Fire-resisting timber doorsets

Fire-resisting doorsets, as distinct from single 'fire door' leaves, are precisely designed and engineered component sets required to perform three main functions:

- **to protect escape routes from the effects of fire (including smoke) so occupants can leave safely (includes lofts and conversions)**
- **to protect the contents and/or structure of the building by limiting the fire spread (an insurance requirement)**
- **to permit fire fighting.**

A doorset package includes:

- **the door leaf**
- **the door frame**
- **hardware**
- **intumescent seals and smoke seals.**

Each component plays a critical role in the doorset's fire resistance. Unauthorised changes in specification may impair the performance of the whole doorset. Any changes from the tested specification should only be made with the approval of an appropriate expert authority, such as a UKAS-accredited testing laboratory.

Testing, assessment and certification

Building Regulations specify the requirements for doorsets to protect occupants for a minimum time in different locations in the building, expressed in minutes, either 20, 30 or 60. Manufacturers must have each design evaluated by a UKAS-accredited laboratory against a British Standard test. The assessment allows them to form a specification, available from suppliers, which installers must follow. The British Standards are BS 476-22:1987, or the newer European standard BS EN 1634-1:2008. Certification schemes, like

Sustainable timber

Timber is the most sustainable building product available. It is naturally renewable - over 97% of softwood timber used in the UK comes from Europe, where the forest area is increasing by the equivalent of 90 football pitches every hour of the day and night.*

For reassurance for softwoods and hardwoods look for certification labels like FSC (Forest Stewardship Council) or PEFC (Programme for the Endorsement of Forest Certification).

Always ask your supplier about their responsible purchasing policies.

*IIED & ECCM, Using Wood to Mitigate Climate Change, 2004 and UNECE-FAO, State of the Europe's Forests, 2011.

FSC
FSC-ACC-008

PEFC
PEFC/16-44-002

This information sheet provides general advice only and is not specific to the requirements of a particular building project. It is the builder's responsibility to check compliance with Building Regulations and standards.

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BM TRADA's Q-Mark Fire Door Scheme and the BWF-CERTIFIRE Fire Door and Doorset Scheme, ensure manufacturers' systems meet the requirements and all doorsets covered by the certificate are fit for purpose. Certified doors leave the factory with clear identification, like a permanent plug in the door edge or a label. They are therefore recognizable as compliant, quality products and will assist with building control approval and any future fire risk assessments of the building. It is therefore recommended that certified doorsets are specified for building projects and an increasing number of companies and organizations are writing certification schemes in to their building specifications.

Components

Fire doors

- **Doorsets:** the best way of buying and fitting a fire door. The door is supplied hung in its frame complete with all essential hardware and seals.
- **Door kits:** similar to doorsets, where the door and frame are sold factory prepared and ready for hanging, complete with the compatible components.
- **Door leaves:** unfinished, veneered or painted, these must be matched with the correct size frame and compatible components.
- **Door blanks:** oversized, unfinished leaves trimmed to size, lipped and veneered. When converted to a doorset, these must demonstrate evidence of performance. Their specification must match the approval, including manufacturing and all components.

Essential hardware

These items vary according to the doorset design, but include:

- hinges and latches for single-acting doorsets
- door closers where required
- floor springs and pivots for double-acting doorsets.

Check that all hardware has test evidence to show its fitness for purpose. Fit non-essential hardware to the door face, leaving its structure intact. Fit all hardware according to manufacturer's specifications, using intumescent gaskets and seals as necessary.

Intumescent seals

These expand with heat, providing a fire stop, smoke seal and thermal insulation and are available as:

- strips
- papers
- mastics
- paints

Their expansion properties vary, so the type, size and installation must remain exactly as tested for the end use application.

Seals are fitted to the sides and top edge of the leaf, or in grooves in the frame, to seal the gap between leaf and frame in a fire. Rigid or flexible systems are available for glazed openings. Intumescent paper or mastic gaskets are often necessary between hardware and timber door components. Ensure correct size and material seals are fitted in the correct locations as indicated by the fire door manufacturer.

Smoke seals

Smoke is the biggest cause of death in fires. Consider smoke seals for additional safety, even where not required by Building Regulations. They can be:

- brushes built into the casing of the intumescent seal
- flexible fins built into the casing of the intumescent seal
- compression seals fitted into the frame rebate
- automatic drop down seals either face fixed or rebated into the bottom of the leaf, located at the threshold

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Glazing

Wired glass is no longer the sole option for FD30 and FD60 doorsets; many systems and glass types are available. Ensure that the glazing system is installed strictly within the overall specification and manufacturer's instructions.

WARNING!

DO NOT cut glazed apertures, or openings, yourself as this will invalidate the fire certificate. This must be performed by an authorised company.

Door frames

Full doorsets are preferable, but existing door frames may be retained providing the specification of the frame matches that for the door being fitted. This is acceptable for FD30 doorsets as long as:

- the type, quantity and location of any intumescent material is identical to that tested and approved
- the frame is at least 32mm-thick softwood (minimum)
- the existing frame is at least as dense as the frame specified in the door's assessment documents, eg 450kg/m^3
- the gap between the frame and wall opening is sealed to prevent fire and smoke passing behind the frame (architrave may need to be removed in order to check the sealing to structural opening)

Use rock fibre insulation (not glass wool), mortar or as approved intumescent mastic, depending on the gap size. For double acting or higher performance doors, seek the manufacturer's advice as they are likely to have specific requirements to meet for fire resistance. MDF frames may be suitable for FD30 applications.

Doorstop size

There is no longer a need for 25mm stops to meet fire resistance requirements. Typically a 12mm minimum depth of stop is now specified.

Installation

Aligning doors

The door leaf should be square in the frame with an even gap of 2–4mm around the sides and top edge. The threshold gap at the bottom edge should be in accordance with the manufacturer's specification. Smoke sealing requirements for the doorset may also dictate the necessary gap under the door (3mm in the absence of a threshold seal).

Planing doors

Manufacturers generally allow light planing (2–3mm) of the edges to fit the door to the frame. Remove intumescent seals before planing; then replace. Increase depth of the seal groove if necessary.

Trimming doors

Some fire door leaves permit limited trimming during installation. Only trim within the allowance stated. A bespoke doorset, possibly manufactured from a door blank, will be required for a non-standard size.

Rebated leaves

Double leaf doorsets with rebated meeting edges must have supporting test evidence as door leaves with rebates only have to distort half their thickness before they effectively separate and allow the fire through.

Double doorsets with rebated leaf edges are often fitted with selectors and fore-end conversion units. If selectors become inoperative, and leaves close out of sequence, the integrity of the doorset is lost. Rebated leaf edges don't contribute to smoke control.

Apertures for glass and transfer grilles

A fire-resisting doorset is an engineered safety device. Any alterations, such as adding glazing apertures, should only be carried out by an approved manufacturer or installer. Do not carry out this work on site as unauthorised alterations to fire door components usually invalidate the certification.

Maintenance

As with any safety devide, a fire-resisting doorset and all its components should be checked and maintained on a regular basis (in fact Article 17 of the Regulatory Reform Fire Safety Order 2005 requires that fire safety equipment and devices are maintained in an efficient state, in efficient working order and in good repair). Any replacement components should match what was originally fitted and be fit for purpose. If the door has to be replaced, it must comply with the appropriate Building Regulations.

IMPORTANT!

The dangers of buying and installing non-certified doors and doorsets and/or the wrong components are obvious. Failure of the door or doorset is likely to occur, putting people and property at risk and resulting in possible prosecution for the installer.

Regulatory requirements and advice

For England and Wales, these are contained in the Building Regulations *Approved Document B*. Volume 1 describes the requirements for domestic houses and Volume 2 addresses other types of buildings. Where a building is erected or extended, or has

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undergone a material change of use, and the Regulatory Reform (Fire Safety) Order applies to that building or extension, Regulation 38 of the Building Regulations requires that a package of fire safety information - 'as built' information which records the fire safety design of the building or extension - must be assembled and given to the person responsible for the premises.

The fire safety information provided should include all fire safety design measures in appropriate detail and with sufficient accuracy to assist the responsible person to operate and maintain the building in reasonable safety. Third party certified doorsets with appropriate identifying plugs and labels provide the builder with simplest method of supplying this information to the end user.

Performance specification

Fire-resisting doorsets are primarily specified according to their performance in terms of fire resistance and/or smoke control. Both British and European test methods are acceptable for UK regulatory The most common specifications are:

Most common fire-resistance specifications

Performance requirement	Performance rating for doors tested to BS 476-22:1987	Performance rating for doors tested to BS EN 1634-1:2008
20 minutes' fire resistance	FD20	E20
20 minutes' fire resistance with smoke control	FD20S	E20Sa
30 minutes' fire resistance	FD30	E30
30 minutes' fire resistance with smoke control	FD30S	E30Sa

Although FD20 doors are referred to in the Building Regulations, it is preferable to use FD30 doors for their added protection. Different building types, insurance or other requirements may require doorsets of 60, 90 or even 120 minutes' performance.

Doorsets in specific environments may have additional performance requirements, eg for robustness or acoustic insulation.

Further information and advice

British Standards

BS 8214:2008 Code of practice for fire door assemblies, BSI

BS 476-20:1987 Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles), BSI

BS 476-22:1987 Fire tests on building materials and structures, BSI

BS 476-31.1:1983 Fire tests on building materials and structures. Methods for measuring smoke penetration through doorsets and shutter assemblies. Method of measurement under ambient temperature conditions, BSI

BS 9999:2008 Code of practice for fire safety in the design, management and use of buildings, BSI

BS EN 1634-1:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware. Fire resistance tests for doors, shutters and openable windows, BSI

BS EN 1634-3:2004 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Smoke control test for door and shutter assemblies, BSI

British Woodworking Federation (BWF) (**www.bwf.org.uk**)

BM TRADA Q-Mark Certification (**www.bmtrada.com/qmark.php**)

England and Wales Building Regulations: Approved Document B (Fire safety) – Volume 1: Dwellinghouses, NBS, 2006, available from **www.planningportal.gov.uk**

Visit **www.trada.co.uk** for additional technical advice if needed.

Choose and Use is a series of information sheets for builders produced by TRADA, The Timber Research and Development Association. They offer up-to-date advice on how to select the right timber and timber products for different applications.

You can often save time and money by choosing the correct timber material or timber products as well as ensuring you comply with current Building Regulations and Building Codes. For more information about specific products visit **www.trada.co.uk** or contact your local supplier.

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