FANTECH
Intelligent Ventilation

TECH TALK

Newsletter Number 89

December 2018

Annexe to Parliament House

Built over a two year period, the new Parliament of Victoria Member's Annexe is providing much-needed office space to the members of the Victorian Parliament.

The project, managed by the Department of Parliamentary Services for the Parliament of Victoria, solves a long-standing accommodation problem and replaces outdated temporary accommodation built in the 1970s.

The new Annexe building, designed by Peter Elliott Architecture + Urban Design, is a completely free-standing structure from Parliament House and is set within the eastern gardens of the triangular precinct bounded by Spring, Macarthur and Albert streets.

Conceived as a companion building to Parliament House, much of the Annexe building has been constructed below ground level to allow it to blend seamlessly with its surrounds.

> "...constructed below ground level to allow it to blend seamlessly with its surrounds"

Integrated multi-discipline consultancy Irwinconsult was awarded the project's engineering consultancy services. They worked closely with a creative and professional project team led by the architect to provide building services, civil, structural, ESD and waste management design on the project.

Designed and constructed to a 5 star Green Star Design, As Built and Interiors equivalency, the Annexe building features an innovative mechanical services design that includes a unique geo-exchange condenser water system that provides both cooling and heating. Comprising a network of 100m deep boreholes, this system eliminates the need for a gas supply for heating whilst offering excellent operating efficiencies.

Another ESD feature of the building is an in-ground labyrinth ductwork system that preconditions the outside air supply to common areas including corridors, lobbies & breakout spaces.

According to Irwinconsult, a key objective of the project was to deliver a high level of thermal comfort to each office, as well as allow individual temperature control while maximising energy efficiency.

To help meet these objectives, while overcoming the limited ceiling space available, Rickard Linear VAV electronic diffusers were installed in all offices and connected to even pressure supply/return ductwork. Supplied by Fantech, these units were selected for their ability to align with the architectural intent of the project while also allowing occupants to adjust set point temperatures to their desired level.

Additionally, VAV diffusers enable a single zoned fan coil unit (FCU) to serve multiple offices – in this case approximately 5-8 offices zoned by orientation. They also allow additional energy efficiencies to be incorporated, including the ability to completely shut the diffuser within an office whose window is open. This prevents loss of heated or cooled air and averts the introduction of additional outside air load onto the common FCUs.

Fantech assisted Irwinconsult with the implementation of the Rickard Linear VAV electronic diffusers on the project, as well as selection of all ventilation fans for outside air, general exhaust and toilet exhaust systems serving the new Annexe building.

"We were able to select fans capable of achieving the required duties while minimising energy consumption and noise generation – and also fitting within the limited plantroom and ceiling space," says Michael Barber, Associate – Mechanical for Irwinconsult.

Completed on budget, the new Parliament of Victoria Member's Annexe was officially opened in August 2018 by the Governor of Victoria, the Hon. Linda Dessau AC.



Image Credit: Department of Parliamentary Services

Technically Speaking
with Kerry Dumicich



Air Leakage

Air leakage is defined as "air, other than exhaust air, return air and/or relief air that escapes from an air-handling system in an uncontrolled manner."

The consequences of air leakage can include a reduction in delivered air flow; thermal losses due to air leaking between conditioned and unconditioned areas; and an increase in power consumption due to the additional capacity required to correct losses due to air leakage.

What our industry may not be aware of, however, are the levels of air leakage possible.

Air leakage standards

The standards commonly used in Australia and New Zealand that define air leakage requirements are:

AS4254.2 2012 *"Ductwork for air-handling systems in buildings Part 2: Rigid duct"*

BS EN1886:2007 *"Ventilation for buildings – Air handling units – Mechanical performance"*

EN 13141-7:2017 *"Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 7: Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings".*

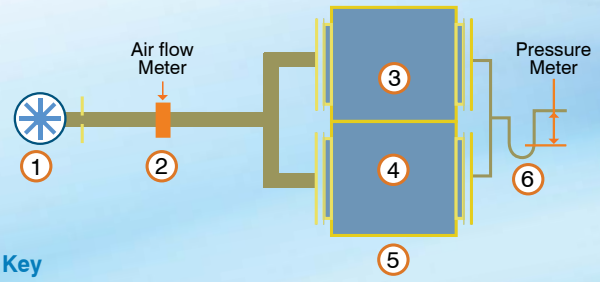
AS4254.2 2012 Clause 2.2.4 requires all duct systems with a capacity of 3,000 L/s or greater to be tested for air leakage at a static pressure of at least 1.25 times the calculated design operating pressure in the tested duct section. The air leakage is not permitted to exceed 5% of the design air quantity for the duct system. The standard requires that a minimum of 10% of each duct system be tested.

BS EN 1886:2007 defines how to test air handling units for air leakage and defines casing leakage classes for air handling units; L1, L2 and L3 (in order of best to worst air leakage performance). This standard calls for lower allowable air leakage as the filter class fitted within an AHU increases.

EN13141-7 is used to measure the air leakage of ventilation units including energy recovery units for single residential dwellings.

Air leakage testing process

Performing an air leakage test is relatively simple. The air inlets and outlets are capped and air pumped into the system until a specified pressure is achieved. The air flow continues and is then measured. This air flow rate reflects the amount of air that is leaking at the specified pressure drop. As the system pressure increases, the amount of air leakage will also increase.



Key

1. Adjustable fan
2. Air flow measuring equipment
3. Exhaust air side
4. Supply air side
5. Heat recovery device
6. Static pressure measuring equipment

Figure 1: Example test setup for external air leakage testing.

Physical test results:

Energy recovery unit

An air leakage test was recently performed on a heat recovery unit (HRV) to EN 13141-7.

When subjecting the HRV Unit to + 300 Pa, 111m³/hr of external air leakage was recorded. As the HRV is rated to 180m³/hr the test indicated 61.8% air leakage. When -300Pa was applied to the HRV unit, an air leakage rate of 64.9% was recorded.

The internal leakage defines the air leakage between the supply air and exhaust air compartments of a heat recovery unit. This test measured 76.7% when a pressure differential of 100Pa was applied. This creates at least a couple of significant issues.

1. True heat recovery performance is extremely poor because much of the air by-passes the heat recovery process.
2. The fresh air supply is likely to be contaminated by exhaust air. This is problematic when extracting from bathrooms (odour and humidity), and with general recirculation of contaminants such as CO_2 and VOC's.

External Overpressure Leakage			External Underpressure Leakage			Internal Leakage		
Reference flow	180	(m³/h)	Reference flow	180	(m³/h)	Reference flow	180	(m³/h)
Ref static pressure	50	(Pa)	Ref static pressure	50	(Pa)	Ref Static Pressure	50	(Pa)
P (Pa)	q_{ve} (m³/h)	$\frac{q_{ve}}{q_{vd}}$(%)	P (Pa)	q_{ve} (m³/h)	$\frac{q_{ve}}{q_{vd}}$(%)	P (Pa)	q_{vi} (m³/h)	$\frac{q_{vi}}{q_{vd}}$(%)
100	59.8	33.2	-100	60.5	33.6	50	92.5	51.4
250	100.3	55.7	-250	105.3	58.5	100	138.1	76.7
300	111.2	61.8	-300	116.8	64.9	200	-	-

Table 1: Air leakage test results of sample HRV unit.

q_{ve} = external air leakage (air flow leaking between the internal and external of the HRV unit at a test pressure).

q_{vi} = internal air leakage (air flow leaking internally between the supply air and exhaust air sections of the HRV unit at a test pressure).

q_{vd} = declared air flow rate.

VAV box and duct run

An air leakage test was recently performed on a length of ductwork and a VAV box to AS4254.2 2012.

The results of the test showed that the VAV Box component of the system had 9% air leakage of the designed air flow rate (design air flow = 3,000L/s, VAV air leakage = 270 L/s). Because the VAV Box exceeded 5% air leakage the total system failed due to this single part of the ductwork, without considering further leakage from the remainder of the duct system.

Potential weak points

Air leakage can be improved by paying close attention to the product's construction. Potential weak points for air leakage include:

- Slip on flanges, such as Mez flanges, ductmate or Wards flanges
- Inadequate size and/or application of gasket seals
- No silicon sealant along seams
- Poor sealing of panels on AHU units

If you can see any holes, gaps or poor joins then you will most likely have air leakage at these locations.



Figure 2: Sample duct section highlighting potential air leakage paths.

Conclusion

Many engineers are unaware of the volume of air leakage in ductwork systems that include multiple components. The amount of air leakage from a piece of equipment is often closely related to the quality of the unit's construction. A unit that appears to be of poor construction quality is likely to have more air leakage.

If a product has been air leakage tested and achieved a low leakage rating (such as L1), this suggests that care has been taken with the design and construction of the unit in order to minimise air leakage.

A lifetime of service

Fantech recognises the important contribution of its staff to the success of the company and thanks them, particularly those who have reached 10 or more years of service.



30 years – Russell McNally

Burra Steel VIC – Operations Manager

Russell started in the steel industry with the Melbourne Board of Works, before eventually joining South Gippsland Heating and Air Conditioning now called Burra Steel) as a sheetmetal worker. Over the years, he progressed his career with Burra, enjoying challenges as the company evolved into a state-of-the-art local manufacturer. Russell has a long involvement with basketball as a referee and player, and has an active role supporting local sporting clubs.



Colin Coulston

Fantech VIC – Despatch Supervisor

Colin worked at Australia Post before seeking a change and joining Fantech in general assembly. Having moved back into the Despatch Supervisor role after many years in inward goods, he likes the daily challenges he faces and being able to satisfy customers. Colin is proud to have contributed to the company's growth and success. Away from work, he loves travelling business class, visiting family and six grandchildren in Queensland, having a flutter and a beer.



25 years – Shawn Harris

Fantech QLD – State Manager

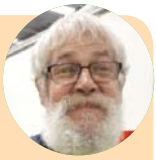
As a graduate mechanical engineer, Shawn experienced the Gold Coast boom before he joined Fantech in 1991. He left briefly in 1993, before returning to oversee the launch of the Air Design air handling product in 1998. Shawn loves representing an innovative market leader that values its people and customers. At home, he is a devoted father to three children.

Thanh Nguyen *Fantech VIC – Engineer*

Thanh completed a 3-month stint at Fantech for her Industrial Engineering Degree before taking a full time engineering position in 1993. Thanh says she was privileged to work with Fantech's founders Jack Pirie and Glen Harries, and to be mentored by former engineering manager Stuart King. Away from work, Thanh does charity work, plays badminton and cares for her family.

20 years – Gary Bracka

Burra Steel VIC – 1st Class Sheet Metal Worker



Gary was originally attracted to his role at Burra Steel because he could work in the sheetmetal trade while being close to home. Fabricating ductwork, he enjoys working under the management of Russell McNally, and looks forward to the Christmas break up each year. When not at work, you'll find Gary fishing, riding motorbikes and renovating his house.

15 years – Stuart Bryson

Fantech VIC – Information Systems Manager

Stuart came to work at Fantech in a one-year industry-based learning position, which eventually led to a role in Marketing. He moved to the Information Systems department in 2011, and built Version 5 of the Fantech Selection Program. Outside of work, he likes testing his knowledge at trivia nights.

Susan Triama

Systemaire WA – Accounts Receivable



Before immigrating to Perth, Sue was an accomplished shorthand typist in the UK. Studying Accounting in Australia she joined Systemaire as a bookkeeper in 2003 and continued working under Tony Fego management and then Fantech. In 2013 Sue transitioned into a part-time role. Sue loves travelling and family time.

Angela Hawkesford

Fantech NSW – Fantech Trade State Sales Manager



Prior to arriving in Australia, Angela worked for a company that supplied Elta fans. Upon moving here, she joined Fantech Plus (now Fantech Trade) in an internal sales role progressing to State Sales Manager. Angela loves working for Fantech because of the great product range, culture and customer base. She plays netball and enjoys Zumba.

Peter Kelly

Fantech NSW – Assembler



With a background as a fitter mechanist, Peter joined Fantech as a fan assembler and except for a three year stint in dispatch, has remained in this often challenging role. He enjoys working with the good bunch of people at Fantech, and likes that work is close to home. Peter likes to follow motor sport.

Kathy Gross

Fantech NSW – Sales Support Officer



Before joining Fantech, Kathy held a similar role in the textile and kitchen appliance sector. In her current role, she says there is always something to learn, and staff are held in great regard. Kathy's personal time is spent keeping up with two children and their Little Athletics Club activities.

Jacky Cai *Fantech NSW – Credit Officer*



Jacky studied accounting and finance at university, then worked in pharmaceuticals before joining Fantech. His diverse and challenging role has grown in responsibility over the years. He enjoys the friendly working environment and being part of a growing company. Jacky is a keen ice skater and bush walker.

Running for beyondblue

This Christmas, Fantech will donate funds that would otherwise be used to purchase Christmas cards to beyondblue via the Mornington Running Festival.

Held in Mornington, about one hour south of Melbourne, the Festival included events in four categories – the 1km Kids Dash, the 5km and 10km Fun Run/Walk and the popular Half Marathon over 21.1km.

Now in its fifth year, the Mornington Running Festival supports the work of beyondblue through various fundraising activities.

It took place in late September, with 52 Melbourne-based Fantech staff, and their families and friends competing across the 5km, 10km and 21.1km events.

> **"the group helped raise valuable funds for a very worthy cause."**

As well as being fun and promoting teamwork, the group helped raise valuable funds for a very worthy cause.

Established in October 2000, beyondblue works to raise awareness of depression, anxiety and suicide prevention by reducing the stigma surrounding these issues and encouraging people to seek support when they need it. Last year, more than 150,000 Australians contacted beyondblue about their concerns.

"So no matter who you are, or how you're feeling, you can talk it through with us – we'll point you in the right direction so you can seek further support," says beyondblue.

Fantech is proud to support the work of beyondblue. For more information, or to donate, visit www.beyondblue.org.au

Proudly supporting beyondblue



0 ears

Dinir (Dean) Ibrahim

Fantech VIC – Senior Developer

After earning a double degree and working at Swinburne University, Dean joined Fantech to manage the company's website development. He likes the rapidly changing technology involved, and the team he works with. Dean has a second child due soon.

Patrick Kennedy



Burra Steel VIC – Boilermaker/Driver

Patrick is a welder and part-time truck driver at Burra Steel – or, as he likes to joke, a "steering wheel attendant". Away from work, Patrick's interest in mechanics extends to collecting and rebuilding vintage stationery engines.

Alistair Hanson



Burra Steel VIC – Boilermaker/Welder

Alistair joined Burra Steel after finishing school and before joining the Australian Army. He returned to Burra Steel and undertook a boilermaker apprenticeship six years ago. Working with a great bunch of guys, he takes great satisfaction in his work. Alistair loves to travel with his wife.

Jason Kelley



Fantech SA – Senior Sales & Project Co-ordinator

Jason originally joined Fantech as an external sales engineer. He has great memories of working on the challenging Royal Adelaide Hospital project and enjoys the family feel and opportunities that Fantech offers. He has recently holidayed in the US with family.

Lynda Griffiths



Fantech QLD – Financial Accountant

After completing a Masters in Accounting Graduate Certificate, Lynda made her way to Fantech Queensland and has remained in her role as Financial Accountant since. On weekends, Lynda loves to cycle - both on road and on mountain bike trails.

Robert McLaren

Fantech VIC – Senior Operations Manager

Rob joined Fantech as a warehouse supervisor to help the company transition from the Mulgrave to Dandenong location. Today, he is involved in implementing the warehouse management system, and building a great working environment. A trout fisherman, Rob heads to Eildon when he can.

Grant Clark

Fantech VIC – Fan Assembler

Grant currently works in the MiniVent section assembling fans and special units. He has fond memories assisting with design updates for a filter fan used by the WA mining community. Grant is into lawn bowling, archery and modelling.

Eva Bek

Fantech VIC – Fan Assembler

Originally a pastry chef, Eva has enjoyed working with friendly colleagues at Fantech while watching the company grow in the ten years she has been with the group. Grandchildren keep Eva very very busy at home.

Manfred Adam

Fantech VIC – Purchasing Manager

In pursuit of a challenging role, Manfred found one as Purchasing Manager with Fantech. He likes working for a recognised market leader, and with its suppliers to reduce costs. At home Manfred gardens, power walks and cares for the elderly.

Michael Turner



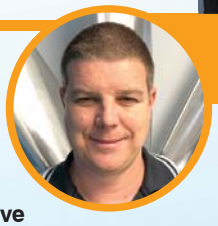
Fantech SA – Storeman

After managing warehouses for a major retailer, Michael joined Fantech in a similar role. Highly motivated, he enjoys the opportunities to succeed and is proud to have reached this milestone with Fantech. Michael plays golf and baseball, and enjoys camping/river trips.



Left to right: Manfred Adam, Eva Bek, Dinir Ibrahim, Grant Clark, Stuart Bryson, Thanh Nguyen, Robert McLaren.

Aviator taking control of the air



Fantech's commitment to the development of innovative technologies has led to the creation of the Aviator range of controllers.

Aviator Intelligent Ventilation Control systems use the latest digital technology to manage as few as one fan, or up to a large system of multiple fans and sensors for almost any ventilation application.

Taking control of the air, the Aviator range can be tailored and pre-configured to suit the requirements of each specific application. The range can drive a Demand Control Ventilation system that monitors the indoor environment via sensors. This provides real-time feedback to the fans, which adjusts fan speed and the ventilation rate to match specific requirements.

"The range combines the latest innovations in controls hardware with intelligent applications developed by Fantech's specialist Control Systems team," says Fantech Group Product Manager, Peter Henry. "Additionally these applications provide centralised system monitoring and remote diagnostics while having the flexibility to be adapted to suit real world requirements."

Three models are currently available – the Aviator Touch PRO, the Aviator MINI and the Aviator MAX.

The Aviator Touch PRO includes an intuitive graphic interface and a high definition 4.3" LCD touch screen for ease of use and navigation. It features built-in temperature and humidity sensors, and is ideal for small to medium size ventilation applications that require a maximum of 10 fans.

The Aviator MINI has the ability to manage a maximum of 50 fans individually or within a maximum of 6 demand control zones. It features an advanced 7 day program scheduler and can easily integrate with Building Management Systems.

Product News

with Peter Henry

The Aviator MAX is a tailored solution designed for car park ventilation. It works in conjunction with Fantech's JetVent fans, pollutant sensors, VSDs, supply and exhaust fans and the building management systems. Aviator MAX has been developed to increase energy efficiency while optimising ventilation output.

> **"flexibility to be adapted to suit real world requirements"**

All Aviator controllers use the Fantech ComLink system – the standard RS485 communications protocol – to connect the controller, fans, drives and sensors. This two-wire system simplifies cabling, reduces installation and commissioning time, and allows for a greater level of system adjustment.

"Increases in energy prices are driving greater demand for cost effective systems that can deliver energy efficient buildings. The Aviator system helps address these concerns while helping to create healthier and more productive spaces for building occupants," says Peter.



HVLS Selection Tool

To assist with selecting the most effective Gorilla X HVLS fan for your specific application, Fantech have developed a step by step easy to use web based selection tool.

Once on the HVLS page, simply enter the width and length of the area, together with the ambient temperature and desired cooling effect from the fans. The selection tool will provide a number of possible options that list the quantity of fans, fan sizes and suggested spacing.

The Fantech HVLS selection tool performs calculations to ASHRAE 55-2017 “Thermal Environmental Conditions for Human Occupancy”. This determines the cooling effect of Gorilla X HVLS fans at different locations relative to the fans (under normal conditions).



“... list the quantity of fans, fan sizes and suggested spacing.”

It can also estimate energy savings when using HVLS fans in air-conditioned spaces, or when HVLS fans are used for de-stratification.

While air movement does not reduce temperature, air movement can cool the skin through evaporation and convection. The amount of skin cooling (or cooling effect) is dependent on a number of factors such as air temperature, humidity and amount of clothing worn.

Fans by Fantech
Product Selection Program



Hints and Tips *with Stuart Bryson*

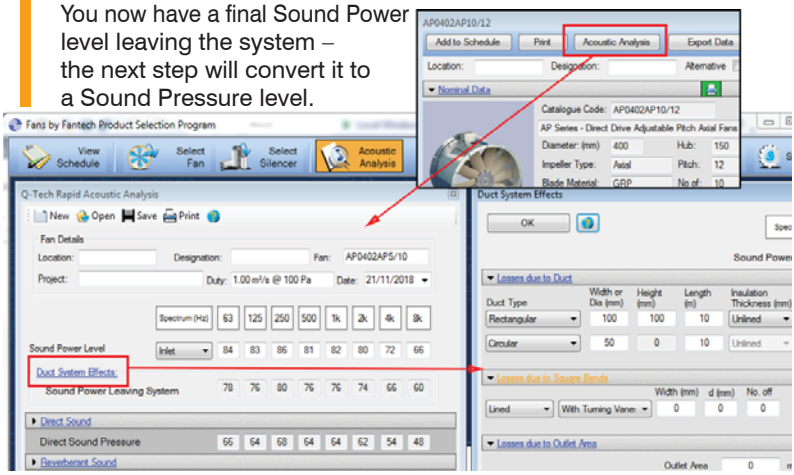
Acoustic Analysis – Part 1

The Selection Program allows you to perform a rapid acoustic analysis to determine ‘real world’ sound levels of a fan, and decide if a silencer is required.

Once a fan is selected, click the Acoustic Analysis button to begin an analysis – it will populate with the Sound Power Levels of the fan. If you use the acoustic analysis menu item at the very top of the program, you can also start a blank analysis.

With the initial sound levels entered, click the Duct System Effects link to enter all of the ductwork characteristics, as these affect the sound power. You will need to input the duct runs as circular or rectangular and indicate any insulation thickness. Also input the square bends and outlet area, plus any additional effects or components like dampers. Click OK to update the Analysis.

You now have a final Sound Power level leaving the system – the next step will convert it to a Sound Pressure level.



Version 5.5 of the Selection Program can be downloaded from our website. Remember to use the auto-updater to make sure you’ve got all the latest features.

Airepure turns twenty

Founded by three friends and colleagues – Peter Wingfield, James (Jim) McIntosh and Roger Van Oosten – Airepure Australia commenced business 20 years ago in Melbourne.

With over 40 years of combined experience in the filtration industry, the trio quickly gained the trust and support of major Australian contractors, as well as that of two US-based manufacturers who granted Airepure the Australian distribution rights to their products in 1999.

Offering world-class air filtration solutions and engineering expertise, Airepure’s early rapid growth saw the company move in 2002 to a large warehouse facility in Mulgrave, where it operates from today. The years following saw branches in Sydney, Adelaide, Brisbane and Canberra, while Airepure New Zealand was established in 2016.

Today, Airepure Australia employs over 50 staff and is also represented by agents in Far North Queensland, Tasmania and Darwin.

The company’s commitment to staff retention and professional development is evident when you consider that 16 staff members have been employed with Airepure for over 10 years – three of those for 15 years or more. Founding director Roger Van Oosten remains at the helm.

Airepure is committed to providing clients with world-class expertise by investing in an in-house engineering team, dedicated product and project specialists, and knowledgeable technical sales and support. In 2013, the Airepure Technical Services division was formed, with three NATA-accredited sites offering on-site testing and certification services.

This is supported by a continuous product development and improvement program to meet client requirements and new markets. The product range includes brands like Pure-V, Aireflow-VC, Focus and Kaire Unit.

This commitment to quality makes Airepure a national leader in air filtration. It continues to be involved in significant projects around Australia, like the Queensland Bone Bank, Melbourne Docklands Harbour Town precinct and the Post-Entry Quarantine Facility at Mickleham.

More recently, Airepure filtration products have been used in key medical and health research facilities including the Victorian Comprehensive Cancer Centre and the Peter Doherty Institute for Infection & Immunity.

Fantech congratulates all at Airepure Australia on their 20 years in business.

airepure® australia



Founding Airepure Director and CEO, Roger Van Oosten (left) and longstanding employee Paul Zeibots, State Sales Manager – NSW/ACT (right)

The d'Arenberg Cube

A 106-year old winery in South Australia's McLaren Vale features an award-winning, cube-shaped building inspired by the complexities and puzzles of winemaking.

As a founding member of Australia's First Families of Wine, the Osborn family has tended its d'Arenberg vineyards since 1912.

Today, the winery is run by fourth generation family member and Chief Winemaker Chester Osborn, who took over the reins from his father d'Arry in 1984. Chester is renowned for his colourful personality and the distinctive, award-winning wines he produces using traditional methods.

As one of South Australia's most iconic wineries, d'Arenberg has always been a popular tourist destination – just a 45 minute drive south of Adelaide – but was in need of expansion to cater for growing numbers of visitors.

In 2003, Chester created the concept of a cube-shaped building inspired by the popular Rubik's Cube puzzle to house a new cellar door. But so complex was the building's form that it took more than a decade before construction of the $15 million building commenced in late 2014.

Sarah Constructions was appointed as the managing contractor on the ambitious project. They were joined by a design team consisting of ADS Architects, CPR Engineers, mechanical services engineers BESTEC and Osborn himself.

The building's mechanical services systems feature a range of Fantech products specified by BESTEC. These include Fantech's in-line mixed-flow fans, axial fans for kitchen exhaust and a number of ceiling mounted fans. Fantech also supplied Q-Seal rectangular attenuators to reduce fan and system noise.

Perched above the vineyards, the d'Arenberg Cube was officially opened by the Osborn family in December 2017. Its striking façade features tempered double glazing across all five levels – the top two are at a 45° angle from those below to resemble the puzzle in rotation. The top floor houses d'Arenberg's new cellar door and bar that take in panoramic views of the region, while the third floor is home to an award-winning restaurant offering degustation dining. The ground floor features the Alternative Realities Museum, which includes a wine sensory room, a virtual fermenter, a 360° video room and other tactile experiences for visitors to enjoy.

As well as attracting thousands of visitors each month, the d'Arenberg Cube has been recognised with numerous awards, including the prestigious Good Design Award 2018 and more recently, the International Best of Wine Tourism Award.



Image courtesy of d'Arenberg

WOULD YOU LIKE MORE INFORMATION?

Please send me a copy of the latest Fans by Fantech catalogue:

- ☐ Electronic version
- ☐ Hard copy printed version
- ☐ Please send me a copy of the Fans by Fantech Product Selection Program.
- ☐ Please send me a copy of the Gorilla X HVLS Brochure.
- ☐ Please send me a copy of the Aviator Controls Brochure.

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Asia

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Visit our website at **www.fantech.com.au**

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NATSPEC ProductPartner