



# TAILOR-MADE FABRIC

## DUCTING SOLUTION FOR CHAMDOR

By Ilana Koegelenberg

When the Chamdor Faktry Sales fabric warehouse in Northriding expanded, it was time to upgrade its HVAC system as well — but how do you cool down such a massive space efficiently and economically?

Chamdor Faktry Sales originally started in Chamdor, Krugersdorp, and since then, this family-owned fabric retailer has grown exponentially, boasting 'Africa's largest fabric warehouse and retail outlets'. Other than Krugersdorp, they also have outlets in Edenvale, Newcastle, and the nearly 6 000m<sup>2</sup> operation in Northlands Deco Park, Northriding — the biggest one of the four.

Their Northriding outlet was originally 4 255m<sup>2</sup> in size, offering everything from upholstery and curtain accessories, to bridal fabric, towels, and everything in-between. The outlet was basically a large warehouse space with ceilings more than 6m high.

Chamdor quickly outgrew the premises and as such, the owners bought the 1 276m<sup>2</sup> space next door, which used to be an action cricket arena, to expand into. However, there was a

height difference between the buildings and a 460m<sup>2</sup> link had to be built — which later proved the biggest challenge for the design team.

It was during this time that the client decided to upgrade their cooling solution as well and brought on board Cassie Joubert of Thaba Air who had done work for Chamdor in Krugersdorp previously.

Thaba Air approached Energy Partners (EP) to facilitate the detailed design and compliance to regulation. Wimpie Swiegers of EP in Irene accepted the request to provide a detailed design, with Ruan Jansen van Rensburg of EP assisting the design process.

The total upgrade at the Chamdor store was executed over six months.



Photos by Ilana Koegelenberg

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## CLIENT BRIEF

The client had a requirement for a practical and cost-efficient cooling and ventilation solution, whilst avoiding draughts or 'dead spots' on the trading floor.

The client also required that the store remain operational, and downtime should be avoided. The entire installation had to be done while trading continued uninterrupted.

## OLD SYSTEM

The redundant HVAC system comprised undersized evaporative cooling units, connected to galvanised spiral ducting. Supply grilles did not provide adequate air distribution. Because the system was undersized, it could not manage to keep the building under positive pressure.

*Virtually anything that can be done with sheet metal, can be done with fabric as well – just much quicker and easier.*

## NEW SYSTEM

A full fresh air evaporative cooling system with textile ducting was installed, serving the now combined area of 5 991m<sup>2</sup>.

New Cool Breeze FD500 twin fan evaporative cooling units were installed. Also, there is a double function on the evaporative coolers and they can operate on fan mode only as well.

Selecting new evaporative cooling units wasn't the biggest challenge. Instead, the sheer size and quantity of ducting needed to run this system efficiently was the real challenge. Especially since the store had to continue trading throughout the entire construction process. The sheer amount of ducting that was needed to ventilate the combined space adequately, was exorbitant. That is why the design team decided to look into the fabric ducting solution.

1. All done now – the 'new' area that was added to Chamdor, complete with its own, colour-coded fabric ducts.
2. One of the evaporative cooling units mounted on brackets outside in the parking lot.
3. The 'new' building under construction during the process of being joined with the existing premises. The ducting was already installed.
4. The link between the two buildings was the hardest part to design for.
5. Thanks to the perforation on the fabric ducts, there are no draughts in the building – just an even distribution of air.

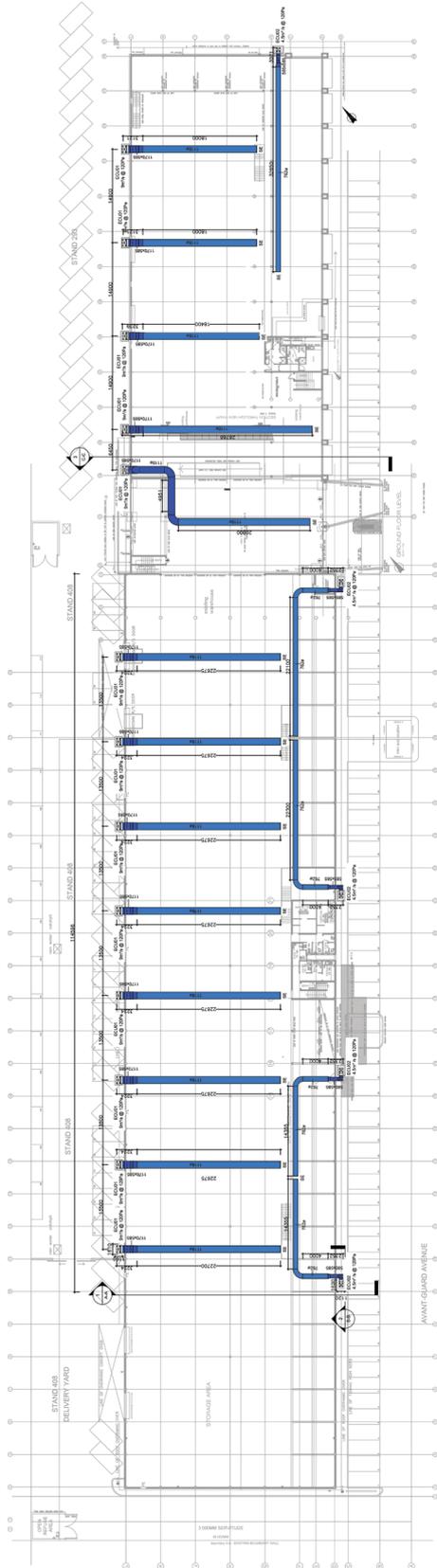




**LEGEND**

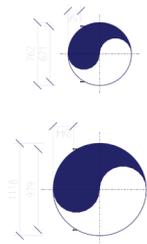
[Symbol]	MECHANICAL ROOM

**STANDARD NOTES:**

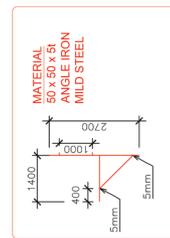


A total of 13 systems were installed, as can be seen on this technical drawing from Energy Partners.

**GROUND FLOOR HVAC LAYOUT**  
SCALE 1:200



**DETAIL ON CANVAS DUCTING**  
SCALE 1:20



**DETAIL ON MOUNTING STRUCTURE**  
SCALE 1:50

**Equipment Schedule**

NO.	DESCRIPTION	QUANTITY	UNIT
1	MECHANICAL ROOM	13	NO.
2	MECHANICAL ROOM	13	NO.
3	MECHANICAL ROOM	13	NO.
4	MECHANICAL ROOM	13	NO.
5	MECHANICAL ROOM	13	NO.

**REVISIONS**

NO.	DESCRIPTION	DATE
1	ISSUED FOR INFORMATION	

**CLIENT**

**EP ENGINEERING**

**HVAC LAYOUT - CHAMBOR**  
GENERAL AIR CONDITIONING & VENTILATION GROUND FLOOR LAYOUT

Drawn	IT	Checked	MS
Date	14/02/2018	Checked	14/2/18
Scale	As shown	Checked	1:5

**PROJECT NUMBER** PAT07-MEC-01

**REVISED BY** A

**DATE** 14/02/2018



Fabricair offered the best solution at the lowest cost and was selected by Thaba Air to provide their product. The customer bought into the concept and was particularly interested in being able to customise the colours of the ducting.

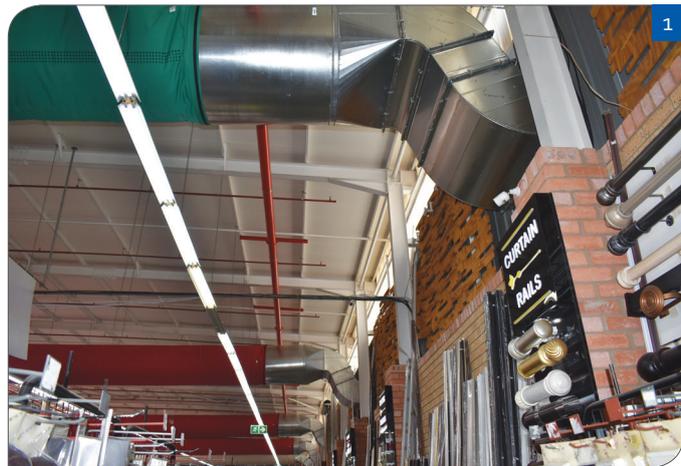
As such, they put in 13 systems, each colour-coded depending on the area, with 1.2m-diameter ducts ranging in lengths between 21m and 23m. There are three pieces of ducting on each run that zip together and the stop end is zipped on.

The ducting is perforated, ensuring an even distribution of air instead of just dumping the air in select spaces via conventional supply grilles. Even the perforation patterns and specifications can be customised to fit each application.

For this project, they used non-permeable fabric as it suits evaporative cooling. For mechanical air-conditioning applications, a permeable fabric would be selected to avoid any condensation forming in the fabric itself. This particular solution is available in nine different optional colours.

The fabric ducting run is installed at a height of 4.2m from finished floor level, and functionality tests indicated that the facility is serviced with cool air whilst avoiding discomfort as a result of draughts. The distribution of air in the facility is considered to be balanced to avoid hotspots, while providing sufficient air movement for the comfort of the clientele.

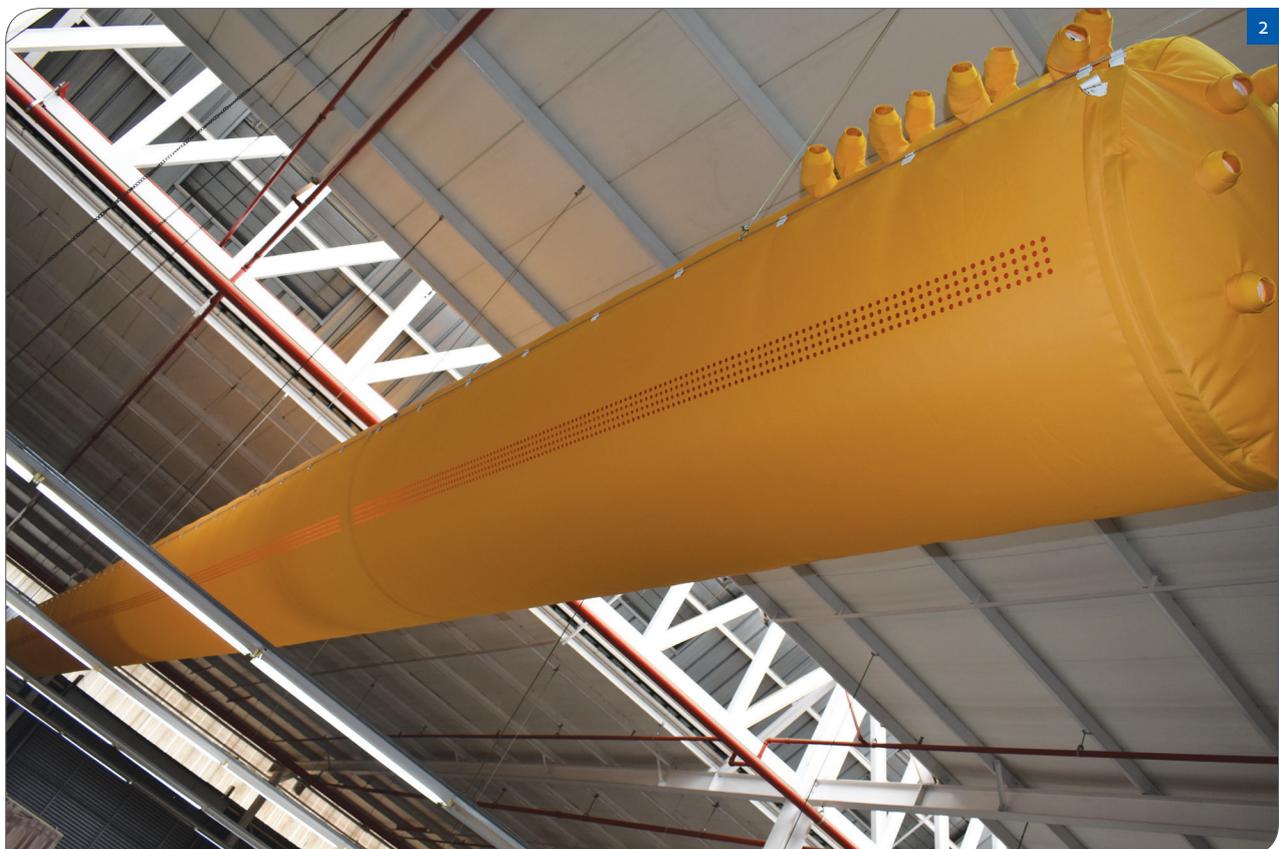
The biggest challenge was that there was nothing to fix the textile ducting to, so Thaba Air had to build brackets first. The staff on site amounted to a count of nine: a supervisor and

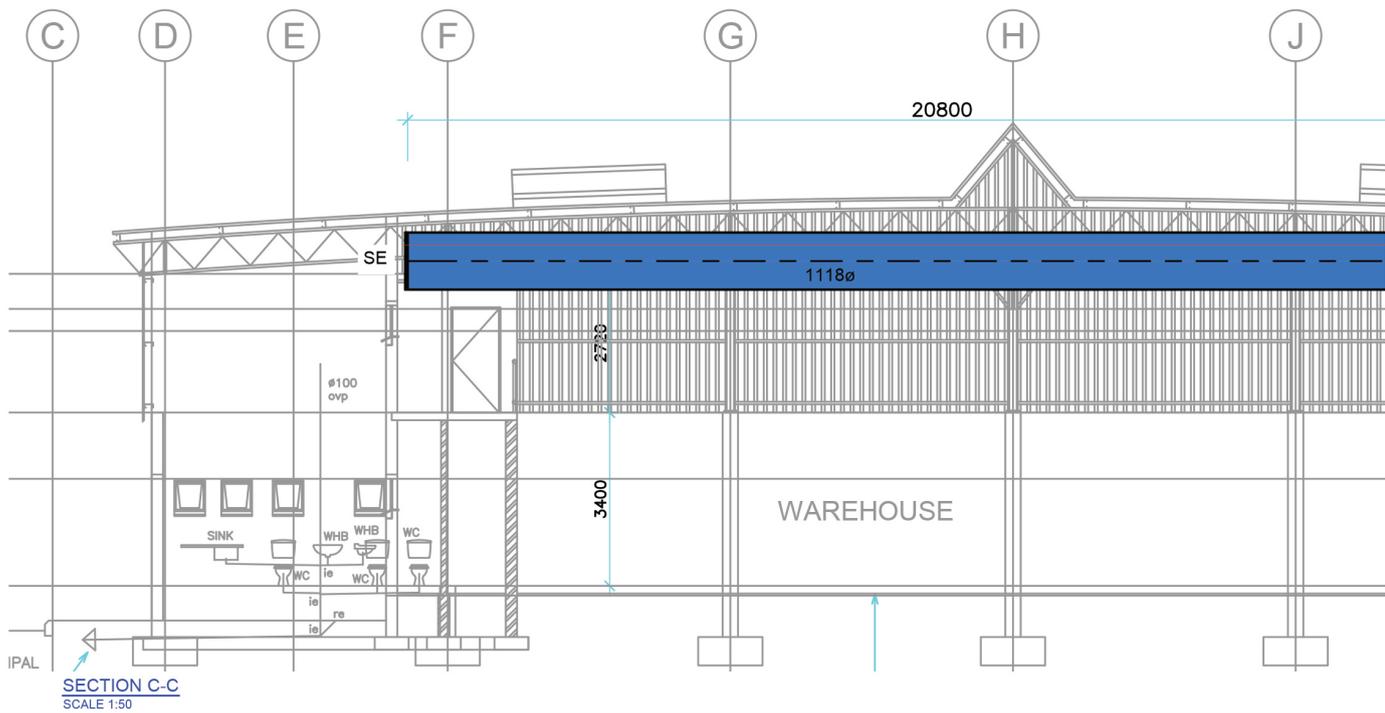
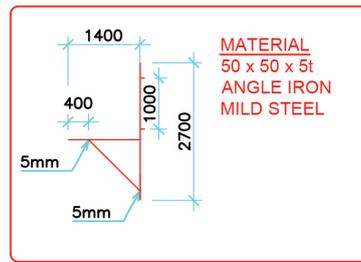
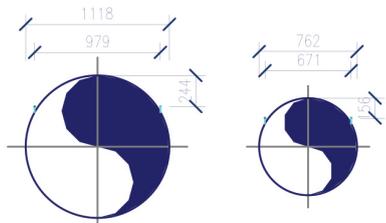
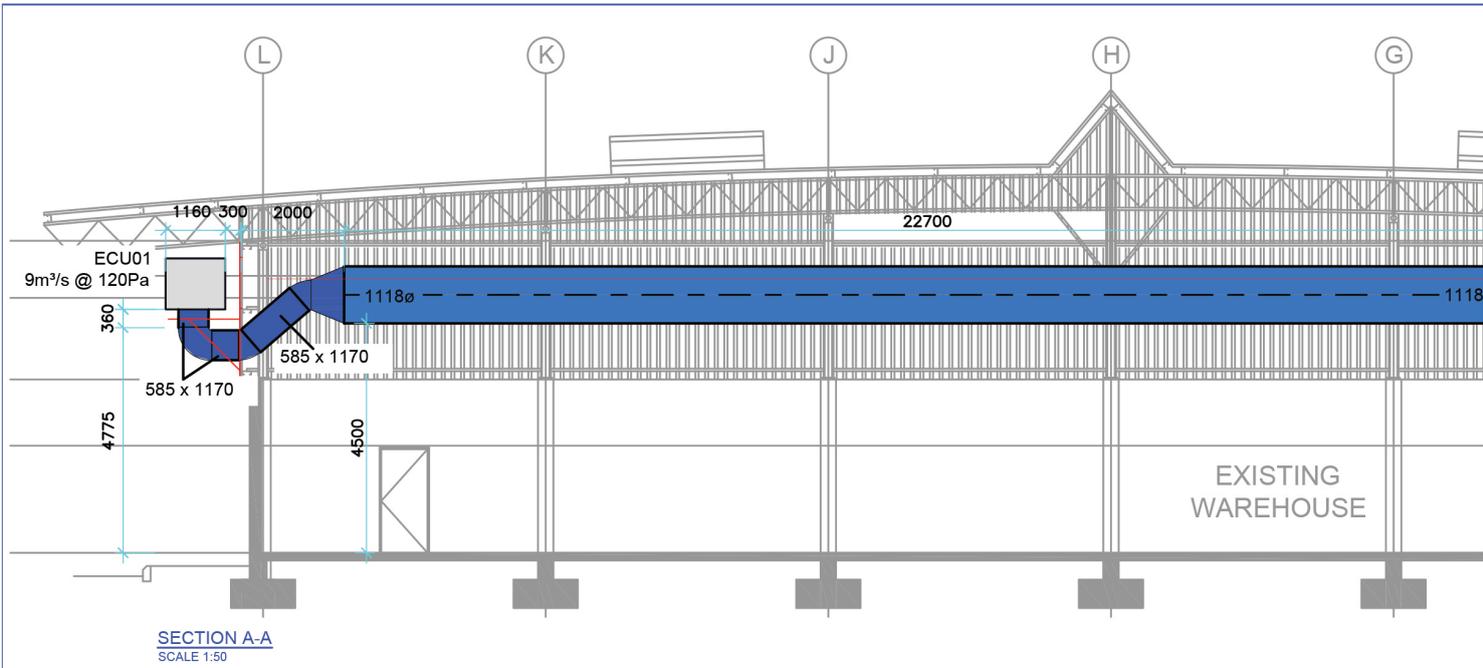


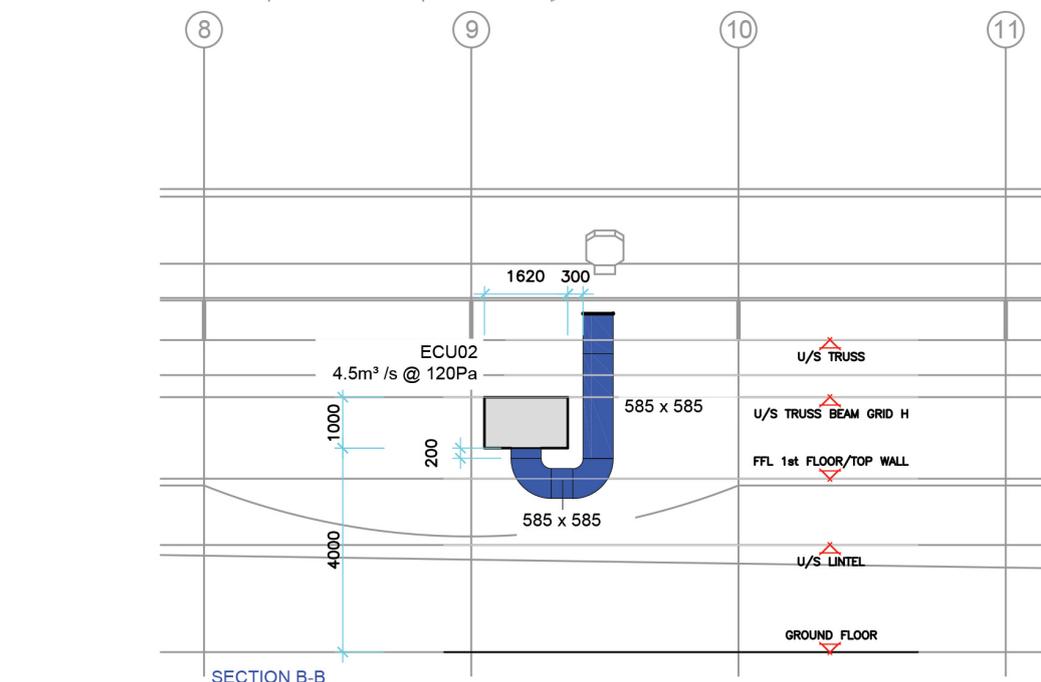
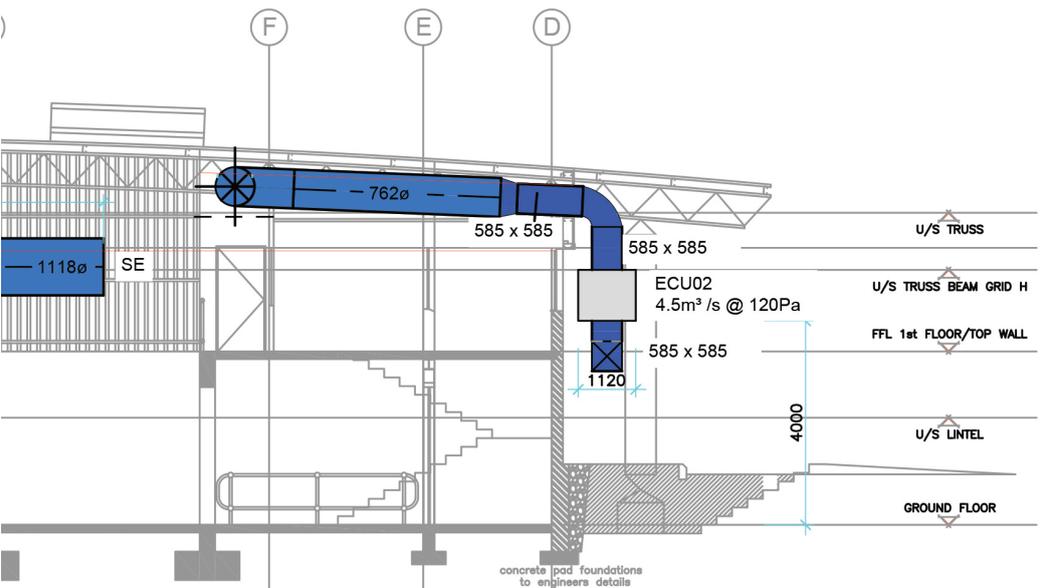
1. *The pieces of ducting simply zip onto the system and can be easily removed again for cleaning or maintenance.*
2. *With these nozzles, the air can reach the mezzanine level as well.*

two teams of four working at heights, making and hanging brackets and ducting. These teams also installed the mounting brackets for the evaporative cooling units, located on the outside of the building.

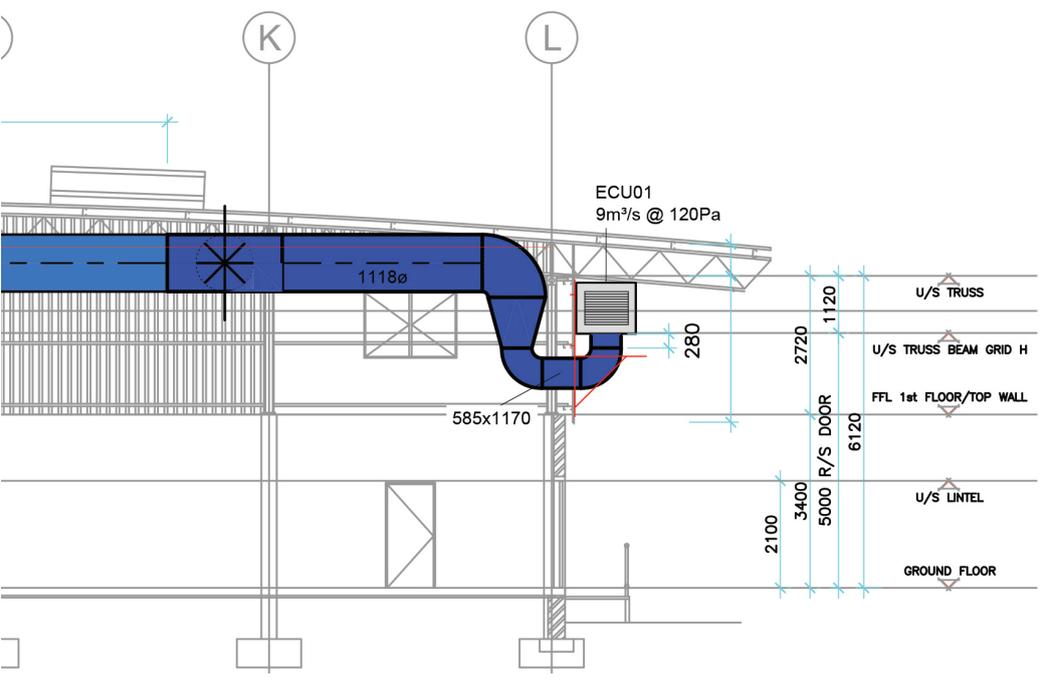
In terms of controls, the system is quite straightforward, where each system can be activated individually, depending on the need. The systems can be operated independently. The controls for each individual unit are wall mounted in close vicinity of each evaporative cooling unit.







SECTION B-B  
SCALE 1:50



LEGEND	
[Blue Line]	New Supply Air Canvas Ducting
[Blue Area]	New Supply Air Galvanized Ducting

STANDARD NOTES :

The evaporative cooling systems are connected to the fabric ducting inside, as shown here.

Equipment Schedule		
Code	Type	Quantity
ECU01	RECONDITIONED EVAPORATIVE COOLER @6000 Us	13
ECU02	RECONDITIONED EVAPORATIVE COOLER @4500 Us	5

REV	17/01/18	DESCRIPTION
		DESCRIPTION

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CLIENT

HVAC LAYOUT - CHAMDOR  
GENERAL AIR CONDITIONING & VENTILATION SECTIONS

Drawn	JL	Surveyed	N/A
Date	17.01.18	Designed	R.J.V.R
Scale	AS SHOWN	Checked	W.S
DRAWING NUMBER		REVISION	PAPER SIZE
P4707-MEC-02		A	A0



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Also, every second system is connected to the emergency generator's power supply. In the case of a power outage, half of the installed units will still be operational.

#### WHY FABRIC DUCTING?

Virtually anything that can be done with sheet metal, can be done with fabric as well — just much quicker and easier.

Various fabric ducting materials are available, depending on the application. From heating to refrigeration,  $-18^{\circ}\text{C}$  to  $140^{\circ}\text{C}$ , there is a fabric that suits every application. There are even anti-microbial options for installations like abattoirs, or anti-static options for projects where a fire risk exists.

Joubert did a costing exercise and found that in terms of cost of material, there wasn't much difference between the rigid ducting and fabric ducting for this job. However, where the massive cost saving came in was on the time and labour side of things. Also, if they went the rigid ducting route, they would have required massive grilles, which would have made it even more expensive.

Putting up sheet metal ducting while the store was trading would have been a nightmare, too. With the store trading, putting up sheet metal would have taken more than double the amount of time.

1. *The contractor built custom brackets for attachment to the ducting.*
2. *The evaporative cooling units serving the existing Chamdor building.*



A big advantage is also the fact that fabric ducting does not take up much space. It all fits into a box and can be transported in the back seat of a car — as opposed to having to hire a 10-tonne truck and forklifts for rigid ducting.

Maintenance just involves removing the ducting and cleaning it in an industrial washing machine.

### THE PERFECT SOLUTION

“This solution was definitely the right one for this project,” says Jansen van Rensburg. Because it is such a substantial space to be air conditioned (basically a huge warehouse), using an alternative solution, such as rooftop units or large ducted split units, would have been considerably more expensive. The evaporative cooling solution works well in Gauteng

because the climate is dry, explains Jansen van Rensburg. It would not have been an effective solution for a location in KwaZulu-Natal, for example. But because of the Chamdor Faktry Sales facility’s location, evaporative cooling, combined with textile ducting, was a feasible solution for this project.

Since the units were mounted on brackets on the side of the building, this system did not call for a plant room. Which was another benefit of going with this solution.

The client is very happy with the outcome, considering the textile ducting solution is almost poetic for the application at a fabric outlet store. There are plans to extend the premises even further in future. So, watch this space. **RACA**

### LIST OF PROFESSIONALS

Developer		New Fynnsaarz
Architect / Designer		De Laroche Architecture
Quantity surveyor		Swart, Coetzee & Partners
Consulting engineers	Mechanical	Energy Partners
	Civil	Entity Structures
Contractors	Main building	Woudstra Construction (1993)
	HVAC & R	Thaba Air
	Wet services	Pretermann Plumbing
	Electrical	IB Electrical (design and supply)
	Fire protection services	Cross Fire Management
Product suppliers	Fabric ducting	Fabricair
	Evaporative coolers	Cool Breeze
	Fans	Systemair

Tel: +27 11 674 4011 | e-mail: sales@fabricair.co.za | www.fabricairsa.co.za

