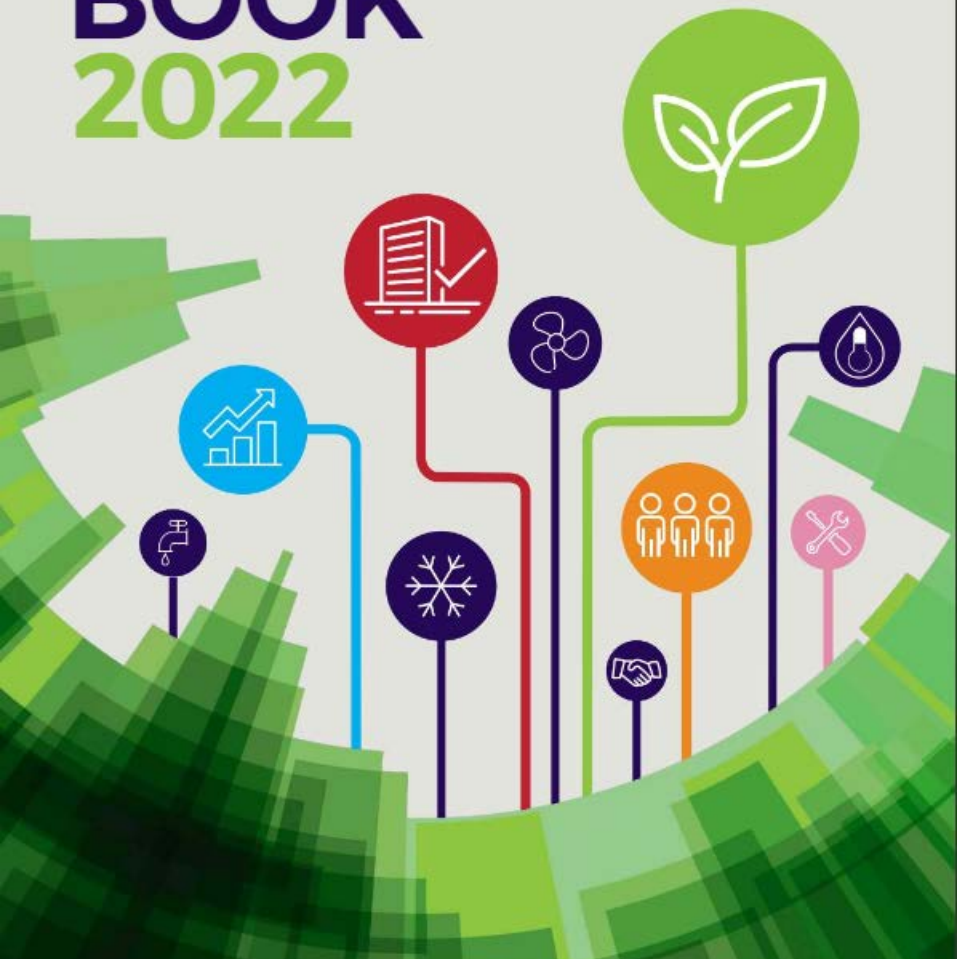


THE BESA BOOK 2022



A Client's Guide to Building Engineering Services

KNOW YOUR INSULATION As AND Bs

Insulation of fire resisting ductwork systems is one of the most frequently asked questions. Firesafe Fire Rated Ductwork commercial director and BSI FSH 22-9 chair, Mark Harrison offers some insights.

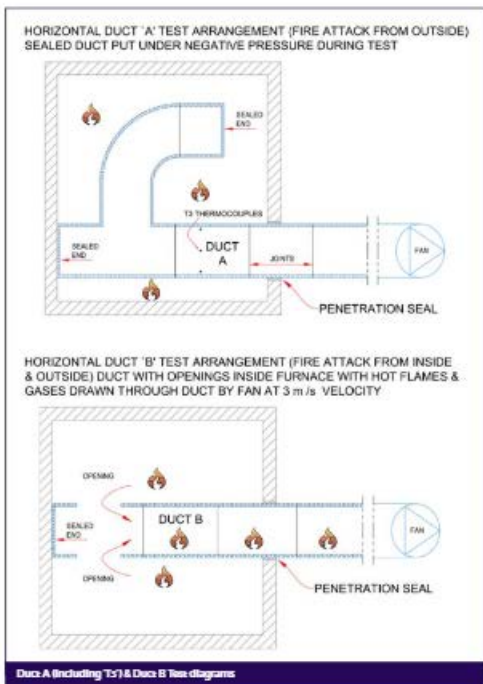
FRD insulation should not be confused with other insulating products used for heat retention or vapour barrier purposes. It must comply with the criteria used in BS476-24 or EN1366-1, depending on specification, and subjected to fire exposure from outside and inside the duct. Its primary purpose is to prevent radiant heat igniting combustible materials (inside or outside the duct).

Know your 'Duct A' from your 'Duct B'

Fire resisting ducts to BS476-24 and EN1366-1 are tested using two scenarios.

- **Duct A** - Fire attack from outside. This duct is sealed and put under negative pressure.

- **Duct B** - Fire attack from both outside and inside. This duct has openings within the furnace and the hot air and gases are drawn through the duct at 3m/s.



In terms of insulation, 'Duct B' performance is usually the worst-case scenario. The exception is for kitchen extract ducts where an additional requirement is included on the 'Duct A' test. Thermocouples, known as 'T3', are placed inside the section of duct within the furnace to record the temperature rise inside the duct with fire attack from outside. The purpose is to simulate the presence of combustible linings inside the duct. In other words, the build-up of grease deposits resulting from commercial cooking.

The insulation failure criteria in the BS476-24 and EN1366-1 test methods are the same. The limits are set at 140°C (average) and 180°C (maximum) temperature rise above ambient.

The impacts of specifying Insulation

Incorporating fire resisting insulation protection will have a significant impact on a project.

- The cost of the fire resisting ductwork system will be higher
- Additional space is required, including sufficient access for installation
- Installation will take longer
- The support system will need to be enhanced for the additional weight

Insulation of a resource kitchen extract ductwork system requires substantial supports



“It is essential to establish the requirement for insulation at design stage by undertaking a risk assessment.”

Compromising on the requirement for fire resisting insulation protection based on cost, programme or space constraints should not be accepted. Retro-fitting of insulation (on previously installed ductwork) is not straightforward or cheap. The ductwork may need to be of a different specification, the supports will almost certainly need to be enhanced, access doors changed and the space around the duct is likely to be restricted.

System function and insulation

Kitchen extract ducts have a higher risk of fire inside the duct as commercial cooking equipment creates potential for flames to pass into the system via the canopy. In addition, there are likely to be combustible deposits lining the duct - even on well-maintained systems.

Kitchen extract ducts are the most likely to require insulating with 'Duct A T3' performance unless it can be established there is no risk of a fire outside the duct. In which case a 'Duct B' performance may be acceptable. This is difficult to prevalidate but, generally, insulation would not be required within the kitchen compartment itself or in a standalone fire resisting shaft containing only one kitchen extract duct.

On the other hand, smoke control and ventilation ducts are much less likely to have combustible deposits inside them. The risk therefore tends to derive from a fire inside the duct travelling through multiple compartments within a building, raising the potential for radiant heat to ignite combustible materials in close proximity.

System routing and 'Proximity to combustible materials'

Cleaning stores (containing flammable liquids), kitchens and plant rooms, to name a few, will be protected with fire resisting construction. FRD routed through these compartments will have a higher exposure risk to fire outside the duct, with the fire potentially igniting combustible deposits inside the duct.

Conversely, if the duct has a fire inside it, say drawn in through a grille in a room where the fire has originated, the radiant heat could ignite combustible material in close proximity, allowing the spread of fire from one compartment to another.

Accepted guidance (supported by ad-hoc test data taken from uninsulated 'Duct B' tests) is that if combustible materials are at least 500mm away from the surface of an uninsulated fire resisting duct, then insulation may not be necessary. >>

UK • EUROPE • MIDDLE EAST • ASIA • USA



THIRD PARTY CERTIFIED BY AN INDEPENDENT NOTIFIED BODY

CASWELL FIRESAFE[®] TECHNICAL GUIDANCE DOCUMENTS ARE AVAILABLE FOR FREE DOWNLOAD

CASWELL FIRESAFE[®] is manufactured in the UK and ROI by these licensed partners:



+44 (0) 1706 227935
enquiries@caswell.uk.com
www.caswellfrd.com



+44 (0) 1323 400680
enquiries@firetrace-ductwork.co.uk
www.firetrace-ductwork.co.uk



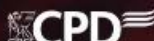
+353 1 8420840
info@sweeneysheetmetal.ie
www.sweeneysheetmetal.ie



+44 (0) 28 9334 1787
estimating@avs-nl.com
www.avs-nl.com

CASWELL FIRESAFE[®] is licenced to manufacturing partners worldwide by FIRESAFE Fire Rated Ductwork[®] Ltd

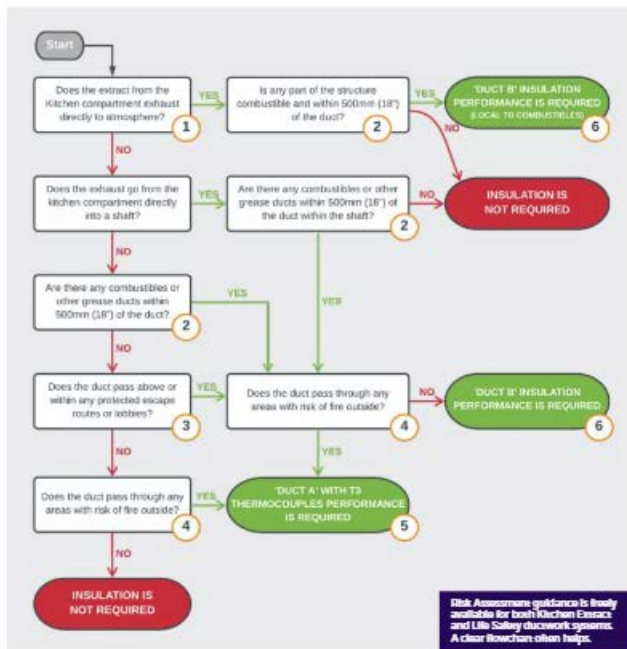
firesafeductwork.co.uk



specification of the duct never exceeds the highest fire rating of any compartment wall or floor through which the system passes.

If the highest rating of a compartment barrier is 1 hour, then there is nothing to be gained from using 2-hour fire resisting duct. This seems common sense but, in practice, specifications tend to default to a 2-hour rating.

As a general guide, fire resisting ducts used for smoke control and general ventilation applications (including passive ducts) will need insulation performance based on 'Duct B' testing. For Kitchen Extract ducts, a 'T3' insulation performance based on 'Duct A' testing is required. This could require double the thickness of insulation material - when compared with a general ventilation duct - for the same insulation period.



Protected escape routes and lobbies

Unless other measures are in place, fire resisting ducts running above or through protected corridors, stairways and lobbies should be considered for insulation to ensure occupants are protected from radiant heat whilst evacuating under fire conditions.

Futureproofing

Building owners and designers may still wish to consider specifying Insulation even where no risk is initially identified. Where there is potential for the risk assessment to change in the future due to a change of use or the requirement for additional services, then this may increase the fire risk.

Specifying FRD performance

Over-specifying FRD will unnecessarily increase costs and take up valuable space. The fire strategy should be checked against the duct route so that the

Finally, be wary of any system offered that is based only on 'Duct A' insulation performance (without the 'T3' thermocouples), as this is far less severe than 'Duct B' testing. This performance would not be suitable for any kitchen extract ducts and only suitable on other types of systems where there is zero risk of a fire inside the duct.

If you are in any doubt, fire resisting ductwork manufacturers will be able to provide guidance and details of their certified insulation performances. ■



Mark Harrison
Commercial Director
Firesafe Fire Rated Ductwork[®] Ltd
www.firesafeductwork.co.uk