

BS 8214:2016



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Timber-based fire door assemblies – Code of practice

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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 December 2016. 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 their secretary.

Supersession

This British Standard supersedes BS 8214:2008, which is withdrawn.

Information about this document

This is a full revision of the standard, and introduces the following principal changes:

- limitation of the scope to timber-based door assemblies only;
- complete revision of recommendations for joints between timber-based door frames and walls;
- removal of colour codes from the normative text;
- general update to take into account the publication of new and revised standards since 2008.

Fire doors perform a vital function in the provision of an adequate means of escape from a building and, depending upon the intended use of the building, BS 9999, BS 9991 and other documents recommend both the performance rating and the position of the fire doors required to ensure safe egress. Similarly, guidance in support of national building regulations includes provision for the control of the spread of internal fire, by means of compartmentation or other techniques, and again adequately rated fire doors contribute to this containment. The rating of such doors is specified by the design team/designer, possibly in conjunction with fire safety professionals, using the recommendations given in these documents, or by the fire strategy that has been developed to meet the functional objectives. The fire resistance provisions of the structure, including the fire door assemblies, will have been determined, when designing to meet the functional requirements of the regulations, as those which are necessary to control the hazard from fire to acceptable levels of risk.

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 level of performance deemed appropriate to contain the risk.

References are given throughout this British Standard to information to be obtained from manufacturers. These are summarized in Annex A.

Use of this document

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

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

Presentational conventions

The provisions in this standard 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.

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

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

Particular attention is drawn to Regulation 7 of the Building Regulations 2010 [1], Regulation 8 of the Building (Scotland) Regulations 2004 [2] and Regulations 23 and 24(2) of the Building Regulations (Northern Ireland) 2012 [3].

Attention is also drawn to the Regulatory Reform (Fire Safety) Order 2005 [4], the Fire (Scotland) Act 2005 [5] and the Fire Safety Regulations (Northern Ireland) 2010 [6] in respect of the requirement for all buildings to be subjected to ongoing fire risk assessment, subsequent to the acceptance by the regulatory controllers of the fire protection measures provided.

0 Introduction

0.1 Role and use of fire doors

Fire doors are required to provide two main functions:

- a) to maintain any compartmentation of buildings, which has been introduced to limit the size and spread of fire in order to control the perceived risk;
- b) to allow access to protected escape routes, both vertically and horizontally, without any loss of fire resistance, and limit smoke movement in the structure forming these routes, e.g. protected corridors, lobbies, stairways and shafts.

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 may be based on fire safety engineering approaches governed by procedures defined in BS 7974.

0.2 Fire door rating

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.

When tested in accordance with BS 476-22, such doors are identified by the prefix FD followed by the required integrity rating expressed in minutes, e.g. FD 30, a fire-resisting door able to resist integrity failure for 30 min. The following ratings fall within the scope of this British Standard: FD 20, FD 30, FD 60, FD 90 and FD 120.

When tested in accordance with BS EN 1634-1, and classified in accordance with BS EN 13501-2, the doors are identified by the prefix E followed by the required integrity rating expressed in minutes, e.g. E 30, a fire-resisting door able to resist integrity failure for 30 min. The following ratings fall within the scope of this British Standard: E 20, E 30, E 45, E 60, E 90 and E 120. Insulation performance is indicated by the shorthand designation "EI" followed by the test time category (e.g. 30 min).

NOTE National building regulations ([1] to [3] and [7]) only apply to life safety. Higher performance levels (such as insulation) might be necessary for certain applications if property protection is required.

In addition to the need to provide fire resistance, certain doors are also required to restrict the spread of ambient temperature ("cold") smoke. When tested in accordance with BS 476-31.1, these doors are identified by the suffix S, e.g. FD 30S. When tested in accordance with BS EN 1634-3 and classified in accordance with BS EN 13501-2, these doors are identified by the suffix S_a, e.g. E 30S_a.

1 Scope

This British Standard gives recommendations for the specification, installation and maintenance of timber-based fire doors. The recommendations are applicable to timber-based hinged or pivoted pedestrian door assemblies or door leaves, fitted into frames of any material.

This British Standard is applicable only to door assemblies that are designed to provide fire resistance ratings of up to and including 2 h when tested in accordance with BS 476-22 or BS EN 1634-1.

This British Standard is applicable to fire performance and smoke control. It does not cover security, ergonomic factors, functional performance other than with respect to fire resistance. It does not cover impact safety of glazing, for which recommendations are given in BS 6262-4.

This British Standard does not include doorsets, which are covered in BS EN 16034.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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: Method 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*

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

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

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

technical evaluation of the expected performance of a door assembly in lieu of testing, carried out by a competent authority, with reference to relevant test evidence, for changes to components or arrangements

3.3 competent person

person, suitably trained and qualified by knowledge and practical experience, and provided with the necessary instructions, to enable the required task(s) to be carried out correctly

3.4 door

building component for closing an opening in a wall that allows access and might or might not admit light when closed

NOTE The word "door" is used as a generic term for door leaves and door assemblies.

3.5 door assembly

complete assembly as specified and installed, including door frame and one or more leaves, together with door hardware, glazing, seals and other components, supplied from more than one source

NOTE A door assembly can also include associated over panels and side panels (which can be glazed) as part of a fire door screen.

3.6 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.

3.7 door hardware

3.7.1 door hardware

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

3.7.2 essential door hardware

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

NOTE Guidance on essential door hardware is given in Annex B.

3.7.3 non-essential door hardware

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

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

3.8 door leaf

hinged or pivoted part within a door frame

3.9 doorset

pedestrian doorset, industrial, commercial and/or garage doorset, rolling shutter and/or operable fabric curtains including any frame or guide, door leaf or leaves, rolling or folding curtain, etc., which is provided to give a fire resisting and/or smoke control capability when used for the closing of permanent openings in fire resisting separating elements, including any side panel(s), vision panel(s), flush over panel(s), transom panel(s) and/or glazing together with the door hardware and any seals (whether provided for the purpose of fire resistance or smoke control) which form the assembly and fulfilling the provisions of BS EN 16034

NOTE Doorsets are supplied from a single source as defined in BS EN 12519.

[SOURCE: BS EN 16034:2014, 3.1, modified – note added]

3.10 fire door

door (3.4) which, together with its frame and hardware as installed in a building, is intended (when closed) to restrict the passage of fire and/or smoke, and is capable of meeting specified performance criteria to those ends

NOTE A fire door may have one or more leaves, and the term includes a cover or other form of protection to an opening in a fire-resisting wall or floor or in a structure surrounding a protected shaft.

3.11 fire door assembly

door assembly (3.5), intended, when closed, to restrict the passage of fire and/or smoke and to be capable of meeting specified performance criteria to those ends

3.12 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 BS 476-22 or BS EN 1634-1

3.13 intumescent fire seal

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

NOTE Intumescent fire seals are components which expand, helping to fill gaps and voids, when subjected to heat in excess of ambient temperatures.

3.14 latch

self-engaging fastener which secures a moveable component (e.g. door) in a closed position and which can be released by hand

[SOURCE: BS EN 12209:2003, 3.1.14]

3.15 lock

fastener which secures a moveable component in a closed position within an opening and which is operated by a key or other device

[SOURCE: BS EN 12209:2003, 3.1.17]

3.16 seal

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

3.17 smoke seal

seal fitted to the leaf edge or frame reveal for the purpose of restricting the flow of smoke or hot gases

3.18 third-party certification scheme

scheme 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 Such schemes are designed to ensure consistency of product conformity and the standard of workmanship being provided.

4 Determination of fire resistance of doors

COMMENTARY ON CLAUSE 4

The fire resistance of a door assembly is determined by subjecting a full-size construction to test in accordance with the procedures laid down in the appropriate fire resistance test standard, i.e. BS 476-22 or BS EN 1634-1. The test standard requires the tested construction to be fully representative of the assembly to be used in practice in terms of materials and methods of construction, size, number of leaves and mode of operation, including all glazed openings and essential door hardware.

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 would be either integrity or insulation.

For the purposes of 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).

Recommendations on the required classification period for a particular application are provided by either regulatory guidance or relevant design standards (such as BS 9991 and BS 9999), as well as individual designs carried out according to BS 7974.

The building designer should ensure that all fire doors to be used are of a design that has been tested or subjected to assessment for the required fire resistance period, and that documentary evidence exists to that effect.

Where the elements of a fire door are to be obtained from different sources, the building designer should ensure that the elements to be used are compatible and are able to provide the required fire resistance period, and that documentary evidence exists to that effect.

Before proceeding with contractual commitments it should be established that evidence of performance exists which meets with the approval of the enforcing authority.

NOTE 1 When it is impossible, due to size or other constraints, or is impractical, to evaluate the constructions by test then it is appropriate to have the potential fire resistance of the construction determined by way of agreed expert opinion based on existing test evidence. This course of action might be required when evidence of performance of a particular component has been established in connection with another form of construction. As a successful fire resistance performance is often the result of complex interactions between materials it can never be assumed that a result obtained under one set of circumstances will be conferred on a different combination of components or materials. It might be possible, however, for the proposed combination to be determined as suitable by a competent expert, on the basis of evidence generated in other tests.

NOTE 2 BS 9999:2017 recommends that door openings in compartment walls are limited to 25% of the wall length where the doors are uninsulated. There is no limit if the doors provide insulated performance at the appropriate level.

5 Marking

All fire doors should be clearly marked with their declared fire resistance period either immediately after manufacture or inspection, or before dispatch.

NOTE 1 Some marking systems are controlled within third-party certification schemes, whereas others are purely identification in their own right and do not imply such certification.

All fire-resisting glass should be identified on the glass itself with a permanent mark that provides, as a minimum, the glass manufacturer's name, product name and impact classification if required by the application. That mark should be permanent, visible and readable after glazing. It should be resilient to common cleaning methods such that the mark remains readable during the working life of the door.

Documentation or website information for the fire-resisting glazing should provide details of the specified glazing system, including, for example, potentially critical information such as edge cover, glazing sealants and setting blocks for expansion provisions within the glazing pocket. That information should also include the fire-resisting classification of the glazed system, with reference to the applicable fire test evidence and certification.

NOTE 2 The system referred to in the 2008 edition of this standard is now considered obsolete but might be encountered when inspecting existing fire doors. The marking system was intended to provide information on the door assembly and is not an indication of third-party certification. Table 1 is reproduced from the 2008 edition for information purposes.

NOTE 3 The GGF publication A guide to best practice in the specification and use of fire-resistant glazed systems [8] gives further guidance on identification and documentation.

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	Colour code interpretation
		min	
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	

6 Specifying fire doors

The specification of fire doors should be undertaken only by persons with appropriate expertise.

NOTE 1 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.

When specifying a fire door assembly, a full description of the element should be provided in addition to the level of fire resistance required. The description should include the following, as any of these can affect the potential fire resistance of the assembly:

- a) overall size;
- b) size and number of leaves;
- c) mode of operation (single or double swing);
- d) size, location and number of any glazed openings;
- e) details of the door hardware, including any additional intumescent protection required;
- f) details of frames;
- g) presence of any over panels, fanlights, side panels, etc.;
- h) presence of any performance seals.

NOTE 2 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 assembly as described in the relevant fire test report 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.

As the constituent parts of a fire door often interact in quite subtle ways, any changes from the original tested specification can significantly alter the performance of the assembly installed. Therefore in order to maintain the performance of fire door assemblies, the quality of materials and components used in manufacturing should be carefully monitored and controlled.

NOTE 3 General guidance on matters relating to fire doors can be found in BWF publication Fire doors – The burning issues – From specification to maintenance: the life cycle of a fire door explained [9] and the ASDMA Best practice guide to timber fire doors [10]. Guidance on the specification of door hardware for fire doors is given in the DHFIGAI Code of practice: hardware for fire and escape doors [11].

NOTE 4 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 consistency of product conformity.