

An ADCAS guide to the specification of flexible ductwork



What is this ADCAS guidance document about?

There is a lack of clarity over statutory requirements, product standards and technical guidance relating to flexible ductwork. This has given rise to a wide variety of interpretations by those parties involved in the design, specification, manufacture, installation and maintenance of ventilation and air conditioning systems containing flexible ductwork.

In turn, this produces ductwork system installations that may not meet statutory requirements and may potentially compromise building performance in terms of energy consumption, ventilation requirements, fire safety, system durability and system hygiene.

This guidance note aims to help improve the performance of buildings by providing guidance about the legislation, product standards, design, installation and maintenance relating to flexible ductwork



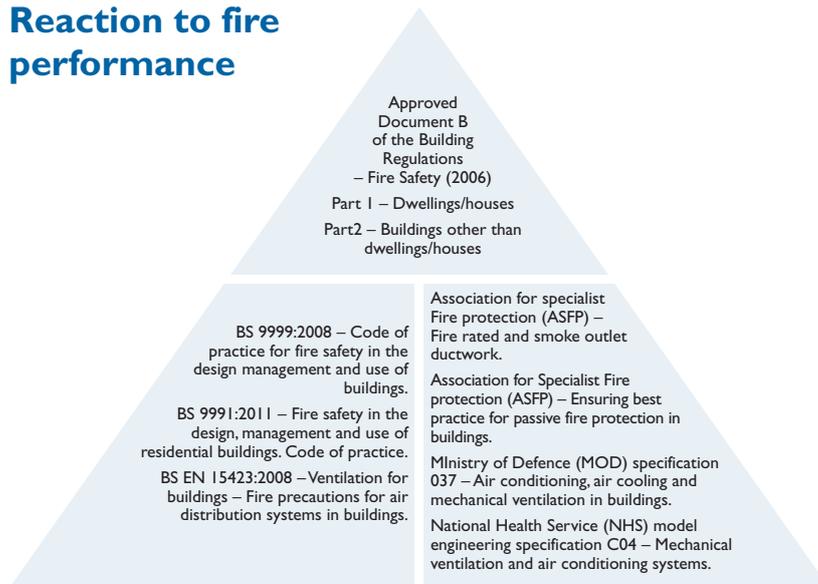
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What guidance should I take into account when specifying flexible ductwork?

The following four diagrams show statutory conformance requirements, British Standards and industry guidance relating to flexible ductwork.

Reaction to fire performance

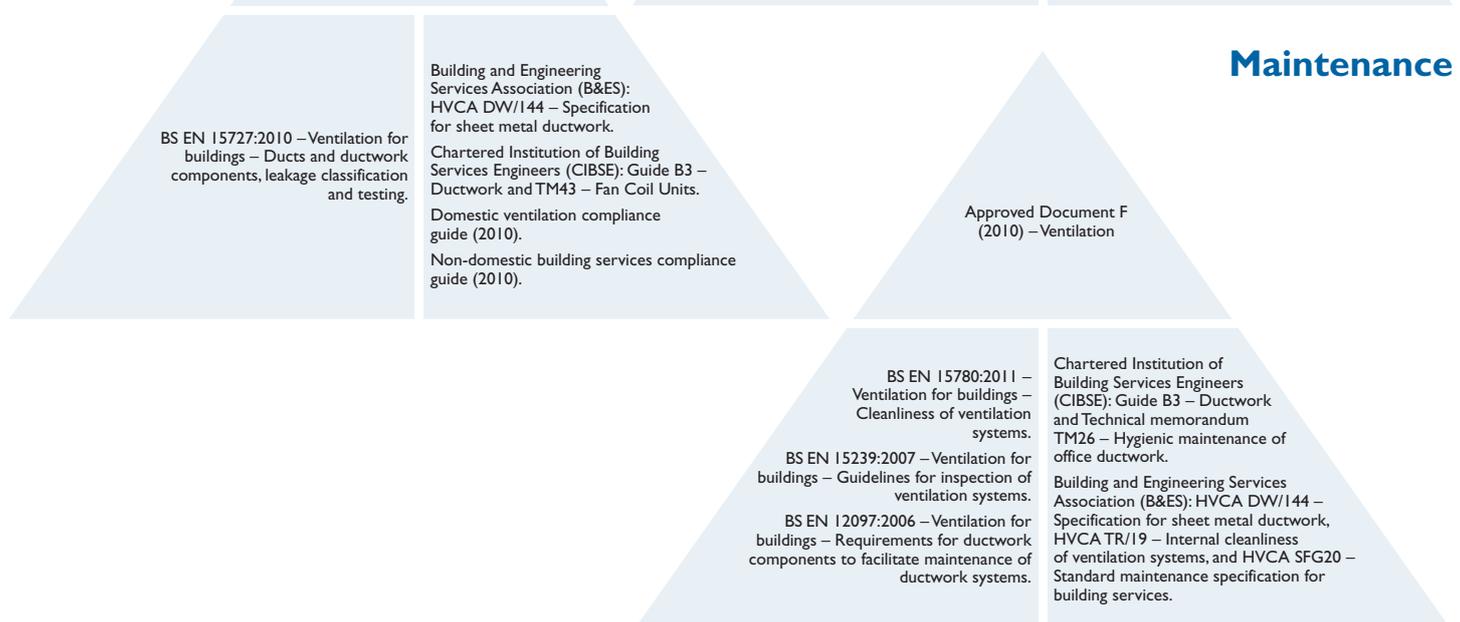


Dimensions and mechanical requirements

Installation



Maintenance



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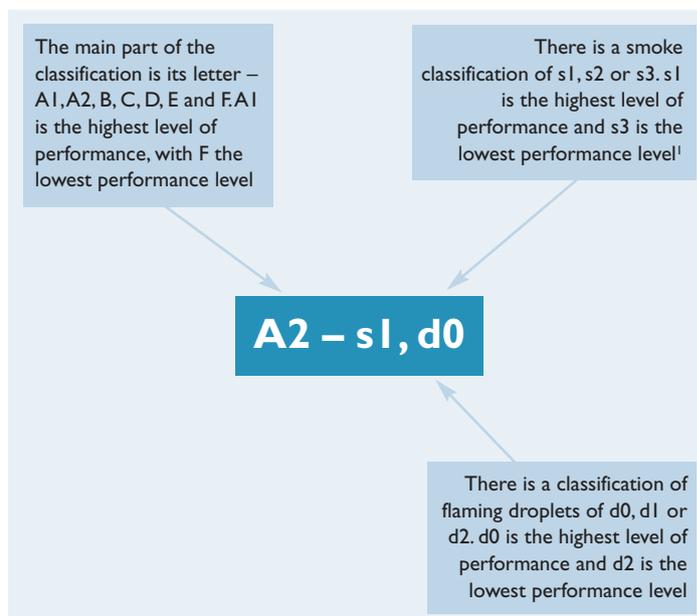
What reaction-to-fire standards apply to flexible ductwork?

In support of the second basic requirement of the Construction Products Regulations (CPR) – safety in case of fire – harmonised procedures for the classification of reaction-to-fire performance have been produced in the European Union (EU).

The harmonised procedures consist of six standards – a classification standard, a suite of four test standards and a standard covering specimen conditioning and substrate selection. The standard EN 13501-1; 2007 + A1: 2009 provides a harmonised procedure for the classification of reaction-to-fire of construction products, including products incorporated within building elements. EN 13501-1 classifies products in the following manner:

The intention is that these harmonised procedures will replace national standards in the member states of the EU. However, at present the harmonised and national standards are co-existing. This means that most flexible ductwork products have multiple national performance classifications. This can lead to confusion within construction project teams about product quality and also acts as a barrier to trade for manufacturers.

Table 1 on the following page uses the seven major classes of the European classification system for reaction-to-fire (A1, A2, B, C, D, E and F) as a means for examining equivalence in reaction-to-fire classification in EU different countries.



1. Materials that are in Class A1 do not require tests for smoke development or production of flaming droplets

Table 1 Equivalence in reaction-to-fire performance classification in Europe³

Euroclass In accordance with EN 13501-1 + A1: 2009	UK (England and Wales)	Germany	France	Sweden	Italy	Netherlands
A1	Non-combustible	A1	Non-combustible	A1 (Non-combustible prior to 1st Jan 2012)	Class 0	Non-combustible
A2	Material of limited combustibility	A2	M0 or M1	A2 (Material of limited combustibility prior to 1st Jan 2012)	Class 1 or Class 2	
B	Class 0 ⁴	B1	M1	B (Class 1 surface lining prior to 1st Jan 2012)	Class 1 or Class 2	Class 1 or Class 2
C	Class 1 ⁵	B1	M2	C (Class 2 surface lining prior to 1st Jan 2012)	Class 2 or Class 3	Class 3
D	Class 3	B2	M3	D (Class 1 surface lining prior to 1st Jan 2012)	Class 3	Class 4
E		B2	M4	E		
F		B3		F		

3. It is important to note that the national classifications for reaction-to-fire do not automatically equate with European reaction-to-fire classifications or with each other. This is because the methodologies and measurements used in the national tests differ from those employed in the tests associated with harmonised European tests. Products cannot assume a European class for reaction-to-fire performance unless they have been tested using a European testing standard.

4. Class 0 products are: a) Composed throughout of materials of limited combustibility or b) Products with Class 1 performance for surface spread of flame when tested in accordance with BS 476-7 which, when tested in accordance with BS 476-6, also have a fire propagation index (I) of not more than 12 and a sub-index (i1) of not more than 6

5. Class 1 or Class 3 is achieved when a material or product meets specific criteria for lateral spread of flame in accordance with BS 476-7.

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Frequently asked questions about flexible ductwork

What standard of fire performance is required for flexible ductwork in the UK?

Approved Document B of the Building Regulations – Fire Safety (2006) states that to inhibit the spread of fire within a building, the internal linings shall:

- Adequately resist the spread of flame over their surfaces; **and**
- Have, if ignited, a rate of heat release or a rate of fire growth, which is reasonable in the circumstances

Approved Document B refers to BS 9999:2008 – Code of practice for fire safety in the design, management and use of buildings. BS 9999 states that flexible ductwork should be constructed of:

- Non-combustible materials², **or**
- Materials conforming to Euroclass A1, as specified in BS EN 13501-1:2007 + A1:2009, **or**
- Material which, when tested in accordance with BS 476-6 has a fire propagation index I of not more than 12 and a sub-index iI of not more than 6, and is situated at least 1 metre from any fire damper

How do I check that flexible ductwork imported from Asia will be of the right size and be strong enough?

The product should comply with BS EN 13180:2002 Ventilation for buildings – Dimensions and mechanical requirements for flexible ductwork. This standard defines compliance criteria relating to nominal length, bending capability, operating pressure, crushing strength, air leakage, marking, labelling and packaging.

What should be the maximum installed length of a section of flexible ductwork?

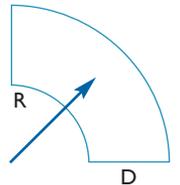
The maximum length of flexible ductwork should be 1 metre. Where practical, flexible ducts should be pulled taut to ensure that the full internal diameter is obtained and flow resistance is minimised. This is considered to have been achieved if the duct is extended to 90 per cent of its maximum length.

What should be the maximum spacing between flexible ductwork supports?

Flexible ducts shall be adequately supported to eliminate sagging and kinking – a maximum interval between supports of 600mm is recommended.

What should be the minimum radius of a flexible ductwork bend?

The radius ratio R/D for bends should be not less than 2, where R is the centre line radius and D is the diameter of the duct



How should flexible ductwork be connected to rigid ductwork or a plenum spigot?

Jubilee clips, or similar mechanical fastenings should be used to ensure a long-term seal is achieved. Connections of lengths of flexible duct should not be taped-only. The integrity of the ductwork system also depends on the correct application of sealant, gaskets or tape. The materials used should be suitable for the purpose intended and satisfy the specified pressure classification.

Should flexible ductwork be insulated on site?

No. Where flexible ductwork is to be insulated, it should be factory applied.

Should flexible ductwork pass through fire-resisting walls, floors or cavity barriers?

No. In order to comply with fire compartmentation requirements, flexible ductwork should not pass through fire-resisting walls, floors or cavity barriers. Flexible ductwork should also not be connected to fire dampers.

Should I take pressure and flowrate readings through flexible ductwork?

No. It is not practicable to make test holes or take test readings in flexible ducts. Where readings are required, the test holes should be made in rigid ductwork.

How frequently should flexible ductwork be inspected?

A visual inspection of flexible ductwork should be undertaken for every 12 months to check damage, security of fittings, deterioration and internal condition

1. Approved Document B (Fire Safety) defines a non-combustible material as any material which when tested to BS 476-11 does not flame nor cause any rise in temperature on either the centre (specimen) or furnace thermocouples, or any product classified as non-combustible in accordance with BS 476 -4



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