

Risk Assessment Considerations Timber Fire Doors



About this Publication

This document is intended to provide for guidance and advice for risk assessors and all persons having duties and responsibilities by reference to the Regulatory Reform (Fire Safety) Order : 2005 and similar legislation applicable in Scotland and Northern Ireland.

The scope of the publication is limited to the consideration of timber fire rated door assemblies and is intended to provide for general guidance with regard to:

- Historical regulations related to timber fire doors.
- Historical and current methods for testing timber fire doors.
- Identifying the potential performance of timber fire doors.
- Smoke Control related to timber doors.
- Recommendations with regard to the qualifications and knowledge requirements for 'competent persons' employed for the care and maintenance of timber fire doors.
- Recommended considerations for the maintenance of timber fire doors.
- Recommended considerations for the care of timber fire doors.
- Timber fire door related considerations for reducing risk.

The actions to be taken by persons with responsibilities and duties under the provisions of fire safety legislation following a risk assessment will vary according to a number of considerations including the design and usage of a particular building. This document simply provides for general advice and guidance that may be taken into considerations in connection with timber fire doors.

Further information relating to timber fire doors can be found by reference to other Architectural and Specialist Door Manufacturers Association (ASDMA) publications that can be downloaded from the ASDMA web site at:

www.asdma.com.

Related publications include:

- **Best Practice Guide to Timber Fire Doors.**
- **Safety - A Matter of Convenience**

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This guide is provided on a best intents basis to indicate information that may be helpful as a contribution to risk assessments and maintenance of timber fire doors. It is not intended to replace evaluation by a specialist in timber fire doors. However, it may serve to indicate important aspects to be considered in a risk assessment inspection, and point to the types of questions to be addressed.

1/ Few basic considerations:

- A 'fire door' is a complex structure consisting of a door, frame, hardware, seals, and sometimes glazing and ventilation. All of these elements must work together as a whole if the potential fire resistance performance requirements are to be achieved.
- A door assembly is not a free standing product. It is unstable and incapable of providing for any performance until it is competently installed into a suitable supporting structure.
- The primary 'performance' function of any door is to provide for a means for 'traffic' to pass from one side of a wall to the other. Any secondary performance requirement e.g. fire, acoustic, security etc. is only likely to be satisfactorily achieved if the door is easy to operate and performs efficiently in its primary role.
- All doors must be easy to operate and provide for the convenience of users. The fire resisting performance of a door can be seriously undermined if users abuse doors either by use of wedges (or similar) to hold doors open or by forcing door open by impact using of 'wheeled traffic'.
- A fire door must be open (and therefore cannot perform a fire resistant function) when providing for a means of escape; but the door must be in the closed position to delay the spread of a fire.
- There are no moving parts in a door leaf or a door frame and consequently no reason why a door that is properly cared for should not last the lifetime of a building.
- Fire doors, particularly in older buildings, can have the same appearance of non-fire rated doors and it may be difficult to identify a 'fire door'.

2/ Regulations:

Building Regulations and the design and construction of fire doors have changed over the years. The following brief history of applicable regulations may assist in the identification of fire doors likely to have been installed, particularly in older buildings.

Regulations in respect of fire related issues have developed over the centuries mainly on a local basis in response to actual fire events.

More formal controls were introduced from the mid-19th. Century by use of Bye-Laws that followed National Government guidelines originally called the 'Form of Bye-Laws' and later as 'Model Bye-Laws'.

Scotland was the first country in the United Kingdom to introduce national regulations that came into force in 1964, this approach was quickly followed in England and Wales by the introduction of The Building Regulations 1965. These regulations were generally of a prescriptive nature.

In November 1985 the Building Act 1984 came into force by the introduction of 'Approved Documents' with their non-prescriptive requirements. A similar approach was ultimately adopted in Scotland in which the equivalent to Approved Documents are the Technical Handbooks and in Northern Ireland the Technical Booklets.

The 'Approved Documents' (and their equivalents in Scotland and Northern Ireland) are published by the respective governments and can be freely accessed on line. These documents are subject to periodic amendment.

NOTE: In England, Fire Safety regulations are currently addressed by reference to Approved Document B Volume 1 (incorporating 2013 amendments) for Dwelling houses and Volume 2 (incorporating 2013 amendments) for buildings other than Dwellings.

With some exemptions, designs for a new building or for the material alteration of an existing building are submitted to the Local Authority Building Control body (Local Authority Building Control or a private Approved Inspector) who ensure (in consultation with the Local Fire and Rescue Authority) that the proposed development complies with current Building Regulations. Compliance with Building Regulations is also required if there is a material change of use of the building.

3/ Brief History of Fire Doors - United Kingdom:

NOTE: Fire door structures and designs have changed over time to address changes in regulations, test methods and to incorporate advances in fire door technology. Doors installed some years ago may not match current designs.

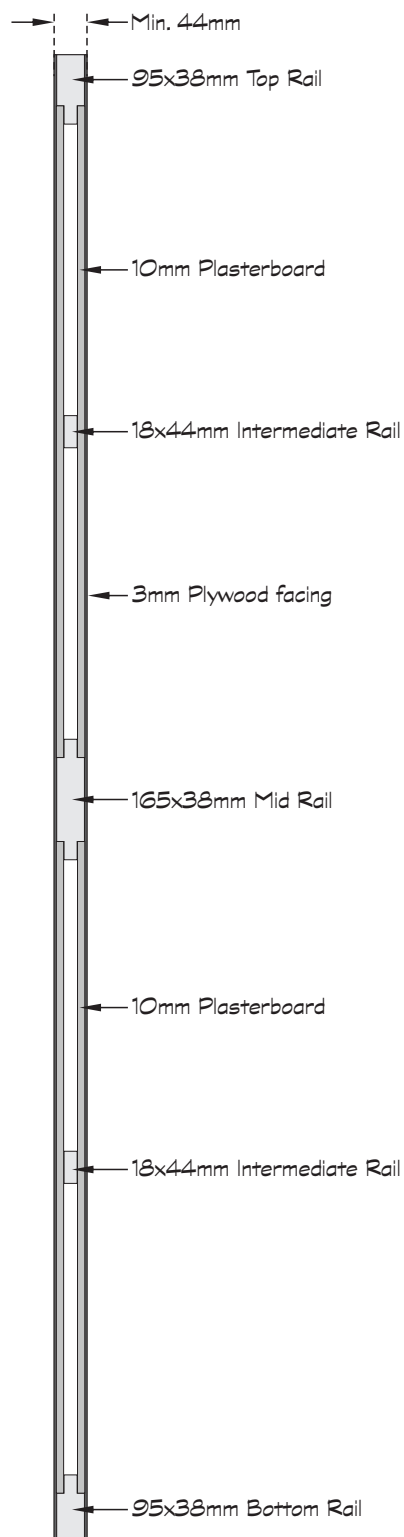
The following information is intended to assist in the determination of appropriate action to be taken with regard to fire door provisions, particularly in respect of older buildings.

Before 1951 there was no national standard for fire doors and products used in buildings were largely controlled by local authorities by reference to Bye-Laws. At this time most wood doors were of a stile and rail joinery construction with panelled or glazed elements but with no particular claims with regard to fire performances.

British Standard BS459 Pt. 3 : 1951 provided for prescriptive designs described as half hour and one hour 'fire check' doors. The 'rules' associated with BS459 Pt. 3 included the following:

- The door must be marked on their hanging stile with the manufacturers name or trade mark.
- The British Standard number i.e. BS459 Pt.3. 'half hour' or 'one hour' as appropriate.
- For 'half hour' applications the frame was required to be provided with a minimum 25mm door stop that could be of either a moulded stop or planted stop design.
- For 'one hour' applications the frame was to be designed with a minimum 25mm moulded door stop only and it was the frame was required to be pressure impregnated with fire inhibition salts being a 15~18% solution of monoammonium phosphate in water

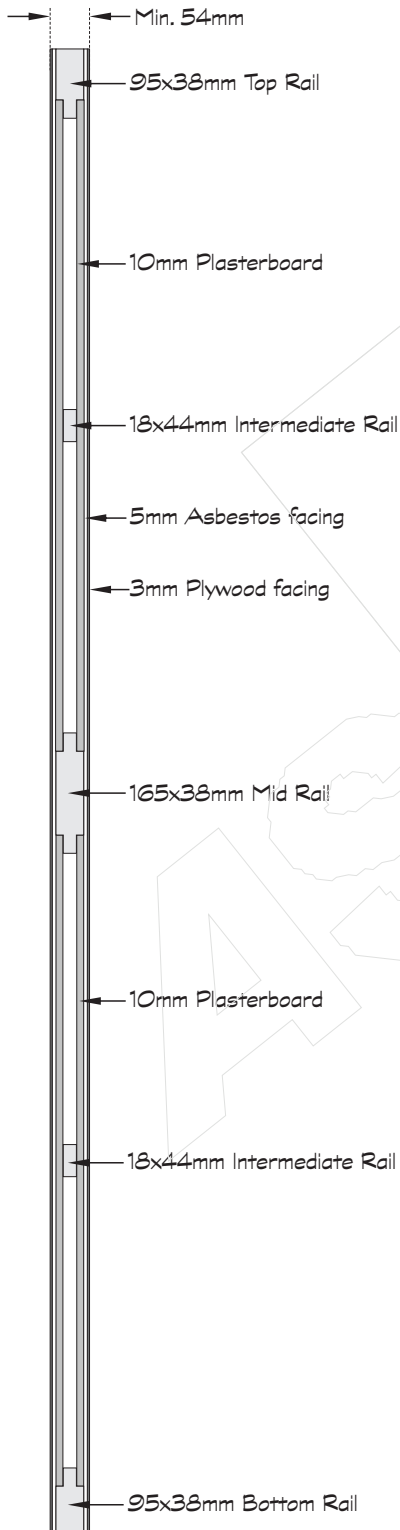
BS459 Pt.3 : 1951 - Half Hour Fire Check.



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BS459 Part 3 : 1951 - One Hour Fire Check.



WARNING: One hour Fire Check doors constructed to BS459 Part 3 : 1951 details are manufactured using 2No. Nom. 5mm thick white asbestos sheet that is not visible when viewing the door.

1953 saw the introduction of a fire door test method by reference to BS476 Part 1 following which fire doors could be constructed to any details determined by a manufacturer and subjected to a time / temperature related fire test. Building Regulations provided for the coexistence of BS459 Part 3 and BS476 Part 1 tested constructions for a number of years.

The BS476 Pt.1 test uses the ISO834 related cellulose time / temperature regime that has been adopted and still applies in Europe and the United States. However, there are differences in the methods by which the tests are applied.

The BS476 Part 1 test conditions resulted in a negative pressure in the furnace. This allowed 'cold' air to pass around the edges of the door leaf. This test method was superseded by BS476 Part 8 in 1972. The primary difference between BS476 Part 1 and BS476 Part 8 is that the latter standard required positive pressure to be applied in the furnace thus allowing hot gases to pass around the edges of the door leaf. The pressure normal was set at 1000 mm above the bottom edge of the door leaf.

BS476 Part 8 was refined by the introduction of BS476 Part 22 in 1987. The refinements related to the timing of the application of positive pressure and other minor adjustments to improve the consistency of testing.

2000 saw the introduction of BS EN 1634-1 to provide for a Europe wide test. The ISO834 related time / temperature requirements applicable to the BS476 based tests still apply but there are differences in the type of thermocouples used in the furnace and a change in the application positive pressure in the furnace. Currently Building Regulations in England & Wales are satisfied by successful testing to either BS476 Part 22 or BS EN 1634-1.

NOTE: BS EN 1634-1 : 2000 has since been replaced with BS EN 1634-1 : 2008.

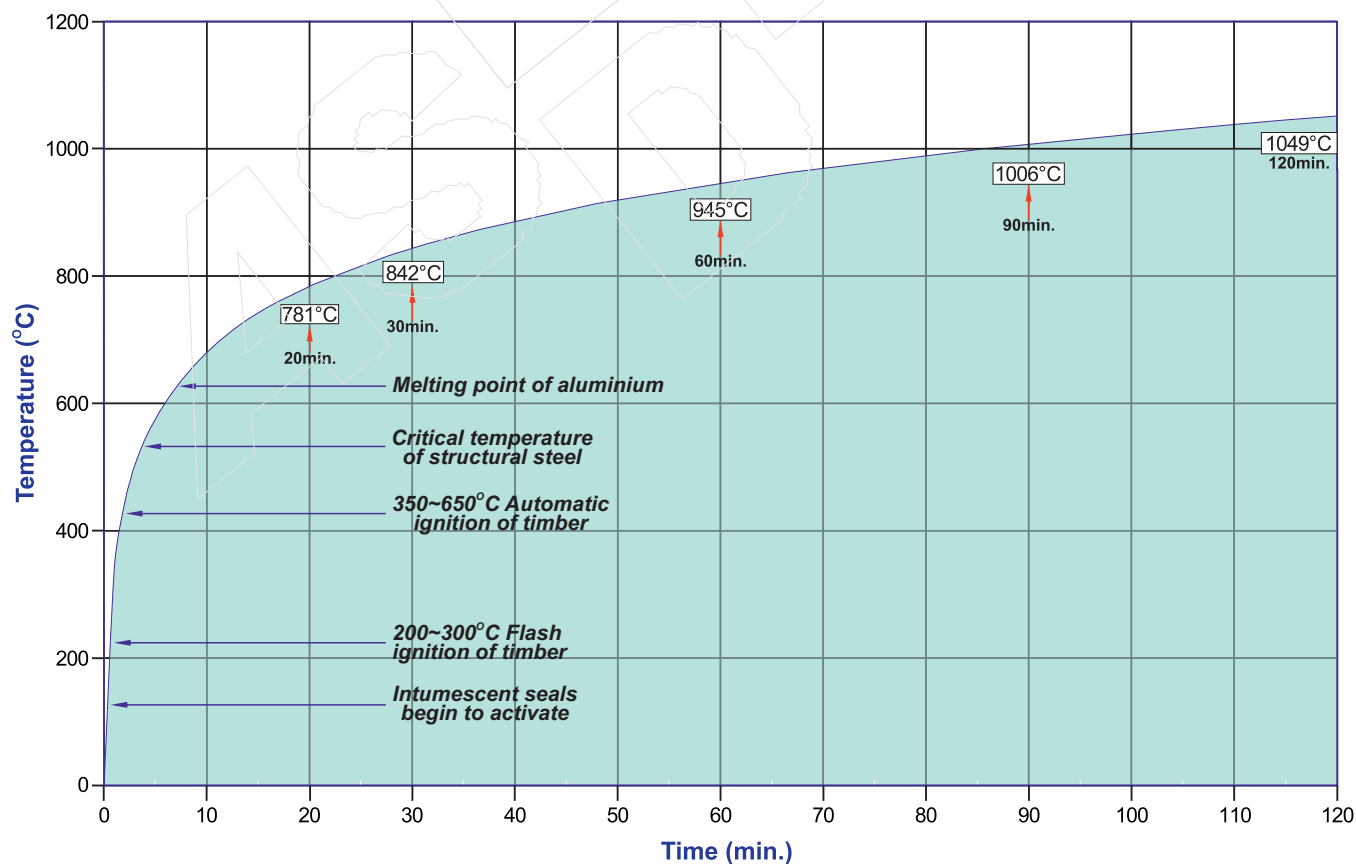
4/ Fire Test Methods & Criteria:

The ISO834 related BS476 & BS EN 1634-1 tests are based on an agreed cellulose fire time / temperature profile i.e. cellulose based burning characteristics typically to be expected when burning timber.

The testing provides for comparative test data based upon controlled conditions that can be used as a reliable means for comparing the performance of specimens. Fire is by its very nature chaotic. Each fire will have its own particular time / temperature profile related primarily to the characteristics of the 'fuel' and ventilation (oxygen) conditions.

NOTE: There are other test time / temperature test profiles that may apply for very specific conditions (e.g. for petrochemical applications - possibly paint / inflammable liquid stores) that differ from the cellulose profile used as the test basis for satisfying Building Regulations. Further advice should be sought where these considerations might apply.

**BS476 Part 20 & BS EN 1363-1 Time Temperature Curve
used for BS476 Part 1 , 8 & 22 and BS EN 1634-1 testing purposes**



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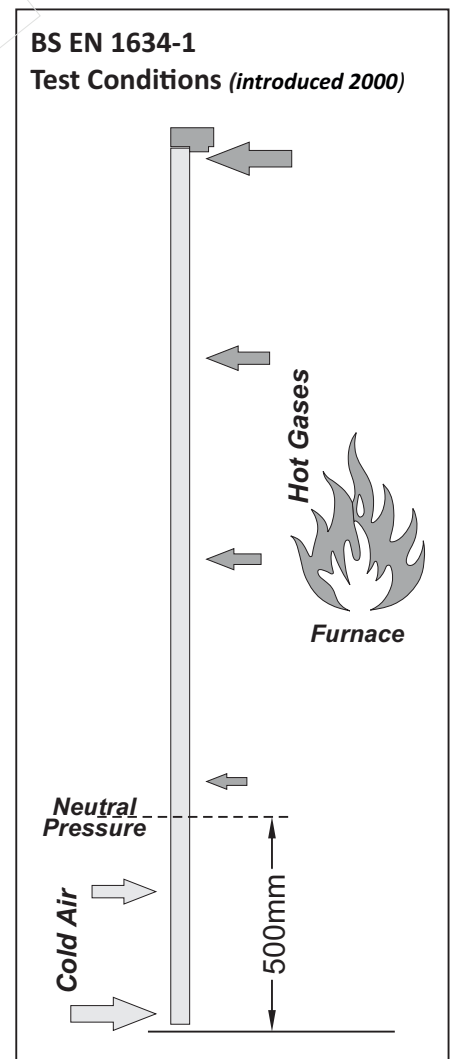
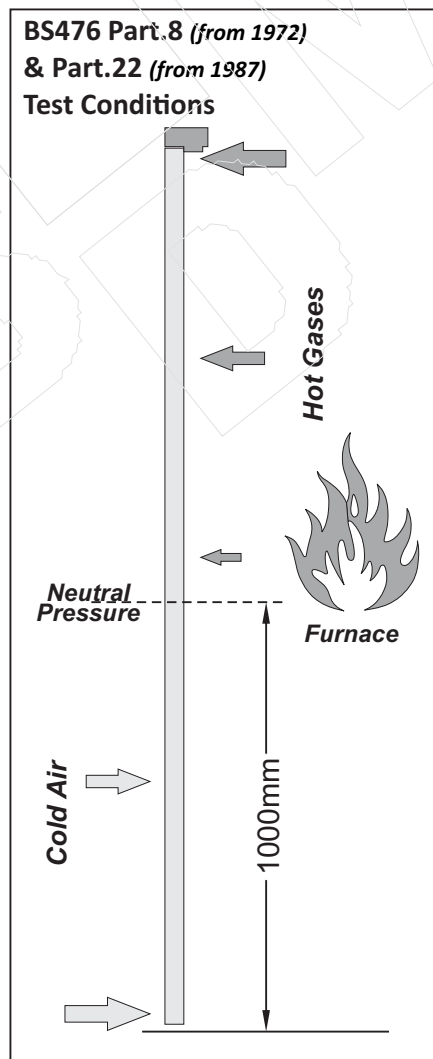
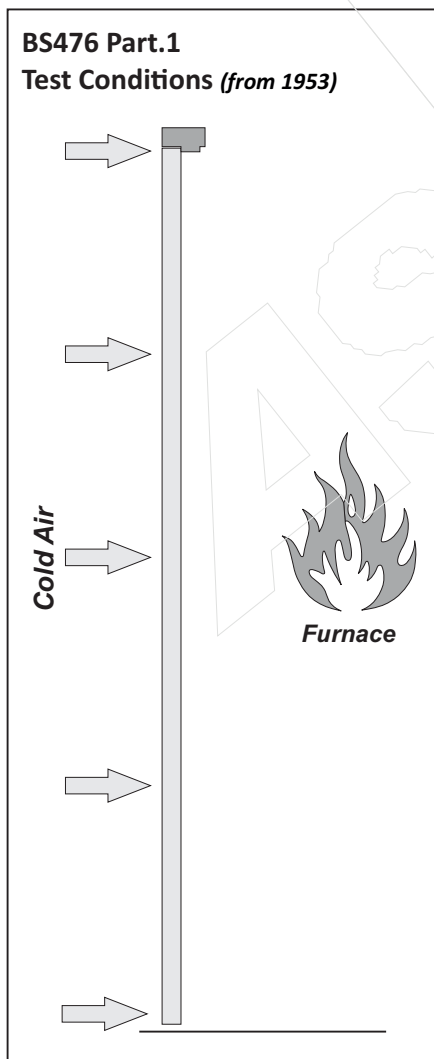
Differences between BS476 Pt1, BS476 Pt.8 & 22 and BS EN 1634-1 relate primarily to the application of pressure in the furnace.

BS476 Pt.1 was a negative pressure test. i.e. there is a negative pressure in the furnace resulting in 'cold' air being drawn around the edges of the specimen with a resultant cooling effect.

BS476 Pt.8 and BS476 Pt.22 are positive pressure tests. The test requires the upper part of the furnace to be maintained at a positive pressure. Typically this means that neutral pressure is achieved at 1000 mm above floor level. This allows 'Cold' air to enter the furnace around the bottom half of a door while the upper half is subject to 'attack' by hot gases being pushed under pressure against the exposed face of the door.

NOTE: BS476 Pt.8 and Pt.22 are essentially the same test but with refinements to the Pt.22 test to provide for improved consistency between testing facilities.

BS EN 1634-1 is a positive pressure test that is basically the same as BS 476 Part 22 but has the neutral pressure set at 500 mm above floor level. Other differences relate to thermocouples and the method of recording results.



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Traditionally there have been four criteria for determining the point of failure of a specimen under test. These are as follows:

1/ Stability: The ability of the specimen to remain stable in its frame without collapse or excessive distortion.

2/ Integrity: The ability to resist the passage of flame from the fire side to the non-fire side of the specimen. Integrity failure can also occur if excessive gaps open up around the specimen door.

3/ Insulation: The ability of the specimen to resist the transfer of heat from the fire side to the non-fire face of the specimen within prescribed limits.

4/ Radiation: The ability of the specimen to prevent the radiation of heat through to the non-fire side of the specimen.

NOTE: Current Building Regulations (England & Wales) Approved Document 'B' requires the measurement of Integrity and insulation performances only. Older fire test reports may record 'stability' and 'Integrity' performances.

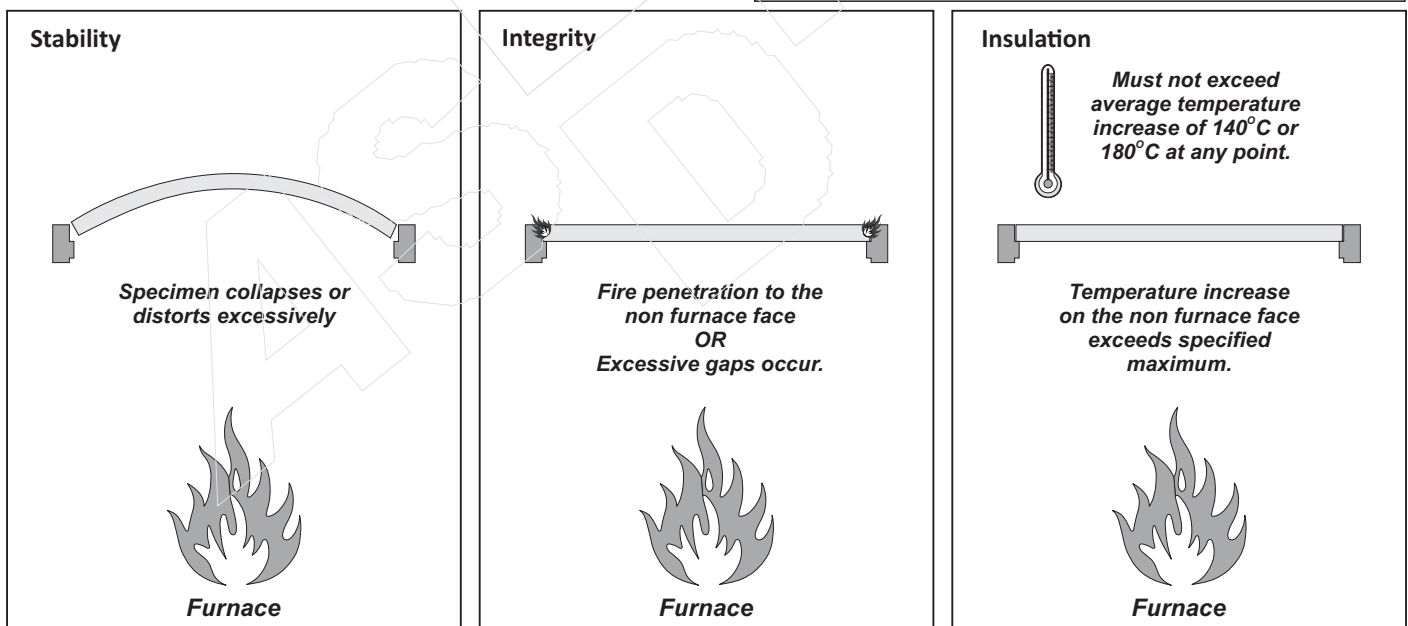
Building Regulations (England & Wales) Approved Document 'B' advises that:

- For door sets occupying less than 25% of a compartment wall an Integrity performance only is generally required.
- For door sets occupying more than 25% of a compartment wall Integrity and insulation performances are generally required.

NOTE 1: Solid timber flush doors will generally provide for insulation performances that are equal to the Integrity performance. However, insulation will be a consideration where doors are glazed.

NOTE 2: The use of non-insulating glass types is permitted in door sets by reference to Building Regulations - Approved Document B. However the regulations provide for limits in respect of glass area and glazing location when non insulating glass types are used.

WARNING: Whereas a radiation performance is not required by reference to current Building Regulations, insulation and / or radiation performances can exceptionally be specified for certain locations in particular buildings to address identified risks. Project records may need to be referred to where these considerations might apply.



Spread of flame:

Testing for 'spread of flame' performance uses a different procedure from that carried out to determine integrity performance.

Door sets are not required to provide for 'spread of flame' performances by reference to Building Regulations.

WARNING: Whereas a 'spread of flame' performance is not required for door sets by reference to current Building Regulations this performance can exceptionally be specified for particular locations in particular buildings. e.g. where the door set is incorporated into a panelled wall where the panelling is required to provide for a spread of flame performance.

5/ Identifying Fire Doors:

For earlier installations in advance of specifications requiring BS476 Pt. 8 or later test certification, it can be difficult to identify 'fire doors'.

Doors constructed to BS 459 Part 3 details may be identifiable on inspection, if the specification criteria described in 3/ above can be seen. A half hour fire check door would generally be nominally 44 mm thick and a one hour fire check door nominally 54 mm thick. Inspection of the frame and door stop detail might provide another indicator.

For installations using doors tested to BS 476 Part 1 : 1953 (*negative pressure testing*) the task becomes more difficult as there were no prescribed construction details to be followed. Testing to this standard was successfully carried out without the need to use intumescent seals.

NOTE: Some successful BS 476 Part 1 testing for one hour fire door applications was achieved using nominally 44 mm thick doors.

Where manufacturers marking are still visible these might show: 30/20, 30/30, 60/45 or 60/60 where:

- 30/20 = 30 minutes stability / 20 minutes integrity.
- 30/30 = 30 minutes stability / 30 minutes integrity.
- 60/45 = 60 minutes stability / 45 minutes integrity.
- 60/60 = 60 minutes stability / 60 minutes integrity.

NOTE 1: Doors with the lower integrity rating were referred to as 'fire check' doors while those with an integrity rating equal to the stability rating were referred to as 'fire resisting' doors. BS 459 Part 3 doors were described as 'fire check'.

NOTE 2: The term 'fire check' is also used to identify door constructions supplied (often from Builders Merchant outlets) without intumescent seals where these seals must be added 'by others' to achieve the tested fire resistance rating.

Where fire doors conform to BS476 Pt.8 : 1972 (*or later standard*) tested details it is likely that intumescent strips will be visible around the edges of the door leaf or mounted in the door frame. For earlier door sets the intumescent seals are likely to be the ammonium phosphate type without a PVC cladding. These will generally be around 10 mm wide and may be red or brown in colour. These may have been painted over but the outline is generally visible. Later doors are likely to use intumescent material clad in a PVC sheath that may be of any colour or in an aluminium carrier.

NOTE: Some fire doors have been successfully tested using concealed intumescent systems. The intumescent seals are concealed under vertical lippings and are not immediately apparent from visual inspection. However, the intumescent sealing is usually exposed and visible at the head of the door and the vertical seals (under the lipping) can generally be seen from the top of the door.

All fire doors should be clearly marked or labelled at the time of delivery. However, due to the application of site finishes or as a consequence of fitting in adjustments these marking can be covered or removed.

Where manufacturers marks are still visible (*for half hour and one hour fire doors*) these should show:

BS476 Part. 8 or Part.22:

- **FD30** = 1/2 hour Fire resisting.
- **FD60** = 1 hour Fire Resisting.

BS EN 1634:

- **E30** = 1/2 hour Fire resisting.
- **E60** = 1 hour Fire Resisting.

NOTE: The coding might include the suffix 'S' or 'Sa'. This indicates that the door set is also intended to provide for a smoke sealing performance at ambient temperatures. The smoke sealing test (BS 476 Section 31.1 : 1983 or BS EN 1634-3 : 2004) is carried out separately. See page 15 for further advice regarding smoke sealing.

For door sets complying with BS476 Pt.8 specifications (*or later*) using pvc clad intumescent seals it is reasonable to expect that:

- a nominally 44 mm thick door using a single minimum 10 mm x 4 mm intumescent seal fitted to the door leaf or the frame was manufactured as an FD30 (*half hour fire resisting*) door.
- a nominally 54 mm thick door using a single 20 mm x 4 mm intumescent seal or 2no. minimum 10 mm x 4 mm seals in the door leaf or the frame was manufactured as an FD60 (*one hour fire resisting*) door.

ASDMA members belong to third party certification schemes administered by experts. Members of such schemes are generally required to clearly mark doors to provide for the traceability requirements of the schemes so that the manufacturer can be identified together with the date of manufacture of the door and the intended fire performance.

The third party certification providers produce 'assessment' or 'field of application' documents that describe the scope (*and limitations*) for use of a particular design. These documents are prepared by experts on the basis of test evidence provided (*or authorised for use*) by the manufacturer or owner of the base test evidence.

Third party certification schemes are administered by a number of providers including:

- Exova BM TRADA – 'Q' Mark.
- Exova – Warrington Certification – 'Certifire'.
- BRE Certification - BRE Global.
- IFC Certification.

These schemes are designed to ensure that fire doors are consistently manufactured to the same specification and standard as that originally tested. This is achieved by periodic audit visits to the manufacturing plant and periodic audit testing of sample fire doors taken from the production line.

NOTE: Some third party certification providers also operate fire door installers and fire door maintenance certification schemes. ASDMA recommends tradesmen listed reference to these schemes for employment in the 'competent person' role for the maintenance of fire doors.

BS 8214 : 2008 Code of Practice for fire door assemblies advises:

'All fire doors should be clearly and permanently marked with their declared fire resistance period either immediately after manufacture or inspection, or before dispatch. A convenient way of providing this information is by means of a colour-coded permanent label or plug.'

Door manufacturers who are members of third party certification schemes are required to provide non-removable labels or plugs that include the minimum information shown in BS 8214 with additional information to assist with identification of the manufacturer.

Labels should be applied to the top edge of the door and include a 'DO NOT REMOVE' notice. If it is necessary to carry out minor adjustments on site to ensure the correct operation of the door leaf, the top edges of fire rated door leaves should not be adjusted; this is a critical area of a fire door.

Plugs may be fitted to the hanging stiles of door leaves. In the case of the Exova BM TRADA 'Q' Mark scheme these will include a manufacturer's identification reference. A number of plugs may be fitted to show:

- **The period of fire resistance:** The fire rating for the door leaf construction. (*Outer colour*).
- **Intumescent provisions at the time of delivery:** Intumescent seals may not have been fitted by the door manufacturer and must be fitted to the door leaf or frame by a third party, usually the installation contractor. (*Red centre core*). A Green centre core is used where the intumescent seals are fitted by the door manufacturer at the factory.
- **Glazing:** Generally fire door will be factory glazed but options exist for site glazing 'by others'. (*Orange centre core*).
- **Factory Hung Door set:** Doors and frames can be delivered separately, perhaps from different sources. A plug is used where the doors is supplied as a factory assembled unit complete with its frame. (*Silver centre core*).
- **Installation:** A plug can be added where the installer is a member of a certified installers' scheme. (*Gold centre core*).

The plug method of marking has the advantage of allowing for the door leaf to be adjusted within approved limits without removal of the identification data.


In the absence of any visible markings it might still be possible to identify further information by reference to manufacturers' marks that may be shown on the bottom edge of the doors. Provided that the name and contact details for the manufacturer are known, most manufacturers will use a marking system to identify their manufacturing references and often include the 'project title' and 'project door number'. The manufacturers' records can then be consulted to determine further details.

NOTE: The project door location reference used for the purpose of construction and manufacturer may be changed by Clients following completion of the project.

EXAMPLE: The Exova BM TRADA Fire Door Plug System:

BMTRADA

Timber Fire Door Certification Scheme



Outer colour - period of fire resistance.


Inner/tree colour - status.

Unique member's certification number.

Outer colour


Period of fire resistance (mins)

30




(Yellow)

60




(Blue)

90








(Brown)

120




(Black)

Inner/Tree colour - when fixed to door


 (Red)	<p>Approved door (FD30 & FD60 only). Intumescent not yet fitted.</p>	 (Orange)	<p>Approved factory fitted glazing.</p>
 (Green)	<p>Approved door Intumescent in door factory fitted.</p>	 (Silver)	<p>Certified factory hung doorset.</p>
		 (Gold)	<p>Certified installed doorset.</p>

Inner/Tree colour - when fixed to frame



Approved frame to match door. All intumescent to door and frame fitted.

For scheme and members' details
visit www.bmtrada.com or
telephone +44 (0) 1494 569826



6/ Smoke Control:

The first indication of a fire is often provided by the presence of smoke. Dense smoke can give rise to disorientation and panic. The inhalation of smoke can lead to serious injury or death. Every effort must be made to keep escape routes in particular clear of smoke.

Following recognition that smoke was a major cause of death and injury under fire conditions, smoke sealing tests were also introduced in 1983.

BS 476 Section 31.1 and the European test BS EN 1634-3 test methods provide for a means of measuring air leakage (and consequently smoke leakage) across a door set.

Testing for fire resistance and for smoke sealing requires two different test events.

Building Regulations Approved Document B identifies locations where a smoke sealing performance is required.

Whereas Building Regulations relate smoke sealing specifically to fire rated doors, smoke seals can be added to other locations including non fire rated doors. In addition to the smoke sealing benefits, the use of smoke seals will generally provide for improved sound attenuation performances

WARNING: *Some buildings use pressurisation systems to clear smoke in the event of fire. Generally smoke seals should not be fitted to doors in buildings with this facility. 'Responsible Persons' should be aware of any smoke clearance pressurisation facility and seek expert guidance with regard to the use of any additional smoke sealing requirements.*

7/ Timber Fire Doors Basic Considerations:

i/ Buildings are generally compartmented to delay the spread of fire from one area to another. The compartments are usually linked by doors to allow for the passage of 'traffic' around the building.

Door sets have two important functions in a fire:

- When open they provide for a means of escape.
- When closed they form a barrier to fire spread.

NOTE 1: *Duties with regard to emergency escape and the considerations that apply in the event of fire are set out by reference to Article 14 of the Regulatory Reform (Fire Safety) Order : 2005. (and equivalent legislation in Scotland and Northern Ireland).*

ii/ Ease of Use:

The primary function of any door is to provide for a means for 'traffic' to pass from one side of a wall to the other. If the door cannot provide for this basic function simply and easily and without causing inconvenience to the users of the building then it is unlikely that it will be able to provide for any secondary performances.

NOTE: *Ease of use is related among other things to operating gaps between the door and the frame and at the meeting stiles of pairs. For further information in this regard see ASDMA publications:*

**Best Practice Guide to Timber Fire Doors
and
Guidance and Recommendations for the Coordination of
Bespoke Door sets**

iii/ Fire Door Standard

Provided there have been no significant changes to the layout or use of the building, fire doors installed to comply with legislation which was current at the time of the initial installation are normally sufficient, (subject to risk assessments applicable to the particular building) provided that they are kept in good working order.

8/ 'Competent Person' - Qualifications:

ASDMA recommends that the 'Responsible Person' employs suitably qualified 'Competent Persons' who are properly accredited members of a Third Party certification schemes for the maintenance and / or installation of fire doors.

9/ Reducing Risk:

Actions to be taken to reduce risk are likely to vary according to the design and use of the building and the nature of the users.

The following provides for recommendations and suggestions of a general nature that might be considered as a basis for determining appropriate actions in respect of timber fire doors.

a/ Education & Staff / Employee responsibilities:

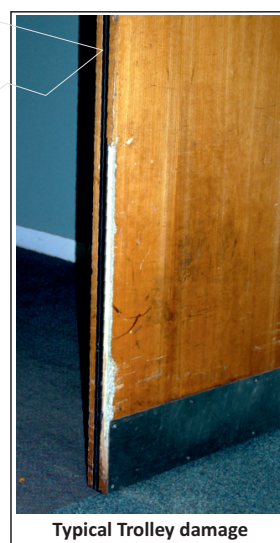
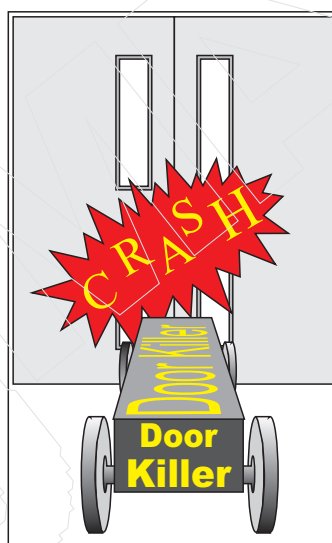
- Staff and employees should be made aware of the importance of fire doors and their function of providing for a means of escape and to delay the spread of fire to other parts of the building. Generally the fire doors will be used as any other door i.e. to provide for a means for 'traffic' to pass around the building. It is likely that they will only be called upon on one occasion to perform their fire resistance function. To maintain that potential performance fire doors must always be treated with care.
- Staff and employees should ensure that doorways on escape routes are kept clear of anything that might impede the closing of fire doors including fire doors that are held open by use of approved devices, until released for closing (*by closer power only*), in event of activation of the command system (*fire alarm*) or in the event of failure of the power supply. Provisions should be made for the immediate reporting of any concerns related to this issue to an appointed competent person.

NOTE: *The use of suitable signage to inform users of the building to keep doorways clear of foreign objects might also be considered for buildings that are open to the general public.*

- Staff and employees should be required to (*immediately*) report any perceived damage to intumescent seals or smoke seals to an appointed competent person. This is a particular requirement for buildings that are open to the public and where the possibility of vandalism is a recognised risk issue.
- Staff and employees should (*immediately*) report any observations of damaged glass or beading to an appointed competent person.
- Staff and employees should be required to (*immediately*) report any difficulties in the operating of any fire doors to an appointed competent person.

- Staff and employees should be fully aware of possible damage and the creation of risk to all users of the building that will be created by the abusive treatment of fire doors.

ADVICE: *Appropriate provisions should be made to prevent doors being opened by impact using wheeled traffic and doors being held in an open position by the use of any unauthorised devices. e.g. wedges, fire extinguishers or the like.*



- Staff and employees should be encouraged to ensure that **all** doors are kept shut when not in use. To develop, the fire must be fed with fuel and oxygen. Any action to reduce the availability of these elements will reduce risk and a closed door will restrict the flow of oxygen that otherwise feeds the fire. Whereas hollow core door constructions or older panelled style doors should not be considered (*in any way*) as being 'fire doors' these constructions, when subjected to fire test conditions have demonstrated integrity performance capabilities of five to fifteen minutes. To this extent they can supplement the performances of the fire doors.

ADVICE: *Use of route markers on the floor or other methods to encourage users to approach doors at a 90° angle will reduce the risk of impact damage to fire doors. See ASDMA publication 'Safety a Matter of Convenience' to identify other ways of minimising damage to door.*

9/ Reducing Risk contd.

b/ Maintenance - General:

Fire doors are engineered products that provide life and property saving functions in the event of fire. It is important that they are regularly inspected and maintained to permit them to perform at their best on the one and only occasion when they may be called to perform their fire resistant performances.

ASDMA recommends the employment of a 'Competent Person' who is a properly accredited member of a Third Party certification scheme for the installation and / or maintenance of timber fire doors.

The appointed 'Competent Person(s)' should prepare an inspection / maintenance schedule to ensure that the fire doors are kept in good working order the following is suggested as a guide:

ADVICE: The following provides for guidance with regard to the initial frequency of inspections. These periods should be modified over time to suit observations and experience related to the particular building.

c/ Door Operation:

- Door sets fitted with hold open devices or swing free type closers should be closed regularly (*generally when there is likely to be low building occupancy*). For buildings in constant use (*e.g. hospitals*) fire doors should be closed preferably on a daily basis. All fire doors should close effectively under closer power only from any angle of opening and override any latch and seal resistance using only the door closer power.

NOTE: This for an operational check to ensure that closing devices can adequately overcome any seal and / or latch resistance to closing. A failure to close properly under unassisted closer power indicates a need for further investigation to determine likely causes.

- Check other fire doors, particularly doors on (or leading on to) escape routes at regular intervals to ensure that they will close from any angle under closer power only and that the closers can overcome any latch / seal resistance to closing.

NOTE 1: The frequency of inspection can be determined relative to the frequency of use of the doorway. Generally doors used less than (say) twenty times per day might be programmed for (say) monthly inspection. Duct doors are normally kept closed and may not be fitted with closers, these can be omitted from the inspection programme. High usage doors (twenty plus operations per day) could be programmed for (say) weekly inspections.

NOTE 2: Duct doors that are normally kept locked need only be inspected when the doors are opened by an authorised person.

d/ Addressing Convenience:

Fire doors form part of the barrier against the spread of fire between compartments that can only be achieved when doors are in the closed position.

NOTE: It is good practice to close all doors when they are not in use.

Experience shows that convenience often takes precedence over safety and building users too often seek to disable or otherwise undermine devices that inconvenience them in carrying out their work. Doors are often held open by wedges or even fire extinguishers so that the building users, particularly if they are moving loads, can pass easily around the building.

With the exception of some locations in residential buildings, all dedicated fire doors (*except duct doors that are normally kept locked*) should be fitted with automatic closing devices. To be effective these must be capable of closing the door from any angle of opening and should be strong enough to overcome the resistance of any latch or sealing system.

For the convenience of users it is often desirable to hold open doors on major routes in the building. Various devices may be used in conjunction with closing devices to achieve this objective including:

i/ Electro Magnetic Hold Open Devices:

- The door is fitted with a normal closer that applies forces to close the doors. The doors are held open by an electro magnet fitted to the wall or floor and a metal plate fitted to the door. The electro magnet is linked to a 'command' system that may be the fire alarm system. In the event of a fire or power failure the electro magnets release and the door closes under the closer power.



Typical electro magnetic hold open device.

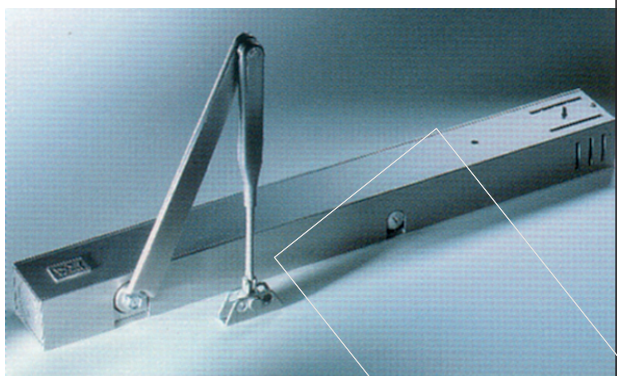
(Guidance on the interface between fire detection systems and hold open devices is given in BS 7273 Part 4 : 2015).

NOTE: Electromagnetic hold open devices must be carefully positioned so that the hold open force is applied at the same level as the closer. When used with overhead closers, the electromagnetic hold open devices should be near the head of the door. For floor mounted closers, they should be positioned near the bottom.

9/ Reducing Risk contd.

ii/ Swing Free Closers :

- These exert no forces on a door leaf during normal operation. They may include internal sensors or be linked to the fire alarm system. When activated by the sensor system (*or in the event of power failure*) the closer system shuts the door in an identical manner to a normal closer.



Swing Free Door closer with smoke sensor

iii/ Fusible links:

- These use a low melt temperature component to hold doors in the open position. In the event of fire the fusible link melts and allows the door to close under closer control. They are low cost products but are not smoke sensitive and will not operate until the temperature at fusible link reaches the operating temperature.

NOTE 1: *These devices do not sense the presence of smoke and are not recommended by ASDMA for this reason.*

iv/ Delayed Action Closers:

- Some closers are provided with a delayed action function. These allow the doors to be opened manually and to stay open for a short time (*enough to allow a trolley or hospital bed to pass through the opening*) before closing.

NOTE: *Many of these devices have been fire tested with timber fire doors. Existing (face fixed) closers can generally be replaced with proven closers with this facility.*

ADVICE: *ASDMA recommends that all doors operated by swing free closers or electromagnetic hold open devices are linked to command systems that allow for daily operation of the doors. Thus the doors may be held open during the working day but closed (e.g. by a timing device) when the building is not in use or during periods of reduced occupancy.*

WARNING: *The area around doorways must not be used for storage and must be kept clear of any foreign bodies that might otherwise prevent the doors from fully closing without human intervention in the event of fire.*

Numerous devices are available for the controlled closing of fire doors in the event of fire. For further information in connection with the selection and use of hardware with fire doors See:

ASDMA publication:

Best Practice Guide to Timber Fire Doors and

DHF / GAI publication:

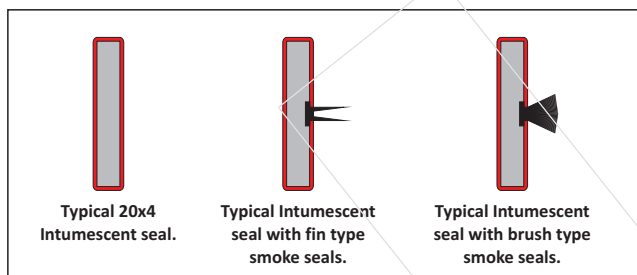
Code of Practice: Hardware for Fire and Escape Doors.

9/ Reducing Risk contd.

e/ Perimeter Intumescent Seals:

i/ Perimeter Intumescent seals - General:

- Most fire doors tested to BS476 Pt.8 or later standards providing a half hour performance or greater performance will be fitted with perimeter intumescent seals. These may be encased in a PVC sheath (of any colour) which may also hold a blade or brush seals for smoke sealing purposes. These seals are fitted in the door leaf edges or the frame reveal to seal the head and vertical edges of the assembly.



NOTE 1: For more recent installations PVC intumescent carriers are generally printed with the manufacturers name and seal type references - this data may not be visible until the intumescent seal has been removed.

NOTE 2: Exceptionally, a door may be fitted with a concealed intumescent system where the long edge seals are housed under lippings. Intumescent seals should be visible at the head of the door.

- Perimeter Intumescent seals expand when exposed to heat and seal the gaps between the door leaf and the frame (and at the meeting stiles of pairs of doors).
- Each fire door design will have been approved for use with particular intumescent seals in terms of size, type and location in the door set. Use of intumescent seals that are not approved for the particular door design should be avoided.
- Not all intumescent materials act in the same way. Low pressure seals expand in all directions but provide little help to the door in resisting distortion in fire. Some high pressure seals exert pressure mainly in one direction and give some resistance to distortion of the door leaf during fire. A further type of pressure intumescent material, available in different grades, acts in all directions and generates some pressure.

NOTE: Intumescent fire seals activate at temperatures that are above human survival levels.

- Door sets using 44 mm thick doors fitted with 10~15mm wide intumescent seals are likely to be half hour rated. 54mm thick doors using at least 20 mm overall width of intumescent seal, (fitted either as one or two strips) have a likely design performance of one hour fire resistance.

ii/ Perimeter Intumescent Seals Maintenance:

- Check perimeter intumescent seals for damage. Immediately replace damaged seals.

NOTE 1: The frequency of inspection can be determined relative to the frequency of use of the doorway. Generally doors used less than (say) twenty times per day might be programmed for (say) monthly inspection. Duct doors are normally kept closed can be omitted from the inspection programme. High usage doors (twenty plus operations per day) could be programmed for (say) weekly inspections.

NOTE 2: Intumescent seals fitted to duct doors that are normally kept locked need only be inspected when the doors are opened by an authorised person.

ADVICE: When replacing damaged intumescent seals the replacement seals should be of the type(s) approved for the particular door design. However, if this cannot be ascertained, any intumescent seal of the same dimensions (and located in the same positions) as the original is better than none.

WARNING: Regretfully intumescent seals are known targets for vandal attacks and the inspection provisions should be adjusted where vandalism is a recognised risk.

For further guidance with regard to intumescent seals related to timber fire doors see:

IFSA (Intumescent Fire Seals Association) publication:
Risk Assessors Good Practice Guide No.1
Guidance to Risk Assessors in respect of the use of intumescent door seals.
Web: www.ifsa.org.uk

9/ Reducing Risk contd.

f/ Intumescent Gaskets (Hardware):

i/ Intumescent Gaskets (Hardware) - General:

Some door set designs require intumescent gaskets to be used with hardware items to limit the risk of heat transfer through metal components.

If intumescent gaskets are required by test/assessment data for either the door leaf design or a particular item of hardware, the gaskets specified must be used.

Typically intumescent gaskets will be fitted with hardware items requiring the removal of door core material including:

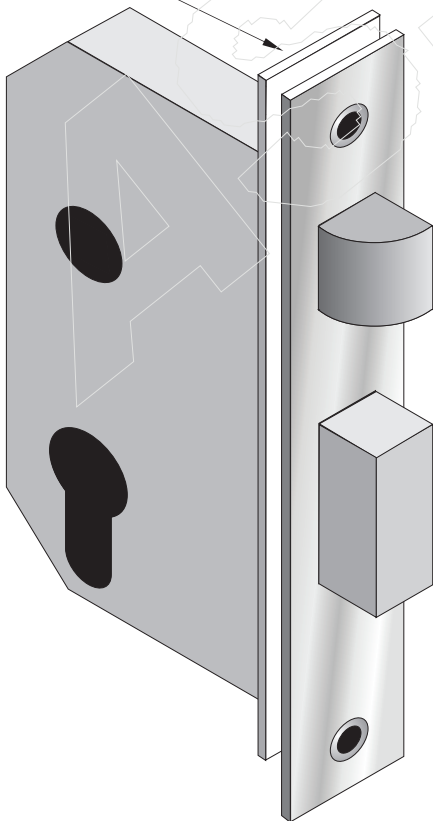
- under hinge blades
- lock/latch forend plates
- strike plates
- flush bolts
- concealed closers

ii/ Intumescent Gaskets (Hardware) - Maintenance:

- Items of hardware may need to be replaced over time due to normal wear and tear. Requirements of this nature will generally be identified during scheduled operational inspections. Hardware in fire doors should be carefully removed to ascertain requirements for the use of intumescent gaskets. Intumescent gaskets may have been used with hardware items listed in **9 fi**/above.
- Provided that the gaskets are undamaged these should be retained and reused with the new hardware fittings. Otherwise these gaskets must be replaced, if possible with gaskets of the same material as used for the original installation.

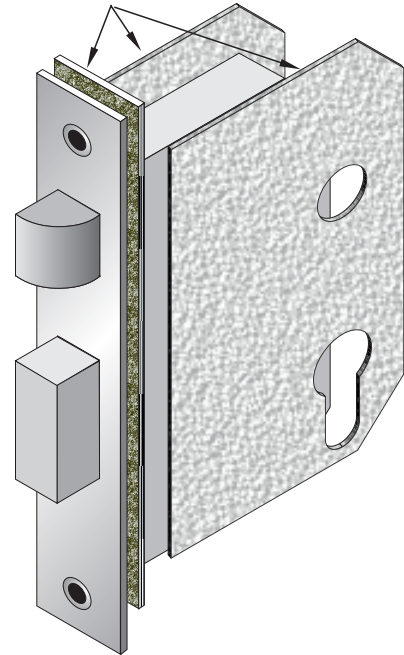
**Hardware Intumescent Sealing
Lock / Latch Forend only**

*Intumescent gasket behind
latch forend*



**Hardware Intumescent Sealing
Full Lock / Latch encasement**

Intumescent Gasket



NOTE 1: For some applications full intumescent encasement of the lock/latch body is required.

9/ Reducing Risk contd.

g/ Smoke Sealing :

i/ Smoke Sealing - General:

- Smoke and fumes from a fire can be as dangerous as fire itself. The appearance of smoke may be the first warning of a fire and dense smoke conditions can lead to disorientation and panic.
- An open doorway provides an easy route for the flow of smoke under fire conditions. Any door, *(and particularly door sets fitted with smoke seals)*, which is closed will restrict the passage of smoke. It is therefore recommended, *(except where smoke clearance pressurisation systems are used)* that all doors are fitted with smoke seals and in any event, kept closed when not in use.
- Where smoke sealed doors need to be held open for the convenience of the users of a building, the use of door control systems that can be activated by smoke detection is necessary. Some closing devices are fitted with built in smoke sensors; others can be linked to alarm systems.
- Door set designs using combined intumescent /smoke seals are quite common. The smoke sealing is provided by either blades or brushes. The location of these seals, particularly at the meeting stiles of pairs of doors makes them highly vulnerable to accidental *(or deliberate)* damage.
- Unless the geometry of the door action during its swing has been adequately taken into account when installing the door set, blade seals can be damaged by a 'guillotine' action and brush seals can become compressed and remain at a setting that suits the minimum gap between the door and the frame *(or adjacent door leaf)* effectively reducing the smoke sealing capability.

ADVICE: Smoke seals are generally low cost items. ASDMA recommends that (unless smoke clearance mechanical pressurisation systems are used in the building) all doors are fitted with simple smoke seals that do not interfere with the operation of the doors. These are also likely to provide for some measure of improved energy conservation and sound attenuating performances.

WARNING: Apart from damage that may be due to a failure to accommodate the door operating geometry at the time of initial installation, smoke seals are regrettably known targets for vandal attacks and the inspection provisions should be adjusted where vandalism is a recognised risk.

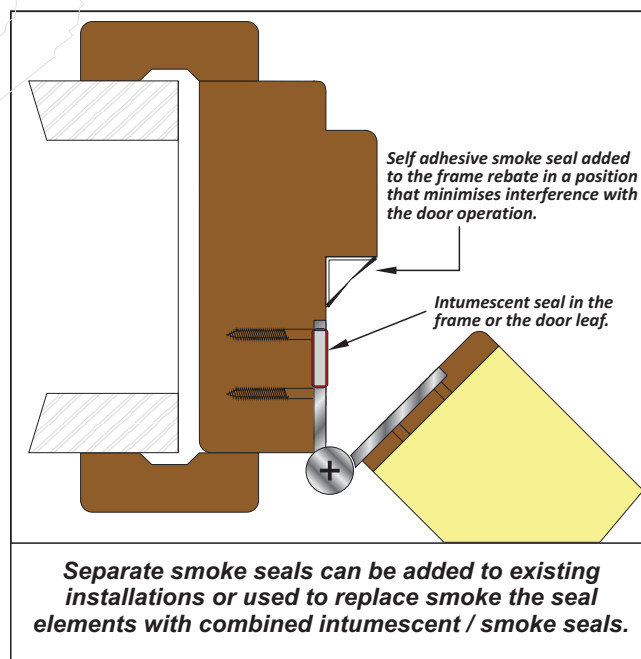
ii/ Smoke Sealing - Maintenance:

- Smoke seals, including those which are fitted in the intumescent seal carrier, may become damaged over time.

NOTE 1: The frequency of inspection can be determined relative to the frequency of use of the doorway. Generally doors used less than *(say)* twenty times per day might be programmed for *(say)* monthly inspection. Duct doors are normally kept closed can be omitted from the inspection programme. High usage doors *(twenty plus operations per day)* could be programmed for *(say)* weekly inspections.

NOTE 2: Duct doors that are normally kept locked need only be inspected when the doors are opened by an authorised person.

- Where combined intumescent / smoke seals are used, it is not necessary to replace the complete combined intumescent / smoke seal. Provided that the intumescent carrier is still in good condition, separate *(tested and approved)* smoke seals can be fitted to existing installations.
- For single action doors it is recommended that replacement *(or additional)* smoke seals are of a type that fits into the frame rebate in a position where they have minimal influence over the operation of the door. These seals generally have self-adhesive backing to allow for ease of fitting in existing installations.



For further information in connection with the smoke sealing of timber door sets see: ASDMA publication:

Best Practice Guide to Timber Fire Doors

9/ Reducing Risk contd.

h/ Hardware:

i/ Hardware - General:

- Hardware generally falls into four categories:
 - Hanging devices (e.g. Hinges & Floor Mounted Closers).
 - Securing Devices (e.g. locks / latches).
 - Operating Devices (e.g. Closers)
 - Furniture (e.g. Lever handles & plates)
- Generally small items of surface fixed hardware can be added to fire doors without detriment to performances (e.g. Coat hooks, small push plates or signs).
- Surface mounted barrel bolts can be generally added to fire doors provided that their use does not undermine means of escape provisions.

NOTE 1: Fitting metal plates to door faces is not recommended by ASDMA. This does little to protect the vulnerable edges of the door and large metal plates may give rise to excessive distortion and consequent performance failures under fire conditions. If metal plates extend around the edges of a timber door, they may form a thermal bridge under fire conditions leading to performance failures.



The use of protection plates of any type may invite abuse.

Large metal plates (or any hardware that extends around the door edges) must not be added to fire doors. These can induce distortion under fire conditions and / or create a thermal bridge for the transfer of heat from the non fire to the fire side of the door.

NOTE 1: Hardware items that replace removed of parts the door can cause the same thermal bridging as metal plates around door edges and so should not be fitted to existing doors.

NOTE 2: If protection plates are deemed to be essential, they are available in high impact plastics using mixes that incorporate fire retardant salts.

ADVICE: Consider fitting buffer systems to the trolleys to soften the impact on the doors. The buffer system should extend all-round the sides of the trolley to prevent the doors closing onto a trolley after the buffer system has passed the door.

- Face fixed items such as electromagnetic hold open devices or faced fixed closers with fittings that do not pass through the thickness of the door leaf can generally be added to fire door installations without detriment to performances provided these do not require removal of door or frame parts.

WARNING: Concealed closers or large items of hardware that require removal of door core material or the substantial removal of frame material must not be added to existing fire door installations.

ii/ Hardware - Maintenance:

- Mechanical items such as hinges, locks, latches, closers, floor springs etc. are likely to wear over time. Maintenance provisions should comply with the hardware suppliers' recommendations where these are known. Otherwise, locks and latches may require occasional light lubrication.

NOTE: Some hinges use self-lubricating bearings that will not need additional lubrication.

- Hardware inspections should generally take place when carrying out operational checks. A failure of a door to operate correctly is likely to result from the wear of hardware items (or possibly the compression of gaskets used with hardware).

9/ Reducing Risk contd.

h/ Hardware contd.

ii/ Hardware - Maintenance contd.

- Where it is necessary to replace worn hardware on a fire door, the mechanical items listed above should be replaced with products to the same specification as the original where possible. Otherwise hinges, latches, locks, flush bolts, closers and other items of hanging, securing or operating hardware should be of the same type and size as the original items and should have been proven for use in timber fire rated door sets of the required performance.

ADVICE:

Hardware items that require the removal of door core material or substantial parts of the door leaf or frame should not be added to timber fire doors.

Small surface mounted items e.g. signage or (say) coat hooks can generally be added to timber fire doors without detriment to the potential performance.

Surface mounted barrel bolts may be added to fire doors provided that these do not impair the means of escape provisions.

Where morticed or recessed items of hardware are removed (and not replaced) from a fire door the resultant recesses must be filled with timber with the filling of any remaining voids using intumescent mastic.

Hardware used with timber fire doors must have been proven by test. Where intumescent gaskets are required by reference to either the hardware or the door test / assessment data then intumescent gaskets of the approved type(s) must be used.

Fire test evidence supporting the use of hardware with metal doors is not valid for use with timber doors and vice versa.

For further guidance with regard to the selection and use of hardware with timber fire doors see:

ASDMA publication:

*Best Practice Guide to Timber Fire Doors
and*

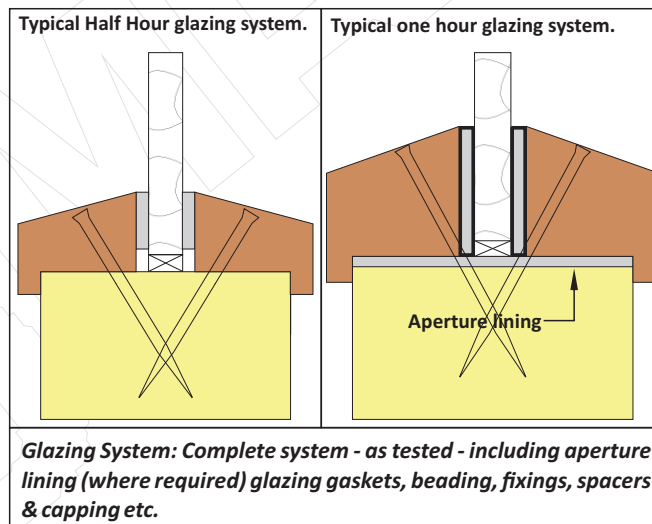
DHF / GAI publication:

*Code of Practice: Hardware for Fire and
Escape Doors.*

J/ Glass & Glazing:

i/Glass & Glazing - General:

- Glazing for fire rated timber doors requires a suitable combination of glass type, beading system and glazing gasket system.
- The glass type may vary according to the fire performance requirements. The beading system, including the bead profile, with its glazing gasket components and fixings must be suitable for use with the particular door construction and glass type.



- The most commonly used glass is 6mm Georgian wired glass. Other clear special glasses may be used and thicker, laminated glass types with intumescent interlayers may be encountered in both integrity doors and where insulation performances are required.

ii/Glass & Glazing - Maintenance:

- The glass in glazed fire rated doors may need to be replaced from time to time generally as a consequence of accidental damage. Generally any replacements should be according to the original specification.
- The re-glazing of fire rated doors involves techniques which require the skills of a qualified glazier familiar with the glazing of timber fire doors.

9/ Reducing Risk contd.

j/ Glass & Glazing - Maintenance contd.

- When re-glazing a fire door, the beading and damaged glass must be carefully removed. The glass, glazing system and beading must be replaced using identical products to the original. The position, angle and size of fixings to secure the beading is important. These should be recorded when removing the damaged glass and replicated when refitting the beading.

NOTE: Replacement fire-resistant glass panes must show a permanent mark that at least identifies the product name, the manufacturer and an indication of the glass fire resistance performance. Under no circumstances is it acceptable to install glass that is not fire resistant in fire doors.

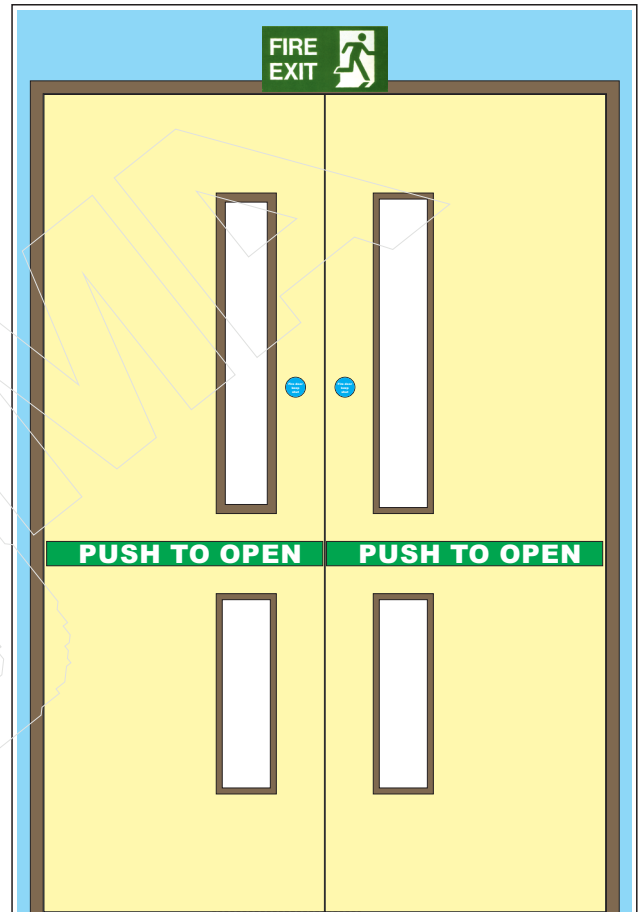
WARNING: Some fire door constructions require internal preparation to receive glazing. Generally glazed apertures must not be added to existing installations. Whereas with some door constructions this may be possible modifications of this nature work must essentially be carried out by a suitably qualified tradesman under the supervision of the door manufacturer.

For further information in connection with the glazing of timber fire rated doors see: ASDMA publication:

Best Practice Guide to Timber Fire Door and

*GGF (Glass and Glazing Federation) publication:
A Guide to Best Practice in the Specification and Use of Fire-Resistant Glazed Systems.*

NOTE: All Escape doors must open in the direction of the escape (i.e. push to open).



K/ Fire Door Signage

i/ Fire Door Signage - General:

- Dedicated fire doors should be fitted with approved signs (e.g. 'Fire Door Keep Shut') that should be visible on both faces of the door.



NOTE 1: For current standards relating to signage refer to: BS EN ISO 7010 and BS5499 parts 4 and 10.

- In the event of fire it is important that all users of the building are aware of escape routes and can use them freely. Escape routes should be clearly marked, and may include emergency lighting.

ii/ Fire Door Signage - Maintenance:

- For older buildings inappropriate signage may have been added over the years with the possibility that fire door signs may have been added to door locations that are not fire rated.
- Whereas there are no specific requirements to change or amend signage, ASDMA recommends that a risk assessment is carried out to ensure that signage has been correctly applied with a consequent programme to remove or replace any inadequate signage.

9/ Reducing Risk contd.

I/Decoration:

i/ Decoration General:

- For most fire door applications the finishes applied to the door leaves and the frames will be the same as used for non fire rated products.

NOTE: *Exceptionally special 'spread of flame' finishes will have been used for the original installation.*

ii/ Decoration Maintenance:

- It is likely that doors and frames will need to be re decorated from time to time. Professional decorator skills should be employed for this purpose.

WARNING: *Generally fire door test / assessment data will require that paint and lacquer finishes do not exceed 0.5mm thickness. An excessive build up of paints or lacquer finishes should be avoided.*

NOTE: *It may not be possible to identify where 'spread of flame' finishes have originally been applied without access to original installation specification details. Where this exceptional requirement applies re decorating paints & lacquers should comply with the original specifications.*

m/ Upgrading Door sets :

i/ Upgrading Door sets - General:

- Where the fire resistance of a door set can be determined by reference to labels/plugs the doors/frames should not be altered or modified in any way that requires interference with the intumescent sealing systems or that requires removal of any door core or frame material.
- Where it can be ascertained that a door is of a solid core construction but is from an unknown source, does not display any fire rating markings, (*excluding signage*) and the door set does not have intumescent seals, consideration may be given to the addition of intumescent seals to improve the fire performance.

WARNING: *While this action is likely to improve the potential fire resisting performance, no specific performance can be claimed for door sets modified in this way.*

ADVICE: *Details of typical solid core door constructions currently used for fire door applications can be found by reference to ASDMA publications see: ASDMA publication:*

*Best Practice Guide to Timber Fire Doors
and by reference to ASDMA member web sites.*

- There is no particular requirement by reference to the Fire Safety Order to replace existing door sets in a building. The extent to which such action is either necessary or reasonably practical is dependent upon the risk assessment applicable to the particular building.
- It is possible to upgrade existing older door sets to provide for improved fire resistance performances. The extent to which this is possible can be a variable and reference to expert advice is recommended where this is required. Exova BM TRADA (*among others*) provide advisory services of this nature See: www.bmtrada.com
- For older buildings where the test basis or details of the existing fire doors cannot be determined, (*provided that there is no impediment to existing means of escape provisions*), consideration might be given to the introduction of additional door sets complying with latest standards for location in selected strategic positions.
- For high risk older buildings consideration may need to be given to the replacement of existing door sets for protected escape routes using latest technology products.

iii/ Repair of Minor Damage:

- It is possible to repair minor damage to doors and frames where the repairs are essentially carried out by a Competent Person who satisfies the qualification requirements advised in this document.
- Damaged lippings can be replaced (*with replacement intumescent seals if applicable*) provided that the replacement lippings conform to the approved dimensional and specifications requirements (*including the use of approved adhesives & fixing*) for use with the particular door design.
- Damaged door frames can be made good by removal of the damaged area and splicing in replacement timber of the same specification as originally used for the door set. These filler piece(s) to be glued and pinned into position. The extent of the timber removed for repair should be limited and should not require removal of any parts of the frame that have been recessed to receive intumescent seals or which align with intumescent seals in the door leaf.

10/ ASDMA Support:

As indicated in this document it may be difficult, if not impossible, (*even for experts*) to determine whether or not a timber door construction is intended to provide for a fire rated performance on the basis of visual inspection alone, particularly for older buildings where door sets were installed without the use of intumescent seals to the satisfaction of regulations applicable at the time of the initial installation.

The extent to which it is '*reasonably practical*' to replace some or all of the door sets in a building can vary according to a number of issues to be taken into account for the purpose of preparing risk assessments.

NOTE: Alternative (or additional) considerations may apply to 'historic' buildings.

It may be necessary to replace damaged fire rated doors and / or frames and in some cases, to install additional or replacement fire rated doors (*manufactured to comply with current standards*) following a risk assessment.

- *ASDMA members specialise in the manufacture of bespoke performance doors and door sets to suit customer defined requirements.*
- *ASDMA members manufacture and / or supply many of the fire door related materials and components referred to in this document.*
- *ASDMA members can also offer a number of fire rated door designs that can simulate 'historic' timber door appearances.*

Persons with duties and responsibilities by reference to the Regulatory Reform (Fire Safety) Order : 2005 (*and similar legislation applicable in Scotland and Northern Ireland*) are invited to contact the ASDMA technical advisory service Tel: 01494 447370 for further assistance.

For further information and a full listing of ASDMA members, please refer to the ASDMA web site www.asdma.com

Additional and supplementary information can be found by reference to the following ASDMA publications:

'Best Practice Guide to Timber Fire Doors'

'Safety - A Matter of Convenience'

'Guidance and Recommendations for the Coordination of Bespoke Door sets'

these can be downloaded from the ASDMA web site:

www.asdma.com

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