BS 8214:2026

BSI Standards Publication

Fire-resisting and smoke control doors – Practical considerations concerning specification, design and performance in use – Code of practice

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Published by BSI Standards Limited 2026

ISBN 978 0 539 26998 7

ICS 13.220.20; 91.060.50

The following BSI references relate to the work on this document:
Committee reference B/538/1
Draft for comment 24/30473815 DC

Amendments/corrigenda issued since publication

Date	Text affected

Contents

Summary of pages
This document comprises a front cover, an inside front cover, pages I to VI, pages 1 to 54, and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 March 2026. It was prepared by Subcommittee B/538/1, *Windows and doors*, under the authority of Technical Committee B/538, *Doors, windows, shutters, hardware and curtain walling.* A list of organizations represented on these committees can be obtained on request to the committee manager.

Supersession

This British Standard supersedes BS 8214:2016, which is withdrawn.

Relationship with other publications

The guidance in this standard is intended to complement the guidance given in BS 9999 and BS 9991.

Fire doors form part of the passive fire protection of a building.

BS 9999, BS 9991 and other documents, such as those providing building regulation guidance, recommend both the performance rating of fire doors and the location of fire doors within a building that are necessary to protect escape routes and to control the internal spread of fire and smoke through measures such as compartmentation. The rating of fire doors is specified by the building designer, possibly in conjunction with fire safety professionals, using these recommendations or the fire strategy developed to meet the functional objectives of the building regulations and to control the hazard from fire and smoke to acceptable levels of risk.

Information about this document

This is a full revision of the document, and introduces the following principal changes.

- The standard is not limited to fire door assemblies but covers fire doors as a coordinated complete system however they are supplied to site, whether this is as door assemblies, doorsets or door kits.
- The standard is not limited to timber fire doors but covers fire doors of many materials, including timber, steel, glazed metal and composite designs.
- The standard has been revised to be less prescriptive in relation to certain performance characteristics and on-site operations and instead now focuses on informing the user as to what supporting evidence (see **B.3**) is needed for any fire door construction within scope.
- The standard includes guidance on both national and European classifications for fire doors.
- The order of the clauses has been changed to reflect the construction process, with recommendations concerning roles and responsibilities preceding specification and supporting evidence followed by guidance on design, installation, handover and maintenance.
- The clauses concerning smoke control provide more information on the use of seals, while the reliance on prescriptive construction recommendations that were difficult to achieve has been removed.
- The guidance on sealing the interface between frames and the surrounding structure has been clarified in respect of the recommended evidence supporting the use of materials, including stone wool, mastic and foam sealants.

This British Standard identifies the important parameters in the specification, installation and maintenance of fire doors that contribute to the successful attainment and retention of the levels of performance deemed appropriate.

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

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

Use of this document

As a code of practice, this British Standard takes the form of recommendations and guidance. It is not to be quoted as if it were a specification. Users are expected to ensure that claims of compliance are not misleading.

Users may substitute any of the recommendations in this British Standard with practices of equivalent or better outcome. Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

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

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

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

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

Where words have alternative spellings, the preferred spelling of the *Shorter Oxford English Dictionary* is used (e.g. “organization” rather than “organisation”).

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This publication is not intended to constitute a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

In particular, attention is drawn to the following specific Acts and regulations:

- Regulation 7 of the Building Regulations 2010 [1];
- Regulation 8 of the Building (Scotland) Regulations 2004 [2];
- Regulations 23 and 24(2) of the Building Regulations (Northern Ireland) 2012 [3];
- Building (Amendment) (Wales) Regulations 2014 [4];
- Building Safety Act 2022 [5];
- Fire Safety Act 2021 [6];
- Regulatory Reform (Fire Safety) Order 2005 [7];
- Fire (Scotland) Act 2005 [8];
- Fire Safety Regulations (Northern Ireland) 2010 [9]; and
- Building (Higher-Risk Buildings Procedures) (England) Regulations 2023 [10].

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Introduction

All fire doors as installed for use have to be specified, evaluated and fitted, with supporting evidence.

Fire doors are required to:

a) maintain any compartmentation of buildings that has been introduced to limit the size and spread of fire in order to control the perceived risk;

b) provide protection for persons escaping from a fire;

c) allow access to protected escape routes, both vertically and horizontally, without any loss of fire resistance; and

d) limit smoke movement in the structure forming these routes, e.g. protected corridors, lobbies, stairways and shafts.

In addition to a) to d), fire doors can have several other properties and functions to fulfil, as for any other door providing access into and around buildings, in a variety of external and internal situations. However, it is important that those characteristics do not compromise the achievement of the primary safety properties of fire doors in use, as installed. Important requirements are for the fire door to operate easily, without hindrance or obstruction, and be safe for all likely users in opening and closing, especially to close fully and effectively without excessive force. Safety, for example, also includes protection against impact injuries and accidental trapping risks.

Other functions vary depending on the situation in which the door is to be used. The range of required and desired functions can be challenging, including, for example, security and controlled access with visibility and building separation, sound insulation (acoustic sound control), and inclusive design, in accordance with the purpose of the building and its occupancy characteristics. Wider attention on security/safety aspects can also include some special protection and shielding properties for fire doors in some locations (e.g. hospital treatment areas or where protection against arson might apply). Basic properties such as energy efficiency, weathering protection and durability in repeated use all apply throughout what can be an extended working life for a fire door.

NOTE Guidance on inclusive design is given in BS 8300-2 and BS 9266; for example, the operational door opening and closing forces.

Those various combinations, to achieve optimum performance, require detailed attention on the specification, design and installation. The locations and ratings for fire doors for means of escape are given in relevant guidance under building regulations in the UK and applicable design standards such as BS 9991 and BS 9999, founded on risk-based design considerations. In more complex buildings, designs might be based on fire safety engineering approaches governed by procedures defined in BS 7974.

Fire doors are key elements in the overall design and fire safety strategy of a building, and they need to function together in combination with other parts of the construction, and other systems, especially walls, partitions, ceilings, floors and smoke evacuation. It is important at the outset, when the required specification is defined, that any conditions that apply which could affect the performance of the door in use are fully provided and explained for the door manufacturer, so that there are no issues to resolve after the door has been manufactured and supplied to site.

Fire door sound insulation guidance can be found, for example, in BS EN ISO 10140-2 and BS EN ISO 717-1.

Weather performance guidance for doors can be found, for example, in BS 6375-1.

Durability performance guidance for doors can be found, for example, in the BS 6375 series.

Security performance guidance for doors can be found in, for example, PAS 24 and similar standards listed in Approved Document Q [11]. Further guidance on security performance is given in Annex A.

Annex B contains guidance regarding fire door ratings and classifications.

Annex C summarizes the information to be obtained from manufacturers.

Annex D provides guidance on essential and non-essential door hardware.

1 Scope

This British Standard gives recommendations and governing principles for the design, specification, installation and performance of pedestrian fire resisting and smoke control doors of all types and materials (e.g. timber, metal and composite doors) installed in the vertical plane. The recommendations within this British Standard are applicable to the performance of fire doors when installed with reference to supporting evidence.

This British Standard is applicable only to doors that are designed to provide fire resistance and/or smoke control when tested for fire resistance in accordance with BS 476-22 and/or BS EN 1634-1 and for smoke control in accordance with BS 476-31.1 and/or BS EN 1634-3. This British Standard is applicable to new builds and repair, maintenance, improvements (RMI) and modifications.

The intended users of this British Standard are all those who are involved in providing fire doors for buildings, and those involved in maintaining performance in use, for example:

a) building designers and specifiers (e.g. architects, architectural technicians, consultants, engineers, contractors and buyers who effectively take on specifier roles);

b) product manufacturers and supply chain providers, including building contractors, installers, principal contractors, specialist penetration seal contractors, mechanical and electrical (M&E) contractors and those who carry out maintenance and repair work on fire doors;

c) inspectors (e.g. fire risk assessors and door inspectors, building control bodies, clerks of works, site managers, supervisors and competent persons);

d) fire and rescue authorities;

e) clients (owner occupiers, building owners and residents);

f) insurers; and

g) regulators.

NOTE 1 For example, Building Control, the Building Safety Regulator, the Office for Product Safety and Standards (OPSS) and the Home Office.

This British Standard is not specifically intended for use with bi-fold doors, sliding doors or operable fabric curtains; however, the principles of this British Standard still apply.

NOTE 2 The BS 8524 series provides guidance on operable fabric curtains.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions, or limits the application, of this document[1)]. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 476-20, *Fire tests on building materials and structures – Part 20: Method for determination of the fire resistance of elements of construction (general principles)*

BS 476-22, *Fire tests on building materials and structures – Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction*

BS 476-31.1, *Fire tests on building materials and structures – Part 31: Methods for measuring smoke penetration through doorsets and shutter assemblies – Section 31.1: Method of measurement under ambient temperature conditions*

1) Documents that are referred to solely in an informative manner are listed in the Bibliography.

BS 4787-1:1980, *Internal and external wood doorsets, door leaves and frames – Part 1: Specification for dimensional requirements*

BS EN 179, *Building hardware – Emergency exit devices operated by a lever handle or push pad, for use on escape routes – Requirements and test methods*

BS EN 1125, *Building hardware – Panic exit devices operated by a horizontal bar, for use on escape routes – Requirements and test methods*

BS EN 1154, *Building hardware – Controlled door closing devices – Requirements and test methods*

BS EN 1158, *Building hardware – Door coordinator devices – Requirements and test methods*

BS EN 1279-5, *Glass in building – Insulating glass units – Part 5: Product standard*

BS EN 1366-4, *Fire resistance tests for service installations – Part 4: Linear joint seals*

BS EN 1529, *Door leaves – Height, width, thickness and squareness – Tolerance classes*

BS EN 1634-1, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 1: Fire resistance test for door and shutter assemblies and openable windows*

BS EN 1634-3, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 3: Smoke control test for door and shutter assemblies*

BS EN 1935, *Building hardware – Single-axis hinges – Requirements and test methods*

BS EN 12209, *Building hardware – Mechanically operated locks and locking plates – Characteristics and test methods*[2)]

BS EN 13501-2, *Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance and/or smoke control tests, excluding ventilation services*[3)]

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

BS EN 14846, *Building hardware – Locks and latches – Electromechanically operated locks and striking plates – Requirements and test methods*

BS EN 15685, *Building hardware – Requirements and test methods – Multipoint locks, latches and locking plates – Characteristics and test methods*

BS EN 17372, *Power operated pedestrian swing door drives with self closing function – Requirements and test methods*

Other publications

[N1] FIRE PROTECTION ASSOCIATION (FPA). *Guide to undertaking technical assessments of fire performance of construction products based on fire test evidence*. The Passive Fire Protection Forum (PFPF) Guide. Gloucestershire: FPA, 2021.[4)]

2) This British Standard also gives an informative reference to BS EN 12209:2024.
3) This British Standard also gives an informative reference to BS EN 13501-2:2023.
4) Available at https://www.firesectorfederation.co.uk/wp-content/uploads/2021/02/Guide-to-Undertaking-Technical-Assessments-of-the-Fire-Performance-of-Construction-Products-Based-on-Fire-Test-Evidence-2021-1-2.pdf.

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 architrave

trim that serves to mask the joint between a door frame and the surrounding structure, which can be integral with the frame or a separate element

3.2 assessment (process)

technical evaluation of the likely performance of a component or element of structure if it were to be subjected to a relevant standard fire test

NOTE Assessments are based on sufficient relevant test evidence and provide a defined scope of approval for a particular design or range of designs and is an opinion of the likely performance of a component or element of structure if it were to be subjected to a standard fire test.

3.3 bottom of door sealing system

any flexible element, generally combined with a rigid support, intended to act as a barrier to draughts, smoke or sound waves, and bridging the gap between the bottom of the door and the threshold or finished floor level

NOTE The seal at the bottom edge of the door leaf can be of different types, for example, a drop seal or a fixed seal.

3.4 competent person

individual, suitably trained and qualified by appropriate skills, knowledge and practical experience, and provided with the necessary instructions, to enable the required task(s) to be performed correctly with regard to the appropriate behaviours for the carrying out of those tasks

3.5 competency

having and being able to demonstrate the appropriate core skills, knowledge, experience and behaviour for the application, relevant to the required design and performance requirements

3.6 composite fire door

fire door, with a leaf or leaves comprising mainly mineral or polymeric-based material, with or without glazing

NOTE 1 A timber/cellulosic-based door leaf hung within a non-cellulosic polymeric door frame is also considered a composite door.

NOTE 2 Doors with a non-cellulosic leaf and timber or metal frame are also considered to be composite.

3.7 designer

any individual, partnership or organization who in the course of their work prepares, modifies or changes a building or product design, or arranges for, or instructs, any person under their control to do so

3.8 door assembly

product constructed by bringing together components from multiple manufacturers/suppliers (e.g. door leaf, door frame, hardware, intumescent seals) that requires additional processing and assembling to be incorporated in the building

NOTE 1 A door assembly includes prepared door leaves (which can be of a specialized proprietary construction) and a door frame, together with hardware items, fire-resistant glazing, various seals and other necessary components, as defined and specified for the application. A door assembly can also include associated over panels and side panels (which can include fire-resistant glazing).

NOTE 2 An uncoordinated assembly, produced by bringing together parts and components without following a specification based on supporting evidence for the whole assembly, might mean that the required performance criteria are not met.

3.9 door frame

fixed surround into which are fitted one or more door leaves

NOTE A door frame can also be designed to surround other panels, and can include sill, threshold, architraves or other cover moulds. A door frame can be a separate item to be fixed to the adjacent structure, or it can be an integral part of a wall or partition.

3.10 Door hardware

3.10.1 door hardware

components, usually metal, used mainly for the operation or support of doors

NOTE Door hardware is also known as architectural ironmongery or building hardware.

3.10.2 essential door hardware

items that are necessary to achieve the fire-resisting performance of a fire door when incorporated into a building

NOTE 1 Guidance on essential door hardware is given in Annex D.

NOTE 2 Fire doors also have other performance characteristics, such as means of escape, enhanced security in dwellings, conservation of fuel and power, access to buildings, resistance to sound and smoke control.

3.10.3 non-essential door hardware

items that are not necessary to achieve the fire-resisting performance of a fire door, but which if fitted might affect that performance

NOTE 1 Performance of fire resistance is evaluated by test of the whole assembly as a single entity.

NOTE 2 Guidance on non-essential door hardware is given in Annex D.

3.11 door kit

doorset which is supplied by a single manufacturer as a coordinated and controlled set of at least two separate components that need to be put together to be incorporated in the building

3.12 door leaf

hinged, pivoted or sliding part within a door frame

3.13 doorset

complete product which is supplied by a single manufacturer/supplier as a coordinated and controlled single entity to be incorporated in the building

NOTE A doorset includes prepared door leaves (which can be of a specialized proprietary construction) and a door frame, together with hardware items, fire-resistant glazing where required, various seals and other necessary components, as defined and specified for the application. A doorset can also include associated over panels and side panels (which can include fire-resistant glazing).

3.14 drop seal

flexible seal bridging the gap between the bottom of the door and the threshold or finished floor level and intended to act as a barrier to draughts, smoke or sound waves, but combined with a mechanism such that the seal is automatically forced downwards by spring pressure when the leaf is in the closed position

3.15 field of application (FoA) report

assessment of a particular product or fire door design, provided in one document with a summary of the relevant and applicable test evidence, with definitions of key parameters such as leaf sizes, essential parts and components as a compatible matched set, and guidance as appropriate on handling, assembly and installation

NOTE 1 An FoA report, in particular, provides clarity of product definition and can help with traceability under third-party certification.

NOTE 2 FoA reports are independently prepared documents, normally checked by appropriately competent product assessors, prepared in accordance with the principles of BS EN 15725 and also the agreed criteria provided by the Passive Fire Protection Forum (PFPF) Guide [N1].

3.16 fire door

door installed within the building that is able to resist the passage of fire and/or smoke when the door leaf (or leaves) is (are) closed, in accordance with the standard performance criteria for fire resistance and smoke leakage at ambient conditions, as required for the intended application

*NOTE 1 All fire doors as installed for use have to be specified, evaluated and fitted with supporting evidence. The specification, the supporting evidence and supply need to be clearly identified in the supporting documentation, for validation and traceability reasons (see Clause **4**). Drawings and images can help to relay this information.*

NOTE 2 The term fire door has been used throughout this British Standard and the guidance is applicable where the fire door has been supplied for installation in the building as a doorset, door kit or door assembly.

NOTE 3 A fire door is not to be confused with a door specifically identified as a fire exit intended for egress in the event of fire (to a place of safety, ultimately outside the building, e.g. with a panic or opening push bar, signifying signage and perhaps emergency lighting). Exit doors are not usually fire doors, except in some situations, where recommended by design guidance.

3.17 fire resistance

ability of a component or construction of a building to meet for a stated period of time some or all of the appropriate criteria specified in the relevant test standards

NOTE Relevant test standards might include BS 476-22 or BS EN 1634-1.

3.18 intumescent fire seal

seal used to impede the flow of heat, flame or gases, which only becomes active and expands when subjected to elevated temperatures

3.19 latch

self-engaging fastener which keeps the door lead in a closed position and which can be released

[SOURCE: BS EN 12209:2024 ©, **3.1.14**]

3.20 lock

fastener which secures a door leaf in its closed position, and which is operated by a key or other device

[SOURCE: BS EN 12209:2024 ©, **3.1.18**]

3.21 seal

fitting provided to close a gap for the purpose of controlling the passage of air, smoke, water, fire, sound, etc.

3.22 smoke seal

seal fitted for the purpose of restricting the flow of smoke

3.23 specification

description of the fire door performance requirements, dimensions, construction, workmanship, materials and components

3.24 supporting evidence

documentary evidence testifying to the fire resistance and/or smoke control of the fire door

*NOTE Supporting evidence includes test reports, technical assessment reports and relevant third-party product certification documents. Further guidance is given in **B.3**.*

3.25 technical assessment (document)

document that extends the scope of design/application or system offered to the market, based on sufficient and directly applicable test evidence by technical evaluation of the product or system, either following a rules-based system or expert judgement

NOTE 1 Technical assessment reports can be described by many terms, for example, an FOA report, a global assessment, a report on a specific individual change, a field of direct application report.

NOTE 2 Technical assessments are important when providing bespoke designs, including multifunctional capabilities, for the specifier-led project market where the limited prescriptive rules of the extended application standards might not provide the scope of design required by architectural specifiers and building owners.

3.26 third-party certification scheme

certification system undertaken by an independent third-party certification body that certifies conformity to the provisions of a recognized document which is appropriate to the purpose for which a product, material or process is to be used

NOTE 1 Such schemes are designed to demonstrate consistency of product and process conformity at a level of acceptable and satisfactory workmanship. Third-party certification therefore can provide assurance regarding product fitness-for-use and can raise confidence in the quality of performance.

NOTE 2 Third-party certification is also available for other operations such as fire door installation, fire inspection and risk assessment for the certification of those involved in providing those services. In those respects, certification can be an important way for operators to show their core competencies in these activities.

3.27 threshold

horizontal member at the bottom of a door frame above which the door leaf aligns and which forms a division at floor level between two adjacent areas

NOTE 1 The threshold could be part of the door frame, or a separate component.

NOTE 2 The threshold is separate from the floor covering.

NOTE 3 An illustration of a threshold is shown BS EN 12519:2018, Figure 14.

[SOURCE: BS EN 12519:2018 ©, **3.58**, modified – changed “rests” to “aligns”; Notes 1 to 3 added]

4 Roles and responsibilities

*COMMENTARY ON CLAUSE **4***

Attention is drawn to the Building Regulations 2010 and subsequent amendments [1], the Building (Higher-Risk Buildings Procedures) (England) Regulations 2023 [10] and other building safety legislation for the devolved authorities across the UK [12], [13], [14], [15] and [16] regarding individuals involved in work concerning fire or structural safety in buildings showing they are competent to do so. This includes the appropriate skills, knowledge, experience and behaviour for the role they are fulfilling. Organizations are required to demonstrate their capabilities in planning, coordinating, managing and monitoring work that can affect building safety risks concerning fire and structural stability.

Installing or replacing fire doors is included as building work under the definition provided in building regulations. The duty holder is responsible for the building work and ensuring that the work is in accordance with building regulations. Attention is drawn to the requirement for building regulations approval to be submitted to the appropriate Building Control Body prior to work starting.

In some cases, it might be appropriate for an on-site survey or inspection to be carried out on the situation that applies where the door is to be installed, including the condition of the partitioning or wall constructions and the quality of the opening as prepared. This applies especially for replacement doors. Detailed surveys on site are not normally necessary for new constructions, where comprehensive preparation drawings are available for the door manufacturer and contractors responsible for preparing wall or partition openings.

4.1 Keeping to the manufacturer's specification

Doors should be provided with a manufacturer's specification, which includes a summary for reference of the supporting evidence and demonstrates the tested fire resistance performance, and where applicable, smoke control performance.

If any changes to the manufacturer's specification are proposed, then those changes should be made in consultation with the specifier and with approval from the responsible manufacturer. Any approved changes that result should be documented by the originator of the change, with an explanation and justification, including supporting evidence, as an addendum to the manufacturer's specification document.

NOTE Anyone who changes a component in a manufacturer's specification is making design changes and might therefore be defined as a designer under the Construction (Design and Management) Regulations 2015 [17].

The final manufacturer's specification, and any associated notes, should be provided to the management responsible for the fire safety of the building, to be maintained in the building records for future reference as necessary during the occupation phase, for example, when fire risk assessments or door inspections are carried out.

4.2 Specifier

*COMMENTARY ON **4.2***

Specifying is often the role of designers, which might include architects, consulting engineers, quantity surveyors, interior designers etc., but can be anyone who, as part of their work, causes a change that alters a design or affects a product, for example, those who specify door hardware changes. The roles and responsibilities of designers are defined under the Construction (Design and Management) Regulations 2015 [17].

The term specifier is used to describe a designer that has responsibility for specifying the expressed wishes of the building or project owner (the client), taking into account any relevant considerations arising from the nature of the building, its purpose and the situations where the doors are to be used, including any relevant conditions that apply arising from the fire safety plan.

The specifier should produce a specification to explain and define clearly for the fire door provider what performance, aesthetic, component and dimensional characteristics are required.

The specifier should provide whatever details are necessary to the door provider at the outset which are significant for the door design, performance characteristics and safety in use, on first contact and during subsequent discussions.

The specifier should provide sufficient information about the required design and its operation and maintenance so that all others with a responsibility for the building can fulfil their roles.

*NOTE See also Clause **5** on specifying fire doors.*

4.3 Door provider

The door provider supplies the manufactured doorset or the components of a door assembly to the construction site and should supply product that is in accordance with the specification and supporting evidence.

NOTE The door provider can be the original manufacturer or part of the supply chain such as a distributor, builders' merchant or installer.

4.4 Manufacturer

*COMMENTARY ON **4.4***

Two key roles of the manufacturer are to determine the fire door design that satisfies the original specification and to manufacture to that design, subject to the key conditions that the door can be made. This is usually established in liaison with the specifier and manufacturing does not normally start until the component specification has been confirmed.

The manufacturer should confirm that the supporting evidence is available and accepted for the specification, especially referring to supporting evidence for fire resistance, smoke control and any other performance criteria as required.

NOTE The overall responsibility for the manufacturer is to make and provide the specified fire door, at whatever levels of quality or workmanship that have been agreed, subject to contract. This applies for bespoke and specialist fire doors (perhaps with some high-performance specialist properties to fit the application) and standard production items produced in volume and provided from warehouse or factory stock.

The manufacturer's specification for the door as a complete assembly to function as a fire door in use should be the main reference for all those in the chain of custody, from the manufacturer to the installer on site, including those involved throughout the process who interact with the product, such as distributors, merchants, component suppliers and any processors.

4.5 Supply chain

*COMMENTARY ON **4.5***

The supply chain might include distributors, merchants, processors, component manufacturers and/or suppliers. It is an important responsibility for all those who handle or interact with the door product in whatever way along the chain of custody (from manufacturing to installation and use) to respect, observe and maintain the specification, as received.

Component changes should not be made without informing the specifier and without seeking approval from the responsible manufacturer (see **4.1**). Approvals should be based on the supporting evidence (see **3.24**).

The selection of individual components, such as individual hardware items, seals and fire-resistant glass, should be in accordance with the supporting evidence for the fire door and complete component specification. In all cases, changes should be justified with reference to supporting evidence, as appropriate to the performance of the assembly to be installed.

Component providers should be informed that their individual item needs to work with other parts and components from other sources as a complete assembly.

NOTE a direct substitution of one item by another different one might not necessarily reproduce the same level of fire resistance as tested for the original assembly.

The original door specification should be maintained as validated by reference to supporting evidence.

4.6 Door installer

Anyone undertaking the installer role should act in accordance with the received specification and any associated guidance or instructions related to the fire door and the installation. Door installers should not make changes to the specification.

If door installers have reason to question the received fire door specification or received instructions, they should raise those questions with the person who originally requested for the building work to be carried out and the relevant duty holder.

*NOTE 1 If the installer does not follow the predefined scope as part of the installation process, for example, the specification or a provided FoA report, they are making design considerations and might be defined as a designer under the Construction (Design and Management) Regulations 2015 [17] (see **4.1** and **4.2**).*

NOTE 2 A prime responsibility of the installer is to ensure that the fire door is fitted correctly into the prepared opening as a functioning door, with satisfactory workmanship (e.g. without leaf binding or opening and closing force issues so that the door opens and closes safely).

*NOTE 3 The installer is responsible for ensuring that the gap between the door frame and the surrounding structure is adequately sealed against the possibility of fire and smoke penetration around the door into the surrounding structure, using either a solution provided by the door manufacturer as preferred choice, or an appropriate option provided in this British Standard (see **13.4**).*

In the case of new build, if the structural opening has not been prepared to the required dimensions and there are problems trying to fit the door and provide sealing for the frame to surrounding structure gap, the door installer should suspend activities and inform the relevant duty holder of the difficulties.

*NOTE 4 If the opening has not been made to specification, see **13.4.9**.*

In the case of refurbishment works where an old door is to be removed and replaced with new, the following checks should be completed prior to removing the existing door.

a) The sizes of the new door fits into the opening it has been made for.

b) The replacement door has not suffered any damage in transit.

c) The specification of the new door is correct and as ordered.

d) All ancillary items are available and contained in the packaging.

If there are problems with the above items, the door installer should suspend activities and inform the relevant duty holder of the difficulties.

NOTE 5 The responsibility of the existing construction falls under the relevant duty holder for the work to ensure it is fit to take installation of the replacement fire door.

*NOTE 6 It is the responsibility of the relevant duty holder to find a suitable solution (see **13.4.9**).*

The installer should not confirm handover until the works are complete and signed off in accordance with agreed site practice.

The installer should provide the handover information for retention by the building/project owner (see Clause **14**).

4.7 Relevant duty holder

Any matters which the door manufacturer, supplier or installer encounter in connection with installing the fire door which are outside their specific responsibilities in connection with providing the door should, in the first instance, be referred to the relevant duty holder to be resolved.

NOTE 1 This could be the Principal Contractor or the Principal Designer.

NOTE 2 For example, the dimensions, tolerances or squareness of the prepared door opening.

If partitioning/walling/flooring issues arise when the door comes to be fitted in place, or if there are opening/closing or stability issues in use, the relevant duty holder should be consulted for advice and approval to resolve the issues and find a coordinated way forward (see **13.4.9**).

4.8 Partitioning and walling system provider and contractor

The opening where the door is to be installed should be prepared by the partitioning or walling contractor to the specified physical dimensions and tolerances as designed, in accordance with the common level and datum references provided for all on-site contractors.

NOTE 1 See BS 8000-8 for guidance on tolerances.

The partitioning or wall system provider should provide the necessary appropriate fire test evidence for the partition system, with the necessary provisions for physical stability and durability in use to support the fire door being installed.

NOTE 2 This especially applies concerning provisions to fit the door frame into the wall or partition (in consideration for example of the expected weight of the completed fire door when installed).

Compatibility of evidence between the fire door and the supporting structure should be taken into account by the design team (see **13.2**).

The walling contractor should prepare the opening in accordance with the required specification (see **13.4.9**). The walling contractor therefore should act in accordance with both the requirements of the wall system provider and the requirements of the fire door manufacturer. Where there is any conflict in these requirements, the partition and/or fire door installers should raise a query with the design team.

The partitioning or walling system provider should confirm that their system is suitable and validated by fire resistance testing at the required fire resistance performance for the location, and they should provide the necessary fire test evidence for the partition or wall construction if requested.

*NOTE 3 Sealing of any partition or wall cavity against fire and smoke penetration, as part of the wall or partition construction, is an important responsibility of the installer (see **13.4**).*

NOTE 4 It is not an obligation of the door manufacturer to take responsibility for the partitioning system or the partitioning and wall construction. It is expected that part of the design approval of a partitioning or walling construction is confirmation by the responsible provider that it can take openings for fire doors (and any associated glazing).

5 Specifying fire door requirements for the application

The fire door specification process should start with the designer or specifier acting on behalf of the client (i.e. the building or project owner) expressing what is required.

The specification should be either descriptive of the various properties or prescriptive in terms of a specific source.

NOTE 1 Further developments in discussion with manufacturers can lead to a more detailed definition of what is to be made to satisfy the original requirements.

Fire door specifications containing the appropriate hardware should enable the various functions that fire doors have to fulfil. A competency-based approach should apply the appropriate combined skills, knowledge, experience and behaviour (in fire door design and manufacturing) to evaluate and determine the needs and available solutions in what can be a complex multi-dimensional application. The fire door specification should take into account aspects affecting the safety of occupants for the situations where the doors are to be used.

In the specialist and bespoke fire door field, the fire door specification should be tailor-made to fit the application rather than being based on a previous project or a standard format.

Competency in specifying should include the whole situation that applies in each case.

NOTE 2 This might require particular technical evaluation of the effective combination of different functions which can possibly impact one on another.

The specification should clearly describe what is essential with respect to key attributes, characteristics and properties, and components. The specification should take into account the following aspects.

a) The primary needs of the application (i.e. basic dimensions and tolerances, the type of door and any screen arrangement associated with the door, including relevant safety aspects in use).

NOTE 3 Attention is drawn to regulatory requirements for fire door performance, including other performance levels required to conform to regulations, such as sound and impact resistance.

b) Any specific conditions to conform to the building context, building purpose or building plan, e.g. the escape, compartmentation and smoke control strategies in view of the occupancy and purpose profile of the building occupancy, and safety in use for power operated pedestrian doors.

NOTE 4 See BS EN 16005.

c) The wishes of the client and person responsible for the building relating to the situation (e.g. appearance, style, decoration, colour) and any associated specific conditions or attributes for the situation.

d) Any additional special attributes and properties considered necessary or desirable for the application (e.g. guarding at the meeting stiles or at the door to frame edge, special functions such as X-ray or electronic shielding).

e) Any requirement for the product and/or product manufacturer and/or installer to be certificated to a third-party product scheme.

f) The availability of the selected system and the site conditions during installation.

g) The standard of workmanship and quality expected at handover.

h) The maintenance requirements of the product considered in the service application.

i) The environmental implications and what will happen at end of service life, or at re-fit before end of service life.

j) Competent door hardware specification which enables the door itself to function correctly in all desired applications.

The door provider should be consulted at the earliest possible stage so that that the expressed fire door specification can be manufactured, and to verify either the supporting evidence is available, or what additional test information needs to be obtained.

The confirmed manufacturer's specification should be clearly defined as appropriate, for example, as a written specification supported by drawings, material and component listings, and any specific conditions that apply, with reference to relevant guidance and supporting evidence.

*NOTE 5 Fire door requirements stated in supporting evidence take precedence over other information, such as product data sheets, see **B.3.2**f).*

Where there are a number of different doors within a project contract, a door schedule should be provided, identifying and characterizing each door by key physical dimensions and characteristics.

A schedule of door hardware and components should also be provided, identifying each relevant component against each door.

The specification of fire doors and hardware should be undertaken only by persons with the appropriate competence.

NOTE 6 Fire door manufacturers have considerable experience in the design, manufacture and testing of fire doors, and have many different proven designs available. Any deviation from designs that have been tested or subjected to assessment need careful evaluation. The smallest alteration to a fire door can affect the performance of the fire door.

A fire door specification should include the fire resistance integrity and insulation, and any other performance requirements for the fire doors based on its intended use and design.

NOTE 7 A fire door can have two unconnected characteristics described as insulation, one in terms of fire performance and the other in terms of energy conservation (thermal transmittance). Insulation in terms of fire performance is described in more detail in the relevant testing standard, BS 476-22 or BS EN 1634-1.

As any of these can affect the potential fire resistance of the fire door, the specification should also include:

1) overall size;
2) acceptable dimensional tolerances (height, width, thickness and squareness in accordance with BS EN 1529 for tolerance classes and BS 4787-1:1980, Clause **7**, provisions as relevant for timber fire doors);
3) the type of door leaf or leaves (material type, e.g. timber, steel, composite etc., and style, e.g. flush, panel etc.);
4) size and number of leaves (single-leaf or double-leaf);
5) mode of operation [e.g. single-action or double-action (in accordance with BS EN 12519:2018, Annex B and the supporting evidence)];
6) latching arrangement (e.g. latched or unlatched);
7) whether it is power-operated;
8) size, location and number of any glazed openings;
9) type of fire-resistant glass and the glazing specification, including identification by name of the glass, the fire resistance performance and the impact safety class;
10) details of the door hardware, including any escape egress requirements;

NOTE 8 Details regarding additional intumescent protection are contained in the manufacturer's component specification.

11) details of frames;
12) lipping specification (e.g. rebated/non-rebated/over-rebated, edge protection);
13) presence of any over panels, fanlights, side panels, etc.;
14) door finish (e.g. for aesthetic purposes but also for a specific performance function, such as impact or hygiene);
15) supporting construction;
16) finished floor level and gap sizes (see **13.5.3**);
17) fire stopping between the fire door frame and surrounding structure;
18) other associated requirements other than fire safety including, but not limited to:
    i) access to and use of buildings;
    ii) conservation of fuel and power;
    iii) protection from falling, collision and impact;
    iv) resistance to sound;
    v) security;
    vi) smoke control;
    vii) other specialist applications;
    viii) the operation of the fire door (opening and closing); and
    ix) ability to release for escape egress.

NOTE 9 The BS 6375 series tests for various operational aspects, including resistance to repeated opening and closing, air permeability, water tightness and wind resistance, mechanical strength and soft and heavy body impact.

NOTE 10 Fire resistance is a property that can be possessed only by a complete construction, and not by the individual components or materials from which the construction is formed. In the case of a fire door, it is only the complete fire door as described in the supporting evidence that can be deemed to provide the required performance when competently installed into the building. Therefore, a door leaf, door frame, door hardware or any other component part cannot be fire-resisting in isolation from other parts. It is particularly important not to arbitrarily substitute one item for another of the same nominal type from a different source, without confirming with the fire door specification that the exchange is acceptable. Individual items of hardware, including edge protection, cannot be considered in isolation for use in a fire door, that is without reference to the whole assembly. The various items of hardware, seals and other essential elements need to function together as a specified system. It is likely that changing one particular item can affect the performance of the whole assembly.

In order to maintain the performance of fire doors, the quality of materials and components used in manufacturing should be carefully monitored and controlled.

NOTE 11 As the constituent parts of a fire door can interact in subtle ways, any changes from the original supporting evidence for the fire door can significantly alter the performance of the fire door installed.

NOTE 12 General guidance on matters relating to fire doors can be found in the BWF publication Fire doors – The burning issues – From specification to maintenance: The life cycle of a fire door explained *[18] (withdrawn) and the ASDMA's* Best practice guide to timber fire doors *[19]. Guidance on the specification of door hardware for fire doors is given in the DHF/GAI* Code of practice: Hardware for fire and escape doors *[20].*

NOTE 13 Users of this British Standard are advised to consider the desirability of sourcing fire doors from a manufacturer that operates as a member of a third-party certification scheme, as such schemes are designed to ensure added assurance of product performance.

6 Supporting evidence

All fire doors should be tested as complete entities to function when installed as effective fire doors, backed by supporting evidence.

*NOTE Guidance on acceptable forms of supporting evidence is given in **B.3**.*

Any aperture cutting should not be attempted without confirming with the manufacturer responsible for the door design how and where this should be done (see **7.2**).

7 Doors and frames

7.1 General

Fire doors should be purchased as coordinated assemblies in accordance with the manufacturer's specification backed by supporting evidence for the complete assembly.

NOTE 1 This is expected to ensure that all the correct components are fitted and that full assembly instructions are available.

Supporting evidence should be provided to demonstrate the fire door meets its performance specification.

NOTE 2 Steel doors, metal framed glazed doors, composite doors and glass doors are typically supplied as complete doorsets.

NOTE 3 Timber-based doors can be supplied as doorsets in the same manner. However, if it is not possible or practicable to install a fire door from a single supplier (i.e. as a doorset) then doors can be assembled from individual components which are available separately (i.e. as a door assembly), provided the supporting evidence for the whole completed assembly includes those exact components as defined by the fire door specification.

Each component used in a fire door assembly should be covered by the supporting evidence that is available for the assembly.

*NOTE 4 This can be original test information for the assembly or evidence that allows valid approved substitutions (see **4.1**).*

NOTE 5 The chosen door leaf or door blank is usually supported by an FoA report that describes the sizes and configurations of doors that can be produced based on that key component. These documents include requirements for other components, including glazing and hardware specifications.

NOTE 6 Components such as door frames, automatic closers, intumescent strips or smoke seals, can have their own FoA reports that describe with which door leaves, sizes and configurations those other components can be used.

Components brought together with manufacturing operations on site (i.e. not a factory finished doorset) should be assembled by a competent individual or organization. The fire door should be produced in accordance with the evidence supporting the claimed performance.

NOTE 7 The person (natural or legal) assembling components takes on the responsibilities of a fire door manufacturer.

7.2 Apertures in the door leaf

Apertures should not be cut on site unless this is carried out by a competent person in accordance with the test evidence and the manufacturer's recommendations.

Apertures should only be cut into doors that are designed (i.e. tested and/or assessed) to receive apertures and should therefore only be fitted into a fire door under the control of the fire door manufacturer. The position of the cut-out within the door, and the aperture area and aspect ratio, should be as previously tested and/or assessed.

Glazed apertures should be in accordance with Clause **9**. Apertures for hardware should be in accordance with Clause **10**. Any other apertures should be discussed with and approved by the fire door manufacturer.

Apertures in steel doors and composite doors should be factory installed or installed on site by the manufacturer.

7.3 Thresholds

Fire resistance and smoke control for thresholds (**3.27**) should be established as part of an appropriate fire door test programme. Queries regarding floor coverings and their effects of propagation of a fire should be referred to the building designer.

*NOTE Under-door gaps are covered in **13.5.3**.*

8 Performance seals

8.1 General

The details of the sealing arrangement used for a fire door design should be provided in the fire door specification.

NOTE This is not just for verifying compliance if needed but for ongoing maintenance and risk assessment.

8.2 Intumescent seals

NOTE 1 Users of this British Standard are advised to consider the desirability of sourcing intumescent fire and smoke seals from a manufacturer that operates as a member of a third-party certification scheme, as such schemes are designed to ensure consistency of product conformity.

NOTE 2 General guidance on the role and performance of intumescent fire seals, including concealed intumescent fire seals, can be found in the IFSA's Information Sheet 01 *[21]. Guidance on selecting smoke seals can be found in the IFSA's* Information Sheet 05 *[22] and guidance on the role of smoke seals can be found in the IFSA's* Information Sheet 03 *[23].*

There are various types of intumescent fire seal, each of which reacts differently; such seals should meet the period of fire resistance and configuration relevant to the specific door design when tested in accordance with BS 476-22 or BS EN 1634-1. The seal formulation, dimensions and configuration should be the same as those originally tested or assessed and specified for the door design.

There are a number of different types of smoke seal available, and the most appropriate type for each specific door type and configuration should be identified from the manufacturer's supporting evidence. Smoke seals should meet the required performance relevant to the specific door design when tested in accordance with BS 476-31.1 or BS EN 1634-3 and should not compromise the fire performance of the door when fitted.

If the door edges contain the intumescent strips and the doors have to be planed to improve fit within the door frame, the seals should be first removed, then replaced with seals of the same specification and manufacturer as those installed. If the seals are damaged on removal, they should be replaced with new (e.g. to maintain adhesion). Limitations indicated by the manufacturer's installation guidance should not be exceeded.

*NOTE 3 There is a limit on the amount of adjustment that can be made to door edges (see **13.5.1**). The performance of the door can be affected, and if too much of the edge is removed, refitting the seal without further modification would leave the seal standing proud.*

The intumescent materials that have been used to achieve a particular performance in test conditions should be present in the finished assembly to maintain the stated performance. This should include any additional intumescent protection used in conjunction with the element of door hardware.

The materials and configurations as detailed in the component specification should be used unless there are approved alternatives covered by the supporting evidence for that door.

*NOTE 4 Further information on supporting evidence is given in **B.3**.*

Technical assessments should be produced using the principles outlined in the FPA's Passive Fire Protection Forum (PFPF) Guide [N1].

When it is necessary to fit seals on site, either in the frame or the door edge, the manufacturer's recommendations should be followed precisely for the type and mode of operation of the door concerned.

All fixing methods for intumescent seals should be covered by supporting evidence.

NOTE 5 Intumescent fire seals are normally fitted into a groove and can be a friction fit, self-adhesive, glued or mechanically fixed.

When fitting self-adhesive seals into a groove, the groove should be of the correct dimension in accordance with the supplier's instructions and dry and free from dust or sawdust to maintain a good bond.

NOTE 6 The self-adhesive action deteriorates at lower temperatures, and additional mechanical fixing might be necessary if the seals are fitted at temperatures below 10 °C.

Any surface mounted seals should have supporting evidence for the application in which the seals are being applied.

NOTE 7 Seals may be surface-mounted if they are sufficiently thin, but such seals are more prone to detachment than those fitted into grooves.

If intumescent fire or smoke seals have to be replaced, this should be done in accordance with **13.4.3**. Intumescent and smoke seals, including replacement seals, should be as detailed in the supporting evidence.

*NOTE 8 See also Clause **16** regarding painting of intumescent fire seals.*

NOTE 9 Intumescent seals are not generally required for steel doors.

8.3 Concealed intumescent fire seals

*COMMENTARY ON **8.3***

Some manufacturers offer door assemblies in which pressure-forming intumescent material is concealed behind the timber lipping of the door leaf. The methods of achieving concealed intumescent details are all proprietary. Doors fitted with concealed intumescent seals are expected to be marked accordingly by the manufacturer.

If a concealed intumescent fire seal is specified, supporting evidence should be obtained and the following factors should be taken into account:

a) the proprietary nature of existing solutions;

b) the fine balance of intumescent fire seal specification, operating gaps, lipping dimensions and adhesives required to achieve such a system;

c) the robustness required for the lipping to withstand normal wear and tear;

d) the potential requirement for a separate smoke sealing system; and

e) ongoing maintenance concerns.

Any trimming of the door should not be attempted without confirming with the manufacturer responsible for the door design.

8.4 Smoke seals

*COMMENTARY ON **8.4***

The test standards for determining smoke leakage are BS 476-31.1 and BS EN 1634-3. Smoke leakage is essentially the transfer of airborne particles of the products of combustion, and sealing systems are used to restrict this air flow. Seals are used to fill the gaps between the door leaf and the frame in order to achieve the required smoke leakage performance (see Annex C). As such, they can have an adverse effect on the operating forces required to use the door if not carefully fitted (see BS 8300 series). Removal of seals to accommodate door hardware increases the leakage rate.

The achievement of effective closing while maintaining the ability to open fire and smoke-control doors, for all users without discrimination, can be one of the most difficult requirements to achieve in practice, given that the doors can have such a range of functional performances to combine. This requires careful consideration of the door specifications, depending on the situation where they are being used.

Seals that fit in the centre thickness of the door are generally subjected to friction effects detrimental to the durability of the seal and the easy use of the door. Seals applied to the face of the doorstop are unlikely to have a noticeably adverse effect on the forces required to open the door. Doorstop-mounted seals might prevent the door from latching or closing if incorrectly fitted, or when incorporated within a door rebate that has not been designed to accommodate such seals. Smoke seals are different from the intumescent seals used for fire resistance performance, and a smoke-control door requires particular attention in addition to the considerations for fire resistance.

Fire doors that are required to restrict the flow of ambient temperature smoke, should either:

a) have a leakage rate not exceeding 3 m^3/h per metre, at 25 Pa, when tested in accordance with BS 476-31.1; or

b) meet the classification requirement of S_{a4} (as classified in accordance with BS EN 13501-2) when tested in accordance with BS EN 1634-3, using an appropriate threshold sealing system.

NOTE 1 While in the past it has been deemed acceptable to allow smoke control doors to be unsealed at the threshold, and smoke leakage performance defined in terms of "head and jambs only", this is no longer the case. Following the test method of BS 476-31.1, the smoke leakage performance is required to be measured over the whole specimen, including the threshold and, if any, the meeting stiles.

*NOTE 2 Both BS 476-31.1 and BS EN 1634-3 test methods for evaluating smoke leakage at ambient conditions measure air leakage in a pressurized chamber. The tests are similar. Leakage depends on the gaps that exist in the door as specified and as measured in the test. The air leakage result as measured is expressed for the whole fire door as it is intended to be used in practice, including the sealing between the back of the frame and the structural opening. Clause **13** covers sealants during smoke and fire door installation.*

NOTE 3 Fire doors classified as S_{a4} will not have been tested with the gap between the bottom of the door and the threshold/finished floor taped over. Taping over the threshold renders the door inoperable and is not representative of how the door will eventually be installed.

Where smoke sealing is required, the gap between the bottom of the door and the threshold or finished floor should be sealed with a suitable bottom of door sealing system, such as a drop seal, providing the same level of protection as around the rest of the perimeter, i.e. with a leakage rate not exceeding 3 m^3/h per metre at 25 Pa when tested in accordance with BS 476-31.1 or BS EN 1634-3.

NOTE 4 A drop seal ensures that no significant increase in frictional forces can interfere with the opening and closing action of the door. The use of drop seals needs to be carefully considered in all situations, not in isolation but within the context of the whole smoke control strategy and the wider requirements. There are situations where smoke control seals might not be advisable; for example, where there is a pressurization system in operation which can cause doors not to close fully, or where the floors are not flat, are sloping or where a floor covering is to be provided that could inhibit opening and closing. Situations in hospital treatment areas and corridors provide a special case where high standard hygienic, aseptic and clean floor conditions are necessary. It is important that the door manufacturer is informed of such considerations at the outset of considering applications when the original fire door specification is defined.

NOTE 5 General guidance on smoke control in fire doors can be found in IFSA's Fact Sheet 02 *[24]. Specific guidance on smoke sealing of doorway thresholds is given in IFSA's* Fact Sheet 04 *[25].*

NOTE 6 In practice, when the door is fitted, the gap between the bottom of the door and the threshold or finished floor for fire performance can be significantly influenced by the type of floor/floor finish provided and the degree of flatness of the floor across the opening arc for the door. Neither of these are determined by the door manufacturer, and if a particular gap is required then it is expected to be identified accordingly in the original fire door specification. In practice, the actual clearance achievable might not be known until the point of installation.

NOTE 7 It is important that the use of smoke sealing on fire doors is considered in conjunction with the smoke evacuation, ventilation and pressurization control strategy that is adopted in the building (e.g. reference BS 9999 and BS 9991).

The manufacturer's recommended installation instructions should be followed whether the intumescent fire and smoke seals are separate or combined.

Smoke seals or combined intumescent fire and smoke seals should not be painted.

*NOTE 8 Such coatings can inhibit the door from closing completely, and the seal could be damaged as a consequence of adhesion to the adjacent element. See also Clause **13** regarding painting of intumescent fire seals.*

9 Glazing

*COMMENTARY ON CLAUSE **9***

Glazing is important for fire doors because of the need under UK regulations for safe access, requiring clear vision from one side of the door to the other. This typically includes one or more glazed panels in doors of an appropriate area and at a suitable height and position for all possible users, in some cases with associated side glazed screens and fanlight glazing. The conditions that apply to glazing in doors are also applicable to associated glazed screen assemblies. A fire door with an associated fire-resisting screen needs to be tested or assessed from applicable test evidence for use as a complete installed door-screen glazed assembly. See Approved Document B: Fire safety *[26], [27] and the Scottish Government's* Domestic Technical Handbook *[14] and* Non-domestic Technical Handbook *[15] for guidance on limitations on use of uninsulated glazed elements on escape routes.*

Applicable guidance under UK building regulations imposes limits on the use of uninsulated (i.e. integrity-only) fire-resisting glazing in fire doors along escape routes because of heat transfer considerations in fire. The use of fire-resisting glazed elements which satisfy the relevant insulating criteria is not so limited.

Regulatory guidance provided in the UK for compliance with building regulations is primarily for life safety. There are other situations where insulation fire-resisting glazing is specified rather than integrity-only. For example, risk-based design approaches can require the enhanced levels of protection provided by fire-resisting insulation glazing for higher risk occupancies, also, for applications in more complex and multiple occupancy buildings where escape might not be straightforward.

Insurers might also set additional limitations on the use of integrity-only fire-resisting glazing that do not apply to insulation fire-resisting glazing, covering specific risks for property protection purposes (see Approved Document B: Fire safety *[26], [27]).*

Glazing apertures should be prepared in the factory where possible, under the control of the door manufacturer and where the door design makes provision for glazing apertures to be included.

*NOTE 1 For the preparation of apertures, see **7.2**. For glass replacement, see **15.4**.*

NOTE 2 Cutting into the body of door leaves that are not designed to accommodate glazing apertures can critically weaken the door and undermine designed fire performance because of the area of glazing that is required and the position of vision panels in the door.

If glazing on-site into factory-prepared apertures is unavoidable, then the glazed system should be installed exactly as specified by the door manufacturer, indicating the named components and any particular glazing conditions or arrangements that apply as determined from the supporting evidence.

NOTE 3 Any cut-outs to take glazing that are not covered by the supporting evidence (or are outside the scope of applicable certification) invalidate approval of the door for use as a fire door.

NOTE 4 Any glazing cut-outs made to a fire door post-manufacture are likely to invalidate its certification or performance.

NOTE 5 Where glazing on site cannot be avoided and is approved by the fire door manufacturer, users of this British Standard are advised to consider the desirability of employing glaziers that operate as a member of a third-party certification scheme for fire rated glass installation, as such schemes are designed to ensure that the glazing process maintains product conformity with the original manufacturer's specification.

Fire-resisting glass used by the door manufacturer should be permanently marked with, as a minimum, the glass name, the fire resistance performance and the impact safety class in accordance with the relevant harmonized product standard.

*NOTE 6 See Clause **11** for further recommendations on marking and BS 6262-4.*

The fire resistance classification for a glazed fire door, a glazed unit in the door, or an associated glazed screen assembly should be checked for the performance classification of the whole entity, rather than relying on a performance class or identification code marked on the fire-resistant glass panes.

NOTE 7 These might not necessarily be the same as the classification that applies to the whole entity.

NOTE 8 See Annex B for more information on fire resistance classification.

Documentation for the fire-resisting glass and glazing should provide details of the specified glazing system, with reference to the supporting evidence.

Fire-resistant insulating glass units should conform to the requirements of BS EN 1279-5.

NOTE 9 Further guidance on fire-resistant insulating glass units is given the GGF publication, A guide to best practice in the specification and use of fire-resistant glazed systems *[28].*

Marking should be permanent and clear, able to be seen and read after installation in the door or associated glazed screen. It should be resilient to common cleaning methods such that the mark remains readable during the working life of the door. Glass should not be marked on site at the installation, or later.

Fire-resisting glass used in fire doors and screens in critical locations where accidental impact is a risk should be rated for impact safety as appropriate, and permanently marked accordingly.

NOTE 10 See BS 6262-4 for specific recommendations.

The glazing system should be installed as specified in each individual case. Only complete specified glazed systems with supporting evidence and available installation guidance should be used. Specified components and glazing arrangements should not be changed unless based on supporting evidence. In addition, any changes carried out during occupation of the building (for example, repairs and maintenance) should be in accordance with the original fire door specification.

In all cases, the specification of the glazing system should include the glass by name and its thickness, together with other associated components including the glazing sealant, and any liner that is required in the glazing pocket. The door manufacturer's recommendations on glazing beads, bead fixings, use of setting blocks, edge cover requirements for the glass, and expansion allowances within the glazing aperture should be followed.

NOTE 11 Other restrictions on door design might be given by the door manufacturer in relation to glazing in fire doors, such as the proximity of hardware to non-insulated glass.

The edge cover limits provided by the glass manufacturer in each individual case should be followed, using the glazing sealant/gasket as specified, since changes to the sealant/gasket can critically affect performance.

NOTE 12 Each component in a fire-resisting glazed system cannot be tested in isolation, and therefore the compatibility of components is essential when fitting fire-resisting glass, as demonstrated by standard fire resistance test evidence for the complete glazed system.

Each specified glazing system is designed to function with the glass as an integrated unit and no aspect should be changed without supporting evidence to make the change (including components, main dimensions, design features and shape). It should not be assumed that what applies to one particular glazed system automatically applies to another glazed system using a different glass. In all cases, the sealant/gasket should be fitted accurately into the corners of the glazing aperture to minimize the risks of fire penetration.

A description of the glass and glazing system, as installed, should be recorded.

*NOTE 13 This is important information for fire risk assessment, or if replacement or refurbishment are needed at some stage during the working life of the building (see **15.4**).*

NOTE 14 Further guidance on fire-resistant glass and glazing is given in the GGF publication, A guide to best practice in the specification and use of fire-resistant glazed systems *[28].*

10 Door hardware

*COMMENTARY ON CLAUSE **10***

Users of this British Standard are advised to consider the desirability of sourcing door hardware from a manufacturer that operates as a member of a third-party certification scheme, as such schemes are designed to ensure consistency of product conformity.

10.1 General

The specification of architectural ironmongery/building hardware for fire doors is a skill which requires high levels of competency, and only people who can demonstrate their competency should undertake this task. Door hardware falls into two categories, essential and non-essential, and all door hardware should be specified according to its intended function. All door hardware should be fitted in accordance with the hardware manufacturer's instructions, and the supporting evidence for the fire door.

NOTE 1 Guidance on essential and non-essential door hardware is given in Annex D.

Electronic access and security controls (e.g. electromagnetic locks and card readers) that form part of the fire doors should be planned in advance with the fire door manufacturer by the supplier of the control item. The supporting evidence for the door should include the item within the list of approved components. The supplier of the control item should also confirm that installation (e.g. any drilling to install cabling) is acceptable to the door manufacturer and in accordance with the supporting evidence.

Electronic items for locking or access control should not be added at or after installation, or during the working life of the door, without consultation with the manufacturer or supplier who is responsible for the fire door.

The intumescent materials that have been used to achieve a particular performance in test conditions, with the door hardware and/or the door, should be present in the finished assembly to maintain the stated performance.

NOTE 2 When intumescent protection is specified, then unless such protection is as tested and approved for the item of hardware, the fire performance of the door is likely to be compromised.

In all circumstances, panic bolts and other emergency exit devices should conform to BS EN 179, BS EN 1125 or BS EN 13637 as appropriate.

NOTE 3 These might constitute essential door hardware on internal compartmentation doors in multi-occupancy buildings.

Panic hardware should only be fitted if allowed by the supporting evidence for the doorset design.

Any changes to hardware components should only be made in accordance with the supporting evidence for the fire door.

*NOTE 4 There may be more than one supporting evidence document (see **B.3**.)*

Door hardware for steel fire doors should be specified early in the process, prior to the commencement of manufacture, as once specified, there is little or no room for substitution.

10.2 Fitting of door hardware

All door hardware should be fitted such that the fire-resisting properties of the door are not compromised, including any tested or approved fixings or intumescent protection.

Mortices for door hardware should not be cut on site unless this is carried out by a competent person in accordance with the test evidence and the manufacturer's recommendations.

Mortices for door hardware should be prepared in the factory where possible, under the control of the door manufacturer and where the door design makes provision for the door hardware to be included.

NOTE 1 Cutting mortices for door hardware into the body of door leaves can critically weaken the door and undermine designed fire performance if not carried out correctly.

If cutting mortices on site is unavoidable, this should be carried out by a competent person in accordance with the door manufacturer's specification for the door hardware being fitted, as determined from the supporting evidence.

NOTE 2 Many items of hardware are factory fitted and supplied installed onto the door, although surfaced fixed items might be supplied loose for on-site installation.

Interruption of intumescent fire seals at the locations of door hardware should be covered within the supporting evidence.

Smoke seals should be continuous around the perimeter of the door unless breaks in the seal are in accordance with the supporting evidence and the fire door is able to meet the leakage criteria (see **8.4**).

Where mortices are cut to take hardware, they should be cut as accurately as possible to avoid unnecessary gaps around the fitted hardware.

10.3 Hinges and pivots

When hinges or pivots are used in a fire door, the door leaf should be hung on hinges or mounted on pivots and they should be able to achieve the intended fire rating.

Hinges and pivots should be able to allow the door closing device, when fitted to a fire door, to close the door leaf reliably from any angle to which it has been opened.

Single-axis hinges fitted to fire doors should conform to BS EN 1935.

NOTE EAD 020001-00-0405 *[29] is a harmonized technical specification and is used as the basis for preparing European Technical Assessments (ETA) on multi-axis hinges and concealed hinges. In combination with the ETA, the EAD provides manufacturers with a method of CE marking multi-axis hinges and concealed hinges.*

10.4 Locks and latches

Locks and latches should only be fitted if included in the supporting evidence.

NOTE 1 The addition of a lock or latch to a fire-resisting door might reduce the fire performance of the door due to removal of material which reduces the fire protection and insulation properties of the fire door. To compensate for loss of material and/or the creation of voids, intumescent material might be required, depending on the supporting evidence.

Locking devices when fitted to a fire-resisting door should conform to BS EN 12209, BS EN 15685, BS EN 14846 or BS EN 179, as appropriate.

NOTE 2 Information on panic bolts and electronically controlled escape systems is given in Annex D.

10.5 Controlled door closing devices

Fire doors can only operate correctly if they are fully closed at the time of a fire; therefore, all fire doors, except those normally kept locked shut and fitted with appropriate signage (e.g. doors leading to a cupboard or service duct), should be fitted with a controlled door closing device conforming to BS EN 1154, or BS EN 17372 for powered pedestrian swing door operators with self-closing function.

NOTE 1 Statutory guidance to building regulations such as Approved Document B *[30] and its equivalents throughout the UK [12], [13], [14], [15] and [16] provide recommendations regarding these devices which can be inconsistent particularly in respect of internal doors within dwellings.*

NOTE 2 More detailed recommendations for controlled door closing devices are given in BS 9991 and BS 9999.

The fitting of surface mounted closers with respect to their proximity to non-insulating elements (e.g. glazing, metal doors) should be included in the supporting evidence. Controlled door closing devices fitted on fire-resisting doors should be able to:

a) close the door leaf reliably from any angle to which it has been opened; and

b) overcome the resistance of a latch or any seals when fitted.

Rebated double fire doors, or double fire doors fitted with astragals, should be fitted with a door co-ordinator in accordance with BS EN 1158 such that they close in the correct order.

Controlled door closing devices fitted to fire doors should be able to perform one of two functions, dependent on whether or not a latch is fitted to the door.

1) Latched door

   The door should be able to close in a controlled manner into a position where the latch engages.

   NOTE 3 In this case, once the latch is engaged, such closers have no further essential role to play in holding the door closed but might influence the fire resistance.

2) Unlatched door

For those door designs relying on the expansion of intumescent seals, the door should be able to close in a controlled manner into its frame or, in the case of double-action doors, to its dead centre closed position, and maintain this condition for a period during fire exposure until the heat-activated sealing system takes over the role of maintaining the door in the closed position.

NOTE 4 Generally, steel doors expand and wedge themselves into place.

NOTE 5 Opening and closing forces, and the speed of closing, are covered in BS 8300-2 and BS 9266 relating to the principles of accessible and inclusive design.

NOTE 6 These functions are considered essential in terms of the ability of the doors to achieve their intended fire resistance rating.

Where hold open devices are specified, the fire door and controlled door closing device should be confirmed as of appropriate design and quality to be held open. The hold open device should be fitted at the same height as the closing device to reduce the chance of warping/twisting occurring.

If a door leaf type requires strengthening in order to accommodate a particular type of closer, this should be done by the door manufacturer in accordance with the supporting evidence.

10.6 Letter plates

A letter plate should have supporting evidence for its use on a particular door construction and have achieved the appropriate classification/performance with respect to fire resistance and smoke leakage. The installation should incorporate any intumescent material which was included in the fire resistance test in which it was proved.

Letter plates should be fitted in accordance with the manufacturer's information provided with the door, identifying the acceptable locations and methods for fitting.

NOTE 1 The position of the letter plate can affect the performance in a fire.

Letter plates to steel and composite fire doors should be factory fitted with adequate strengthening to maintain the integrity of the door.

NOTE 2 General guidance on smoke control in fire doors can be found in IFSA Fact Sheet 02 *[24].*

*NOTE 3 Apertures for cat/dog flaps might need to be considered similarly to letter plates (see **10.1**).*

10.7 Air transfer grilles

10.7.1 General

An air transfer grille should have supporting evidence for its use on a particular door construction and have achieved the appropriate classification/performance with respect to fire resistance and smoke leakage. The installation should incorporate any intumescent material which was included in the fire resistance test in which it was proved.

Where the grille has been tested with a metal cover grille, this forms part of the tested solution and therefore should be included with the installed grille.

Only decorative grilles included in the supporting evidence should be fitted.

The required application of the door should be determined, in terms of fire resistance only (fire containment air transfer grille) or fire resistance and cold smoke control (fire and cold smoke containment air transfer grille), as described in a) and b) below.

a) Fire containment air transfer grille

Air transfer grilles that are designed for fire containment only allow the passage of air during normal operation that, when activated by a rise in temperature of the air stream, provides containment of fire. Fire containment only air transfer grilles are typically activated by a thermal release mechanism usually pre-set to operate between 70 °C and 74 °C, or by activation of a suitably tested intumescent matrix within the grille, and are not designed to control smoke at ambient temperature. Fire containment air transfer grilles are therefore only suitable for fitting to doors that are intended to provide fire resistance only (e.g. FD 30).

b) Fire and cold smoke containment air transfer grille

Air transfer grilles that are designed for fire and cold smoke containment allow the passage of air during normal operation, but include an electro-mechanical system that interacts with smoke detectors (either directly or via a fire alarm panel), which seals the grille in order to maintain the smoke leakage rate for the fire door, as defined in the relevant smoke leakage test standard (see **8.4**). Fire and cold smoke containment air transfer grilles also include mechanisms that are activated by a rise in temperature (either mechanical or intumescent-based) that can seal the grille to provide fire containment. Fire and cold smoke containment air transfer grilles are therefore suitable for fitting to doors that are intended to provide fire resistance and ambient temperature smoke control (e.g. E30 S_{a4}).

The installation of air transfer grilles should be undertaken only when full fitting instructions, including acceptable locations, and relevant wiring diagrams are available, and should be undertaken only by competent persons.

In the case of electrically interactive air transfer grilles, the installer should liaise with the person(s) responsible for the fire alarm panel or building management system.

All air transfer grilles should be commissioned in accordance with the grille manufacturer's installation and commissioning instructions. They should be installed in accordance with the fire door manufacturer's installation instructions, including any additional protection required for wire ways, conduits and receiver loops, as appropriate.

NOTE The position of the air transfer grilles can affect the performance in a fire.

Air transfer grilles to steel and composite fire doors should be factory fitted with adequate strengthening to maintain the integrity of the fire doors.

10.7.2 Over panels and side panels

An air transfer grille should have supporting evidence for its use in a particular over or side panel construction and have achieved the appropriate classification/performance with respect to fire resistance and smoke leakage. The installation should incorporate any intumescent material that was included in the fire resistance test in which it was proved.

NOTE 1 The position of the air transfer grilles can affect the performance in a fire.

Fire and/or smoke containment requirements should be determined as recommended in **10.7.1**.

NOTE 2 General guidance on the appropriate use of air transfer grilles in fire- and smoke-resisting doors can be found in the IFSA's Information Sheet 07 *[31].*

10.8 Add-ons and modifications

Clients, contractors and building owners should be made aware that changes made to the door after installation mean that the original supporting evidence is unlikely to be applicable.

NOTE 1 Examples of such changes are surface fixing of additional items to the door, replacing one component by another, cutting into the door or drilling.

All changes made to the fire door as received and after installation should be confirmed and checked with reference to the supporting evidence for the fire door.

If a fire door is to be modified in a way that is different from what is detailed in the original supporting evidence, the proposed change should be submitted to a suitable test/assessing body to see whether the supporting evidence can be revised based on the proposed detail or whether additional test evidence is required to support the change.

NOTE 2 This exercise can be undertaken before the modification is made.

NOTE 3 Examples of products which are often requested to be fitted/retrofitted in this manner include letter plates, door viewers, air transfer grilles, additional mechanical locks and electronic items such as digital locks, magnetic locks and other product related to door automation.

11 Marking

Marking on the fire door should allow the supporting evidence to be traced and referenced if necessary. Marking should include the fire door classification, e.g. FD30.

*NOTE 1 PAS 24:2022+A1, Clause **5**, gives further detail on marking of fire doors that have been assessed to provide enhanced security*

NOTE 2 Traceability is important so that maintenance can be carried out during the door's working life by reference to the supporting evidence, including reference to the original organization taking responsibility for the door product (or to a consultant responsible body if the original provider is no longer available to be consulted).

NOTE 3 There are different ways to achieve the identification of the fire door; for example, by securely fixed labels that include a QR code for access to a Digital Data Base of traceability, plugs or Radio Frequency Identification Discs (RFID for access to a Digital Data Base) inserted into the door edge or frame and included in the supporting evidence.

NOTE 4 If fire doors are supplied under third-party certification, each certification scheme has its own marking system.

Those who take on the responsibility of providing fire doors under their name and who are not manufacturers (e.g. contractors) should be informed that by providing the doors they are effectively taking on the responsibilities and obligations of manufacturers (e.g. providing supporting evidence for the fire door as provided).

*NOTE 5 See Clause **4** for more guidance on roles and responsibilities.*

NOTE 6 Anyone who makes changes to the original received fire door manufacturer's specification is responsible for those changes.

Fire door marking should be clear and not easily removed so that it remains in place, attached to the door, for continued identification throughout its working life.

Marking attesting to the performance of a fire door should be distinct from safety signage.

NOTE 7 The BS 5499 series and other building design guidance, for example HTM 05-02 *[32], recommend fitting signs to doors denoting a level of fire resistance.*

NOTE 8 Separate marking might be applied by a fire door maintainer, inspector or installer which applies specifically to their work and not to the performance of the fire door.

NOTE 9 Some fire door components (e.g. glass and hardware) require marking under other regulations (e.g. a CE or UKCA mark). These marks do not indicate that the component is suitable for the purpose for which it is being used, only that it has been subjected to the conformity assessment required by the appropriate product standard, under the construction products regulation relevant to the market where they apply.

*NOTE 10 The colour code identification system using concentric rings referred to in BS 8214:2016, Clause **5**, is now considered obsolete but might be encountered when inspecting existing fire doors. The marking system was intended to provide information on the fire door and is not an indication of third-party certification. Table 1 is reproduced from the 2016 edition for information purposes. Similar colour coding systems are used within existing certification schemes subject to the scheme rules.*

Table 1 — *Range of colour codes giving a method of performance identification for non-metallic doors and frames*

Core colour	**Label colour or background colour**	**Integrity** min	**Colour code interpretation**
Red	White	20	Intumescent fire seals need to be added at time of original installation
	Yellow	30	
	Pink	45	
	Blue	60	
	Brown	90	
	Black	120	
Green	White	20	Intumescent fire seals will have been fitted at time of manufacture
	Yellow	30	
	Pink	45	
	Blue	60	
	Brown	90	
	Black	120	

NOTE This is a reproduction of Table 1 in BS 8214:2016 (withdrawn).

12 Handling and storage of doors on site

Delivery should be planned so as to reduce the storage time on site to the practical minimum. Where fire doors and components have to be stored, they should be protected at all times from moisture and water damage, and extremes of temperature, preferably in a ventilated building. Fire doors and components should be stored in such a way as to prevent other damage, e.g. dents or scratches to pre-applied finishes.

NOTE Guidance on moisture content, ambient temperatures and humidity levels can be found in the ASDMA's Best practice guide to timber fire doors *[19].*

The manufacturer's specific handling and storage instructions should be followed.

Hardware already installed into the fire door should also be protected.

13 Installation of fire doors

13.1 General

The fixing of fire doors should be left as late in the building programme as possible to avoid damage arising from other operations. The manufacturer's specific installation instructions should be followed and documented (see **13.4.6**).

Operatives should be able to demonstrate that they are competent to install fire doors.

NOTE Users of this British Standard are advised to consider the desirability of employing installers that operate as a member of a third-party certification scheme for fire door installation. Such schemes are designed to ensure that the installation process conforms with the supporting evidence.

13.2 Compatibility of door frames with surrounding structure

*COMMENTARY ON **13.2***

Planning, preparation, design and agreement are key to ensure the fire door can be installed within the prepared opening as required by its supporting evidence.

A procedure to identify issues should be completed, and issues identified during this process should be raised before work starts.

The main supporting structure for the fire door, including any part of the reveal left unprotected by the frame after the fire door is installed, should be shown to be capable of providing the required period of fire resistance.

NOTE 1 The type of surrounding structure or wall/partition can exert an influence upon the fire performance of the assembly, e.g. for a timber door leaf in a steel door frame or a glazed screen.

*NOTE 2 When considering the compatibility of door frames with existing surrounding structures, see **4.5**.*

The provider for the door and door installer, taking advice from the fire door manufacturer, should liaise with the relevant contractor to determine what the requirements are for the supporting structure with regards to:

a) the loads imposed by the weight of the fire door on the supporting structure, e.g. the loads that would need to be supported for each opening and closing cycle;

b) the structural opening sizes necessary for the appropriate clearances between the fire door and the supporting structure allowing for the proposed sealing method and variations in both the supporting structure and the fire door frame (tolerances);

c) the requirements for fixings of the frame suitable to transfer the loads to the supporting structure and retain the fire door in position; and

d) installing the proposed fire door in accordance with supporting evidence for the required fire resistance period and smoke control.

The method of fixing and the location of fixings should be suitable for the particular structure into which the fire door is to be installed.

NOTE 3 Additional fixings to those required by the supporting evidence for fire resistance and smoke control might be needed to ensure the mechanical performance and durability for its intended use.

13.3 Installation of door frames

Fire door frames should be fixed in accordance with the manufacturer's instructions and be installed plumb and square within the opening, without twist, racking or distortion of any member.

Correct methods of installation should be adopted to such that, when fixed into the wall, the designated fire rating for the door opening is achievable.

Fixings for installation should be appropriate for the substrate into which they are to be installed and be covered within the supporting evidence.

Additional fixing locations to those given within the supporting evidence should be confirmed with the fire door manufacturer.

NOTE It might be necessary to provide additional fixings to ensure stability for everyday use.

13.4 Sealing between fire door and surrounding structure

13.4.1 General

To maintain the fire resistance of a fire-resisting wall or partition when fitted with a fire door, the sealing between the door frame and the supporting construction should be undertaken using materials with supporting evidence for their use, taking into account the width and depth of the gap, the type of door frame, the type of supporting construction and the required period of fire resistance.

To facilitate installation, the structural opening for the fire door should be prepared to a size that includes the permissible clearances between the back of the fire door frame and the supporting structure as defined by the door supplier.

The fire stopping between the fire door frame and supporting structure should be in accordance with the fire door manufacturer's guidance and supporting evidence.

When installing a replacement door, the door should be manufactured to a size appropriate to the structural opening, taking into account any gap required for fire stopping between the back of the frame and the structural opening.

13.4.2 Sealants

The sealant between the door frame and supporting construction (e.g. mastic or expanding foam) should be included in a fire resistance test of a fire door in accordance with BS 476-22 or BS EN 1634-1 and meet the required performance class for the installation.

*NOTE Supporting evidence can include additional test evidence from successful tests in accordance with BS 476-20 or BS EN 1366-4. Further information on supporting evidence is given in **B.3**.*

The use of the sealant should be limited to the scenarios described by the supporting evidence, which should include the:

a) frame material;

b) type of supporting construction;

c) maximum width and required depth of the sealant; and

d) period of fire resistance.

All sealant materials should be installed by a competent person in accordance with the instructions and conditions of use provided by the sealant supplier, confirmed by the installer with the sealant supplier for the requirements of the application, with reference to the supporting evidence.

13.4.3 Intumescent fire seals

Pressure forming intumescent seals (e.g. pre-formed intumescent strips typically used as door edge seals) used to seal between the door frame and supporting construction should be included in a fire resistance test of a fire door in accordance with BS 476-22 or BS EN 1634-1 and meet the required performance class for the installation using the same door frame material, type of supporting construction and maximum width of gap as stated in the supporting evidence. The seals should be tested in the location in which they are to be used and proven for the end use application.

*NOTE Supporting evidence can include additional test evidence from successful tests in accordance with BS 476-20 or BS EN 1366-4. Further information on supporting evidence is given in **B.3**.*

13.4.4 Packers

Packers should be installed in accordance with the fire door manufacturer's guidance concerning fire resistance and smoke control.

NOTE Packers can interrupt the sealing material used between the back of frame and the supporting structure. Fire resistance and smoke control might require specific sealing details for the packers such as capping with mastic, as the packers could provide a path for fire and smoke leakage.

Packers should be used to prevent distortion of the frame at the fixing points and to maintain the width of gap around the fire door frame.

13.4.5 Architraves

Architraves should be integral or mechanically fixed (e.g. with pneumatically fired pins or screws) unless supporting evidence is available to prove alternative installations.

Enhanced fixings, where the closer is fixed through the architrave, should be in accordance with the manufacturer's guidance.

NOTE Continuous operation of the closer when fixed to the architrave can cause the architrave to become loose and compromise the self-closing action of the door.

13.4.6 Checklist

The manufacturer of the fire door or sealant should have supporting evidence confirming the fire resistance and/or smoke control performance of the application of the sealant for the installation details.

NOTE The checklist in Table 2 provides a list of criteria that can influence the sealing solution. It provides a means for the specifier to confirm the fire door specification so the fire door manufacturer can provide the required sealing solution based on their fire door design and supporting evidence. It connects the fire door specification to the appropriate installation detail. It is not mandatory but assists good practice when installing fire doors.

Table 2 — *Example of a completed checklist*

Essential sealing detail	Detail of fire door to be installed	Solution (to be supplied by sealant manufacturer or fire door manufacturer)
Period of fire resistance and standard	30 min to BS 476-22	Full depth fill of stone wool [insert brand or spec], due to smoke requirement, capping of intumescent mastic [insert brand or spec]. Packers should be cut short and continuously capped with mastic. Certificate ref: XXXX supports above detail for minimum 30 min performance to BS 476-22 and smoke control to BS 476-31.1 (<3 m^3/m/h) including threshold
Smoke control performance required and standard	Smoke control to BS 476-31.1 (<3 m^3/m/h) including threshold	
Other specialist performance required (e.g. acoustics)	No	
Fire door type	Timber leaves in steel frames	
Door frame (material)	Steel hollow section	
Door frame (dimensions)	100 mm × 30 mm	
Wall type (likely or unlikely to exhibit significant distortion during fire exposure)	Likely to exhibit significant distortion	
Wall substrate/fixing medium (e.g. timber stud, steel stud, plasterboard liner, masonry)	Steel stud with timber infill	
Depth of gap at back of frame	100	
Width of gap at back of frame	10-15	
Presence of architrave	No	
Dimensions of architrave	N/A	
Packer material	Plastic	

13.4.7 Prescriptive fire-stopping installation scenarios of timber-based fire doors using stone wool and mastic

NOTE 1 A non-exhaustive list of acceptable fire stopping scenarios is given in Table 3 to Table 6 for 30 min and 60 min timber-based fire doors.

The information given in Table 3 to Table 6 should only be used with the approval of the fire door manufacturer.

For these scenarios, the mastic should either:

a) have been included within a fire test, between the door frame and surrounding structure, on a timber-based fire door that has demonstrated the required fire resistance performance in accordance with BS 476-22 or BS EN 1634-1; or

b) be an approved linear gap joint seal, successfully tested in accordance with BS 476-20 or BS EN 1366-4 for the required period of fire resistance.

NOTE 2 The following substrate materials tested either side of the approved mastic are acceptable as supporting evidence:

a) timber to concrete;

b) timber to timber;

c) timber to masonry;

d) timber to timber stud partition; or

e) timber to metal stud partition.

The above recommendations in a) to b) for the scenarios given in Table 3 to Table 6 differ from the recommendations for all possible installation scenarios as described in **13.4.2**, where the supporting evidence should specifically cover the scenario in which the mastic is to be used.

For the purpose of sealing details in Table 3 to Table 6, packers should be made from the same material as the fire door and be continuously capped with mastic.

Table 3 — *Supporting construction unlikely to exhibit significant distortion during fire exposure, for timber based fire doors with 30 min fire resistance, e.g. for a masonry wall or non-load bearing timber stud partition*

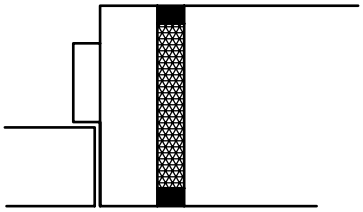
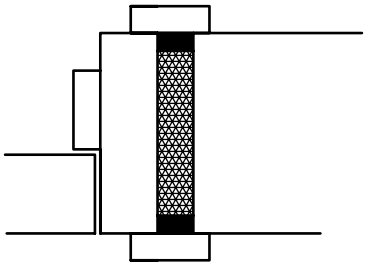
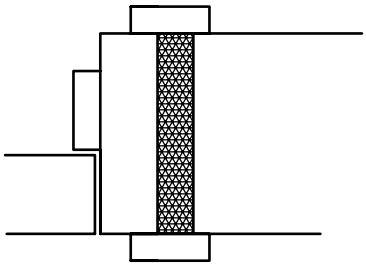
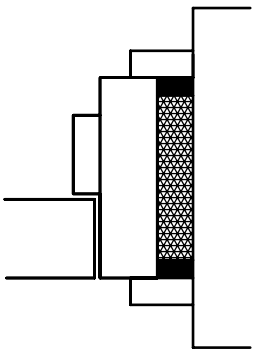
No.	Architrave condition	Minimum width of gap measured between frame and supporting construction	Maximum width of gap measured between frame and supporting construction	Additional protection	Suitable for smoke control	Schematic
1	Architraves are optional	5 mm	15 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	
2	Minimum 15 mm thick constructed from softwood, hardwood or MDF with 15 mm overlap on frame and wall	5 mm	20 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	
3	Minimum 15 mm thick constructed from softwood, hardwood or MDF with 15 mm overlap on frame and wall.	5 mm	20 mm	Stone wool tightly packed to the depth of the frame only	No	
4	Minimum 15 mm thick constructed from softwood, hardwood or MDF tightly fitted between wall and frame and overlapping frame by 15 mm	5 mm	20 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	

Table 4 — *Supporting construction likely to exhibit significant distortion during fire exposure, for timber based fire doors with 30 min fire resistance, e.g. steel stud partition or load-bearing timber stud partition*

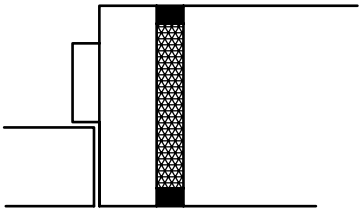
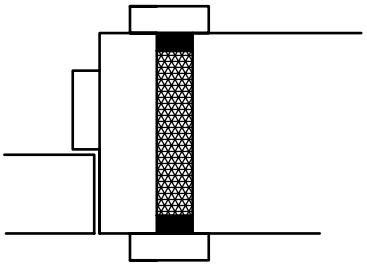
No.	Architrave condition	Minimum width of gap measured between frame and supporting construction	Maximum width of gap measured between frame and supporting construction	Additional protection	Suitable for smoke control	Schematic
1	Architraves are optional	5 mm	15 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	
2	Minimum 15 mm thick constructed from softwood, hardwood or MDF with 15 mm overlap on frame and wall	5 mm	20 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	

Table 5 — *Supporting construction unlikely to exhibit significant distortion during fire exposure, for timber based fire doors with 60 min fire resistance, e.g. non-load bearing timber stud partition or masonry wall*

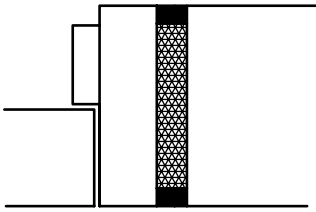
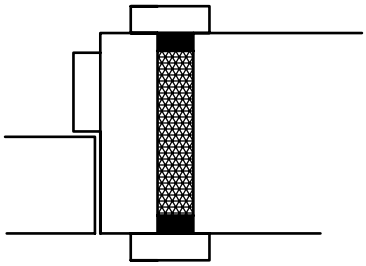
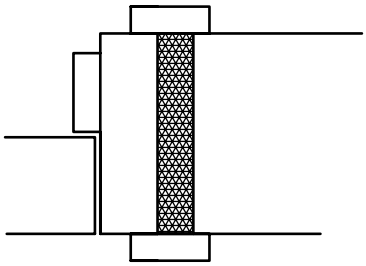
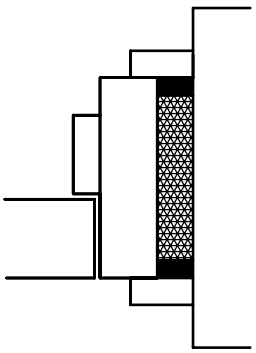
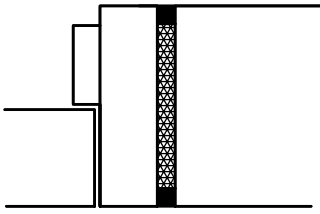
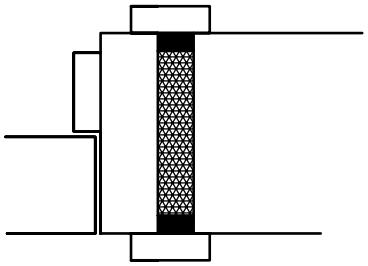
No.	Architrave condition	Minimum width of gap measured between frame and supporting construction	Maximum width of gap measured between frame and supporting construction	Additional protection	Suitable for smoke control	Schematic
1	Architraves are optional	5 mm	15 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	
2	Minimum 15 mm thick constructed from softwood, hardwood or MDF with 15mm overlap on frame and wall	5 mm	20 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	
3	Minimum 15 mm thick constructed from softwood, hardwood or MDF with 15 mm overlap on frame and wall	5 mm	20 mm	Stone wool tightly packed to the depth of the frame only	No	
4	Minimum 15 mm thick constructed from softwood, hardwood or MDF tightly fitted between wall and frame and overlapping frame by 15 mm	5 mm	15 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	

Table 6 — *Supporting construction likely to exhibit significant distortion during fire exposure, for timber based fire doors with 60 min fire resistance, e.g. steel stud partition or load-bearing timber stud partition*

No.	Architrave condition	Minimum width of gap measured between frame and supporting construction	Maximum width of gap measured between frame and supporting construction	Additional protection	Suitable for smoke control	Schematic
1	Architraves are optional	5 mm	10 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	
2	Minimum 15 mm thick constructed from softwood, hardwood or MDF with 15 mm overlap on frame and wall	5 mm	20 mm	Stone wool tightly packed to the depth of the frame with a 10 mm deep continuous capping of mastic on each side	Yes	

13.4.8 Acceptable installation scenarios for non-timber-based fire doors

For all other framing materials that are not timber-based, sealing materials should be installed in accordance with the supporting evidence.

13.4.9 When the opening is not to specification

*NOTE 1 Situations can arise in practice where the door installer arrives on site to find that the wall or partition opening has not been prepared in accordance with the specified dimensions, tolerances and squareness, so that fitting the door and door frame into the opening, to be true and plumb, is difficult either in accordance with the manufacturer's specified sealing arrangements for the door or the acceptable installation details provided in this British Standard (see **13.4.7**).*

Issues fitting the door into the prepared opening should be resolved with the relevant duty holder as appropriate.

Where an installer holds information that describes how modifications are to be made on site, without detrimentally affecting the fire performance of the fire door, those modifications should be made in accordance with the parameters allowed by the supporting evidence, and in accordance with the documented competence of the installer, to provide adequate sealing of the gap between the frame and supporting structure.

NOTE 2 Replacements into existing wall and partition constructions can be challenging. A survey and a discussion with the relevant duty holders and Building Control as necessary, might be particularly important to agree upon an acceptable sealing solution for the gap between the frame and supporting construction. See the ASDMA's Installation Guide *[33] for more details.*

13.5 Fitting a door leaf

13.5.1 General

Any adjustment to the door size necessary on site to achieve the required operating gap around the sides, top and bottom of the door leaf should be performed in accordance with any limitations given in the manufacturer's installation instructions applicable to the particular door type. If, in the process of installation, any fire and/or smoke seals are damaged, they should be replaced with identical products.

It should be established before alteration on site whether the fire door incorporates a concealed intumescent fire seal and, if so, adjustment (e.g. planing) should be limited accordingly.

*NOTE Specific recommendations for the installation of intumescent fire and smoke seals are given in Clause **8**.*

13.5.2 Operating gaps

The width of the gap between the edges of the door leaf and the door frame should be in accordance with the supporting evidence.

Fire doors should be fitted with intumescent fire seals, or intumescent fire and smoke seals (combined or separate) where required and as specified (see Clause **8**).

Certain smoke seals (e.g. those fitted in the frame reveal or edge of the door) occasionally require a larger gap to operate without causing significant frictional increases, but the gap should remain within tolerances approved for the fire resistance performance. The correct gap between the doorstop and the face of the door leaf should be allowed for where doorstop-mounted smoke seals are fitted. The leaf should not protrude from the face of the frame unless covered by the supporting evidence.

Due to the action of steel door leaves expanding during fire test conditions, intumescent seals are not always required but if they have been tested and are specified for the fire door design they should be fitted.

NOTE Smoke seals are required for steel fire doors if smoke control performance is specified with reference to supporting evidence.

13.5.3 Under-door gaps (gap between the bottom of the door and the threshold or finished floor) for fire resistance

The gap between the bottom edge of the door and the threshold or finished floor should be in accordance with the fire door manufacturer's installation instructions and supporting evidence for the particular design.

NOTE 1 Gaps larger than those approved are likely to compromise the smoke control and fire resistance performance of the fire door.

The door should be able to open freely over its entire opening angle without damaging the seal or catching on the floor.

NOTE 2 Further guidance on the gap between the bottom of the door and the threshold or finished floor is given in the ASDMA publication Guidance for the coordination of bespoke doorsets *[33].*

The sealing systems for smoke performance for the gap between the bottom of the door and the threshold or finished floor should be in accordance with **8.4**.

14 Handover

When the installation has been completed, information should be provided to the appropriate persons, depending on the building type, so that all actors with a responsibility for the building are able to fulfil their roles.

NOTE 1 There might be contractual responsibilities concerning the content and form of the information that is required.

NOTE 2 Information about the design of the fire door might include, but is not limited to, drawings, component listings and a product description.

NOTE 3 It is not necessary to provide individual test reports where the performance of the fire door can be shown by an FoA report, an EXAP report or classification report that has been prepared by a competent authority. As the scope of the use of the door is defined in these reports, there is no need to also provide the test evidence used as the basis for their creation.

The fire door specification should be covered by the supporting evidence.

The following should be provided as part of the fire door handover information.

a) A description of the fixings, packers and sealants used in the installation of the door, including test evidence supporting their use in the installation.

b) Operating and maintenance instructions and safety information relevant to the door and its components.

NOTE 4 Photographic evidence can be provided to show how particular details have been completed (e.g. the sealing of the frame to the supporting construction prior to the fitting of architraves). Some clients might require these photographs to have a location signature allowing them to be linked to a particular installation.

NOTE 5 For new buildings, the fire door handover forms part of a wider package of building information, including, for example, the specification and construction of the supporting structure and whether this is considered flexible or non-flexible. The same information for fire door handover is also required for existing buildings; however, where the information is not available (e.g. the wall specification), this is typically addressed by a risk assessment, carried out by a suitably competent individual as required by the relevant fire safety regulations for that jurisdiction.

NOTE 6 Attention is drawn to relevant regulations regarding maintenance and fire safety for purpose of door inspections, e.g. Regulation 38 of the Building Regulations 2010 [1] and the Regulatory Reform (Fire Safety) Order 2005 [7].

15 Maintenance

*COMMENTARY ON CLAUSE **15***

Doors can deteriorate where they are situated in pedestrian transit routes and subject to significant damage, normal wear and tear due to repeated operation and perhaps abuse.

Deterioration typically takes two forms.

a) Damage to the leaf or the components making up the assembly.

b) Wear in the door hardware, or a reduction in the effectiveness of fixings, causing the door not to self-close effectively, resulting in a breach of the fire and smoke barrier.

It is important, therefore, for inspection, maintenance and repair of any damage to be undertaken on a regular basis if the required fire resistance is to be maintained. The markings of individual components can be an aid to the correct replacement of those components when necessary.

Attention is drawn to Article 17 of the Regulatory Reform (Fire Safety) Order 2005 [7] and to the *Fire Safety Act 2021* [6] *regarding the maintenance of fire safety provisions for protected escape. Further guidance on maintenance is given in ASDMA publication* Risk assessment considerations – Timber fire doors *[35].*

The term "notional fire door" is defined in the Home Office guide Fire safety in purpose-built blocks of flats[5] *[36]. It applies to an existing fire door that, at the time of installation, met the requirements for a fire door but which might not meet today's standards. Notional fire doors are only relevant within a fire safety risk assessment conducted in accordance with Home Office guidance.*

Doors without fire resistance documentary test evidence that do not meet the definition of notional as given above are sometimes termed "nominal fire doors" by the industry. Doors without fire resistance documentary test evidence can only be considered to provide a level of fire resistance after an appropriate risk assessment that takes into account, for example, the means of escape, occupancy profile and the full safety measures in the building.

Fire safety risk assessments are outside the scope of this British Standard.

Users of this British Standard are advised to consider the desirability of employing maintenance personnel who operate as a member of a third-party certification scheme.

15.1 General

Inspection of fire doors should be carried out and recorded on a regular basis as determined by the risk assessment.

NOTE 1 Attention is also drawn to the Fire Safety (England) Regulations 2022 [37].

Major failures in door function should trigger immediate inspection and remedial action.

NOTE 2 Where fire doors are in regular use, major failures in door function will quickly become apparent, e.g. difficulties in opening and closing or failure to close properly.

Any modifications and replacements of individual components should be carried out in accordance with the supporting evidence as originally provided and approved, following the guidance provided by the responsible door manufacturer.

Where replacements of parts and individual components are necessary, this should be done wherever possible on a like-for-like basis with reference to the original fire door specification and the original supporting evidence. Where the fire door is covered by third-party product and process certification, then the relevant and applicable certification should also be referenced.

Where the original fire door specification is not available and not referenced, the door should be evaluated to decide whether a full replacement is necessary. In all cases, work should be carried out to maintain at least the intended function of the fire door before more permanent repairs are carried out, rather than leaving a door where there is a question over its likely performance.

Maintenance should be completed in accordance with manufacturer's recommendations.

NOTE 3 If the manufacturer is unknown, advice can be sought from competent individuals and relevant trade associations.

Door leaves, door frames, hardware, glass and seals should be examined at regular intervals for superficial damage, structural damage, excessive bow, cup or twist of the door leaf or deformation of the door frame. These inspection intervals should be modified over time as necessary to suit observations and experience related to the particular building and the condition of the doors.
Any replacement components should be in accordance with the fire door specification as covered by the supporting evidence.

NOTE 4 The frequency of inspection can be determined according to the risk assessment and relative to the frequency of use of the doorway.

[5] Available at https://www.gov.uk/government/publications/fire-safety-in-purpose-built-blocks-of-flats.

Inspection and maintenance should be undertaken by a competent person (see 3.4).

Maintenance activities should be integrated with the fire risk management plan for the building, and regularly reviewed, recorded and updated.

The maintenance record should include:

a) any changes made to the fire door;

b) who approved the changes;

c) who carried out the work; and

d) the associated instructions and explanations for why the changes were required.

15.2 Door leaves and door frames

15.2.1 General

It is difficult to repair fire doors and maintain the interactive behaviour of the various component parts; ideally, repairs should only be undertaken within the specification and supporting evidence of the fire door. When damage occurs that is not repairable, the door leaf, door frame or the complete assembly should be replaced as appropriate.

The replacement fire door should be able to provide the same level of fire resistance as within the original fire door specification. In the case where it is deemed possible to just replace the door leaf, it should be confirmed that the existing frame and any intumescent fire seals, if fitted, are compatible with the new door leaf by checking the specification, design and supporting evidence.

Fire doors that are normally kept locked should be inspected with the door leaves open.

If whole door replacement is deemed necessary, the inspector should provide a report explaining the faults and reasons for the recommendation to replace doors. Any fire door replacement should be taken in consultation with the fire risk assessment.

NOTE *It is not normally possible to repair steel and composite fire doors; replacement is generally needed.*

Where determination by fire risk assessment is sufficient to identify fire door replacement, new doors should be installed rather than actions taken to try to upgrade existing doors in place with major modifications that impair key safety performances.

15.2.2 Double-leaf doors

If one leaf of a double-leaf door requires replacement, then the replacement leaf should be made by the original door manufacturer such that the same door leaf structure from the original fire door specification is reproduced. Where the original specification is unable to be referenced, or if a door leaf made by the original door manufacturer is not available, then both leaves, or the whole assembly, should be replaced. The door leaf should be fitted in accordance with the manufacturer's instructions and installed by a competent installer (see 3.4).

The gap between the two leaves and the alignment of the leaves should be in accordance with the provided fire door specification and the supporting evidence. These gaps apply at the time of fitting, and changes occurring during the working life of the door, for example, arising after door inspections, should be addressed separately as part of the maintenance programme for the doors.

15.2.3 Replacement of intumescent fire seals, smoke seals and combined intumescent fire and smoke seals

*COMMENTARY ON **15.2.3***

There are three types of door seal available for fire and smoke containment.

a) Intumescent seals for fire resistance only, designed to maintain the fire door integrity.

b) Smoke seals to restrict the flow of smoke before intumescent fire seals become effective.

c) Combined intumescent fire and smoke seals where both intumescent fire and smoke seals are incorporated in the same assembly.

Damage or degradation of these seals can have a significant adverse impact on the ability of the fire door to perform its designed function.

If a seal is missing in part or in total, the entire length should be replaced. To maintain the potential (or design) integrity performance, the replacement seal should be of the same brand, formulation, dimensions and configuration as that of the seal being replaced. The replacement seal should be fitted in accordance with the fire door manufacturer's specification, following the guidance provided by the seal provider identified by the door manufacturer. Where the seal brand is not identifiable, the whole set of seals should be replaced in accordance with the original fire door specification.

NOTE General guidance on replacing intumescent fire seals can be found in the IFSA's Fact Sheet 01 *[38]. Intumescent seals can be based on different chemical formulations which affect the trigger temperature and the degree of intumescence that takes place. Precisely identifying intumescent seals can be difficult, and consultation with a seal supplier is usually advisable.*

15.3 Replacement of door hardware

Where it is necessary to replace essential door hardware for whatever reason, such as damage or wear, the fire door manufacturer's specification and supporting evidence should be followed. In addition, the replacement hardware should be of the same dimensions and fit to avoid additional machining or filling of the door leaf or frame.

15.4 Replacement of glass

*NOTE 1 For fitting of glass on site, see Clause **9**.*

Glass should be replaced by a competent person and in accordance with the fire door manufacturer's guidance, which should advise whether or not the glass replacement is able to be carried out on site. Only fire-resistant glass that is in accordance with the fire door's supporting evidence should be used, and it should be permanently marked to allow identification at least by name, manufacturer, glass type and impact performance.

Damaged components should be replaced as necessary when replacing broken glass. All glazing system components should be replaced like for like, unless complete replacement is required.

NOTE 2 Examples of components include glazing beads, cassettes, fixings, setting blocks and sealing systems.

In all cases, the glass and glazing system should be supported by the supporting evidence for the doorset design and fitted in accordance with door manufacturer's instructions, taking into account the glass manufacturer's recommendations (e.g. edge cover and expansion allowance).

When replacing broken glass, the glazing aperture pocket should be cleaned of debris and any projections removed before re-glazing.

NOTE 3 Users of this British Standard are advised to consider the desirability of employing glaziers who operate as a member of a third-party certification scheme for glass and glazing system replacement, as such schemes are designed to ensure that the glazing process maintains product conformity.

16 On-site decoration

*COMMENTARY ON CLAUSE **16***

Fire door leaves generally do not have a specific surface spread-of-flame requirement, and may therefore be painted or lacquered as desired in accordance with the manufacturer's recommendations where available. Information on other decorative finishes, such as foils, films or veneers, are typically given in the manufacturer's supporting evidence. Some finishes are factory applied, whereas others might be suitable for on-site decoration, but only in accordance with the manufacturer's instructions.

For all paints and lacquers, the manufacturer's guidelines should be followed regarding recommended curing and drying times, and compatibility with fire and/or smoke seals manufactured from PVCs, butyls, and/or nitriles.

Smoke seals or combined intumescent fire and smoke seals should not be painted.

NOTE 1 Painting smoke seals makes them inflexible and has a detrimental effect on smoke sealing and operational performance of the fire door.

For intumescent fire-only seals, the overpainting of intumescent fire seals has no detrimental effect on the ability of the seals to perform efficiently; however, overpainting should be limited to a maximum of five coats of conventional paint or lacquer or a maximum of 0.5 mm, whichever is the greater. The manufacturer's instructions should be followed.

NOTE 2 General guidance on over painting of intumescent seals can be found in IFSA's Fact Sheet 03 *[39].*

When preparing a frame for redecorating, the use of heat or chemical strippers should be avoided if seals are incorporated. If seals are damaged by either of these processes, they should be replaced in accordance with **15.2.3**.

Where glazing beads are identified as having been painted with intumescent paint, specialist advice should be obtained before repainting.

NOTE 3 Steel fire doors are generally pre-finished.

Annex A (informative)
Security and fire doors

Security fire doors provide an example of where two prominent safety-related functions come together in the same door, and need to be combined along with other requirements that apply (such as safe opening/closing and edge sealing). Combining the functions requires an emphasis on careful design and evaluation of performances.

The main situations for security apply to apartment entrance doors in residential blocks, communal entrances/exits and perhaps a relatively small number of doors in different buildings where there is a particular requirement for what is described as security compartmentation (i.e. controlled or limited access for various security reasons). There is an emerging trend for internal charging areas where electric vehicles, bikes and disability scooters are kept.

The key principle is that there is a single fire door specification that is demonstrated by appropriate testing and applicable data to meet the requirements of both the security and the fire safety functions.

A security fire door functions as a complete system that includes the door itself with its seals, glazing and closer, the frame, the locks and other security hardware, and increasingly electronic operated items. The robustness and strength of the door and frame are especially important considerations, which are not normally expected for fire doors in other parts of the building. It is therefore important that the suitability of the door for its intended use and integrated design principles are observed, and in particular, that the responsible source is identified and consulted.

Annex B (informative)
Fire door classifications

COMMENTARY ON ANNEX B

Any detail in this British Standard that allows alteration to the door design might conflict with the original fire door classification.

B.1 Fire door classifications and supporting evidence

B.1.1 General

The expression of fire resistance requirements in the UK in regulations and design standards is limited to either the integrity criterion alone or integrity with insulation. Performance is tested in accordance with either BS 476-22 or BS EN 1634-1, determined by the time in minutes when the standard failure criteria are reached for either integrity or insulation. Fire doors are typically designated by reference to their integrity performance, although insulation performance might also be a requirement, particularly under risk-based design approaches and for the requirements of insurance for enhanced property protection.

B.1.2 Fire door classifications based on British Standards

British standards introduced the prefix “FD” to identify fire doors that have fire resistance integrity performance when tested in accordance with BS 476-22 and/or BS EN 1634-1 but assessed to a BS 476-22 performance (see Note 1). The FD prefix is followed by the integrity rating, which is expressed in minutes, e.g. FD30, a fire-resisting door able to resist integrity failure for 30 min.

A fire-resisting door that has been identified with the notation FD cannot be assumed as being able to provide the same level of insulation performance. Insulation performance would need to be confirmed by the supporting test evidence for the door design.

NOTE 1 Where insulation and integrity are used in this British Standard, these are in relation to fire resistance. Heat transmission with reference to U-value is thermal transmittance.

In addition to the need to provide fire resistance, certain doors are also required to restrict the spread of ambient temperature ("cold") smoke. British standards introduced the suffix "S" to identify fire doors that have a leakage rate not exceeding 3 m^3/m/hour when tested at 25 Pa, in accordance with BS 476-31.1, see **8.4** of this standard.

NOTE 2 The FD and S notations are not used in the Scottish Government's Domestic Technical Handbook *[14] or the* Non-domestic Technical Handbook *[15] (Table 2.9 and Table 2.19 respectively), but the fire resistance and smoke leakage requirements are the same as that stated above for doors tested in accordance with the British Standards.*

B.1.3 Fire door classifications based on European standards

When tested in accordance with the European test methods for fire resistance (BS EN 1634-1) and smoke control (BS EN 1634-3), the door design can be classified in accordance with classification standard BS EN 13501-2.

The classification indicates the performance of the door design, by using letters defined in BS EN 13501-2. It is only possible to assign a European classification to a door design using the BS EN 13501-2 standard, which is conducted as a separate exercise from the testing.

It is possible to extend the scope of fire door designs tested in accordance with the EN test methods using direct FoA, DIAP or EXAP rules and then classifying the range of options using BS EN 13501-2. The classification for the door relates to the tested fire door design or those modifications that have been covered by DIAP or EXAP.

Manufacturers of EN classified fire doors are required to provide the necessary details for correct installation.

The European classifications given in the guidance to UK building regulations for fire doors are:

a) E – integrity performance; and

b) S_a – ambient temperature smoke control.

The rating for the fire door is given after the integrity classification, with the S_a classification added as a suffix, e.g. E30S_a indicates a fire door with 30 min integrity and ambient temperature smoke control.

The S_a classification communicates that the maximum leakage rate for the fire door measured at ambient temperature, and at a pressure of 25 Pa only, does not exceed 3 m^3/h per metre length of gap between the fixed and moveable components of the fire door (e.g. between the door leaf and door frame).

BS EN 13501-2 was revised in 2023 and now includes a requirement to complete the S_a classification with either "3" or "4" to indicate whether the fire door has been tested with seals on 3 sides (vertical sides of the door leaf/leaves and head) or on 4 sides (i.e. additionally including the threshold). A note is included within BS EN 13501-2 to clarify that by default, the S_a classification according to the previous version of BS EN 13501-2 will correspond to $S_{a3.}$

Fire resistance insulation performance is included within the classification system and is indicated by I_1 or I_2, which correspond to two definitions given in BS EN 13501-2, and relate to the positioning of the thermocouples on the specimen and temperature limits on the surface. A fire door that can provide 30 min of integrity and insulation performance when tested in accordance with the BS EN 1634-1 test method can be classified as E$I_2$30, based on the definition of integrity and insulation given in BS EN 13501-2.

NOTE European (EN) standards under the authority of the European Committee for Standardization (CEN) have been developed for the purposes of facilitating trade involving the free movement of goods across the Single Market internal area of the EU. Classifications are based on initial type testing, and use of the associated extended applications rules require at least one test result (though manufacturers are able to submit more if they wish, and certain modifications in the rules might call for such additional tests).

B.2 Determination of fire resistance of doors

The fire resistance of a fire door is determined by subjecting a representative sample of the complete fire door assembly at its full size, or the maximum size permitted by the furnace. The classification can be extended with the addition of further test evidence from full size or reduced size testing in accordance with the procedures in the appropriate fire resistance test standard, i.e. BS 476-22, BS EN 1634-1 or BS EN 1634-2. The test standard requires the tested construction to be fully representative of the assembly to be used in practice.

The fire resistance is expressed in terms of the number of minutes for which the assembly meets the relevant criteria. Depending upon the test standard used for the evaluation, the criteria is either integrity or insulation.

For the purposes of European classification, doors are classified to the last specific fire resistance period that has been passed during the test before failure occurs. Where more than one criterion is identified during the test, it is possible that for each of these criteria, a different classification period might apply (see BS EN 13501-2:2023, **7.5.5**).

Fire doors tested in accordance with BS 476-22, or those for which data from BS EN 1634-1 testing has been assessed to a BS 476-22 performance, can be classified under the national classifications FD30, FD60, etc. Where the test evidence available also includes smoke control performance to BS 476-31.1, or results from a test in accordance with BS EN 1634-3 test is assessed to a BS 476-31.1 performance, the fire door might also be classified as FD30S, FD60S etc. When determining an FoA for the results, a technical assessment may be used. Further guidance is available in the PFPF *Guide to Undertaking Technical Assessments* [N1].

Doors classified for fire resistance and smoke control performance under the European classification system can only use test data from tests to BS EN 1634-1 or BS EN 1634-2 for fire resistance and BS EN 1634-3 for smoke control. An enhanced field of application for fire resistance and smoke control performance can only be determined using the direct application rules in the relevant test standard and the extended application rules in the BS EN 15269 series of standards. BS EN 15725 covers guidance on EXAP reports and BS EN 13501-2 covers guidance on classification reports.

Recommendations on the required classification period for a particular application are given in regulatory guidance or relevant design standards (such as BS 9991 and BS 9999), as well as individual designs carried out in accordance with BS 7974.

B.3 Supporting evidence

B.3.1 Forms of supporting evidence

Construction products such as fire-resisting and smoke control doors are tested against benchmark test standards to quantify their ability to provide a specific performance based on their end use function.

The objective of benchmark test standards is to provide repeatable and reproducible test conditions (e.g. heating and pressure) for construction products, such that their performance can be established against the criteria of the standard. The process of testing and resulting test evidence is therefore a critical aspect of demonstrating the performance of a construction product.

However, given that construction products are often used as part of a system of components with specific end use applications when installed in the building, test evidence is not always the most appropriate document when considering the use of the construction product in-situ. There are other forms of supporting evidence that can be used to establish the performance of the product supplied and installed. These are all based on the test evidence for the design and can also:

a) communicate the performance for the product family based on a series of tests;

b) provide essential information on the end use of the product (e.g. installation);

c) list other important performance characteristics (e.g. enhanced security); and

d) indicate that the product is subject to ongoing conformity assessment under an accredited third-party certification scheme.

Examples of supporting evidence that can be used when considering the performance of a fire door, components or other materials for installation or maintenance activities are:

1) fire test evidence;

2) technical assessment of fire performance (test laboratories and independent assessment/ consultancy bodies);

3) FoA reports;

4) European classification and EXAP reports;

5) fire performance scope of application reports;

6) the associated technical documents and relevant installation instructions that are issued with a CE/UKCA marked product covered by a scope of application given within a European Technical Assessment (ETA) that is linked to a valid declaration of performance (DoP);

7) the associated technical documents and relevant installation instructions that are issued with a CE/UKCA marked product, which has been placed on the market in conformity with a harmonized/designated product standard, linked to a valid DoP;

NOTE There is still no harmonized/designated EN product standard for internal fire doors so, at time of publication, it is not possible to CE/UKCA/UKNI mark internal pedestrian fire doors.

8) information and data for the additional and specialized functions that might apply to fire doors, in addition to the fire safety performance requirements (for example, U values, acoustic performance, durability and various shielding applications). This can include information and performance data from component suppliers and manufacturers (such as various seals, glass and hardware); and

9) codes of practice that contain specific information on how to complete a function and demonstrate compliance against a performance-based standard (e.g. this British Standard).

B.3.2 Use of supporting evidence

Supporting evidence is used to demonstrate compliance with relevant regulatory requirements and is essential for the specification, performance evaluation, installation and maintenance of fire resisting doors.

Supporting evidence can take multiple forms and to meet the objectives outlined above, needs to be suitable and sufficient for the door design, and compatible with one another. Fire doors are tested as complete entities and the supporting evidence demonstrates the performance of the door, as well as provides other critical information related to design, fitting of components, operating tolerances, installation and maintenance requirements.

Understanding the different forms of evidence and compatibility of the documents is therefore critical to ensure a smooth process throughout the specification, manufacture, installation and handover. Using documentation that is not compatible might also result in fire doors being supplied with the illusion of compliance, where the doors are believed to have the performance stated, based on the information supplied, but might not be fit for the intended use.

In all cases, the supporting evidence is applicable to the fire door design, contains sufficient information to support the performance of the door and provides the necessary information to be able prepare a specification, evaluate its performance, correctly install the door, and with sufficient information for the purpose of ongoing information. If the supporting evidence does not fulfil these criteria, it is unlikely to be suitable or sufficient.

Where multiple documents are to be used as supporting evidence, the documents are checked for compatibility with one another. If the supporting evidence does not clearly explain how and what additional documents can be used to support the performance of the fire door as a complete entity with whatever additional scope is provided by the additional documents, the additional documents cannot be used. It is not possible to assume that just because something has been tested, assessed or certified for fire resistance (or any other performance characteristic), that it can be used alongside different pieces of supporting evidence such as fire resistance and enhanced security.

The use and limitations of the different forms of supporting evidence are given below.

a) Test report

A test report from a laboratory accredited to the relevant test method, where the fire door has been successfully tested, in full accordance with the test standard, as meeting the minimum performance criteria required (e.g. 30 min integrity). A test report can be used as supporting evidence as a standalone document but only provides information on the exact design that has been tested. A test report cannot be considered automatically compatible with another test report, even if the report is on the same design. If more than one test report is required to demonstrate compliance, the evidence is compiled and considered by technical evaluation, e.g. field of application.

b) Assessments (technical assessments, FoA reports)

Assessments express the opinion of the body that prepared the report and are based on one or more test reports. Assessments that provide all the necessary information for demonstrating the compliance of the door design sometimes refer to separate pieces of supporting evidence for specific design applications. The assessment is carefully read, and any restrictions or requirements precisely followed including what type of document, the body that prepared the document, the associated test standard and any application restrictions (e.g. a particular door type, location, material).

c) Third-party certification (fire performance certification scope of application)

Accredited third-party certification schemes are operated by different bodies based on the requirements given in BS EN ISO/IEC 17065, using the conformity assessment activities outlined in BS EN ISO/IEC 17067. The differences between the schemes mean they cannot be assumed to have interoperability, or that a certificate from one scheme provider is able to be used alongside a certificate from another provider. If information from another body has been deemed acceptable for use by a scheme provider, the conditions and limitations of use are clearly stated by the scheme provider to avoid confusion.

d) European classification and EXAP reports

European classification and EXAP reports are prepared using defined rules within test standards and EXAP standards. For the classification (e.g. E30 S_{a4}) of the door to be valid, the BS EN 13501-2 classification report is read in conjunction with the supporting scope documents (e.g. EXAP) referred to in the classification report. It is not possible to provide a classification (e.g. E 30 S_{a4}) outside of a formal BS EN 13501-2 classification report.

e) Technical documents (CE/UKCA)

A CE or UKCA marked product is supplied with documents that provide information on the scope, use and installation of the product, which are linked to a valid DoP issued by the manufacturer. Any linked documents are clearly stated in the technical documentation issued by the manufacturer and is under the responsibility of the manufacturer based on the DoP.

f) Information and data for specialized functions (e.g. manufacturers' data sheets)

Manufacturers' data sheets can provide useful information for other performance characteristics for specific components and systems that have been incorporated within the fire door.
Where manufacturers' data sheets are intended to be used as supporting evidence, the component or system covered by the data sheet is first checked for compatibility with the door design.
Manufacturers' data sheets are not the same as test evidence, and to verify the performance stated on the manufacturers' data sheets, the evidence that supports that data sheet is obtained or verified by an independent and competent entity.

g) Codes of practice

Some codes of practice provide details on how to fulfil a specific function, such as installation, and maintain compliance with performance requirements of a benchmark standard.
For example, **13.4.7** provides a prescriptive solution for installing timber-based doors for 30- and 60-min fire resisting applications. To demonstrate compliance, all requirements given in the relevant section of the code, if proactive, are followed, which is then cross referenced with the fire door to be installed. It is not enough to state that the installation complies with BS 8214, the user demonstrates how and why it complies with BS 8214, in association with the supporting evidence for the complete fire door.

Annex C (informative)
Information to be obtained from manufacturers

The list in this annex encompasses information to be provided by different manufacturers involved in the process, e.g. fire door manufacturers, hardware manufacturers, glazing and seal manufacturers. It is a checklist for references to manufacturers' instructions/recommendations within this British Standard and is not necessarily an exhaustive list of all information that might need to be provided.

Information to be obtained from manufacturers are:

a) a detailed specification for the complete assembly, with reference to the applicable test evidence, e.g. in the applicable FoA report;

b) minimum dimensions for frame cross-sections, where applicable (**7.1**);

c) cutting of apertures (**7.2**, Clause **9**);

d) handling and storage instructions (Clause **12**);

e) fixing of door assemblies (**13.1**);

f) general instructions for installation of door frames (**13.1**, **13.2**, **13.3**);

g) specific instructions for installation of metal and composite frames (**13.2**);

h) joints for any door frame materials, types of construction or periods of fire resistance that are not covered in Table 3 to Table 6 (**13.4.1**);

i) suitability of the test evidence for the sealant to be applied between the back of the frame and the structural opening (**13.4.2**);

j) installation of packers (**13.4.4**);

k) limitations on door size adjustment (**13.5.1**);

l) under-door (the gap between the bottom of the door and the threshold or finished floor) gaps (**13.5.3**);

m) instructions for installation of glazing (Clause **9**);

n) specification of glass or associated retaining system (Clause **9**, **13.4**);

o) instructions for installation of door hardware (**10.1**);

p) instructions for fitting of letter plates (**10.6**);

q) instructions for installation of air transfer grilles (**10.7.1**, **10.7.2**);

r) instructions for installation of intumescent fire or smoke seals (**8.2**, **8.3**, **8.4**);

s) handling and storage of doors on site (Clause **12**);

t) materials and configurations for intumescent fire seals (**13.4.3**);

u) sealing arrangements (**13.4.8**, **13.4.9**);

v) details of whether repairs are permissible (**15.2.1**, **15.2.2**);

w) specification of intumescent fire or smoke seals for replacement purposes (**15.2.3**);

x) technical information for door hardware for replacement purposes (**15.3**); and

y) technical information for glass replacement (**15.4**).

Annex D (informative)
Guidance on essential and non-essential door hardware

NOTE *Further guidance on door hardware is given in the DHF/GAI* Code of practice: Hardware for fire and escape doors *[20].*

D.1 Essential door hardware

The following non-exhaustive list gives examples of items of hardware that might be necessary for fire resistance:

a) hanging devices:

1) multi-axis hinges;

2) single axis hinges conforming to BS EN 1935;

3) pivots as part of closing device assembly conforming to BS EN 1154;

b) controlled door closing devices:

1) controlled closing devices conforming to BS EN 1154;

2) powered pedestrian swing door operators with self-closing function conforming to BS EN 17372;

3) electro-magnetic hold-open or free-swing devices conforming to BS EN 1155;

4) door co-ordinators conforming to BS EN 1158;

c) locking devices:

1) lock cases conforming to BS EN 12209, BS EN 15685, or BS EN 179 when supplied as an assembly for emergency escape locksets;

2) electro-mechanical locks conforming to BS EN 14846;

3) mechanical cylinders conforming to BS EN 1303;

4) mechatronic cylinders conforming to BS EN 15684 or DHF's TS 007-2 [40];

5) bolts for inactive or slave leaves conforming to BS EN 12051;

6) panic bolts and other emergency exit devices to normally locked internal fire doors on escape routes, conforming to BS EN 1125 or BS EN 179 or BS EN 13637; and

d) intumescent fire seals and hardware protection.

The continuing correct performance of these items is critical to the achievement of the potential fire resistance of the assemblies.

Further security standards for locking devices or doorsets include:

1) lock cases conforming to BS 3621, BS 8621, BS 10621, PAS 3621, PAS 8621 or PAS 10621;

2) mechanical cylinders conforming to DHF's TS 007-1 [40] or Sold Secure SS312 [41][6)];

3) mechatronic cylinders conforming to DHF's TS 007-2 [42] or Sold Secure SS504 [43][6)]; and

4) doorsets conforming to PAS 24 or LPS 1175 [44].

D.2 Non-essential door hardware

The following non-exhaustive list gives examples of items of hardware that are not normally considered necessary for fire performance, but which might be necessary for means of escape or the function of the door:

a) mechanical lever furniture conforming to BS EN 1906;

b) mechatronic door furniture conforming to BS EN 16867;

c) pull handles;

NOTE 1 The guidance in the BS 8300 series prefers single-side fixing.

d) electro-magnetic hold-open devices conforming to BS EN 1155;

e) panic bolts and other emergency exit devices, conforming to BS EN 1125, BS EN 179 or BS EN 13637;

f) push plates;

6) This trade name is provided for reasons of public interest or public safety. This information is given for the convenience of users of this document and does not constitute an endorsement by BSI.

g) kick plates;

h) number or name plates; and

i) signs, accessories, etc.

NOTE 2 Attention is drawn to the legal requirement for signage to identify fire doors.

NOTE 3 Safety signs are covered in BS EN ISO 7010 and the BS 5499 series.

Such items might affect the fire performance of the door.

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