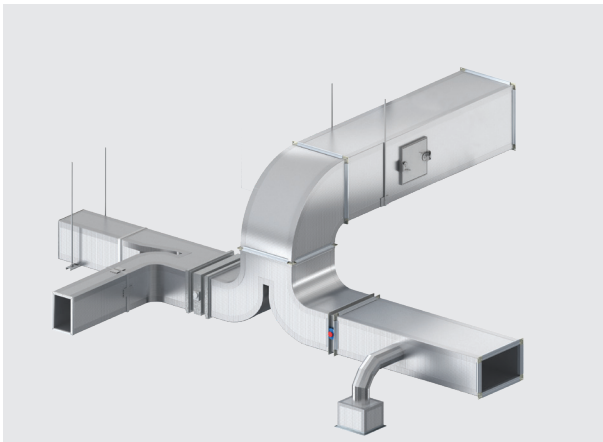


Technical Insulation

Great Britain & Ireland

The Kingspan **KoolDuct**[®] System

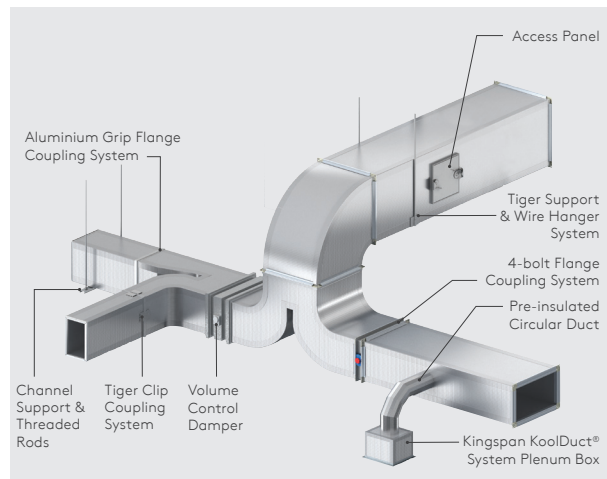
Pre-insulated Rectangular Ductwork for Mechanical Ventilation, Heating
and Air-conditioning Systems



System Details

Introduction

The Kingspan KoolDuct® System is an innovative lightweight pre-insulated rectangular HVAC ductwork system. It comprises premium performance Kingspan KoolDuct® phenolic panels, fabrication methods, coupling systems and accessories to produce ductwork in sections up to 2.95 m long.



The Kingspan KoolDuct System is compatible with: standard Access Panels, Standard Volume Control Dampers, Channel Supports and Threaded Rods and Wire Hanger Systems.

Application Suitability

The Kingspan KoolDuct® System is designed for mechanical ventilation, heating and air-conditioning systems. It is suitable for both new build and refurbishment projects in the residential, commercial, public, light industrial and leisure sectors. It is especially suitable for use in non-ferrous applications and on high specification projects where non-fibrous insulants may be preferred, for instance: the food, beverage and pharmaceutical industries; clean air and hygiene controlled environments; high relative humidity environments; swimming pools; and sterile areas of hospitals and communication / server rooms in data centers.

Ductwork fabricated from The Kingspan KoolDuct® System can be installed internally, externally, visibly mounted and concealed above false ceilings, below raised floors or within confined enclosures such as pre-fabricated modules.

Ductwork Design & Frictional Resistance

The design of ductwork, including fittings, fabricated from The Kingspan KoolDuct® System, follows the same calculation principles and duct sizing methods as are used for rectangular ductwork constructed from galvanised sheet steel.

The frictional resistance is comparable with that of galvanised sheet steel ductwork. As a result, frictional pressure drop data for galvanised sheet steel ductwork may also be used when designing ductwork systems fabricated from The Kingspan KoolDuct® System.

Operating Recommendations & Limitations

It is recommended that ductwork fabricated from The Kingspan KoolDuct® System is used for operation as supply, return, fresh and exhaust air ductwork for heating, ventilation and air-conditioning systems within Table 1 below.

Mean Air Velocity (Max.)	25.4 m/s
Design Pressure (Max.)	Positive: 1000 Pa Negative: 750 Pa
Temperature	Internal air temperature of -20°C to +80°C during continuous operation
Size	Unlimited (provided that Kingspan KoolDuct® System fabrication procedures are strictly observed).

Table 1 shows maximum values. Refer to The Kingspan KoolDuct® System Fabrication Manual series of publications for details.

NB 'Mean Air Velocity' refers to the design air flow rate related to the cross-sectional area of the ductwork. 'Design Pressure' relates to the actual total pressure of the relevant section of ductwork and not the fan static pressure. 'Total Pressure' is a combination of both static and dynamic pressures.

Ductwork fabricated from The Kingspan KoolDuct® System should not be used in the following applications:

- conveyance of solids;
- fire resistant ductwork;
- kitchen / grease hood exhaust systems;
- chemical, fume or smoke exhaust systems;
- where combustible matter readily collects inside the ductwork;
- adjacent to any mechanical / electrical sources of extreme heat;
- where the failure of automatic control equipment may give rise to extreme temperatures; and
- outdoor / underground use without mechanical and / or weather protection.

Pressure & Air-leakage

Air-leakage Classes & Limits

For HVAC systems designed to withstand a maximum static pressure of 1000 Pa, ductwork fabricated from The Kingspan KoolDuct® System, with different coupling systems, can achieve the ductwork air-leakage classes shown in Table 2 below.

Standard	Air-leakage Classes Achievable with Different Coupling Systems	
	4-bolt	Tiger Clip
BS EN 1507: 2006	Class C	Class C and D*
BS EN 13403: 2003		
BESA DW/144: 2016		

Table 2 shows the Standards which reference classes of air leakage and the air tightness class achievable.

BS EN 1507: 2006 (Ventilation for buildings. Sheet metal air ducts with rectangular section. Requirements for strength and leakage).

BS EN 13403: 2003 (Ventilation for buildings. Non metallic ducts. Ductwork made from insulation ductboards).

DW/144: 2016 (Specification for Sheet Metal Ductwork).

*Note: Class C and D at low pressure 400 Pa, class C at medium pressure 1000 Pa.

System Details

The air-leakage limits for air-leakage Classes A to D, over the range of pressures from 0 to 1000 Pa, are shown in the graph.

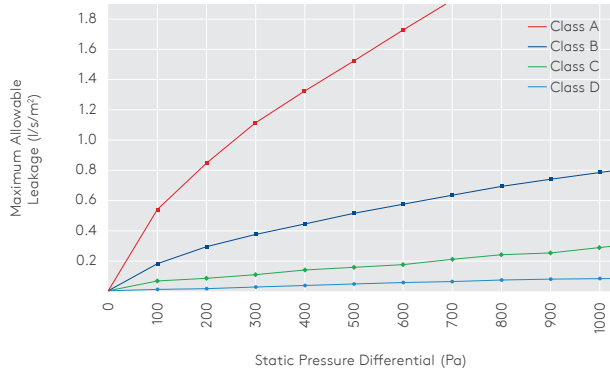


Figure 1

Commissioning

The test pressure should not exceed the design pressure to which ductwork from The Kingspan KoolDuct® System has been fabricated. When pressure or air-leakage testing is known to be necessary, ductwork should be fabricated to withstand the test pressure, if greater than the design pressure.

Fabrication & Installation

Ductwork from The Kingspan KoolDuct® System is only fabricated by specially trained fabricators who have completed The Kingspan KoolDuct® System Training Course, and who are registered with Kingspan Insulation Ltd. The required standards of fabrication are detailed in The Kingspan KoolDuct® System Fabrication Manual series of publications or in the SMACNA Phenolic Duct Construction Standard. Ductwork should be installed using best practice methods in accordance with industry accepted standards.

When fixing ductwork to building structures, the principles laid out in BESA DW/144: 2016 Part 6: Hangers and Supports, or equivalent guidance, should be followed, whilst bearing in mind the lower weight of pre-insulated ductwork.

All HVAC equipment components, such as fire dampers, volume control dampers (VCDs), mixing boxes and humidifiers etc., shall be independently supported such that their load on the ductwork is completely neutralised.

When phenolic ductwork passes through a fire-separating element (e.g. compartment wall or floor), the integrity of those elements should be maintained using a fire damper / smoke control damper in accordance with current Buildings Regulations / British Standards.

The reaction to fire of Kingspan KoolDuct® panels is in accordance with the fire performance requirements for commercial applications and dwellings of BS 5422: 2023 (Thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40 °C to +700 °C. Method for specifying) and is in accordance with BS 9999: 2017 (Fire safety in the design, management and use of buildings. Code of practice), (see 32.5.10.1). Consideration should be given when installing this product within 500 mm of a fire damper as the European class of this material is not A1 or A2 (see 32.5.10.2 item c).

Suitable Finishes

Standard

Factory-applied aluminium foil vapour barrier facing.

Cosmetic

Paint (consideration should be given to any effect that it might have on the thermal and fire performance of the insulation and its factory-applied aluminium foil vapour barrier facing).

Mechanical & Weather Protection

Aluminium sheet; aluminium-zinc alloy coated steel sheet; heavy-duty self-adhesive laminate; synthetic elastomeric jacketing systems; reinforcing glass / synthetic cloth embedded between two coats of appropriate coating; or UV resistant glass reinforced polyester / epoxy (GRP / GRE) cladding systems (all applied in accordance with manufacturer recommendations and project specification requirements).

Maintenance & Cleaning

Ductwork fabricated from The Kingspan KoolDuct® System can be easily and economically cleaned to industry standards, as required by BS EN 15780, BESA TR/19 and NAAD 21 (refer to Table 3 below for full titles), using dry and non-abrasive cleaning methods offered through professional HVAC ductwork cleaning specialists.

Suitable cleaning methods include the following:

- mechanical brushing with a soft and non-abrasive rotary brush to brush the surface of the ductwork;
- hand wiping and manual brushing with soft and non-abrasive materials; and
- electric / manual vacuuming to gently remove dust and debris through suction.

Other methods, depending upon the nature of the deposit to be removed, may be also suitable. For details please contact Kingspan Technical Insulation's Technical Service Department prior to usage.

Standard / Guidance	Title
BS EN 15780: 2011	Ventilation for buildings - Ductwork - Cleanliness of ventilation
BESA TR/19	Building & Engineering Services Association (formerly known as the Heating & Ventilation Contractors' Association) - Guide to Good Practice - Internal Cleanliness of Ventilation Systems, 2019 Edition
NAAD 21	National Association of Air Duct Specialists UK (NAADUK). Cleaning advice for phenolic ductwork available from Kingspan or direct from NAADUK

Table 3 shows full titles for relevant Standards.

Kingspan KoolDuct® Panels

Description

Kingspan KoolDuct® panels are available in a standard thickness of 22 mm and 30 mm. They comprise a non-fibrous rigid thermoset phenolic insulation core faced with silver aluminium foil on both sides. Both facings are autohesively bonded to the core during manufacture.

The core is manufactured with a CFC/HCFC-free blowing agent that has a negligible Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP) < 5.

General Properties

Property	Typical Value												
Standard Dimensions	Length: 2950 mm Width: 1200 mm Thickness 22 mm and 30 mm												
Nominal Density Range of Insulation	55-60 kg/m ³												
Minimum Closed Cell Content of Insulation	> 90%												
Minimum Compressive Strength at 10 % Compression (BS EN 826: 2013)	> 175 kPa												
Aged Thermal Conductivity (λ -value) (BS EN 14314: 2009 + A1: 2013)	<table border="1"><tbody><tr><td>-20°C</td><td>0.023</td></tr><tr><td>10°C</td><td>0.022</td></tr><tr><td>19°C</td><td>0.023</td></tr><tr><td>25°C</td><td>0.024</td></tr><tr><td>50°C</td><td>0.027</td></tr><tr><td>80°C</td><td>0.031</td></tr></tbody></table>	-20°C	0.023	10°C	0.022	19°C	0.023	25°C	0.024	50°C	0.027	80°C	0.031
-20°C	0.023												
10°C	0.022												
19°C	0.023												
25°C	0.024												
50°C	0.027												
80°C	0.031												
Operating Temperature Limits	-20°C to +80°C												

BS EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

BS EN 14314: 2009 +A1: 2013 (Thermal insulation products for building equipment and industrial installations. Factory made phenolic foam (PF) products. Specification.)

Thermal Performance

The low thermal conductivity (λ -value) of Kingspan KoolDuct® panels makes them the most thermally efficient, and hence the thinnest, insulation product commonly used for pre-insulated HVAC ductwork.

Fire Performance

Kingspan KoolDuct® panels, faced with silver aluminium foil on both sides:

- achieve Reaction to Fire (Euroclass classification) of Thickness 22 mm: B-s2,d0 (both sides).
Thickness 30 mm: B-s2,d0 (both sides).

Environmental Impact

Environmental Product Declaration (EPD)

Kingspan KoolDuct® Panels have a verified Environmental Product Declaration (EPD) published online at www.kingspanductwork.co.uk/koolduct.

NB The above information is correct at the time of writing. Please confirm at the point of need by contacting Kingspan Technical Insulation's Technical Service Department, from which copies of certificates can be obtained.

Kingspan KoolDuct® Panels

Sustainability & Responsibility

Kingspan Technical Insulation has a long-term commitment to sustainability and responsibility: as a manufacturer and supplier of insulation products; as an employer; as a substantial landholder; and as a key member of its neighbouring communities.

Further information can be found at:
www.kingspan.com/gb/en/about-us/sustainable-buildings-hub/.

Building Information Modelling (BIM)

Kingspan Technical Insulation's BIM objects can be downloaded from **NBS Source**.

Compliance

Specifications

Kingspan KoolDuct® panels and ductwork fabricated from the Kingspan KoolDuct® System satisfy the apposite requirements of many major national specifications. They include DIO (DEO) Specification 037, and NBS Source. For clarification of the relevant sections and clauses, contact the Kingspan Technical Insulation Technical Services Department.



CE Marking

Kingspan KoolDuct® panels are CE marked in conformance with BS EN 14314: 2009 +A1: 2013 (Thermal insulation products for building equipment and industrial installations. Factory made phenolic foam (PF) products. Specification and a Declaration of Performance is available to download from www.kingspanductwork.co.uk/koolduct

Health & Safety

Kingspan KoolDuct® panels have a non-fibrous insulation core and are odourless, non-tainting, non-deleterious, and chemically inert and safe to use. Further information is contained in the Kingspan KoolDuct® Panel Product Safety Information Sheet.

NB The reflective surface on this product will reflect light as well as heat, including ultraviolet (UV) light. Therefore, it is advisable to wear UV protective sunglasses or goggles, and protect the bare skin with a UV block sun cream. The reflective facing used on this product can be slippery underfoot when wet. Warning - do not stand on or otherwise support your weight on this product.

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