



# Colt International Ltd

Design considerations when integrating smoke and fire curtains into a building  
CPD Technical Seminar 2018





## Certification

of CPD course provision

This is to certify that

**Colt International Ltd**

has been registered as a CPD Course Provider by  
The Chartered Institution of Building Services Engineers (CIBSE)

Accredited from 1st June 2017 to 31st May 2019

Andrew Rowe  
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Colt have a number of CPD accredited topics including:

- Car park ventilation
- The general principles of smoke control
- Pressurisation
- Smoke shafts
- Overheating common corridors
- Smoke and fire curtains
- Louvre
- Evaporative cooling



# A brief history of Colt

Colt International Limited



Founded in

**1931**

2016 UK turnover

**£30 million**

2016 Group turnover

**£160 million**

Manufacturing facilities in  
**UK, Holland & Germany**



# Accreditations and Memberships

Colt International Limited



## Accreditations

- Achilles
- Altius Gateway
- CHAS
- Construction Line
- Safe Contractor
- Worksafe Contractor
- RoSPA

PPQ still required by clients



Chas Accredited



ISO 9001: 2015

MANAGEMENT SYSTEM CERTIFICATE

Colt International Limited  
Head Office  
Colt House, Regency Office Park, Bedford Road, Hemel Hempstead, Herts, SG3 3DP,  
United Kingdom

has been found to conform to the Environmental Management System standard:  
**BS-EN-ISO 14001:2015**

The design, manufacture, installation, service, repair and preventive maintenance of air and noise ventilation equipment, noise control equipment, acoustic and electro-energetic control equipment, dampers, louvers and air moving equipment.



ISO 14001: 2015

## Memberships





Smoke Control



Climate Control



Louvre & Shading

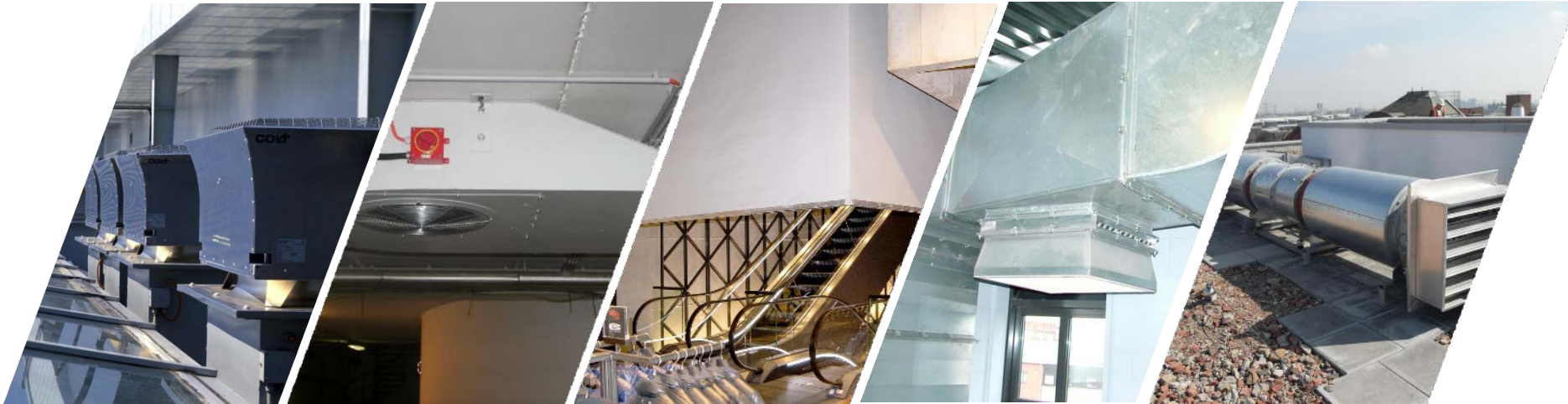


Service





## Smoke Control



**SHEVS**  
Smoke and Heat  
Exhaust Systems

**Car Park**  
Ventilation

**Smoke**  
Containment

**Pressurisation**  
Systems

**Smoke Shaft**  
Systems





Climate control



Natural  
Ventilation

Mechanical  
Ventilation /  
HVAC

Evaporative  
Cooling

Industrial Heating



# Performance & Screening Louvre

Colt International Limited



Louvre



Screening

Ventilation &  
Rain Defence

Shading

Acoustic







## Service



24 hour call out

Nationwide Coverage

Spare Parts

Surveys



# Introduction

Design considerations when integrating smoke and fire curtains into a building 2018



- Fire curtain vs smoke curtain
- What are smoke curtains and fire curtains?
- Construction
- Relevant UK standards
- Building Regulations (UK)
- Applications
- Use, testing and maintenance
- Summary



# The differences between smoke and fire curtains

Design considerations when integrating smoke and fire curtains into a building 2018



- A smoke curtain is used as part of a smoke control system to control the flow of smoke – typically as a channelling screen or a smoke reservoir screen.
- A fire curtain is used to provide fire separation between 2 spaces – typically to protect a lift door or an escape route through an open plan dwelling.
- A smoke curtain is only exposed to smoke so is rated to 600°C.
- A fire curtain is exposed to fire so is rated against the ISO fire curve, which exceeds 1000°C for a specified period of time, e.g. 60, 120, 180 minutes
- A smoke curtain usually remains above head height.
- A fire curtain fully closes an opening.



# The differences between smoke and fire curtains

Design considerations when integrating smoke and fire curtains into a building 2018



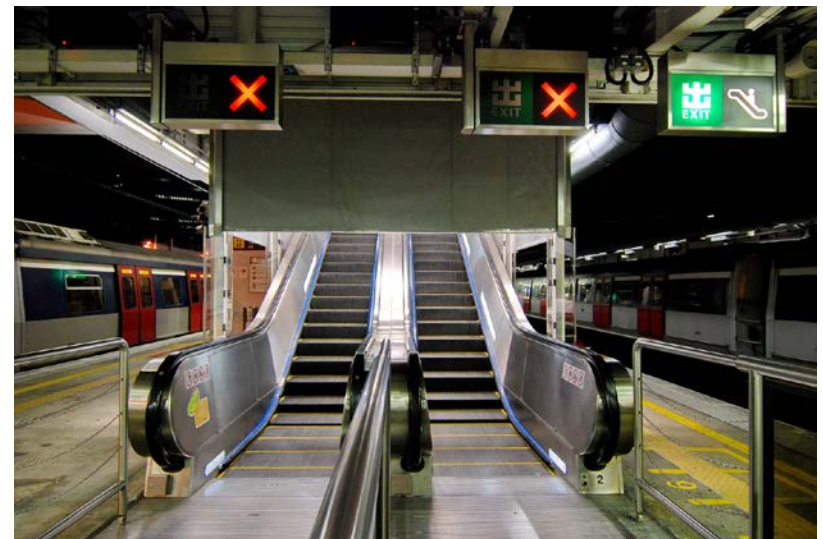
## Smoke curtains (barriers)

Smoke barriers may be conventional smoke curtains or any other product which will withstand temperatures up to 600°C (fire rated glazing, builder's work, etc).

Smoke curtains may be fixed or automatic.

**Fixed** curtains are usually a lightweight fabric, rigidly fixed along the edges.

**Automatic** curtains are usually a similar fabric, wrapped round a motorised roller. Concertina designs are also available.



# The differences between smoke and fire curtains

Design considerations when integrating smoke and fire curtains into a building 2018



## Fire curtains

Fire curtains replace conventional fixed elements, doors, shutters, walls or any other product providing a fire rated partition.

Fire curtains are always **automatic** (active).

Automatic curtains are usually a similar fabric to a smoke curtain but wire reinforced to withstand higher temperatures, wrapped round a motorised roller. Side guides are always required.



# Smoke Curtains

Design considerations when integrating smoke and fire curtains into a building 2018



## Smoke Curtains

- Construction
- Relevant UK standards
- Building Regulations (UK)
- Applications
- Use, testing and maintenance
- Project example



# Smoke Curtains - Construction

Design considerations when integrating smoke and fire curtains into a building 2018



Smoke curtains typically comprise:

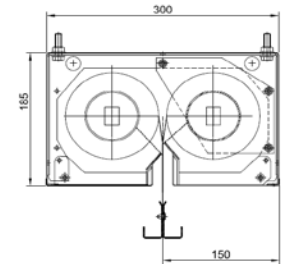
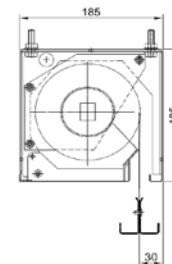
- A roller with integrated motor and bearings
- A fabric fixed to and rolled round the roller
- A weighted bottom bar fixed to the fabric

A head box to contain the mechanism.

Curtains may be gravity drop or drive down.

In multiple curtains the rollers and fabric overlap.

Optional side guides may be available.



# Smoke Curtains – Standards (Product)

Design considerations when integrating smoke and fire curtains into a building 2018



Smoke barriers must comply with BS EN 12101-1 and be CE marked.

Testing includes:

- Heat exposure (minimum 600°C/30 minutes)
- Reliability (1000 cycles)
- Response time
- Speed of descent (0.06m/s to 0.3m/s)
- Measurement of gaps.

Gravity descent or powered descent is permitted.

This standard applies to static barriers too, whatever material they are made of.





# Smoke Curtains – Standards (Application)

Design considerations when integrating smoke and fire curtains into a building 2018



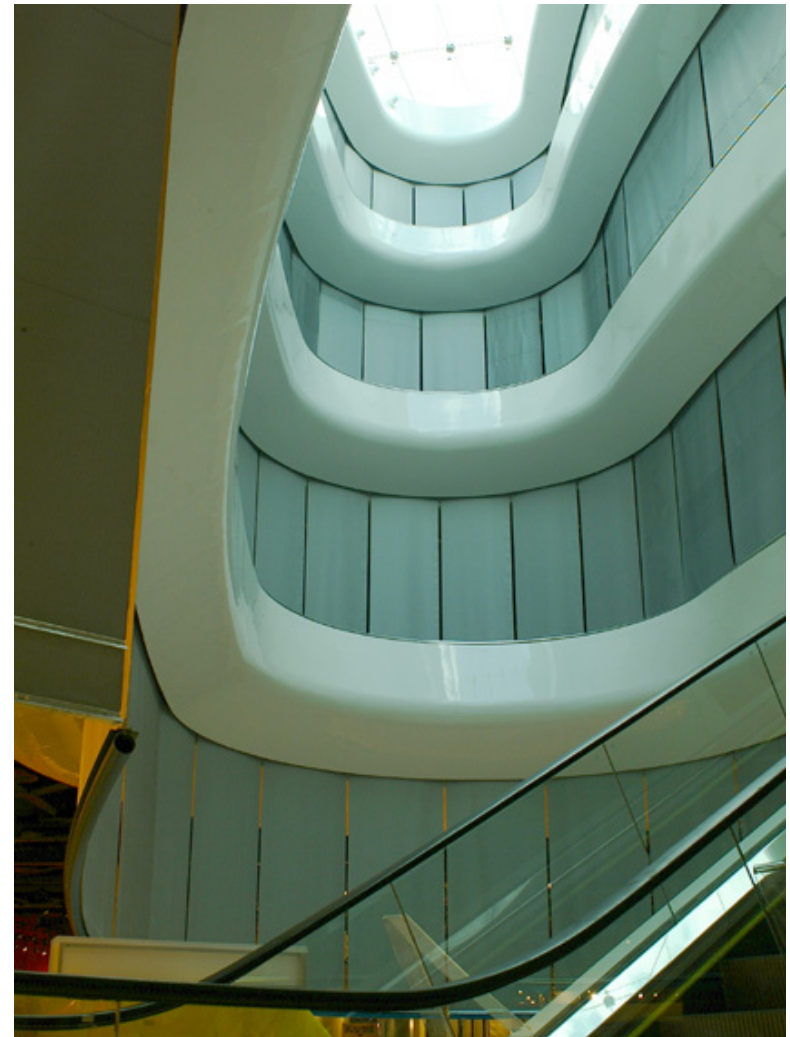
There is **no specific** application standard.

**BR368** gives guidance (out of date).

**BS 7346-4** gives limited guidance in 6.6, 6.9 and Annex D

- Maximum smoke reservoir areas, leading to smoke curtain locations
- Minimum depth; 100mm below base of layer in deflected position
- Minimum depth for use as a channelling screen
- Calculation for deflection
- Avoidance of increased edge gaps for deflected curtains.

**Building Regulations** make no mention of smoke curtains

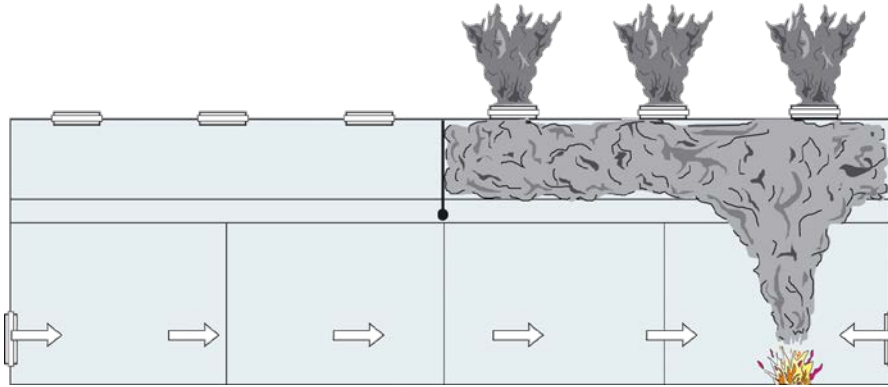


# Smoke Curtains - Applications

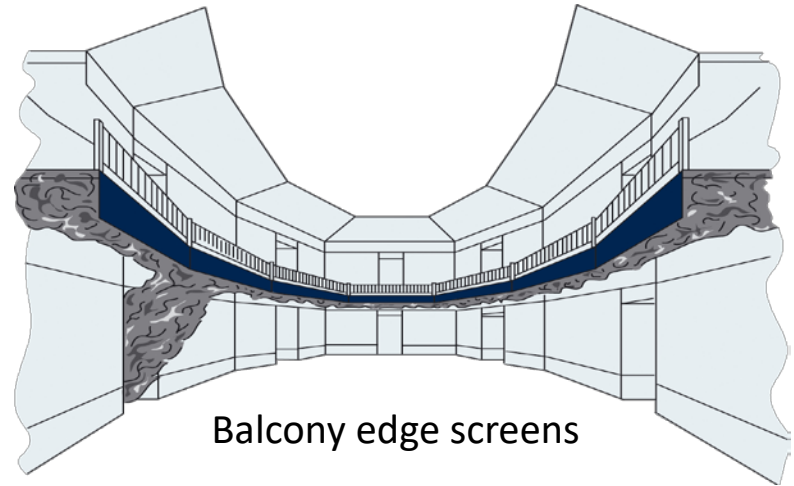
Design considerations when integrating smoke and fire curtains into a building 2018



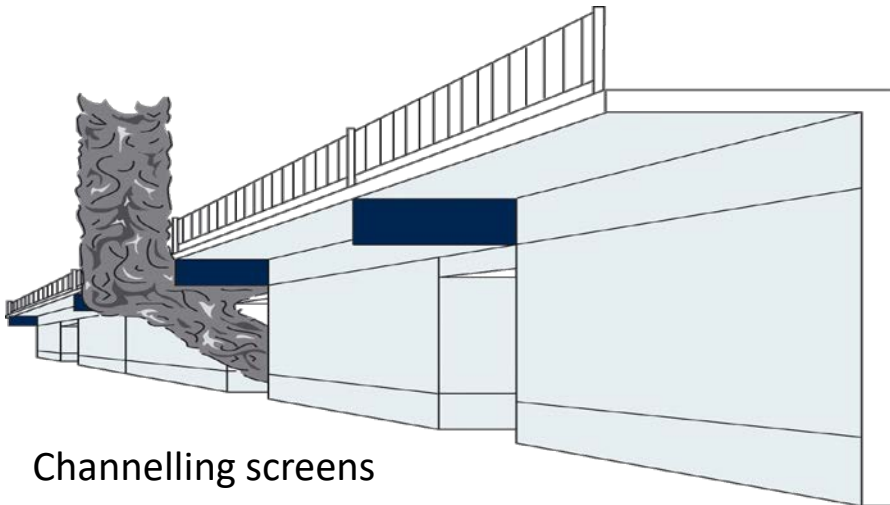
There are 4 common applications for smoke curtains:



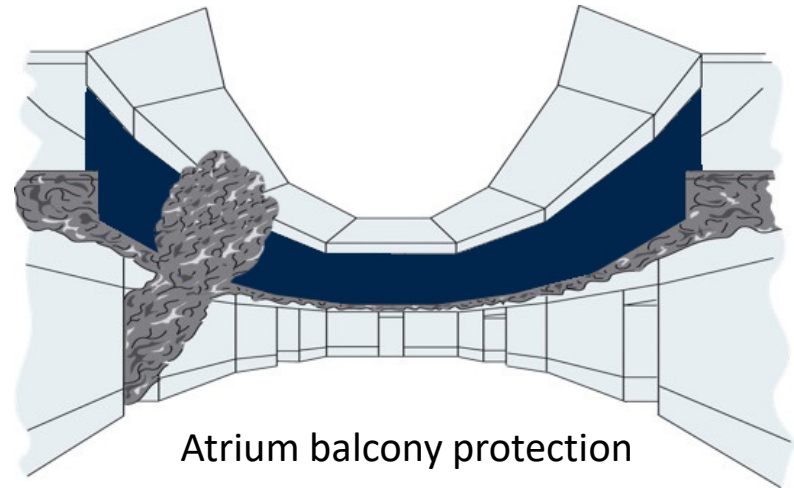
Smoke reservoir boundaries



Balcony edge screens



Channelling screens



Atrium balcony protection

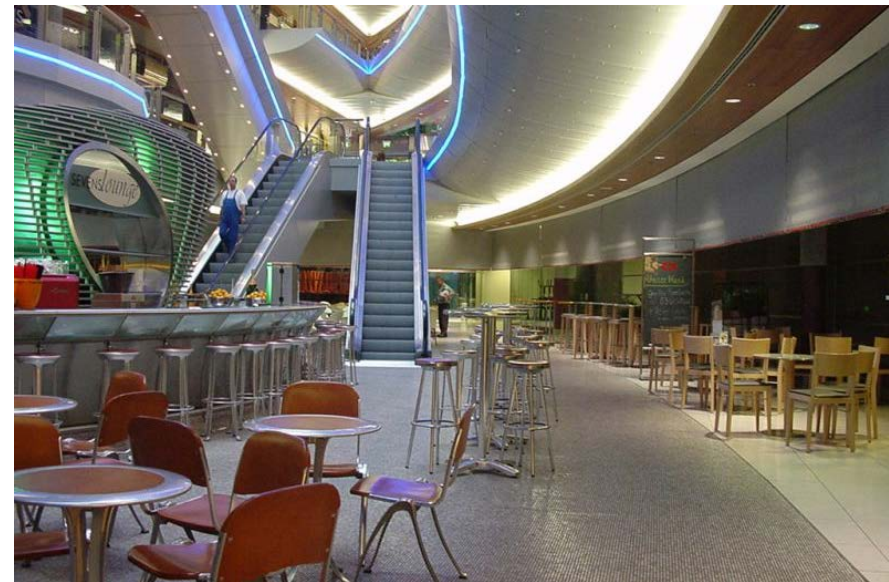


# Smoke Curtains - Issues

Design considerations when integrating smoke and fire curtains into a building 2018



- Access for maintenance and repair
- Location of controls and battery back ups
- Air movement
- Deflection, billowing and edge gaps
- Location – not above fire source



# Smoke Curtains – Use, testing and maintenance

Design considerations when integrating smoke and fire curtains into a building 2018



Automatic smoke curtains are **not designed for daily use**. The 1000 operation life cycle test represents only 20 years of testing once a week.

Life safety systems should be tested once a week.

Annual maintenance is normally sufficient.

- Access



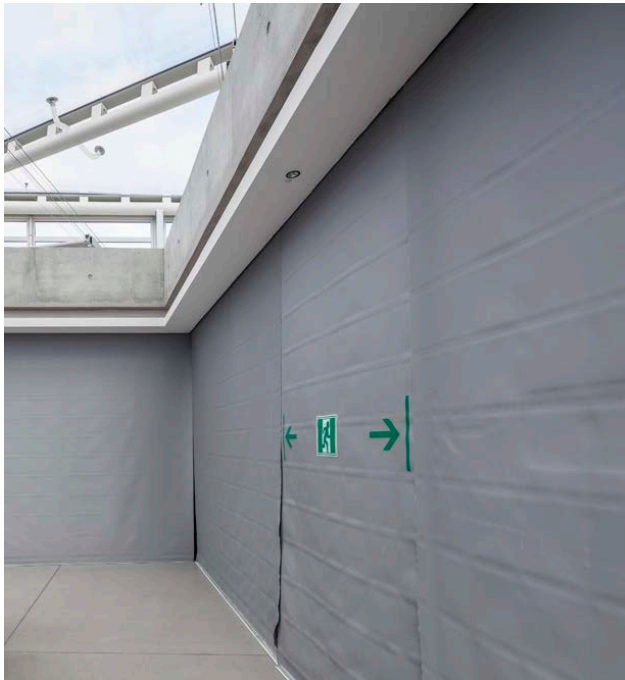
# Smoke Curtains – Project example

Design considerations when integrating smoke and fire curtains into a building 2018



## Schuldorf School, Germany

EN 12101-2 certified smoke curtains for atrium area of new school building.



# Fire curtains

Design considerations when integrating smoke and fire curtains into a building 2018



## Fire Curtains

- Construction
- Relevant UK standards
- Building Regulations (UK)
- Applications
- Use, testing and maintenance
- Project example



# Fire curtains - Construction

Design considerations when integrating smoke and fire curtains into a building 2018



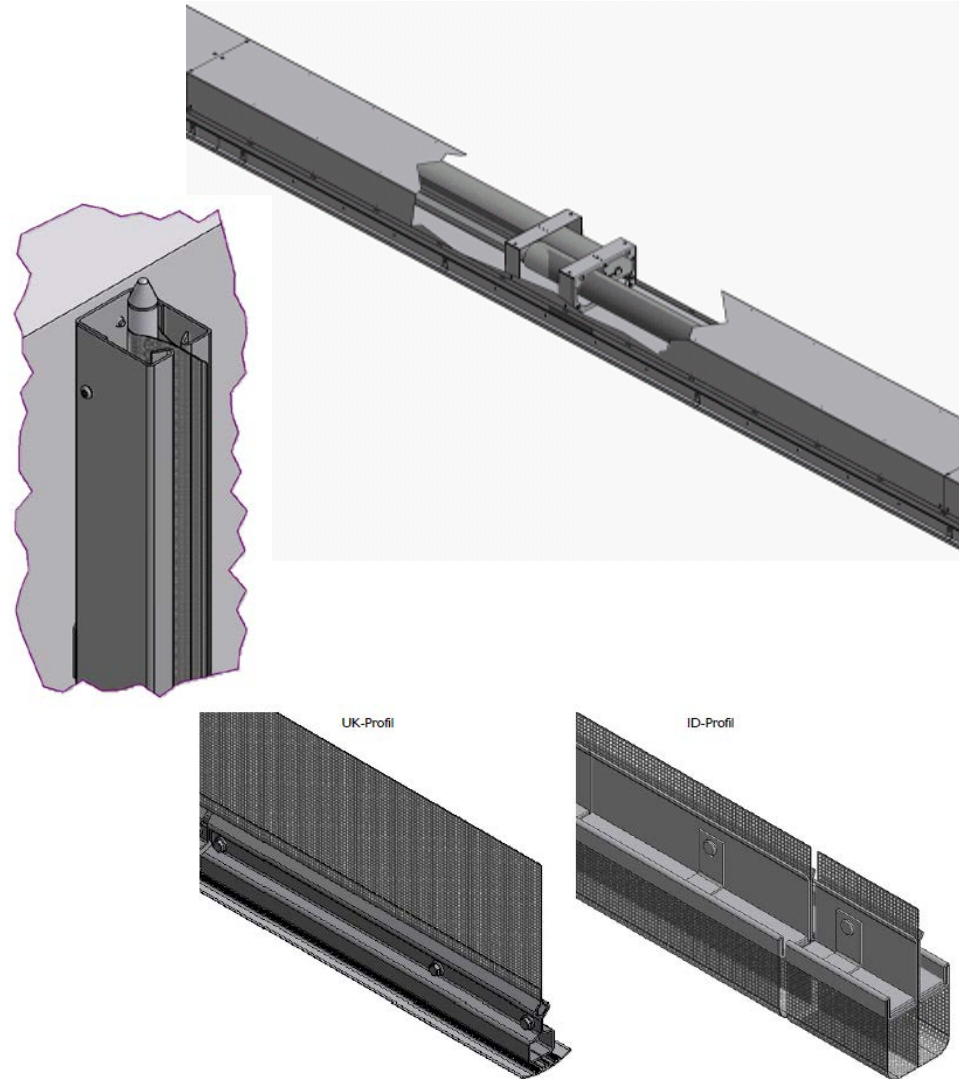
Fire curtains typically comprise:

- A roller with integrated motor and bearings
- A fabric fixed to and rolled round the roller
- A weighted bottom bar fixed to the fabric
- A head box to contain the mechanism
- Side guides to retain the fabric and bottom bar.

In multiple curtains the rollers and fabric overlap.

Control is usually from a zone control panel.

Battery back up is usually provided (essential if emergency access or egress controls fitted).



# Fire Curtains – Standards (Product)

Design considerations when integrating smoke and fire curtains into a building 2018



Fire curtains should comply with BS 8524-1: 2013. Gravity descent is required (except for horizontal units).

## Testing includes:

- Fire resistance (EN 1634-1 or BS 476-22) (integrity, optional radiation/insulation)
- Reliability (impact and cycle test)
- Response time
- Speed of descent (0.06m/s to 0.15 or 0.3m/s)
- Smoke containment (optional)
- Accessories

*Under EU rules, curtains replacing a fire door or shutter should instead be CE marked to EN 16034 once this is harmonised.*





# Fire Curtains – Standards (Applications)

Design considerations when integrating smoke and fire curtains into a building 2018

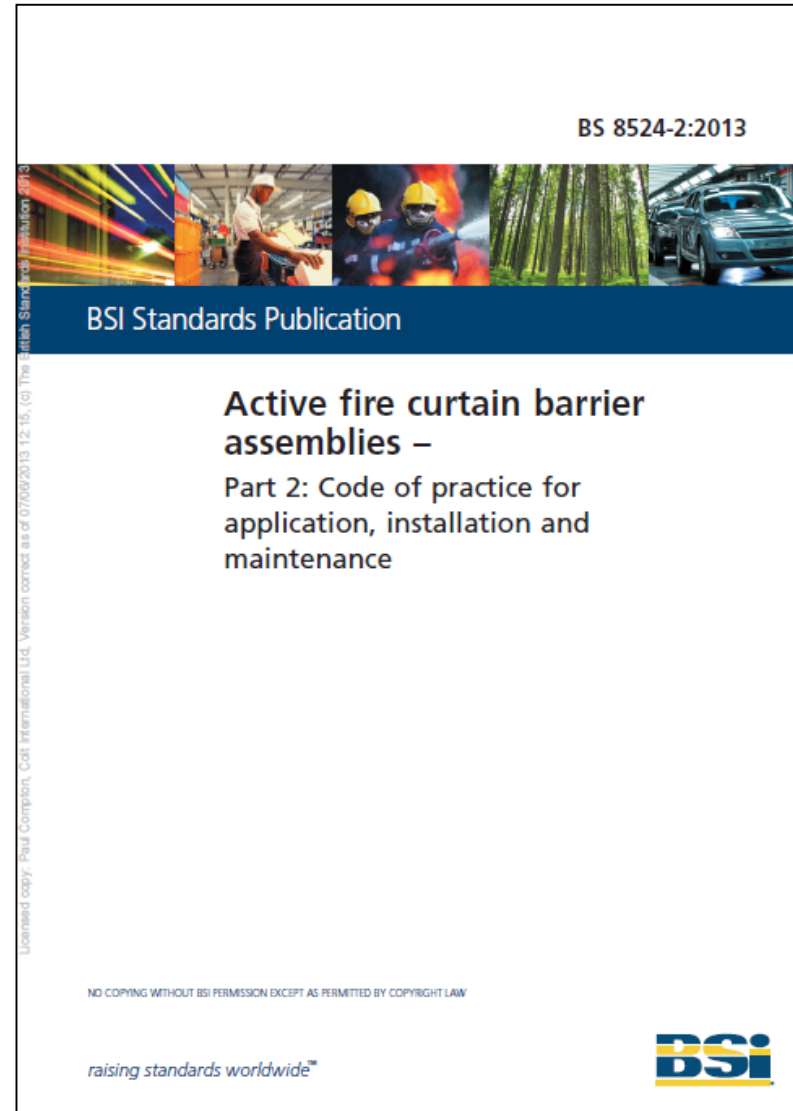


The application standard is **BS 8524-2: 2013**.

This has replaced PAS121

**Building Regulations** make no mention of fire curtains.

Fire curtains are a fairly recent development and ADB is old.



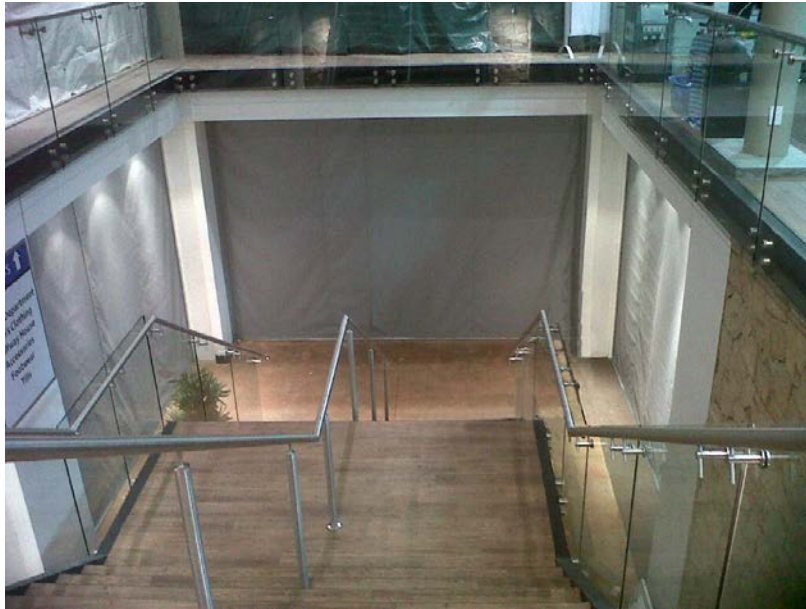
# Fire curtains - Applications

Design considerations when integrating smoke and fire curtains into a building 2018



Example applications for fire curtains:

- As direct replacements for fire doors or fire shutters
- To protect lift doors
- To close voids used as smoke shafts
- To protect MoE in open plan dwellings
- To protect counters, serveries, service shafts
- To allow escape along narrow atrium balconies



Most basic fire curtains have no insulation rating.

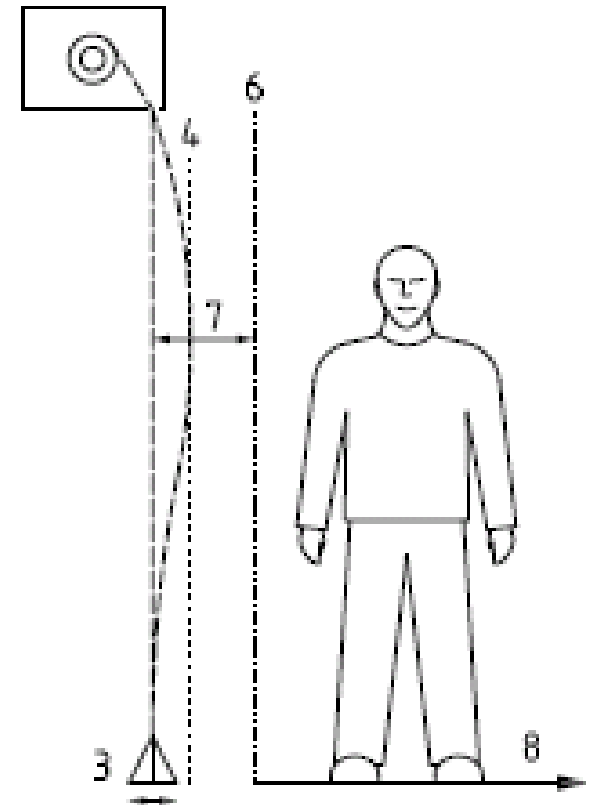
Where an insulation rating is wanted:

- If available, insulation rating should be used
- Alternatively BS8524-2 provides ways to use radiation data instead:
  - Simple table for small dwellings
  - Fire engineered approach

### Radiation tenability at 15 min

Length of barrier assembly run along escape route m	Max. radiation permitted <sup>(A)</sup> kW/m <sup>2</sup>
1	13.7
2	7.6
3	5.5
4	4.4
5	3.7

<sup>(A)</sup> As measured in a fire resistance test in accordance with BS 8524-1:2013, 5.6.4, the radiation measurement is taken after 15 min.



c) Tenable zone

# Fire curtains - Issues

Design considerations when integrating smoke and fire curtains into a building 2018



- Close before starting smoke extract fans
- Deflection
- Access for maintenance and repair
- Location of controls and battery back ups
- Obstruction
- When should a fire curtain close?
- Fire Service access



# Fire curtains – Use, testing and maintenance

Design considerations when integrating smoke and fire curtains into a building 2018



Automatic fire curtains may be designed for daily use. Most are intended for emergency use only.

Reliability classes from 0 to 200,000 cycles are available in BS8524-1; most curtains are likely to be rated C1 (500 cycles).

Maintenance should be to manufacturer's instructions – annual is normally sufficient.



**Table 6 Inspection and testing of barrier assemblies**

Frequency	Inspection and testing
Daily	Where no sensory equipment is installed, check for obstructions to operational areas, e.g. by alterations to cosmetic finishes, lighting, shelving, sales displays or racking or by furniture or temporary or moveable displays.
Weekly	Operate all barrier assemblies. Where a barrier assembly forms part of a smoke control system protecting a means of escape, the barrier assembly should be operated in conjunction with the smoke control system. <sup>A3</sup>
Monthly	<p>Test the release of self-closing devices and automatic release mechanisms via a test switch.</p> <p>Check that any sensory detection equipment is functioning correctly.</p> <p>Check that the barrier fabric is undamaged.</p> <p>Check that the self-test facility is functioning correctly.</p>
Every three months	Operate any barrier assembly forming part of any smoke control system, testing all zones separately. <sup>A3</sup>
Every six months	<p>Check that smoke seals are undamaged.</p> <p>Check that the barrier assembly is not structurally damaged or excessively bowed or deformed.</p> <p>Arrange inspection and testing of the barrier assembly by competent persons.</p>

<sup>A3</sup> A smoke control system might include fans and powered exhaust ventilators, smoke dampers, natural exhaust ventilators, automatic smoke curtains, etc.



# Fire Curtains – Project example

Design considerations when integrating smoke and fire curtains into a building 2018



## Lakeside North Harbour, UK

17m fire curtain installed in a newly refurbished office complex, to protect the main foyer in case of fire.



# Controls

Design considerations when integrating smoke and fire curtains into a building 2018



Controls for **smoke curtains** are usually simple: a battery back up or UPS to prevent unwanted deployment and a simple panel linked to the fire detection system.

Controls for **fire curtains** can be much more complex, with **BS 8524** recommending a number of enhancements for the various curtain applications.





# Controls – Fire curtains

Design considerations when integrating smoke and fire curtains into a building 2018



## Optional controls:

### Multi position deployment

- Curtain drops part way and holds for set period before full deployment

### Emergency access switch

- Allows fire service to raise the curtain to enter

### Emergency egress switch

- Allows occupants to raise the curtain to escape

### Obstruction warning

- Provides audible and visual alarm if an obstruction remains in place for a set period



## Smoke curtains and fire curtains:

- Are different and **not** interchangeable
- Fire curtains restrict the spread of fire (and smoke)
- Smoke curtains only restrict the spread of smoke
- All smoke curtains sold in the UK should be **CE marked to EN 12101-1**
- Fire curtains cannot currently be CE marked to the CPR
- Both products enhance architectural flexibility and, used properly, form important parts of a building's fire safety strategy.





**Design considerations when  
integrating smoke and fire  
curtains into a building**

Whitepaper

**Your next steps:**

Call us: +44(0)23 9245 1111

Email us: [info@coltgroup.com](mailto:info@coltgroup.com)

Visit our website: [www.coltinfo.co.uk](http://www.coltinfo.co.uk)



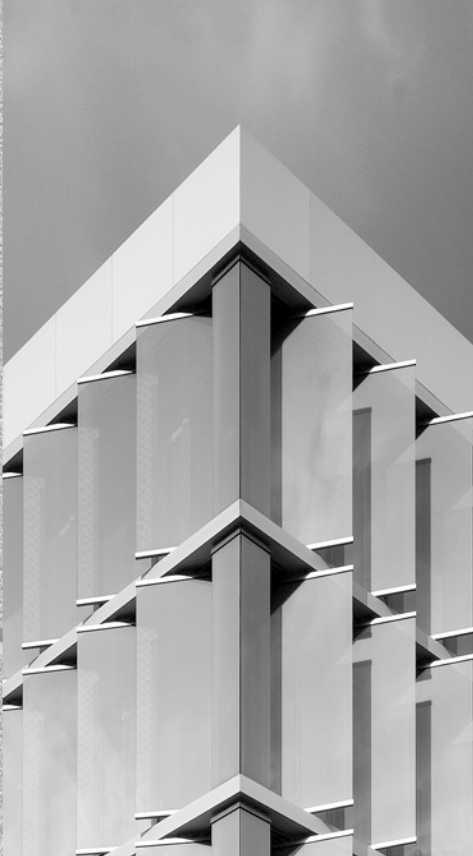
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## Whitepaper: Design considerations when integrating smoke and fire curtains into a building

Download this and more at:

[blog.coltinfo.co.uk/white-papers](http://blog.coltinfo.co.uk/white-papers)





# Q&A Session...

**COLT**

"People feel better in Colt conditions" | [www.coltgroup.com](http://www.coltgroup.com)