

Issues to Consider

2 The TIMSA Domestic and Non-Domestic Heating, Cooling and Ventilation Guide

- 2.1 The British Standard, BS 5422: 2001 (Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40°C to $+700^{\circ}\text{C}$), previously used as the reference document for compliance with Approved Documents L to the Building Regulations in England and Wales and Technical Booklet F to the Building Regulations (Northern Ireland), has been replaced.
- 2.2 The 2006 editions of Approved Documents L1A, L1B, L2A and L2B to the Building Regulations in England and Wales and the 2006 editions of Technical Booklets F1 and F2 to the Building Regulations (Northern Ireland), refer directly and indirectly to the TIMSA “Domestic and Non-Domestic Heating, Cooling and Ventilation Guide” (the TIMSA Guide) as the reference document for the required standard of duct insulation to control heat loss / gain.
- 2.3 The TIMSA Guide takes over the role of BS 5422: 2001, in providing practical information on how to comply with the Building Regulations in England, Wales and Northern Ireland. It gives this information in the form of tables of thicknesses of duct insulation for differing scenarios.
- 2.4 The duct insulation tables in the TIMSA Guide are based on the consideration of the control of energy usage and associated carbon dioxide emissions. These tables continue to assure that the heat loss / gain for a given duct will be equivalent, irrespective of the insulation type selected. They have been created based on assumed fuel costs, target payback periods, utilisation rates and other relevant factors. In particular, the social cost of carbon has been included as a parameter.

- 2.5 All tables in the TIMSA Guide are set out in a standardised format requiring the following data in order to use them effectively:
- the application of the ductwork (e.g. warm air, chilled air or dual purpose); and
 - the thermal conductivity of the insulation being used (at the mean operating temperature) in Watts per metre Kelvin (W/m-K).
- 2.6 With this data it is possible to use the tables to determine the thickness of insulation required. Examples of the thicknesses required by the TIMSA Guide are shown in the tables below. More detail is given in the tables in Appendix B of the Project Specification section of this document. Ducting, operating at temperatures outside those given in the tables will need specific calculations.

Air Temperature ($^{\circ}\text{C}$)		Thickness (mm)		
Inside Duct	Ambient	Kooltherm [®]		
		Duct Insulation	Mineral Fibre	Nitrile Rubber
35	15	18	29*	33

Thickness (mm) of Insulation for Warm Ducting Service Areas to Control Heat Loss (Based on TIMSA Guide Section 6.2.4)

Air Temperature ($^{\circ}\text{C}$)		Thickness (mm)	
Inside Duct	Ambient	Kooltherm [®]	
		Duct Insulation	Mineral Fibre
13	25	30	50*

Thickness (mm) of Insulation for Chilled and Dual Purpose Ducting Service Areas to Control Heat Gain (Based on TIMSA Guide Section 6.2.5)

* This figure is based on an insulation thermal conductivity of $0.035\text{ W/m}\cdot\text{K}$ at the average temperature of the insulation material. At the average temperature of the insulation material, some mineral fibre duct insulation products may have a thermal conductivity lower than $0.035\text{ W/m}\cdot\text{K}$. For accurate thicknesses of those products please refer to a mineral fibre manufacturer. This table takes $0.035\text{ W/m}\cdot\text{K}$ as a "safe" value.

2.7 It can be seen from the tables that in all circumstances shown the thickness of *Kingspan Kooltherm*[®] Duct Insulation can be significantly less than that for mineral fibre (up to 40% thinner) or nitrile rubber (up to 45% thinner).

The thickness of *Kingspan Kooltherm*[®] Duct Insulation can be up to **40%** thinner than that for mineral fibre and up to **45%** thinner than that for nitrile rubber.

2.8 Reduction in insulation thicknesses facilitates the installation of ductwork in confined spaces.

Kingspan Kooltherm[®] Duct Insulation can be easier to install in confined spaces.

2.9 Installing *Kingspan Kooltherm*[®] Duct Insulation in preference to mineral fibre or nitrile rubber enables you to reduce the thickness of the insulated duct support inserts, thus making significant savings.

Kingspan Kooltherm[®] Duct Insulation means reduced insulated duct support insert thickness, thus saving on capital costs.

2.10 *Kingspan Kooltherm*[®] Duct Insulation can be installed as a single layer, unlike nitrile rubber which can only be supplied in a single layer up to a limited maximum thickness, significantly reducing labour costs and time.

Kingspan Kooltherm[®] Duct Insulation can always be installed as a single layer, unlike nitrile rubber, significantly reducing labour costs and time.

NB The Non-Domestic Heating, Cooling and Ventilation Compliance Guide refers to the TIMSA Guide for help with condensation control. The TIMSA Guide does not show a table of insulation thicknesses for the control of condensation on below ambient ductwork. Therefore, please refer to the table of thicknesses for the control of condensation on below ambient ductwork contained in BS 5422: 2001.