



# The Kingspan **KoolDuct**<sup>®</sup> System

AN INTRODUCTION



# Introduction

## Overview

The heating, ventilation and air-conditioning (HVAC) industry is in the midst of a dynamic era, however air-distribution ductwork remains virtually unchanged since the early 1900s.

Several factors have introduced the need to revolutionise HVAC ductwork. Energy use has continued to escalate, and thus the demand for energy reducing solutions has intensified. Requirements for clean air are becoming increasingly prevalent. Speed of construction has become a valuable asset. Floor space and headroom are under constant pressure.

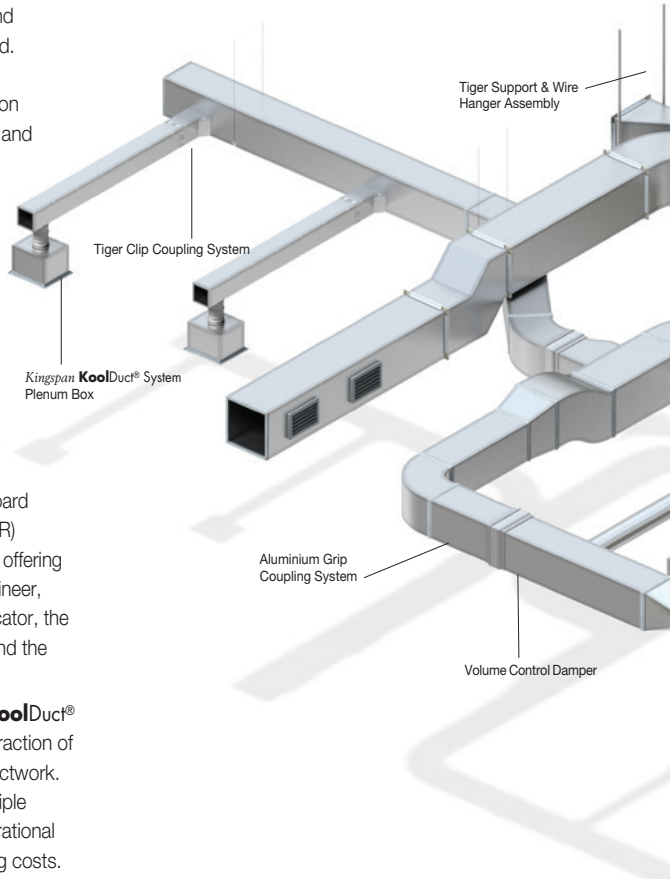
Traditionally, HVAC ductwork is constructed from galvanised sheet steel, which is installed first and then insulated separately as a second operation.

The **Kingspan KoolDuct® System** however, is an advanced and innovative pre-insulated rectangular HVAC ductwork system, which is installed in a single-fix.

The **Kingspan KoolDuct® System** eliminates virtually all of the problems associated with galvanised sheet steel, mineral fibre duct board and pre-insulated rigid polyisocyanurate (PIR) ductwork systems whilst, at the same time, offering additional advantages to the specifying engineer, the architect, the M&E contractor, the fabricator, the facilities manager, the property developer and the building owner.

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 (CO<sub>2</sub>) emissions and cutting costs.

As a result, The **Kingspan KoolDuct® System** should be considered the ductwork system of choice, where low embodied environmental and low operational environmental impacts are key requirements.



## What is The *Kingspan KoolDuct*<sup>®</sup> System?

The *Kingspan KoolDuct*<sup>®</sup> System comprises premium performance *Kingspan KoolDuct*<sup>®</sup> panels, fabrication methods, coupling systems and a complete line of accessories to produce pre-insulated rectangular ductwork in sections up to 2.95 m long that satisfy the Building Regulations for fire safety, thermal performance and air leakage.

*Kingspan KoolDuct*<sup>®</sup> panels are available in a standard thickness of 22mm and 30 mm. They comprise a non-fibrous rigid thermoset modified resin insulation core faced with silver aluminium foil on one side and either silver or black coated aluminium foil on the other.

In addition, there are several coupling systems available to suit different installation and project specification requirements. They include the 4-bolt, aluminium grip and Tiger Clip systems.

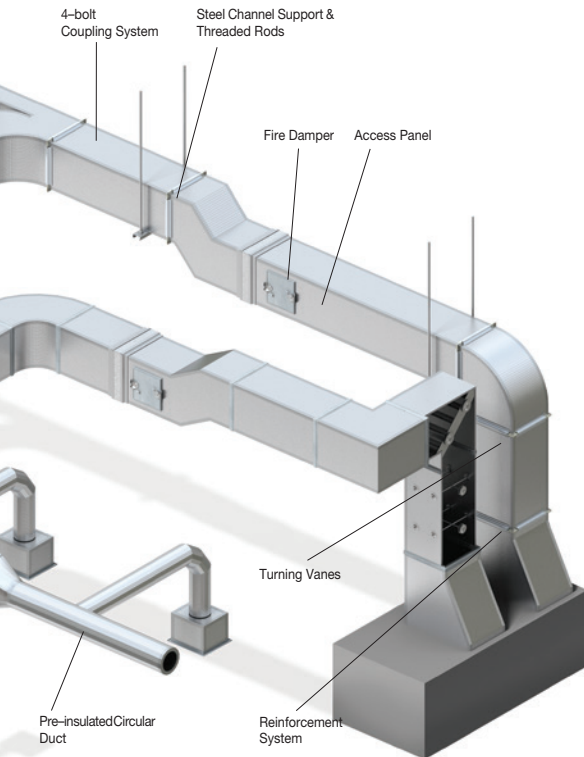
The design of ductwork, including fittings, fabricated from The *Kingspan KoolDuct*<sup>®</sup> System follows the same calculation principles and duct sizing methods as are used for ductwork constructed from galvanised sheet steel.

Kingspan Insulation offers a complete product line, providing all materials, tools and accessories necessary for the effective fabrication of ductwork from The *Kingspan KoolDuct*<sup>®</sup> System.

Ductwork from The *Kingspan KoolDuct*<sup>®</sup> System is only fabricated by specially trained fabricators who have completed

The *Kingspan KoolDuct*<sup>®</sup> System Training Course, and who are registered on The *Kingspan KoolDuct*<sup>®</sup> System Competent Persons Database. The required standards of fabrication are detailed in The *Kingspan KoolDuct*<sup>®</sup> System Fabrication Manual series of publications (see rear cover).

Ductwork is installed according to the principles of B&ES DW/144.



# Benefits

## What's Different about The *Kingspan KoolDuct*<sup>®</sup> System?



**Low weight** – weighs up to 75% less than mineral fibre insulated galvanised sheet – this makes it ideal for refurbishment projects, where existing building structures have insufficient load capacities for new service loads.

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**Faster installation speeds** – low weight ductwork fabricated in sections up to 2.95 m long, single-fix installation and no need to install insulation as a second operation, reduces project scheduling periods for insulated ductwork.

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**Space saving** – typically saves up to 150–200 mm in a single dimension, since the space required to manually install a separate layer of insulation around the ductwork is eliminated – this allows ductwork to be installed flush to ceilings, walls and floors, as well as to surfaces within confined enclosures.

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**Installed cost savings** – reduced labour and materials, including fixings and first level support members, can provide an ideal value engineered ductwork solution without compromising performance – over 15% less expensive.

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**Low air-leakage** – rates can be reduced to a fraction of those typical of rectangular sheet metal ductwork – can easily achieve: BS EN 1507: 2006 air-leakage Class D; BS EN 13403: 2003 Class C; and B&ES (HVCA) DW/144 Class C.

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**Reduced energy usage & running costs** – low ductwork air-leakage can yield significant electrical consumption savings because of reduced heating and cooling loads, and fan energy usage.

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

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**Euroclass B<sub>s1d0</sub>** – *Kingspan KoolDuct*<sup>®</sup> panels faced with silver aluminium foil on one side and silver aluminium foil on the other, are Euroclass B<sub>s1d0</sub>, as defined by the European Fire Classification System.

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**UL Listed** – the only premium performance pre-insulated ductwork in the world to be UL Listed as a Class 1 Air Duct, to Standard for Safety UL 181 (Underwriters Laboratories: Factory Made Air Ducts & Air Connectors), when fabricated to a specification clearly defined by UL.

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**Easily modified** – ductwork configurations can be easily modified and adapted onsite to deal with unexpected changes to the design, which may be required to circumvent unforeseen obstructions and other building design issues.

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**Whole life cost saving** – up to 25% over 30 years, compared with mineral fibre insulated galvanised sheet steel.

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**Reduced workshop-generated waste** – computer aided fabrication can greatly reduce the volume of waste, compared with manual fabrication.

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**Thin insulation** – the low thermal conductivity ( $k$ -value /  $\lambda$ -value) of *Kingspan KoolDuct*<sup>®</sup> panels makes them the most thermally efficient, and hence the thinnest, insulation product commonly used for pre-insulated HVAC ductwork.

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**A Non-fibrous rigid insulation core** – minimises the risk of loose fibres entering the airstream through the ductwork, since distributed air does not come into contact with an insulation material that produces loose fibres.



**Manufactured to the highest standards** – *Kingspan KoolDuct*<sup>®</sup> panels are manufactured under a management system certified to BS EN ISO 9001: 2008 (Quality management systems. Requirements), BS EN ISO 14001: 2004 (Environmental Management Systems. Requirements) BS OHSAS 18001: 2007 (Health & Safety Management Systems. Requirements) and BES 6001 (Responsible sourcing).

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**Green Guide Summary Rating of 'A'** – an Ecoprofile, certified by BRE Certification to the the BRE Environmental Profiles methodology, has been created for *Kingspan KoolDuct*<sup>®</sup> panels produced at Kingspan Insulation's Pembridge, UK, manufacturing facility. BRE has assigned the panels a 2008 Green Guide Summary Rating of 'A'.

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**Low embodied environmental impact** – up to 65% less than that of rock mineral fibre insulated galvanised sheet steel ductwork.

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**Reduced operational CO<sub>2</sub> emissions** – as a result of low ductwork air-leakage, and the subsequent reduction in operational energy usage.

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**Zero-ODP & Low GWP** – the insulation core of *Kingspan KoolDuct*<sup>®</sup> panels is manufactured with a CFC/HCFC-free blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).



**BREEAM 2011** – ductwork fabricated from The *Kingspan KoolDuct*<sup>®</sup> System can contribute directly, and indirectly, toward the achievement of credits in the 2011 version of the building rating system, BREEAM. The relevant credits are 'Mat 4 – Insulation' and 'Ene1 – Reduction of CO<sub>2</sub> emissions'.

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# Applications

## Application Suitability

The **Kingspan KoolDuct® System** is designed for use in building services / HVAC applications. It is suitable for both new build and retrofit projects in the residential, commercial, institutional, light industrial and leisure sectors. Moreover, 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 centres.

*\*For swimming pools, non-standard applications and project specific advice, please contact the Kingspan Insulation HVAC Technical Service Department (see rear cover).*

## 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 -20°C to +80°C during continuous operation.
Size	Unlimited (provided that <b>Kingspan KoolDuct® System</b> fabrication techniques and procedures are strictly observed).

Table 1: Operating Limits for Ductwork Fabricated from the **Kingspan KoolDuct® System**

*\*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 (see rear cover).*

*NB 'Mean Air Velocity' refers to the design airflow 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 (please check compatibility with Kingspan);
- 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.



# Prestige Projects



Project Name: Alfaridan Towers  
Location: Doha, Qatar  
Client: Alfaridan Real Estate Company  
Building Use: Residential – High Rise  
Architect: Arab Engineering Bureau (AEB)  
Consulting Engineer: Shaker Consulting Group  
Main Contractor: Construction Development Company (CDC)  
Delivery Partner: Qatari Industrial Equipment (QIE) WLL



Project Name: Riverside Museum of Transport  
Glasgow  
Location: Scotland, UK  
Building Use: Public & Community – Museum  
Client: Glasgow City Council  
Architect: Zaha Hadid Architects  
Consulting Engineer: Buro Happold  
Main Contractor: BAM Construct UK Ltd  
Delivery Partner: Ductform Ventilation UK Ltd

# Contact Details

## Customer Service

For quotations, order placement and details of despatches, please contact the Kingspan Insulation Customer Service Department:

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## Literature & Samples

Kingspan Insulation produces a comprehensive range of technical literature for designers, specifiers, fabricators, installers, building services managers and facilities managers. The literature contains clear 'user friendly' advice on design, design considerations, specification, fabrication, installation, maintenance and product data.

Available as individual brochures, Kingspan Insulation technical literature is an essential specification tool. For copies please contact the Kingspan Insulation Marketing Department, or visit the Kingspan Insulation website:

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email: [info@kingspaninsulation.ie](mailto:info@kingspaninsulation.ie)

## Technical Advisory Service

The **Kingspan KoolDuct® System** is supported by a complementary and comprehensive technical advisory service for designers, specifiers, fabricators, installers, building services managers and facilities managers. Expert guidance is provided to make specification and installation, operation and maintenance of ductwork fabricated from The **Kingspan KoolDuct® System**, as straightforward as possible. Project specific advice and solutions for non-standard applications and complex technical issues are also offered.

Amongst other services, heat loss / gain, condensation / dew point risk and required insulation thickness can be calculated.

Kingspan Insulation also provides a series of technical presentations specifically tailored for designers, specifiers, local authorities and developers. Additionally, site surveys and visits can also be undertaken, if required.

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