COLT

Smoke control and day to day ventilation systems for multi-storey residential buildings

Ventilation systems that help meet legislative requirements and achieve design objectives

Front cover:
Gunwharf Quays, Portsmouth

Pan Peninsula, London

Why provide smoke control for multi-storey residential buildings?

- In multi-storey residential 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 left open even for a short period of time, it can quickly fill a corridor or lobby, making escape difficult for occupants.
- Smoke entering the stairs can make escape difficult for occupants of higher storeys and slow down fire-fighters on their way in.
- 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.

In this leaflet we:

- Provide an understanding of the legislative framework within the UK
- Explain how ventilation systems can both help meet legislative requirements and achieve design objectives
- Look at the equipment options.

In addition, we look at opportunities for a smoke control system to provide both smoke control and day to day ventilation.

The legislative framework and standards within the UK

The legislative requirements derive from the Building Regulations for England and Wales (2010). 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.

For apartment buildings, the most up to date guidance is contained within ADB.

Smoke control systems are required to protect the means of escape (MOE) for the occupants.

Furthermore there is a requirement for buildings with a floor more than 18m above fire service access level or with a basement more than 10m below it to have a protected fire-fighting core with a fire fighting lift whether these be residential buildings or not. Certain other buildings just require a fire-fighting core.

The requirements are set out in ADB, BS 5588-5, BS 9991 and BS 9999.

See our "Ventilation for fire-fighting stairs" leaflet for further information on those buildings which fit within this category. However in residential buildings ADB does not require a fire fighting lobby or the higher performance ventilation system that such a lobby would require.

Highbury Square, London

The ventilation system options

The ventilation system options depend largely upon the building layout. A choice has to be made between:

1. ***Natural ventilation using AOVs***. 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.
   For product options, go to pages 12-13.

2. ***Natural or mechanical ventilation using shafts***. Where corridors or lobbies are enclosed, ventilation shafts with dampers or fire doors and natural or powered ventilators may be used to evacuate smoke.
   For product options, go to pages 7-9 and 14.

3. ***Pressurisation systems*** are an alternative method of protecting escape routes and firefighting cores against the ingress of smoke by maintaining the pressure within the escape route at a higher pressure than that in the adjacent spaces. If BS 9991 is being followed, there is a recommendation therein that only pressurisation systems should be used where there is a storey above 30m.
   For pressurisation systems, see pages 10-11.

These alternative approaches are explained in the following pages.

Help resources

For further help resources on deciding whether a natural or a mechanical shaft is right, please visit our blog: http://blog.coltinfo.co.uk/topic/smoke-shaft-series.

Benefits of natural shafts:

- ***No fans***. The primary benefit is that no fans are needed, together with their cabling and controls and, of course, their standby power requirements.
- ***Low noise***. The systems are virtually silent, although they can still be a source of noise transmission in noisy areas, such as under flight paths.
- ***Low costs***. Purchasing and operating costs are low, with a very small power requirement and limited equipment to be tested and maintained.
- ***No roof top plant***. Little roof space is required, simply room for the termination at the top of the shaft.

Mechanical shafts have three major benefits:

- ***Size***. They can be small.
- ***Flexibility***. They can be more flexible in layout.
- ***More ventilation***. They can provide improved ventilation to compensate for extended travel distances.

Smoke control for means of escape (MOE) in residential buildings

Approved Document B (ADB) accepts that, in the event of a fire in an apartment, some smoke will spread from the apartment into the corridor as the occupants make their escape.

Consequently, it is a requirement that any corridor or lobby that opens into a staircase has ventilation to allow that smoke to be removed and, most importantly, to prevent that smoke from getting into the staircase.

For small single stair buildings: If the building is under 11m high, has no more than 3 storeys and the staircase does not connect to a covered car park, then only a stairwell ventilator is required, provided that the escape distances are limited to 4.5m in the corridor. If the corridor is also ventilated, then escape distances can be extended up to 7.5m. See below and pages 6-7 for the Colt Shaft System.

For all other kinds of residential buildings: In all other apartment buildings, the travel distances are limited to 7.5m in one direction and 30m if escape is in two directions, and any corridor or lobby that opens onto a staircase should be ventilated. If BS 9991 is being followed, a dead end travel distance of up to 15m is permitted in buildings with sprinkler protection to all apartments.

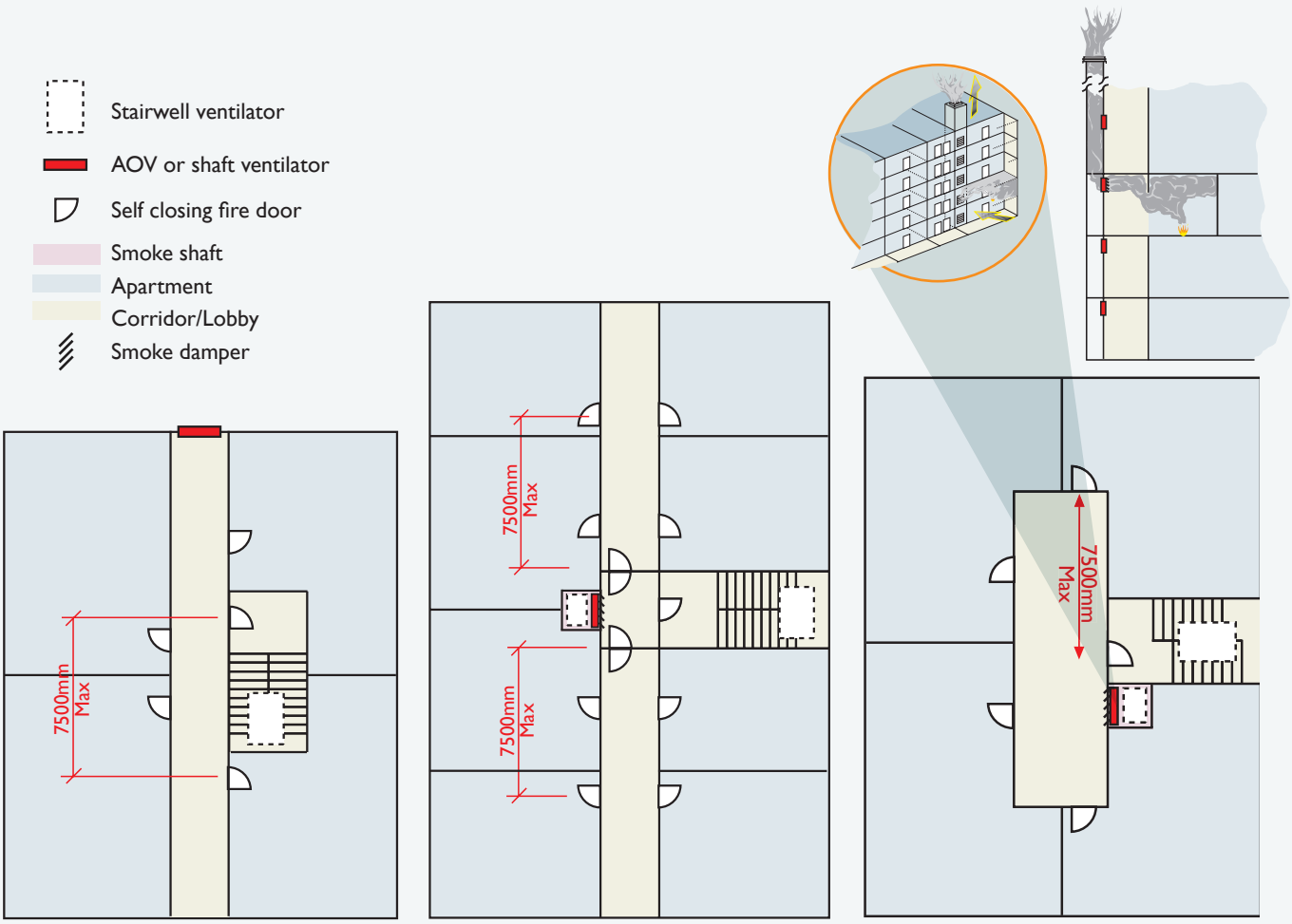


Figure A

Figure B

Figure C

If the corridor has outside walls, as in figure A, then an AOV is a suitable means of ventilation, with a minimum free area of 1.5m².

If the corridor is landlocked, as shown in figures B or C, then a shaft system will be required. This can be either natural or mechanical.

If a natural shaft is used, ADB recommends that the shaft:

- Is closed at the base
- Has a minimum cross-sectional area of 1.5m² with a minimum dimension of 0.85m in either direction
- Extends at least 0.5m above the highest structure within 2m
- Extends 2.5m above the ceiling of the highest level served by the shaft
- Is constructed from non-combustible material and the vents are equivalent to an E30S fire door
- Is vertical with no more than 4m at an inclined angle (max 30°).

The vent into the shaft, the vent at the top of the shaft and any safety grilles in the shaft should all have a minimum free area of 1.0m².

Alternatively, mechanical ventilation or pressurisation may be used.

Operation of the ventilation system

If the apartments have access only to one escape stair, the system must be linked to an automatic detection system.

On detection of smoke in the corridor, the vent on the fire floor, at the top of the shaft and the top of the stair should all open simultaneously, and vents on all other levels should remain closed.

If the apartments have access to more than one escape stair, the ventilators can be operated manually, but operation of the shaft ventilators and the stair vent must still be simultaneous. It is often more convenient to have a fully automatic system instead.

The ADB shaft

In 2006 the ADB smoke shaft was introduced. The requirement is for a 1.5m² cross section shaft with a ventilator at the top and 1m² dampers to each lobby, and there is no requirement for inlet air at ground level. Automatic ventilation is required to the stairs, comprising a 1m² AOV at the head of the stairs. BS 9991 now mentions the ADB smoke shaft as an alternative form of ventilation to an AOV scheme or pressurisation.

The Colt Mechanical Shaft

Colt recognised that space for smoke shafts can be difficult or expensive to find and has therefore developed the Colt Mechanical Shaft.

The Colt Mechanical Shaft provides equivalent performance to an ADB shaft for the ventilation of fire-fighting lobbies. It can therefore be considered an equivalent to the recommendations of Approved Document B and BS 9991.

This shaft performs as well as or better than the ADB shaft and requires only 40% of the shaft area.

More effective ventilation combined with space-saving

The Colt Mechanical Shaft, which is suitable for use in any stair core (escape or fire-fighting), requires a shaft which can be as small as only 0.6m². This represents up to a 60% reduction in the floor space required. It opens up the space on each floor, which allows architects to be more creative in their designs, and improves the saleable or lettable space for the client. This in turn increases the profits for developers and the income for landlords, and permits more usable space.

In addition the Colt Mechanical Shaft can perform better than a standard shaft since it extracts at a defined rate - this means that it is unaffected by external wind pressures. It is also less susceptible to obstructions to the airflow within the duct.

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

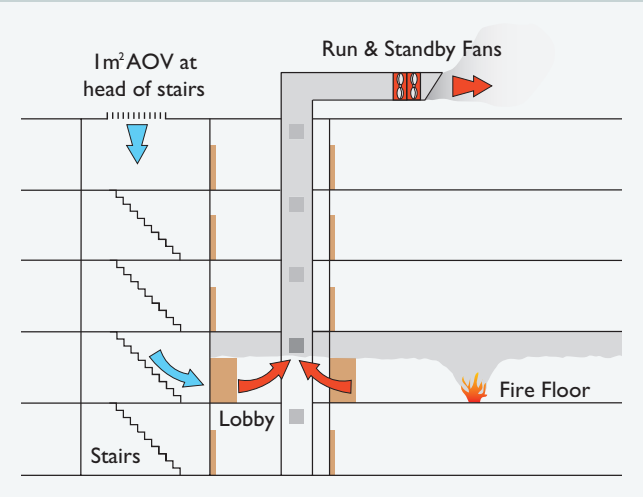


Figure D

The Colt Mechanical Shaft in detail

The Colt Mechanical Shaft solves a common problem associated with mechanical extraction. Since the lobby is fire rated, it is usually well sealed, so even a small amount of extract will cause a high negative pressure in the lobby, which could make doors difficult to open and could cause smoke to be drawn into the lobby from the fire compartment, with devastating effect.

Two versions are available, the Colt Shaft Variable and the Colt Shaft Constant.

The Colt Shaft Variable

The Colt Shaft Variable incorporates duty and standby variable speed extract fans linked to a pressure sensor via the control panel.

The Colt Shaft Variable 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.

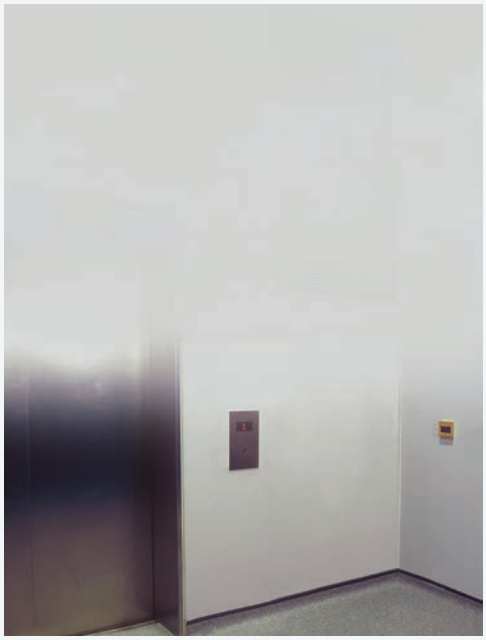
With all doors open, the fan runs at full speed to extract smoke discharging from the accommodation. With all doors closed, the fan runs at minimum speed to help mop up any smoke leaking past the closed door. In intermediate conditions, the fan speed modulates to ensure adequate ventilation without excessive depressurisation.

The Colt Shaft Constant

The Colt Shaft Constant is a simpler and lower cost variation which can be used under some circumstances.

The fans run at full speed and excessive negative pressure is avoided by allowing the suction to pull open the (reverse hung) stair door slightly against a carefully adjusted door closer. It is only suitable when:

- No more than 60 people are expected to escape via the stair door
- A reverse hung stair door will not cause difficulties such as blocking corridor access.



Testing of the Colt Shaft

We have conducted a series of smoke tests which demonstrate that the Colt Shaft can perform as well as a standard 1.5m^2 ADB 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 lobby will clear totally within 15 to 20 seconds of opening the stair door.

The Colt Shaft Extended Corridor system

A further development of the Colt Mechanical Shaft is the Colt Shaft Extended Corridor system, which can extend travel distances in means-of-escape corridors.

Such systems offer developers substantial space and cost saving benefits, while providing a safe evacuation route, aiding fire-fighters by allowing the corridor to be cleared of smoke rapidly, even during the later stages of a fire, when a conventional system might well be overwhelmed.

Rapid response and enhanced performance

The Colt Shaft Extended Corridor system allows safe escape conditions to be maintained in the corridor, even when the travel distance is extended by a factor of 2 or 3 in one direction. This can remove the need for an additional staircase, freeing up typically as much as 20-30m² of additional saleable space per floor.

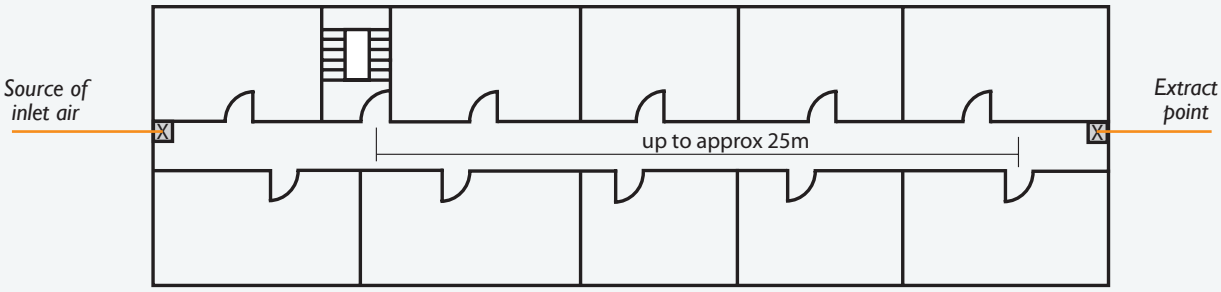


Figure E

The Extended Corridor system out-performs the conventional solution for both evacuation and fire-fighting.

The system is generally unaffected by external wind pressures, so is inherently more reliable than a natural system.

The system achieves exceptional smoke extraction performance by utilising a corridor extraction system at one end of the corridor and a dedicated air inlet system at the other.

There are four types of Extended Corridor system:

(a) Pull system – mechanical extract / natural inlet
(b) Push system - mechanical inlet / natural exhaust
(c) Push-pull – balanced system.
(d) Push-pull reversible - balanced system but with added flexibility.

Justification and approval for extended travel distances

Since extended travel distances are an area of design risk, we would always recommend talking to Building Control early to obtain agreement in principle.

At the detail design stage, CFD analysis is inevitably required to satisfy the authorities that the proposed system provides adequate performance. Originally CFD was simply used to show that conditions were demonstrably better than for a compliant solution, but nowadays it is more common to show compliance with set performance objectives. The SCA publication, "Guidance on smoke control to common escape routes in apartment blocks" provides guidance on what these objectives might be.
It is available as a free download from www.feta.co.uk.

Building Control may also request physical smoke tests to be carried out upon completion to confirm compliance.

With extended travel distance systems, location is critical!

In a compliant building the location of the smoke outlet from the lobby or corridor is not legislated for. As long as the system is compliant it can be located anywhere. For an extended travel distance system it's very different. Location is critical.

On these systems:

- The inlet and extract should be as close to the opposite ends of the corridor as possible
- The direction of air flow should draw smoke away from the stairs whenever practicable
- Mechanical extract is usually preferred
- Remember that if natural inlet is used, it needs to be generously sized to avoid excessive depressurisation of the corridor.

The aim is to continuously flush through the corridor to ensure that any smoke entering from the fire room is quickly extracted, keeping the corridor fully tenable except when the fire room door is open and for a short period after it is closed.

Help resources

For further help resources on designing smoke shaft systems, please visit our blog: http://blog.coltinfo.co.uk/topic/smoke-shaft-series

This series covers a variety of topics including builder's work shafts, noise, power, extended travel distances, natural vs mechanical shafts, smoke ventilation only and dual purpose systems.

LABC Certification

The Colt Shaft Variable and Colt Shaft Extended Corridor systems are LABC Registered Systems because of their superior performance as proven by CFD.

Improved effectiveness

Colt has carried out extensive CFD modelling in both escape and fire-fighting modes, and compared its Extended Corridor Solutions with a compliant corridor that has a natural AOV system. In the model zero wind conditions have been assumed in assessing the relative performance of the AOV. A typical example is shown below.

This modelling shows that in the early stages of the fire, the two systems perform satisfactorily. The fire starts in an apartment, the occupants evacuate and smoke spills into the corridor. Both the AOV and the mechanical system keep clear conditions for evacuation although a ceiling smoke layer hangs around with the AOV. At this stage, the fire is relatively small. Ten minutes later, when the fire brigade open the apartment door, the fire is much more severe. Large volumes of smoke spill out, completely filling the corridor, and the AOV system is overwhelmed. However, once the apartment door is closed, the mechanical system can clear the corridor within 60 seconds.

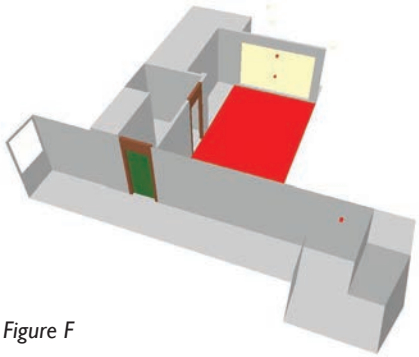


Figure F

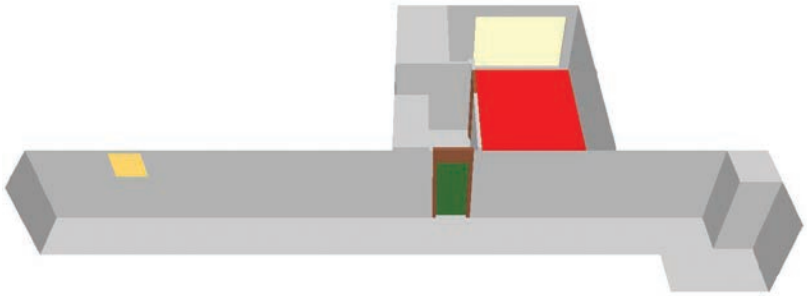


Figure G

Extended Corridor System

This CFD screen-grab shows visibility in the corridor. Red denotes the greatest visibility distance, blue shows the least visibility distance. Just 30 seconds after the apartment door closes, the Extended Corridor System is well on its way to clearing the corridor.

Despite the fact that the corridor is more than twice the length of the compliant corridor, the corridor is almost completely cleared of smoke within 60 seconds of the apartment door closing.

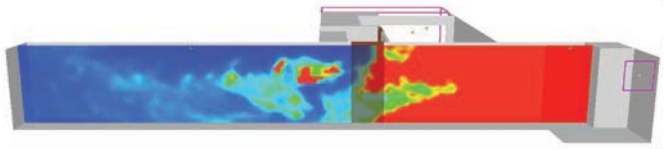


Figure H

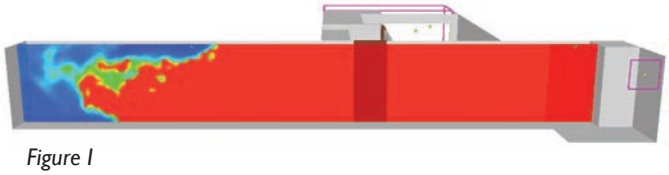


Figure I

Conventional approach

After the same amount of time in the corridor equipped with a conventional AOV, the visibility in almost zero - the corridor is still completely smoke logged.

A video of these CFD simulations working dynamically may be viewed at: http://www.coltinfo.co.uk/extended-corridor.html.

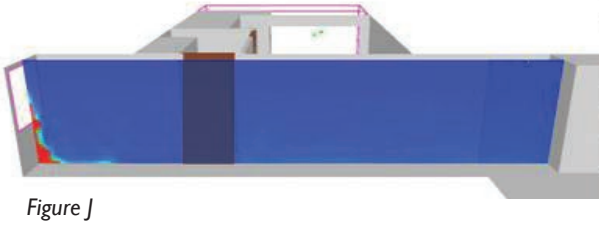


Figure J

Pressurisation systems (or stairwell pressurisation systems)

Pressurisation is one of the possible solutions to provide smoke ventilation in escape stairs, common lobbies and corridors in residential buildings as required by Approved Document B and as recommended for buildings taller than 30m (BS 9991).

Guidance on design of pressurisation systems is provided in BS EN 12101-6:2005. Guidance on when pressurisation is appropriate is given in ADB volume 2: 2006 edition, BS 5588 (various parts) and BS 9991:2011.

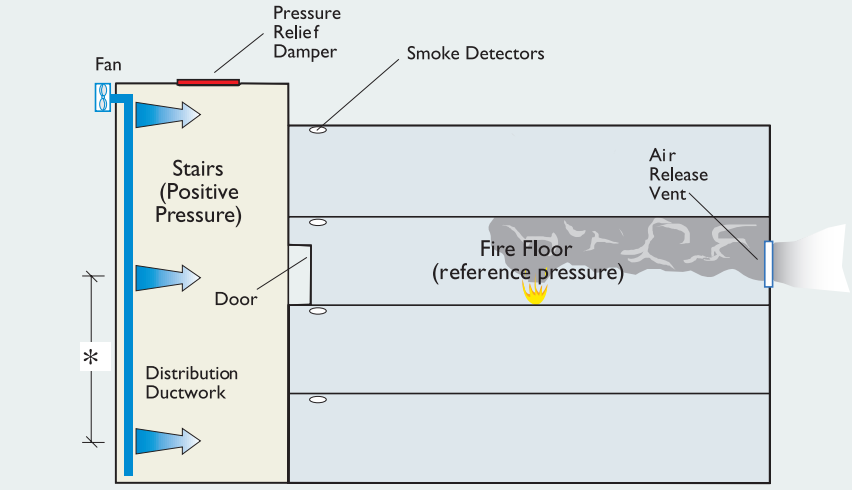


Figure K

Pressurisation systems protect escape routes against the ingress of smoke by maintaining the pressure higher than that in the adjacent spaces.

Pressurisation systems offer these benefits:

- Protection of escape routes
- Compliance with Approved Document B and BS EN 12101-6.

However pressurisation systems are generally relatively expensive, so they are normally only used where demanded by regulations or standards or by Building Control, usually as a trade-off.

Protecting escape routes: Smoke shafts versus pressurisation

How do you decide which to use? The decision is influenced by legislation and standards, building configuration, budget and space requirements. There is no universal "right" choice, but there's certainly a best choice for each individual building. We can advise on this.

Help resources

For further help resources on making the choice between designing a smoke shaft or a pressurisation system, please watch our recorded webinar from: http://blog.coltinfo.co.uk/smoke-shafts-v-pressurisation.

This webinar compares and contrasts each system, providing an idea of relative benefits, performance, space and cost.

How a pressurisation system works

A pressurisation system provides 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.

In residential 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.

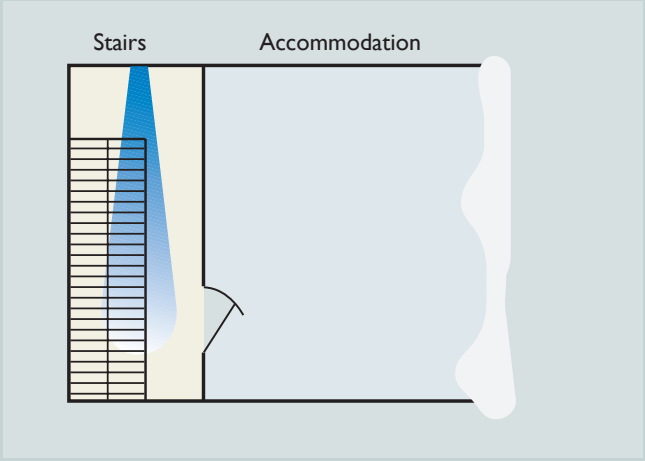
Pressurisation systems need to meet the recommendations of Approved Document B and BS EN 12101-6 "Specification for Pressure Differential Systems" or BS 5588-4 - "Code of practice for smoke control using pressure differentials".

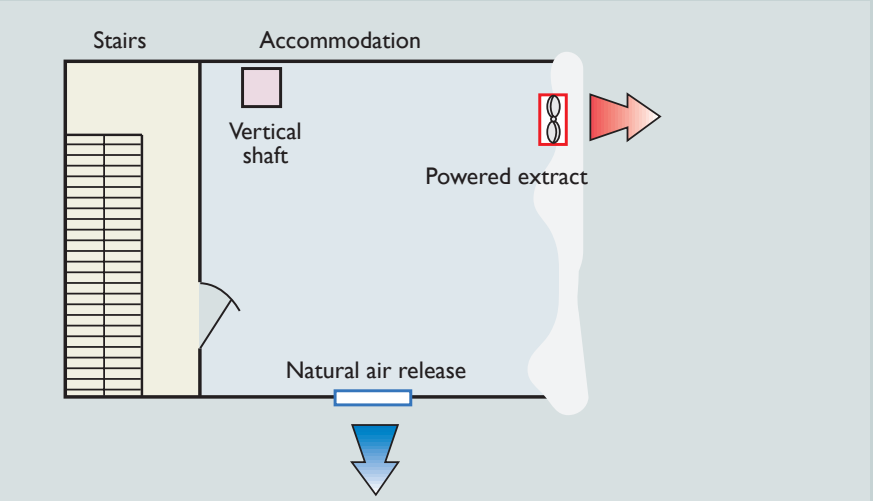
System components

A pressurisation system comprises:

- 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 roof 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 the fire service), or within the central building services control room.





System requirements

Two requirements need to be maintained 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.

It is critical that the walls to pressurised areas should be carefully constructed to minimise air leakage and that all services penetrations should be properly fire stopped.

Product options: roof/façade ventilators

Casement versus louvred AOVs

Approved Document B requires that lobbies / corridors should be ventilated by an AOV with a free area of at least 1.5m². This does not sound like very much, but the definition of 'minimum free area' for an AOV makes this difficult to achieve simply with opening windows.

If using a casement ventilator, the side opening sections are not taken into account and the top section is measured at 90° to the casement. As a result, a 1.5m wide (throat) ventilator opening to an angle of 30° needs to have a throat height of 2.0m and the stroke of the motor will need to be around 1.2m in order to achieve the required area. Clearly this results in a large ventilator size and in a lot of instances this may prove impractical.

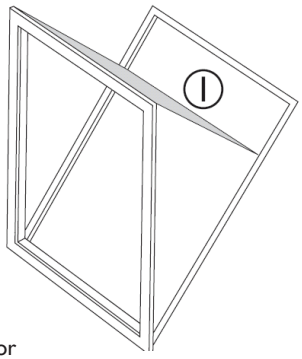
As a result it has become more common to use natural louvred ventilators to provide the necessary area of AOV.

Lobbies / coridors should be ventilated by an AOV with a free area of at least 1.5m².

As per current version of ADB:

1.5m² can only be achieved via open area at 90° to direction of airflow, ie area ①.

Total area = ① only = 1.5m²



To achieve 1.5m² a 1.5m wide vent opening to 30° needs to be at least 2.0m high and the stroke of the motor will need to be around 1.2m.

Product options: roof / facade ventilators

These natural ventilators can be used at the head of a shaft, in the stairwell or as AOVs.

Coltlite louvred ventilator

For vertical applications only.
- High aerodynamic efficiency and high thermal performance
- Compared to a casement ventilator, it opens to 90° with attendant high efficiency
- Tested to EN 12101-2 and CE marked

Options
- Glazed or insulated aluminium infill
- Thermally or non-thermally broken
- Pneumatic, electric or manual controls
- Optional anti-finger trapping controls

Airlite louvred ventilator

For vertical or roof applications. Generally for heated or unheated areas.
- High aerodynamic efficiency and high thermal performance, with thermal breaks
- Tested to EN 12101-2 and CE marked

Options
- Opaque or clear polycarbonate blades
- Pneumatic, electric or manual controls

Seefire louvred ventilator

For vertical or roof applications. Lower thermal performance than Airlite, so generally for unheated areas and as shaft terminations.
- High aerodynamic efficiency
- Tested to EN 12101-2 and CE marked

Options
- Wired glass, polycarbonate, single skin or insulated aluminium infill
- Pneumatic, electric or manual controls

Kameleon casement ventilator

For vertical applications only.
- High aerodynamic efficiency and high thermal performance, with thermal breaks
- Tested to EN 12101-2 and EN 14351-1 and CE marked

Options
- Glass, polycarbonate or insulated aluminium infill
- Pneumatic or electric controls

Roof access hatch

Single flap staircase ventilator designed to provide1.0 or 1.5m² minimum free area to ADB for smoke control, combining smoke ventilation with roof access.

Product options: shaft ventilators

All these components have been designed with Colt Shaft systems in mind. They can be controlled as part of the shaft system network, and also be addressed and linked via an OPV system to the fire alarm system.

All systems are minimum E30S rated, that means 30 minutes fire integrity and smoke sealed.

Defender motorised smoke shaft damper

Fire-rated louvred damper mounted behind a grille.

- Robust construction
- Low leakage rate and high free area
- Offers a fire-rated construction equivalent to that of an E30S door
- Option for a sleeved variant with motor at the front.

Defender F motorised smoke shaft ventilator

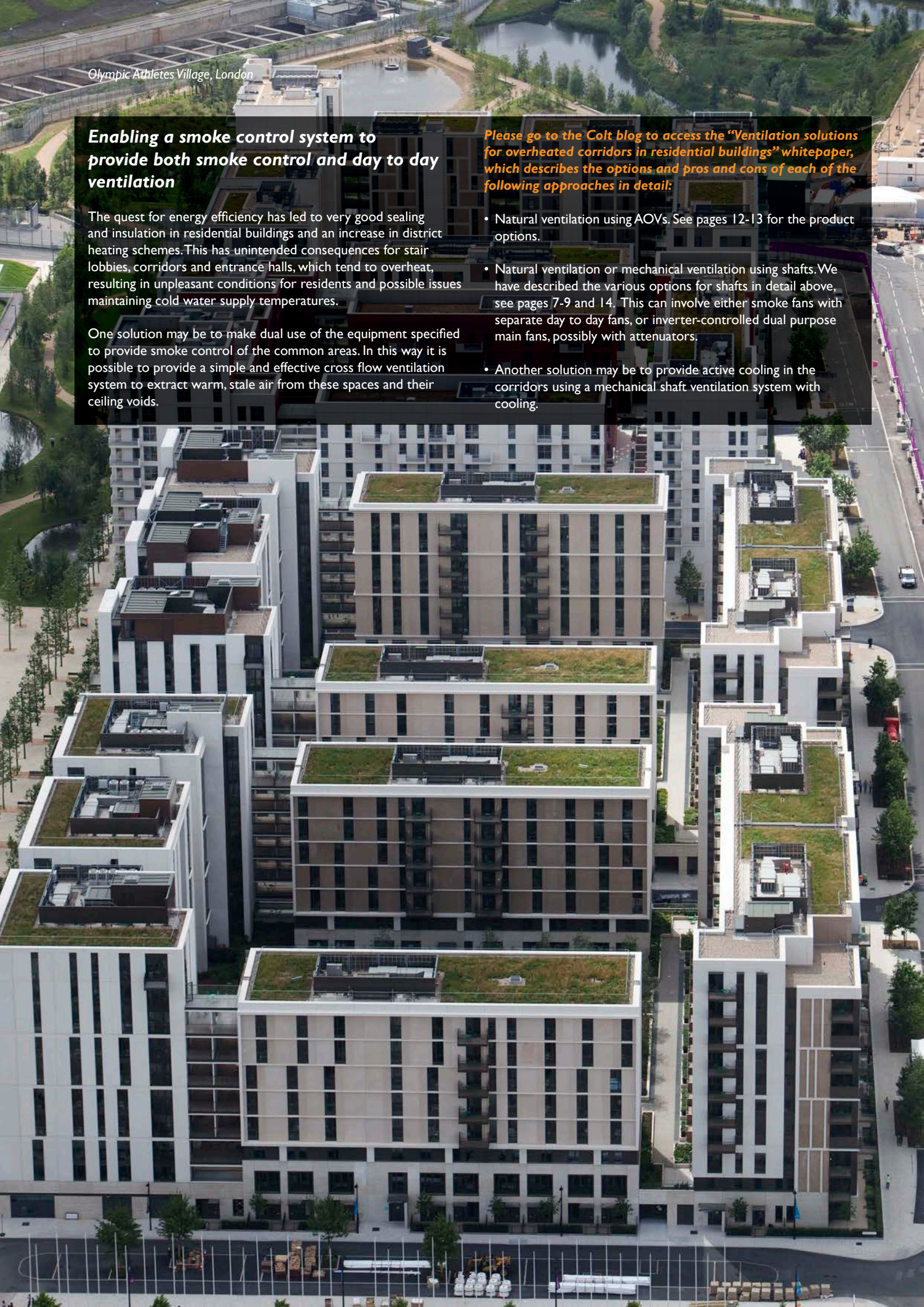
Fire-rated bottom hung motorised flap ventilator. Standard width is 630mm wide x 1350mm high (structural opening).

- Mineral wool insulation
- Double seal system to control air leakage in ambient and fire conditions
- Offers a fire-rated construction equivalent to that of an E30S door
- Tested to BS EN1634 parts 1 & 3 (fire resistance tests for door and shutter assemblies)
- Motor release from the corridor/lobby side to ease maintenance.

Doorman smoke shaft door operator

Fire-rated motorised shaft door operator to open or close an E30S fire door.

- Robust mechanism ensures doors stay locked when not in use but open when required
- Its modular design allows ease of installation and flexibility in location of components. Supplied completely assembled, and simple installation onto rear face of door
- One standard size for all doors - 790mm wide (door height would then need to be 2150mm to meet Approved Document B)
- A 'Colt Shaft' option allows for the narrower doors that are used on these systems, suitable for doors 600mm wide and above.



Olympic Athletes Village, London

Enabling a smoke control system to provide both smoke control and day to day ventilation

The quest for energy efficiency has led to very good sealing and insulation in residential buildings and an increase in district heating schemes. This has unintended consequences for stair lobbies, corridors and entrance halls, which tend to overheat, resulting in unpleasant conditions for residents and possible issues maintaining cold water supply temperatures.

One solution may be to make dual use of the equipment specified to provide smoke control of the common areas. In this way it is possible to provide a simple and effective cross flow ventilation system to extract warm, stale air from these spaces and their ceiling voids.

Please go to the Colt blog to access the "Ventilation solutions for overheated corridors in residential buildings" whitepaper, which describes the options and pros and cons of each of the following approaches in detail:

- Natural ventilation using AOVs. See pages 12-13 for the product options.
- Natural ventilation or mechanical ventilation using shafts. We have described the various options for shafts in detail above, see pages 7-9 and 14. This can involve either smoke fans with separate day to day fans, or inverter-controlled dual purpose main fans, possibly with attenuators.
- Another solution may be to provide active cooling in the corridors using a mechanical shaft ventilation system with cooling.

Colt CoolShaft: providing smoke ventilation and combating overheating in common areas of residential buildings

CoolShaft is a combined smoke and day-to-day shaft system which uses evaporative cooling technology to provide active pre-cooling of the incoming air, without compromising the ability of the shaft system to ventilate the common area in a fire – and this with exceptionally low energy consumption.

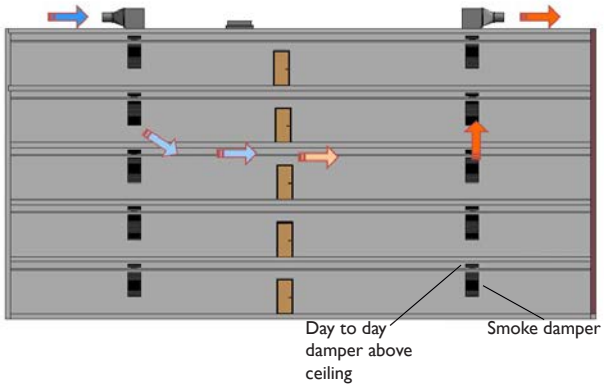
While a ventilation system supplying untreated outside air is able to achieve temperatures in the corridor at typically 3-5°C above the outside ambient, a CoolShaft system is able to reduce temperatures to below the outside ambient by providing active cooling in the corridors.

Since CoolShaft is a combined smoke and day-to-day shaft system, our design ensures that if there is a fire there is no compromise in its ability to ventilate the common area and allow smoke to escape.

The many benefits of CoolShaft begin with low energy cooling

It doesn't need to cost the earth to cool a building: using the cooling power of water, it's possible to achieve low energy cooling. Here are some of the features and benefits of CoolShaft:

- ***Cooling of corridors.*** Whereas basic day-to-day ventilation systems for common corridors and lobbies use outside air to ventilate the space, the CoolShaft provides active cooling with incoming air up to 10°C below ambient temperatures, providing highly desirable conditions for residents.
- ***Economical.*** CoolShaft systems offer cooling that is 4 - 7 times more economical than conventional air conditioning systems, with lower initial costs. CoolShaft runs much of the year in free cooling mode, with evaporative cooling brought on-line when temperatures rise.
- ***Low energy use.*** Evaporative cooling is up to 90% efficient. CoolShaft only needs a small quantity of electricity for the fan that circulates the air and for the water pump.
- ***High cooling capacity.*** One CoolShaft unit can cool multiple floors, and often the complete building, owing to its inherent high cooling capacity.
- ***No refrigerants.*** CoolShaft is free from refrigerants, thus there are no F gas compliance issues, and there is no need for refrigerant / water pipework in the building.
- ***Hygiene certificate.*** CoolShaft has an integrated water quality system using simple and robust technology. It provides safe circulation with temperature control and regular renewal of water to avoid the growth of bacteria and scale. It has been extensively tested and certified hygienically in compliance with VDI 6022 ("Hygienic Requirements for Ventilation Systems and Units for Internal Spaces"). This is a rigorous standard for air conditioning systems and confirms the high quality of supply air.
- ***A space saver.*** CoolShaft has a smaller rooftop footprint and saving on rooftop ductwork compared to conventional air conditioning systems, thereby freeing up space.
- ***Lightweight.*** CoolShaft is more lightweight than conventional air conditioning systems.



With CoolShaft, the incoming air is pre-cooled adiabatically when temperatures reach a set point

A CoolShaft evaporative cooling unit is integrated into the smoke ventilation shaft plant

Help resources

View our white paper, "Ventilation solutions for overheated corridors" for further info.


Quartermile, Edinburgh


Castlegate, Manchester


Harrods Apartments, London

Some residential projects completed by Colt


Highbury Square, London


Junction Apartments, Manchester


Olympics Athletes Village, London


Olympics Athletes Village, London


St George's Square, Glasgow

Highbury Square, London

Harrods Apartments, London


Blenheim Court Student Accommodation, Bristol

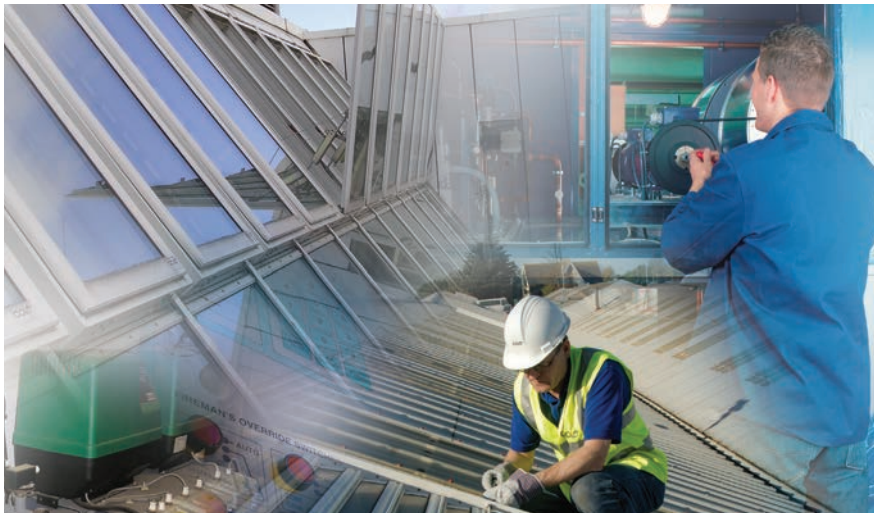

Southside Apartments, Birmingham

Commissioning and testing

Any mechanical or electrical system needs commissioning before use and natural or powered ventilation systems are no exception.

Colt commissioning engineers will check the installation, set the equipment to work and set up the control system to ensure that everything works correctly in accordance with the system cause and effect chart.

Smoke testing of the completed installation is not part of the normal commissioning process but may be offered upon request.



Why choose Colt?

- We are able to provide all the equipment necessary for smoke control of multi-storey buildings: OVs, AOVs, shaft systems, access hatches, smoke dampers, smoke door and window actuators, smoke detectors, break glass switches, and manual and automatic controls.
- We can provide a complete package of scheme design, manufacture, installation, commissioning and maintenance, with the advantage that all the components are contained within one package of works.
- Every type of building presents different dynamics and requirements, and when you work with Colt, you can count on full peace of mind in every phase of the project and for the full life cycle of your system because our experts understand the engineering and architectural challenges of different buildings.

You can count on Colt to:

- Look at the complete picture: we know how a building works and have extensive in-house expertise in a broad range of technologies.
- Design the most cost-effective, no-nonsense solution engineered to meet your needs and any prevailing regulations, relying on our in-house technical resources such as CAD and CFD.
- Advise on the prevailing regulations and standards. We have the expertise to deliver smoke control systems that satisfy both the architectural demands and the safety regulations. Customise our products to fit the exact requirements of your project and, where necessary, have them specially tested at our R&D facility.
- Supply our high quality products, manufactured under quality standards and third party tested to rigorous standards. Install and commission your system: our experienced, professional project management teams will take care of everything.
- Maintain and service your system to ensure it keeps working at its most efficient throughout its life cycle.
- Train and advise through all phases of the process. We offer free technical seminars.

Service and maintenance

Our service team offers mechanical and electrical, preventative and reactive service, maintenance and repair for a wide variety of building services equipment, whether or not this has been supplied by Colt.

We provide a 24 hour, 365 day emergency cover as standard.

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.

British Standard BS 5588-12 and BS9999 recommends that smoke control systems should be serviced at least once a year and tested weekly.

COLT INTERNATIONAL LIMITED
New Lane | Havant | Hampshire | PO9 2LY | Tel +44(0)23 9245 1111 | Fax +44(0)23 9245 4220
info@coltgroup.com | www.coltinfo.co.uk

"People feel better in Colt conditions."