

PUBLICLY AVAILABLE SPECIFICATION

Specification for active fire curtain barrier assemblies and active fire curtain barrier assemblies with smoke rating

ICS 13.220.20



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Foreword

Publishing information

This Publicly Available Specification was published by BSI and came into effect on 31 August 2007.

Acknowledgement is given to the following organizations that were involved in the development of this specification:

- Bodycote warringtonfire
- Chiltern International Fire
- City of Westminster Building Control
- International Fire Consultants
- Royal Borough of Kensington & Chelsea Building Control
- Safety – Smoke and Fire Engineering Technology

The Publicly Available Specification process enables a specification to be rapidly developed in order to fulfil an immediate need in industry. A Publicly Available Specification may be considered for further development as a British Standard, or constitute part of the UK input into the development of a European or International Standard.

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Information about this document

This Publicly Available Specification, PAS 121:2007, provides a comprehensive specification, including test requirements, for companies or individuals designing, manufacturing, installing and employing active fire curtain barrier assemblies. These active fire curtain barrier assemblies can be used in a range of built environments to provide fire separation in the horizontal, vertical or angled orientation.

This Publicly Available Specification is not intended to restrict new developments in design and materials.

NOTE This Publicly Available Specification takes into account the extended application general requirements of EN 15269-1 ¹⁾.

Users of this Publicly Available Specification need to consider the environment in which these active fire curtain barrier assemblies are to be installed. Certain environments may expose the barrier to adverse conditions in which the barrier may not operate effectively.

¹⁾ In preparation.

Presentational conventions

The provisions of this Publicly Available Specification are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

Attention is drawn to national guidance documents in regard to fire safety. In England and Wales, for example, relevant documents include Approved Document B *Fire safety* [1] and Approved Document M *Access to and use of buildings* [2] of the Building Regulations.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a Publicly Available Specification cannot confer immunity from legal obligations.

0 Introduction

0.1 General

It is common practice, driven primarily by aesthetic and economic motives, to provide more open planned and spacious buildings to allow ease of travel under normal conditions for building occupants. This increases the need for fire engineered buildings. Active fire curtain barrier assemblies can have a role to play in both fire engineered designs to assist smoke control and also as an alternative to fire doors and partitions in prescriptive means of escape codes and national guidelines such as Approved Document B [1] and BS 5588 (all parts).

NOTE BS 7974 provides a framework for developing a rational methodology for design of buildings using a fire safety engineering approach based on the application of scientific and engineering principles to the protection of people, property and the environment from fire.

Active fire curtain barrier assemblies can be used to control the movement of fire effluent within buildings in the event of fire. When used as part of a fire engineered design, fire curtain barrier assemblies become a critical element of that design. If fire curtain barriers do not deploy to their operational position, the system will not perform as designed. However, in the event that other elements of the fire protection system do not function, for example due to total power failure, the fire curtain barriers in the fire operational position will provide fire separation.

0.2 Function of gravity fail-safe fire curtain barrier assemblies

The gravity fail-safe active fire curtain barrier assembly allows free movement throughout a building, but on receipt of a fail-safe initiation signal or in the event of a system or wiring failure or total power failure, will move from its retracted position into its fire operational position in a controlled manner facilitating fire separation. A fire separating element may provide a barrier to fire and smoke where it is needed.

0.3 Application of active fire curtain barrier assemblies

Active fire curtain barrier assemblies used in life safety and property protection applications can be horizontal, vertical or angled. For example, these could be used in place of fire doors and shutters, non-load bearing walls, non-load bearing ceilings and glazing. They can be used to form fire separation, such as protected routes and protected lobbies. The typical advantage of active fire curtain barrier assemblies is that they enable greater widths and barrier movements with a smaller space requirement than other traditional methods, e.g. steel fire shutters, doors.

0.4 Deployment of active fire curtain barrier assemblies

Some examples of how active fire curtain barrier assemblies could be deployed are:

- a) barriers deploy fully upon receipt of a signal from the fire alarm system;
- b) barriers remain retracted when the fire alarm system is activated and only deploy upon receipt of a signal from a local smoke/heat detector. In these circumstances, the only fire curtain barrier assemblies to deploy are those where fire or smoke are in the vicinity;
- c) barriers remain retracted when the fire alarm system is activated for a predetermined time to allow for evacuation before deploying fully;
- d) barriers move to given height above fixed floor level when the fire alarm system is activated and act as a smoke barrier for a predetermined time before closing fully for fire containment;
- e) barriers only deploy upon local detection of smoke or fire, independent of the fire alarm system such as a fusible link;
- f) barriers are required to remain retracted as part of a buildings smoke extraction design;
- g) barriers will deploy on loss of primary and auxiliary power supply.

1 Scope

This Publicly Available Specification gives requirements for design, specification, testing, installation, commissioning and maintenance of active fire curtain barrier assemblies.

It is applicable for use by active fire curtain barrier assemblies manufacturers, designers, specifiers, regulators and installers:

- a) in creating protected routes for the purpose of means of escape as an alternative to fire doors, non-load bearing walls, non-load bearing ceilings or fire shutters;
- b) in creating fire separation horizontally, vertically or angled for compartmentation;
- c) as a method of upgrading non-fire resisting elements, e.g. in front of non-fire resisting glazing and doorsets, where required for compartmentation or protecting means of escape;
- d) in providing a smoke barrier in conjunction with non-smoke rated doors/shutters and other products protecting openings to reduce leakage of smoke.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 476-22, *Fire tests on building materials and structures – Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction*

BS 476-31.1, *Fire tests on building materials and structures – Part 31: Methods for measuring smoke penetration through doorsets and shutter assemblies – Section 1: Method of measurement under ambient temperature conditions*

BS 5839-1:2002, *Fire detection and fire alarm systems for buildings – Part 1: Code of practice for system design, installation, commissioning and maintenance*

BS 7346-6, *Components for smoke and heat control systems – Part 6: Specifications for cable systems*

BS 8434-2, *Methods of test for assessment of the fire integrity of electric cables – Part 2: Test for unprotected small cables for use in emergency circuits – BS EN 50200 with 930 deg flame and with water spray*

BS EN 949, *Windows and curtain walling, doors, blinds and shutters – Determination of the resistance to soft and heavy body impact for doors*

BS EN 1363-1:1999, *Fire resistance tests – Part 1: General requirements*

BS EN 1363-2, *Fire resistance tests – Part 2: Alternative and additional procedures*

BS EN 1364-1, *Fire resistance tests for non-loadbearing – Part 1: Walls*

BS EN 1364-2, *Fire resistance tests of non-loadbearing – Part 2: Ceilings*

BS EN 1634-1, *Fire resistance tests for door and shutter assemblies – Part 1: Fire doors and shutters*

BS EN 1634-3, *Fire resistance tests for door and shutter assemblies – Part 3: Smoke control doors and shutters*

BS EN 12101-1, *Smoke and heat control systems – Part 1: Specification for smoke barriers*

BS EN 12101-9, *Smoke and heat control systems – Part 9: Control panels* ²⁾

BS EN 12101-10, *Smoke and heat control systems – Part 10: Power supplies*

BS EN 13501-2:2003, *Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services*

²⁾ In preparation.

BS EN 14600:2005, *Doorsets and openable windows with fire resisting and/or smoke control characteristics – Requirements and classification*

BS EN ISO 13943, *Fire safety – Vocabulary*

3 Terms and definitions

For the purposes of this Publicly Available Specification, the terms and definitions given in BS EN ISO 13943 and the following apply.

3.1 active fire curtain barrier assembly

product that facilitates fire separation and moves from its retracted position into its fire operational position automatically when called upon to do so

3.2 active fire curtain barrier assembly with smoke rating

product that facilitates fire and smoke separation and moves from its retracted position into its fire operational position automatically when called upon to do so

3.3 barrier movement

travel distance of an active barrier from its retracted position to its fire operational position

3.4 compartmentation

process of separating a building or part of a building, into one or more rooms, spaces or storeys, with the intention of preventing the spread of fire to or from another part of the same building or adjoining building

NOTE 1 Compartmentation is mainly employed to assist the emergency services by confining the fire within a fire resisting enclosure. In some instances it is employed to assist means of escape in buildings where evacuation may be delayed, for example, where phased evacuation policy has been applied in premises, such as hospitals and care homes, or where a policy of non-evacuation (e.g. “defend in place”) is employed as in certain designs of flat complexes.

NOTE 2 Fire enclosures specifically for the purpose of means of escape, such as lobby protection to stairways and enclosure of special risks, are not regarded as compartments and normally have a lesser fire time and may employ passive smoke resistance measures.

3.5 deployment

movement of a barrier from its retracted position to its fire operational position

3.6 fire operational position

position of a fire curtain barrier assembly which provides and sustains fire separation for a designated period

3.7 fire separation

method of providing an element that is intended for use in maintaining separation between two adjacent areas of a building in the event of a fire to form protected routes and/or compartmentation

3.8 fitness for purpose

ability of a product, process or service to serve a defined purpose under specific conditions

- 3.9 gravity fail-safe**
property of a fire curtain barrier assembly to move to its fire operational position in a controlled manner to facilitate fire separation when all consumable primary and auxiliary power supplies are removed, in the event of wiring or system corruption, or any combination thereof
- 3.10 integrity**
ability of a test specimen of a separating element of building construction, when exposed to fire on one side, to prevent the passage through it of flames and hot gases and to prevent the occurrence of flames on the unexposed side
- 3.11 insulation**
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
- 3.12 insulating zone**
area created between the surface of the unexposed face of the separating element of building construction exposed to fire and the point at which the air temperature is 180 °C above ambient air temperature at any given time classification
- 3.13 life safety application**
application of the smoke and heat control system in its fire operational condition for the period of time required for the occupants of the premises to be alerted, and to be able to exit the premises, with the smoke and heat control system assisting in the protection of the means of escape and emergency services access
- 3.14 multi-positional deployment**
staged movement of active fire curtain barrier assemblies to provide initial smoke containment prior to full fire containment
- 3.15 radiation (total heat flux)**
heat energy transported as electro-magnetic radiation
- 3.16 side retention**
retention device of fire resisting material which holds the barrier to the building to contain fire
- 3.17 smoke and heat control system**
arrangement of components installed in a building to limit the effects of smoke and heat from a fire
- 3.18 smoke barrier**
device to channel, contain and/or prevent the migration of smoke (fire effluent)

NOTE Smoke barriers may also be referred to as smoke curtains, smoke blinds or smoke screens.

4 Product requirements

NOTE The active fire curtain barrier assembly requirements are intended to provide the fire engineer and/or designer with an alternative to fire doors, shutters, walls and ceilings which fulfil the fire separation design requirements for life safety and property protection. Compliance with this specification does not necessarily, by itself, ensure fitness for purpose for an application, as defined in ISO/IEC Guide 2:1996.

The building design parameters will dictate the minimum classification and performance of active fire curtain barrier assemblies that can be used in any particular application. The criteria for the correct choice of active fire curtain barrier assembly should take into account the total system, function and location requirements without hindering the means of escape or endangering the occupants. Applications are based on a full series of tests on the complete assembly (including fire tests) as it is to be installed.

4.1 Installation

4.1.1 General

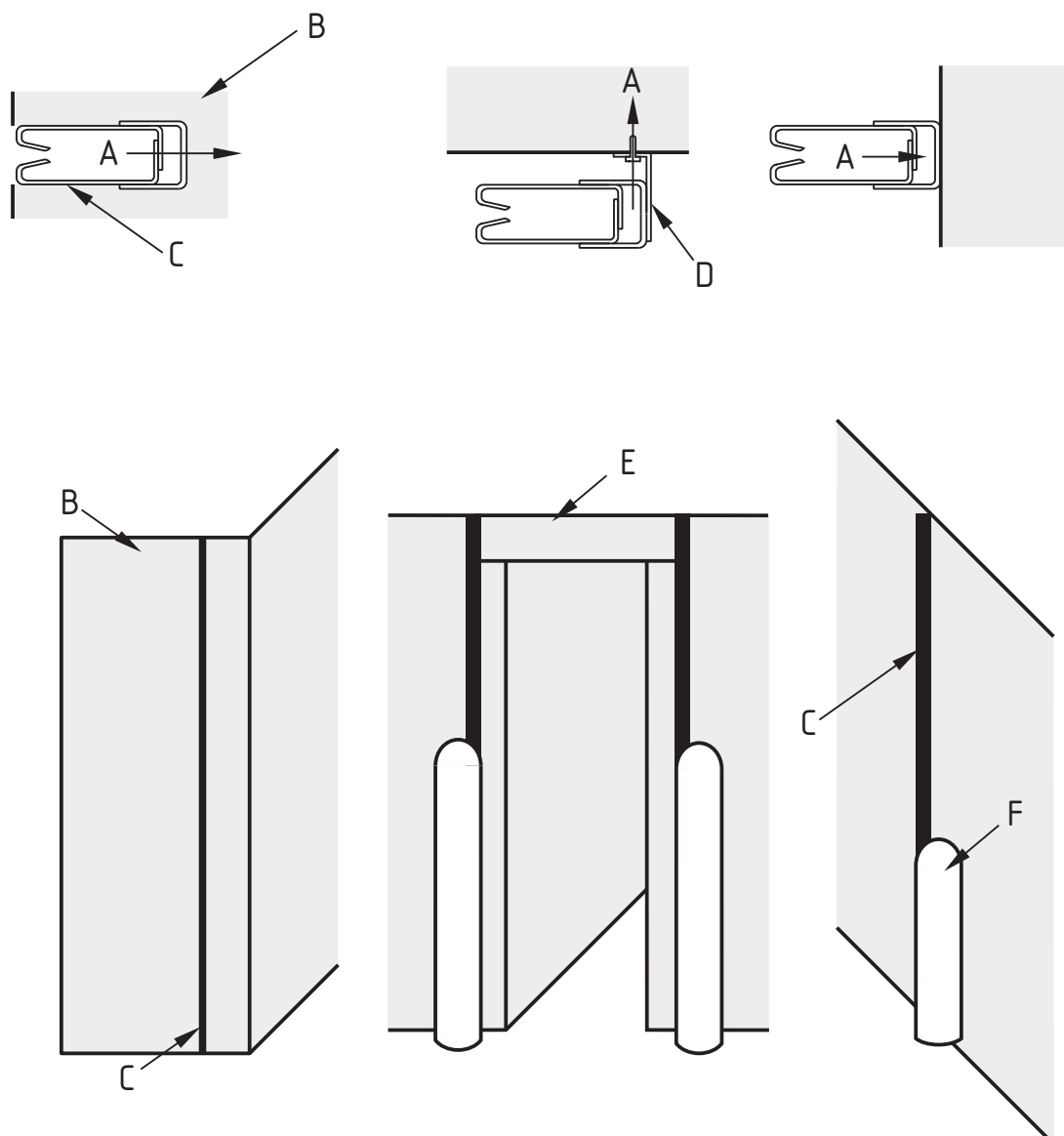
The active fire curtain barrier assembly shall be installed such that its deployment is not obstructed. The inclusion of an additional zone to compensate for the deflection of the barrier due to fire pressure shall be taken into account (see Annex A).

NOTE Care should be taken to ensure that any adjacent surfaces which form part of the barrier to fire, e.g. false ceilings or fittings, have at least equivalent properties as the fire/smoke barrier, e.g. resistance to temperature and permeability.

4.1.2 Side retention

Side retention shall be installed within the buildings' structure unless measures are taken to protect the side retention from mechanical damage by using, for example bollards (see Figure 1).

Figure 1 Protection of side retention guide



a) Side retention guides set into wall

b) Side retention guides face fixed require protection to prevent distortion of guides by impact

c) Side retention guides end fixed requires protection from both sides

Key

- A Direction of fixing
- B Wall
- C Side retention guide
- D Fixing bracket
- E Head box
- F Side protection, bollards or fixed protective framework