

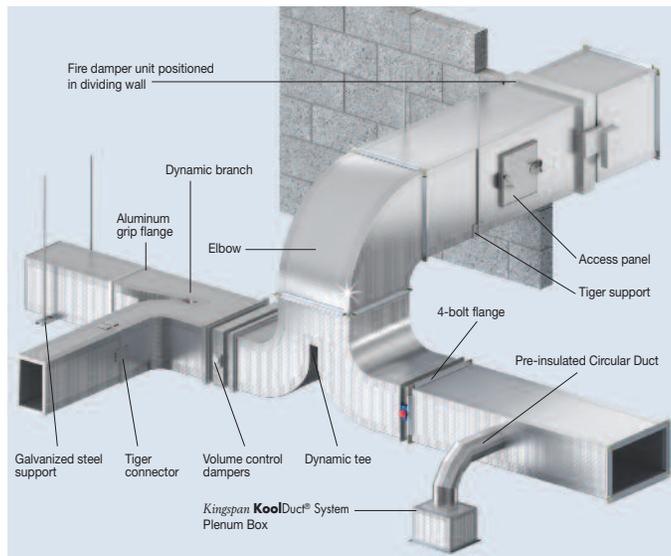
The Kingspan **KoolDuct**® System

SUBMITTAL SHEET - USA

Introduction

The **Kingspan KoolDuct**® System is an advanced and innovative system of pre-insulated air-distribution ductwork. Ductwork is fabricated using premium performance rigid insulation panels in sections up to 13' long and can provide the optimum energy saving and environmental solution in comparison with other types of ductwork.

Premium performance **Kingspan KoolDuct**® panels, fabrication methods, jointing systems and a complete line of accessories produce a System where air leakage can be reduced to a fraction of that typical of sheet metal ductwork. This can yield significant electrical consumption savings because of reduced heating and cooling loads.



Applications

The **Kingspan KoolDuct**® System is designed for use in Building Services / HVAC applications and is suitable for both new build and refurbishment projects in the residential, commercial, institutional, industrial and leisure sectors.

Ductwork fabricated from the **Kingspan KoolDuct**® System is particularly suitable for use on high specification projects in the food, beverage and pharmaceutical industries, clean air and hygiene controlled environments, high humidity environments, swimming pools, and sterile areas of hospitals and communication / server rooms in data centers where non-fibrous insulation materials may be preferred.

Kingspan KoolDuct® System ductwork can be installed internally, externally, concealed above a false ceiling or visibly mounted. Furthermore, its versatility enables individual system components such as plenums, risers and straight sections to be integrated with traditional sheet metal ductwork.

Fabrication & Installation

To insure that uniform quality standards are maintained, **Kingspan KoolDuct**® System ductwork is fabricated and installed only by specially trained fabricators and installers that have attended a specialized training program.

Due to the lightweight nature of the product two individuals can quickly and easily install substantially sized ductwork sections. Specialized mechanical handling and lifting equipment for heavy loads is generally not required.

All ductwork should be fabricated and installed in strict accordance with methods approved by Kingspan Insulation Ltd.

Application Recommendations & Limitations

It is recommended that **Kingspan KoolDuct**® System ductwork be 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 (Maximum)	4000 fpm
Design Pressure (Maximum)	Positive: 4 in.w.g. Negative: 3 in.w.g.
Temperature	Internal air temperature of -4°F to +176°F during continuous operation
Size	Unlimited (provided that recommended Kingspan KoolDuct ® System fabrication techniques and installation procedures are strictly observed)

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:

- kitchen / grease hood exhaust systems;
- conveyance of solids;
- conveyance of hot air with temperatures in excess of 176°F;
- chemical, fume or smoke exhaust systems;
- with equipment of any type that does not include automatic maximum temperature controls;
- adjacent to any mechanical / electrical source of extreme heat; and
- outdoor use without additional weather and / or mechanical protection.

Air Leakage

The air leakage rate of **Kingspan KoolDuct**® System ductwork can be a fraction of that of insulated sheet metal ductwork and can easily meet the requirements of SMACNA Class 3. The graph below (Figure 1) shows the maximum allowable air leakage for each leakage class over a range of pressures from 0.1 to 4 in.w.g.

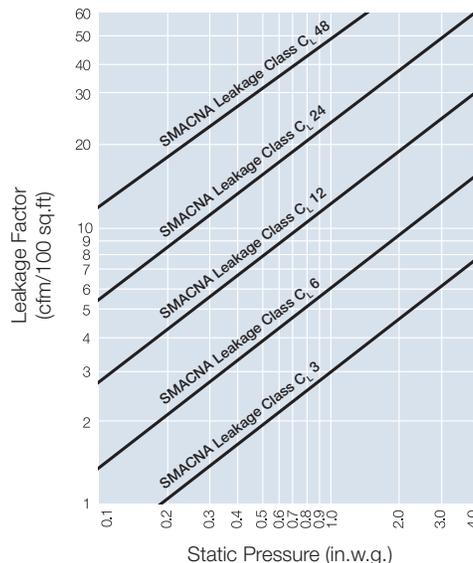


Figure 1 Based on SMACNA (HVAC Air Duct Leakage Test Manual First Edition 1985) Figure 4-1 'Duct Leakage Classification'

*NB This document only provides a summary of the **Kingspan KoolDuct**® System and should not be used as the sole basis of an actual specification. Reference must be made to 'The **Kingspan KoolDuct**® System Global Specification Manual' (latest edition) for specification details. Please contact the Kingspan Insulation Marketing Department (see rear cover) for a copy.*

Recommended Finishes

Internal & Exposed to View Ductwork

The external factory applied reinforced aluminum foil vapor barrier facing constitutes the standard finish. Additional finishes include: aluminum or stainless steel sheet; aluminum-zinc alloy coated steel sheet; vapor retarder self-adhesive jacketing systems; and a paint finish which must not compromise the aluminium foil facing, insulation, thermal performance or fire classification.

Internal Ductwork in Plant Rooms, Boiler Houses or Service Areas

Kingspan KoolDuct® System ductwork must be protected against mechanical damage. Finishes include: aluminum or stainless steel sheet and aluminum-zinc alloy coated steel sheet.

External Ductwork

Kingspan KoolDuct® System ductwork installed outdoors must be protected against the elements. Weatherproof finishes include: aluminum or stainless steel sheet; aluminum-zinc alloy coated steel sheet; vapor retarder self-adhesive jacketing systems; UV resistant glass reinforced plastic (GRP) cladding systems; and a reinforcing membrane embedded between two full coats of a protective fire resistive vapor barrier coating.

Product Data

Description

The panels from which **Kingspan KoolDuct® System** ductwork is fabricated, comprise a non-fibrous premium performance rigid thermoset modified resin insulation core, faced on both sides with an extremely durable and protective low vapor permeability 1 mil aluminum foil reinforced with a 0.2" glass scrim. Both facings are autohesively bonded to the insulation core during manufacture.

Kingspan KoolDuct® panels are CFC/HCFC-free and are manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).



Availability

- Insulation panel dimensions: 12.89' x 3.94'.
- Insulation panel thicknesses: 7/8", 1 3/16" & 1 5/16".

Nominal Density Range

3.43-3.75 pcf at 10% compression.

Minimum Compressive Strength

29 psi (BS EN 826: 1996).

Specific Heat Capacity

0.45 Btu/lb.°F.

Operating Temperature Limits

-4°F to +176°F.

Moisture Resistance

The insulation core of **Kingspan KoolDuct®** panels has 90% (or greater) closed cell structure, which means that they are non-wicking and highly resistant to moisture penetration. In addition, the risk of moisture absorption into the core is effectively eliminated as the factory applied aluminum foil facings provide a high performance and impervious vapor barrier.

The panels have a water vapor transmission of 0.34 grains/hr-ft² (ASTM E 96).

Indoor Air Quality

Distributed air flows over sealed aluminum surfaces, minimizing any risk of loose fibers entering the air handling system. In addition, **Kingspan KoolDuct®** panels have a non-fibrous insulation core, are non-deleterious, odorless and non-tainting. They will resist attack from mold and microbial growth and do not provide any food value to rodents or vermin.

Thermal Performance

The thermal conductivity (k-value) of **Kingspan KoolDuct®** panels is 0.146 Btu-in/hr-ft²-°F at 50°F (ASTM C 518), the lowest of any commonly used insulation material. A low thermal conductivity allows thinner insulation to achieve the required thermal performance.

The installed material thermal resistances (R-values) for the range of panel thicknesses are shown in the table below:

Thickness	R-value
7/8"	6.0 ft ² -hr-°F/Btu
1 3/16"	8.1 ft ² -hr-°F/Btu
1 5/16"	8.8 ft ² -hr-°F/Btu

Fire & Smoke Performance

Kingspan KoolDuct® panels have a resistance to burning and spread of flame far superior to that of rigid polyurethane (PUR) or rigid polyisocyanurate (PIR) insulants. In addition, there is an almost complete absence of smoke when the panels are subjected to a flame source.

The insulation core of the panels is thermoset and unlike thermoplastic materials it does not melt, drip or produce flaming droplets.

The panels successfully pass the Burning Test (UL 181) and do not exceed flame spread / smoke developed indices 25/50 (ASTM E 84 / UL 723).

Code Compliance & Approvals

Ductwork fabricated from the **Kingspan KoolDuct® System**:

- satisfies the requirements of ANSI / ASHRAE / IESNA 90.1: 2007, IECC 2003, 2006 & 2009, IMC 2009 and other major national specifications;
- complies with the requirements of NFPA Standards 90A & 90B; and
- is UL Listed as a Class 1 Air Duct to Standard for Safety UL 181 when fabricated using: **Kingspan KoolDuct®** panels faced on both sides with factory applied silver aluminum foil; the aluminum grip flange and / or tiger jointing systems; and an aluminum foil vapor barrier tape that is UL Listed to Standard for Safety UL 181 A-P.



Kingspan KoolDuct® panels are manufactured to the highest standards under a management system certified to:

- BS EN ISO 9001: 2008 (Quality management systems. Requirements);
- BS EN ISO 14001: 2004 (Environmental management systems. Requirements); and
- BS OHSAS 18001: 2007 (Health and safety management systems. Requirements).

Kingspan Insulation Ltd reserves the right to amend product specifications without prior notice. Product thicknesses shown in this document should not be taken as being available ex-stock and reference should be made to the current Kingspan Insulation Ltd price list or advice sought directly from Kingspan Insulation Ltd. The information, technical details and fixing instructions etc. included in this literature are given in good faith and apply to uses described herein. Recommendations for use should be verified as to the suitability and compliance with actual requirements, specifications and any applicable codes, laws and regulations. For other applications or conditions of use, Kingspan Insulation Ltd offers a Technical Advisory Service, the advice of which should be sought for uses of Kingspan Insulation Ltd products that are not specifically described herein. The fire tests referenced in this literature and the assigned results are not intended to reflect hazards presented by the materials and products described herein under actual fire conditions. For detailed information please contact Kingspan Insulation Ltd for a copy of 'The Kingspan KoolDuct® System Global Specification Manual' (latest edition). Please check that your copy of the literature is current by contacting Kingspan Insulation Ltd.

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