Air Delivery Systems

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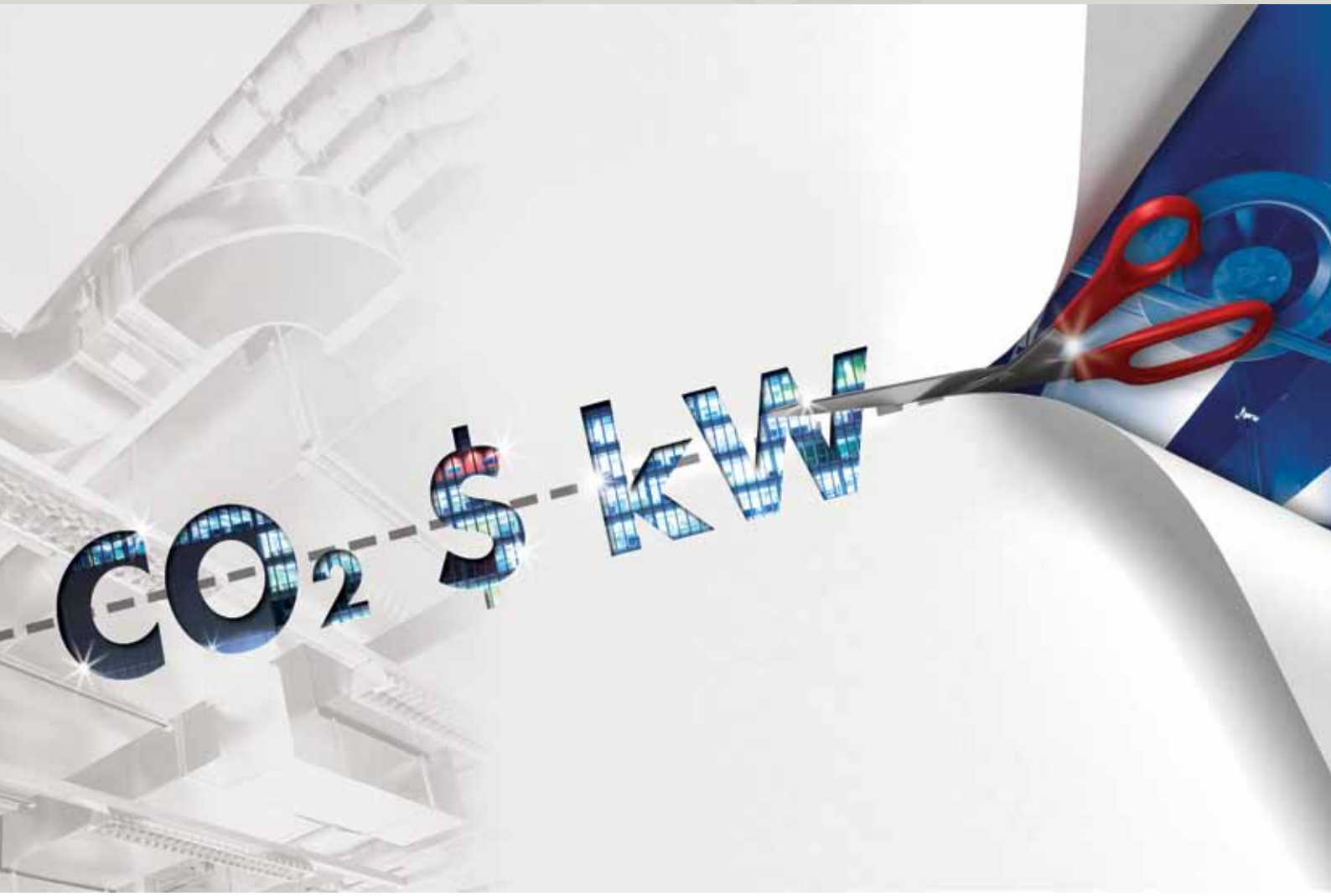
The Kingspan KoolDuct™ System

RETHINKING DUCTWORK



Kingspan™

Low Energy – Low Carbon Buildings

Case Study: Luther Home of Mercy

Project Background

Luther Home of Mercy is an Intermediate Care Facility for Developmentally Disabled (ICF/DD) adults located in Williston, Ohio. It is licensed by the Ohio Department of Health and is certified as an ICF/DD Provider under the auspices of the Ohio Department of Human Services. The ministry of Luther Home of Mercy is a not for profit organization affiliated with the Lutheran church.

Cottage 6A, Luther Home of Mercy

Kingspan Insulation commissioned MDA Engineering inc. to undertake an independent study of two air-distribution HVAC ductwork installations, in two identical new construction buildings (Cottages 6A & 6B), at Luther Home of Mercy to compare energy use; associated carbon dioxide emissions; installed, operational and whole life cost.

Cottage 6B, Luther Home of Mercy

Both ductwork systems were specified to meet the exact same performance standards to SMACNA air leakage Class 24 and to duct insulation requirements ANSI/ASHRAE/IESNA 90.1: 2004 and IECC 2006. Both systems were fabricated to 2 in.w.g. pressure class. The total duct surface area for each system is 1926 sq.m. The system design and layout for both installations are also identical.

Cottage 6A, The *Kingspan* **Kool**Duct™ System

The only differences between the two installations are in the type of ductwork and the insulation materials used. Cottage 6A was constructed with pre-insulated ductwork fabricated from the *Kingspan* **Kool**Duct™ System, and Cottage 6B with traditional sheet metal ductwork insulated with fiber glass duct wrap.

Cottage 6B, Insulated Sheet Metal Ductwork

Cutting Energy

The air leakage rates of both ductwork systems were measured by an AABC Certified TAB contractor and tested at 2 in.w.g. static pressure. The results are shown in the table below:

	Total Air Volume (CFM)	Max. Allowable Air Leakage (CFM)	Total Actual Air Leakage (CFM)	Actual Leakage as a proportion of Max. Allowable Leakage (%)
Kingspan **Kool**Duct™	6985	732	469	64
Sheet Metal & Glass Fiber	6985	732	2306	315

It can be seen that the air leakage rate of *Kingspan* **Kool**Duct™ System ductwork is a fraction of that of the insulated sheet metal equivalent – up to 80% less. In terms of energy savings, this equates to 24 MMBtu per annum and over a 30 year life, a staggering 720 MMBtu.

Cutting Carbon

As a result of the reduction in air leakage and subsequent reduction in energy usage compared with those of the insulated sheet metal system, ductwork fabricated from the *Kingspan* **Kool**Duct™ System can provide a saving of 12528 lbs of CO_2 emissions per annum[1]. Over a 30 year life, this amounts to 188 tons of CO_2 emissions: equivalent to the same mass of CO_2 sequestered by 36 acres of pine forest growing in one year.

Cutting Cost

An analysis of the differing costs associated with air distribution HVAC ductwork systems was carried out. All results clearly show that the costs related to the *Kingspan* **Kool**Duct™ System installation are lower than the insulated sheet metal installation.

- The installed cost of ductwork fabricated from the *Kingspan* **Kool**Duct™ System was 16.8% cheaper than that for the insulated sheet metal equivalent as a result of reduced material and labor costs.
- The operational cost of the air-distribution HVAC system on this project using *Kingspan* **Kool**Duct™ System ductwork is reduced by 7.5% compared with that of the insulated sheet metal equivalent.
- Over a 30 year life, the air-distribution HVAC system using the *Kingspan* **Kool**Duct™ System ductwork installation can yield a whole life cost saving of over 14% compared with sheet metal ductwork insulated with glass fiber.

Cutting Edge

Fabricated using premium performance rigid insulation panels in sections up to 13', the *Kingspan* **Kool**Duct™ System is the clear leader in new generation pre-insulated ductwork. It is the most advanced and innovative system of
air distribution ductwork available worldwide. It offers the triple benefits of cutting energy, cutting carbon and cutting cost whilst already having proved itself in its highly competitive marketplace.

1 Figure estimated at 12528 lbs based on data derived from the Trane Trace 700 program which utilises EPA (Environmental Protection Agency) state average energy mix CO_2 generation data.

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