compromise its fire resistance.

There are also requirements for doorsets in other relevant Building Regulations guidance included in other Approved Documents including part E, L and M. Therefore, it is imperative that doorsets are designed to meet all of the relevant requirements in one package i.e. the same specification.

Government Advice Note 16, point 5 states:

“This Advice Note primarily concentrates on fire safety; however, front doors should also meet security requirements set out in Approved Document Q”



Design and specification

If a fire doorset is not specified correctly or if the specification is broken then fire safety is compromised from the outset. As a baseline for all fire safe doors, a third party approval should apply to all doors, frames, and other components, as well as associated ironmongery where possible.

In addition, incorrect specification throughout the construction phase, driven by budget reduction needs or to take competitive advantage often carries risk of non-compliance or potential for future failure post-handover.

Next we need to consider the integrity of the doorset as a whole. Specifying a high-quality fire rated door but then breaking specification to save money on substandard quality hinges, door closers or other hardware undermines the performance of the door in the event of a fire or emergency.

For example, if the installed hinges do not perform as intended within the specification the door could drop, which may result in the locks being incorrectly aligned and consequently egress being compromised. Similarly, failing hinges can place additional stress on door closers – and if a door closer fails this could put people at risk in a fire or emergency situation.

Delivering a correct specification is only part of the solution. There has been a significant shift in recent years, made more urgent by tragic events, to prove compliance. Although some organisations may claim their doors, frames and ironmongery are certified for use as fire protection products, this is not always the case – either in isolation or when combined as a doorset.

The method of certification should be verified during the initial specification and ideally any fire protection solutions should be accredited by an independent third party. Particular care should be taken to make sure certification of all the constituent parts of a doorset do not contain any hidden caveats that are triggered by other parts of the specification or the environment in which the doorset is to be applied.

Inclusive design

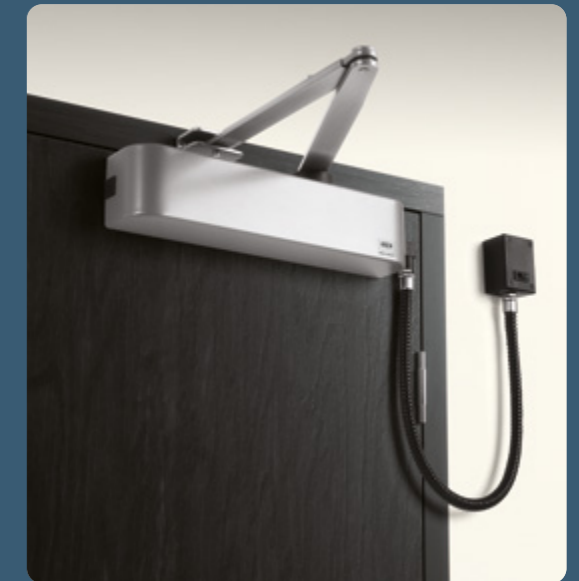
The guidelines governing inclusive design state that buildings must not only avoid creating access and usage issues, but also ensure all people are able to escape in the event of a fire or other emergency.

Guidelines make clear that fire doorsets for corridors in particular should be held open with an electro-magnetic device, but self-close when activated by smoke detectors or a main fire alarm system. They should also close should power supply fail, or when activated by a hand-operated switch. Meanwhile, fire doorsets for individual rooms should be fitted with swing-free devices that close when, again, activated by smoke detectors, a fire alarm system, or when power supply fails.

BS EN 1154:1997 is a British and European Standard that covers the specific requirements for controlled closing devices for swing doors. The standard classifies door closers using a six-digit system.

BS EN 1154:1997 Six-digit door closer classification system

- 1 Category of use
- 2 Number of test cycles
- 3 Test door mass/size
- 4 Fire behaviour
- 5 Safety
- 6 Corrosive resistance



The third digit is an important one. Depending on the width of the door, the maximum mass is offered, and the related door closer power size identified. So, for a door width of 950mm, the maximum mass should be 60kg, and the door closer power size is EN 3.

However, for any fire doorset fitted with a door closer, EN 3 is the minimum door closer power size allowed, regardless of what the door width is. Therefore, to comply with the guidelines governing inclusive design, decision makers must opt for a door closer that offers a power setting of EN 3.

Some suppliers will try to overcome the challenges surrounding opening and closing forces by winding down the door closer and its spring to the power setting of EN 1. For fire doorsets in particular, this is a dangerous tactic that does not comply with the guidelines governing inclusive design.

There are, however, door closers available in the marketplace that are able to balance both opening and closing forces for fire doorsets, ensuring buildings are easily accessible while delivering vital protection against fire and smoke.

Installation

All fire doorsets must be installed in line with the specific manufacturers' installation instructions and tested requirements. If they are not installed correctly, this can significantly impact the effectiveness of the performance. Worse, the required level of safety and protection will not be provided to the building's occupants.

Currently, there is no regulation governing the installation of the compliant product; but as with the production of fire doorsets, some installers, or manufacturing installers, have adopted auditable third-party accreditation by a UKAS accredited certification body such as FIRAS to cover the installation process, thereby demonstrating competency in this field.

Under the Fire Safety Order (FSO) 2005, there is a duty to maintain fire doorsets in sections 17.110 & 38.1. A regular maintenance routine should be carried out by third party certified maintainers referencing manufacturers' instructions or by the manufacturer. Any repairs should be recorded and carried out in line with the manufacturer's instructions.

The FSO goes on to define the 'Responsible Person' as the following: "(a) in relation to a workplace, the employer, if the workplace is to any extent under his control; (b) in relation to any premises not falling within paragraph (a) — (i) the person who has control of the premises (as occupier or otherwise) in connection with the carrying on by him of a trade, business or other undertaking (for profit or not); or (ii) the owner, where the person in control of the premises does not have control in connection with the carrying on by that person of a trade, business or other undertaking."

Therefore, building owners and landlords, and the contractor (or the employee delivering the task) are responsible for ensuring that these requirements have been met. Forfeiting these responsibilities at worst can lead to loss of life but also unlimited fines and imprisonment.



Usage, maintenance and inspection

One of the failings of the current fire safety culture is that the responsibility of ensuring that regulations are being correctly followed is spread over several groups and individuals.

In order to avoid this, the independent review has recommended that this overlap of regulations and responsibilities be replaced by a requirement for a building's owner or superior landlord to be appointed as the duty holder. This would place them in overall responsibility for all parts of a HRRB and require them to inform residents about the fire strategy.

This JCA would then be empowered to inspect the entire building and take action as required, with the duty holder acting as a single point of contact.

As well as ensuring that equipment is working as intended, the duty holder would also provide residents with a route for raising concerns and help to encourage them to work together to make their shared building a safe place to live.

ASSA ABLOY UK believes that the appointment of a Building Safety Manager, combined with open dialogue with residents, will ensure that fire safety is an ongoing commitment and the responsibility of all building users.

We also recommend that the importance of fire doors, and of their correct use, is made a priority when sharing information with residents. In particular, residents should be made aware of the importance of working self-closers on all fire doors.

When installed, a fire doorset is subject to varying demands and pressures according to the building use and type. Its performance as a fire doorset should always be assessed with these in mind. If neglected, these issues may cause fire control systems to fail, increasing the risk to both property and lives.

It is also not uncommon for unauthorised or uncontrolled modifications to be made, or accidental or malicious damage to be sustained by a fire doorset, all of which can have a significant impact on its performance. In post Grenfell reports it was noted that in some properties large numbers of fire doorsets had even been removed, clearly resulting in no fire compartmentation as design intended.

In the UK, current regulations require commercial and social housing developments to be fitted with fire doorsets, however, nationally there are no laws for the mandatory safety maintenance specifically of these doors. This can create issues for facilities managers, as fire doorsets can become unfit for purpose if mistreated or poorly maintained.

High use, lack of user care, insufficient or no maintenance and even the natural shifting and settling of a building over time can result in fire safety products becoming ineffective – from excessive gaps around door leaves to damaged or missing seals.

In fact, one of the most common issues resulting in significant damage to doors, frames and hardware is simply down to general wear and tear, use or abuse. Although this cannot be prevented, actions of facilities managers can have a controlled effect on products when they are inspected and maintained regularly.

Poorly maintained hardware components, such as door closers, can also prevent fire doorsets from shutting properly; thereby reducing the doorsets' effectiveness.



Accountable Person

Following on from the recommendations of Dame Judith Hackitt in her 2018 Independent Review of Building Regulations & Fire Safety, the Building Safety Bill has now been published.

The new Bill introduces the concept of an 'Accountable Person; and a Building Safety Manager (BSM) for each residential building, with the intention of eradicating any confusion when it comes to responsibility, and ensuring direct liability for a building and its assets.

One of the largest roles of the BSM and 'Accountable Person' will be to ensure maintenance and repairs are always up to date and up to standard.

Maintenance programme

Even if a fire doorset is correctly specified and certified, it will only continue to perform as intended if it is both properly maintained and regularly inspected. Most specifications make a consideration of the ongoing cost and management of an asset, and fire doorsets should be viewed as a continuous investment into fire safety. They therefore require their own, tailored maintenance programme in order to continue to add value, provide a demonstrable service in the event of an emergency and service a building's ongoing needs.

When specifying a fire doorset, it is important to consider how and where within the building this will be used and therefore the potential implications this may have on its lifecycle and need for renewal and refurbishment. For example, a fire doorset may be placed in a high traffic route or subjected to hard use or occasional abuse, meaning the service life of the door and hardware must be predicated and reviewed.

A regular maintenance programme will help identify potential issues before they become so serious as to compromise safety.

The lack of a mandatory fire doorset inspection and maintenance scheme also contrasts sharply with the standardised procedures in place for many of the other fire safety systems found in shared properties, including residential.

We at ASSA ABLOY Opening Solutions UK & Ireland believe that to ensure a fire doorset is performing as it should be, biannual inspections (as a minimum) by third party certified parties (i.e. BRE or FDIS) ought to be mandatory. In addition, an inspector should provide a detailed FIRA report so that subsequent repairs and maintenance are undertaken, which should also be mandatory and regulated.

Common fire doorset maintenance issues

1

Damaged door closer

Damaged door closers prevent fire doorsets from shutting properly, meaning it cannot adequately perform its role.

2

Wear and tear

Building movement and wear and tear often means a change in the position of doors, leading to open gaps, holes, warping and cracked glazing.

3

Obstructed doors

To perform effectively, fire doorsets must be able to shut firmly so regularly check they aren't wedged or propped open. Likewise, they should not be blocked with furniture or other barriers.

4

Gaps

Incorrect ironmongery may result in a sizeable gap underneath or around the fire doorset. If this is the case, it may not be able to prevent fire or smoke spreading.

7

Damaged seals

If the seal around the door is no longer intact, the door may not be able to contain smoke or fire to the appropriate standard.

6

Hinges and latches

Hinges are vital to a fire doorset's integrity. There must be a minimum of three hinges that are of the correct specification and with the correct intumescent protection for the door type.

5

Damage or splits

Any damage sustained by the door could affect its performance. This can be caused by later work, as well as vandalism. For instance, fire doorsets often fail because a lock has been fitted incorrectly or has been put in the wrong lock case.

All of the above issues can be easily spotted by a qualified inspector, and then quickly corrected by qualified tradespeople. If neglected, these issues may cause fire control systems to fail, increasing the risk to both property and lives. Similarly, if mandatory inspections come into force, they can help facilities managers remind building occupants of the importance of keeping fire doorsets closed at all times.

Conclusion

Here at ASSA ABLOY Opening Solutions UK & Ireland, we believe it is abundantly clear that changes need to be made beyond those enforced by legislation and that a cultural shift is needed in the way we approach fire safety and the importance in which it is held. The best way to achieve this is:

- 1 Do not approach fire safety at a product level – all building materials must work and be tested together
- 2 Correct specification will fail if installation is not carried out by professionals and monitored
- 3 Fire door testing should be mandatory, ongoing and monitored
- 4 Certified doorsets should be sold as complete systems, or that where the door and door components are from separate suppliers, then there should be an audit trail to prove compliance and performance at every stage.
- 5 Responsibility and accountability should be clear at every stage of the build process

“While there are many competent people working within the system, the lack of a coherent and comprehensive approach to competence can seriously compromise the fire safety of HRRBs.”

Judith Hackitt, Independent Review of Building Regulations and Fire Safety



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³ A Guide for Selecting Flat Entrance Doorsets: <https://www.fia.uk.com/static/uploaded/5d5ea2ab-e671-42e3-8b0ed41b25f02a35.pdf>

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⁷ The Regulatory Reform (Fire Safety) Order 2005: <https://www.legislation.gov.uk/uksi/2005/1541/contents/made>

Our experienced and knowledgeable teams here at ASSA ABLOY Opening Solutions UK & Ireland are here to help advise on compliance in order to keep people's safety paramount. If you'd like to learn more, please get in touch by calling 0845 223 2124, emailing AASS-Forum@assaabloy.com or visiting assaabloyopeningsolutions.co.uk.

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