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## Fire door hardware

IR Security and Safety



### 1 Types of product

There is a very strong link between the role of door hardware and the performance of fire doors. The successful performance of a fire-resisting door or doorset, whether timber or metal, in a fire or fire test not only depends on the door leaf but, often more crucially, on the components which allow the door leaf to fulfil its intended function of filling the hole.

Whether the package comprises a factory-assembled doorset, an assembly from separately sourced components supplied as a package, or individually purchased components for installation on site, it is critical that the door hardware is fully compatible with its surrounding materials.

There is a considerable range of door hardware products masquerading under cover of the same general description. This can readily lead to the selection of a lower grade product than that which was included in the original fire test report for which the door assembly has passed.

Quality varies considerably in both the material content and the method of assembly and installation. Research carried out in the 1970s by the Property Services Agency's Directorate of Architectural, Building and Quantity Surveying Services for the Method of Building found that hardware for internal doorsets accounted for about 1% of the building costs but created more than 80% of the complaints, failures and maintenance costs.

A fire-resistant door is an everyday object whose main role is to function correctly and smoothly at all times. It is, hopefully, only rarely called upon to perform as a fire barrier. The door must open and close fully, lock or latch as required and at the same time maintain its integrity in case of fire.

To do this, it is essential that good quality fittings are selected and installed correctly.

The products which play a key role in the efficient performance of a fire-resisting door assembly are hinges, door closing devices and locks or latches, where required. Care must also be taken to ensure that, where required, any intumescent and/or smoke seals are installed in such a way that they can perform their required role but do not impede the opening and closing action of the door.

It must also be appreciated that a product may offer a lower cost in the 'loose' form but attract a much higher fixing cost. Some products may also require special provision to be made for installation, resulting in substantially higher total costs. Similarly, other selected products may be totally unsuited to the application. While it may be necessary to follow a particular design criteria, aesthetics must take second place to practicality, especially now that full implementation of the Disability Discrimination Act 1995 and the May 2004 revision of Approved Document M – *Access to and use of buildings* – to the Building Regulations in England and Wales are looming ever nearer.

All items selected and subsequently offered for inclusion on a fire-resistant door should be supported by a current successful building hardware product specification third-party test report, which is appropriate to the product in question. All items should also be accompanied by a current fire-resistance test report, preferably carried out under the current BS EN 1634-1: *Fire resistance tests for door and shutter assemblies – fire doors and shutters*.



## 2 Installation

Unsuitable or incorrect fixings may lead to early failure. It should be remembered that fire-resistance tests are currently carried out on doorsets/assemblies which are supplied as new, without any cycling requirements to test the performance of the fixings. It is essential to ensure that there is sufficient body in any door leaf or frame (timber or metal) to accommodate the door hardware. For timber doors, overhead door closers require a full top rail with a minimum depth of 75mm; floor springs require a full width and length top and bottom rail; mortise locks need a lock block at least equal to the depth of the lock case. It is no use relying on a thin facing and a soft-core material to achieve a firm fixing. Requirements for metal doorsets vary according to the manufacturer.

Doorset and door assembly manufacturers and suppliers are expected to take account of these matters but, where the components are supplied to site from separate sources, there is less likelihood of such co-ordination. Therefore, it is the responsibility of the specifier and the purchaser/installer to ensure the installation is correct.

Where mortise components are used, it is important to avoid any over-mortising, both in the depth and the width of the void. Any voids around mortise items should be filled with intumescent paste, mastic or other suitable fire-stopping medium.



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## 3 Inspection and maintenance

Regular maintenance of all supporting door hardware is essential. A six-monthly inspection programme should be introduced to ensure that all components are serviced on a regular basis. In the case of fire doors, it is essential for the maintenance to be proactive, not reactive. Poor maintenance can lead to the failure of a door in daily use, resulting in the possible loss of life, as well as damage to the building and its contents. Maintenance is just as essential as insurance; indeed it is insurance under a different guise. A badly-performing door will draw immediate attention. It is handled by everyone passing through it and will be identified as a problem for all.

After installation, an initial tightening up of all fixings should be carried out at an early stage. For new sites and refurbishment projects, the work should be done prior to handover. For general maintenance, it should be done about a month after installation.

It is critical that all essential door hardware is maintained in good condition. Non-essential door hardware may also need similar attention to enable the fire door to function correctly.

Failures which may occur and require immediate attention include:

- hinges on which the fixings may become loose, wear or become deformed. This will cause the door leaf to drop and drag

along the floor, fail to close into the frame completely, or distort, if under pressure from a door-closing device. Misalignment of the door leaf may prevent the latch bolt, if one is fitted, from engaging and stop any projecting intumescent and/or smoke, draught or acoustic seals from locating in the frame. Alternatively, the door leaf may become jammed, preventing the door from opening for escape purposes

- door-closing devices, when incorrectly fitted or adjusted, may cause the door to slam, fail to close completely or 'stick' in an unacceptable position. Hydraulic fluid leakage may have an adverse effect on the fire-resistance qualities, as well as being unacceptable in aesthetic terms
- latches which fail to engage correctly may cause the door leaf to remain ajar. In a general situation, this is unacceptable since the door leaf is failing to do what is intended and does not provide privacy, sound reduction, etc but, when required for fire resistance, it is imperative that it does not impede the full movement of the door leaf
- panic and emergency exit devices are an essential part of the fire exit route. Such devices must operate efficiently and correctly at all times. Maintenance is essential to ensure that this happens

Other fittings, such as door bolts, pull handles, protection plates and signage, although not classified as essential, must not interfere with the correct function of the door. All must be included in the maintenance programme.

Moving parts require lubrication. This is especially true for hinges, where the knuckle is exposed to regular movement and the effects of a warm, dry atmosphere, causing evaporation of the lubricant. A light, full-bodied oil should be used. For locks and cylinders, special lubricants are available to prevent dust accumulation. Door-closing devices have sealed hydraulic units which should not be taken apart. Panic and emergency exit devices must be suitably free moving.

For guidance on inspection and maintenance of the whole timber doorset or assembly, reference should be made to prEN 14600: 2003: *Doorsets and openable windows with fire resisting and/or smoke control characteristics – Requirements and classification* (version 2004-01-13), annex C Inspection and maintenance

## 4 Regulations and standards

Door hardware is among the most advanced sectors of the construction industry in that it has seven harmonised European Standards which either already qualify for CE marking or are nearing time for inclusion. Although CE marking is not currently required by Building Regulations in England and Wales, Northern Ireland and Scotland, CE-marked products should be selected, since they will meet the requirements of UK law and the European Construction Product Directive.

The harmonised building hardware standards, which set out door hardware recommendations and test methods, are: BS EN 179: *Emergency exit devices operated by a lever handle or push pad*; BS EN 1125: *Panic exit devices operated by a horizontal bar*; BS EN 1154: *Controlled door closing devices*; BS EN 1155: *Electrically powered hold-open devices for swing door*; BS EN 1158: *Door co-ordinator devices*; BS EN 1935: *Single axis hinges*; and BS EN 12209: *Locks and latches – Mechanically operated locks, latches and locking plates*.

Non-harmonised BS ENs include: BS EN 1303: *Cylinders for locks*; BS EN 1527: *Hardware for sliding doors and folding doors*; BS EN 1670: *Corrosion resistance*; BS EN 1906: *Lever handles and knob furniture*; BS EN 12051: *Door and window bolts*; BS EN 12320: *Padlocks and padlock fittings*; and BS EN 13724: *Apertures of private letter boxes and letter plates*.

Other European Standards in preparation include those for powered pedestrian doors, electrically-controlled panic exit systems, electrically-controlled emergency exit systems, electrically-controlled hold-open systems for fire/smoke door assemblies and uncontrolled door-closing devices (spring closers) for single-action doors.

## 5 Other issues

When preparing any specification or approving alternatives, always be conscious of the ultimate responsibility in accepting changes for which the required performance has not been verified. There is always a cheaper alternative available but is it of the same quality and required performance? If not, lives could be put at risk and the reputation of your company could be seriously damaged.

Do not compromise on such essential fittings but budget at a realistic level and stand by your original judgement. There are many alternative ways of reducing costs, if

All of the above standards are directly or indirectly implicated in the respective Approved Documents which accompany the Building Regulations 1991 in England and Wales. Approved Document B (2000) is already in place. A revised Approved Document M comes into effect on 1 May 2004. The standards are also referenced in the Disability Discrimination Act 1995, which comes fully into force in the UK on 1 October 2004.

Other publications worthy of note are: BS 8214: *Code of practice for fire doors with non-metallic leaves* (currently being revised); the Building Hardware Industry Federation's *Code of practice – Hardware for Timber Fire and Escape Doors*; the Association of Building Hardware Manufacturers' CD-ROM, *Locks and Hardware – your guide to the CE mark* (Version 1.0); the Door and Shutter Manufacturers' Association's *Code of Practice for fire-resisting metal doorsets*; the Architectural and Specialist Door Manufacturers' Association's *Best Practice Guide to Timber Fire Doors*; the Association for Specialist Fire Protection's *Ensuring Best Practice for passive fire protection in building*; and the British Woodworking Federation's *Fact cards on installation and maintenance of fire doors*.

Third-party certification schemes for doorsets (including door hardware) and installation are administered by CERTIFIRE and BM TRADA, respectively.

Assistance with the correct selection and specification of building hardware is available from your local member of the Guild of Architectural Ironmongers (website: [www.gai.org.uk](http://www.gai.org.uk)).

necessary, but do not put lives at risk by reducing the protection afforded by fitting the right quality fire-resisting doors and door hardware. Above all, check all the credentials of the essential door hardware in respect of product performance and the contribution of the product to the fire resistance of the doorset or assembly.

Specifiers will find *A pocket guide for Fire Test Reports and Assessments*, published by the Fire Test Study Group, useful in deciding if the products selected and approved are safe in the event of fire.

## 6 References

Further information is available from:

### British Standards Institution

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### TSO (The Stationery Office)

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