Smoke Control in Apartment Buildings
INTRODUCTION

This brochure is intended to provide an understanding of how smoke control systems can protect multi-storey residential buildings and what the legislative framework is.

Why provide smoke control in apartment buildings?

- In multi-storey apartment buildings, the main escape route is always via common corridors and/or lobbies to protected stairs.
- Smoke can easily spread from the accommodation, and if a door is simply left open for a short period of time quickly fill a corridor or lobby, making escape difficult for occupants.
- Smoke entering the stairs can also make escape difficult for occupants of higher storeys.
- In taller buildings the fire and rescue services need clear access to stairs and lobbies to form a bridgehead for operations, using a fire fighting shaft which is protected from smoke.

Legislation and standards

The legislative requirements derive from the Building Regulations for England and Wales (2000). Detailed recommendations to meet these requirements are provided in Approved Document B (ADB). Please note that the Building Regulations for Scotland and Northern Ireland vary in some details.

These requirements depend upon the height of the building. For buildings under 18m high, smoke control systems are required to be designed for the means of escape (MOE) of the occupants. The most relevant standard is BS 5588 -1: 1990: Code of practice for residential buildings. See pages 4 to 5 of this leaflet.

Above 18m, which is the higher than the reach of a fire service appliance, most types of buildings must contain a fire-fighting core with at least one fire-fighting lift. This also applies in basements more than 10m deep. Fire-fighting cores without a lift are required where there are 2 or more basements each exceeding 900 m². The most relevant standard is BS 5588 -5: 2004: Access and facilities for fire-fighting. See page 6 of this leaflet.

These two approaches are explained in the following pages.

The design approaches

The design approach depends largely upon the building layout.

Openable ventilators or windows (OVs) or automatically opening ventilators (AOVs) may be used to evacuate smoke where common stairs, corridors or lobbies extend to external walls.

Where corridors or lobbies are enclosed, ventilation shafts with dampers or fire doors and natural or powered ventilators may be used to evacuate smoke.

Pressurisation systems are an alternative method that protect escape routes and fire-fighting cores against the ingress of smoke by maintaining the pressure within the escape route at a higher pressure than that in the adjacent spaces. See pages 18 to 19 of this leaflet.
1. The Postbox Apartments, Birmingham.
   Window actuators, smoke dampers, stairwell ventilators, car park ventilation.

2. The Centrium, Woking. (as above).

3. Castlegate House, Manchester.
   Doorman door actuators, stairwell ventilators.

4. The Centrium, Woking. (as above).

5. Bridgewater Place, Manchester.
   Doorman door actuators, stairwell ventilators.

   Window actuators, stairwell ventilators.

7. Hardy’s Development, Manchester.
   Doorman door actuators, stairwell ventilators.
MEANS OF ESCAPE

Where an outside wall is adjacent to common stairs, lobbies and corridors:

Where a corridor has no dead end, a 1m² openable window (OV) is required.
Where a corridor has a dead end, a 1.5m² automatically opening vent (AOV) is required.

In Figure A the corridor is divided by a fire door. Since each length of corridor has a dead end, each end must be fitted with an AOV.

In Figure B only one AOV is required since the corridor is not divided by fire doors.

Stairs require either a 1m² remote operated OV at the head of the stairwell, or a 1m² OV at each storey.

KEY TO ALL FIGURES

- Stairwell Ventilator
- AOV
- Self Closing Fire Door
- Smoke Shaft
- Apartment
- Corridor/Lobby
- Smoke Damper

Figure A  Figure B
**Where an outside wall is not available:**

Modern buildings rarely have corridors extended to outside walls, as described above, since developers want to maximise lettable or saleable space.

Figures C and D show a case where apartments open onto an enclosed corridor. This needs an alternative approach. One option is to build a horizontal shaft incorporating a 1.5m² AOV at one end, as shown in figure C, which is described in ADB. Smoke flows along the shaft and out via the external wall mounted ventilator.

An option that is not described in ADB but which is commonly used nowadays is a single vertical smoke shaft serving all levels as shown in figure D. This option can save space and cost compared to other options. Smoke enters the shaft either through an openable smoke damper or fire door, which is opened on receipt of the fire alarm signal.

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The smoke dampers or doors on the other levels remain shut, preventing the ingress of smoke into these areas.

At the top of the shaft there is a natural ventilator through which smoke is exhausted to atmosphere. Until recently it was common practice to provide an inlet at the base of the shaft for replacement air, but recent research by BRE (project report 213179) has shown that this is not necessary. Shaft systems using extract fans may also be used to allow space saving by use of a smaller shaft.
Fire-fighting cores provide smoke free access to the upper floors of a building and allow the fire fighters to attack the fire from a position of relative safety.

Fire-fighting cores include the following elements:

- A protected staircase
- A protected lobby
- A fire-fighting lift (not for shallow basements)

Note that for apartment buildings the protected lobby is not necessary and a normal protected corridor will suffice.

See figure E for a typical fire-fighting core layout.

Where an outside wall is adjacent to stairs and lobbies:

- A 1m² OV is required to each lobby.
- A 1m² OV is required to the stairs at each storey or a 1.5m² remote operated OV at the head of the stairs.

Where an outside wall is not available:

A vertical shaft system is usually used to ventilate the lobbies, consisting of either a conventional shaft, a BRE shaft or a mechanical shaft design.

A vent is also required at the head of the stairs; its type and size is dependent upon the type of shaft used to ventilate the lobbies.

The standard shaft

The standard smoke shaft as recommended in BS 5588 Part 5: 2004 comprises a shaft with a minimum cross sectional area of 3m². The shaft is terminated with an AOV to provide weather proofing when closed. At the bottom the shaft is open, or has an automatically opening ventilator or fire damper to the outside with a minimum free area of 1.5m².

At each storey an automatically controlled fire rated smoke damper or fire door is connected from high level in the lobby to the shaft, providing an air flow path from the lobby to the shaft. Each damper or door has a minimum free area of 1.5m².

Figure E

Neville House, London.
Dampers, architectural grilles, stairwell ventilators, car park ventilation.
In automatic mode, the system is activated by the building fire detection system or a dedicated fire detection system incorporating smoke detectors in the accommodation adjacent to each door into the fire fighting core and supplied as part of the ventilation system. The detection system has the capability of distinguishing on which storey the fire occurs and providing a dedicated output for each storey. A break glass switch is also provided in the lobby on each storey for manual activation.

Under fire conditions the damper or door on the fire floor as well as the AOV open. The dampers or doors on all other storeys remain closed. The stair is ventilated by either a 1m$^2$ OV at each storey or a 1.5m$^2$ remote operated OV at the head.

### The BRE shaft

In 2002 BRE introduced the BRE shaft as a simpler and better means of ventilating fire fighting stairs and lobbies in commercial buildings. This has now become the normal method for ventilating enclosed lobbies.

The requirement is for a 3m$^2$ cross section shaft with a ventilator at the top and 1.5m$^2$ dampers to each lobby, and there is no requirement for inlet air at ground level. Automatic ventilation is required to the stairs with the BRE shaft, comprising a 1m$^2$ AOV at the head of the stairs. The recently updated BS 5588-5 now mentions the BRE smoke shaft as an alternative form of ventilation.

However it still requires a 3m$^2$ shaft area, space that can be difficult or expensive to find. Colt has therefore developed the Colt shaft.
The Colt Shaft

THE COLT SHAFT

What is the Colt shaft?

The Colt shaft is a mechanical shaft system which provides equivalent performance to a BRE shaft for the ventilation of fire fighting lobbies. It can therefore be considered an equivalent to the recommendations of Approved Document B and BS 5588-5:2004 for ventilation of fire fighting shafts.

This shaft performs as well as or better than the BRE shaft and requires only 20% of the shaft area.

The Colt Shaft, which is suitable for use in any fire-fighting core, requires a shaft of only 0.6m² compared with 3m² for the BRE shaft. This represents an 80 per cent reduction in the floor space required. It opens up the space on each floor, which allows architects to be more creative in their design, and improves the saleable or lettable space in commercial buildings for the client. This in turn increases the profits for developers and the income for landlords of commercial buildings, and permits more usable space.

Automatic ventilation is required to the stairs, comprising a 1m² AOV at the head of the stairs.

The Colt Shaft in detail

The Colt shaft incorporates duty and standby variable speed extract fans with a Seefire duct termination, linked to a pressure sensor via the control panel.

The Colt Shaft solves two common problems associated with mechanical extraction. Firstly, since the lobby is fire rated, the area of ventilation into it is usually small so even a small amount of extract will cause a high negative pressure in the lobby, which could make doors difficult to open. Secondly, negative pressure could cause smoke to be drawn into the lobby from the fire compartment, with devastating effect.

However, the Colt Shaft avoids excessive negative pressures without compromising the integrity of the stairs and lobby by automatically reducing the ventilation rate when the lobby doors are closed. It does this via a pressure sensor linked into the control system that varies the fan speed. With all doors open, the fan runs at full speed to extract smoke discharging from the accommodation. With all doors closed, the fan runs at minimum speed to help mop up any smoke leaking past the closed door. In intermediate conditions, the fan speed modulates to ensure adequate ventilation without excessive depressurisation.
Colt has conducted a series of smoke tests which demonstrate that the Colt Shaft can perform to an equivalent standard as a standard 3m² BRE Shaft when this is fitted in the same situation. The tests also showed that the system reacts quickly to pressure changes, smoke clears quickly from the lobby when the accommodation or stair doors are opened, and the lobby is kept clear of smoke once the accommodation door is closed.

With the door to the accommodation closed, a typical 5m² lobby will clear totally within 15 to 20 seconds of opening the stair door.

Please contact Colt to obtain a copy of the short report describing these tests. A video is also available for demonstration at a client’s office, and it can also be viewed at www.coltinfo.co.uk.

**COLT SYSTEMS**

Colt is able to provide all the equipment necessary for smoke control of apartment buildings: OVs, AOVs, the Colt Shaft, smoke dampers, smoke door and window actuators, smoke detectors, breakglass switches, and manual and automatic controls. This equipment is described on the following pages.

**WHY USE COLT?**

All systems may be completely designed, supplied and installed inclusive of wiring and fully commissioned by Colt, with the advantage that all the components are contained within one package of works.
Corridor Kameleon Ventilator

APPLICATION

Please refer to figures A and B on page 4 for details on the applications when corridor ventilators are used.

THE PRODUCT

The Colt Corridor Kameleon is a non-thermally broken natural glazed casement ventilator designed to ventilate corridors and stairwells in the event of a fire.

It has a slimline profile and a discreet window appearance with a minimum free area of 1.5m².

OPERATION

The ventilator is actuated by two gas springs to open and a tubular motor using cables to close. The unit is held shut by electro-magnets.

On loss of power (230v ac) the motor disengages and the gas springs push the lid open with gravity assistance. The motor design includes an electronic clutch to control the rate of opening which is automatic.

AERODYNAMIC PERFORMANCE

The Colt Corridor Kameleon has been designed to maintain a geometric measured throat area of 1.5m². The opening angle has been limited to 28-30° to reduce operational load, which also optimises the area of the opening that is shielded from face winds when open. An opening angle of 28° ensures that there is an equal or greater opening area around the lid as through the throat of the ventilator.

OPTIONS

Standard - Factory fixings, visible gas springs.

Tamper-proof - All fixings have tamper-proof heads, gas springs are covered.

Extra Security - Additional electro-magnet, burglar mesh (2.5mm welded to frame).

Glass - 6, 8, 10 mm single, 7mm wired and 24mm double glazed (subject to size).

SIZING

Assume building opening of 1300mm

Select of body width of 1295mm (5mm tolerance) and subtract 104mm (frame dimension) 1295mm - 104mm = 1191mm throat width.

Now divide 1.5m² by throat width = 1500mm / 1191mm = 1259mm.

Add 229mm for frame and control box = 1488mm.

Therefore the body size to be ordered is 1295mm x 1488mm.

INSTALLATION

Vertical only, bottom hung.
### TYPICAL CONTROLS CONFIGURATION

![Diagram of TYPICAL CONTROLS CONFIGURATION]

### SPECIFICATION

**Product Reference**
Colt Corridor Kameleon

**Description**
Vertical Casement Ventilator designed, manufactured and tested to provide a measured throat area of 1.5 m², as required by the UK Building Regulations for corridor smoke ventilation.

**Material**
All metallic components manufactured from corrosion resistant aluminium alloy grade 3005 in accordance with EN573-3, with stainless steel fixings.

**Casement Type**
6/8/10mm Single glass/7mm Georgian wired/24mm (6-12-6) double glass/28mm 20kg/m² insulated infill.

**Base Fixing Type**
Front flanged low profile - suitable for integration into glazing systems and prepared openings in the vertical only.

**Control Options**
Standalone failsafe to open system. Power to close. 230/1/50 electrical supply.
EN Stairwell Ventilator

APPLICATION

Please refer to Figures A, B, C and D on pages 4 and 5.

THE PRODUCT

The EN Stairwell ventilator is a low profile, roof or wall mounted louvred natural ventilator which is designed to provide heat and smoke exhaust ventilation in protected stairwells and corridors within residential apartments, hotels, shops and offices.

It is principally applied to protect means of escape for occupants, who would otherwise remain trapped inside the premises, and to create a safe means of access for fire fighters.

A range of sizes are available to meet the 1.0 and 1.5m² minimum free area requirements.

The example illustrated has a free area of 1.13m².

The EN Stairwell ventilator can be installed either vertically or horizontally, and is equally as effective as a corridor ventilator.
CERTIFICATION
The EN Stairwell ventilator can be used for applications in BS 5588 Parts 1, 5 & 6. It failsafes to open on loss of power, and is CE marked in compliance with EN 12101-2.

OPTIONAL EXTRAS
- Paint finish to any RAL colour
- Burglar guard
- Break glass switch
- Battery back-up unit
- Bird guard, Insect guard
- Fireman's override switch
- Alternative base details

CONTROLS
Stairwell ventilators should be controlled by clearly visible manual switches at the top of the stairwell and close to the final exit from the stairwell. The optional break glass switch or fireman's override switch are recommended for this.

SPECIFICATION
Product Reference
Colt EN Stairwell Ventilator

Description
Clear opening louvred natural extract ventilator, suitable for installation at any angle from vertical to horizontal. CE marked in compliance with EN 12101-2. The ventilator shall have an open area of at least 1.0m² in accordance with the requirements of Approved Document B to the Building Regulations and BS 5588.

Operation
The ventilator shall open on loss of power, either 240V ac or 24V dc, and shall close automatically when power is reinstated. Operated by a manual break glass switch or fireman's override switch. Switches shall be located at the head of the stairs and at the final exit from the stairs. To avoid the ventilator opening in the case of a power failure, a maintained supply or a battery backup system capable of keeping the ventilator closed for at least 30 minutes is required. The mains supply (by others) shall terminate [select] in the protected stairwell / close to the battery backup panel.

Material
All principal components manufactured from corrosion resistant aluminium alloy grade 3005 in accordance with EN 573-3, with stainless steel fixings.

Louvre blades
Single skin aluminium/ Insulated double skin aluminium / Twin wall opaque or clear polycarbonate / Single skin laminated or toughened glass. Fitted with low-loss seals to minimise air leakage when closed.

Controls
24v dc or 230v ac OPV addressable electronic, failsafe open. Thermal release at the ventilator for added security.

Guards
Factory fitted Bird guard / Insect guard / Security guard / Burglar guard.

Finish
Mill finish Aluminium/ Polyester Powder Paint Finish/ PVF2.
THE PRODUCT

The Colt Defender is a motorised smoke shaft damper that allows the passage of smoke from corridors, lobbies and stairwells into smoke shafts.

The Defender is operated by a local fireman’s breakglass along with a dedicated locally mounted smoke detector.

If these components are incorporated into an OPV control system, there is the advantage of a fully integrated addressable system.

In the event of a fire, the Colt OPV panel opens the Defender on the specific fire floor in conjunction with the roof mounted ventilator at the top of that shaft, allowing smoke to pass from the fire floor into the smoke shaft. The other dampers on the floors above and below will remain closed, so as not to allow any leakage of smoke or fire spread onto the other floors. For this reason the Colt Defender is purposefully not designed to failsafe open.

When all clear the damper will motor closed.

It is recommended that 24 volt dc motors be used, since this will allow a simple battery back up system to be incorporated.

FEATURES AND BENEFITS

- Wide variety of sizes
- Robust mechanism
- Supplied completely assembled
- Exhaustively tested in-house

Colt offers a complete install, wire and commissioning service, thus all the components are contained within one package of works and under one company’s responsibility.

SPECIFICATION

Product Reference
Colt Defender Smoke Damper

Description
Comprising a 1.6mm fully welded galvanised mild steel flange case incorporating 2mm formed mild steel parallel operation blades mounted onto stainless steel spindles and bushes complete with integral stainless steel side seals.

CONTROLS

Actuated by a drive-in, drive-out motor fitted on the rear.

OPTIONS

Available in a wide variety of finishes, and with a wide variety of decorative grilles. Side, back or front motor mounting.
TYPICAL CONTROLS CONFIGURATION

Defender with typical louvre screen installed. Rear mounted motor.

CSIO Panel

Smoke Damper

Smoke Detector

Breakglass Switch

EN OPV
Central Control Panel

3A Fused Spur
230V/1ph/50 Hz supply

Battery Backup Panel

F

J

CSIO Panel

Apollo® comms line

OPERATING INSTRUCTIONS

MAIN STRUCTURE

This panel is for the day to day control of ventilators. Use the arrow keys to choose from the menu the function required. Press the SELECT key to carry out this function. To return back through the menu press the CANCEL key. Use the diagram below to guide you.

Main Menu
Vent Status Open / Close Configure
Open Close S/W Channel
Time Control
Set Points

All     Zone      Individual

*Lamp
Test
Alarm
Silence Reset

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Tel: (01705) 451111
Doorman Door Actuator and Colt Window Actuators

DOORMAN SMOKE DOOR ACTUATOR

The Colt Doorman is an addressable smoke shaft door actuator system designed to provide a safe and reliable actuation system for doors which are part of a smoke ventilation scheme for installation into staircases and enclosed corridors, as an alternative to a smoke damper.

The Doorman controls the movement of doors when these are used as part of a smoke control scheme to allow the passage of smoke from corridors, lobbies and stairwells into smoke shafts.

The Doorman consists of individually addressable and controllable door actuation systems linked to the fire alarm system via a Colt OPV system. Each Doorman includes the door operator, door lock and communication module, and it is all packaged to allow easy installation on site.

During normal, non-fire conditions, the system is in its monitoring mode. The door lock is engaged to ensure no accidental operation. Once the door has opened, it can be closed remotely. In the event of a fire, the Colt OPV panel operates the Doorman Door Operator on the specific fire floor in conjunction with the roof mounted ventilator at the top of that shaft allowing smoke to be extracted from the fire floor.

FEATURES AND BENEFITS

- One standard size unit for all doors
- Small enough to fit situations where double leafs are required
- Robust mechanism ensures doors stay locked when not in use but open when required
- Doors are remotely operated and require no manual closing after a test
- Supplied completely assembled, and simple installation onto rear face of door
- Exhaustively tested in-house
- Options include 230v ac or 24v dc operation, 24v dc latch, cover box

Colt can provide a complete install, wire and commissioning service, thus all the components are contained within one package of works and under one company’s responsibility.

SPECIFICATION

Product Reference
Doorman Smoke Door Actuator

Description
Addressable smoke shaft door operator for smoke ventilation from corridors, lobbies and stairwells into smoke shafts. Operates doors on the fire floor and keeps doors on non-fire floors closed.

Designed to be installed onto the back of a certified fire door between 375mm and 900mm wide. Suitable for fire doors requiring up to 30 Nm opening and closing torque, as 'Certifire' Technical Schedule TS 21: Smoke Door Seals.

Size envelope 350mm (W) x 450mm (H) x 160mm (D + arm).

Actuator rated to DIN V 18232 T6, gears mechanically lock to maintain the door safety position in the event of power loss.

COLT WINDOW ACTUATORS

Colt can provide a wide range of window actuators for use when windows are to be operated as part of a Smoke Control System.
1 Discovery Dock, London. Doorman door actuators, stairwell ventilators.

2 Holy Cross Apartments, Liverpool. Doorman door actuators, stairwell ventilators, car park ventilation.

3 Holliday Wharf, Birmingham. Doorman door actuators, stairwell ventilators.
PRESSURISATION SYSTEMS

Pressurisation systems protect escape routes and fire-fighting shafts against the ingress of smoke by maintaining the pressure within the escape route higher than that in the adjacent spaces.

A pressurisation system consists of three main components: Supply Air (where air is injected into the area that is to be protected), Pressure Relief (to avoid overpressure when doors are closed) and Air Release (air and smoke is released from the adjoining fire area). Combining these elements creates a positive pressure difference which prevents lobbies and staircases from filling up with smoke.

Pressurisation systems should meet the recommendations of Approved Document B and BS EN 12101-6 “Specification for Pressure Differential Systems” or BS 5588-4 - “Code of practice for smoke control using pressure differentials”.

In commercial buildings pressurisation is normally carried through up to the final door to the accommodation, with air release provided from the accommodation. In apartment buildings it is usually impractical to carry pressurisation up to each apartment door due to the difficulty of providing air release from each apartment. Therefore stairs and lobbies are usually pressurised with air release from the corridor.

* One outlet at a maximum of every 3 storeys
THE SYSTEM COMPRIS

- Inlet Fans for introducing air into the designated area. The run and standby fans and control equipment should be housed in a separate plant room or outdoors and the inlet should be protected from smoke. Dual inlets with automatic smoke dampers are required for high level inlet.

- Ductwork and Outlet Grilles, to provide distribution of air exactly where it is needed.

- Pressure Relief Dampers, to release excess air in the closed door condition from the stair area. This should be ducted to discharge directly to atmosphere independent of the wind direction. Damper blades are set to start opening at 50 Pa pressure differential.

- Automatic air release to prevent unwanted pressure build up in the adjacent spaces. This may be automatic vents, natural shafts or mechanical extract systems.

The control system should operate automatically from the smoke detection system with a manual on/off switch also provided within either the pressurisation plant room, near the building entrance (to suit fire service), or within the central building services control room.

SYSTEM REQUIREMENTS

There are two requirements to maintain within a pressurisation system. These are:

- Maintaining a pressure difference for a closed door condition. Here the pressure difference is required to overcome buoyancy pressure generated by the hot smoke layer, expansion of the gases in the compartment due to heating, stack pressure and wind pressure

- Maintaining a velocity for an open door condition. Here maintaining a velocity for an opened door is required to hold back the smoke on the fire floor when the door onto the fire floor is open.

Getting the right balance for a pressurisation system needs careful design in order for the system to work effectively. Insufficient pressure difference across a closed door will allow the passage of smoke into the protected space. Excess pressure will impede door opening and hence escape.

DESIGN METHODOLOGY

- Assess the usage and layout of the building, the area to be pressurised and the class of system required.

- Assess the leakage paths (through doors, lifts, vents).

- Calculate the required volume flow rates.

- Calculate the area of pressure relief dampers.

- Calculate the area of air release ventilation.

Colt can assist with the design of pressurisation schemes.

Colt offers a free technical design service on all projects undertaken. Please contact Colt for further information.

![Supply air example](image1)

![Air release options](image2)
THE COLT PACKAGE

Colt International offers the following services:

- Scheme design of all types of Smoke and Heat Exhaust Ventilation Systems (SHEVS)
- Scheme design of pressurisation systems
- Scheme design of smoke containment systems
- Provision of performance specifications
- Project management
- Supply, installation, commissioning and maintenance of systems, including all necessary controls, which will be designed to interface with others' control systems.

A free full system check will be carried out approximately 9 months after a Smoke Control System has been installed and commissioned by Colt. Besides the opportunity to check that the system is performing as designed, this will allow for any further training of local personnel that may be necessary. Assuming that this visit falls within the warranty period, any defective parts are replaced free of charge. A test certificate will be issued.

Other reasons to choose Colt:

- Colt Smoke Control systems are suited to both commercial and industrial buildings, and may be adapted to suit most architectural requirements.
- Over the years Colt has funded a large proportion of the research into smoke control, and its representatives maintain an unparalleled level of technical expertise.
- Colt's in-house research and development capability ensures that Colt smoke control systems are designed, tested and updated by Colt to meet or exceed relevant legislation and standards.
- The majority of Colt's Smoke Control systems are manufactured in the UK under BS EN ISO 9001:2000 and BS EN ISO 14001:2004. They are also CE marked, where relevant, in compliance with EN 12101-2.

COLT SERVICE

Part of the Colt Group of companies, Colt Service offers a comprehensive range of maintenance packages incorporating the maintenance and repair of all building services equipment including non Colt products.

Colt Service provides a 24 hour, 365 day emergency cover as standard.

MAINTENANCE

Maintenance of a smoke control system is essential. Regular maintenance protects your investment and brings peace of mind that the system will operate effectively in an emergency.

The British Standard, BS 5588-12: 2004 recommends that smoke control systems should be serviced at least once a year and tested weekly.