

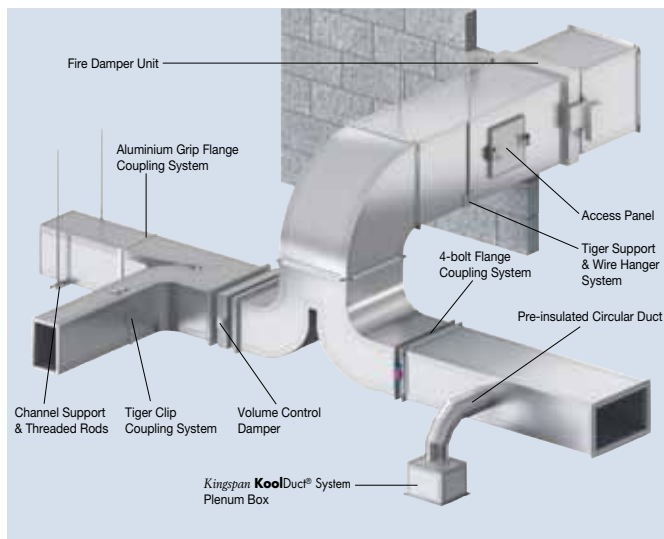


The Kingspan **KoolDuct**® System

TECHNICAL DATA SHEET

Introduction

The **Kingspan KoolDuct**® System is an advanced and innovative pre-insulated rectangular HVAC ductwork system. It comprises premium performance **Kingspan KoolDuct**® panels, fabrication methods, coupling systems and a complete line of accessories to produce ductwork in sections up to 3.93 m long. Ductwork fabricated from The **Kingspan KoolDuct**® System can reduce air-leakage rates to a fraction of those typical of rectangular sheet metal ductwork. This cutting edge System thus offers the triple benefits of cutting energy use, cutting operational carbon dioxide (CO₂) emissions and cutting costs.



Application Suitability

The **Kingspan KoolDuct**® System is designed for use in building services / HVAC applications. 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 insulants with a fibre-free core 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 in medical research and healthcare facilities and communication / server rooms in data centres.

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

Ductwork Design & Sizing

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.

Frictional Resistance

The frictional resistance of ductwork fabricated from The **Kingspan KoolDuct**® System 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 the following limits:

Mean Air Velocity (Max.)	25.4 m/s
Design Pressure (Max.)	Positive: 1000 Pa Negative: 750 Pa
Temperature	Internal air temperature of -26°C to +85°C during continuous operation.
Size	Unlimited (provided that Kingspan KoolDuct ® System fabrication techniques and procedures are strictly observed)

*These are maximum values and vary depending upon both the coupling system and the size of the ductwork. 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;
- outdoor / underground use without mechanical and / or weather protection;
- where the failure of automatic control equipment may give rise to extreme temperatures; and
- with equipment of any type that does not include automatic maximum temperature controls.

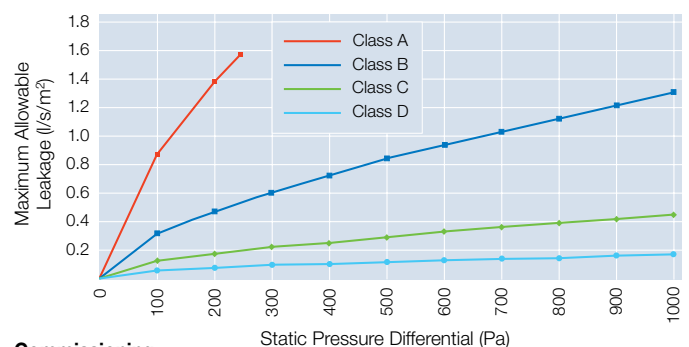
Pressure & Air-leakage

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 the table.

Air-leakage Standard	Air-leakage Classes Achievable with Different Coupling Systems		
	4-bolt	Aluminium Grip	Tiger Clip
BS EN 1507: 2006	Class D	Class C	Class D
BS EN 13403: 2003	Class C	Class C	Class C
SMACNA	Class 3	Class 3	Class 3
B&ES DW/144	Class C	Class C	Class D

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.



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 should only be fabricated by specially trained fabricators who have completed The *Kingspan KoolDuct®* System Training Course. It is recommended that ductwork is fabricated in accordance with the methods detailed in The *Kingspan KoolDuct®* System Fabrication Manual series of publications. Ductwork should be installed using best practice methods in accordance with industry accepted standards.

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 cleaned to industry standards, as required by BS EN 15780: 2011, BS EN 13403: 2003 and B&ES TR/19, using many of the dry and non-abrasive cleaning methods offered through professional HVAC ductwork cleaning specialists. For suitable methods, refer to The *Kingspan KoolDuct®* System – A Specifier’s Guide or Fabrication Manual series of publications.

Kingspan KoolDuct® Panels

Description

Kingspan KoolDuct® panels comprise a fibre-free rigid thermoset phenolic insulation core, faced on both sides with a protective and durable 25.4 micron aluminium foil that is reinforced with a 5 mm glass scrim.



Kingspan KoolDuct® panels are available either with silver aluminium foil on both sides, or silver aluminium foil on one side and black coated aluminium foil on the other. Both facings are autohesively bonded to the core during manufacture.

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

General Properties

Property	Typical Value
Standard Dimensions	Length: 3930 mm Width: 1200 mm Thickness: 20*, 30, 33*, 42 mm * Minimum order quantities apply
Nominal Density Range of Insulation	55-60 kg/m³
Minimum Closed Cell Content of Insulation	> 90%
Specific Heat Capacity of Insulation	1.88 kJ/kg·°C
Minimum Compressive Strength at 10% Compression (BS EN 826: 1996)	200 kPa
Thermal Conductivity (k-value / λ-value) at 23°C Mean (ASTM C518 in accordance with AS/NZS 4859.1)	0.021 W/m·K
Operating Temperature Limits	-26°C to +85°C
Mean Maximum Specific Optical Density of Smoke (EN ISO 5659-2: 2006)	In Presence of Pilot Flame: 0 (25 kW/m²) 7 (50 kW/m²) In Absence of Pilot Flame: 0 (25 kW/m²) 6 (50 kW/m²)

Fire & Smoke Performance

Kingspan KoolDuct® panels have been tested by independent laboratories. The tests shown in the table below have been successfully passed.

Standard	Result
UL 181 (Factory Made Air Ducts & Air Connectors)	Burning (as part of fabricated duct section): Pass
AS 1530.3	Ignitability Index: 0 Flame Spread Index: 0 Heat Developed Index: 0 Smoke Developed Index: 0-1

Fire & Smoke Classification

Kingspan KoolDuct® panels, faced either with silver aluminium foil on both sides, or with silver aluminium foil on one side and black coated aluminium foil on the other, and their rigid thermoset insulation core, are Class 0, as defined by the Building Regulations in England.

Kingspan KoolDuct® panels, faced with silver aluminium foil on both sides, are Euroclass B_{s1d0}, as defined by the European Fire Classification System.

Green Guide Rating & Responsible Sourcing

BRE has assigned *Kingspan KoolDuct®* panels, produced at Kingspan Insulation’s Pembridge, UK, manufacturing facility, a 2008 Green Guide Summary Rating of A.

Kingspan KoolDuct® panels produced at Kingspan Insulation’s Pembridge, UK manufacturing facility, are certified ‘Very Good’ to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products).

Compliance

AS 4254.2

Kingspan KoolDuct® System is compliant with AS 4254.2 as required by the NCC BCA.

UL Listing

Ductwork fabricated from The *Kingspan KoolDuct®* System is UL Listed as a Class 1 Air Duct, to Standard for Safety UL 181 (Underwriters Laboratories: Factory Made Air Ducts & Air Connectors). The UL Listing requires that ductwork is fabricated using:



- 20-45 mm *Kingspan KoolDuct®* panels, faced with silver aluminium foil autohesively bonded to the insulation core, on both sides, during their manufacture at Kingspan Insulation’s Pembridge, UK, manufacturing facility;
- either, or a combination of, the 4-bolt, aluminium grip and / or the Tiger Clip coupling systems;
- a 63 mm wide (minimum) aluminium foil vapour barrier tape that is UL Listed A-P to Standard for Safety UL 181 A (Standard for Closure Systems for use with Rigid Air Ducts); and
- Kingspan High Performance Silicone Sealant / Caulk.

Thermal Performance

Tested to ASTM C518 in accordance with AS/NZS 4859.1.

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, NES & NES+, NBS Plus, HTM 03-01, the National Construction Code of Australia (NCC) and the New Zealand Building Code (NZBC). For clarification of the relevant sections and clauses, contact Kingspan Insulation.

Health & Safety

Kingspan KoolDuct® panels have a fibre-free insulation core and are odourless, non-tainting, non-deleterious, and chemically inert and safe to use.

Avoid slip hazards - excess foil facing should be contained from floors and accessways.

Prevent sunburn - Installers must be protected from reflection of UV radiation, when working in direct sunlight, by wearing protective clothing or UV block out sun cream.

Avoid contact with electrical sources - the black or silver aluminium foil facing is conductive to electricity.

Do not stand on or otherwise support your weight on this product.

Further information is contained in the *Kingspan KoolDuct®* Panel Product Safety Information Sheet.



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