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» Armaflex Thickness Calculator DUCTWORK (UK 03/2010)

The need for insulation

Maintaining a temperate and well conditioned environment is an energy intensive process. Studies have shown commercial buildings spend over half their energy simply maintaining a comfortable temperature for occupants.

In any large building air is heated or cooled in a central plant room and then ducted to where it is needed. Heat loss through the duct walls is an inevitable and unavoidable drain on the system. Effective thermal insulation of the ductwork can reduce this waste and help to minimise energy consumption.

In extreme circumstances the heat loss from ductwork can be so great the system is no longer able to maintain a comfortable temperature in some rooms. Thermal insulation also prevents against this – improving the overall experience of building occupants.

Iso 12241

An international standard, ISO 12241, allows the heat loss through duct walls to be accurately calculated. This standard, adopted across the industry, takes into account the thermal resistance of the insulation and also the resistance of heat transfer for both the internal and external surfaces.

Surface emissivity, a unit-less factor related to the colour and finish of a surface, is key to calculating the rate of heat transfer from any surface into the air. A bright foil finish will reduce heat loss compared to a dark high emissivity finish.

The tool on the following page allows calculations to be made in full accordance with ISO 12241 to assess the impact of different Armaflex insulation materials on heat loss.

Selecting a thickness

Across England and Wales Building Regulations Part L requires that adequate provision is made to prevent energy loss from duct by means of thermal insulation. The Thermal Insulation Manufacturers and Suppliers Association (TIMSA) HVAC Compliance Guide recommends ways of demonstrating compliance with Part L, setting heat loss rates which an insulated system should strive to achieve.

For heating ductwork the target is to achieve a heat loss rate no greater than 16.34 W/m2 - a target achieved using 19 mm of Armaflex Duct.

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Achieving full performance

ISO 12241 recognises that heat loss does not occur solely through the duct wall. Heat flows as water and disproportionate energy loss occurs at weak points, known as “thermal bridges”. These points can be uninsulated flanges, along duct insulation pins, contact points with unistrut hangers or even just a slight gap between two pieces of insulation.

With a flexible insulation material and a high quality installation thermal bridging can be averted and a higher overall performance can be achieved.

Acoustic considerations

Whilst important, restricting heat loss is not the only reason to insulate. Noise from air-handling units propagates throughout a building along ductwork and impacts on the productivity and health of occupants.

Armaflex materials not only absorb noise at key nuisance frequencies but also act to significantly damp vibration in the duct wall. Whether used externally or as an internal duct lining Armaflex fulfils both thermal and acoustic requirements.

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