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Passive Fire Protection Federation

Fire rated partitions

1 Types of product

Fire rated partitions are internal walls that provide vertical fire separation, for example in dividing walls, proprietary partitioning systems, protected shafts, stairs, lift wells, escape routes and separating roof voids between properties. In the main, these will be non-loadbearing, although some proprietary systems may have loadbearing characteristics.

Products used for the construction of partitions may be either standard gypsum wallboards or special fire-rated boards, depending on the fire rating required. The majority of partitions are likely to be rated for 30 minutes' integrity and insulation but systems with fire ratings up to 4 hours are available from specialist manufacturers. Specialist boards may be calcium silicate,

fibre-reinforced cement, vermiculite board, or other proprietary materials.

Materials offering the standard 30-minutes of fire resistance may be fixed onto timber studing or patented metal strip studding that is either channel- or angle-section fixed with self-tapping screws. Insulation ratings will be provided either by the use of insulation boards or by mineral fibre or other insulation materials, fitted between the outer skins of the partition.

Some materials will offer a self-finished surface, whilst others are decorated in a standard way. But as these partitions may form part of an escape route, surface spread of flame ratings for decorative materials may have to be considered.

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2 Types of system

When standard structures using plasterboard or proprietary materials should be tested as a system, providing test evidence of fire performance to BS 476: Part 22: 1987: *Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction* or, under the European system, BS EN 1364-1: 1999: *Fire resistance tests for non-loadbearing elements. Walls*. Such tests are done in wall furnaces of 3m² in area; partitioning systems are available for multiples of this measurement and will have test evidence or assessments supporting their extended use over long runs or at greater heights.

The system will also be required to include windows and doors rated to the same level as the wall itself and any penetrations of the wall will require sealing to the same fire

rating. Where proprietary systems are used, the doors, windows and penetrations should be tested as part of the system. Mixing components from different systems is dangerous, since the resulting system will not necessarily perform as expected if not installed as tested.

Manufacturers of all types of boarding provide comprehensive trade literature on their systems and details of the test evidence obtained. And, although many materials may be purchased over the counter at specialist suppliers, they are best installed by fitters trained by the manufacturers and supported by third party accreditation systems.

Similar care should be taken when services are passed through the partitions as these will require sealing with materials or

components that have been tested in an appropriate construction. Many system manufacturers also provide the materials required for such penetration seals. These should be used wherever possible to ensure that the penetration does not endanger the fire rating of the structure.

Where partitions are installed co-incident with steel beams, it is important to note that if an insulation rating is required, the fire protection materials used for structural protection of the steel may not offer such a rating when tested to BS 476: Part 22. Manufacturers advice should be sought for the detail area around the steel members. The use of linear gap seals at the junctions of partitions and roof or floor structures should also be part of the system test evidence.

3 Design and installation

It is very difficult to upgrade the fire performance of a system once it has been installed, so it is important to ensure that the specification is correct at the outset. As with all performance systems, fire performance is achieved through the interaction of all of the system components; the metal framework, the lining board, the fixings and the jointing products and techniques. The performance of a fire-rated system needs to be proved via a test or assessment. Substituting sub-standard or untested components could affect the performance and mean the installed system does not meet the performance claimed, jeopardising the fire safety of the building and its occupants. It could also mean any manufacturer's warranty offered on the system will be invalidated.

System performance can also be compromised following installation, as boards are removed or holes cut for services, or for the incorporation of light fittings, doors etc. A risk assessment should therefore establish whether there is any visual damage to the system – cracks or holes will downgrade the performance –

and whether there has been work carried out on the wall since its original installation. Any fittings must be rated to match the wall or ceiling performance, and any subsequent work to the system must be correctly carried out and finished to ensure that performance is not compromised.

If the fire-rated partition is being specified and installed from new, it is essential to adopt a joined-up approach to its installation, in order for integrity to be maintained. Co-ordination between the trades on site, to ensure that the correct preparations are made for the introduction of services must be a priority.

It is always safer to specify and install proprietary fire-rated systems, supplied and tested together by a single manufacturer. In this case the system will have been developed as a joined-up solution, and generally tested to prove its performance.

When specifying and using fire-rated systems:

- ensure that proprietary warranted systems that have been fully tested are used

- ensure the system that has been installed is exactly as per the original specification
- look out for constructions that use components from several manufacturers – it is difficult to check their performance
- ensure the systems have been installed in accordance with manufacturers' recommendations
- ensure any materials used with the system (doors, windows etc) carry the correct fire rating and have been tested in a similar construction
- ask to see test-based substantiation

Third party accredited installer schemes are available from FIRAS, operated by Warrington Fire Research Certification, and from the Loss Prevention Certification Board. All major board manufacturers also offer training schemes, as a result of which fitters will appreciate the importance of the interaction of components within fire-rated structures of this type. Many installations will form part of escape routes and a failure to construct them correctly can result in danger to the occupants.

4 Inspection and maintenance

From a risk assessment point of view, once the building has been completed, it can be difficult to establish, just by viewing the surface of a wall or partition, what the design fire performance of that element is. Often, the only way to do this is to go back to the Construction Design and Management (CDM) file for the building. Every building has its own CDM file, drawn up at the construction stage, which will contain details of all systems installed in that building. This should include details of where fire-rated systems exist and the performance they should achieve.

It should be noted that, where the partition is a designated compartment wall, Approved Document B (ADB) to the Building Regulations in England and Wales recommends that it must run to the full height of the storey in which it is situated.

This may mean that the wall must run above a suspended ceiling, or where it is located on the top storey, it must continue through to the roof.

If, as recommended, an accredited installer has been used to construct the original structure, then a 'Certificate of Conformity' for the system will have been filed in the CDM file. This information should form the basis of any risk assessment conducted by the occupier who should:

- ensure any subsequent work has been carried out to the required standard
- watch for any damage that may downgrade the performance
- ensure manufacturers' maintenance schedules are followed to maintain protection levels throughout the life of the building.



5 Relevant standards and other documents

Approved Document B to the Building Regulations in England and Wales recommends the minimum period of fire performance for each of the structural elements of a building, based on the purpose group of the building, combined with the height of each of those elements (see Tables A1 and A2 in Appendix A, as called for in section 6.3 of ADB General Provisions).

The fire performance of non-loadbearing walls is tested to BS 476: Part 22: 1987: *Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction* or, under the European system, to BS EN 1364-1: 1999: *Fire resistance tests for non-loadbearing elements. Walls*. Fire classification is defined according to BS EN 13501-2: 2003: *Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation services*.

Insurance companies often require a building to have standards of fire protection beyond those specified by the Building Regulations. Where this is the case the requirements are set down in the *LPC Guide for the fire protection of buildings* and must be agreed with individual insurance companies.

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