

Code of practice for

Fire door assemblies with non-metallic leaves

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Timber Standards Policy Committee (TIB/-) to Technical Committee TIB/23, upon which the following bodies were represented:

- Association of Builders' Hardware Manufacturers
- British Furniture Manufacturers' Federation
- British Lock Manufacturers' Association
- British Standards Society
- British Woodworking Federation
- Department of Health
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Construction Industries Directorate)
- Department of the Environment (Property Services Agency)
- Fibre Building Board Organization (FIDOR)
- Fibre Cement Manufacturers' Association Limited
- Flat Glass Manufacturers' Association
- Guild of Architectural Ironmongers
- Gypsum Products Development Association
- Institute of Carpenters
- Institution of Fire Engineers
- Intumescent Fire Seals Association
- Joinery Managers' Association Ltd.
- London Housing Consortium
- Royal Institute of British Architects
- Timber Research and Development Association
- Coopted member

This British Standard, having been prepared under the direction of the Timber Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 31 October 1990

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The following BSI references relate to the work on this standard:
Committee reference TIB/23
Draft for comment 86/13318 DC

ISBN 0 580 18871 X

Amendments issued since publication

Amd. No.	Date	Comments
7438	15 November 1992	Indicated by a sideline in the margin

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Foreword

This British Standard has been prepared under the direction of the Timber Standards Policy Committee.

In recent years there has been an increase in performance based regulations and codes and a corresponding decrease in the use of specified constructions for particular functional applications. Fire doors are now almost exclusively specified by the level of performance that they can attain when subjected to the standard method of test for the determination of the fire resistance of elements of construction. The current method of test is given in BS 476-22 which, with BS 476-20, BS 476-21 and BS 476-23, replaced BS 476-8 in 1987. Whilst most of the advice given in this code is based on testing performed in accordance with BS 476-8, it is considered that the guidance will be applicable to tests performed in accordance with BS 476-22.

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, the appropriate Part of BS 5588 and other guidance documents recommend both the rating and the position of the fire doors required to ensure safe egress. Similarly, national building regulations include provision for the control of the spread of internal fire, either by means of compartmentation or other techniques, and again adequately rated fire doors contribute to this containment. The rating of these doors will be specified by the controlling authorities in terms of the performance that they are to provide when evaluated with respect to the current fire resistance testing procedure.

This code of practice identifies the important parameters that contribute to the successful attainment and maintenance of the required level of performance in the design, construction and use of fire doors where the door leaf component is of a non-metallic construction.

The information is of value to the designer of such fire doors as it should reduce the product development time and costs. It is also of use to the specifier of such doors as it identifies the key parameters to be specified and advises on any constraints that may apply to the design to be specified. Controlling authorities will find that the information will assist them in evaluating whether the test evidence submitted is relevant to the component under examination, and whether further evidence of performance is required.

Assistance is provided to the builder by identifying the permissible site operations and by the provision of guidance relating to the installation of such assemblies. Finally, advice on how to maintain fire doors in an operating condition is provided for use by property management.

Further information on the technology and the current methods of specifying fire doors is to be found in PD 6512-1. Examples of how to construct two designs of timber based FD30 rated, single leaf, single swing, latched fire doors of limited size, for internal use which are in compliance with the recommendations of this code, are to be found in PD 6512-2¹⁾.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 34, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ In preparation.

Section 1. General

0 Introduction

0.1 Role and use of fire doors

Fire doors are required to provide two main functions.

- a) To maintain the compartmentation of buildings, which is aimed at containing the fire to the area of origin and yet still allow the passage of people or goods between one compartment and another.
- b) To allow access to escape routes, both vertically and horizontally without any loss of fire resistance and limit smoke movement in the structure forming these routes, i.e. protected corridors or protected shafts.

NOTE 1 The position and fire performance of door assemblies required to fulfil the objectives given in a) above are specified in the appropriate regulations and guidance.

For means of escape purposes the positions and ratings of the fire doors are given in the relevant codes of practice, i.e. BS 5588-1, BS 5588-2 and BS 5588-3.

NOTE 2 The specification of fire doors for the protection of the means of escape may also be found in other documents such as the Guides to the Fire Precautions Act.

A more detailed explanation of the role and use of fire doors is given in PD 6512-1:1985.

0.2 Fire door rating

Recent changes in the methods of expressing the results of fire resistance tests, both at international and national levels, have lead to the dropping of the stability term and in future non-loadbearing elements will be adjudged by the criteria of integrity and insulation only. The performance of a fire door when tested in accordance with BS 476-22 is judged by its time to failure (in minutes) for both integrity and insulation (see clause 3); however for the purposes of BS 5588 fire doors are designated by reference to their required performance for integrity only and 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 standard; FD 20, 30, 45, 60, 90 and 120.

In addition to the need to provide fire resistance, certain doors are also required to restrict the spread of ambient temperature or "cold" smoke. These doors are identified by the suffix S, e.g. FD 30S and when tested in accordance with BS 476-31.1 should comply with the recommendations for performance given in the relevant Part of BS 5588.

1 Scope

This British Standard gives recommendations for the specification, design, construction, installation and maintenance of fire doors constructed with non-metallic door leaves. The guidance given is applicable to assemblies where the door leaves are manufactured from wood, ligno-cellulosic materials and compatible mineral based or inorganic products and where the door frames are constructed from any of the above materials in addition to metal.

The recommendations given are restricted to doors, manufactured as described above, designed to provide fire resistance ratings of up to, and including 2 h. These ratings are in respect of tests conducted in accordance with the conditions specified in BS 476-8 and BS 476-22. Design guidance in particular is limited where proprietary materials may be involved, e.g. mineral cored doors.

The code does not provide recommendations relevant to industrial or architectural steel fire doors, lift doors, roller shutters or other forms of closure.

An example of a typical fire door specification is given in Appendix A. Guidance on essential and non-essential ironmongery is given in Appendix B and additional recommendations for timber used in fire doors are given in Appendix C.

NOTE The titles of the publications referred to in this standard are listed on page 34.

2 Definitions

For the purposes of this standard the definitions given in BS 6100-4.1, BS 6100-4.3, and BS 6100-4.4 apply together with the following.

2.1 fire door

a door or shutter provided for the passage of persons, air or things which, together with its frame and furniture as installed in a building, is intended, when closed, to restrict the passage of fire and/or gaseous products of combustion and is capable of meeting specified performance criteria to those ends

2.2 door

a term used for convenience where the context applies equally to door leaves, door frames, doorsets, door assemblies and door kits

2.3 door leaf

a hinged or pivoted construction, the function of which is to allow or prevent access

2.4**door kit**

a set of fully machined and fitted frame components together with a door leaf or leaves fully prepared for site assembly and fixing. Door kits may or may not include all the items of ironmongery required for the finished door assembly

2.5**door frame**

the fixed surround into which are fitted one or more door leaves. The door frame may also be designed to surround other panels, and may include sill, threshold, architraves or other cover moulds. The door frame may be a separate item to be fixed to the adjacent structure, or it may be an integral part of a wall or partition

2.6**door assembly**

a complete assembly as installed, comprising door frame and one or more door leaves and any other panels, together with their ironmongery and any seals

2.7**fire door assembly**

a door assembly, intended, when closed, to restrict the passage of fire and/or gaseous products of combustion and be capable of meeting specified performance criteria to those ends

NOTE For the purposes of this standard the term “fire door assembly” is synonymous with “fire door”.

2.8**doorset**

a door frame with its door leaf or leaves pre-hung on hinges or pivots, supplied as an assembled unit from a single source

2.9**seal**

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

2.10 ironmongery

Small components, usually metal, used mainly for the operation or support of doors, windows and joinery fittings.

2.10.1**essential ironmongery**

items vital to achieve the fire resistance performance of a fire door assembly

2.10.2**non-essential ironmongery**

items which are not required to achieve the fire resistance performance of a fire door assembly but which if fitted may affect the performance

2.11**lock**

a mechanism combining, in one case, a spring bolt and a dead bolt operated respectively by handle and a removable key

2.12**latch**

a device, operable from both sides and generally self engaging, for holding closed a door, gate or the like, consisting of a moveable part operated by a handle, falling by gravity or sliding or moving by means of a spring into a retaining member

2.13**heat activated sealing system**

a material, or combination of materials, normally intumescent in nature, which, when heated, forms a seal which is able to restrict the egress of hot gases between two adjacent surfaces, thus contributing to the integrity of the assembly

2.14**fire resistance**

the ability of a component or construction of a building to satisfy for a stated period of time the appropriate criteria specified in the relevant Part of BS 476

3 Determination of fire resistance of doors

The fire resistance of a door assembly is determined by subjecting a full sized construction to test in accordance with the procedures laid down in the fire resistance testing standard specified in the relevant legislative document, e.g. BS 476-8 or BS 476-22.

The test standard requires the tested construction to be fully representative of the assembly to be used in practice in terms of both the materials and methods of construction, the size, number of leaves and mode of operation including all glazed openings and essential ironmongery. Essential ironmongery includes, on a latched door the hinges or pivots and the latch, and on an unlatched door the hinges or pivots and the self-closing device.

The fire resistance is expressed in terms of the number of minutes for which the assembly satisfies the relevant criteria. Depending upon the test standard used for the evaluation, the criteria would be one or all of the following: stability, integrity, insulation.

In addition to the above criteria, for door leaves that incorporate significant quantities of glazing, the heat flux, or the radiation level and the position at which it was measured may also be recorded to enable the safe storage distance for combustible materials to be calculated. The fire resistance of a doorset may typically be expressed as follows:

stability:	37 min ^a
integrity:	35 min
insulation:	35 min ^b

^a In BS 476-22, non-loadbearing elements are no longer evaluated with respect to stability and this term will not be found in test reports for door assemblies. Doors will be required only to satisfy the integrity criterion, hence the current method of referring to fire door performance purely by reference to the integrity rating, e.g. FD 30, as described in PD 6512-1.

^b When glass, which does not satisfy the insulation criterion, is incorporated in the construction, then the door cannot claim to satisfy the full insulation rating.

NOTE The relevant criteria are specified by the controlling authority.

The building designer should ensure that all fire doors (in all sizes and configurations) to be used have satisfied the requirements of appropriate fire tests, and that certificates exist 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.

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 fire resistance of the construction assessed by a competent assessor based on existing test evidence. This course of action may 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 should never be assumed that a result obtained under one set of circumstances will be conferred on a different combination of components or materials. It may be possible, however, for the proposed combination to be assessed as suitable by an assessor, on the basis of evidence generated in other tests.

The assessment should include details of the original tests on which the assessment is made, and the justification for the basis of the assessment.

NOTE It is important that assessments are carried out by suitably qualified fire safety engineers or laboratories accredited by the National Measurement Accreditation Service (NAMAS) for conducting the relevant test. In either case the assessor should be familiar with the standards and procedures for the testing of fire doors and have current experience of such testing. In the case of assessments which take the form of either an extrapolation or an interpolation of test evidence the assessor should have specific knowledge, normally accumulated over a period of time, of the behaviour of the products when subjected to fire tests. Only this degree of knowledge can equip the assessor to provide assessments in respect of variations from the tested details. Test data and information in support of the assessment should be provided by the client who should either own or have permission to use the data.

4 Methods of specifying fire doors

4.1 Fire performance

Prior to 1983 the most commonly used method for specifying the performance of fire doors was by reference to the stability and integrity ratings. For example a half-hour fire door was required to resist stability and integrity failure for a period of 30 min. For certain applications it was permissible to reduce the integrity to less than that of the stability, known as “firecheck” performance, and these doors were designated 30/20. Since then the reference to stability has been dropped and fire doors designated by the prefix FD should be specified only by their integrity rating, i.e. FD 30. This system is in accordance with the guidance given in PD 6512-1.

4.2 Description of the assembly

It is important when specifying a fire door assembly to provide a full description of the element in addition to the level of fire resistance required. This description should include the overall size, the size and number of leaves, details of frames and any overpanels, fanlights, sidepanels, etc., the mode of operation, the size and number of any glazed openings, and details of the ironmongery, as all of these can affect the potential fire resistance of the assembly.

The size of leaf is critical as a supplier will need to establish whether the certification of his product covers the size of the leaf required. The fire resistance of a doorset which has been determined by test applies only to assemblies up to the size tested unless it has been subsequently assessed as being able to be used at a larger size by an appropriate authority (see clause 3). It should be stated carefully whether the assembly is:

- a) single leaf;
- b) double leaf, including unequal pairs of leaves.

A door leaf tested as a single leaf assembly is not suitable for use as a leaf in a double leaf assembly unless it has also been tested as part of a double leaf doorset, or has been assessed as suitable by an appropriate authority on the basis of supportive test evidence (see clause 3).

Integral overpanels, i.e. those fitted without a transom, play an important role in the fire resistance of a doorset and if these are to be used they should be clearly identified. Any door leaf used in conjunction with an overpanel should have demonstrated its ability to provide the required integrity when used in this manner under test conditions. Fanlights and sidepanels are normally separated from the leaves by transoms or mullions and as such they have less influence on the performance than integral overpanels. However, the method of construction of these panels should be such that they do not have a lesser fire resistance than the door leaves with which they are associated.

It should be clearly stated whether the doors are to be hung as:

- 1) single swing, i.e. opening in one direction only;
- 2) double swing, i.e. opening in either direction.

Glazed openings can have a twofold influence on the ability of a door assembly to achieve the required level of fire resistance. The glass and the glass retaining system should in themselves be capable of providing an equal level of fire resistance as the door leaf into which they are to be installed. The core material of certain forms of door construction may require to be modified, e.g. by the incorporation of solid timber framing to the intended aperture, and it is important therefore to establish the size and position of such openings before commencing manufacture. Secondly, the inclusion of an aperture may interfere with structural components within the leaf and as a result reduce the stability of the door under fire test conditions. It is necessary, therefore, to establish whether the door has been tested or assessed as being capable of providing the desired level of fire resistance when glazed in the manner proposed.

The size, number and position of any glazed openings (by reference to a drawing if necessary) should be clearly identified at the time of specifying the assembly.

The presence, or absence of any ironmongery which will retain the door leaf in the closed position during fire exposure has an important influence on the ability of a door to provide the required fire resistance. A door leaf, or leaves which are retained closed by means of a mortise latch, mortise lock or bolts will usually perform better in fire test conditions than a similar assembly that is only held in the closed condition by means of a self-closing device. It is important therefore to state in a specification whether the doors are positively retained shut as doors tested with the benefit of positive closing will not necessarily provide a similar level of performance when such devices are omitted. The absence of positive latching will influence the selection of both the edge sealing system and the associated ironmongery. (See Appendix A.)

5 Marking

All fire doors should be clearly and permanently marked with their fire resistance rating, as established by test or assessment, either immediately after manufacture or inspection, or before dispatch. The marking should indicate clearly the integrity and, if applicable, the stability and insulation performance, together with the standard to which these figures relate, e.g. BS 476-8 or BS 476-22. The marking should also indicate whether heat activated seals need to be incorporated at the time of installation in order to achieve the claimed rating. A convenient way of providing this information is by means of a colour coded permanent label or plug.

The recommended colour code for non-metallic door assemblies is indicated by a combination of two colours. The background colour identifies the integrity rating of 20, 30, 45, 60 min, etc., and the inner core, either red or green, indicates the requirements for the heat activated (intumescent) seals. The red core indicates that the door should be hung only with the necessary heat activated seals fitted at the time of installation. The green core advises that the door has been supplied with any necessary seals already incorporated, therefore the door should be hung only as received in an appropriate door frame and will provide the claimed performance without any additional work. Alternatively a blue/white coded plug may be used. In order to qualify for a blue/white code, doorsets should have been tested with and without additional seals and should achieve FD 30 and FD 20 integrity ratings respectively. Table 1 shows the complete range of colour codes for door assemblies of up to 120 min integrity. It is essential to check that the applied intumescent seal is suitable.

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

Core colour	Background colour	Integrity	Colour code interpretation
Red	White	min 20	Intumescent seals require to be fitted at time of original installation (see clause 13)
	Yellow	30	
	Pink	45	
	Blue	60	
	Brown	90	
	Black	120 ^b	
Green	White	20	No additional intumescent seal need be fitted at time of installation
	Yellow	30	
	Pink	45	
	Blue	60	
	Brown	90	
	Black	120 ^a	
Blue ^c	White	20	With no intumescent seal fitted
	White	30	With intumescent seal fitted in either door edge or frame
^a FD 120 rating is unlikely to be achieved with conventional timber frames. ^b FD 120 rating is not achievable with conventional timber frames. ^c Only door constructions with a fire resistance rating of 30 min that satisfy both FD 20 without an additional intumescent seal fitted and FD 30 with an intumescent seal fitted are marked with a blue/white plug.			

NOTE 1 Existence of a colour code does not necessarily mean that the product is available.

NOTE 2 Attention is drawn to the fact that 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.

Where the door identification includes a red core, identifying the need for intumescent seals to be fitted at the time of installation, it is important that the installer is supplied with the necessary information giving the type, size, quantity and the position of the intumescent seals to be fitted. This information should be appended to the door leaf in such a manner that it does not easily become detached in transit. Whilst it is imperative that this information is supplied for these doors, it is strongly recommended that all fire resisting doors are supplied to site with a data sheet advising the recipient of all limitations that apply to that particular door, e.g. its ability to be sized on site, selection of essential ironmongery, compatibility with items of non-essential ironmongery, suitability and approved techniques to be used for glazing and any limitations on finishes, etc.

It should be noted that the use of factory pre-finished, pre-hung doorsets/door kits precludes the need for this information being transmitted to site as it is not intended that site work would be performed on these assemblies. It is recommended that essential ironmongery is factory fitted, or that morticing for these items is carried out by the door manufacturer.

6 Other considerations

6.1 General

Whilst the achievement of the required fire resistance rating of a fire resisting door assembly is of paramount importance the door should also comply with the recommendations given in 6.2 to 6.5.

6.2 Safety

Where door assemblies incorporate areas of glass, the glass should satisfy the recommendations of BS 6262. BS 6262 gives a classification system and recommends the minimum rating for the glass to be used, depending upon the location and the size of the pane.

6.3 Ergonomic factors

Fire doors are usually heavier than similarly sized non-fire doors. In addition they are often required to be fitted with a self-closing device. This means that some users, particularly elderly and disabled people and children, may have difficulty in opening the door. Difficulties may be aggravated by badly fitted door seals or pressure on the door due to a fire or air movement in the building.

The force required to open a fire door depends on the above factors, and on the size and mass of the door leaf, the strength and efficiency of the door closer and the type and position of those items of ironmongery that have to be used to open the door.

Recommendations relating to maximum resistance to opening forces that can be tolerated by various user groups are given in DD 171 and the appropriate pressures should generally not be exceeded.

Where forces are excessive, the use of automatic door release devices complying with BS 5839-3 should be considered, but prior agreement of the enforcing authority should be sought.

NOTE Further guidance on ergonomic factors is given in the Building Research Establishment Information Paper IP 2/82 "Ergonomic requirements for windows and doors."

6.4 Security

Security considerations can impose contradictory requirements on the design and installation of fire doors, particularly with respect to the ironmongery specification. When such conflicts are encountered it is important to consult the enforcing authorities in order to resolve any incompatibility between the two requirements. BS 8220 gives guidance on the security aspects of buildings.

6.5 Fire safety signs

After installation the fire door should be labelled with the appropriate signs complying with BS 5499-1.

7 Functional performance

The most important aspect of the design and specification of a fire door is that it should meet the normal functional requirements. It is important that the door assembly is correctly specified in terms of its strength, robustness and other properties that may influence its ability to satisfy the normal functional requirements. DD 171 gives guidance on the relevant criteria and describes the appropriate test procedures for establishing the properties to be specified.

Section 2. Design and manufacturing considerations

8 Introduction

8.1 Quality control and quality assurance

All of the individual components and materials forming a fire resisting door assembly which has successfully satisfied the fire resistance test for a given period will have contributed in some way to the fire performance of the assembly. In order to maintain the performance of doors manufactured subsequently, the quality of materials and components used should be carefully monitored and controlled.

It should not be necessary to check that a fire door conforms to that reported in the original fire test report with respect to the quality of construction. The use of a quality control scheme ensures consistency of product quality and is strongly recommended (see BS 5750).

8.2 The role of the constituent parts of the assembly

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, which can claim to provide the required performance. Therefore, a door leaf, door frame, ironmongery or any other component part cannot be fire resisting in isolation from other parts.

Because the individual component parts comprising a door assembly might previously have been included in successful fire resistance tests it does not necessarily follow that a composite construction formed from such items will perform similarly.

As the constituent parts of a fire door often interact in quite subtle ways any changes from the original tested specification may significantly alter the performance of the assembly installed.

The wide range of door leaf constructions and types of ironmongery, the behavioural differences between timber and metal frames, the very different nature of certain intumescent seals, and the varying compatibility of glazing systems with leaf cores, are all factors that contribute to the probability of the fire performance of a composite door assembly not being equal to that of its individual components.

Components from two or more fire doorset designs should not automatically be brought together to form a hybrid construction.

In some cases it may be possible to assess the fire resistance of a previously untested combination of components but test evidence relating to the various components should be available to the assessor. Indicative tests using parts of full sized elements can be used to aid such an assessment, particularly the aspects of such combinations that are not directly affected by the size of the specimen. Where it is not possible to make such an assessment the assembly should be re-evaluated by test.

Clauses 9 to 19 will assist the door designer to appreciate some of the aspects of the materials and how they may influence the design and the subsequent manufacture of fire door assemblies.

9 Door configuration

9.1 General

Depending upon the door assembly configuration, the door leaves are supported by different forms of ironmongery which vary in respect of their ability to control the various modes of distortion that may be exhibited by particular door leaf constructions. It is important to note that doors originally fire tested as single leaf or single swing assemblies should not then be used as double leaf or double swing doorsets without evidence of performance relating to that mode of operation. Door leaves tested as double swing assemblies may be favourably assessed for use as a single swing door, but this may require a modification to the amount of intumescent material required.

9.2 Single leaf, single swing, hinged doors

Leaves of single swing doors are generally hung on hinges and thus one side of the leaf is firmly restrained at one vertical edge. Even when fitted with a latch, which helps to restrain the other vertical edge of the door leaf, there is little to prevent door leaf distortion, under fire exposure, in the form of bowing on plan.

Single swing doors have doorstops, and it is widely recognized that door assemblies are often able to offer greater fire resistance when opening away from the direction of fire exposure. This has led to the erroneous belief that doorstops make an important contribution to fire resistance performance. Timber door leaves generally exhibit distortion due to shrinkage of the face towards the fire and the result is often seen as the edges and corners of the leaf tending to move towards the fire. Thus, if a door leaf opens in towards the fire the doorstop becomes irrelevant as the leaf distorts away from it. With a door leaf opening away from a fire the doorstop is on the exposed face and movement of the leaf edges or corners towards the fire is checked. This checking effect can be only temporary as eventually doorstops of any dimension will be charred away.

When heat activated sealing systems are used, the doorstop makes no significant contribution to fire resistance. The size, type and fixing of the stop is, therefore, unimportant.

9.3 Single leaf, pivot hung, unlatched doors

The special type of ironmongery required for pivot hung doorsets restrains the door leaves in a different manner from single swing doors in the event of fire exposure. Such ironmongery consists of two pivot points, one in the head of the leaf and one at the foot of the leaf. Double swing leaves are not fitted with latches and when compared with single swing leaves the ironmongery for double swing leaves offers less restraint to leaf distortion when exposed to fire.

The absence of a doorstop and the different basic door frame cross section means that any leaf distortion will not necessarily move the leaf out of the frame. Without the resistance to door leaf distortion that the doorstop provides initially to an inward opening door the distortion will probably occur about the original plane of the leaf putting less stress on the heat activated sealing system.

9.4 Single and double swing, double leaf doors

A major problem is to maintain an effective seal between the meeting edges. Should one leaf move or distort differentially with respect to the other as a result of fire exposure, the meeting edges can separate, leading to a premature loss of integrity.

The selection of a suitable heat activated sealing system for this junction is vital. Excessive pressure resulting from the activation of an intumescent seal can cause the differential movement to increase whilst insufficient pressure may not be able to restrain any such deformations which occur in the leaves. Rebated meeting edges are a deprecated form of construction (see 12.13). As the rebates separate, due to differential bowing, the gap between the leaves becomes increasingly difficult to seal, the width of the gap to be sealed being equal to the depth of the rebate (see Figure 1). If a rebated joint is unavoidable then the rebate should be as small as practical. Unequal rebates are more likely to be successful than equal rebates. Test evidence should be furnished to support rebated meeting stiles.

Double swing, double leaf assemblies are preferred to double leaf, single swing doors where leaves open in opposite directions.

Even when plain meeting stiles are utilized it is difficult to achieve a seal at the junction with the meeting stiles and the head of the door frame. If a unidirectional intumescent seal is used then a better seal is likely to be achieved if the sealing strip is fitted continuously across the head of the frame rather than in the leaf heads, particularly for periods of fire resistance in excess of 30 min. When a multidirectional intumescent seal is used this will be more tolerant and an adequate seal may be achieved without the need for it to be frame mounted.

10 Door frames

10.1 General

The frame of a fire resisting doorset should provide:

- a) support of the leaves in the cold state;
- b) adequate support of the leaves under fire exposure.

10.2 Workmanship

Fire exposure will exploit any void or badly formed joint. Any void in any joint should be plugged with solid timber or filled with intumescent compound or suitable filler at the time of manufacture.