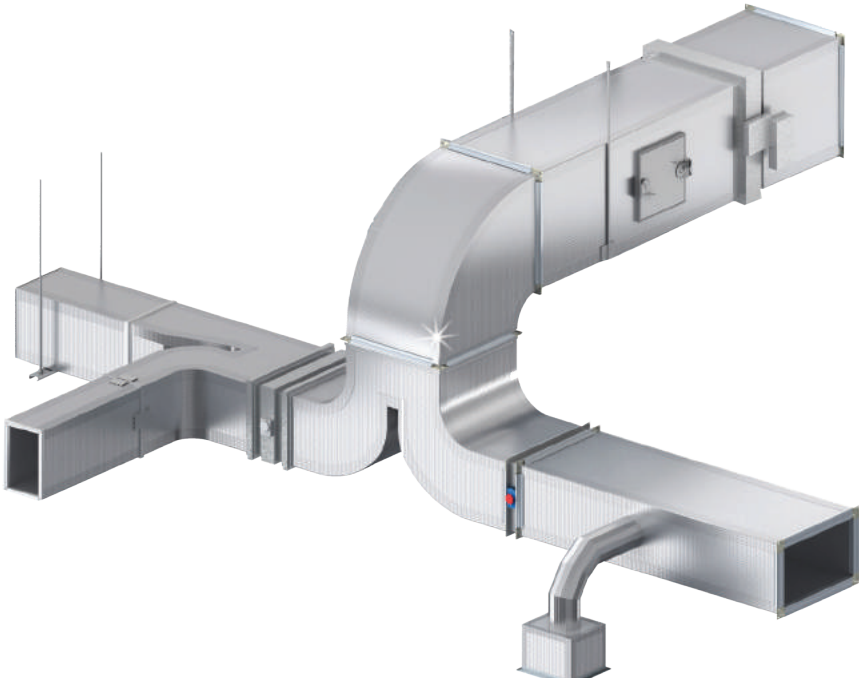




The Kingspan **KoolDuct** System

AN INTRODUCTION



Low Energy –
Low Carbon Buildings

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 revolutionize 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.

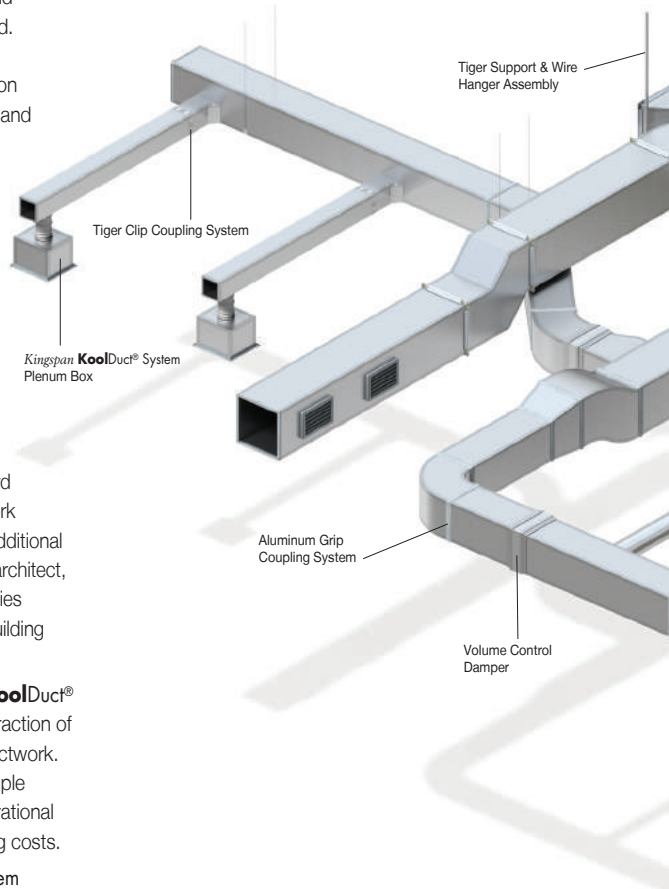
Traditionally, HVAC ductwork is constructed from galvanized sheet steel, which is installed first and then insulated separately as a second operation.

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 galvanized sheet steel, fiber glass duct board and pre-insulated rigid polyiso (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 (CO₂) 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*[®] System?

The *Kingspan KoolDuct*[®] System comprises premium performance *Kingspan KoolDuct*[®] panels, fabrication methods, coupling systems and a complete line of accessories to produce pre-insulated rectangular ductwork in sections up to 13 ft / 3.93 m long.

Kingspan KoolDuct[®] panels are available in the following standard thicknesses and corresponding installed R-values:

- 7/8" = R-6.0 ft²·hr·°F/Btu / 22 mm = R-1.047 m²·K/W; and
- 1 3/16" = R-8.1 ft²·hr·°F/Btu / 30 mm = R-1.428 m²·K/W.

This allows ductwork to be fabricated with different wall thicknesses to suit different performance specifications.

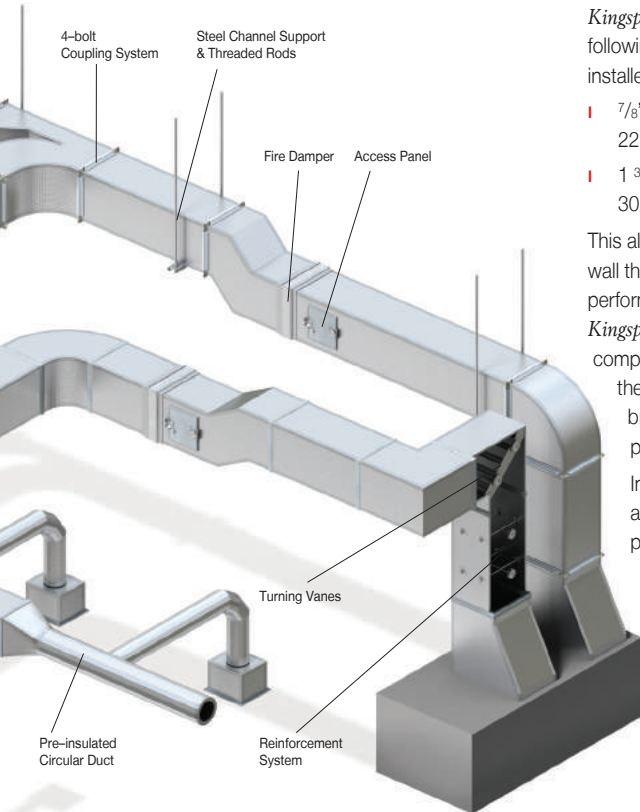
Kingspan KoolDuct[®] panels comprise a fiber-free rigid

thermoset phenolic insulation core faced with branded silver aluminum foil on one side and plain silver aluminum 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, aluminum grip and Tiger Clip systems.

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 ductwork constructed from galvanized 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*[®] System.



Benefits

What's Different About The *Kingspan KoolDuct*[®] System?



UL Listed – was the first 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.



Low weight – weighs up to 72% less than ductwork constructed from galvanized sheet steel and insulated with fiber glass duct wrap – this makes it ideal for refurbishment projects, where existing building structures have insufficient load capacities for new service loads.



Faster installation speeds – low weight ductwork fabricated in sections up to 13 ft / 3.93 m long, single-fix installation and no need to install insulation as a second operation, reduces project scheduling periods for insulated ductwork.



Space saving – typically saves up to 6–8" / 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.



Installed cost savings – reduced labor and materials, including fixings and first level support members, can provide an ideal value engineered ductwork solution without compromising performance – over 16% less expensive.



Low air-leakage – rates can be reduced to a fraction of those typical of rectangular sheet metal ductwork – can easily achieve SMACNA air-leakage Class 3.



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.



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.



Single source supply – Kingspan Insulation offers a complete product line, providing all materials, tools and accessories necessary for the effective fabrication of ductwork, all through a single supplier.



Easily integrated – into existing sheet metal fabrication workshops with low cost capital investment, and without having to radically extend, reconfigure or retrofit.



Whole life cost saving – up to 20% over 30 years, compared with ductwork constructed from galvanized sheet steel and insulated with glass fiber duct wrap.



Lower embodied energy – up to 27% less than that of fiber glass insulated galvanized sheet steel ductwork.



Reduced operational CO₂ emissions – as a result of low ductwork air-leakage, and the subsequent reduction in operational energy usage.



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



High R-values with thin insulation – the low thermal conductivity (k-value / λ -value) of *Kingspan KoolDuct*[®] panels makes it the most thermally efficient, and hence the thinnest, insulation product commonly used for pre-insulated HVAC ductwork.



A fiber-free rigid insulation core – minimizes the risk of loose fibers entering the airstream through the ductwork, since distributed air does not come into contact with an insulation material that produces loose fibers.



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



LEED[®] – ductwork fabricated from The *Kingspan KoolDuct*[®] System can contribute points towards achieving credits, including pilot credits, in many of the LEED[®] rating systems.

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 centers.

**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.)	5000 fpm / 25.4 m/s
Design Pressure (Max.)*	Positive: 4 in-w.g. / 1000 Pa Negative: 3 in-w.g. / 750 Pa
Temperature	Internal air temperature of -15°F to +185°F / -26°C to +85°C during continuous operation.
Size	Unlimited (provided that Kingspan KoolDuct® System 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;
- 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: Luther Home of Mercy
Location: Ohio, USA
Building Use: Residential Care – Rehabilitation Cottages
Client: Mercy Outreach Ministries II
Architect: Normand Associates, Inc.
M&E Engineer: MDA Engineering, Inc.
Ductwork Contractor: Commercial Comfort Systems (CCS), Inc.
Delivery Partner: Delta Air Systems LLC



Project Name: Icehouse
Location: Philadelphia, USA
Building Use: Multi-Family Low-Rise Residential Complex
Client / Developer: EnVision Realty Group LLC
Consulting Engineer: Wachter & Associates
Architect: Continuum Architecture & Design, Inc.
Ductwork Contractor: RP Rex Heating & Cooling
Delivery Partner: PTM Manufacturing LLC





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