Fire Resisting Non Load Bearing Partitions
1st Edition: revised
Association for Specialist Fire Protection (ASFP)
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The Association was formed in 1976, and currently represents the majority of UK contractors and manufacturers of specialist fire protection products, with associate members representing regulatory, certification, testing and consulting bodies.

ASFP seeks to increase awareness and understanding of the nature of fire and the various forms, functions and benefits provided by passive fire protection.

It is willing to make available its specialist knowledge on all aspects of fire protection and can assist specifiers and main contractors in identifying products suitable for specific requirements, both in the UK and overseas.

ACKNOWLEDGEMENT

This Guide has been prepared by collaboration between the following Companies and Test Laboratories/Certification Bodies, who have given freely of their time and expertise to make this manual as useful as possible. Many of those listed have also provided the results of research and other data owned by their organisations at no charge.

ASFP  Association of Interior Specialists  British Gypsum Ltd
Cape Calsil Ltd  Chiltemn International Fire Ltd  Knauf
Lafarge Plasterboard Ltd  Loss Prevention Council  Promat Fire Protection Ltd
Rockwool Ltd  Warrington Fire Research Centre

The text has been updated in light of changes to UK fire safety legislation and guidance documents.

FIRE AND YOUR LEGAL LIABILITY

2008 produced the highest UK peace time fire losses of all time, rising over the previous year by 16% to a record £1.3bn. That’s why we must all play our part.

Why is this of relevance to me?

If you are involved in provision of a fire protection package, at any level, then you share liability for its usefulness and its operation when it’s needed in fire, and that liability will still be there in the event of a court case.

I place the order; it is not my responsibility to install the works!

If it is your responsibility to specify the materials and/or appoint the installation contractor, it is also your responsibility to ensure that they can prove competency for the fire protection materials used, or the works to be carried out. It’s no longer simply a duty of care or voluntary – it’s a legal obligation.

If you knowingly ignore advice that leads to a failure in the fire performance of any element of installed fire protection within a building, then you are likely to be found to be just as culpable as the deficient installer.

You share liability for the provision of information required under Building Regulation 16B that tells the user of the building about the fire prevention measures provided in the building. Otherwise, the user cannot make an effective risk assessment under the Regulatory Reform (Fire Safety) Order 2005.

What is expected of me?

In the event of fire, and deaths, a court will want to know how every fire protection system was selected; the basis for selection of the installer, whether adequate time was provided for its installation, and whether there was adequate liaison between the different parties to ensure it was installed correctly. No ifs, no buts – it’s all contained in the Construction, Design and Management Regulations 2007.

The CDM 2007 regulations, enforced by Health and Safety Executive concentrate on managing the risk, and the health and safety of all those who build, those that use the building, those who maintain it and those that demolish it – cradle to grave.

Be aware – the time to consider the above is before the event, not after it!

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Fire resisting non load bearing partitions

Foreword

I am delighted to introduce you to the ASFP Publication "Fire resisting non load bearing partitions" (the "Purple Book") which has been designed to be the definitive guide to the provision of proprietary materials and systems used to provide fire resisting partitions.

Designers, regulators, fire authorities and building owners can all rely on this information and the explanatory notes provided by industry experts on all aspects of the protection requirements.

I extend my congratulations to all those involved with the production of the "Purple Book" which provides an authoritative source of guidance on the safe provision of fire resistance with regard to the design, construction and maintenance of fire rated partitions in buildings."

BRIAN ROBINSON CBE, QFSM
ASFP President
Ex -Commissioner for the London Fire and Emergency Planning Authority

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## Amendment Sheet

Subsequent amendments to this document will be listed on this sheet.

<table>
<thead>
<tr>
<th>DATE</th>
<th>SECTION</th>
<th>AMENDMENT SUMMARY</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>21/01/08</td>
<td>14.2</td>
<td>Addition of IFC Certification Ltd to list</td>
<td>BP</td>
</tr>
<tr>
<td>09/06/09</td>
<td>Intro</td>
<td>Fire and Legal statement and new disclaimer</td>
<td>BP</td>
</tr>
</tbody>
</table>

**Note 1.** Amendments may only be inserted by ASFP Secretariat with approval of the ASFP Technical Officer.

## Contents

Fire resisting non load bearing partitions

Association for Specialist Fire Protection
# INTRODUCTION

## DEFINITIONS

2.1 General Definitions

2.2 Fire Definitions

## WHAT IS A PARTITION?

4

## THE FUNCTION OF A FIRE RESISTING PARTITION

4.1 Room or enclosure

4.2 Protected corridor

## FIRE TESTING

5.1 Fire Resistance using BS test methods

5.2 Reaction to Fire

## THE EUROPEAN SITUATION

6.1 Fire Resistance using EN test methods

6.2 Reaction to fire

## BUILDING REGULATIONS AND OTHER REQUIREMENTS

7.1 Building Regulations

7.2 Insurance requirements

## COMPONENTS OF FIRE RESISTING PARTITIONS AND BEHAVIOUR IN FIRE

8.1 Performance of Partitions in Fire - General

8.2 Facing Boards

8.3 Framing and Fixings

8.4 Mineral Wool in Partitions

8.5 Other types of partition systems

## OTHER FACTORS AFFECTING THE DESIGN OF FIRE RATED PARTITIONS

9.1 Height Effect - Fire Rated Height

9.2 Wind loading

9.3 Influence of adjacent constructions

9.4 Deflection Heads

9.5 Steelwork

9.6 Other service penetrations through partitions

9.7 Doors

9.8 Ducts

9.9 Cables

9.10 Pipes

## APPRAISAL PRINCIPLES FOR NON-LOADBEARING PARTITIONS

10.1 Current UK Situation

10.2 European Situation

10.3 Structural Fire Safety Engineering

## PRODUCT CERTIFICATION INSTALLER ACCREDITATION SCHEMES

11.1 British Board of Agrément

11.2 Chiltern ‘BM TRADA’ Certification

11.3 Bodycote Warringtonfire ‘CERTIFIRE’

11.4 LPCB/BRE Certification

11.5 Installer Accreditation Schemes

## EUROPEAN ORGANISATION FOR TECHNICAL APPROVALS (EOTA)

## REFERENCES

14.1 Laboratories

14.2 Certification Bodies

14.3 General

14.4 ASFP Publications
1 INTRODUCTION

Lightweight non load bearing partitions are used in all types of buildings; the actual form of construction will be determined by the specified performance criteria and desired appearance. Fixed stud and sheet or panel partitions are normally used in housing, schools and industrial buildings, whereas re-locatable frame and sheet systems are more appropriate for offices and other commercial buildings. Twin-framed constructions of various types are also available, which are used to sub-divide multi-screen cinema complexes and other applications requiring high sound insulation.

To some extent all partitions help to contain the effects of fire and depending on the size and function of a building, national Building Regulations require fire resisting constructions to have specified periods of fire resistance. When correctly specified and installed, the partitions may contribute substantially to the safety of the occupants of the building. Insurance companies may also specify particular requirements for certain applications such as property protection and business continuity.

Accordingly, many partition suppliers carry out extensive product development and fire testing to demonstrate that their partition designs can achieve satisfactory levels of fire resistance. Indications of such fire resisting partition designs are described in this publication for fire resistance periods ranging from 30 minutes to 240 minutes (or more).

This publication relates to the fire resistance of individual partitions, rather than interfaced systems, with no interruptions in their function from such items as doors or glazing. It should be appreciated that the fire resistance of a partition assembly containing other components, such as a door or glazing, is likely to be controlled by the performance of the weakest component.

In addition to the fire resistance of partitions, based upon their behaviour when subjected to a standard fire resistance test, this publication also covers reaction to fire (a property of individual products). Reaction to fire may also need to be considered to meet the requirements of Building Regulations. The classification of construction products can be obtained from the partition manufacturer/supplier. Test and classification data should be provided to support the claimed fire performance.

The information in this document is related to non load bearing fire resisting partitions. Other forms of fire separating elements will be added to later editions.

2 DEFINITIONS

For the purposes of this document, the definitions given in BS 5234 Parts 1 and 2 and BS EN ISO 13943 apply.

2.1 General Definitions

Partition:
A load bearing or non load bearing vertical construction, used internally to buildings, which may have sufficient fire resisting properties for use as a fire resisting wall

Note: It is incorrect to assume that such partitions are not subjected to incidental loads, particularly lateral loads.

Compartment wall
A fire resisting wall used to separate one fire compartment from another [as defined by Approved Document B].

Note 1 The fire resistance requirements of Approved Document B Tables A1 and A2 require load bearing capacity in fire.

Note 2: Load bearing fire resisting partitions may be suitable for this application.

Fire separating element:
A compartment wall, compartment floor, cavity barrier and construction enclosing a protected escape route and/or a place of special fire hazard [as defined in Approved Document B]

Frame and panel partition:
Framed partition in which the panels are supported by an exposed framework.

Frame and sheet partition:
Framed partition in which the framework is exposed.

Framed partition:
Partition consisting of a continuously supported plane frame with facings or infills.
Glazed partition:
Partition that includes transparent or translucent glass or plastics in its construction.  
*Note: It may be fully or partially glazed.*

Hollow partition:
Partition that has usable voids throughout most of its area.

Monobloc panel:
Prefabricated partition unit capable of being removed without affecting adjacent units.

Movable partition:
Partition of separate sections that is capable of re-arrangement by the occupants of a building.

Panel partition:
A partition of rigid panels without supporting framework.

Protected corridor/lobby
A corridor or lobby which is adequately protected from fire in adjoining accommodation by fire resisting construction.

Re-locatable partition:
Partition capable of removal and re-assembly elsewhere without substantial repair other than replacement of ancillary seals and fixings.

Screen:
Partition that may not extend fully from floor to ceiling, sometimes self-supporting, that provides a degree of protection or privacy.

Solid area partition:
Partition without glazing.

Solid partition:
Partition that has no internal void throughout most of its area.

Stud and sheet partition:
Framed partition in which the studs and other ancillary members are concealed by the facings.

2.2 Fire Definitions

Exposed face:
The side of the element being tested that is exposed to the heating conditions of a fire.

Fire resistance:
The ability of a test specimen of an element of building construction to maintain its function, expressed in times to failure against specified criteria, when subjected to standard heat, pressure and mechanical test conditions.

Insulation:
The ability of a test specimen of a separating element of building construction, when exposed to fire on one side, to restrict the temperature rise of the unexposed face to below specified levels.

Integrity:
The ability of a test specimen of a separating element of building construction, when exposed to fire on one side, to withstand collapse and to prevent the passage through it of flames and hot gases and to prevent the occurrence of flames on the unexposed side.

Load bearing capacity:
The ability of a test specimen of a load bearing element to support its test load, where appropriate, without exceeding specified criteria with respect to the extent and rate of deformation.

Load bearing element:
An element that is intended for use in supporting an external (applied) load in a building and maintaining this support in the event of a fire.

Neutral pressure plane:
The elevation at which the pressure is equal inside and outside of the furnace.

Notional floor level:
The assumed floor level relative to the position of the building element in service.

Restraint:
The constraint to expansion or rotation (induced by thermal and/or mechanical actions) afforded by the
conditions at the ends, edges or supports of a test specimen. Examples of different types of restraint are longitudinal, rotational and lateral.

**Supporting construction:**
The construction that may be required for the testing of some building elements into which the test specimen is assembled, e.g. the wall into which a door is fitted.

**Sustained flaming:**
Continuous flaming for a period of time greater than 10 seconds.

**Test construction:**
The complete assembly of the test specimen together with its supporting construction.

**Test frame:**
The frame containing the test construction for the purpose of mounting onto the furnace.

**Test specimen:**
An element (or part) of building construction provided for the purpose of determining either its fire resistance or its contribution to the fire resistance of another building element.

### 3 WHAT IS A PARTITION?

A *partition* is defined in different ways in different sources.

- In British Standards as an "internal, dividing, non load bearing, vertical construction".
- In European (CEN) standards it is defined as a non load bearing wall.
- The EOTA European Technical Approval Guideline ETAG 003*, is entitled "Internal partition kits for use as non-load bearing walls".

In this publication the term *partition* normally relates to a non load bearing construction, but it is recognized that some systems may be load bearing and suitable for use as compartment walls.

Whilst the primary function of a partition is for space division within a building, it may also be used to separate areas with different floor levels, e.g., mezzanine floors, or may be used as an independent lining to an external wall.

Typically, a partition will include junctions with floors and soffits. The incorporation of ceilings butted to a partition may require particular detailing to maintain the overall fire resistance requirements. Where partitions are providing fire resistance, they should be properly integrated with the associated structures, and fire barriers incorporated in line with the partition above the suspended ceiling and beneath the platform floor.

Partitions may be constructed in a variety of ways and the designer’s specification will depend on the intended use, performance levels and the standards of finish and appearance required. Partitions may be formed from various types of sheet materials, supported by and concealing timber or metal stud framework, with or without expressed/ featured joints. They may also be constructed by using composite panels supported by an exposed framework, or prefabricated panels, butted together in floor and head tracks, with or without a supporting frame. The range of generic forms of partition construction is given in the definitions in clause 2.1.

* The ETAG 003 for partition kits differentiates between the involvement of EOTA (European Organization for Technical Approvals) and CEN (Comitè European de Normalisation) in the area of internal partitions. EOTA deals with systems described in the ETAG as kits, whilst CEN deals with partitions built on site from components generally available or manufactured on site. In the wording of the CPD (Construction Products Directive) a kit is the equivalent of a construction product. A kit comprises of at least two separate components that need to be used together, i.e.; to become an assembled system (supplied from the same source).

### 4 THE FUNCTION OF A FIRE RESISTING PARTITION

A *fire resisting partition* is a partition for which the *fire resistance* performance has been determined according to the appropriate British or European standards. Similarly, the *reaction to fire* performance of the exposed surfaces is also determined by the appropriate fire test standards. The requirement to determine the fire resistance and the reaction to fire performance of a partition is stated in current building regulations.

Partitions may provide different functions in a building. They may [a] contain a fire within a space or [b] provide a corridor for means of escape. When a partition is providing such functions it should comply with Building Regulations and the guidance provided in Approved Document B. Insurers may have further requirements. The objective of the Building Regulations is solely to preserve life rather than the property or the business.
4.1 Room or enclosure

Once a fire has become fully developed it will attack the structure of the enclosure and try to spread beyond the room of origin. A fire resisting partition may inhibit the passage of fire and products of combustion for a given period of time. The fire resistance of a partition is determined by standard fire tests using defined heating and pressure conditions. The fire resistance of such partitions typically range from 30 to 240 minutes.

4.2 Protected corridor

The initial growth of a fire in a building is mainly caused by the ignition of the contents. The surfaces of walls and ceilings can also contribute significantly to the fire, depending on their reaction to fire characteristics. A protected corridor can be provided in a building to protect occupants escaping in the event of a fire. The fire performance of the boards, sheets and wall coverings that comprise partitions are subject to the guidance given in Approved Document B of the Building Regulations (for England and Wales), the Building Standards (Scotland) Regulations and the Building Regulations (Northern Ireland).

5 FIRE TESTING

Fire testing covers both resistance to fire and reaction to fire testing using specified methods. Tests may be carried out either to British Standard or European EN test methods. The latter tests are specified in the classification documents EN 13501 Parts 1 and 2.

The fire resistance of partitions shall be determined by fire testing at 3rd party test laboratories accredited to ISO 17025; e.g. UKAS accredited laboratories.

5.1 Fire Resistance using BS test methods


The test method measures two criteria of the partition’s behaviour in the fire test: integrity and insulation, which are defined in clause 2.2.

The test method is described briefly below:

5.1.1 Specimen Preparation

The partition to be tested is constructed within a test frame with an opening normally 3m x 3m. Unless required for a special or smaller sized application, partitions are always tested at the maximum width, with one edge fixed as per the manufacturer’s specification and the other edge unfixed i.e. a nominal 50mm fire stopped gap is left between one vertical edge of the partition and the test frame to represent an infinite length of partition.

All aspects of the partition system e.g. sizes and type of all internal framework, stud centres, internal insulation, facing board configuration, fixings etc, as proposed to be used in practice, must be covered by the test construction.

5.1.2 Application of instrumentation

The measured insulation performance of the partition uses fixed and roving thermocouples as follows:

- One thermocouple is fixed at or near the centre of the unexposed face of the test specimen and one at each quarter section. These thermocouples are used to evaluate the average unexposed face temperature (see 5.1.3).

- Additional thermocouples are fixed on the unexposed face adjacent to joints in the construction and other areas where ‘hot spots’ are likely to occur. These thermocouples are for evaluating the maximum unexposed face temperature. A roving (hand-held) thermocouple is also provided to supplement these fixed thermocouples.

5.1.3 Test procedure / failure conditions

The frame with the partition inside it is sealed onto a furnace, which is controlled to a standard temperature-time curve. The furnace pressure is controlled so that it is slightly greater inside the furnace than outside the furnace over the top two thirds of the specimen. This allows hot gases to explore weaknesses in the partition, which may lead to failure.

During heating, the partition is evaluated with respect to two criteria: integrity and insulation.

Failure of integrity occurs if:

- the specimen collapses
- sustained flaming is observed on the unexposed face
- a cotton pad can be ignited by hot gases emerging from the specimen
- it is possible to penetrate a gap in the specimen with a 25 mm diameter gauge
- it is possible to penetrate a gap in the specimen with a 6 mm diameter gauge and for it to be traversed for a distance of 150 mm.

Failure of insulation occurs if:
- Integrity failure occurs
- the average unexposed face temperature rise as measured by the thermocouples in 5.1.2 is greater than 140°C.
- the maximum unexposed face temperature rise as measured by any fixed thermocouple and the roving thermocouple is greater than 180°C.

5.1.4 Configuration

Although in practice a partition in a building may incorporate other elements or services, the fire resistance of a solid area partition has to be first evaluated without the influence of such 'perforations' as doors or glazing. This is the situation covered by this document.

Warning: The interaction between components in partitions of different configurations is very complex and if tests are carried out on composite structures, it is inappropriate to subsequently mix and match components from different tests without seeking expert advice.

5.2 Reaction to Fire

The tests used to evaluate the behaviour of wall and ceiling linings in restricting fire growth are called reaction to fire tests. They examine how the materials react to a standard thermal exposure representing a growing fire.

Four British Standard tests are predominantly used currently to determine the behaviour of linings in fire. Details are given below.

5.2.1 Non-combustibility

To provide maximum fire safety, the Building Regulations require certain constructions to be made from non-combustible materials. A non-combustible building material is one that satisfies prescribed performance criteria when tested in accordance with BS 476: Part 4 "Non-combustibility test for materials".

5.2.2 Limited combustibility

A slightly lower level of performance, a material of limited combustibility is one that satisfies the performance criteria prescribed in Approved Document B when tested in accordance with BS 476: Part 11 "Method for assessing the heat emission from building materials". In addition, any material with a non-combustible core at least 8mm thick having combustible facings (on one or both sides) not more than 0.5mm thick that satisfies the appropriate flame spread requirements by test (e.g. plasterboard) is also deemed to be of limited combustibility.

5.2.3 Surface Spread of Flame

BS 476: Part 7 "Method for the classification of the surface spread of flame of products" evaluates the ability of a wall or ceiling lining to spread flame over its surface. The result is expressed in terms of classes with Class 1 representing the best performance (low or no flame spread) and Class 4 the worst performance (high flame spread).

5.2.4 Fire propagation

BS 476: Part 6 "Method of test for fire propagation for products" measures the amount and rate of heat evolved by a specimen whilst subjected to heat in an enclosed chamber under prescribed conditions. The Standard describes the method of computing the results to obtain an index of performance. The higher the index, the greater the contribution the material makes to the fire.

5.2.5 Class O

Although neither a test nor defined by British Standards, the Building Regulations refer to Class O when restricting the reaction to fire performance of partition, wall and ceiling linings for certain applications. A Class O material has a Class 1 surface spread of flame and fire propagation indices i not exceeding 6 and I not exceeding 12. Non-combustible materials are defined as Class O.

For a fuller discussion on Class O consult ASFP TGN 005 ‘Guide to Class O’.
6 THE EUROPEAN SITUATION

The aim of the Construction Products Directive (CPD) is to reduce technical barriers to trade between Member States of the EU. Its implementation will mean that technical specifications for products (harmonised European Product Standards or ETAGs) will call up new European fire tests and classification procedures.

Technical Committee CEN/TC 127 'Fire Safety in Buildings' has been preparing standards under instruction from the Commission of the European Community and the European Free Trade Association, which evaluate the essential requirement of safety in case of fire as part of the requirements of the Construction Products Directive.

The timings for the introduction of the new European standards (technical specifications for products, fire test and classification methods) vary on a product by product basis. Once the relevant technical specification is available, products subject to that specification must comply with its requirements within a fixed time period. This is normally 21 months for a harmonised European product standard and 33 months for an ETA [European Technical Approval, see www.eota.be].

Existing BS requirements may coexist with new EN classifications depending on national requirements.

6.1 Fire Resistance using EN test methods

In fire resistance the basic principles of the tests are broadly unchanged from BS (and ISO) methods. However, the new EN standards are more rigorous and incorporate some new procedures to satisfy all Member States. Each standard now contains a field of direct application clause giving the range of constructions that may differ from the test specimen to which the result is also automatically applicable.

The two principle methods used for partitions are:

BS EN 1363-1 Fire Resistance Tests - Part 1 - General Requirements and
BS EN 1364-1 Fire Resistance Tests For Non-Loadbearing Elements: Part 1: Non-Loadbearing Walls

These are summarised below:

6.1.1 BS EN 1363-1

This is the equivalent to BS 476: Part 20. The main changes that may affect the fire resistance of partitions are:

- The temperature of the furnace is controlled by the use of plate thermometers. The use of the plate thermometer can result in a greater heat input into the test specimen, especially during the early stages of the test.
- A new concept has been introduced whereby discreet areas of the differing elements of the partition are separately evaluated for thermal insulation. This is likely to have an effect on components that were previously in the negative pressure zone, and are now in the positive pressure zone e.g. door handles.

6.1.2 BS EN 1364-1

This is largely equivalent to BS 476 Part 22. The main changes that may affect the fire resistance of partitions are:

- The testing of glazing, including extensive mandatory guidance on the design of the test specimen is dealt with in a normative (compulsory) annex.
- A new concept has been introduced of separately evaluating discrete areas of different thermal insulation with respect to insulation. This means duplication of thermocouples for specimens, which incorporate elements of different thermal insulation.
- There is a definition for uninsulated constructions based on expected thermal performance.
- There is a field of direct application section, which covers such items as extension of height, width etc.

6.1.3 EN Classification for fire resistance

The results of the appropriate European fire resistance test are interpreted into classes by following the procedure given in EN 13501 Part 2 "Fire classification of construction products and building elements - Part 2 Classification using data from fire resistance tests, excluding ventilation services".

This converts the test results for load bearing capacity, integrity, insulation etc with times rounded down to a list of predetermined classes.

- R is used to denote load bearing capacity
E is used for integrity and
I is used for insulation.

Therefore, a load bearing wall with a load bearing capacity of 155 minutes, integrity of 80 minutes and insulation of 42 min would be classified R 120 or RE 60 or REI 30.

6.2 Reaction to fire

New test methods and classifications have been developed in CEN TC 127 following discussion with the European Fire Regulators Group. A material can now be evaluated against a series of six Euroclasses from the highest level of performance, Euroclass A1 (approximately equivalent to non-combustible) to Euroclass E (simple ignitability). The table below shows the test methods, which have been developed, the fire situation they address and the various levels of potential contributions to a fire.

<table>
<thead>
<tr>
<th>FIRE SCENARIO</th>
<th>CLASS</th>
<th>TEST METHODS</th>
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<td>Fully developed in a room</td>
<td>A1</td>
<td>EN ISO 1182 Non combustibility test and</td>
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<td></td>
<td></td>
<td>EN ISO 1716 Bomb Calorimeter</td>
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<td></td>
<td>A2</td>
<td>EN ISO 1182 Non-combustibility test or</td>
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<td></td>
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<td>EN ISO 1716 Bomb calorimeter AND</td>
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<td></td>
<td>EN 13823 Single Burning Item test</td>
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<tr>
<td>Single Burning Item in a room</td>
<td>B</td>
<td>EN 13823 Single Burning Item test and</td>
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<td>EN ISO 11925-2 Small flame test (30s)</td>
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<td>C</td>
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<td>EN ISO 11925-2 Small flame test (30s)</td>
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<td>EN ISO 11925-2 Small flame test (30s)</td>
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<td>Small flame attack</td>
<td>E</td>
<td>EN ISO 11925-2 Small flame test (15s)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>No performance determined</td>
</tr>
</tbody>
</table>

6.2.1 Euroclass A1

These products are tested using the EN ISO 1716 Bomb Calorimeter and the EN ISO 1182 Non-combustibility test although some products will be ‘deemed to satisfy’ the requirements. Euroclass A1 products would normally be expected to have less than 1.0% distributed organic material.

6.2.2 Euroclasses A2

In addition to using one of the tests specified in 6.2.1 above, in which the parameters are the same as those for Euroclass A1, but with different values, products are also tested in the new Single Burning Item (SBI) test. The SBI parameters are rate of heat release, spread of flame, smoke production and the generation of flaming particles.

6.2.3 Euroclasses B, C and D

Products are tested in the Single Burning Item test (SBI) and by use of the small flame test, with a 30 second flame application time. The criteria for the small flame test will be based on rate of flame spread, extent of damage and production of flaming particles.

6.2.4 Euroclass E

Products are tested with a small flame source for ignitability and a spread of flame, both on their surface and within their core. Flame application time is only 15 seconds.

6.2.5 Euroclass F

This classification is for products which have either not been tested or for products which have failed all European reaction to fire tests.

6.2.6 Classification for reaction to fire

The results of the appropriate European reaction to fire tests are interpreted into classes by following the procedure given in EN 13501 Part 1 “Fire classification of construction products and building elements, Part 1 Classification using test data from reaction to fire tests”. This converts the values measured of the different parameters from the various tests into the appropriate Euroclass.
7 BUILDING REGULATIONS AND OTHER REQUIREMENTS

7.1 Building Regulations

The current Building Regulations, which came into operation in April 2007, are approved by the Secretary of State for Communities and Local Government, for England and Wales. There are other provisions elsewhere in UK, generally as follows:-

STATUTORY INSTRUMENTS

England and Wales

The Regulatory Reform (Fire Safety) Order 2005 – Statutory Instrument 2005/ 1541 and can be obtained via www.opsi.gov.uk

Scotland
The Building (Scotland) Regulations 2004

Northern Ireland
The Building Regulations (Northern Ireland) 2000

DOCUMENTS SUPPORTING THE STATUTORY INSTRUMENTS

England and Wales
Approved Document B: Fire Safety: 2006

Scotland
Technical Handbook (Fire) 2005 for Domestic and for Non-domestic buildings

Northern Ireland
DFP Technical Booklet E - Fire Safety 2005

CHANGES IN FIRE SAFETY LEGISLATION

The Regulatory Reform (Fire Safety) Order 2005 replaced most fire related legislation in England & Wales from 1st October 2006. In Scotland, Part 3 of the Fire (Scotland) Act 2005 - and related subordinate legislation – also introduced a new fire safety regime on 1st October 2006. Both measures are based on the ongoing fire safety risk assessment of buildings. Similar changes are expected in Northern Ireland. In all cases, this means that fire certificates will be abolished and an existing fire certificate will no longer have effect. The responsibility will be with all those having any degree of control over nearly all non-domestic premises, along with Houses in Multiple Occupation [HMO’s]

See:
- www.planningportal.gov.uk
- www.infoscotland.com/firelaw
- www2.dfpni.gov.uk/buildingregulations

Many previous pieces of legislation will be repealed, including
- Fire Safety: An employer’s Guide
- Fire Precautions Act 1971
- Draft guide to fire precautions in existing residential care premises Home Office/Scottish Home and Health Dept. 1983. The new Document will be the Fire Safety order Scotland / Residential Care Premises

SUPPORTING DOCUMENTS

The following supporting documents may be useful, but is not an exhaustive list

- 11 new Risk Assessment Guides for buildings in different types of occupation
- Department of Health HTM 05 Series, including
  - HTM 05-01 Managing Healthcare fire safety
  - HTM 05-02A Guidance in support of functional requirements
  - HTM 05-02B Fire engineering provisions
  - HTM 05-03 Operational provisions
- A new DfES Building Bulletin 100 – Designing & managing against the risk of fire in schools. [Will replace BB 7 - Fire and the design of educational buildings (DES) 1988]

APPROVED DOCUMENT B is now published in two separate volumes for dwelling houses and buildings other than dwelling houses. They contain the following sections:
7. Means of escape
- B1 Means of escape
- B2 Internal fire spread (linings)
- B3 Internal fire spread (structure)
- B4 External fire spread
- B5 Access and facilities for the fire service

The detailed provisions contained in these Sections of the Approved Document B are intended to provide guidance for some of the more common building situations. In other circumstances, alternative methods of demonstrating compliance with the requirements may be appropriate. There is no obligation to adopt any particular solution contained in Approved Document B if it is decided to satisfy the requirement with an alternative procedure. However, if a contravention of a requirement has been alleged, and the guidance in the relevant document has been followed, then this may be used as evidence in demonstrating compliance with the regulations.

7.2 Insurance requirements

The insurance requirements for separating elements are concerned mainly with compartments in construction. The FPA Design Guide for the Fire Protection of Buildings refers to Robust Materials: Appendix 3B. This section sets out a table of various building products, which include the gypsum-based and calcium silicate boards used in partitions, and also states the relevant dimensional limitations. However, some modifications to the construction may be required to provide adequate resistance to fire and to impact.

In the case of fire-resisting non load bearing partitions, one major factor is impact testing. An impact test is carried out prior to the full-scale fire resistance test.

8 COMPONENTS OF FIRE RESISTING PARTITIONS AND BEHAVIOUR IN FIRE

8.1 Performance of Partitions in Fire - General

The performance of a partitioning system during a fire resistance test depends on the facing boards, studwork, head and base track, insulation material in the void and the method of fixing the facing board to the internal framework. Each of these aspects is considered in more detail in the following sections.

8.2 Facing Boards

8.2.1 Calcium Silicate Boards

Calcium silicate boards are manufactured from lime, cement, silica and fire protective fillers in combination with cellulose fibre. After making the uncured boards they are subjected to a specific autoclave curing process which forms the hydrated calcium silicate binder. The finished boards come in a range of types, offer considerable fire resisting properties, and are exceptionally stable in fire and moisture.

The boards are categorised non-combustible when tested to BS 476: Part 4 and are designated as a Class O building material.

8.2.2 Cellulose reinforced cement based boards

Cement based boards are made from a mixture of cement and binders or reinforcing materials such as engineered wood filaments. The boards will have structural strength and are highly durable. The key features of these boards are load bearing capabilities and sound insulation. The fire performance and moisture resistance may be limited.

They will not rot and may be used as an alternative to other wood based materials.

These boards are usually designated as a Class 1 building material.

8.2.3 Glass fibre reinforced cementitious boards

Cementitious boards are manufactured from Portland cement, lightweight fillers and binders. The boards may also contain alkali resistant glass fibre in the form of mesh or random strands.

The boards are normally categorised non-combustible when tested to BS 476: Part 4 and are designated as a Class 0 building material.
8.2.4 Glass reinforced gypsum boards
Boards manufactured from gypsum with glass wool tissue facing membranes and glass core reinforcement may exhibit excellent fire resistance. The glass tissues and reinforcement help to ensure the board’s physical integrity.

These boards are categorised non-combustible when tested to BS 476: Part 4 and are designated as a Class 0 building material.

8.2.5 Gypsum fibreboard
Gypsum fibreboards are manufactured from calcined gypsum and cellulose fibres produced from recycled paper, mixed with water but without the use of binders.

These boards are categorised as limited combustibility when tested to BS 476: Part 11 and are designated as a Class 0 building material.

8.2.6 Gypsum Plasterboard Variations
Gypsum plasterboard consists of a gypsum core encased in and firmly bonded to strong paper liners. Gypsum itself is non-combustible and contributes to the fire resistance of the structure in which it is to be used.

However where extra fire protection is required, fire resistant plasterboard should be used. This type of plasterboard has been specially formulated to provide increased resistance to fire and incorporates glass fibre and vermiculite additives.

Special formulations combine improved fire resistance with high impact strength.

All these types of boards are categorised as limited combustibility and are designated as a Class 0 building material.

8.2.7 Steel faced boards
Steel faced boards are manufactured from a non-combustible core, which is usually cementitious based, onto which steel sheets are mechanically bonded.

This produces a high strength, highly fire resisting composite. Fire integrity of over 240 minutes is usual and the boards also provide impact resistance, blast resistance and some electro-magnetic shielding. These are high performance boards used in areas of high risk, where long life is required; such as underground smoke extract ducting, nuclear power, petro-chemical and offshore installations, compartmenting barriers in high risk stores and high rise buildings.

8.3 Framing and Fixings
The behaviour of the stud framework, which supports the board linings, plays a key role in the performance of the system.

8.3.1 Metal Studs
Metal expands under the action of heat and a lined metal stud frame will undergo various movements during the fire resistance test. For the first part of the test, one flange will be at a higher temperature than the other and the temperature differential causes the stud frame to bow into the furnace. Eventually, after the exposed face linings have burnt away, the metal temperature is at furnace temperature throughout. At these temperatures, the metal has virtually no strength left and integrity failure is likely to occur. The principle of obtaining high fire resistance is to use suitable board linings that protect the metal from the heat as long as possible.

8.3.2 Timber studs
Timber studs, in contrast to steel, do not expand, but the timber tends to shrink slightly when heated and will then burn. However, because of the limited amount of shrinkage of timber, there is very little movement associated with the internal studwork. This means that it will not readily buckle and will not transfer additional stresses to the facing boards and fixings. Consequently, the facing boards will remain in position for longer than a similar steel stud partition.

The thermal insulation properties of timber are such that the timber, a few millimetres inside the burning zone, is only warm. This is in contrast to high thermal conductivity materials, such as metals, which heat up more uniformly giving rise to problems of expansion and loss of strength over the whole section.

Different timbers char at varying rates, largely as a function of their density, with the higher density timbers charring more slowly. For normal structural softwood this rate of depletion is taken as 20mm in 30 minutes from each exposed face. Denser hardwoods (>650 kg/m³) used for structural purposes, fire door frames, glazed screens, etc, char at a reduced rate of around 15mm in 30 minutes, whereas timbers of lower density (below...
450 kg/m³) will char more quickly. For example, western red cedar is quoted as 25mm in 30 minutes. The rate of charring is little affected by the severity of the fire, so for an hour’s exposure, the depletions are 40mm for most structural timbers and 30mm for the denser hardwoods.

### 8.3.3 Head and base track

The requirement to limit the temperature on the unexposed face from rising more than 140°C or 180°C above initial ambient temperature, as defined in BS 476: Part 22, means that the head and base track will have to be carefully designed in order to meet this requirement. Installation is therefore of prime importance. Such detail will include a thermal break, or timber or plaster inserts to increase the thermal inertia. Similarly, where there are large shadow gaps or cover strips between the joints in the boards, it must be demonstrated by means of fire test or assessment that these do not cause problems associated with heat transfer through the partition, which could lead to a loss of insulation and integrity.

**Note:** Approved Document B 2006 para 8.27, has introduced a new ‘requirement’ to accommodate central deflection of the floor above, by up to 40mm whilst maintaining integrity, as it sags under fire conditions, unless a smaller value can be justified by assessment. Outside this area the limit can be reduced linearly to zero at the supports.

### 8.3.4 Fixings

The movement of the partition and/or erosion of the boards in fire, will cause gaps to occur in the construction, between both the insulation and studs and between the facing boards and the studs. It is the role of the fixing to ensure that the gaps are minimised, so that the positive pressure on the fire side will limit the transfer of hot gases through the partition. These gases can either ignite themselves or ignite combustible materials on the unexposed face. The fixings must ensure that these gaps do not develop, although deflection, expansion, contraction, or change in material properties, will tend to promote cracking. Consequently, the method of fixing is vital and can take many different forms such as screws, clamps and clips.

### 8.4 Mineral Wool in Partitions

Mineral wool is manufactured from molten glass, stone or slag to produce products with different characteristics. Partitions with fire integrity and insulation between 60 and 240 minutes normally require the use of a stone wool. Glass wool is non-combustible but will melt at a lower temperature than stone wool. In many of the partition systems described in this publication, the benefits of specific mineral wool infills are evident.

When higher density products are incorporated, they either provide longer fire insulation times, or the same time, for a reduced thickness of mineral wool. The mineral wool generally used in partitions is non-combustible in accordance with BS 476: Part 4.

### 8.5 Other types of partition systems

The previous sections have considered systems where the head, base track and studs are firstly installed and are then clad with boards. Sometimes mineral wool insulation is placed within the voids.

There are other systems, which are of a modular form such as ‘monobloc’ or ‘bi-bloc’ systems. These tend to be bespoke systems, which have been engineered to achieve particular performance requirements such as aesthetics, sound insulation, demountability, impact resistance or fire resistance.

Systems such as these tend to have specially designed studs and fixing systems between modules and special methods of securing the facing boards to the studs.

### 9 OTHER FACTORS AFFECTING THE DESIGN OF FIRE RATED PARTITIONS

#### 9.1 Height Effect - Fire Rated Height

Common practice in the UK has been to accept the result of a 3m fire resistance test to be valid to a greater height, such as 5m or more. With the introduction of EN 1364-1, the European EXAP or consensus embodied within the standard is to limit the fire rated height to 4m (subject to a maximum midpoint deflection of 100mm during the 3m test). For BS fire testing, in order to claim a fire rated height in excess of this, a fire engineering type assessment is required. There are two approaches to this;

- consider the action of a particular design fire load on a specific partition and,
- to assume the BS 476 Part 20:1987 fire load as defined by the standard temperature/time curve.
9.2 Wind loading
When large compartment walls or partitions are required to sub-divide a large building into zones, there is the possibility that the external wind load, or a proportion of that load, will be transferred to the wall or partition. This is likely to occur in hangars, or storage buildings, which have large doors that remain open for long periods.

Owing to the size of this type of wall or partition, the steelwork required may be larger than that required for fire resistance alone. The size of steelwork would therefore need to be calculated to resist the wind load, rather than be based on the resistance to fire requirement.

BS 6399 Part 2 Code of practice for wind loads, gives details of the calculation methods to be used to calculate the steelwork sizes for walls or partitions used for this purpose inside buildings.

9.3 Influence of adjacent constructions
The use of the partition shall be considered in association with the adjacent construction and it is necessary to establish if the adjacent structure surrounding the partition will deflect. The following points will also need to be resolved.

- If it does deflect, will gaps occur at the junction between the partition and the supporting construction?
- Will the supporting construction maintain its strength when heated?
- If it deflects will it impose loads on to the partition which could cause it to collapse?
- When there are structures or elements passing through the partition will they deflect when heated and transfer loads to the partition, which it cannot support?

The above mentioned problems cannot be resolved by the partition manufacturer. It is necessary however, that the designer of the building has considered these specific items because they will have a significant influence on the behaviour of the building in a real fire situation.

9.4 Deflection Heads
Building designers may require a fire rated partition to be able to accommodate the deflection of the floor above and provision must be made for a deflection head, which will maintain the fire resistance when a downwards movement of the floor occurs.

Note: Approved Document B 2006 para 8.27, has introduced a new 'requirement' to accommodate central deflection of the floor above, by up to 40mm whilst maintaining integrity, as it sags under fire conditions, unless a smaller value can be justified by assessment. Outside this area the limit can be reduced linearly to zero at the supports.

9.5 Steelwork
Steel beams may pass through the partition. Structural fire protection is often applied to steel beams and must be applied so that the specified fire resistance criteria for the division are not impaired, whilst ensuring that the beam is fully protected from fire. Any deflection of the beam in a fire could impinge on the partition and destroy its fire integrity.

9.6 Other service penetrations through partitions
The objectives of a fire resisting partition are to:

- Provide protected boundaries to enclosed space.
- Isolate the fire to a defined area for specified periods
- Prevent the spread of fire and smoke beyond the enclosure boundaries.

Where other service penetrations breach the partition, they must have the same fire resistance as the partition in order to maintain the fire resistance of the compartment.

9.7 Doors
The interface between the door and the partition is important. It is unlikely that a fire door will have been tested in all the types of partition available. Care must therefore be taken to ensure that there are no adverse effects in performance between the door and the partition. These would include differences in deflection in a fire test, correct fixing between door frame members and the flexural strength of the partition.
9.8 Ducts
In ventilated compartments, especially those in complex or high rise buildings, there will may be ducts passing through fire resistant partitions. It the ductwork is not fire rated, it must be correctly fitted with a fire resistant damper(s). In order to comply with the requirements of BS 476: Part 24 the fire penetration seal must be the same as that tested with the duct. It is important to ensure that the duct (or fire damper) is independently supported from the non load bearing partition and will prevent any deflection/movement being transferred to the partition in a fire. See ASFP publication ‘Fire resisting ductwork: 2nd Edition, as a free download at www.asfp.org.uk/publications.

9.9 Cables
Electrical cables need to be sealed into the partition by a fire penetration seal compatible with both cables and partition. There are many types of fire sealing materials for cables, for both permanent and temporary use. It is important that all temporary seals are replaced with permanent seals before the building is fully occupied. The fire resistance of the penetration seal must be the same as that specified for the fire resistant partition.

Currently, there is no formal BS fire test method for service penetrations passing through diverse constructions. Ad hoc testing and assessments are currently in use in the UK. In Europe, EN 1366-3 test method is to be associated with formal EN EXAP Rules for the extended use of test and fire resistance classifications.

9.10 Pipes
Pipes and cables have similar fire penetration sealing needs. However, pipes are rigid, whereas cables are flexible. In many cases, the fire penetration seal for pipes will need to be flexible to allow for structural movement and/or thermal expansion of the pipe(s). Some pipes may be hot, others may be cold, dependent on their use. Lagging is often applied to conserve heat, and any penetration sealant must be applied onto the pipe and not onto the lagging. The temperature of the pipe must be taken into account when choosing the penetration seal material.

Currently, there is no formal BS fire test method for service penetrations passing through diverse constructions. Ad hoc testing and assessments are currently in use in the UK. In Europe, EN 1366-3 test method is to be associated with formal EN EXAP Rules for the extended use of test and fire resistance classifications.

10 APPRAISAL PRINCIPLES FOR NON-LOADBEARING PARTITIONS

10.1 Current UK Situation
Many installed fire resistant partitions vary from the specimens that were originally tested and are often constructed in a variety of sizes, shapes and configurations in order to satisfy the requirements of the market. Whilst it is recognized that it is impractical to test every combination and permutation for each product, the test report produced by the test laboratory is only valid for the actual specimen that was tested. Any change, however minor, from the tested construction is not covered by the report. However, products are sold that are different from that tested and in such cases the product’s performance needs to be substantiated.

In most cases, end users or Building Control Officers will require manufacturers to justify the performance of any major variations from the tested construction. Currently, the accepted vehicle for approving such variations is an assessment, which is an opinion from an UKAS accredited fire laboratory or other competent expert. The scope of an assessment may vary from a minor change, such as fixing centres, to a complete package on a whole range of partitions.

The Passive Fire Protection Federation (PFPF) has published a “Guide to undertaking assessments in lieu of fire tests”, which gives detailed guidance on who can undertake assessments, how they should be carried out and includes requirements on those organisations undertaking them.

Copies of the PFPF Guide can be obtained from PFPF can be downloaded from the PFPF Website as a pdf file from: http://www.associationhouse.org.uk/pfpf_pubs.html

10.2 European Situation

10.2.1 Field of Direct Application
In the fire resistance tests developed in CEN/TC127, rules for the acceptance of many of the constructional variations that frequently occur have been included in the test method. These relatively simple variations are grouped together under the heading of field of direct application.

The field of direct application clause in each specific European test method may relate to the more common forms of construction for which experience of testing has provided the knowledge that such variations can be safely accepted.
Such a series of rules allows building regulators and other bodies to accept the product without themselves having to make a judgment or request a professional opinion from a recognised authority. The variations that are permitted under direct or extended application can be introduced automatically to manufactured products without additional approval.

10.2.2 Extended application

Direct rules of application, DIAPs, provide classifications based on EN tests data from individual fire tests or a range of test results where individual parameters have been modified. Direct application does not cater for extrapolation of test data beyond agreed limits.

Changes to the test specimen may be required that cannot be dealt with by direct application. Variations outside DIAP rules fall under the scope of formal rules for extended application, EXAPs, based on in-depth review of the particular product design and performance in EN fire tests. Historical test data to national test standards are not used for primary classification but may assist that process.

10.3 Structural Fire Safety Engineering

Structural fire safety engineering is a method of demonstrating fire safety by engineering principles.

There are three aspects, which will affect the fire resistance:

- the method of fixing the partition
- the size, height and width of the partition
- the thermal exposure

It is often necessary to use the tested partition construction(s) for applications that are typically 3 to 6 times higher and 10 to 30 times longer. For these applications the fire resistance test can only be considered as data to enable an evaluation of the product’s performance to be undertaken at these significantly larger sizes. Based on engineering principles it is possible to calculate the limiting height of the partition.

The data produced for evaluating thermal response is based on the thermal exposure used in the fire resistance tests. When this information is used in the design, it effectively assumes the thermal loading inducing the strain is the same over the entire partition as that defined in BS 476:Part 22.

Due to the geometry and layout of the building, the thermal exposure produced within the compartment may be much lower than that defined by BS 476: Part 20. An alternative method is to use the actual fire load within the compartment to evaluate the thermal exposure and use this thermal exposure to predict the response of the partition. This method of analysis can be considered as fire safety engineering, because the structure being designed is based on the actual conditions within the compartment. See the appropriate part of BS 7974 for guidance on the provision of a fire safety engineering solution from a competent fire safety engineer.

11 PRODUCT CERTIFICATION INSTALLER ACCREDITATION SCHEMES

11.1 British Board of Agrément

The British Board of Agrément (BBA) is principally concerned with the testing, assessment and certification of products for the construction industry. This ensures the ready acceptance of the products concerned and ensures their safe and effective use.

11.2 Chiltern ‘BM TRADA’ Certification

BM TRADA Certification is an independent third-party certification body, forming part of the Chiltern International Fire organisation.

11.3 Bodycote Warringtonfire ‘CERTIFIRE’

CERTIFIRE is an independent, third party certification body operating schemes for passive fire protection products and services.

11.4 LPCB/BRE Certification

BRE Certification incorporates LPCB and WIMLAS and provides certification and approvals for the following: construction, fire, loss prevention, security, communications, transport & environment.

11.5 Installer Accreditation Schemes

The primary objective of 3rd party installer accreditation schemes is to ensure that passive fire protection is installed in a way that will enable the designed fire performance to be realised in the event of a fire and that those involved in installation gain an understanding of the relationship between the materials they are using and
how they might perform in a fire. The secondary objective is to ensure that the client, regulators, insurers and all others concerned with the fire safety of the building have confidence in the passive fire protection systems installed by an accredited installer.

11.5.1 FIRAS

FIRAS is a training and accreditation scheme for the installers of passive fire protection products. The first of the schemes to be developed was with the Glass and Glazing Federation for the installation of fire resisting glass. Further schemes have been developed for the installation of partitions, fire protection to structural steelwork, fire resisting ducts, dampers and fire resisting doors.

11.5.2 BRE Certification

Loss Prevention Certification Board operates LPS 1531 Accreditation scheme for installers passive fire protection systems

12 EUROPEAN ORGANISATION FOR TECHNICAL APPROVALS (EOTA)

The EC Construction Products Directive introduced the concept of a European Technical Approval (ETA) which is one of two types of technical specification, the other being a harmonised European Standard.

All EC Member States have designated bodies to issue ETAs and these bodies form the European Organisation for Technical Approvals (EOTA), which provides a common approach to be adopted by the individual Member states. See www.eota.be

The EOTA Working Group has drawn up a European Technical Approval Guideline (ETAG) “Internal partition kits for use in non-loadbearing walls”.

An ETAG is not a European (CEN) Standard but the basis for an ETA, which is a technical assessment of fitness for an intended use. The Guideline is the result of a distinction between EOTA and CEN involvement in the area of internal partitions. EOTA deals with complete systems (kits), as described in the Scope of the Guideline, whereas CEN deals with partitions built with components generally available or manufactured on site.

13 REFERENCES

BS 476 Fire tests on building materials and structures
BS 476: Part 4 Non-combustibility test for materials
BS 476: Part 6 Method of test for fire propagation of products
BS 476: Part 7 Method for classification of the surface spread of flame of products
BS 476: Part 11 Method for assessing the heat emission from building materials
BS 476: Part 20 Method for determination of the fire resistance of elements of construction (general principles)
BS 476: Part 22 Method for determination of the fire resistance of nonload bearing elements of construction
BS 476: Part 24 Method for determination of the fire resistance of ventilation ducts
BS EN ISO 1182 - Non-combustibility test
BS EN ISO 1716 Gross calorific potential
BS EN 13823 Single Burning Item test
BS EN 1363 – 1 Fire resistance tests – Part 1: General Requirements
BS EN 1364 – 1 Fire resistance tests for non-loadbearing elements – Part 1: Walls
BS EN ISO 11925-2 Small flame source test
FPA Design Guide for the Fire Protection of Buildings
The Building Regulations 2006 - Approved Document B 2006
BS 5950:Part 8:1990 Code of practice for fire resistant design
ASFP TGN 005:1996 Guide to Class 0

Non-fire/General

BS 6399-2 Loading for buildings. Code of practice for wind loads
BS 5234 Part 2 Partitions (including matching linings) Part 2. Specification for performance requirements for strength and robustness including methods of test
BS 8000 Part 8 Code of practice for plasterboard partitions and dry linings
BS 8212 Code of practice for dry lining and partitioning using gypsum plasterboard
BS 8233 Code of practice for sound insulation and noise reduction for buildings
EOTA ETAG 003 Internal Partition Kits for use as Non-Loadbearing Walls

14 USEFUL INFORMATION

14.1 Laboratories:

BLACKBURN FIRE TEST CENTRE
Bonsall Street, Mill Hill, Blackburn, Lancashire BB2 4DD
Tel 01254 267 267;  Fax 01254 680 521

CHILTERN INTERNATIONAL FIRE Ltd
Chiltern House, Stocking Lane, Hughenden Valley, High Wycombe, Bucks HP14 4ND
Tel: 01494 563091 Fax: 01494 564895

FIRE RESEARCH STATION
Building Research Establishment, Bucknells Drive, Garston, Watford WD2 7JR
Tel: 01923 664000 Fax: 01923 664010

THE BUILDING TEST CENTRE
British Gypsum Ltd, East Leake, Loughborough, Leics LE12 6NP
Tel: 0115 945 1564  Fax: 0115 945 1562

WARRINGTON FIRE RESEARCH CENTRE
Holmesfield Rd, Warrington WA1 2DS
Tel: 01925 655116;  Fax: 01925 655419

(Note: all the laboratories mentioned above are members of Fire Test Study Group Ltd.)

14.2 Certification Bodies

BBA
British Board of Agrément, P O Box 195, Bucknells Lane, Garston, Watford, Herts WD2 7NG
Tel: 01923 670844  Fax: 01923 662133

BM TRADA
Chiltern House, Stocking Lane, Hughenden Valley, High Wycombe, Buckinghamshire, HP14 4ND
Tel: 01494 565484  Fax: 01494 565487

CERTIFIRE
Holmesfield Rd., Warrington WA1 2DS
Tel: 01925 444851  Fax: 01925 234962

FIRAS
Holmesfield Rd., Warrington WA1 2DS
Tel: 01925 630438  Fax: 01925 234962

IFC CERTIFICATION LTD
20 Park Street, Princes Risborough, Buckinghamshire HP27 9AH
Tel: 01844 275500  Fax: 01844 274002

LOSS PREVENTION CERTIFICATION BOARD
Melrose Avenue, Borehamwood, Herts WD6 2BJ
Tel: 0181 2072345  Fax: 0181 2369683

14.3 General

BSi
British Standards Institution, 389 Chiswick High Rd, London W4 4AL
Tel: 0181 996 9000  Fax: 0181 996 7400
CEN
CEN Management Centre Rue De Stassart 36, B – 1050 Brussels
www.cenorm.be

EGOLF European Group of Official Laboratories for Fire Testing
Laboratorium voor Aanwending der Brandstaffen en Warmte Overdracht, Ottermemsesteenweg 711
B9000 - Gent, Belgium
Tel: +32 (0)9 243 77 50 Fax: +32 (0)9 243 77 51

EOTA European Organisation for Technical Approvals
Rue Du Trône 12 Troonstraat, B – 1000, Brussels
Tel: +32 2 502 69 00 Fax: +32 2 502 38 14

FTSG Ltd (Fire Test Study Group)
c/o Holmesfield Rd., Warrington WA1 2DS
Tel: 01925 655116 Fax: 01925 655419

COMMUNITIES AND LOCAL GOVERNMENT
Eland House, Bressenden Place, London SW1E 5DU

PASSIVE FIRE PROTECTION FEDERATION
Kingsley House, Ganders Business Park, Kingsley, Bordon, Hampshire, GU35 9LU.
Tel 01420 471 612 www.pfpf.org.uk

UKAS (formerly NAMAS)
21-47 High St., Feltham, Middlesex, TW13 4UN
Tel: 0181 917 8535 Fax: 0181 9178500

14.4 ASFP Publications
FIRE PROTECTION FOR STRUCTURAL STEEL IN BUILDINGS - the 'Yellow Book'
FIRE STOPPING & PENETRATION SEALS FOR THE CONSTRUCTION INDUSTRY - the 'Red Book'
FIRE RESISTING DUCTWORK - the 'Blue Book'
ENSURING BEST PRACTICE FOR PASSIVE FIRE IN BUILDINGS