GREY BOOK

Volume 1: EN Fire dampers

ASFP
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Volume 1: Fire dampers (European standards)

E (integrity) & ES (integrity and leakage) classified

2nd Edition

As used in ventilation systems to maintain fire compartments and/or to protect the means of escape from buildings

Guidance on EN fire testing, classification, application & installation.

FIRE AND YOUR LEGAL LIABILITY

Fire losses in the UK were £1.1bn in 2011. 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 38 (formerly 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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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 related overseas markets.

Heating and Ventilating Contractors' Association

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The HVCA represents the interests of firms active in the design, installation, commissioning and maintenance of heating, ventilating, air conditioning and refrigeration (hvac) products and equipment

Acknowledgements

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Amendment sheet

DATE	SECTION	AMENDMENT SUMMARY
04 Oct 2011	20	Addition of 8 new products for BSB Dampers
04 Oct 2011	20	Addition of 23 new products for Actionair

Since this document may be subject to change and updating, it is an uncontrolled document. For the latest version of this publication visit the ASFP web site at www.asfp.org.uk/publications as indicated by the dated 'footer' on each page.

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Published by the Association for Specialist Fire Protection in conjunction with the Heating and Ventilating Contractors Association, HVCA, and fire damper manufacturers

FOREWORD

Fire dampers (E and ES classified) represent a major method used in the United Kingdom and other countries to prevent fire and smoke from passing through heating, ventilation and air conditioning (HVAC) systems, from one compartment to another, and to maintain fire separation for means of escape.

It is common for UK industry to refer to 'E' classified products as 'fire dampers' and 'ES' classified products as 'fire and smoke dampers'.

It is imperative that all fire dampers are adequately fire tested and installed in accordance with the damper manufacturer's instructions. Such instructions must be practical and be supported by relevant test data.

This document attempts to provide practical advice so that fire damper manufacturers, system designers and installers are able to consider the appropriate issues and at the design stage, to make the necessary decisions to ensure that dampers will function as intended by current regulations.

Volume 1 is concerned with fire dampers tested to EN 1366-2 and classified according to EN 13501-3. Volume 1 does not refer to smoke control dampers which are tested to EN 1366-10 and classified according to EN 13501.4. These smoke control dampers will be covered in a separate Volume 2.

In simple terms, Volume 1 is intended to provide guidance for fire and smoke protection for means of escape routes; and for maintaining the fire compartment, whereas Volume 2 will be focussed on the use of smoke control damper systems in combination with ductwork.

ASFP wishes to remind all those involved that an effective fire tested combination of fire damper, wall/floor and fire-stopping will be required to obtain an effective installation.

Richard Earle

Chair ASFP Task Group 6B

Exova Warringtonfire

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1 SCOPE

This document is intended to make the specification and installation of fire dampers, where tested and classified to harmonised European procedures, easier for designers and installers. It will also provide a guide for inspectors. It emphasises the importance of installing fire dampers as recommended by the manufacturer and is intended to ensure the use of fire dampers that have been fire tested for the appropriate application.

It should be noted that this document does not include 'smoke control dampers' which will be discussed in Volume 2 of this Edition.

In simple terms, this Volume 1 is intended to provide guidance for fire and smoke protection for means of escape routes; and for maintaining the fire compartment, whereas Volume 2 will be focussed on the use of smoke control damper systems in combination with ductwork.

2 INTRODUCTION

This publication has been produced to assist those involved in the manufacture, specification, installation, inspection and verification of fire resisting dampers installed in heating, ventilation and air conditioning (HVAC) ductwork systems. For information on fire resisting ductwork, reference should be made to the ASFP publication "Fire resisting ductwork: classified according to BS EN 13501-3 for fire resisting ductwork, and BS EN 13501-4 for smoke control ductwork (known as Blue Book: European version)".

Despite many years of use, there has not previously been a nationally recognised guideline for installing fire and smoke damper units when used for providing fire resisting compartments and separation.

Limited guidance in the correct installation of damper systems has resulted in numerous methods being specified by well intended sources such as design consultants, damper manufacturers, ductwork contractors, local authorities, fire authorities, etc, but to the extent that methods vary quite considerably from one project to another. More often than not, methods are based on opinions rather than accepted principles and, quite often, do not take into account the practical installation conditions that vary from project to project.

This document is intended to provide information on best practice and to progressively include fire damper data sheets provided by Third Party Certification schemes, accredited or recognised by UKAS. For further information see section 19.

Other parallel initiatives are also supported, such as that published by the Heating and Ventilation Contractors Association, HVCA, under the title of 'DW/145: Guide to good practice for the installation of fire and smoke dampers'.

There are numerous types of fire dampers and associated installation frames available in the market place. These are broadly described in this ASFP publication. It is equally important to recognise that there are many varieties of walls and floors that are penetrated by fire resisting ducts and dampers. The combinations will have a direct effect on the fire resistance that is achievable.

IMPORTANT

The ASFP wishes to provide a clear signal to the construction industry and H&V industry as a whole, that the ad hoc installation of fire dampers in duct systems at positions which are out of compliance with manufacturers fire tested systems is completely unacceptable and avoidable. These ineffective installations include positioning of fire dampers away from the fire resisting wall or floor element which is being penetrated by the duct and fire damper system. It is vital that the fire damper is properly positioned in the plane of the wall or floor, unless tested otherwise, fully in accordance with the manufacturer's instructions,

The existing and frequent level of ineffective installation adds delays and unnecessary costs to those projects affected by such bad installations. Too many examples occur. Universal attention is needed to adhere to best practice methods. Construction managers must ensure that fire dampers and walls are mutually installed in line, to meet the fire performance required and the fire risk strategy for the building.

In the case of BS EN European fire tests and classification systems, the system uses formal rules for direct and extended rules for the field of application of test data. Assessments as practiced under previous BS 476 series are not permitted for BS EN Classification systems.

Relevant fire protection & prevention information must be provided to the user of the building to allow effective risk assessments to be made and maintained under the duties arising from the Regulatory Reform (Fire Safety) Order 2005. Those who fail to provide such information will be liable in law under Building Regulation 16B [also see Approved Document B: 2006, Appendix G]. In such cases, the intent of Building Regulations will not have been met, and insurers may be reluctant to provide cover.

Without such duties being fulfilled, ASFP/ HVCA suggest that the requirement to meet the occupation clause, such as that which exists under Section 20 Regulation in London, may not be attained.

This guidance attempts to clarify some of the basic principles of installation and at the same time highlight the important responsibilities attached to the ductwork system designer, the local authorities, the ductwork contractor/installer, the main contractor and the contractor installing fire separating walls.

3 DEFINITIONS

Assessments
For test data based on BS 476 series of tests, documents from competent persons or fire test bodies providing broad ranges of application based on a range of fire test data. Products and systems may only be used in applications covered in the range of the assessment

In the case of BS EN test and classification systems, formal rules for direct and extended application of test data are used. Previous use of 'assessments' are limited to permitted processes within the formal rules. Assessment of arbitrary methods may not be forthcoming! See further comment in section 7.4

Break-away duct joint
A joint connecting a fire damper spigot or sleeve to the attached duct work which will allow collapse of the ductwork during a fire without disturbing the integrity of the fire damper. 'Break-away' and flexible joints incorporate materials, fixings, clamps, etc, that are manufactured from a non - fire resistant material with a low melting point such as aluminium, plastic, etc.

Cavity Barriers
Construction, other than a smoke curtain, provided to close a concealed space against penetration of smoke or flame, or provided to restrict the movement of smoke or flame within such a space.

Compartment wall
A fire resisting wall used to separate one fire compartment from another.

Compartment floor
A floor used to separate one fire compartment from another

Damper, fire
A device for use in heating, ventilation and air-conditioning (HVAC) systems at fire boundaries to maintain compartments and protect means of escape in case of fire – it may have reduced smoke leakage characteristics (E or ES classification).

Damper, fire & smoke

A device for use in heating, ventilation and air-conditioning (HVAC) systems at fire boundaries to maintain compartments, to protect means of escape in case of fire (ES classification).

Damper, smoke control
A device, automatically or manually activated, which may be open or closed in its operational position, to control the flow of smoke and hot gases into, from or within a duct, and may assist fire fighting procedures.

Duct/ductwork
A system of enclosure of any cross sectional shape for the distribution or extraction of air.

Expansion Frame
A factory fitted installation frame supplied by the damper manufacturer that forms a complete assembly with the appropriate damper fitted therein. This frame allows the damper to expand under fire conditions and must be to a design which has been successfully fire tested. (Figure 1)

Figure 1: Fire damper in a typical expansion frame

A HEVAC / HVCA frame can be regarded as falling within this definition however particular attention must be paid to the individual fire damper manufacturer's data and fixing instructions particularly relating to the positive fixing of the building ties. Failure to do so may result in a non-compliant installation.

Field of application of test data

In the European classification system, formal rules exist for direct and extended rules for the field of application of fire test data. The rules will be provided in BS EN 1366-2 and BS EN 15882-2 respectively

Fire compartment

Enclosed space, which may be sub-divided, separated from adjoining spaces by fire barriers / fire separating elements

Fire containment

Precautions which contain the fire to the smallest possible area, and control the threat to life safety and the extent of property damage

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]

Fire-stop

A linear joint seal provided to close an imperfection of fit or design tolerance between elements or components to restrict the passage of fire and smoke. The fire- stopping system must be fire tested as part of the fire damper system.

Non combustible material

See Approved Document B Table 6, which includes the following text.

Any material which when tested to BS 476-11:1982 does not flame nor cause any rise in temperature on either the centre [specimen] or furnace thermocouples. Products classified as non-combustible under BS 476-4:1970.

Any material classified as class A1 in accordance with BS EN 13501-1:2002.

Products made from one or more of the materials considered as Class A1 without the need for further testing as defined in European Commission Decision 2003/424/EC of 6 June 2003 amending Decision 96/603/EC , etc.

Penetration seal

The system used to restore/maintain the fire rating of the fire barrier at the position where the damper/ductwork to pass through the barrier.

The penetration seal system must be tested as part of the fire damper system.

Responsible person

The term 'Responsible person' is defined in several ways:-

[a] in relation to a workplace, the employer, if the workplace is to any extent under his control.

[b] in relation to any premises not falling within [a]

- [i] The person who has control of the premises (as occupier or otherwise) in connection with the carrying on by him of a trade, business or other undertaking (for profit or not), or
- [ii] The owner, where the person in control of the premises does not have control in connection with the carrying on by that person of a trade, business or other undertaking

Sleeve and angle installation method

This method applies a sleeve to the outside of the damper casing, to which angles are fitted on either side of the compartment wall to hold the damper in position

Particular attention must be paid to the individual fire damper manufacturer's data and fixing instructions. Failure to do so may result in a non-compliant installation.

Support system

The components used for suspending and/or fixing a damper assembly to either the fire barrier itself or an adjacent floor, wall or soffit.

Test evidence

Data obtained from a fire resistance test carried out to determine the suitability of a product, system or combinations to seal service penetrations. In respect to fire dampers, this means fire testing to BS EN 1366- 2 and classification of performance to BS EN 13501-3:2005. Historical data to BS476-20/22 will only be applicable

in certain instances (e.g. fan shut-down on detection of fire) see Approved Document B: Fire safety. Tests to be undertaken by an UKAS accredited laboratory or equivalent

The following text is provided for clarity:-

The definition of the three elements of the performance criteria of dampers tested to BS EN 1366-2 (1999) are:

Integrity (E)

After the start of the fire test, the leakage through the fire damper shall not exceed 360m³/h/m²) (corrected to 20°C). The integrity around the perimeter of the fire damper shall continue to maintain its separating function during the test without either

a) causing the ignition of a cotton pad

b) permitting a penetration of a gap gauge,

c) resulting in sustained flaming

Insulation (I)

This is the time in completed minutes for which the fire damper continues to maintain its separating function during the test without developing temperatures on its unexposed surface for which either

a) increases the average temperature above the initial average temperature by more than 140°C or

b) increases at any location (including the roving thermocouple) above the initial average temperature by more than 180°C.

Leakage (S)

Leakage through a fire damper shall not exceed 200m³/h/m² (corrected to 20°C). The requirement for leakage during the ambient leakage test need not be met after 5 minutes test duration.

NOTE - The result of the fire test shall be stated in terms of time elapsed to the completed minute from the commencement of the heating to the time when the fire damper failed to satisfy the criteria for integrity, insulation or leakage, or the termination of the heating, whichever is the shortest.

4 TYPES OF FIRE DAMPERS

4.1 Curtain fire dampers

Folding curtain fire dampers are constructed of a series of interlocking blades, which fold to the top of the assembly permitting the maximum free area in the airway. The blades are held open by means of a thermal release mechanism normally rated at 72°C ± 4°C. The blades fall/are sprung to fill the airway to prevent the passage of the fire. Test results or assessments are required for plane of installation (e.g. horizontal and vertical) and the method of installation.

Figure 2: Curtain fire damper

4.2 Intumescent fire dampers

Intumescent fire dampers incorporate components, which expand by intumescent activity under the action of heat, to close the airway to prevent the passage of fire. The intumescent materials form the main component for fire integrity. In some instances this may be supported with a mechanical device to prevent cold smoke leakage. Activation temperatures will be influenced by the type of intumescent material selected and these temperatures typically range from 120°C to 270°C. Some intumescent dampers, whilst containing fire and hot smoke, also incorporate an electro-mechanical device that provides cold smoke containment by interface with smoke sensors via a fire alarm panel.

Test results or assessments are required for plane of installation (e.g. horizontal and vertical) and the method of installation.

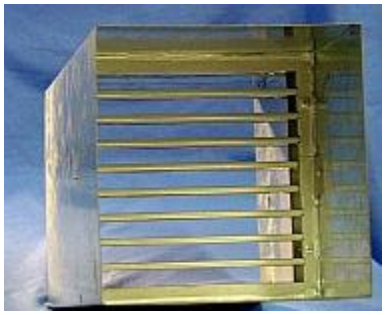


Fig 3: Intumescent Fire Damper

4.3 Multi-blade Fire Dampers

Multi-blade fire dampers are constructed with a number of linked pivoting blades contained within a frame. The blades are released from their open position by means of a thermal release mechanism normally rated at 72°C ± 4°C. When the release mechanism is activated the blades pivot and move to close the airway to prevent the passage of fire. Test results or assessments are required for plane of installation (e.g. horizontal and vertical) and the method of installation.

Figure 4: Multi-blade Fire Damper

4.4 Single Blade Fire Dampers

Single blade fire dampers are constructed with a single pivoting blade within a frame. The blade is released from its open position by means of a thermal release mechanism normally rated at 72°C ± 4°C. When the release mechanism is activated the blade pivots and moves to close the airway to prevent the passage fire. Test results or assessments are required for plane of installation (e.g. horizontal and vertical) and the method of installation.

Figure 5: Single Blade Fire Damper

4.5 Multi-section dampers

Where the duct exceeds the maximum tested size of an individual damper (or single section), manufacturers may provide multi-section units. These will generally be supplied with some type of joining strip or mullion to allow the unit to be assembled on site. This joining is not, necessarily, structural. Consideration must be given by installers for additional support, particularly on larger multi-section units.

4.6 Leakage classified fire dampers (S)

Leakage classified fire dampers are fire dampers that satisfy the appropriate integrity and reduced leakage requirements when tested. They are often referred to as fire and smoke dampers.

Test results or assessments are required for plane of installation (e.g. horizontal and vertical) and the method of installation

4.7 Insulated Fire Dampers (I)

Insulated fire dampers are fire dampers that satisfy the appropriate integrity/leakage requirements and satisfy the insulation performance criterion when tested.

Test results or assessments are required for plane of installation (e.g. horizontal and vertical) and the method of installation

4.8 Smoke Control Damper

Smoke control dampers will be discussed In Volume 2 of this publication. Smoke control dampers are single or multi-blade dampers that would generally have two positions - 'open' to allow smoke extraction or 'closed' to maintain the fire compartment. They do not have thermal release mechanism, relying on a 'powered' control system to ensure that they achieve the correct position – see also 8.2

5 REGULATIONS & CODES

5.1 Introduction

The documents listed in this section include many of the publications relevant to the performance requirements of ductwork in the event of a fire.

For new buildings, buildings which are changing their use, and for extensions or alterations to existing buildings, one generally should refer to the guidance given in Approved Document B, (England and Wales); Technical Standards - Parts D and E (Scotland); or Technical Booklet E (Northern Ireland).

For commercial and industrial buildings, property and business insurance may also be an important consideration. Useful information can be found in the FPA Design Guide for the Fire Protection of Buildings or go to www.thefpa.co.uk

5.2 Statutory instruments

England and Wales

Building and Buildings - The Building Regulations 2000 (SI 2000 2531 and amendments as SI 2006/652, SI 2004/3210, SI 2004/1465, SI 2003/2692, SI 2002/2871, SI 2002/0440 and SI 2001/3335

NOTE: Building Regulation 38 (formerly 16B) – also see Appendix G Approved Document B – Fire safety

Appendix G of the Approved Document B, 2006 Edition, introduced comments on a new Regulation 38 (formerly16B) of the Building Regulations 2000, which requires that where building work involves the erection or extension of a relevant building, or a relevant change of use of a building, then fire safety information shall be given to the responsible person at the completion of the project, or when the building or extension is first occupied.

- 'Fire safety information' means information relating to the design and construction of the building or extension, and the services, fitting and equipment provided in or in connection with the building or extension, which will assist the responsible person to operate and maintain the building with reasonable safety.
- 'Relevant building' is to which the Regulatory Reform (Fire Safety) Order 2005 applies, or will apply after the work is completed
- 'Responsible person' has the meaning given in Article 3 of the Regulatory Reform (Fire Safety) Order 2005

- Details are provided in Appendix G Approved Document B Volume 2 – Buildings other than dwelling houses.

The Regulatory Reform (Fire Safety) Order 2005

Statutory Instrument 2005/ 1541 can be obtained via www.opsi.gov.uk/si/si2005/20051541.htm

The Regulatory Reform (Fire Safety) Order 2005 replaced most fire related legislation in England & Wales from 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.

For more information, see:
- www.planningportal.gov.uk
- www.infoscotland.com/firelaw and
- www2.dfpni.gov.uk/buildingregulations

Many previous pieces of legislation have been 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
- Design principles for smoke ventilation in enclosed shopping centres. BR186, BRE, 1990 (Revision of smoke control methods in enclosed shopping complexes of one or more storeys. A design summary. (BRE 1979)

Construction Design and Management Regulations 2007

For original details see http://www.hse.gov.uk/construction/cdm/summary.htm

The CDM Regulations 2007 came into effect 6 April 2007 and is enforceable under criminal law.

Details are contained in a new Approved Code of Practice L144 'Managing health and safety in construction' as ISBN 978 0 7176 6223 4 and are available from www.hse.gov.uk

User guides [six versions] are available from www.cskills.org/healthsafety/cdmregulations.

In brief, government intends that health and safety is integrated into the management of a project and encourages everyone to work together to achieve that objective as a normal part of a project, to reduce risks and manage the residual risks, by use of the right people for the right job at the right time. This shall enable hazards early on such that they be removed, reduced or managed properly. The focus is in five parts:-

(i) Interpretation and application

(ii) General management duties

(iii) Additional management duties

(iv) Competent contractors who do the work or control the work

(v) Ensure all necessary safeguards and allow sufficient time for each stage of work.

The client shall appoint a CDM coordinator and a 'principal contractor' on a notifiable project, and will be deemed legally liable for their duties and for carrying them out until the end of the construction phase of the project.

The CDM Coordinator should coordinate health and safety aspects of the design work and cooperate with others involved with the project, to

- Facilitate good communication between client, designers and contractors
- Liaise with the principal contractor regarding ongoing design
- Identify, collect and pass on pre-construction information

A PowerPoint interpretation is available from ASFP at www.asfp.org.uk/publications/slides

The designer should check that the client is aware of his duties and that a CDM coordinator has been appointed

The principal contractor should plan, manage and monitor the construction phase in liaison with the contractor, and liaise with the CDM Coordinator regarding ongoing design.

The contractor should cooperate with the principal contractor in planning and managing the work, and inform the principal contractor of problems with the plan.

A PowerPoint interpretation is available from ASFP at www.asfp.org.uk/publications/slides

Scotland

The Building (Scotland) Regulations 2004

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 requiring risk assessments for most buildings not dwelling houses.

Northern Ireland

The Building Regulations (Northern Ireland) 2000

5.3 Documents supporting the statutory instruments

England and Wales

Approved Document B: Fire Safety: 2006.

Scotland

Technical Handbook (Fire) 2011 for Domestic and for Non-domestic buildings

The Handbooks are available to view online or download in full or part in PDF format via http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/pubtech

Northern Ireland

DFP Technical Booklet E - Fire Safety 2005

Technical Booklet E for Northern Ireland closely follows Approved Document B.

The fire safety requirements for these regulations are supported by Technical Booklet E, which contains provisions regarding structural fire resistance, fire compartments, etc. similar to those in the Approved Document for England and Wales. Unlike the provisions of the Approved Document, which are for guidance, the use of which is regarded as evidence tending to show that the requirements of the Building Regulations have been met, the provisions of Technical Booklet E are deemed to satisfy those requirements. Where the provisions of the Technical Booklet are not followed then the onus falls on the designer to show that the requirements of the regulations can be met by other means. Technical Booklet E can be downloaded from http://www.dfpni.gov.uk/index/buildings-energy-efficiency-buildings/building-regulations/br-technical-booklets.htm

5.4 BB100 Fire safety design for schools

DfES Building Bulletin 100 – Designing & managing against the risk of fire in schools. *[This document replaced BB 7 - Fire and the design of educational buildings (DES) 1988]*

5.5 HTM Codes for buildings providing health services

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

5.6 LABC Guides (includes London District Surveyors Association)

- Fire Safety Guide No 1 - Section 20 Buildings: 1997
- Fire Safety Guide No 3 – Phased evacuation from office buildings 1990
- Note that Section 20 is a National Act applied locally within London.

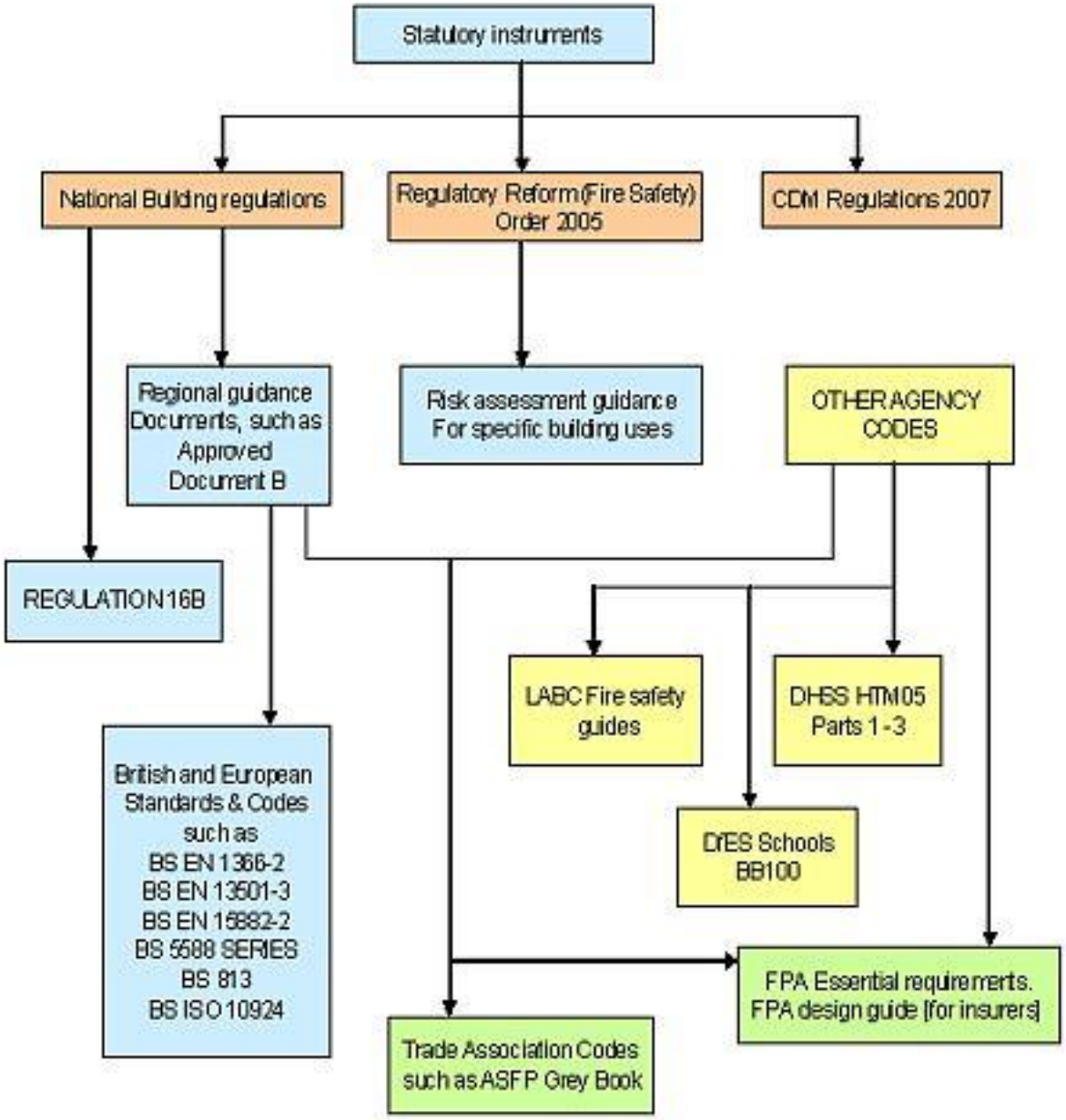
5.7 Fire Prevention Association

- FPA Design Guide for the Fire Protection of Buildings,
- FPA Essential principles

- FPA documents can be obtained together with other publications on behalf of the RISC Authority insurance organisation at www.thefpa.co.uk/publications or at www.RISCAuthority.co.uk

5.8 Regulations and Codes

The diagram indicates some of the more likely Codes that could apply to the use of fire damper systems in buildings. Note that Building Regulation 38 (formerly 16B) requires all parties to provide the building user with details of the fire precautions provided to assist in the preparation of the risk assessment.



6 OVERVIEW OF EUROPEAN STANDARDS FOR FIRE RESISTING DAMPERS AND SMOKE CONTROL DAMPERS

In general terms, all BS EN European standards are referenced in a Product Standard that lists the agreed fire classification system. The classification document provides details of the fire tests required to satisfy the classification requirements. In addition to this, the field of application of test data and classification shall be determined using agreed BS EN Rules for direct and extended application of the fire test data. These BS EN standards are listed below.

Fire Resisting Dampers [discussed in this document, Volume 1]

Product standard	EN 15650: Fire dampers
Test standard	BS EN 1366-2:1999: Fire resistance tests for service installations: Fire dampers

Classification standard	EN 13501-3:2005: Fire classification of construction products and building elements - part 3: classification using data from fire resistance tests on components of normal building service installations
Extended field of application	EN 15882-2: Extended applications of test results for fire resistance tests for service installations: Dampers

Smoke Control Dampers [discussed in Volume 2]

Product standard	prEN 12101-8: Smoke and heat control systems: Specification for smoke control dampers
Test standard	prEN 1366-10: Fire resistance tests for service installations: Smoke control dampers
Classification standard	BS EN 13501-4:2007: Fire classification of construction products and building elements - part 4: classification using data from fire resistance tests on components of smoke control systems
Extended field of application	prEN YYYY-XX: Smoke control dampers

7 EUROPEAN FIRE CLASSIFICATIONS, FIRE TESTS, DIRECT & EXTENDED FIELDS OF APPLICATION

7.1 European fire classification systems for fire dampers

The classification system described in BS ISO 10294-2 and EN 13501-3 is also essentially the same and, in summary, is as follows: -

Integrity (E) - Leakage during the fire test of less than 360 $m^3/hr/m^2$, no failure of the installation

Insulation (I) – average temperature rise on the unexposed face of 140°C with a maximum value of 180°C

Leakage (S) – Leakage during the fire test of less than 200 $m^3/hr/m^2$ and the same requirement for a second unit of the smallest section to be manufactured and measured at ambient conditions

The above system is then qualified with a time interval, such that, as an example, the following classifications might be seen

- E240 – Fire damper with integrity of 240 minutes
- ES120 – Leakage rated fire damper with integrity of 120 minutes
- EIS 180 – Leakage rated fire damper with integrity and insulation characteristics for 180 minutes

The full detail of the classification system may be determined by reading the standards concerned.

7.2 Standardised fire tests for fire resisting dampers

7.2.1 Background

Until 1997, no specific tests for fire dampers existed. This meant that manufacturers had to test to BS 476 part 20 (formerly part 8) to give an indication of how their products reacted when subjected to fire. BS476 part 20 is titled “Fire tests on building materials and structures – Method for determination of the fire resistance of elements of construction (general principles)”, and was the best available standard that could be followed, but rather crude for a damper exposed to a potentially higher flow of hot gases.

The method of test thus adopted followed closely the method of test for un-insulated doors where the only suitable method for evaluating integrity was by using the 6mm-diameter rod (additionally 25 mm gap, cotton pad if applicable and sustained flaming). In addition, the dampers were not installed in a duct system; neither were the pressure conditions representative of normal HVAC practice. In addition, dampers were tested typically in brickwork (later in block work) and normal weight concrete (later using lightweight aggregates or aerated concrete slabs). Application of such test results was more difficult to apply to actual situations, particularly when considering the effect of high under-pressures more typical of air-distribution applications and the higher gas leakage that would be found. There are also practical limitations in using the gap gauge criterion for dampers where large gaps are rare. However, there is plenty of potential for leakage between damper blades, around the perimeter of the damper and, for multi-blade dampers, around the pivot rods as well. Lack of opening and closing test requirements also mean that even the minimum information on durability was not available.

Because of these significant limitations, a method based on testing a damper in a ducted system with integrity based on measurement of leakage was developed. This included a fifty opening and closing cycle prior to the

fire test. This was tabled as a proposal by the UK to ISO TC 92 and received much support from other major European countries.

This work was generally completed in 1997 with the start of the publication of the BS ISO 10294 series. This meant that for the first time manufacturers could test to a British Standard specifically written for their products. Indeed, most of the leading manufacturers had been testing to the drafts of this standard since the early '90's to both aid the development of the standard and to determine whether products would meet the new more stringent requirements.

The general view is that historical test data on dampers, tested as un-insulated doors to the criterion of BS 476: Parts 8 or 22, should be viewed with considerable caution and ideally should not be accepted. The principle difference between the original ad-hoc test methods and the EN/ISO tests are tabulated overleaf.

7.2.2 BS EN fire test methods

Comparison between test methods for fire dampers

BS 476:Part 8 BS 476:Part 20	BS EN 1366-2 ISO 10294-1,2 and 3
No guidance available for testing fire dampers so ad-hoc methods used	EN and ISO standards available specific to testing mechanical fire dampers
No leakage measurements taken so limited data for end-use conditions.	Leakage measurements essential part of establishing integrity criterion. A more onerous leakage criterion available when smoke leakage considered an important factor.
Dampers not tested in a duct	Requirement is that damper is tested installed in a representative duct. Several different locations of damper in duct covered to represent end-use conditions.
No application rules	Some guidance on field of application rules. More extensive rules being drafted in CEN TC 127
Little relevance to end use conditions	Tests try as far as possible to be representative of HVAC practices with variations such as higher under-pressure conditions being covered as an option for special applications.
No opening and closing test prior to fire test	An opening and closing test is undertaken prior to the fire test. This represents the minimum amount of opening and closing cycles a damper would be subjected to in its operating life.

The work in ISO TC92 was adopted by CEN TC 127, whose main task was to develop a suitable leakage criterion. BS EN 1366-2 was published in 1999. This is a mandated European Standard and states in its foreword that it should supersede any national standards in September 2001. EN 13501- 3 gives classification details to be used for dampers tested to BS EN 1366-2.

7.2.3 BS ISO fire test methods

Although BS 5588-9: 1999 still makes reference to the BS 476: Part 20 series, it also cross references to BS ISO 10294-1, BS ISO 10294-2 and BS ISO 10294-3. BS EN 1366-2 is technically identical to ISO 10294-1 (although earlier tests did not have the furnace temperature measured by plate thermocouple) and ISO 10294-2. However, CEN does not have a commentary document at all so background information has to be derived from BS ISO 10294-3.

Method of test defined in BS EN 1366-2 and ISO 10294-1

Figure 6: Fire test arrangement

The test method prescribed by BS EN 1366-2 and ISO 10294-1 is essentially the same.

In summary, it consists of the following:

The damper (of the largest size to be manufactured as a single section) is installed in a wall, partition or floor in the manner that would normally be used for installation on site

A section of plenum/duct is attached to the damper unit on the non-furnace side. This is in turn connected via measuring stations to a high temperature fan

Prior to the test the damper is subjected to 50 closures in the manner that it would normally close on receipt of a fire signal

The cold leakage of the damper is tested at various under-pressures above and below the test pressure (normally -300Pa)

The test is started with the damper open – i.e. it is required to close within two minutes from the start due to exposure to the fire. There is a nominal air velocity of 0.15m/s passing through the damper controlled by the fan.

The furnace is started and the damper having closed, the leakage is recorded from 5 minutes into the test for the duration of the test. Adjusting the fan controls the pressure drop across the damper and this is normally maintained at -300Pa. Not meeting the leakage criterion after 5 minutes constitutes a failure. The furnace follows the standard fire test curve of either BS EN 1363-1 or ISO 834-1.

The integrity of the joints between the damper and the wall or partition is regularly assessed for gaps etc.

Full details may be found in the standards concerned.

A simplified illustration is shown below in Figure 7 that follows:

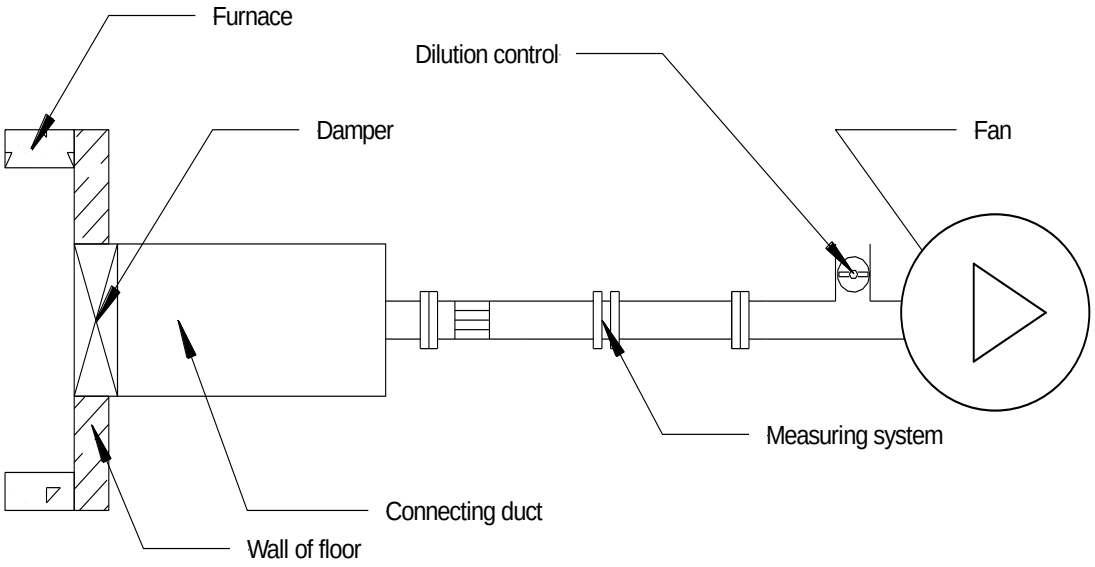


Figure 7: Example of general test arrangement used in ISO 10294-1 and BS EN 1366-2

7.3 Direct and extended field of application of test data for dampers

7.3.1 DIAP rules for direct field of application of test data

The rules for the direct field of application of test data obtained from EN 1366-2 are listed in that harmonised test document, BS EN 1366-2. They are not copied here in case of modification. The latest copy of the test standard should be consulted for the latest information

7.3.2 EXAP rules for extended field of application of test data: BS EN 15882-2

General

BS EN 1366-2 provides limited guidance on rules for direct field of application.

BS EN 15882-2 will contain rules agreed at CEN TC127 for the use of test data from EN 1366-2 for extended field of application. The rules are not copied here in case of modification. The latest copy of the test standard should be consulted for the latest information

The extended application standard EN 15882-2 will identify the parameters that affect the fire resistance of dampers. It also will identify the factors that need to be considered when deciding whether, or by how much, the parameter can be extended when contemplating the fire resistance performance of an untested or untestable variation in the construction. It does not cover the effect of the fire damper assembly on the performance of the wall or floor into which it is installed.

The standard will provide the required principles behind how a conclusion on the influence of specific parameters/constructional details, relating to the relevant criteria (E, I, and S), can be achieved.

The following overview is intended to provide an insight into the rationale considered in agreeing the rules.

7.3.3 Overview of EN 15882-2

Spacing between dampers

Dampers shall not be installed less than [200mm] apart unless tested closer together.

Influence of fixing damper to supporting construction

a) Centres between fixings shall not be reduced

b) Size of fixing shall not be decreased

c) Alternative fixings may be used if supporting data is available.

Note: The location of fixings also needs to be given consideration

Multiple damper assemblies

At the time of writing, the use of multi-sectional assemblies without specific fire testing is not formally agreed.

The following guidance should be used for large duct sections:-

a) Multi-sectional units above 4 individual sections must be installed with supporting rolled steel angle or channel sections of a minimum 6mm thick.

b) Calculations may be possible to ensure the strength of the supports.

Actuators

Actuators cannot be changed without requiring additional fire tests.

Penetration seals

Alternative penetration seals may be used if supporting fire test data relevant to the application is available. The possibility of some differential movement between the damper, duct and wall, partition or floor should be considered when specifying the most appropriate method of sealing.

Proof that a penetration seal has been tested, does not mean that it may be applied to a damper, as the damper test is different to the penetration seal test and has its own specific criteria with regard to the damper (see also 12.6)

Seals that are not able to accommodate some movement of the adjacent components should not be specified.

7.4 Assessments & expert judgements

Expert Judgments (EJ)

An EJ provides a solution to specific technical problem that may lie outside the direct or extended fields of application rules, contained in the relevant European standards. They should only be issued by competent persons and covered by appropriate justification and supporting test data. Products and systems may only be used in applications covered within the scope of the EJ which usually means for a single application. If there is any doubt that a third party (notified body) would be unable to arrive at the same conclusion an EJ should not be made.

An EJ expert judgement cannot lead to a formal European classification.

Assessment

An assessment is an expert judgement issued by an independent third party. Such assessments cannot lead to a formal European classification for performance in fire.

Whilst this document recommends the adoption of tested methods, the need to design/illustrate non-standard methods may arise in some circumstances. When this occurs, the system designer shall help to resolve any problems that arise during installation, to the satisfaction of the building control authority.

One way to resolve such a situation would be to consult a competent person or body with relevant expertise, such that a case by case proposal can be provided for the particular site conditions.

8 OTHER NON-FIRE TESTS FOR FIRE DAMPERS

8.1 Thermal release mechanisms

Thermal release mechanisms for mechanical dampers can be evaluated to ISO 10294-4: 2001.

This test determines if a thermal release mechanism is:

- suitable for a fire damper assembly to be tested according to ISO 10294-1
- suitable for a fire damper already qualified according to ISO 10294-1 with an alternative system of the same class (temperature-load)
- to maintain its performance after the reliability tests

However, any new or revised thermal release mechanisms should undergo at least one fire test (and possibly two tests, depending on EXAP rules) to ensure the will function correctly wherever they are situated in the damper design

8.2 Smoke control dampers

Volume 2 of this document will provide additional information when European standards become available. The Smoke Control Association may have additional guidance available.

8.3 Dampers (aerodynamic testing)

Dampers may be aerodynamically tested to BS EN 1751. This gives details for measuring performance (flow rate/pressure drop), damper blade leakage (with classification), fire damper casing leakage (with classification), torque and thermal transmittance.

Where classification is defined this is presented graphically within the standard and is too complex to be presented here; reference should be made to the standard.

Before specifying thermal transmittance requirements, reference should be made to individual manufacturers to determine whether products are available that have been subjected to this test.

Please note that fire dampers may be tested using these methods to allow determination of their general performance under standard conditions.

9 THIRD PARTY CERTIFICATION SCHEMES

The United Kingdom Accreditation Service UKAS, and similar bodies, operate schemes for the accreditation of Third Party bodies to provide independent certification of materials, products and/or installers - which have an impact on the performance of elements of a building.

While these schemes are not an alternative to formal Building Regulation approval, they may be accepted by Building Control Bodies as evidence of compliance with the requirements of Building Regulations. The Building Control Body may, however, wish to establish, in advance of the work, that the scheme is adequate for the purposes of the Building Regulations.

There are many UK product certification schemes, which certify compliance with the requirements of a relevant standard, which are appropriate to the purpose for which the product/material is to be used. Materials which are not certified in this way may still conform to a relevant standard.

There are also independent schemes for the certification and accreditation of installers and maintenance firms which provide confidence in the appropriate standard of workmanship being provided.

9.1 Third party product certification

The fundamental benefit of third party certification is that it provides the specifier, customer, end-user, and/or regulator, an informed dynamic choice when purchasing or selecting a suitable fire tested and classified product. Choosing a product, which carries the badge or mark of a reputable third party certification body, will give safeguards as to the performance of the product. Also, in the rare event of a failure, it will help to defend against any accusation of possible negligence, which may be directed towards the specifier or other individual concerned.

Third party product certification is growing in popularity with product manufacturers, who see it as an independent ‘stamp of approval’ that their products have been tested to a recognised high standard.

ASFP continues to be a leading advocate of third party product certification schemes

9.2 Third party installer certification

Third party certificated installer schemes involve assessment of the installer company, competence assessment of its site workforce and regular, random inspection of actual contracts. Training designed to meet some aspects of the competency assessment requirements is normally available from the certification body.

ASFP encourages accredited bodies to extend the number of installer certification schemes available for fire dampers.

10 CE MARKING AND ATTESTATION OF CONFORMITY

To obtain CE Marking, the applicant should follow the instructions provided in the product standard EN 15650 Annex ZA.

CE Marking is not a mark indicating conformity to a standard but rather a mark indicating conformity to the legal requirements of EU Directives. Class 1 Security Products require manufacturers to have a Certified Quality System to ISO 9000 in operation and product certification.

The manufacturer should use the assistance of a Notified Body in order that the manufacturer can legitimately apply the CE Marking to their product.

A Notified Body is one that a national government appoints to oversee the operation of specific aspects of a Directive.

Useful information is available from the governments BERR website at the following address:-

http://www.berr.gov.uk/whatwedo/sectors/sustainability/regulations/cemark/page11646.html

or at European Commission site at:- http://europa.eu.int/comm/enterprise/regulation/goods/index_en.htm

Attestation of conformity

Attestation of conformity procedures regulate which tasks will be assumed by the manufacturer and which by the certifying body. Following a decision met by the European Commission, these procedures are laid down in harmonized standards or in European Technical Approvals (ETA).

The Construction Products Directive provides for 6 different Attestation of Conformity systems which are selected according to formal rules. Whereas conformity assessment systems 1, 1+, 2 and 2+ absolutely require notified certification bodies to be involved in the attestation of conformity of products and factory production control, systems 3 and 4 exclusively call on the manufacturer himself to independently assess his conformity.

Fire damper products fall into System 1.

11 DESIGN, SELECTION & SPECIFICATION

11.1 Selection

Regardless of the type of fire separating element in which the damper is to be mounted, there are only two main design criteria to be met and they are:–

(a) that the damper should be fixed either within or directly adjacent to the fire barrier and be supported independently of the connecting ductwork, i.e. if the ductwork were to be removed from both sides of the damper it would continue to be an integral member of the barrier it protects.

(b) that the damper is installed in accordance with the manufacturers recommended tested method

(c) that the installation meets or exceeds its design specification especially with regard to its fire rating.

11.2 Selection and responsibilities

It cannot be over-emphasised how important it is for each party involved in the satisfactory specification, design and installation of fire and smoke dampers to not only recognise their responsibilities in meeting the design criteria outlined above but also to communicate with the appropriate party in terms of resolving, clarifying and implementing any non-standard occurrences.

The Building Control Body of the local authority is a frequently used resource for many construction sites. In relation to fire protection the comment “it’s been passed by the building controller” is sometimes given even when it is not appropriate to do so! It is important to understand the responsibilities of those concerned in the process. Also see the inside front cover of this document.

There is a statutory duty to notify the Building Control Body prior to installation of any system. There is a general duty to enforce all the Building Regulations; this is done on a risk basis. Central to their ability to provide this support will be time and availability. Some projects will attract much more attention than others.

It seems that general comments offered by a building inspector in answer to very general questions are sometimes taken as “approval” for work done or specified, which may not be to a suitable standard. Building control bodies only check compliance with the building regulations. Even then, the contractor cannot assume carte blanche that all damper installations will be the same and not need additional technical support.

All parties on the construction site are required to ensure that the required fire protection is actually provided and not jeopardised by incorrect locations of fire dampers in relation to fire resisting walls or floors.

The ASFP wishes to provide a clear signal to the construction industry and H&V industry as a whole, that the ad hoc installation of fire dampers in duct systems at positions which are out of compliance with manufacturers fire tested systems is completely unacceptable and avoidable. These installations include positioning of fire dampers well away from the fire resisting wall or floor element which is being penetrated by the duct and fire damper system. It is vital that the fire damper is properly positioned in the plane of the wall or floor fully in accordance with the manufacturer’s instructions.

The existing and frequent level of ineffective installation adds delays and unnecessary costs to those projects affected by such bad installations. Too many examples occur. Universal attention is needed to adhere to best

practice methods. Construction managers must ensure that fire dampers and walls are mutually installed to meet the fire performance required.

Those who fail to comply will be liable in law under Building Regulation 38 (formerly 16B) [also see Approved Document B 2006, Appendix G] in that relevant fire protection & prevention information must be provided to the user of the building to allow effective risk assessments to be made and maintained under the duties arising from the Regulatory Reform (Fire Safety) Order 2005.

Without such duties being fulfilled, the Completion Certificate for the building works may not be issued, and insurers will be reluctant to provide cover.

Individual responsibilities, which are listed in detail in later sections, can be summarised as follows:–

The Fire Damper Manufacturer

The damper manufacturer shall provide detailed instructions on how the damper should be installed to comply with the fire tested system, and liaise with installers to ensure that the method specified is practical for site conditions, whilst still satisfying the requirements for classification.

The System Specifier and Designer

The system designer should submit proposals to the local building control / fire body for conceptual approval at the initial design stage and at the final design stage This should include full details of the proposed damper installations, with due provision for adequate space for the installation process.

Building Control Bodies

Building Control Bodies (including approved inspectors) must be content that the damper installation shows compliance with building regulations and is suitably tested and classified to EN 13501-3

The Ductwork/Damper Installer

Ductwork/damper installers must ensure that they meet the dimensional/specification requirements of the system designer and the fire damper manufacturer. They must also ensure that all variations meet the approval of the designer, manufacturer and the building control local authorities.

The Fire Separating Element Contractor

All relevant contractors must ensure that fire divisions and penetrations are formed to accommodate specific damper units and they must also ensure that the penetration seals they apply comply with the manufacturer's installation instructions to meet the classification required.

11.3 Specification and selection issues

When establishing the ductwork routes, the system designer is responsible for the following actions:-

Before the tender stage the designer should provide the following minimum information:–

(a) the locations, types and fire resistance period of all fire separating elements;

(b) the locations, sizes, orientation (vertical or horizontal) and types of all dampers – e.g. fire and/or smoke having first ensured that the actual size of the fire barrier penetration / opening can be accommodated within the spatial design;

(c) detailing the interface between the damper(s) and the control system;

(d) the method of blade release;

(e) the requirements for blade position indication;

(f) basic material requirements of blade and casing;

(g) any particular local authority or client requirements that is peculiar to the project;

(h) inspection and handover requirements.

There is very often a lack of space in which to fit services. The system designer shall allow sufficient space for the selected method of installation to be used and for planned maintenance and service access to be provided. Duties arise from the Construction Design and Management Regulations 2007.

Ductwork or insulation made from combustible materials

Some ductwork products are constructed of combustible materials, such as phenolic foam, coated with a thin layer of metal foil. Visually such ductwork appears like insulation applied to metal ductwork without the metal ductwork. (i.e. a combustible product forms the duct enclosure).

Use of this type of ductwork should depend on compliance with other aspects of the current Building Regulations, Approved Document B and the design code for ductwork fire safety, BS 5588: Part 9. The following points are relevant:-

1. The scope of Part 9 states that it is intended for ductwork 'manufactured from metal and/or rigid mineral based components'. Foil lined phenolic foam does not comply with this requirement.

2. Part 9 requires that any insulation within 500mm of a fire damper needs to be either non combustible or a material of limited combustibility. (Phenolic foam will not comply with this requirement). (page 21 of Part 9 item 6.5.2 (3)

11.3.1 Fire separating elements

Ensure that the contractor responsible for the construction of the fire separating elements is given instructions by the designer on the requirements to seal the initial open penetrations, including all dimensional information. They should also be instructed on any finishing-off activities and the sequence in which they should be carried out relative to both the installation of the damper assembly and the connecting ductwork.

All apertures formed for ductwork must make adequate provision for the damper unit and its frame, without being excessively oversized. Otherwise additional costs will be incurred to make a compliant installation.

11.3.2 Fire stops and penetration seals

It is important to specify the correct fire stopping system as used in the tested configuration. The apertures should not be oversized to make this impracticable. Indicate, where necessary, the type of penetration seal that is to be used to make good any nominal clearance space within the fire separating element and around the damper to ensure that the integrity and insulation of the fire barrier is maintained.

Fire-stopping subcontractors are very often selected on price at tender stage without in-depth analysis of the systems they propose or an accurate specification provided for them. This leads to low cost tenders using cheaper untested solutions. This will increase the final cost if poor work is picked up by approval bodies.

11.3.3 General

Specific installation details should only be derived from manufacturer's tested configurations that are appropriate to the intended application.

The system designer shall ensure that the damper installation will provide meaningful protection in the event of a fire. They shall verify the relevant test evidence of the wall/floor, the damper manufacturer and the fire-stop manufacturer. Bad practice must be prevented if an installer is to provide the Responsible Person with useful information on the fire precautions provided.

There are frequent miss matches between the type of damper installation frame used and the substrate in to which it will be installed. This is especially apparent in drywall construction. Evidence available to the passive fire protection industry suggests that standard practice on construction sites is to simply infill the gaps between the frame and the wall as "well as possible". *This will not enable a compliant installation* and must be avoided

The requirements of Approved Document B cannot be achieved unless the installed system complies with the fire tested damper system. All parties involved with completing the damper installation must be accountable for their element of work. Approved Document B comments that:-

''*Since the fire performance of a product, component or structure is dependent upon satisfactory site installation and maintenance, independent schemes of certification and accreditation of installers, and maintenance firms of such, will provide confidence in the standard of workmanship being provided"*

Specific recommendations

Correct selection and installation of systems is probably more important for fire dampers passing through fire separating walls than many other building features. The following guidance will help to ensure that the duct and damper installation will meet expected requirements in the event of a fire:-

a) At design stage a competent person should be designated to be responsible for the design of the correct installation of dampers in compartment walls and floors.

b) The fire damper manufacturer's installation instruction should be followed at all times. Any variations should be approved by the designer, manufacturer and building approval agency. The detail of the installation may be different for different types of fire separating walls or floors

c) Where dampers are to be installed through drywall construction the drywall and fire damper manufacturers should both be consulted.

d) Fire dampers should always be installed in the plane of the fire separating element.

e) All parties that affect the installation must meet and agree the installation procedure as soon as possible on site. The installers of ductwork, drywalls and fire stopping systems should all be involved.

11.3.4 Supports

The support system used for the damper should be confined to the system as specified by the manufacturers, including provisions for the type of fire separating element/barrier to be penetrated, and any requirements for other associated services.

This information should include material details such as cleats, angle clamps/rods, suspension rods, etc, which must be sized and specified to match the fire resistance of the fire barrier. It should be noted that the support system should take into account the practical considerations that will arise if the programme of installation dictates that the barriers will be installed after the damper and/or ductwork installation.

11.3.5 Guidance on the use of fire dampers protecting escape routes

[a] ES (integrity and leakage) classified smoke dampers

These are fire dampers tested to BS EN 1366-2 that meet 'ES' classification requirements of BS EN 13501-3: 2005, and achieve the same fire resistance in relation to integrity as the fire separating element through which the duct/damper passes.

[b] Protection of means of escape routes

Traditionally ductwork passing through protected escape routes needed to be enclosed with imperforate fire resisting construction to prevent the spread of smoke in to the escape routes. Developments in damper technology and testing methods have enabled the use of ES leakage classified dampers capable of reducing smoke leakage to a minimum. Since 2006 guidance documents referred to in Building Regulations such as Approved Document B (in England and Wales) now give two options:-

[i] The ventilation ducting located within the protected escape routes is enclosed in half hour fire resisting construction in terms of integrity and insulation , or

[ii] ES classified fire dampers are provided to ventilation ducts where penetrating the fire resisting enclosure to the escape route, and where fire dampers are used instead of a fire resisting enclosure to ductwork, the fire damper should achieve an ES classification of 60 minutes as described in 13501-3:2005 and be successfully tested to BS EN 1366-2:1999.

[iii] Fire dampers only fitted with fusible links are not suitable and the fire damper shall close under the control of a smoke alarm.

[c] Damper fixing

The guidance on installation and fixing in other parts of this document is equally important for ES classified dampers, and incorrect installation can be problematic as smoke leakage can occur at the junction of the damper and the enclosing wall / partition or floor. It is therefore particularly important that the manufacturers tested fixing method is followed precisely. To avoid smoke leakage in this area, designs normally require dry wall construction to be framed and sealed before the damper in fixed in the opening. *The system specifier, designer, damper installer and inspecting authority should question the appropriateness of an installation method where the damper opening is not framed and sealed in dry wall construction.*

[d] Air transfer grilles

ES Classified fire and smoke dampers are also suitable where air transfer grilles are provided between a room and a protected escape route.

NOTE: In the case of protected routes in dwelling houses and the inner hall protection of flats different standards apply. Further guidance is given in Approved Document Part B Volume 1 & 2.

[e] Actuation of fire dampers in buildings involving sleeping risk

Where a building involves a sleeping risk such as a hotel, residential care home, hospital etc, Approved Document B, BS 5588-9 and Department of Heath HTM series, recommend in certain cases the actuation of fire dampers by smoke detector-controlled automatic release mechanisms, in addition to being actuated by thermally actuated devices. *Note that BS 5588 is replaced by BS 9999.*

11.4 Designer's check list

An example of a designer's check list is given in DW/145 as published by HVCA.

12 INSTALLATION ISSUES

Regulatory Reform (Fire Safety) Order 2005

The provision of dampers used to protect escape routes should be recorded and identified in the risk assessment as elements provided for the protection of the means of escape and requiring regular maintenance. The provision of correct information as a legal duty arising under Regulation 38 (formerly16B) is extremely important. It is recommended that damper installers and competent persons appointed to carry out a risk assessment; record the location of all types of fire dampers and pass this information onto the responsible person. The responsible person should ensure that a regular inspection and maintenance regime is in operation.

12.1 General

This document is intended to provide information on best practice and to progressively include fire damper product data sheets, known to be accepted by recognised 3rd party certification schemes, or where the data provided has been scrutinised by appointed members of the ASFP Technical Review Panel.

Dampers should be fixed to the structure they are installed into.

In order to encourage reliable installation practices, the ASFP formally supports information published by the Heating and Ventilation Contractors Association, HVCA, under the title of 'DW/145: Guide to good practice for the installation of fire and smoke dampers'.

There are numerous types of fire dampers and associated installation frames available in the market place. These are broadly described in this ASFP publication. It is equally important to recognise that there are many varieties of walls and floors that are penetrated by fire resisting ducts and dampers. The combinations will have a direct effect on the fire resistance that is achievable.

IMPORTANT

The ASFP wishes to provide a clear signal to the construction industry and H&V industry as a whole, that the ad hoc installation of fire dampers in duct systems at positions which are out of compliance with manufacturers fire tested systems is completely unacceptable and avoidable. These ineffective installations include positioning of fire dampers away from the fire resisting wall or floor element which is being penetrated by the duct and fire damper system. It is vital that the fire damper is properly positioned in the plane of the wall or floor, unless tested otherwise, fully in accordance with the manufacturer's instructions,

The existing and frequent level of ineffective installation adds delays and unnecessary costs to those projects affected by such bad installations. Too many examples occur. Universal attention is needed to adhere to best practice methods. Construction managers must ensure that fire dampers and walls are mutually installed in line, to meet the fire performance required and the fire risk strategy for the building.

This guidance attempts to clarify some of the basic principles of installation and at the same time highlight the important responsibilities attached to the ductwork system designer, the local authorities, the ductwork contractor/installer, the main contractor and the contractor installing fire separating walls.

12.2 Compliance with manufacturers instruction

Ensure that all methods of installation not only meet the designer's instructions, the manufacturer's tested/assessed criteria relative to the damper and its functionality, but also the requirements of Building Control authority.

Has the installation method been tested and classified for installation in the intended fire separating element? This will be indicated in the classification and field of application report documents

All parties involved in the installation process should recognise that the final installation may be checked by the designer's inspector or clients' inspection team.

Every method of installation shall be compliant with the fire tested system and classification, or be subject to a site specific appraisal by a suitably qualified person from a notified body.

All fire damper products and installation instructions should be fit for purpose and application.

The responsibility of a successful installation cannot just be passed down to the 'last man in', be it the ductwork contractor, the barrier contractor or the penetration sealing contractor.

NOTE: Since *it is very important to ensure that only tested dampers and installation details are used on site, it is imperative that the installation methods published by the damper manufacturers are applicable to the site conditions. Close liaison between damper manufacturers and installers is essential.*

12.3 Typical issues for successful installation

Conscientious fire damper manufacturers liaise with dry-lining manufacturers to develop effective installation techniques and instructions, such that the fire tested performance can be readily provided.

Nevertheless, a number of site and design related problems can still be identified which may combine to complicate the installation of dampers in walls and floors to tested standards. These problems are summarised as follows:-

i. Current test requirement and standards are in a transient state. Harmonised European fire test and classification systems are being introduced to replace ad hoc BS methods. Understanding the requirements is vital for successful fire damper installations.

ii. Some damper manufactures have limited scope of application of EN classifications for their products.

iii. There is reluctance by some approval bodies to rigorously check fire test and classification data to ensure it is relevant and applicable to the particular case on site.

iv. Incorrect damper frame selection will prevent successful installation.

v. Fire dampers sealed in floors may have to conform to load bearing requirements to allow access for inspection and maintenance through the building

vi. All site personnel must respect the work of others. Splitting an installation into too many packages will threaten the success of the installation.

- The work programme requires integrated installation practices, especially at the outset of a new project, before the services layout has been finalised.
- The accountable persons must be clearly identified for a successful installation.
- There must be adequate coordination between those who form apertures in fire separating elements and those installing and sealing the fire dampers. Duct size and location must be accurately set out.
- Different program sequences are required for drywall and solid wall. In respect to drywall, holes must be provided as the wall is constructed so as to accurately locate studwork positions.

vii. Installation contractors should be trained to understand how fire dampers operate and how different substrates and sealing systems might affect them.

viii. Main contractors may give inadequate consideration to the type of fire-stopping system which is required to complete damper installation. Often the choice is left to a separate untrained subcontractor who carries out work unchecked and jeopardises the entire installation of fire dampers. For more information on this and advice, contact the ASFP who can provide data on third party certificated installation schemes.

ix. Very few people understand the need to install ductwork and dampers to a fire tested method. ASFP strongly recommend that installation packages are only awarded to suitably qualified and certificated installers.

12.4 Installation sequencing

Installation sequence

- Has a job specific programme of sequenced installation activities been prepared that covers the project team involved in the activity
- Are the manufacturer's installation instructions being fulfilled?
- Does the sequence recognise the requirements for each party to ensure that the system designer's detailed requirements can be successfully installed?
- These and other installation issues are addressed in HVCA DW/145

Design approval of on-site alterations

Situations may arise where the tested solution and manufacturer's detailed installation instructions cannot be followed, due to physical constraints on site.

In such cases, rules for direct or extended fields of application of test data may facilitate an acceptable solution. Where this cannot be achieved, then a task specific judgement should be undertaken by a suitably qualified person so that Building Control officials are satisfied that the final solution is reasonable under the circumstances

12.5 Installation check list

An example of an installer's check list is given in DW/145 as published by HVCA.

12.6 Fire-stopping and fire penetration seals

The fire classification of fire resisting ducts or fire damper systems is determined by a harmonised European process of fire test and fire classification. These fire tests include a specified fire stopping system, selected by the damper manufacturer for the duct/fire damper being tested, and should not be replaced by other systems in practice, unless additional test information justifies the change.

13 HANDOVER CHECK LIST

An example of a handover check list is given in DW/145 as published by HVCA.

13.1 Handover information

It is good practice to provide an identifiable list of the location, type and purpose of each fire damper installation in relation to the building records and drawings. Installers may wish to have identification labels at each fire damper.

13.2 Regulation 38 (formerly16B) and provision of fire safety information

Appendix G of the Approved Document B, 2006 Edition, introduced comments on a new Regulation 38 (formerly) 16B of the Building Regulations 2000, which requires that where building work involves the erection or extension of a relevant building, or a relevant change of use of a building, then fire safety information shall be given to the responsible person at the completion of the project, or when the building or extension is first occupied.

- 'Fire safety information' means information relating to the design and construction of the building or extension, and the services, fitting and equipment provided in or in connection with the building or extension, which will assist the responsible person to operate and maintain the building with reasonable safety.
- 'Relevant building' is to which the Regulatory Reform (Fire Safety) Order 2005 applies, or will apply after the work is completed
- 'Responsible person' has the meaning given in Article 3 of the Regulatory Reform (Fire Safety) Order 2005
- Details are provided in Appendix G Approved Document B Volume 2 – Buildings other than dwelling houses.

13.3 Compliant installation & obligations under fire legislation

a) The ASFP wishes to provide a clear signal to the construction industry and H&V industry as a whole, that the ad hoc installation of fire dampers in duct systems at positions which are out of compliance with manufacturers fire tested systems is completely unacceptable and avoidable. These ineffective installations include positioning of fire dampers away from the fire resisting wall or floor element which is being penetrated by the duct and fire damper system. It is vital that the fire damper is properly positioned in the plane of the wall or floor, unless tested otherwise, fully in accordance with the manufacturer's instructions,

b) The existing and frequent level of ineffective installation adds delays and unnecessary costs to those projects affected by such bad installations. Too many examples occur. Universal attention is needed to adhere to best practice methods. Construction managers must ensure that fire dampers and walls are mutually installed in line, to meet the fire performance required and the fire risk strategy for the building.

c) In the case of BS EN European fire tests and classification systems, the system uses formal rules for direct and extended rules for the field of application of test data. Assessments as practiced under previous BS 476 series are not permitted for BS EN Classification systems.

d) Relevant fire protection & prevention information must be provided to the user of the building to allow effective risk assessments to be made and maintained under the duties arising from the Regulatory Reform (Fire Safety) Order 2005. Those who fail to provide such information will be liable in law under Building Regulation 38 (formerly 16B) [also see Approved Document B 2006, Appendix G]. In such cases, the intent of Building Regulations will not have been met, and insurers may be reluctant to provide cover.

e) Without such duties being fulfilled, ASFP/ HVCA suggest that the requirement to meet the occupation clause, such as that which exists under Section 20 Regulation in London, may not be attained,

f) This guidance attempts to clarify some of the basic principles of installation and at the same time highlight the important responsibilities attached to the ductwork system designer, the local authorities, the ductwork contractor/installer, the main contractor and the contractor installing fire separating walls.

14 MAINTENANCE OF FIRE DAMPERS

Adequate access must be provided to fire dampers to enable inspection, maintenance and cleaning. This would normally be in the form of access panels/doors. At least one access point is required for access to the fusible link, but access both sides may be required for cleaning (refer to the relevant ductwork cleaning standards)

Building Regulation 38 (formerly 16B) implies a duty on manufacturers to publish maintenance information for the fire damper. This should include:

- inspection and maintenance procedures;
- recommended frequency of operational checks;
- recommended checks to establish the effects of corrosion.

Regular testing/inspection by suitably qualified personnel shall be undertaken to meet regulatory requirements, such as the Regulatory Reform (Fire Safety) Order 2005, at intervals not exceeding 6 months, or to manufacturers recommendations.

The requirements in BS 9999 (BS 5588-12) should be checked, as these products may form some part of a controlled system that responds to alarms. Some automatic systems may allow more frequent testing (48 hours or less), but physical inspection is still required at the prescribed intervals.

Some systems, where cleanliness is an issue due to site conditions, may require more frequent inspection, testing and cleaning.

All such inspections shall be recorded; a suggested checklist for the above procedure is given below.

15 MAINTENANCE & INSPECTION CHECKLIST FOR FIRE DAMPERS

Operation/task	Result
Damper Reference	
Date of inspection	
Check actuator wiring for damage (where applicable)	
Check end-switch wiring for damage (where applicable)	
Check damper cleanliness and corrosion, clean and repair where necessary	
Check the condition of blades and seals, rectify and report where necessary	
Confirm the safety closure operation of the fire damper according to the manufacturer's instructions	
Confirm operation of damper to OPEN and CLOSE by use of the control system and physical observation of the damper, rectify and report where necessary	
Confirm operation of OPEN and CLOSED end-switches, rectify and report (where necessary)	
Confirm that the damper fulfils its function as part of the control system (where necessary)	
Confirm that the damper is left in its normal working position	

NOTE: A fire damper is usually part of a system. As this is the case the whole system should be checked as governed by the operation and maintenance requirements for the system

16 OTHER INDUSTRY GUIDANCE

A variety of other industry guidance is available in other documents, such as

CIBSE	Guide B2 Ventilation and air conditioning
HVCA	DW/143: 2000 A practical guide to ductwork leakage testing
HVCA	DW/144: 1998 - - Specification for sheet metal ductwork; low medium and high pressure velocity systems (supersedes DW/142)
HVCA	**DW/145: 2009 - Guide to good practice for the installation of fire and smoke dampers**
HVCA	DW/172: 2005 - Standard for kitchen ventilation systems
HVCA	TR/19: 2005 - HVCA Guide to good practice – Internal cleanliness of ventilations systems
SMACNA Sheet Metal and Air Conditioning Contractors National Association, USA	Fire, Smoke and radiation damper installation guide for HVAC systems

17. TRADE ASSOCIATIONS; FIRE TEST & RESEARCH BODIES; FIRE CERTIFICATION BODIES, FIRE CONSULTANTS, ETC

The following organisations may provide appropriate advice:

17.1 Trade Associations

ASFP Association for Specialist Fire Protection
Kingsley House, Ganders Business Park, Kingsley, Bordon, Hampshire GU35 9LU, United Kingdom
t: +44 (0) 1420 471 612 f: +44 (0) 1420 471 611
www.asfp.org.uk

HEVAC
2 Waltham Court, Milley Lane, Hare Hatch, Reading, Berks RG10 9TH
t 0118 940 3416, f 0118 940 6258
www.feta.co.uk

HVCA (Heating and Ventilating Contractors' Association)
Esca House 34 Palace Court, London W2 4JG
t 0207 313 4900, f 0207 727 9268
www.hvca.org.uk

IFSA (Intumescent Fire Seals Association)
20 Park Street, Princess Risborough, Bucks, HP27 9AH
t 01844 276928, f 01844 276928
www.ifsa.org.uk

17.2 Fire test & research bodies

BRE Global
Bucknalls Lane, Watford, Herts WD25 9XX
t 01923 66 4000, f 01923 66 4910
www.bre-global.co.uk

BSRIA
Old Bracknell Lane West, Bracknell, Berks, RG12 7AH
t 01344 465600, f 01344 465626
www.bsria.co.uk

Exova Warringtonfire
Holmesfield Road, Warrington, Cheshire, WA1 2DS
t 01925 655116 f 01925 655419
www.warringtonfire.net

17.3 UKAS Accredited Fire Certification Bodies

The Loss Prevention Certification Board
BRE Global, Bucknalls Lane, Watford, Hertfordshire, WD25 9XX, United Kingdom.
t: +44 (0)1923 664100
Email: enquiries@breglobal.com
Web link: http://www.redbooklive.com

Warrington Certification Ltd
Holmesfield Road, Warrington, Cheshire WA1 2DS
t: +44 (0) 1925 646777
Email: info@warringtonfire.net
Web link: http://www.warringtonfire.net and http://www.warringtoncertification.com/

Chiltern International Fire
Stocking Lane, Hughenden Valley, High Wycombe, Bucks HP14 4ND
t: +44 (0) 1494 569800
Email: cif@chilternfire.co.uk
Web link: http://www.chilternfire.co.uk/contact_us.html

International Fire Consultants Ltd
20 Park Street, Princes Risborough, Buckinghamshire, HP27 9AH.
t: + 44 (0)1844 275 500
Email: ifc@intfire.com
Web link: http://www.intfire.com/sampleform.htm

FM Approvals
1 Windsor Dials, Windsor, Berkshire, UK, SL4 1RS
t: +44 (0) 1753 750 472
Email: richard.zammitt@fmglobal.com
Web: www.fmglobal.com

18 BIBLIOGRAPHY

18.1 BS Standards

BS documents are not applicable under the harmonised European Construction Products Directive [CPD], or under the proposed Construction Products Regulation [CPR]

BS 476: Fire Tests on Building Materials and Structures

Part 4:	1970	Non-combustibility test for materials
	1984	Non-combustibility test for materials
Part 6:	1981	Method of test for fire propagation for products
	1989	Method of test for fire propagation for products
Part 7:	1971	Surface spread of flame test for materials
	1987	Method for classification of the surface spread of flame of products
	1997	Method of test to determine the classification of the surface spread of flame of products
Part 11:	1982	Method for assessing the heat emission from building materials
	1988	Method for assessing the heat emission from building materials
Part 20:	1987	Method for determination of the fire resistance of Elements of construction (general principles)
Part 22:	1987	Methods for determination of the fire resistance of non-load bearing elements of construction
Part 24:	1987	Method for determination of the fire resistance of ventilation ducts (ISO 6944)

BS 5588: Fire Precautions in the Design, Construction and Use of Buildings

Part 0:	1996	Guide to fire safety codes of practice for particular premises / applications
Part 1:	1990	Code of practice for residential buildings
Part 4:	1998	Code of practice for smoke control using pressure differentials
Part 5:	2004	Access and facilities for fire-fighting
Part 6:	1991	Code of practice for places of assembly [with amendments 1998, 1999 and 2004]
Part 7:	1997	Code of practice for the incorporation of atria in buildings [with amendments 1 & 2]
Part 8:	1999	Code of practice for means of escape for disabled people [with Amendment 1]
Part 9:	1999	Code of practice for ventilation and air conditioning ductwork.
Part 10:	1991	Code of practice for shopping complexes [Incorporating amendment 1]
Part 11:	1997	Code of practice for shops, offices, industrial, storage and other similar buildings [incorporating Amendments 1, 2 and 3]
Part 12:	2004	Managing fire safety

BS 5669 *for impact test information*

BS 7346 Components for smoke and heat control systems;

Part 2:	1990	Specification for powered smoke and heat exhaust ventilators

BS 8313: 1989 Code of practice for accommodation of building services in ducts.

BS 9999: 2008 Code of practice for fire safety in the design, management and use of buildings

18.2 BS ISO standards (International Organisation for Standardisation)

ISO 834: Fire resistance tests – Elements of building construction

ISO 834-1:1999 Fire resistance tests – Elements of building construction:
Part 1 General requirements

ISO 6944-1 Fire Resistance Tests – Elements of building construction:
Part 1 Ventilation ducts

ISO 6944-2 Fire resistance tests – Elements of building construction:
Part 2 Kitchen extract ducts

ISO 9000: 2000 Quality management systems – Fundamentals and vocabulary

ISO 9001: 2000 Quality management systems – Requirements

BS ISO 10294 Fire Resistance tests - Fire dampers for air distribution systems

Part 1: 1996 - Test method.
Part 2: 1999 – Classification, criteria & field of application of test results
Part 3: 1999 – Guidance on the test method
Part 4: 2001 – Test of thermal release mechanism
Part 5: 2005 – Intumescent fire dampers

18.3 BS EN Standards

BS EN 1366	**Fire resistance tests for service installation** -	
BS EN 1366-1	Part 1	Ducts
BS EN 1366-2	Part 2	Fire dampers
BS EN 1366-3	Part 3	Penetration seals
BS EN 1366-8	Part 8	Multi compartment smoke extraction ducts
BS EN 1366-9	Part 9	Single compartment smoke extraction ducts
BS EN 1366-10	Part 10	Smoke control dampers

BS EN 1751 Ventilation for buildings- Air terminal Devices – Aerodynamic testing of dampers and valves

BS EN 12101-7 **Smoke and heat control systems:** Part 7: Smoke control ducts
BS EN 12101-Y Smoke and heat control systems: Part y: Fire resisting ducts
BS EN 12101-8 Smoke and heat control systems: Part 8: Smoke control dampers

EN 13501: **Fire classification of construction products and building elements:**
Part 1: Classification using data from reaction to fire tests
Part 2: Classification using data from fire resistance tests, excluding ventilation services
Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers
Part 4: Classification using data from fire resistance test on components of smoke control systems

BS EN 15882-1 Extended application of test results for fire resistance tests for service installations: Part 1 – Ducts
BS EN 15882-2 Extended application of test results for fire resistance tests for service installations: Part 2 - Fire dampers
BS EN 15882-x Extended application of test results for fire resistance tests for service installations: Part x - Smoke control dampers BS EN 15882–xx Extended application of test results for fire resistance tests for service installations: Part xx - Smoke extraction ducts

BS EN 15650 Fire dampers

19 CRITERIA OF ACCEPTABILITY OF PRODUCT FIRE TEST DATA FOR INCLUSION IN THE PRODUCT DATA ENTRIES

LEVEL OF ENTRY

The European version of the ASFP 'Grey Book 2nd Edition- Volume 1' makes provision for data sheets based on harmonised BS EN test and classification methods, agreed for use across Europe.

For acceptance in this ASFP publication, the product data is all subject to 3rd party product certification as a basic condition of entry, and Rules 1 to 5 as stated below.

GENERAL

These rules supplement the procedure for ASFP members to submit product data sheet entries for inclusion in ASFP Publications, as provided in ASFP document TCOM 09_38.

The claims in the product data sheets will be confirmed by a relevant 3rd party Certification Body. The claims made must also satisfy the criteria in Rules 1 to 5 as listed below, and as Section 1 of this publication. All claims will be based on EN Fire Resistance classification and test methods, to enable specific UK Regulatory requirements to be satisfied.

It should be noted that, at the time of writing, the proposed European Community's Construction Products Regulation, the CPR, may demand mandatory compliance with BS EN standards around mid 2012. When that happens, BS 476 based data will only be applicable for non-CPR applications for construction products

RULE 1 –PRIMARY DATA

[a] Submissions for data entry into the ASFP 'Grey Book' for fire resisting dampers and leakage rated fire dampers shall be made for products covered by product standard EN 15650 in accordance with classification system EN 13501-3 for [a] fire resisting dampers and [b] leakage classified fire dampers respectively. The classification system calls up the EN 1366-2 fire test method for 'conventional fire dampers' and is expected to included EN 1366-XX for fire dampers containing intumescent components.

[b] Depending on the scope of subsequent amendments, test data from relevant prEN standards may also be considered suitable for classification purposes, as determined by CEN TC127.

RULE 2 – SECONDARY DATA

Data obtained from a relevant prEN test or national test method may be used as supplementary evidence by the Certification Body.

RULE 3 – THIRD PARTY PRODUCT CERTIFICATION SCHEMES

For inclusion into this publication, fire resisting products must be certificated under a UKAS accredited product certification scheme (ISO Guide 65) covering the test data required in Rule 1.

RULE 4 – DIRECT AND EXTENDED FIELDS OF APPLICATION

The field of application for the classification obtained from test data can fall into two cases, direct or extended fields of application.

The rules for direct field of application are provided in the test standard EN 1366-2 and EN 1366-xx for intumescent fire dampers. Rules for extended application are confined to those agreed within EN 15882-2 for 'conventional' fire dampers and within EN 15882-xx for fire dampers incorporating intumescent components. The classification report will provide the agreed scope of application.

RULE 5 – UNCERTAINTY OF DATA

The ASFP Technical Review Panel will determine acceptability where ANY uncertainty exists.

SMOKE CONTROL DAMPERS

The fire performance of smoke control dampers will be discussed in Volume 2 of this publication which is in preparation at the time of writing.

20 FIRE DAMPER PRODUCT FIRE RESISTING DATA ENTRIES

Details on specific fire damper products will be progressively added to the data entry list as manufacturers complete and submit the relevant test and classification information in accordance with Section 19.

List of Product Data Sheets

BSB Engineering Services Ltd

BSB FSD-TD-AF AND FD-AF

BSB FSD-TD-BF AND FD-BF

BSB FSD-TD-CL AND FD-CL

BSB FSD-TD-HF AND FD-HF

Actionair Ruskin Air Management Ltd

Smoke Shield (AA/F10700)

Fire Shield (AA/F10701)

Smoke Shield (AA/F10702)

Fire Shield (AA/F10703)

Smoke Shield (AA/F10704)

Fire Shield (AA/F10705)

Smoke Shield (AA/F10706)

Fire Shield (AA/F10707)

Smoke Shield (AA/F10708)

Fire Shield (AA/F10709)

Smoke Shield (AA/F10710)

Fire Shield (AA/F10711)

Smoke Shield (AA/F10712)

Fire Shield (AA/F10713)

Smoke Shield (AA/F10714)

Fire Shield (AA/F10715)

Smoke Shield (AA/F10716)

Fire Shield (AA/F10717)

CSS (AA/F10708)

CSS (AA/F10719)

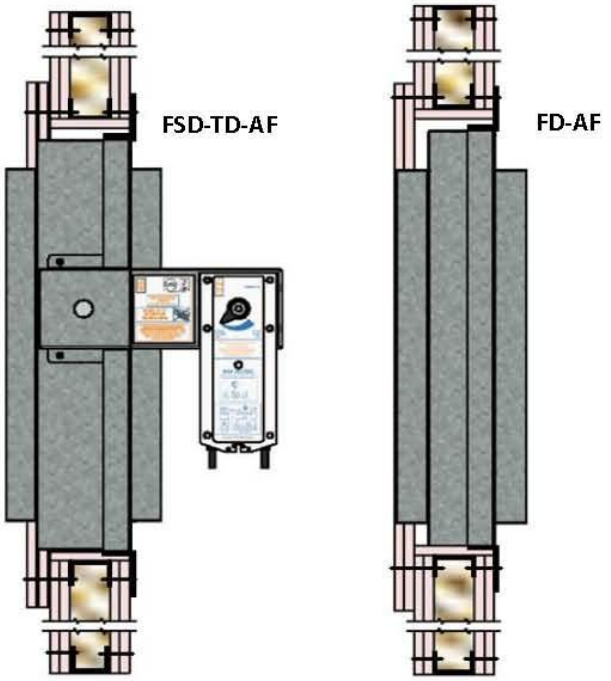
CSS (AA/F10720)

CSS (AA/F10721)

CSS (AA/F10722)

INFORMATION SHEET FOR FIRE DAMPER INSTALLATION METHOD

DRY WALL - ANGLE FRAME



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	BSB	
PRODUCT REFERENCE:	FSD-TD-AF	FD-AF
ASFP UNIQUE REFERENCE NUMBER (URN):		

TESTED / ASSESSED TO:	EN1366-2	EN1366-2
TEST REPORT / ASSESSMENT REFERENCE:	BRE 260152+3 / CC261450	BRE CC261451
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120min	-
FIRE RESISTANCE (INTEGRITY ONLY)	120min	120min
CLASSIFICATION TO BS ISO 10294-2	ES120	E120
MAXIMUM SIZE:	1200 x 1200	1200 x 1000
MINIMUM SIZE:	100 x 100	100 x 100

SEPARATING ELEMENT:	Drywall
MANUFACTURER'S INSTALLATION REFERENCE:	AF (Angle Frame)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	828a
BS EN ISO 9001 CERTIFICATION REFERENCE:	828
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162

MANUFACTURER:	BSB Engineering Services Ltd
ADDRESS:	Unit E, Tribune Drive
	Trinity Trading Estate
	Sittingbourne
	Kent
POSTCODE:	ME10 2PD
TELEPHONE:	01795 422609
FAX:	01795 429543
WEBSITE:	www.bsb-dampers.co.uk
CONTACT EMAIL:	sales@bsb-dampers.co.uk

NOTES:

1: The information in this datasheet is intended to allow simple differentiation between products and product claims.

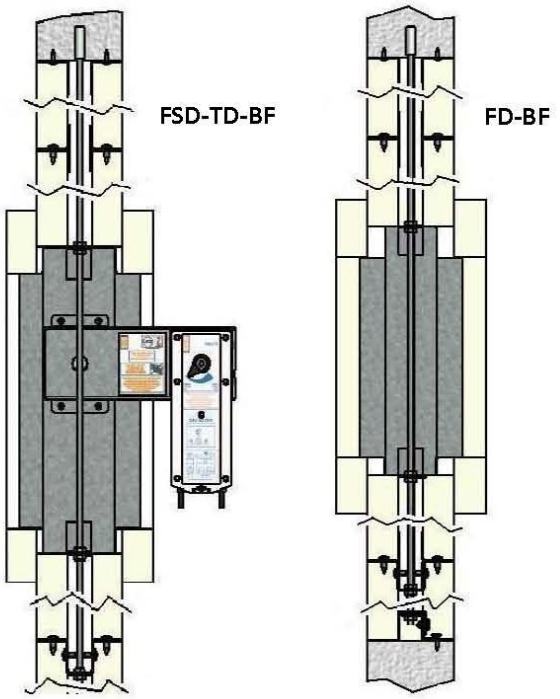
2: Contact the manufacturer/supplier for product availability and the full correct installation details. They may also have further details in terms of additional testing and other supporting information.

3: At the time of writing these tables, the European standard EN 15882-2, Extended application of results from fire resistance tests for service installations – Part 2: Fire dampers, has not been published. Therefore, for this publication, variations on the tested systems have been included if they have been assessed by a suitably qualified independent body and approved by a recognised third party certification body. As these assessed systems are not in accordance with a published European Standard it is not possible to classify them in accordance with BS EN 13501-3: 2005. Confirm any classifications direct with the manufacturer.

4: If your proposed installation method has minor variations to that shown please confirm acceptance with the local Building Control Authority (BCA) before proceeding. Manufacturers/Suppliers/ASFP are not able to "approve" specific installations.

INFORMATION SHEET FOR FIRE DAMPER INSTALLATION METHOD

BATT WALL - BATT FRAME



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	BSB	
PRODUCT REFERENCE:	FSD-TD-BF	FD-BF
ASFP UNIQUE REFERENCE NUMBER (URN):		

TESTED / ASSESSED TO:	EN1366-2	EN1366-2
TEST REPORT / ASSESSMENT REFERENCE:	BRE 254506 / CC261450	BRE CC261451
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120min	-
FIRE RESISTANCE (INTGERITY ONLY)	120min	120min
CLASSIFICATION TO BS ISO 10294-2	ES120	E120
MAXIMUM SIZE:	1000 x 1000	1200 x 1000
MINIMUM SIZE:	100 x 100	100 x 100

SEPARATING ELEMENT:	Batt Wall / Batt Infill
MANUFACTURER'S INSTALLATION REFERENCE:	BF (Batt Frame)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	828a
BS EN ISO 9001 CERTIFICATION REFERENCE:	828
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162

MANUFACTURER:	BSB Engineering Services Ltd
ADDRESS:	Unit E, Tribune Drive
	Trinity Trading Estate
	Sittingbourne
	Kent
POSTCODE:	ME10 2PD
TELEPHONE:	01795 422609
FAX:	01795 429543
WEBSITE:	www.bsb-dampers.co.uk
CONTACT EMAIL:	sales@bsb-dampers.co.uk

NOTES:

1: The information in this datasheet is intended to allow simple differentiation between products and product claims.

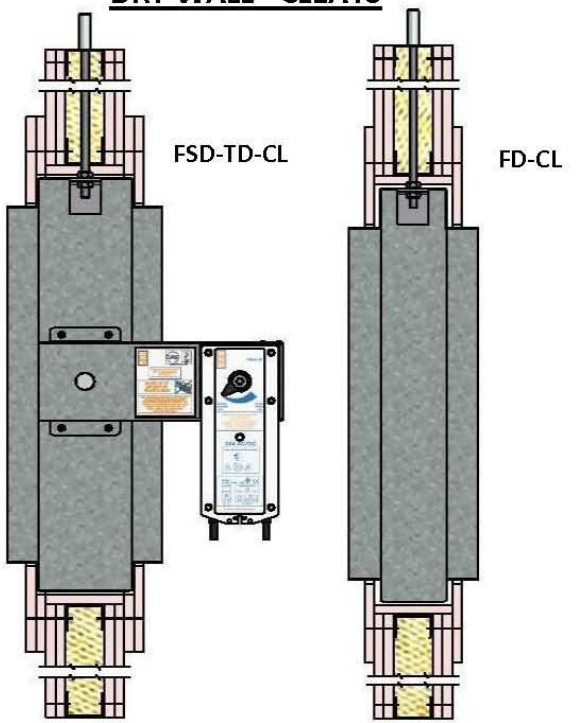
2: Contact the manufacturer/supplier for product availability and the full correct installation details. They may also have further details in terms of additional testing and other supporting information.

3: At the time of writing these tables, the European standard EN 15882-2, Extended application of results from fire resistance tests for service installations – Part 2: Fire dampers, has not been published. Therefore, for this publication, variations on the tested systems have been included if they have been assessed by a suitably qualified independent body and approved by a recognised third party certification body. As these assessed systems are not in accordance with a published European Standard it is not possible to classify them in accordance with BS EN 13501-3: 2005.

4: If your proposed installation method has minor variations to that shown please confirm acceptance with the local Building Control Authority (BCA) before proceeding. Manufacturers/Suppliers/ASFP are not able to "approve" specific installations.

INFORMATION SHEET FOR FIRE DAMPER INSTALLATION METHOD

DRY WALL - CLEATS



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	BSB	
PRODUCT REFERENCE:	FSD-TD-CL	FD-CL
ASFP UNIQUE REFERENCE NUMBER (URN):		

TESTED / ASSESSED TO:	EN1366-2	EN1366-2
TEST REPORT / ASSESSMENT REFERENCE:	BRE 256075 / CC261450	BRE CC261451
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120min	-
FIRE RESISTANCE (INTEGRITY ONLY)	120min	120min
CLASSIFICATION TO BS ISO 10294-2	ES120	E120
MAXIMUM SIZE:	1000 x 1000	1200 x 1000
MINIMUM SIZE:	100 x 100	100 x 100

SEPARATING ELEMENT:	Dry wall
MANUFACTURER'S INSTALLATION REFERENCE:	CL (Cleats)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	828a
BS EN ISO 9001 CERTIFICATION REFERENCE:	828
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162

MANUFACTURER:	BSB Engineering Services Ltd
ADDRESS:	Unit E, Tribune Drive
	Trinity Trading Estate
	Sittingbourne
	Kent
POSTCODE:	ME10 2PD
TELEPHONE:	01795 422609
FAX:	01795 429543
WEBSITE:	www.bsb-dampers.co.uk
CONTACT EMAIL:	sales@bsb-dampers.co.uk

NOTES:

1: The information in this datasheet is intended to allow simple differentiation between products and product claims.

2: Contact the manufacturer/supplier for product availability and the full correct installation details. They may also have further details in terms of additional testing and other supporting information.

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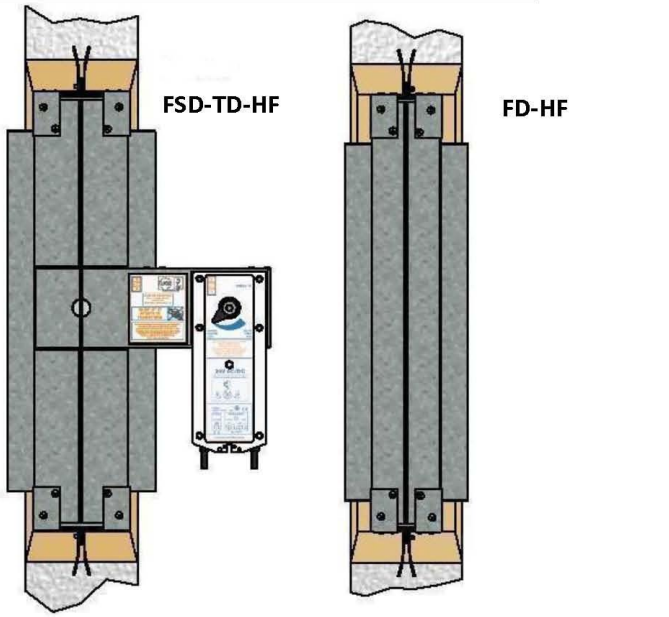
INFORMATION SHEET FOR FIRE DAMPER INSTALLATION METHOD

BLOCK/MASONRY WALL - HEVAC FRAME



HORIZONTAL (FLOOR) INSTALLATIONS ARE ALSO APPLICABLE

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	BSB	
PRODUCT REFERENCE:	FSD-TD-HF	FD-HF
ASFP UNIQUE REFERENCE NUMBER (URN):		

TESTED / ASSESSED TO:	EN1366-2	EN1366-2
TEST REPORT / ASSESSMENT REFERENCE:	BRE 256538 / CC261450	BRE 201633 / CC261451
FIRE RESISTANCE (INTEGRITY & LEAKAGE):	240min	-
FIRE RESISTANCE (INTEGRITY ONLY)	240min	240min
CLASSIFICATION TO BS ISO 10294-2	ES240	E240
MAXIMUM SIZE:	1000 x 1000	1200 x 1000
MINIMUM SIZE:	100 x 100	100 x 100

SEPARATING ELEMENT:	Block / Masonry wall
MANUFACTURER'S INSTALLATION REFERENCE:	HF (Hevac Frame)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	828a
BS EN ISO 9001 CERTIFICATION REFERENCE:	828
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162

MANUFACTURER:	BSB Engineering Services Ltd
ADDRESS:	Unit E, Tribune Drive
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	Sittingbourne
	Kent
POSTCODE:	ME10 2PD
TELEPHONE:	01795 422609
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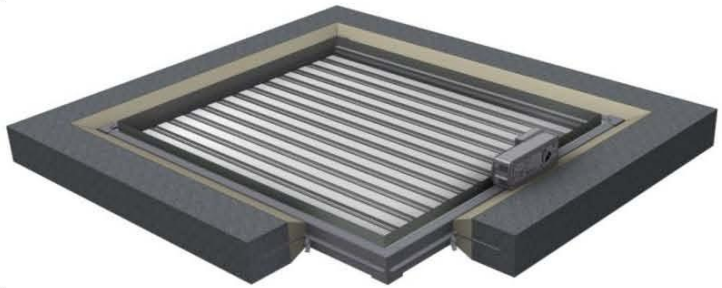
INFORMATION SHEET FOR FIRE DAMPER



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10700)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 231740
FIRE RESISTANCE (INTEGRITY ONLY)	240 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See notes
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E240 ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Concrete floor
MANUFACTURER'S INSTALLATION REFERENCE:	I/F (Installation Frame)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
ADDRESS:	South Street
	Whitstable
	Kent
	England
POSTCODE:	CT5 3DU
TELEPHONE:	01227 276100
FAX:	01227 264262
WEBSITE:	www.actionair.co.uk
CONTACT EMAIL:	sales@actionair.co.uk

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5: BS ISO 10294:2 1999 Classification: Leakage limited $m^3/(h.m^2)$ **E** = 360 **ES** = 200 **EI** = 360 Temp rise limit °C mean/max 140/180 **EIS** = 200 Temp rise limit °C mean/max 140/180 (Note: **I** - insulation rating, not required by legislation for dampers in the UK)

INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10701)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 209934
FIRE RESISTANCE (INTEGRITY ONLY)	240 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	n/a
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E240

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	concrete floor
MANUFACTURER'S INSTALLATION REFERENCE:	I/F (Installation Frame)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
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5: BS ISO 10294:2 1999 Classification: Leakage limited $m^3/(h.m^2)$ **E** = 360 **ES** = 200 **EI** = 360 Temp rise limit °C mean/max 140/180 **EIS** = 200 Temp rise limit °C mean/max 140/180 (Note: **I** - insulation rating, not required by legislation for dampers in the UK)

INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10702)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 259933 & BRE CC270714
FIRE RESISTANCE (INTEGRITY ONLY)	240 Minutes with wall pockets
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120minutes without wall pockets
CLASSIFICATION TO EN 13501:	see note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E240 ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Masonry wall
MANUFACTURER'S INSTALLATION REFERENCE:	I/F (Installation Frame)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
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5: BS ISO 10294:2 1999 Classification: Leakage limited $m^3/(h.m^2)$ **E** = 360 **ES** = 200 **EI** = 360 Temp rise limit °C mean/max 140/180 **EIS** = 200 Temp rise limit °C mean/max 140/180 (Note: **I** - insulation rating, not required by legislation for dampers in the UK)

INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10703)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 231739 and BRE 267925
FIRE RESISTANCE (INTEGRITY ONLY)	240 Minutes with wall pockets 120Minutes without wall pockets
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	N/A
CLASSIFICATION TO EN 13501:	see note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E120 & E240

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	Masonry Wall
MANUFACTURER'S INSTALLATION REFERENCE:	I/F (Installation Frame)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
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INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10704)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 256493
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	see note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See note	ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Dry wall
MANUFACTURER'S INSTALLATION REFERENCE:	DWFX-F
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
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	Kent
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INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10705)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 259932
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	N/A
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E120

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	Dry wall
MANUFACTURER'S INSTALLATION REFERENCE:	DWFX-F
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
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INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10706)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714A
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	see note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Masonry wall
MANUFACTURER'S INSTALLATION REFERENCE:	DWFX-F
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

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INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10707)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714B
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	N/A
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E120

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	Masonry wall
MANUFACTURER'S INSTALLATION REFERENCE:	DWFX-F
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
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INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10708)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 231741
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Dry wall
MANUFACTURER'S INSTALLATION REFERENCE:	DWFX-C
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

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CONTACT EMAIL:	sales@actionair.co.uk

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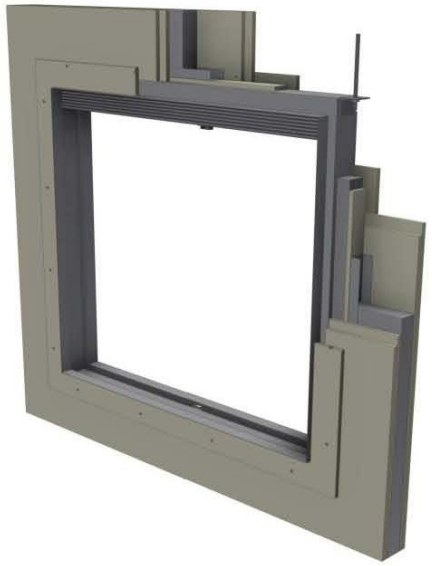
INFORMATION SHEET FOR FIRE DAMPER



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10709)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC260846
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	N/A
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E120

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	Dry wall
MANUFACTURER'S INSTALLATION REFERENCE:	DWFX-C
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
ADDRESS:	South Street
	Whitstable
	Kent
	England
POSTCODE:	CT5 3DU
TELEPHONE:	01227 276100
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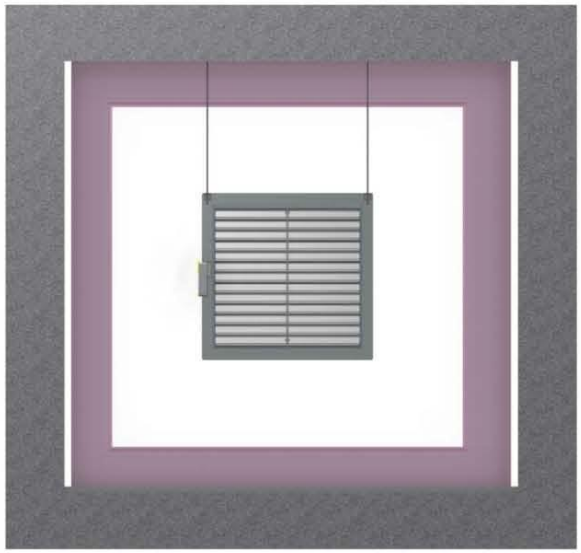
INFORMATION SHEET FOR FIRE DAMPER



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10710)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 267924
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Dry wall & Rockwool Ablative BATT
MANUFACTURER'S INSTALLATION REFERENCE:	S&A (Sleeve & Angle)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

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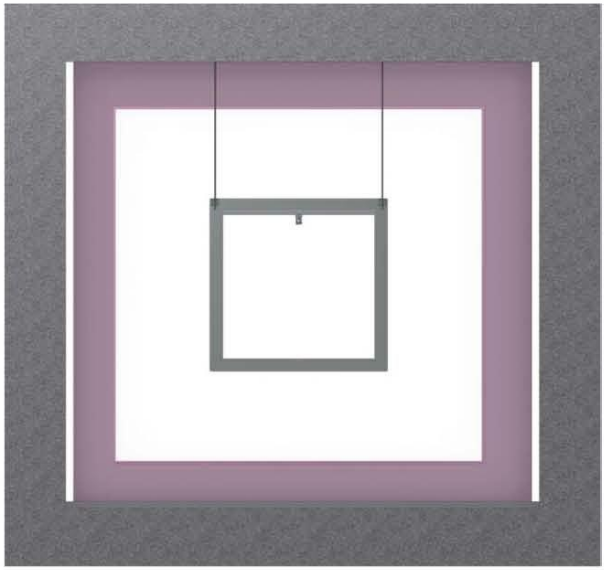
INFORMATION SHEET FOR FIRE DAMPER



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10711)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714B
FIRE RESISTANCE (INTEGRITY ONLY)	120 minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	N/A
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	Dry wall & Rockwool Ablative BATT
MANUFACTURER'S INSTALLATION REFERENCE:	S&A (Sleeve & Angle)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

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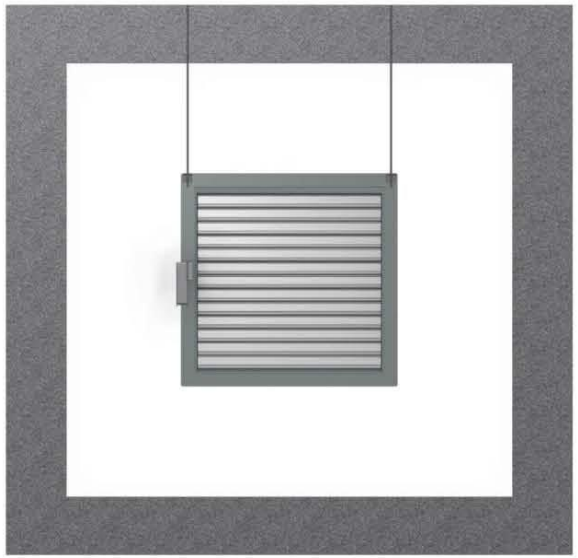

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10712)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714A
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Masonry wall & Rockwool Ablative BATT
MANUFACTURER'S INSTALLATION REFERENCE:	S&A (Sleeve & Angle)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
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PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

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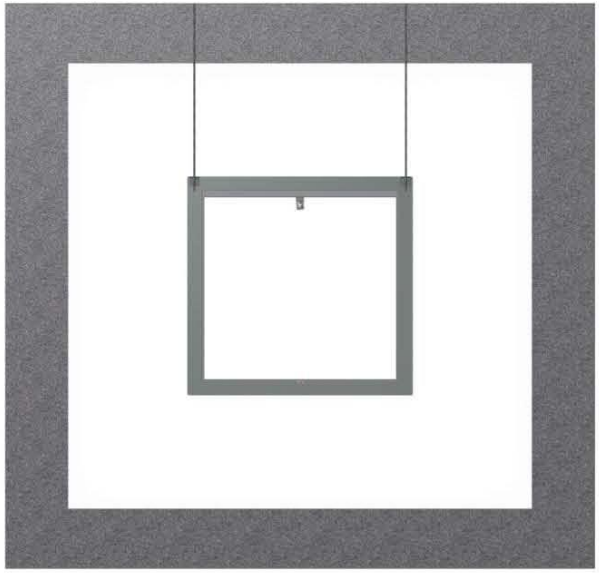

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10713)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714B
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	N/A
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E120

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	Masonry wall & Rockwool Ablative BATT
MANUFACTURER'S INSTALLATION REFERENCE:	S&A (Sleeve & Angle)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
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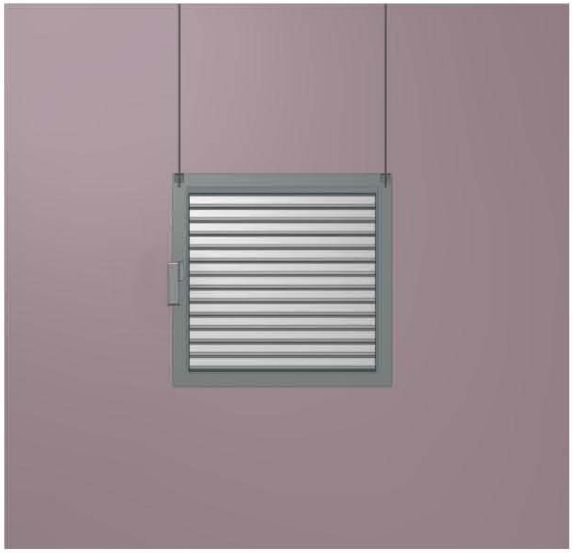

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10714)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714A
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Dry Wall
MANUFACTURER'S INSTALLATION REFERENCE:	S&A (Sleeve & Angle)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

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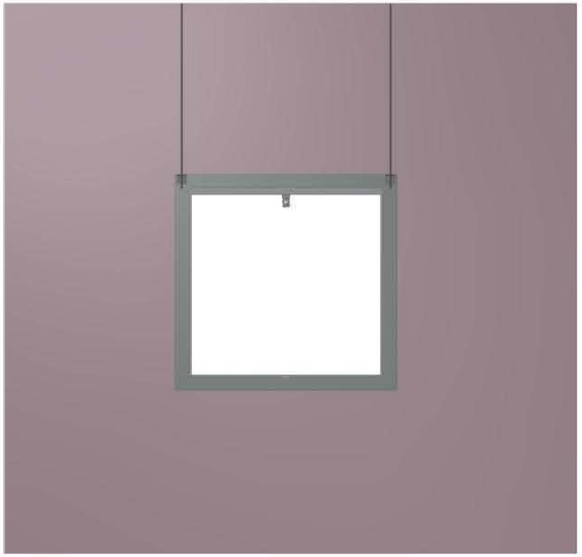

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10715)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714B
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	N/A
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E120

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	Dry wall
MANUFACTURER'S INSTALLATION REFERENCE:	S&A (Sleeve & Angle)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
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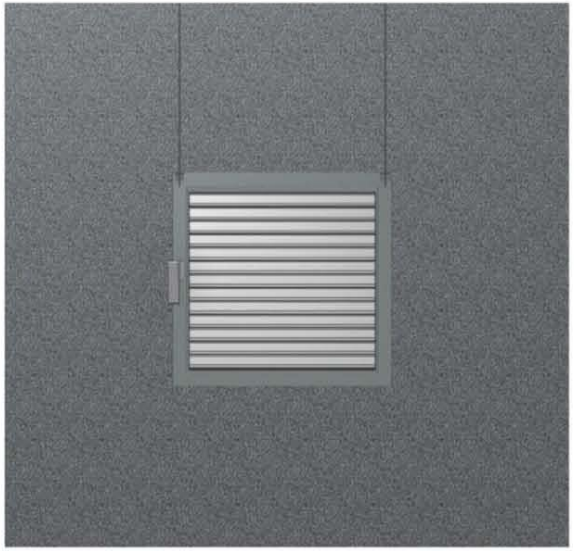
INFORMATION SHEET FOR FIRE DAMPER



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Smoke Shield (AA/F10716)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714A
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	1000 x 1000
MINIMUM SIZE:	200 x 200

SUPPORTING CONSTRUCTION:	Masonry Wall
MANUFACTURER'S INSTALLATION REFERENCE:	S&A (Sleeve & Angle)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 04
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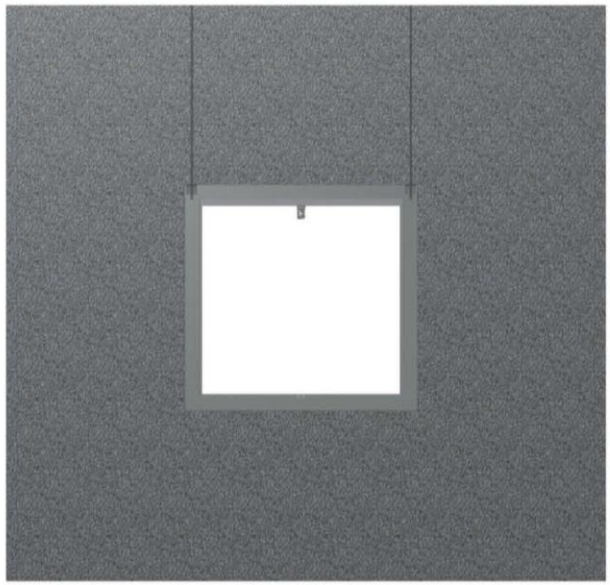

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	Fire Shield (AA/F10717)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714B
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	N/A
CLASSIFICATION TO EN 13501:	See note 3
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	E120

MAXIMUM SIZE:	1250 x 1000
MINIMUM SIZE:	100 x 100

SUPPORTING CONSTRUCTION:	Masonry wall
MANUFACTURER'S INSTALLATION REFERENCE:	S&A (Sleeve & Angle)
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 01
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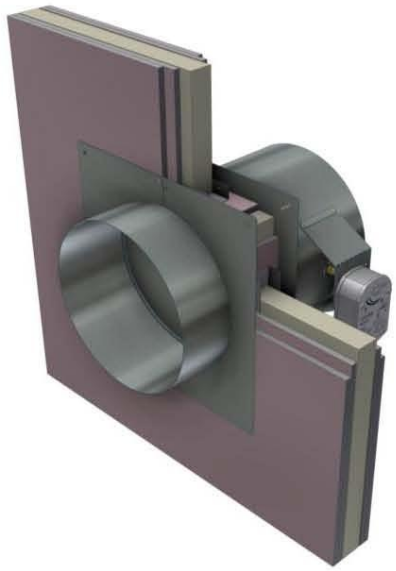
INFORMATION SHEET FOR FIRE DAMPER



INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	CSS (AA/F10718)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 238072
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See notes
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	Ø350mm
MINIMUM SIZE:	Ø100mm

SUPPORTING CONSTRUCTION:	Dry wall
MANUFACTURER'S INSTALLATION REFERENCE:	CSS Dry wall
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 05
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
ADDRESS:	South Street
	Whitstable
	Kent
	England
POSTCODE:	CT5 3DU
TELEPHONE:	01227 276100
FAX:	01227 264262
WEBSITE:	www.actionair.co.uk
CONTACT EMAIL:	sales@actionair.co.uk

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INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	CSS (AA/F10719)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE 246994
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See notes
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	Ø350mm
MINIMUM SIZE:	Ø100mm

SUPPORTING CONSTRUCTION:	Concrete floor
MANUFACTURER'S INSTALLATION REFERENCE:	CSS Concrete floor
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 05
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
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INFORMATION SHEET FOR FIRE DAMPER

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	CSS (AA/F10720)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714C
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See notes
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	Ø350mm
MINIMUM SIZE:	Ø100mm

SUPPORTING CONSTRUCTION:	Masonry wall
MANUFACTURER'S INSTALLATION REFERENCE:	CSS Masonry wall
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 05
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

MANUFACTURER:	Actionair Ruskin Air Management LTD
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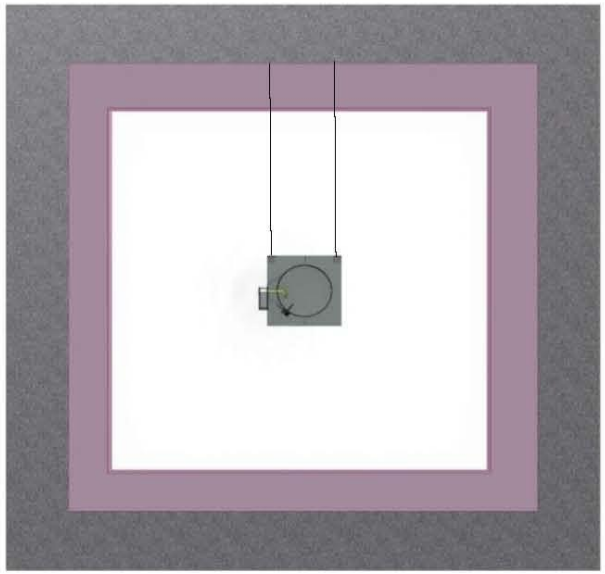

INDICATIVE FIGURE:
SEE MANUFACTURER'S/SUPPLIER'S INFORMATION FOR FULL INSTALLATION DETAILS

MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	CSS (AA/F10721)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714C
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See notes
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	Ø350mm
MINIMUM SIZE:	Ø100mm

SUPPORTING CONSTRUCTION:	Dry wall & Rockwool Abaltive Batt
MANUFACTURER'S INSTALLATION REFERENCE:	CSS
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 05
BS EN ISO 9001 CERTIFICATION REFERENCE:	17 issue 13
PRODUCT CERTIFICATION SPECIFICATION:	LPS 1162 (issue 4)

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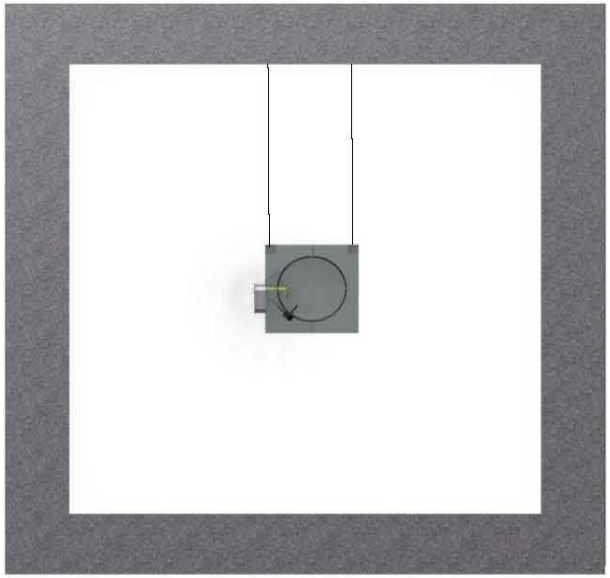

INDICATIVE FIGURE:
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MANUFACTURER/SUPPLIER:	Actionair Ruskin Air Management LTD
PRODUCT REFERENCE:	CSS (AA/F10722)

TESTED / ASSESSED TO BS EN1366-2	YES
TEST REPORT / ASSESSMENT REFERENCE:	BRE CC270714C
FIRE RESISTANCE (INTEGRITY ONLY)	120 Minutes
FIRE RESISTANCE (INTEGRITY & LEAKAGE)	120 Minutes
CLASSIFICATION TO EN 13501:	See notes
CLASSIFICATION TO BS ISO 10294:2 1999 (See notes)	ES120

MAXIMUM SIZE:	Ø350mm
MINIMUM SIZE:	Ø100mm

SUPPORTING CONSTRUCTION:	Masonry & Rockwool Abaltive Batt
MANUFACTURER'S INSTALLATION REFERENCE:	CSS
THIRD PARTY CERTIFICATION BODY:	LPCB
PRODUCT CERTIFICATION REFERENCE:	017A / 05
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