



DUCTMATE

FIRE RATED VENTILATION DUCTWORK SYSTEMS



FENLAND FIRE DUCT



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From our roots in sheet metal work, Ductmate have been at the forefront of the ductwork industry for decades. We have continually expanded and diversified, but our aim remains the same: to provide our customers with the best products and services available.

Throughout this time Ductmate have utilised various forms of Fire Resistant ductwork, but since its development in 1999, the Fenland system has proved to be the right product for the job and Ductmate are proud to incorporate it within our ever growing product portfolio.



Approximately 85% of deaths in fire situations are caused by smoke inhalation. Non-fire resisting ductwork systems can be responsible for allowing the initial spread of fire between compartments, and by allowing the rapid spread of smoke and decomposition products.

The correct use of fire resistant ductwork will maintain fire compartmentation and assist in the safe dispersal of smoke and hazardous fumes.

Building Regulations

The Building Regulations require that to limit the spread of Fire all new buildings should be sub-divided into separate Fire Compartments. Obviously this sub-division can have potential areas of weakness, namely Doors, Windows, Service Penetrations and particularly Ventilation ducts which can easily assist in the spread of fire.

British Standard BS5588 Part 9 sets out 3 methods of Fire protection for Ventilation ductwork.

Method 1: The Use of Fire Dampers – Fire is isolated in the compartment of origin by the automatic actuation of Fire Dampers within the ductwork system; As this method blocks the passage of air this is not acceptable where ventilation requires to be maintained, or where the use of Fire Dampers is not permitted. (i.e. Smoke Extracts, Car Park Extracts, Kitchen Extract & Pressurisation Systems.) It should also be noted that wherever a ventilation duct crosses an escape route without serving that area, as well as the use of Fire Dampers, this duct must be protected to method 2, or method 3.

Method 2: Protective Enclosures – A services shaft is constructed through which the ventilation ductwork passes, if this enclosure is constructed to the highest standard of fire resistance of the structure through which it penetrates, it forms a compartment known as a protected shaft. Fire dampers require to be installed where ventilation ductwork enters or exits this shaft. However if there is only one duct and no other services within the shaft between the fire compartment and the outside of the building, then no fire dampers will be required.

Method 3: Fire Resisting Ductwork – The ductwork itself forms a protected shaft, the fire resistance may be achieved by the ductwork material itself, or by the application of a protective material, providing that the protected duct is constructed to the standard by which the product was originally tested and certified. The fire resistance of the ductwork when tested from either side, should not be less than the fire resistance required for the elements of construction in the area/compartment through which it passes.

All fire resistant ductwork must be tested to BS476 part:24, or the appropriate National Standard by a recognised NAMAS/UKAS Accredited Laboratory.

The Fenland Fire Duct System is an augmented ductwork construction utilising the latest manufacturing techniques to which an intumescent coating is factory applied.

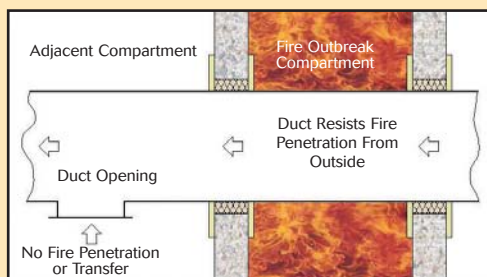
As the coating is spray applied, this allows the ductwork system to be manufactured in any cross sectional shape to suit the application, producing a flanged single skin Fire Rated Ductwork system giving Stability and Integrity of up to 4 hours. This provides wipe clean surfaces both internally and externally and can be delivered to site in manageable sections for ease of assembly.

Manufacturing in this manner gives total flexibility over the design of the system, and allows the externally applied insulation requirements to be fine-tuned to meet the varied requirements of each particular type of Fire rated ductwork system.

The Fenland Fire Duct System complies with the requirements of Method 3 of BS 5588 part 9: 1989, and has been fully tested in accordance with BS 476 part 24: 1987 (ISO 6944: 1985).

The Fenland Fire Duct System has been assessed by the BRE Centre for Fire Resistance (formerly the Loss Prevention Council) as being suitable for use as, **"a Fire Rated Ventilation Duct, a Smoke Extract/Outlet Duct or a Kitchen Extract Duct."**

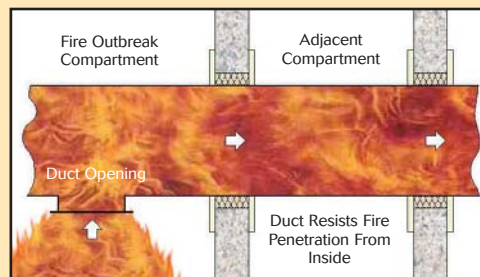
TYPE A DUCT (fire outside)



Up to 4hours - Stability, integrity and Insulation.

Typical for Escape Lobby Ventilation and Staircase Pressurisation Systems.

TYPE B DUCT (fire inside)



Up to 3hours - Stability, integrity and 2hours Insulation.

Typical for Kitchen Extract, Smoke Extract and other Fire Rated Systems.

In accordance with BS 476 Part 24 : 1987 the fire resistance of ventilation ductwork shall be expressed in minutes of duration of heating in accordance with the ISO 834 : 1985 (Cellulosic - Standard Time/Temperature Curve) until failure occurs to one or more of the following criteria – **Stability / Integrity / Insulation**

Stability: Stability failure shall be deemed to have occurred in duct A within the furnace and in ducts A and B outside the furnace when the duct no longer fulfils its intended function. (For smoke outlet ducts stability failure will also be deemed to have occurred when there is any restriction of the cross-sectional area of the duct to 75% or less of its original area)

Integrity: The presence and formation of any cracks, holes or other openings outside the furnace through which flames or hot gases can pass.

Insulation: Insulation failure shall be deemed to have occurred when the temperature rise above initial ambient on the unexposed surface of the duct outside the furnace exceeds either:

- 140 °C as an average value above ambient
- or
- 180 °C as a maximum value above ambient

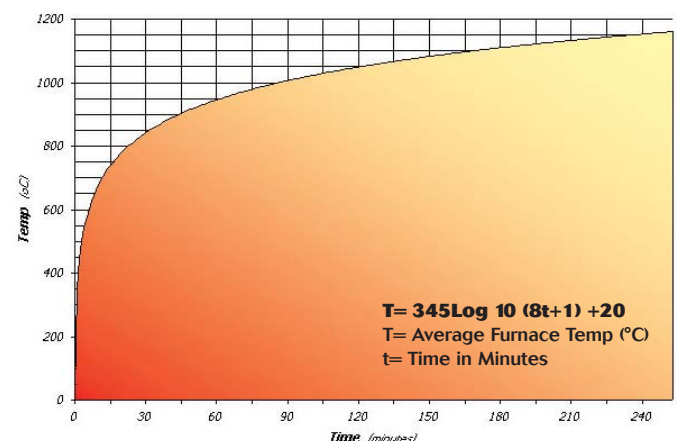
For a Kitchen extract duct (Type A) these temperature limits also apply to the inside surface of the duct within the furnace.

Fire Resisting Ventilation Duct: A duct or ductwork system used for the distribution, or extraction of air, designed and tested to satisfy the criteria of test defined in British Standard BS476 part 24:1987 (ISO 6944:1985), (Duct Type A & Duct Type B).

Smoke Extract/Outlet Duct: A duct or ductwork system used for the extraction of products of combustion, designed and tested to satisfy the criteria of test defined in British Standard BS476 part 24:1987 (ISO 6944:1985), (Duct Type B). Additionally this duct must prove by test that within the fire compartment, its cross sectional area is maintained above 75% when subjected to the full fire temperature.

Kitchen Extract Duct: A duct or ductwork system that is entirely independent of any other duct or ductwork system within a building, which serves as an extract for non-domestic kitchens (BS5588 part 9:1999 clause 6.4.6.2 refers). Designed and tested to satisfy the criteria of test defined in British Standard BS476 part 24:1987 (ISO 6944:1985), (Duct Type A & Duct Type B). Note; Testing of both types A & B are equally important, as due to the likelihood of combustible deposits within the duct it is necessary to protect both the duct and the adjacent compartment from ignition due to radiated heat.

Cellulosic - Standard Time/Temperature Curve



In addition to testing to BS476 Part 24, further independent furnace testing has been carried out in accordance with BS 7346 to simulate smoke extract temperatures of between 250 °C and 600 °C. The results allow us to tailor the insulation requirement for smoke extract systems where the gas/fume temperature is known.



The Right System

In order that the Ductmate Fire Resistant ductwork system can be correctly tendered to meet your requirements there are various factors which require to be carefully considered and defined.

Any specification should therefore;

- Define the type of system ie (Smoke Extract / Kitchen Extract / Ventilation / Pressurisation).
- Determine whether the system is Duct type A (fire outside), or Duct type B (fire inside), or whether the requirement is for fire both inside and outside.
- Stipulate the required Fire Rating in minutes, in accordance with BS476 part 24 1987, for each of the following criteria

Stability:

Integrity:

Insulation:

These criteria will be determined by the design of the structure, for which guidance can be sought from publications such as;

The Building Regulations, Approved Document B (Fire Safety).

Dependent on the route and type of system, it may be possible to refine the Insulation requirement to prevent unnecessary over application. This is particularly true on smoke extract systems where a lesser thickness of insulation may be required to suit smoke temperatures, instead of full thickness insulation to suit fire temperatures.

It is the Design Teams' responsibility to ensure that the correct system and criteria are selected to comply with the recommendations of the local regulatory authority.

Example Specification

The **Smoke Extract** ductwork should be constructed in accordance with the Ductmate Fenland specification for Fire Resistant ductwork, to provide **120 Minutes Stability**, **120 Minutes Integrity** and **120 Minutes Insulation** (or **120 Minutes fire Insulation** to suit a smoke temperature of **300 °C**) when tested to the requirements of BS476 part 24 : 1987 by a recognised NAMAS/UKAS Accredited laboratory.

The ductwork systems should be manufactured and installed in accordance with BS5588 part 9 : 1999, and be capable of providing type **B** fire containment.

Under normal non-fire operating conditions the ductwork should conform to the class **C** pressure/leakage classification of the current HVCA DW/144 specification for sheet metal ductwork.



Edinburgh Royal Infirmary

Project Portfolio

- AMC Cinemas
- Astra Pharmaceuticals
- Atlantic House - London
- British Home Stores
- Burger King
- Centre for Life
- City Inn Westminster
- Colt Communications
- Eastgate Shopping Centre
- Edinburgh Royal Infirmary
- Glasgow Royal Infirmary
- Greenside Leisure Development
- Greenside Office Development
- Grosvenor Casinos
- GSK House (Project Bridge)
- Haimyres Hospital
- Harry Ramsdens
- Holmes Place Leisure
- Kingsgate Shopping Centre
- Morrison St Office Development
- Nandos Restaurant
- New Norfolk & Norwich Hospital
- Newcastle Airport
- Nokia Communications
- Paddington Central
- Paddington Residential
- Peterborough Court
- Princess Margaret Hospital
- Project Saviour
- Royal College of Nursing
- Sandown Park
- South Tees Acute Hospital
- St Malachys School - Belfast
- The Gate - Newcastle
- The Lanes - Carlisle
- The Lowry Centre
- Warner Cinemas
- Whitehall Square - Belfast
- Woolgate Exchange



Holmes Place Leisure



British Home Stores



Burger King

UCTMATE



SUPPLYING FIRE RATED VENTILATION
DUCTWORK SYSTEMS WORLDWIDE



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For further information please contact: