

The advantages of fabric ducting

by David Mackerness, General Manager, The LGM Group

As an air distribution option, it is an alternative to a steel ducting and diffuser system.

Fabric ducting is a common ACMV (Air-Conditioning & Mechanical Ventilation) component used all over the world. It offers great improvements in productivity as well as in energy efficiency and thermal comfort.

The heat load calculations and equipment sizing for fabric ducting remains the same as for traditional systems, but instead of using metal ducts to transport the air, patented fabric is used.

The three main benefits of fabric ducting are a vast reduction in labour costs required to install the system (achieving up to 80% reduction in man-hours), energy efficiency (generating up to 25% savings), and better comfort.

Productivity

Fabric ducting systems are mounted on aluminium rails which hold the fabric ducts in place. This simple and reliable mounting system allows contractors to reduce installation times by up to 80% and the lightweight characteristics of the system allow it to be installed on any ceiling (including false ceilings).

Energy efficiency

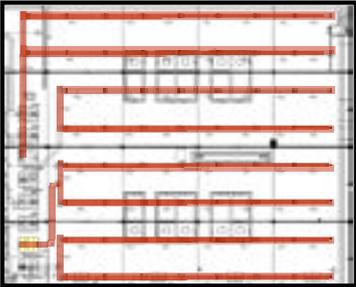
Fabric ducting systems should be custom designed with the help of local suppliers who understand the energy efficiency and performance goals of the project. If designed correctly,

fabric ducts can operate at significantly reduced static pressure requirements as compared to steel ducting systems. This results in energy savings of up to 25%, as the AHU/FCU fans do not need to work as hard to push the air through the system.

To cite one example, fabric ducting has enabled an office in Singapore to generate energy savings and obtain a BCA Green



The use of fabric ducting in this factory at Tuas reduced installation times by 73%.

Steel Ducting and Diffusers	Fabric Ducting
	
<p>27 AHUs 1 m² of steel duct requires 0.5 man hours to install Each diffuser requires 0.5 man hours to install</p> <p>SAD = 250 m² per AHU = 125 man hours x 27 = 3,375 RAD = 250 m² per AHU = 125 man hours x 27 = 3,375 Diffusers = 864 in total = 0.5 man hours x 864 = 432</p> <p>TOTAL = 7,182 Man Hours</p>	<p>27 AHUs 2.5 m² of fabric duct requires 0.5 man hours to install Each diffuser requires 0.5 man hours to install</p> <p>SAD = 180 m² per AHU = 72 man hours x 27 = 1,944 RAD = 0 m² per AHU = 0 Diffusers = 0</p> <p>TOTAL = 1,944 Man Hours</p>

Comparison between installation times required for conventional ducting systems and for fabric ducting systems.

Mark Platinum rating. The original ACMV design for this office used three FCUs and a traditional ducting and diffuser system. During the fit-out stage, fabric ducting was retrofitted to the existing FCUs and it reduced the fan motor power requirements by 23%.

Better comfort

Fabric ducts are custom-made for every project, ensuring optimal air distribution throughout the space. This allows designers to accommodate any temperature or velocity requirements and results in a good indoor environment.

Given the challenge of cooling a 15 m by 35 m space with side-wall diffusers, an advertising agency opted for a custom designed fabric ducting system. The design incorporates three different throw lengths and angles to achieve uniform air distribution and temperatures throughout the space with no draughts or hotspots.

Types of fabric ducting

The technology for fabric ducting is not new. Fabric ducts have been used in Europe and the US for the past three decades.

Most manufacturers can offer fibreglass-based, PVC-coated ducts but these are not recommended for use in Asia as they are not permeable and condensation may form on the outside of the ducts, due to the humid conditions here. This could result in dripping water which can damage equipment in the space.

To prevent the condensation problem, fabric ducting systems for Asian markets must be permeable.

Until recently, none of the permeable fabric ducts could comply with the Class 'O' fire certification standards required by Singapore.

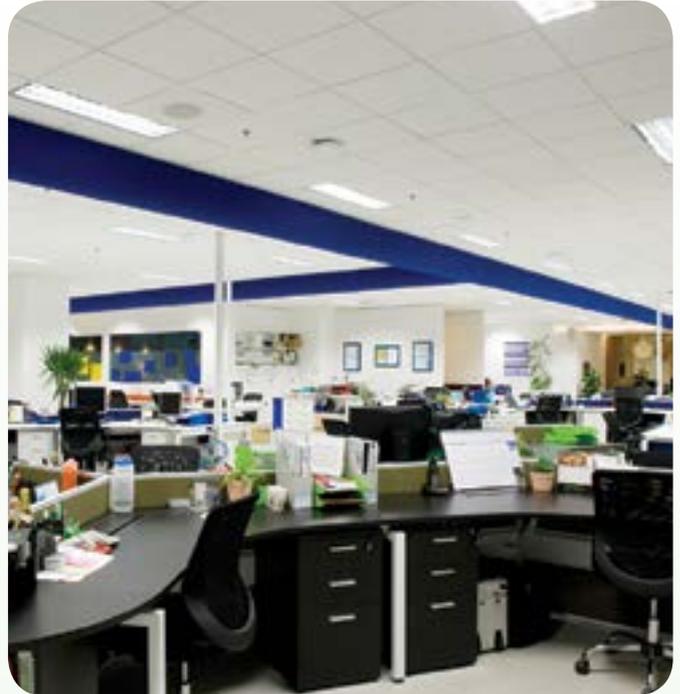
Recent advances in technology have now enabled some of the fabric ducting manufacturers, in Europe and the US, to produce permeable ducts which meet the Class 'O' fire certification standards.

And now, there are local suppliers who offer design, supply and installation services for this type of fabric ducting, for projects in any Asian environment.

Such ducting has already been installed in over 30 high profile projects in Singapore.

Fabric ducting can be used in any project and there are examples of fabric ducts being used in warehouses, sports halls, offices and even a sound stage.

For installations that require a high indoor air quality, the ducts can be taken down and washed. To ensure that warranties are



Fabric ducting has enabled this BCA Green Mark Platinum-rated office in Singapore to generate energy savings of 23%.

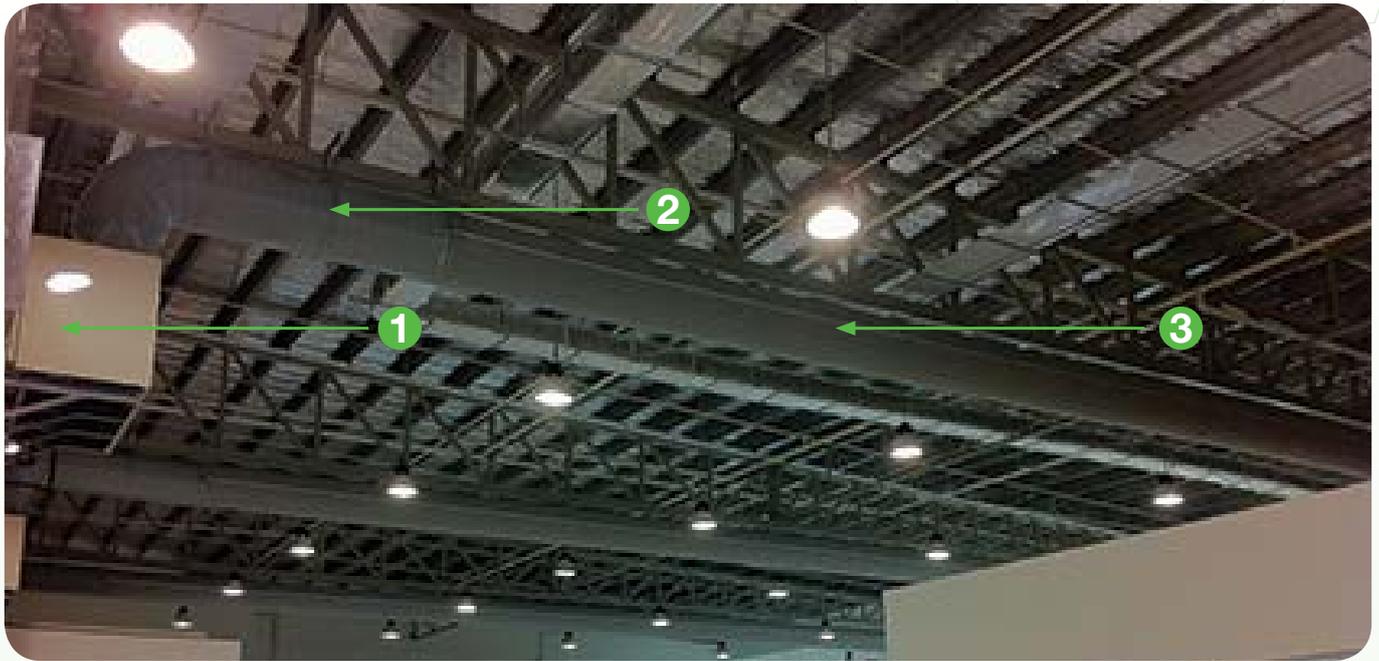
FCU Parameters	Steel Ducting and Diffusers	Fabric Ducting
Airflow	7001	7001
Static Pressure	218	195
Fan Motor Power each	2.0	1.55
No. of Fan Motors in Operation	3	3
Total Power in Operation	6.0	4.7
Annual Operation Hour	2,730	2,730
Annual Energy Consumption	16,380	12,695
Annual Energy Savings = 3,686 kWh % of Annual Energy Savings = 23%		

Comparison between energy consumption of office with conventional ducting systems and with fabric ducting systems.

maintained, the manufacturer's guidelines for washing must be followed.

In Europe and the US, fabric duct installations have shown no signs of deterioration or damage during the 30 years that they have been in service.

More information on fabric ducting may be obtained from the author (Tel: 6586 9015. Email: david.mackerness@thelgmgroup.com)



A research and development facility with fabric ducting - (1) Equipment sizing remains unchanged. (2) Cool air leaves the Air Handling Unit (AHU) / Fan Coil Unit (FCU) and is transported along the fabric duct. (3) Once the duct is inflated and pressurised (in 5 sec to 10 sec), cool air enters the space through the permeable fabric as well as custom designed, laser-cut holes.



Advertising agency using side-wall mounted fabric ducting.



Fabric ducting installed in the sports hall of an international school in Singapore.



A Green Mark Platinum-rated engine assembly plant that uses a custom designed fabric ducting system.