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## **Fire doors save lives... don't they?**

*Peter Barker of Chiltern International Fire discusses the technology of fire resisting doorsets and the importance of correct installation to ensure performance in fire.*

A critical element of safety in buildings is the provision of sufficient fire exits with fire doors of the appropriate design. The fire doorset is a complex product, however. Every component - the door leaf or leaves, the frame in which the door is hung, essential hardware, intumescent and smoke sealing devices – must be correctly designed and installed.

Even the simplest design of fire door can rarely tolerate error in installation. If a window is poorly fitted it will soon become obvious when the rain leaks in or the sealed unit fails. If fire doors are badly installed, one hour's fire resistance could easily be reduced to less than 10 minutes, but you won't necessarily be able to see the problem unless there is a fire. For the specifier, the single most important consideration must surely be that, if the worst should happen and fire breaks out, the doorset will perform as it has been designed to do.

It has always been Chiltern International Fire's opinion, therefore, that fire-resisting doorsets should ideally be manufactured and installed by companies who can demonstrate through testing and third-party certification that they have specialist knowledge in this field. Furthermore, we strongly recommend that specifiers choose wherever possible a complete manufactured doorset, rather than individual components which may not be correctly assembled on site.

If it is not feasible to specify a complete doorset, it is important to ensure that there is precise and definite test/assessment data supporting use of the selected components in addition to detailed instructions for their assembly.

Specifiers can and should ask suppliers for this test evidence. The fire resistance of a doorset is measured by subjecting a complete operational doorset to a test in accordance with either BS 476: Part 22: 1987 *'Methods for the determination of the fire resistance of non load-bearing*

*elements of construction*'; or BS EN 1634-1:2008 '*Fire resistance tests for door and shutter assemblies*'.

It is important to note, however, that these are not performance standards and do not contain details of how doorsets should be made. Over the years the materials used and methods of construction have become very diverse. Most fire resistance tests are carried out for individual manufacturers and as such the detailed designs are their confidential property.

To determine the fire resistance time, a doorset is exposed to an 'average' fully developed fire in a test furnace until failure occurs according to certain criteria. It is worth stressing that the times specified in all legislation relate to the time of exposure to the fully developed fire after flashover - the ignition of all exposed combustible materials - has occurred. It specifically does not include the time taken for the fire to develop to this stage.

Assessments are also an accepted form of demonstrating likely fire resistance if prepared by experienced consultants. Assessments will be based on actual test data, which may have been sponsored by door, glass or intumescent manufacturers and referenced with their express permission. This type of report may remove the need for actual testing by the client or significantly reduce the number of physical tests required.

It is becoming increasingly difficult to identify fire-resisting doors by weight and thickness. New materials and methods of construction have led to the production of thinner and lighter fire resisting doors where traditional rules of thumb such as 45mm for 30 minute performance may not hold true.

Concern has been expressed that manufacturers could submit a 'hand built' specimen for fire resistance testing and that doors of the same design from the production run might not give the same result. Third-party-certified manufacturers, however, such as those who hold the BM TRADA Certification Q-Mark, must operate a factory production control system to ensure product quality, ideally to comply with ISO 9001:2000 or equivalent. They will submit to initial type testing, ongoing audit visits and audit testing to ensure consistency in quality and performance.

Approved Document B (*Fire safety*) of the Building Regulations (England & Wales) has for years recommended, although has not prescribed, third-party certification for installation. It states: 'Since the performance of a system, product, component or structure is dependent upon satisfactory site installation, testing and maintenance, independent schemes of certification and registration of installers and maintenance firms of such will provide confidence in the appropriate standard of workmanship being provided.'

The driver for further adoption of third party certification, we believe, is likely to be a combination of the Regulatory Reform (Fire Safety) Order together with the publicity surrounding recent high profile fires. Since the RRFSSO came into force there have been more prosecutions and owners, tenants and landlords are more aware than they used to be. Architects and others now want the reassurance that third-party certification can give for their investment.

After installation, fire doors may be moved if a building is partitioned, perhaps, or its function changes. Clients might decide to install a vision panel or make other modifications. It is essential that any changes do not compromise performance and building owners/managers must go back to the installer or even the manufacturer for adaptations, to ensure that performance is not impaired. Within a properly documented certification scheme this should be straightforward.

Third-party certification of fire door manufacture and installation will, we believe, improve standards in the market place. Schemes like the BM TRADA Q-Mark will play a vital role in setting unimpeachable standards, which ultimately could protect lives.

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