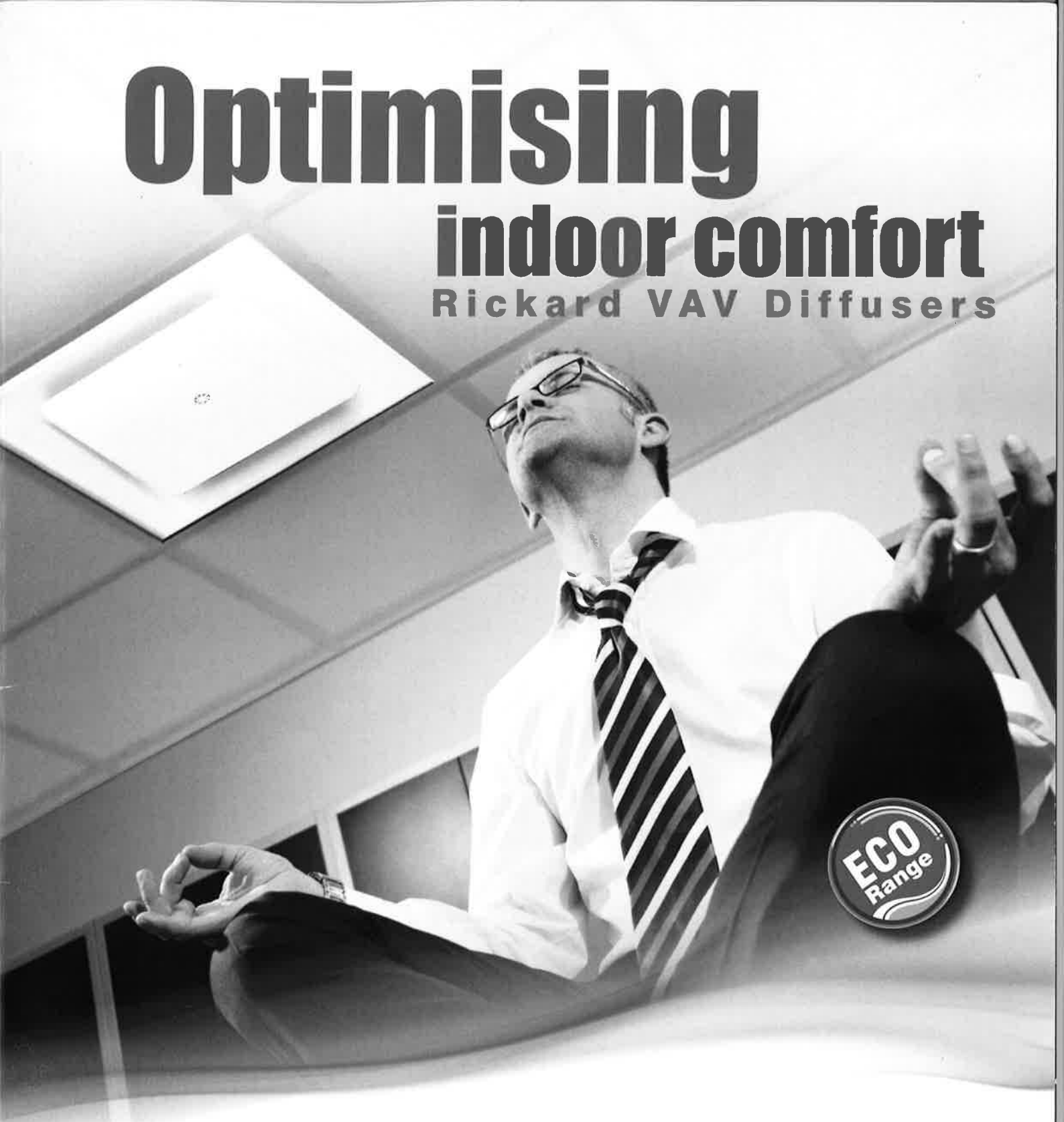
Optimising indoor comfort

Rickard VAV Diffusers



- Reduces power consumption by lowering demand on air handling system
- Tenant changes easy & cost effective
- Provides occupant with improved thermal comfort
- Improved indoor air quality
- Simple, easy to install plug and play system
- Compatible with commonly used Building Management Systems (BMS)

Version 2.0

FANTECH
Intelligent Ventilation

The drive for comfort and energy efficiency

There is a growing need for products that help create comfortable indoor spaces while maintaining a healthy and productive working environment. At the same time, new government policies and the dramatic increase in energy costs have created greater demand for products and systems that utilize energy efficient technologies. These new demands are now being driven by architects, engineers and developers to create buildings that offer both the optimal working conditions while saving energy consumption and reducing greenhouse gas emissions.

The RICKARD range of Variable Air Volume (VAV) diffusers helps meet these demands and is a cost effective system that is simple to operate and very reliable.

A highly effective design

Rickard VAV diffusers have a number of unique attributes that ensure they provide optimum performance over a long period of time. The diffusers feature a modern "flush" to ceiling/wall stylish look and aerodynamically shaped components that minimise noise while improving air flow characteristics.

All Rickard VAV diffusers are finished in a chip resistant baked acrylic paint which comes white as standard, but can be ordered in a wide range of colours.

Rickard diffusers do not require routine maintenance, but in-case a repair is required, all mechanical components are easily accessible from inside the room. As a result any maintenance is simple, low cost and can be carried out with minimal disruption to the room occupants.

Key projects



University of Sunshine Coast (QLD)



Echuca Regional Health Hospital (VIC)



Royal Rehab (NSW)



Grand Plaza Shopping Centre (QLD)



Queensland University of Technology (QLD)

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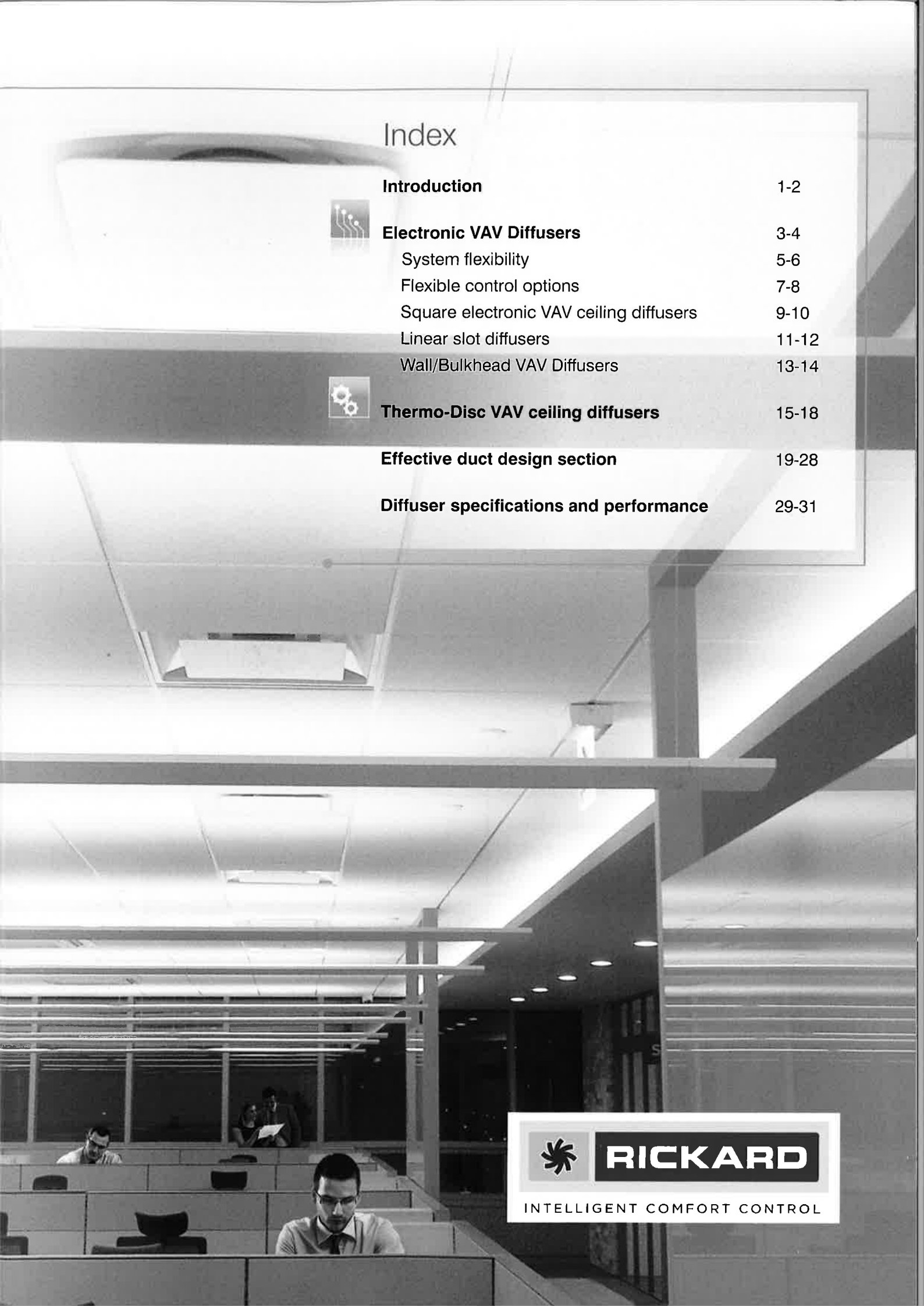
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RICKARD

INTELLIGENT COMFORT CONTROL

Ensures individual occupant comfort and productivity

Rickard VAV diffusers help to provide a well ventilated indoor environment that maintains a consistent and comfortable temperature in most types of applications. They eliminate the negative impact undesirable thermal conditions can have on output, accuracy and productivity.

Rickard diffusers achieve this by allowing only the required amount of conditioned air to enter the space. This air volume is determined by the temperature in the space and the set-point on the diffuser's in-built temperature sensor or wall thermostat. The set-point on individual diffusers can be easily adjusted by the occupant, giving them personalised comfort control of their environment.

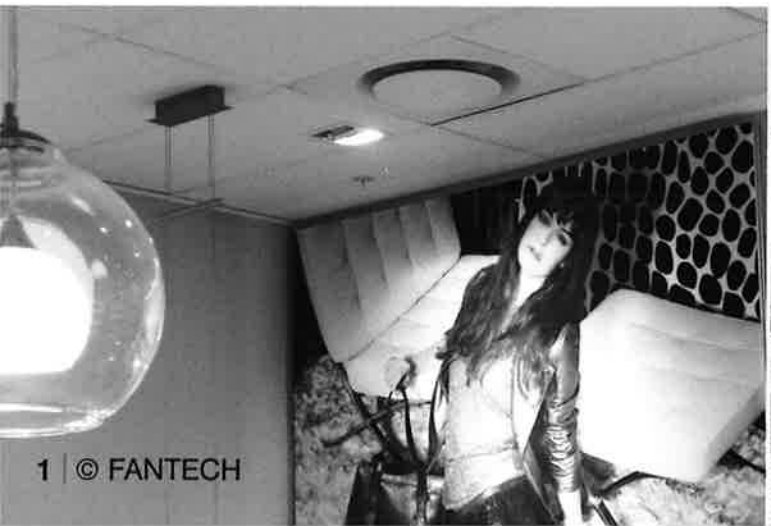
Rickard VAV diffusers provide excellent supply air distribution, which ensures uncomfortable drafts, or air dumping are minimised. Air is discharged from the square diffuser in a 360 degree pattern and circulated around the room and up through the centre to ensure the air within the space is thoroughly mixed and the space is kept at the desired temperature.

Simple and energy saving solution

A key benefit of Rickard VAV diffusers is their ability to potentially reduce the energy consumption of a building by reducing the demand on the air handling system. They achieve this by allowing only the required volume of hot or cold air to enter the conditioned space according to the set point. If the required air volume reduces, the diffuser's aperture size also reduces which creates additional pressure in the ductwork. This pressure signals to the air conditioning system to slow down which in turn saves fan energy. If the air volume required increases, the diffuser's aperture opens allowing more conditioned air to enter the space.

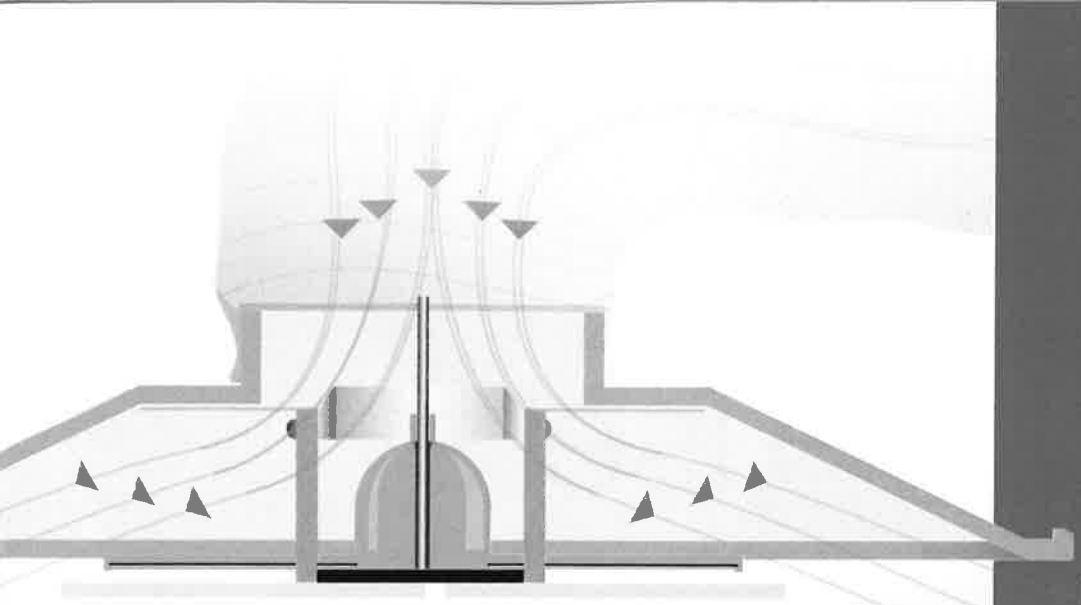
The incentive for building owners and tenants to have energy efficient rental spaces has never been higher. Rickard VAV diffusers can also help achieve Green Building Credits for Building Management, Indoor Environmental Quality and Energy Efficiency.

Rickard VAV diffusers are easy to install and set up, and will function effectively when the building's air conditioning systems are in either cooling or heating mode. All Rickard ceiling diffusers are either installed in suspended tiled ceilings with "T" frames or standard plaster board using a standard ceiling frame.

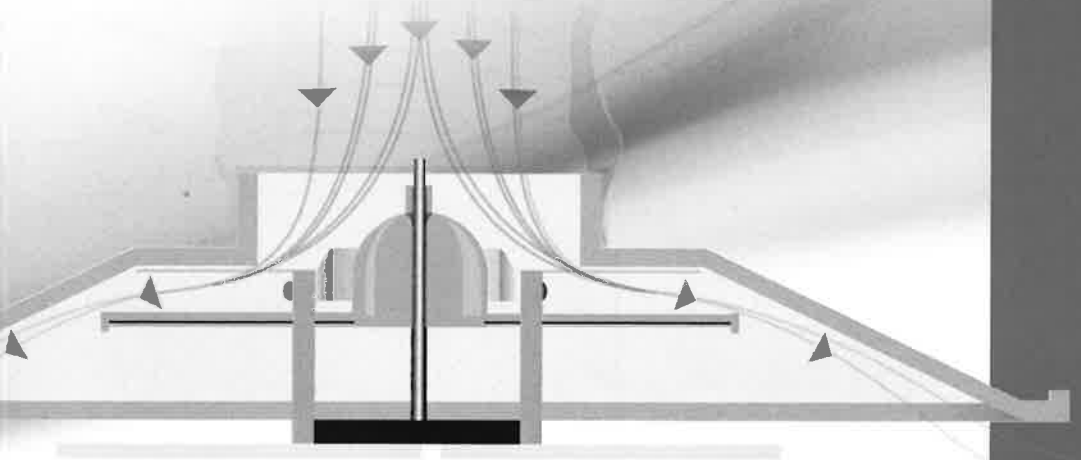




An extensive range to suit most applications and mounting positions



Aperture fully opened to allow 100% of air flow to enter space



Aperture almost fully closed to allow only 10% of air flow to enter space

Rickard VAV diffusers are available as:

System controlled, electronically powered, plug and play models.

Standalone, mechanically controlled, thermally powered models

Each VAV diffuser model is available in various configurations which are suitable for numerous applications or mounting positions. The range comes in square, linear slot and bulkhead models.

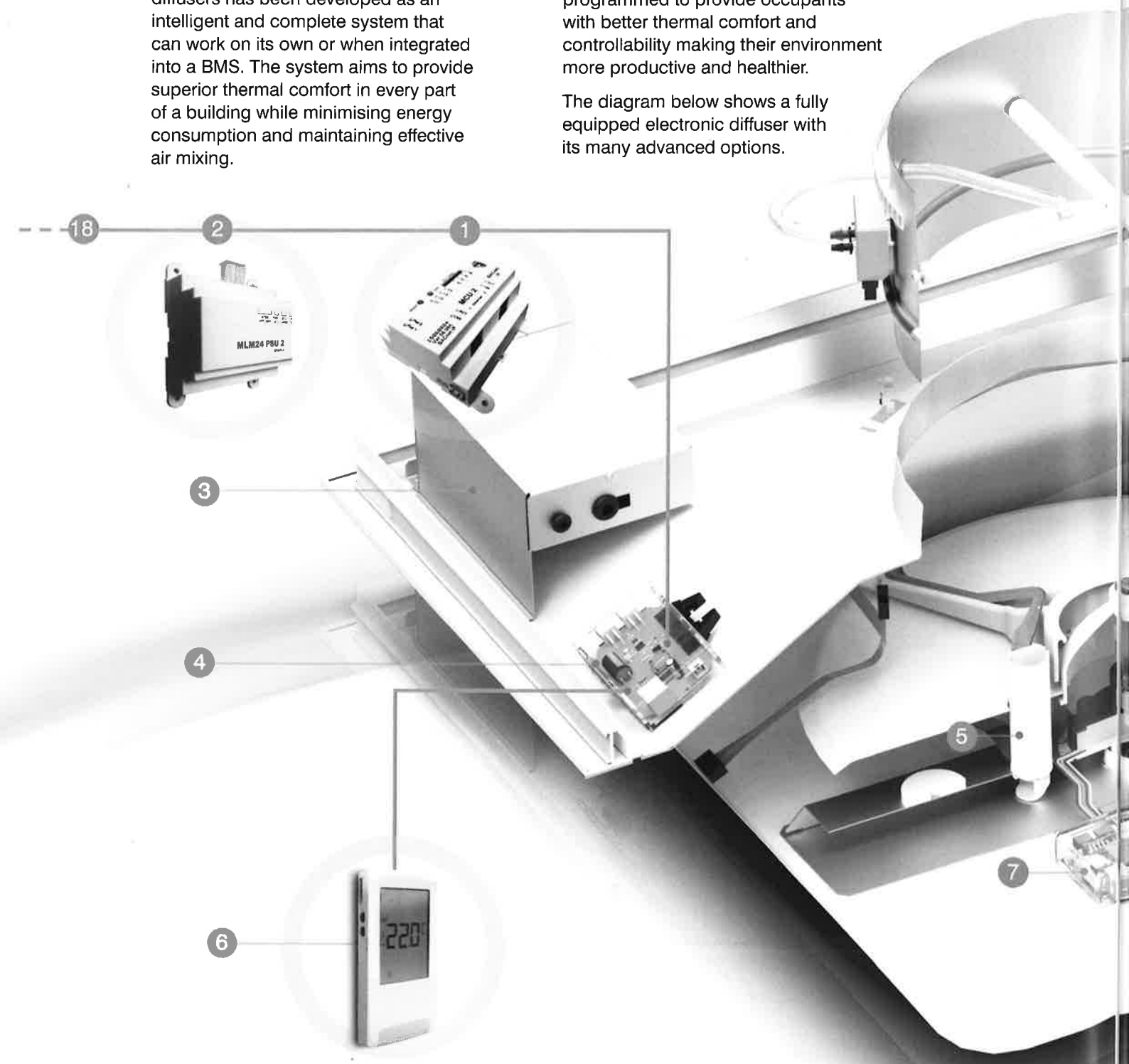


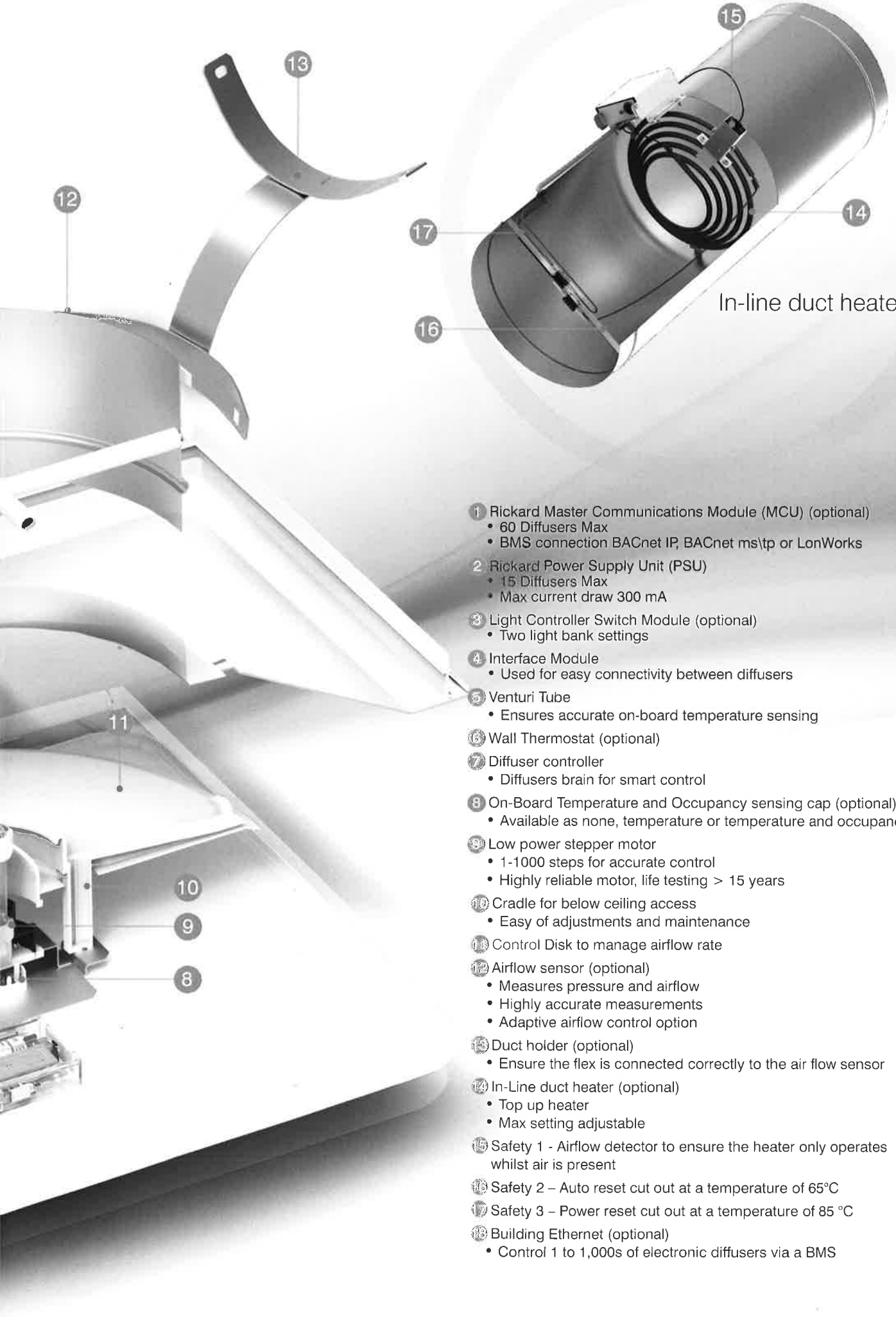
Electronic VAV Diffusers

The Rickard range of VAV electronic diffusers has been developed as an intelligent and complete system that can work on its own or when integrated into a BMS. The system aims to provide superior thermal comfort in every part of a building while minimising energy consumption and maintaining effective air mixing.

Electronic diffusers can be individually programmed to provide occupants with better thermal comfort and controllability making their environment more productive and healthier.

The diagram below shows a fully equipped electronic diffuser with its many advanced options.





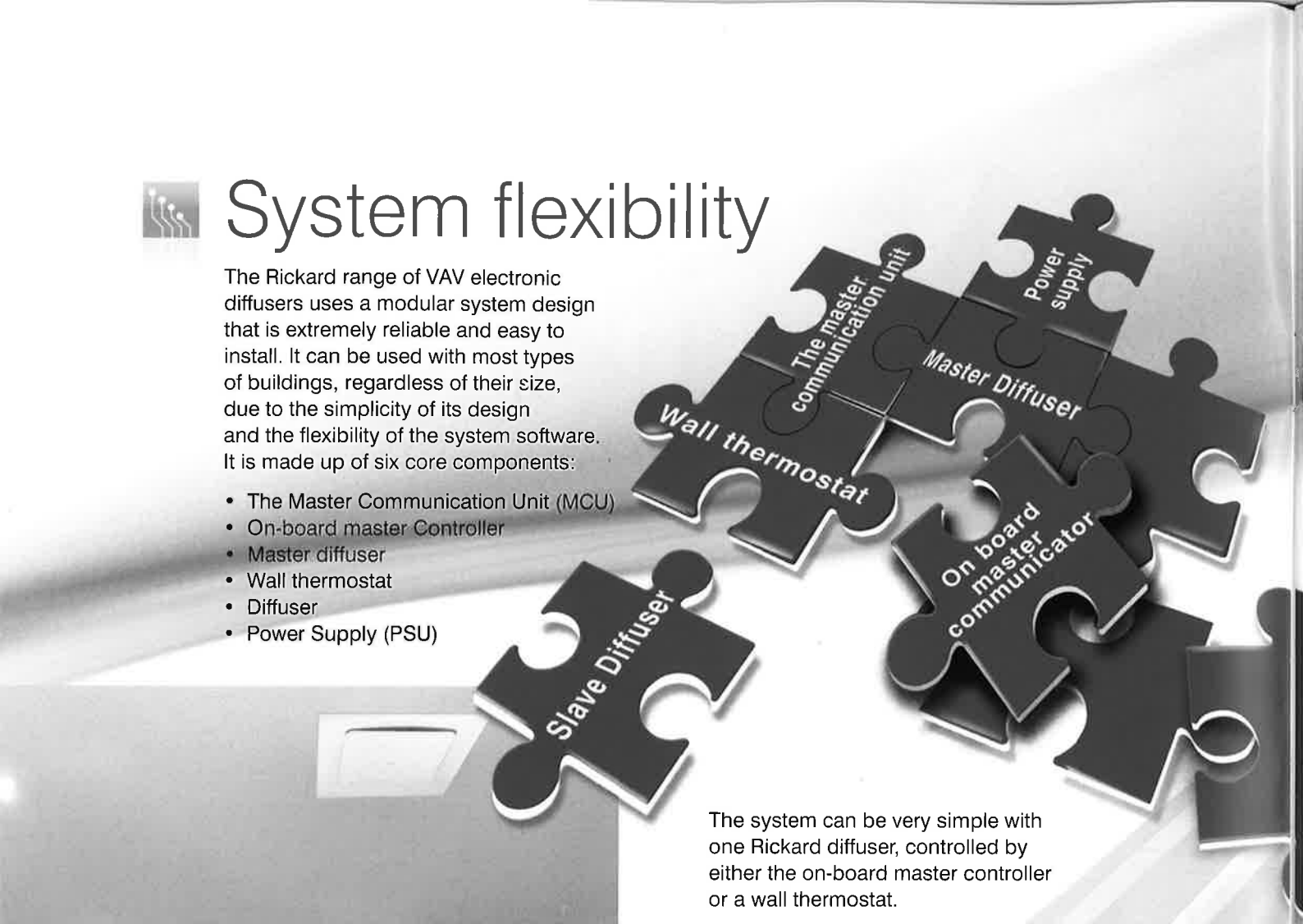
In-line duct heater

1. Rickard Master Communications Module (MCU) (optional)
   - 60 Diffusers Max
   - BMS connection BACnet IP, BACnet ms\tp or LonWorks
2. Rickard Power Supply Unit (PSU)
   - 15 Diffusers Max
   - Max current draw 300 mA
3. Light Controller Switch Module (optional)
   - Two light bank settings
4. Interface Module
   - Used for easy connectivity between diffusers
5. Venturi Tube
   - Ensures accurate on-board temperature sensing
6. Wall Thermostat (optional)
7. Diffuser controller
   - Diffusers brain for smart control
8. On-Board Temperature and Occupancy sensing cap (optional)
   - Available as none, temperature or temperature and occupancy
9. Low power stepper motor
   - 1-1000 steps for accurate control
   - Highly reliable motor, life testing > 15 years
10. Cradle for below ceiling access
    - Easy of adjustments and maintenance
11. Control Disk to manage airflow rate
12. Airflow sensor (optional)
    - Measures pressure and airflow
    - Highly accurate measurements
    - Adaptive airflow control option
13. Duct holder (optional)
    - Ensure the flex is connected correctly to the air flow sensor
14. In-Line duct heater (optional)
    - Top up heater
    - Max setting adjustable
15. Safety 1 - Airflow detector to ensure the heater only operates whilst air is present
16. Safety 2 – Auto reset cut out at a temperature of 65°C
17. Safety 3 – Power reset cut out at a temperature of 85 °C
18. Building Ethernet (optional)
    - Control 1 to 1,000s of electronic diffusers via a BMS

System flexibility

The Rickard range of VAV electronic diffusers uses a modular system design that is extremely reliable and easy to install. It can be used with most types of buildings, regardless of their size, due to the simplicity of its design and the flexibility of the system software. It is made up of six core components:

- The Master Communication Unit (MCU)
- On-board master Controller
- Master diffuser
- Wall thermostat
- Diffuser
- Power Supply (PSU)





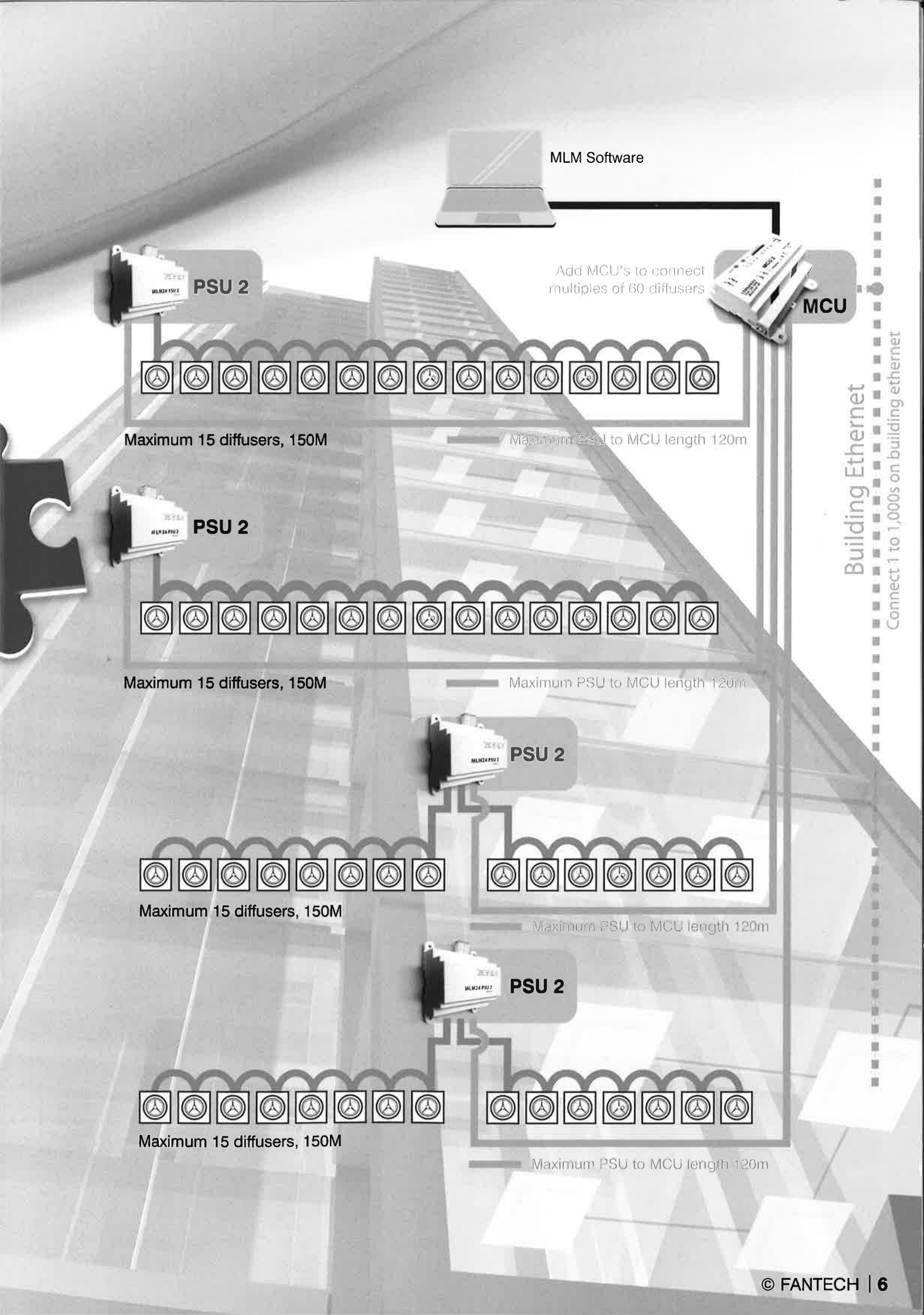
The system can be very simple with one Rickard diffuser, controlled by either the on-board master controller or a wall thermostat.

The system can also be scaled up. A maximum of 60 diffusers can be accommodated on a single Master Communication Unit (MCU) and multiple MCU's can be connected to the BMS if more than 60 diffusers are required. Up to 15 diffusers can be connected to a single power supply, and these can be split into multiple zones.

The diffusers can be individually controlled by either a wall thermostat or the on-board controller that sends its signal back to the BMS. The entire system is then monitored and changes are made through a PC using the Rickard stand-alone software or a BMS.

Rickard Electronic diffusers have adopted an easy to install "plug and play" system that uses simple, automotive grade, daisy chain connections. This helps to minimise the cost of installation and eliminates the risk of using the incorrect connectors.

For new installations of Rickard Electronic Diffusers, duct design that achieves static regain is highly recommended. If retrofitting to existing ducting that cannot be changed, a relief ring can be installed at the end of a duct run to release air pressure when the diffusers close.


MLM Software
Add MCU's to connect multiples of 60 diffusers
MCU
PSU 2
Maximum 15 diffusers, 150M
Maximum PSU to MCU length 120m
PSU 2
Maximum 15 diffusers, 150M
Maximum PSU to MCU length 120m
PSU 2
Maximum 15 diffusers, 150M
Maximum PSU to MCU length 120m
PSU 2
Maximum 15 diffusers, 150M
Maximum PSU to MCU length 120m
Building Ethernet
Connect 1 to 1,000s on building ethernet

Flexible control options

A key benefit of the Rickard electronic diffuser system is its flexibility. From the installation of one single diffuser in a standalone situation to thousands of diffusers all networked together and controlled and monitored via a building management system (BMS).

These diffusers are typically installed in a matrix on high rise buildings and then zoned as tenant's change, without the need to change any duct work. Each diffuser can be made a master or slave throughout the life of the building. Every room needs to have one master controller.

On Board Controller

The most cost effective method is to use an On Board controller which is a small module that plugs into the Diffuser making that diffuser the master of the room. The diffuser will then monitor the room temperature from the centre of the diffuser and then manage the space temperature accordingly. The diffusers have a venturi tube that draws air past the sensor making the room temperature measurement accurate.



Wall Thermostat Controller

The Wall Thermostat is also a master controller. The added benefit to this module is the end user can be given some control of the space temperature. Typically, the set temperature is display and the end user can select a temperature within a small window, such as between 20°C and 24°C.

Infrared remote set point adjuster

Individual temperature control and energy saving is becoming more important in today's modern building. Giving the occupant control over their environment can improve productivity and job satisfaction. This remote can be used to adjust the room temperature between allowable ranges and turn the diffuser to standby

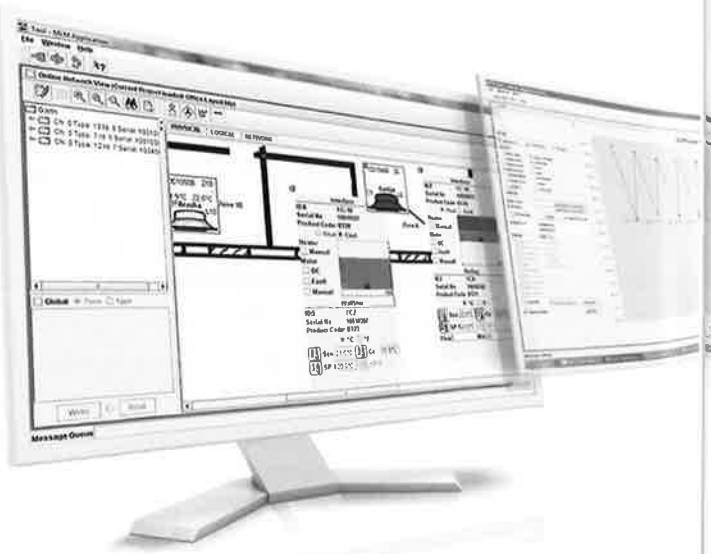


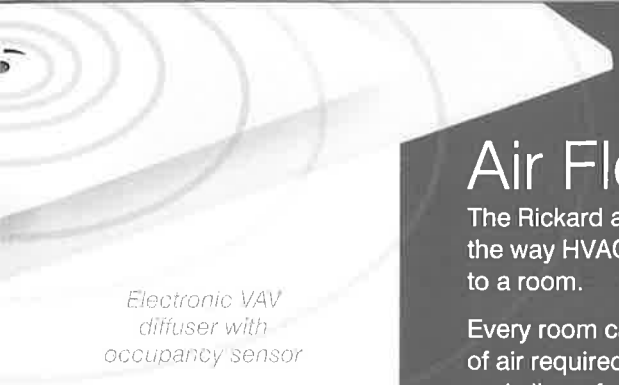
Easy to install, commission and re-program

Rickard offers a free, easy to use software package, the MLM Tool, to manage the diffuser network. This software package has been developed for commissioning and setting diffuser parameters, monitoring the network and logging diffusers activity. Its user friendly graphics have easy to follow instructions and simple colour-coded diffuser icons for set up and commissioning. This software makes the system flexible by easy converting slave to masters and re-zoning rooms within a building.
All the Rickard system commissioning is done via this software and below the ceiling on a PC.

The Rickard software can show you how each diffuser is connected within a zone and which diffusers make up each zone. By selecting the diffuser parameters you wish to log, data can be also viewed in an easy to understand chart and exported for storage and analysis if required.

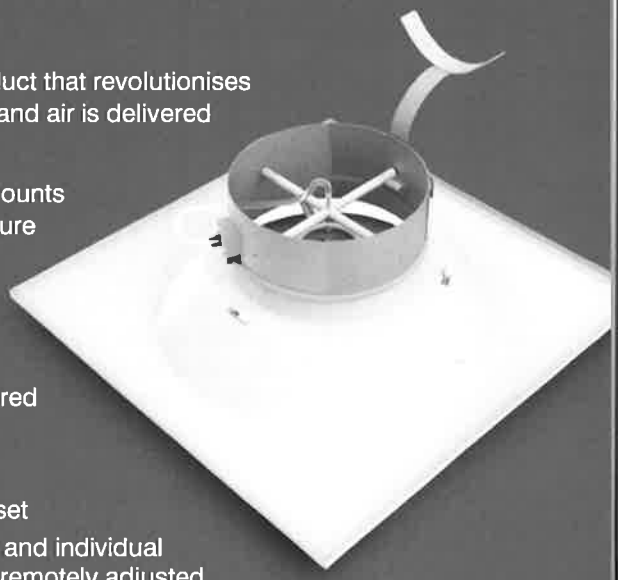
This allows building monitoring and tuning to be done remotely and with minimal disturbance to the building occupants.





Electronic VAV diffuser with occupancy sensor

Air Flow Sensors



The Rickard airflow sensor is a unique product that revolutionises the way HVAC systems are commissioned and air is delivered to a room.

Every room can now supply the precise amounts of air required by a unique air trimming feature and allows for the system to be electronically commissioned.

The Rickard airflow sensor benefits are;

- Allows for electronic commissioning, measurement via Hood is no longer required
- Time saving on commissioning
- Precise airflow delivery trimming
- Minimum and maximum l/s limits can be set
- The pressure and airflow at every diffuser and individual room in a building can be monitored and remotely adjusted
- Building tuning can be conducted electronically for the life of the building
- Accurate to 10%
- Easy BMS integration
- Available on ceiling and linear diffusers

Occupancy Sensor

Rickard occupancy and lighting switch control is integrated into the Rickard diffuser network, making it very cost effective option that can save energy associated with both HVAC and lighting running costs. Once a room has been deemed unoccupied the diffuser will automatically back the supply of air to that room and turn the light off. If the room then becomes occupied then the diffuser will return to automatic control and turn the lights back on.

Both the occupancy and light controllers are connected to the BMS and can be controlled accordingly. The BMS can monitor and control both the occupancy and light features. For example, after hours or if rooms are not used then the BMS can close the diffusers and turn the lights off.



The occupancy sensor can be fitted to the centre of the ceiling diffusers or integrated into a Wall Thermostat

Lighting Control

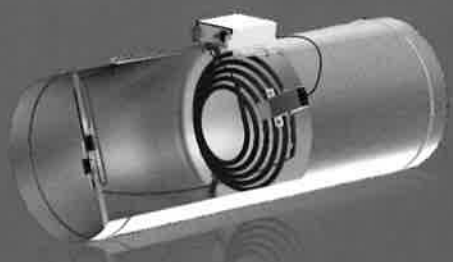
The light switch controller is fitted to the diffuser and the electrician can wire the lights into the system. This is a very cost effective system as all the infrastructure of the control is integrated into the Rickard system. The BMS can then monitor and control the lights and diffusers remotely.

Inline electric heater

The Rickard VAV diffusers can have an electric heater installed. These heaters are re-energized when additional heating is required in a room.



If used correctly, electric heating in VAV diffusers can be considered as an energy saving device.



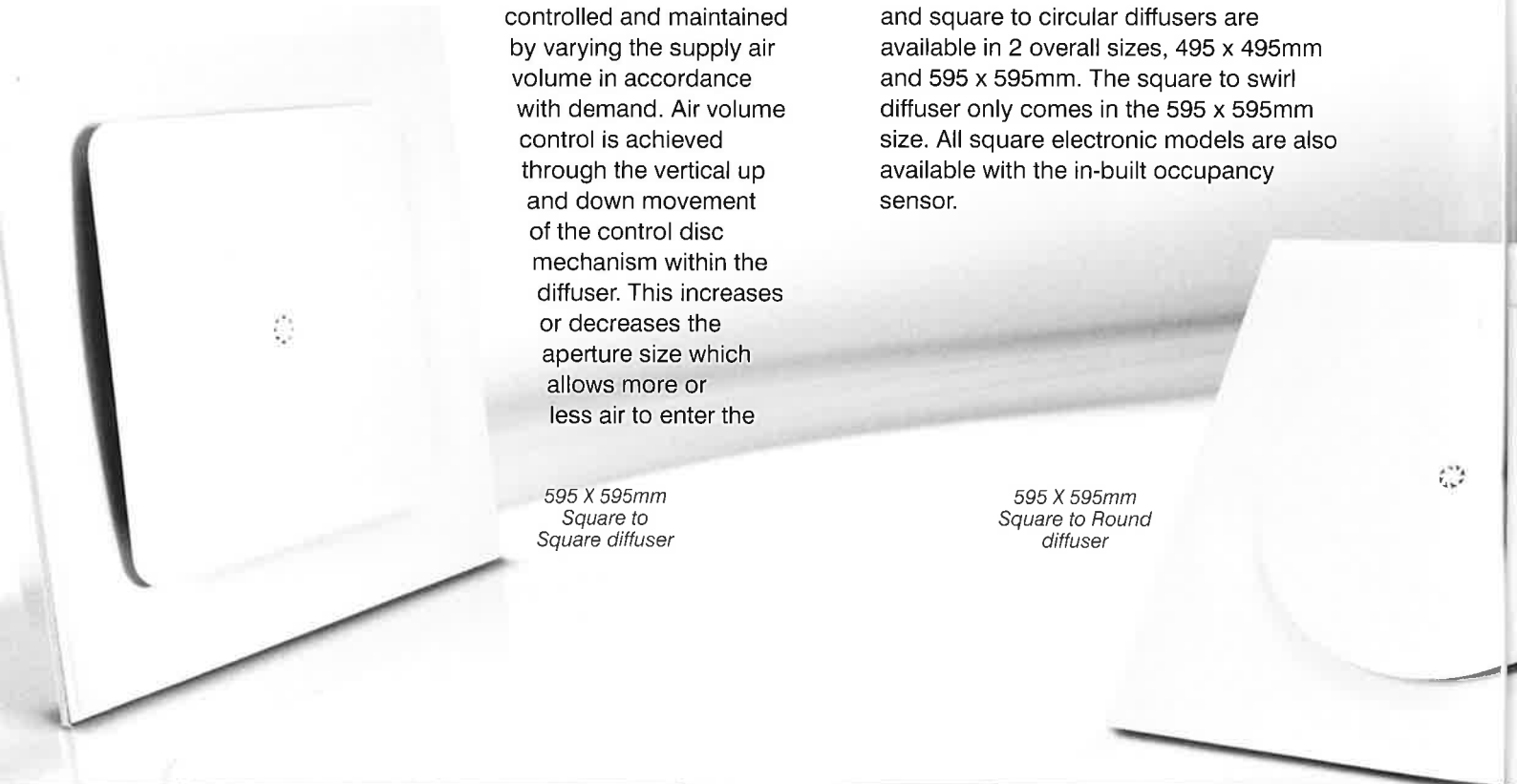
By using them in offices that are typically colder than the buildings average, allows the central plant to produce less heating in winter than is otherwise possible. The safety features include:
(1) auto reset at 65°C
(2) power reset at 85°C
(3) airflow detection cut out

Square electronic VAV ceiling diffusers

The square electronic diffusers are available in 3 distinctive styles: square to square, square to circular and square to swirl. The square to square and square to circular diffusers produce low noise levels and are designed for general building zones where uniform radial discharge is the preferred supply air distribution pattern. The square to swirl diffuser is a more efficient solution for generating high induction between supply and room air.

Room temperature is controlled and maintained by varying the supply air volume in accordance with demand. Air volume control is achieved through the vertical up and down movement of the control disc mechanism within the diffuser. This increases or decreases the aperture size which allows more or less air to enter the occupied space. This effectively maintains constant air movement in the room at discharge volumes from 100% down to approximately 10%. An electric actuator drives the position of the control disc in response to a signal received from the temperature sensor.

All square electronic ceiling diffusers are available in the industry's most popular neck sizes; 150, 200, 250 and 300mm. The square to square and square to circular diffusers are available in 2 overall sizes, 495 x 495mm and 595 x 595mm. The square to swirl diffuser only comes in the 595 x 595mm size. All square electronic models are also available with the in-built occupancy sensor.

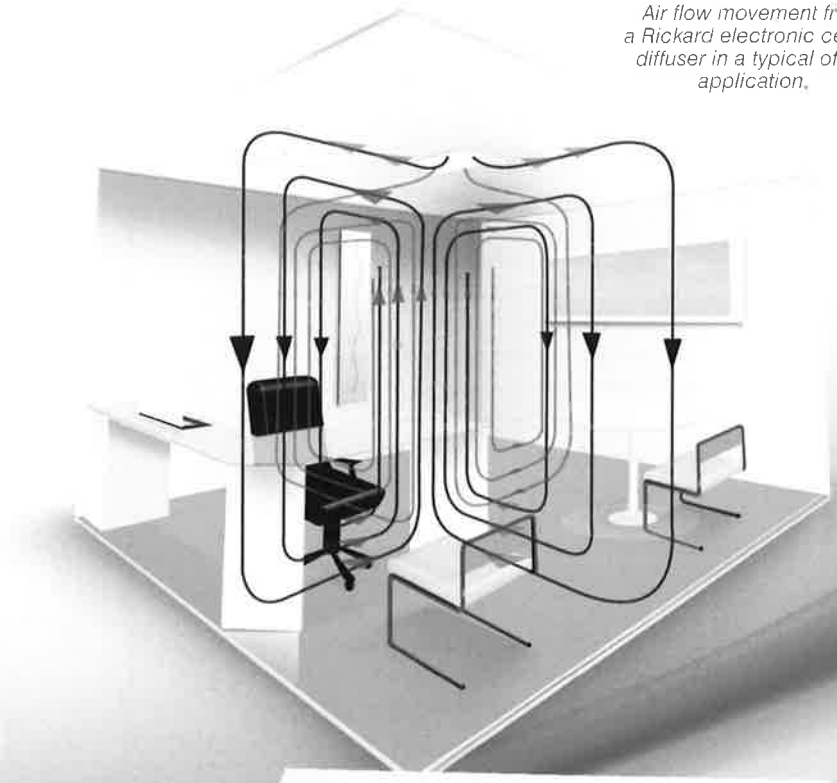


595 X 595mm Square to Square diffuser

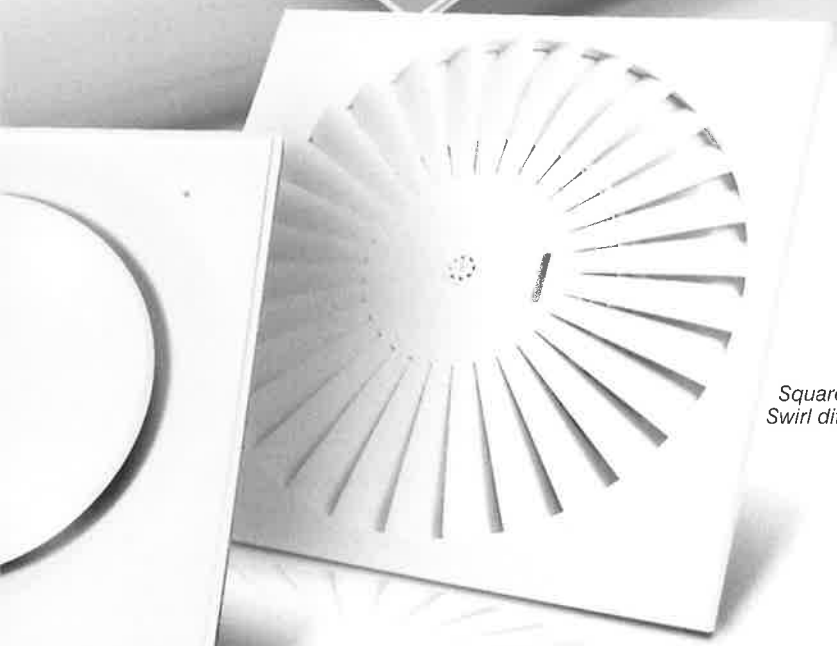
595 X 595mm Square to Round diffuser







Air flow movement from a Rickard electronic ceiling diffuser in a typical office application.

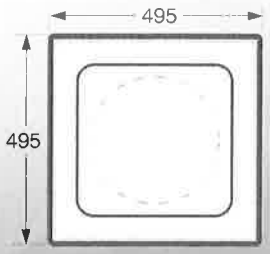


Square to Swirl diffuser



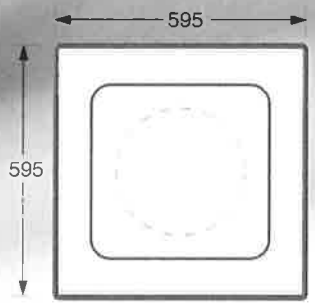
Range dimensions

Square to square style



Neck/Spigot size:

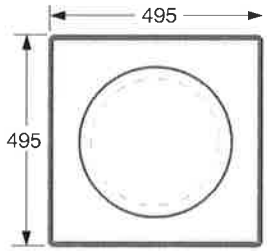
Ø150
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Ø250
Ø300



Neck/Spigot size:

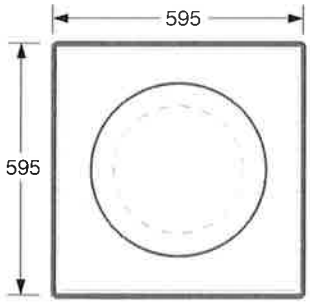
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Square to Round style



Neck/Spigot size:

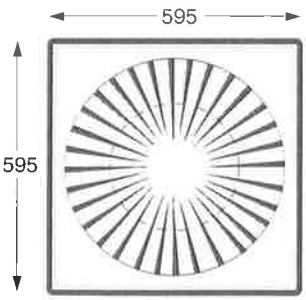
Ø150
Ø200
Ø250
Ø300



Neck/Spigot size:

Ø150
Ø200
Ø250
Ø300
Ø350

Square to Swirl style



Neck/Spigot size:

Ø150
Ø200
Ø250
Ø300

Dimensions in mm

Linear slot electronic VAV ceiling diffusers

Rickard linear slot diffusers provide an effective means of distributing conditioned air into the perimeter zones of a building where the temperature control requirements are the most demanding. The slim, attractive shape of the diffuser ensures that its subtle design works with most architectural styles. At the same time its superior aerodynamic design ensures that the air distribution creates no drafts, is quiet and highly efficient.

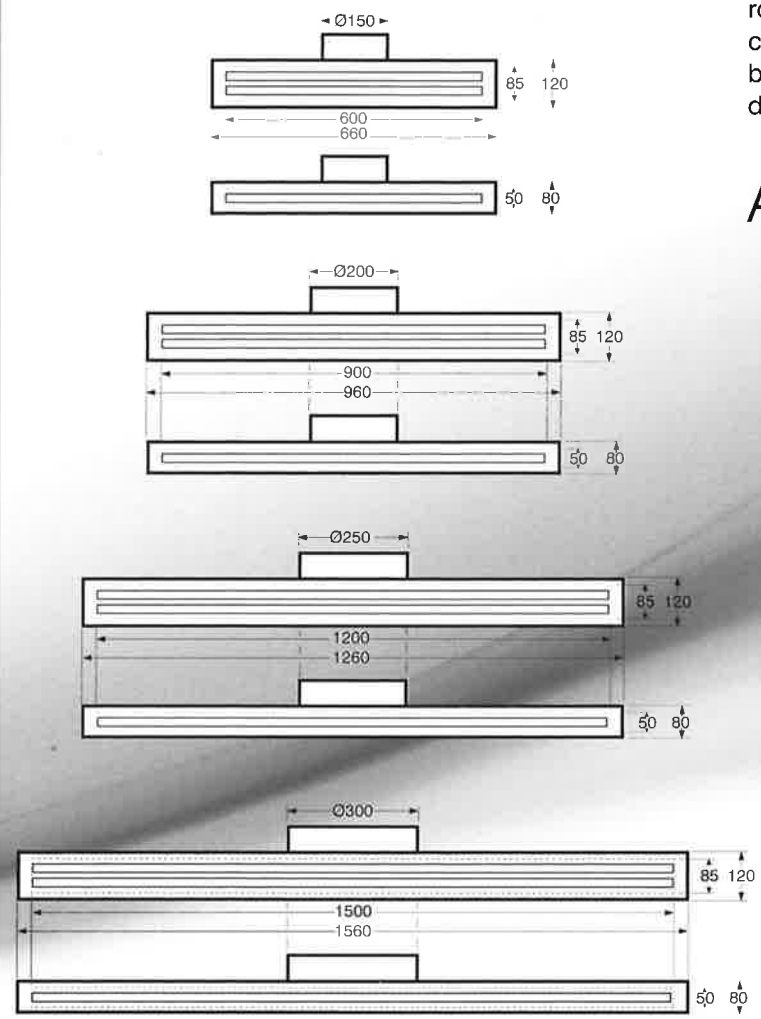
A linear slot electronic VAV ceiling diffuser must be connected to a wall thermostat (temperature sensor) for it to perform as a master diffuser. The diffuser can then operate with one or more slave diffusers, or as a standalone system to provide the required amount of conditioned air to the area. This amount of conditioned air is determined by the temperature in the space and the set point on the wall thermostat.

Air volume control on the linear slot diffuser is achieved with the opening and closing of vanes driven by an electric actuator. This increases or decreases the aperture size which allows more or less air to enter the occupied space. This will effectively maintain a comfortable temperature at discharge volumes from 100% down to approximately 10%.



Range dimensions

One and two slots styles



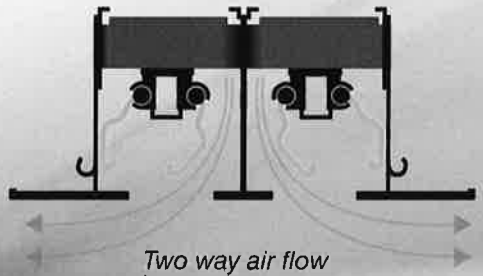
Dimensions in mm

3 and 4 slots also available

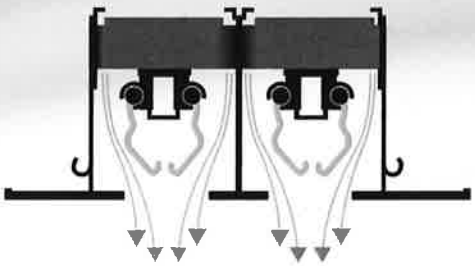


The air flow direction from the diffuser can be changed so it blows in the opposite direction, the same direction, or vertically downward for better room penetration in rooms with high ceilings. These changes can be made easily by the occupant from below the ceiling without affecting the diffuser's performance.

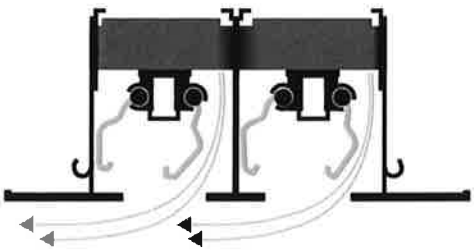
Air flow direction



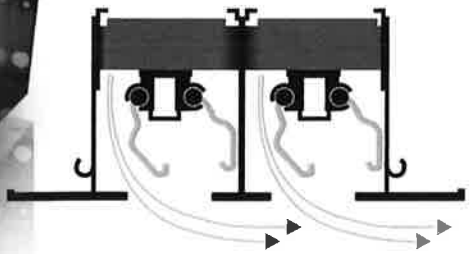
Two way air flow



One way air flow - downward



One way air flow - left



One way air flow - right

Electronic Wall/Bulkhead VAV Diffusers

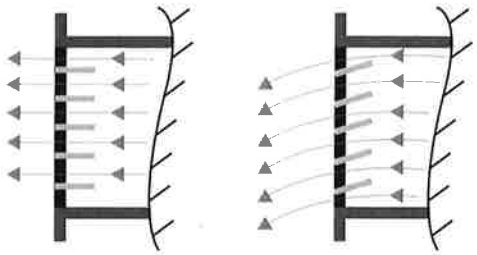
The Rickard electronic wall/bulkhead VAV diffusers are normally used in sidewalls or bulkheads where restricted ceiling voids exist or covered ceilings are not available. They are very effective at distributing air across long offices but, when only a short distance is required, the angle of the double deflection blades within the housing are simply changed to reduce the throw.

A comfortable room temperature is maintained by varying the supply air volume in accordance with demand. This is achieved by opening or closing the diffuser's aperture which is a set of air foil shaped aluminium vanes, driven by a 24V AC electric actuator.

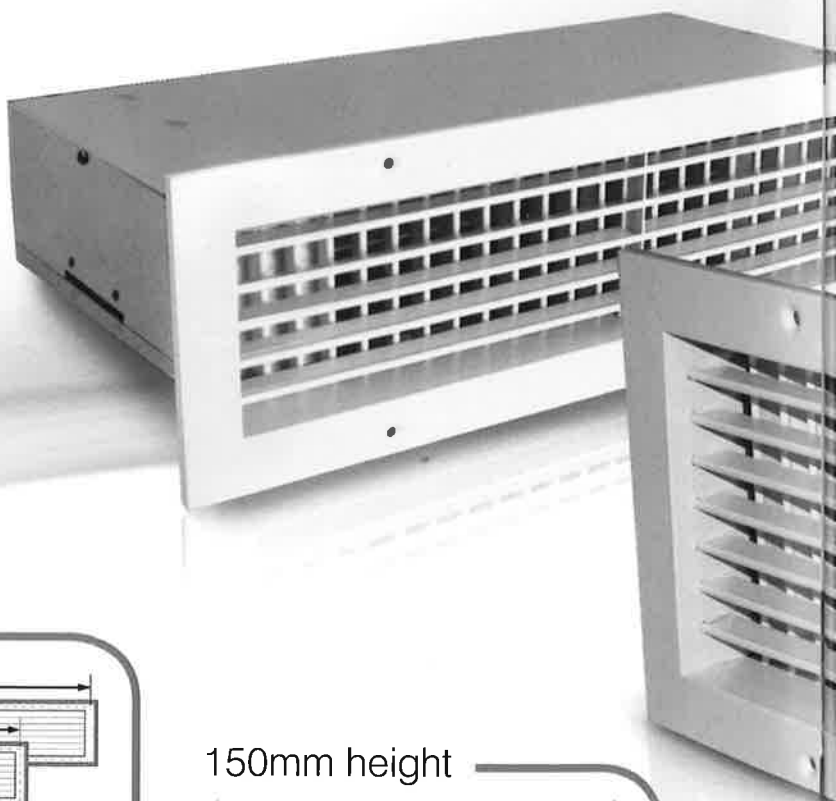
Like the linear slot electronic diffusers, the movement of the vanes is determined by the temperature in the space and the set point on the wall thermostat. Depending on the demands required, these diffusers maintain air volumes ranging from 100% to 10% which effectively mixes the air and maintains a more healthy and productive environment.

The electronic wall/bulkhead diffusers are available in 2 heights, 100mm and 150mm. The 100mm size is available in lengths from 300 to 650mm and the 150mm size comes in lengths from 500 to 700mm.

The wall/bulkhead diffuser has no in-built temperature sensor so it must be connected to a wall thermostat for it to be changed to a master diffuser. The diffuser can then operate with one or more slave diffusers or as a standalone system to provide the required amount of conditioned air to the area.

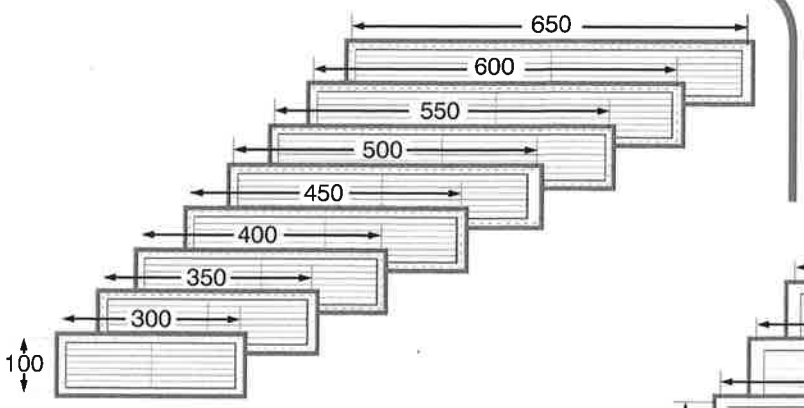


Angle of blades can be changed to reduce the throw.

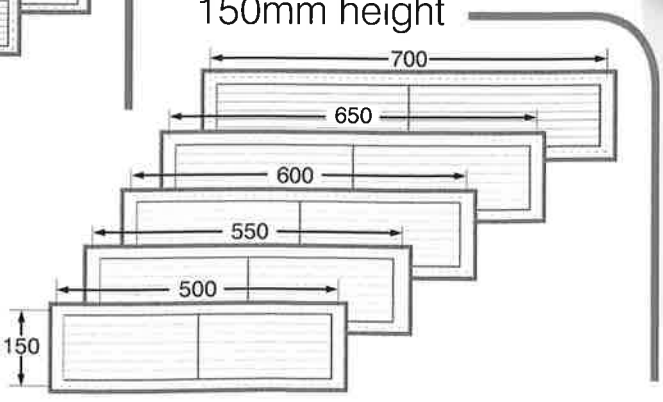


Range dimensions

100mm height



150mm height





Air flow movement from a Rickard Electronic Bulkhead diffuser in a typical office application.

Thermo-Disc VAV ceiling diffusers

The Rickard thermo-disc ceiling diffuser is a mechanically controlled, thermally powered VAV diffuser. It requires no external temperature sensors such as a wall thermostat as each diffuser contains its own in-built temperature sensing and volume control mechanism.
Its overall appearance and construction is very similar to the electronically controlled diffusers, but has the advantage that it requires no external wiring or power supply.

As with the electronic version, air volume control is achieved through the vertical up and down movement of the control disc within the diffuser.
In the case of the thermo-disc diffuser, this movement is caused by the expansion and contraction of the diffuser's mechanism at set temperatures.

This increases or decreases the aperture size which allows either more or less conditioned air to enter the space and effectively maintain a constant air movement from 100% down to 25% of maximum air volume.

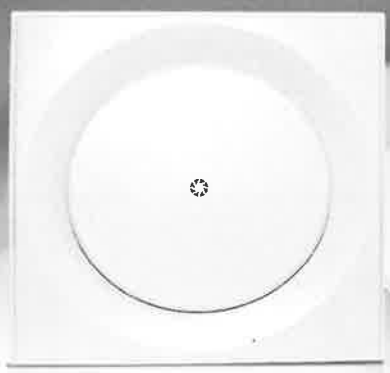
Setting and adjusting the room temperature set point is easily achieved by rotating the adjustment rings; blue ring for cooling and red ring for heating. The rings have calibrated temperature markings from 19°C to 24°C to suit individual occupant choice. To access these rings when installed, occupants simply rotate the diffuser trim-plate counter-clockwise and remove it from the diffuser back pan.

Thermo-disc Diffuser Components

1. Thermal Mechanism
2. Room Temperature Set-point Adjustment Ring (Cooling mode)
3. Induction Tube
4. Room Temperature Set-point Adjustment Ring (Heating mode)
5. Control Disc Minimum Stop Adjustment Ring
6. Control Disc
7. Diffuser Trim-plate
8. Diffuser Backpan



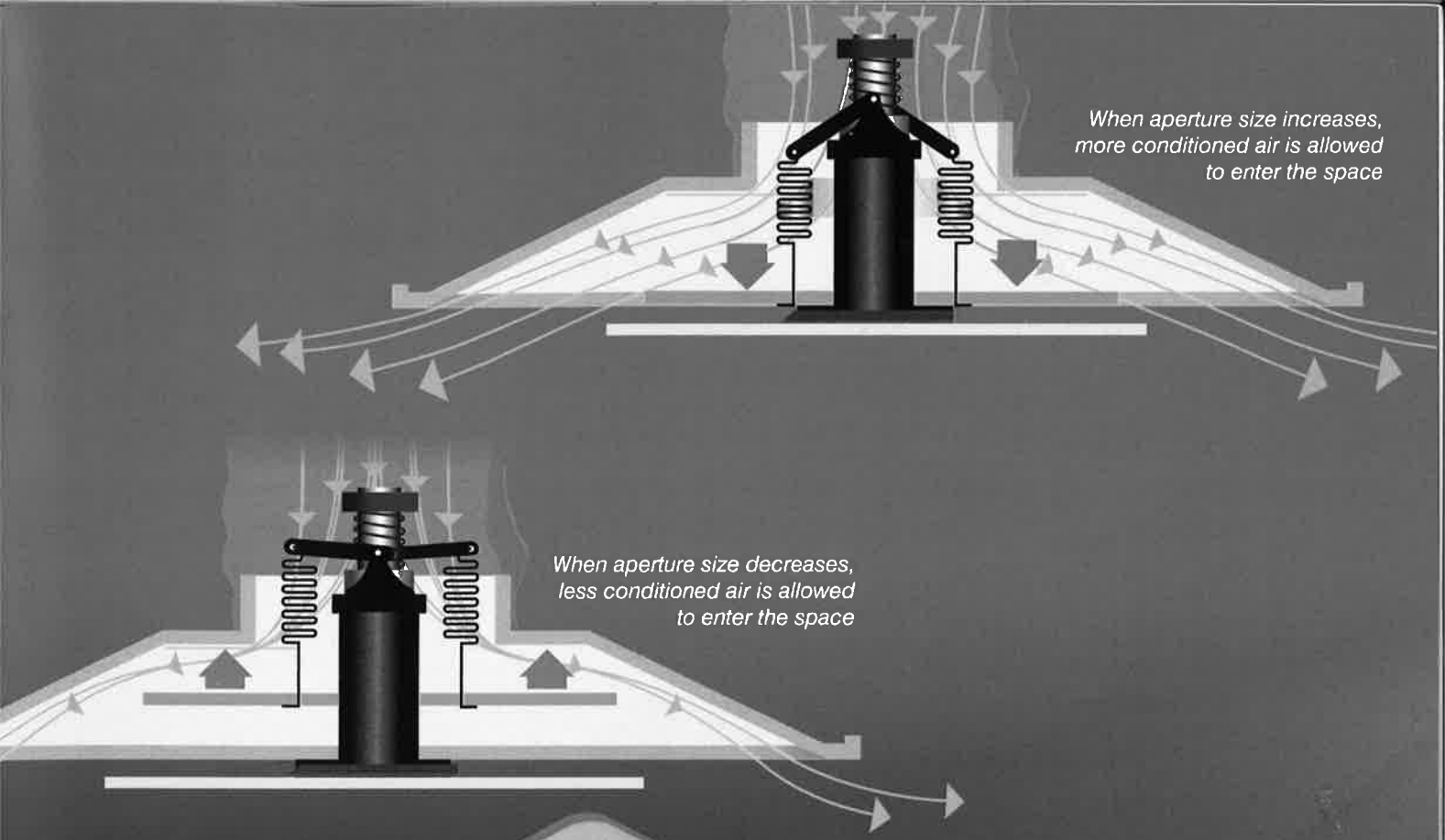
595 X 595mm Square to Square diffuser



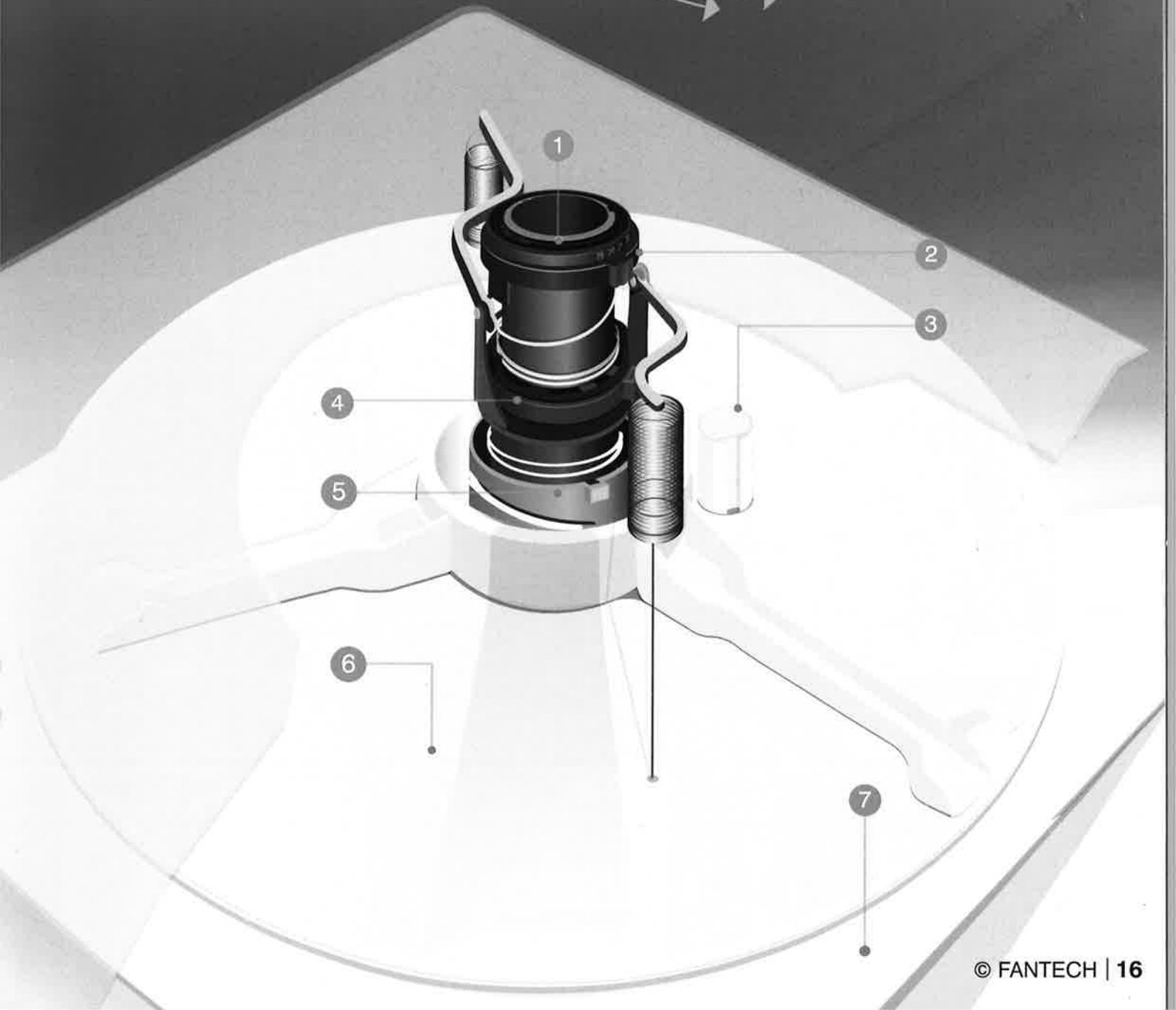
595 X 595mm Square to Round diffuser



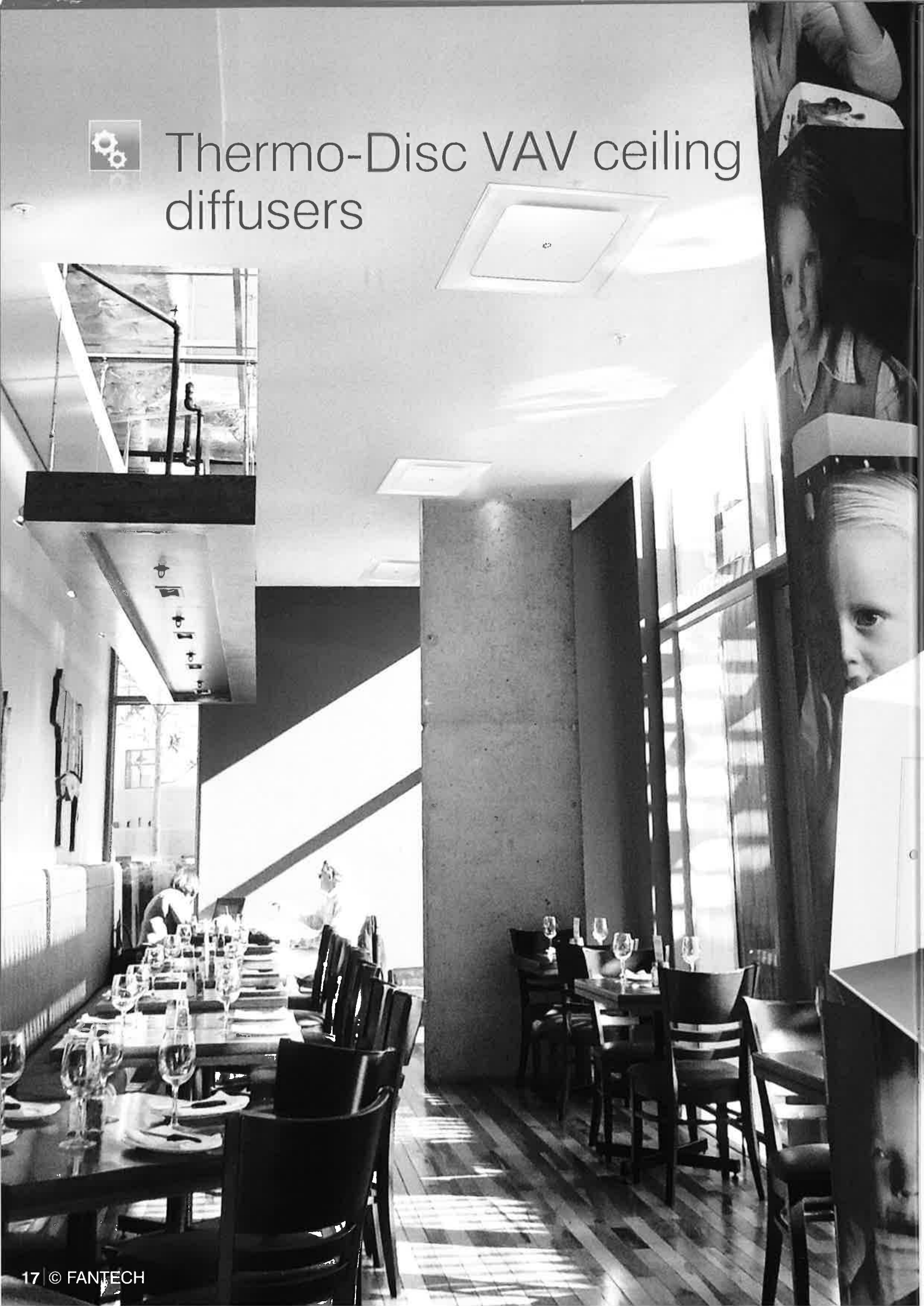
Reverse side view of Thermo-disc VAV diffuser


When aperture size increases,
more conditioned air is allowed
to enter the space

When aperture size decreases,
less conditioned air is allowed
to enter the space

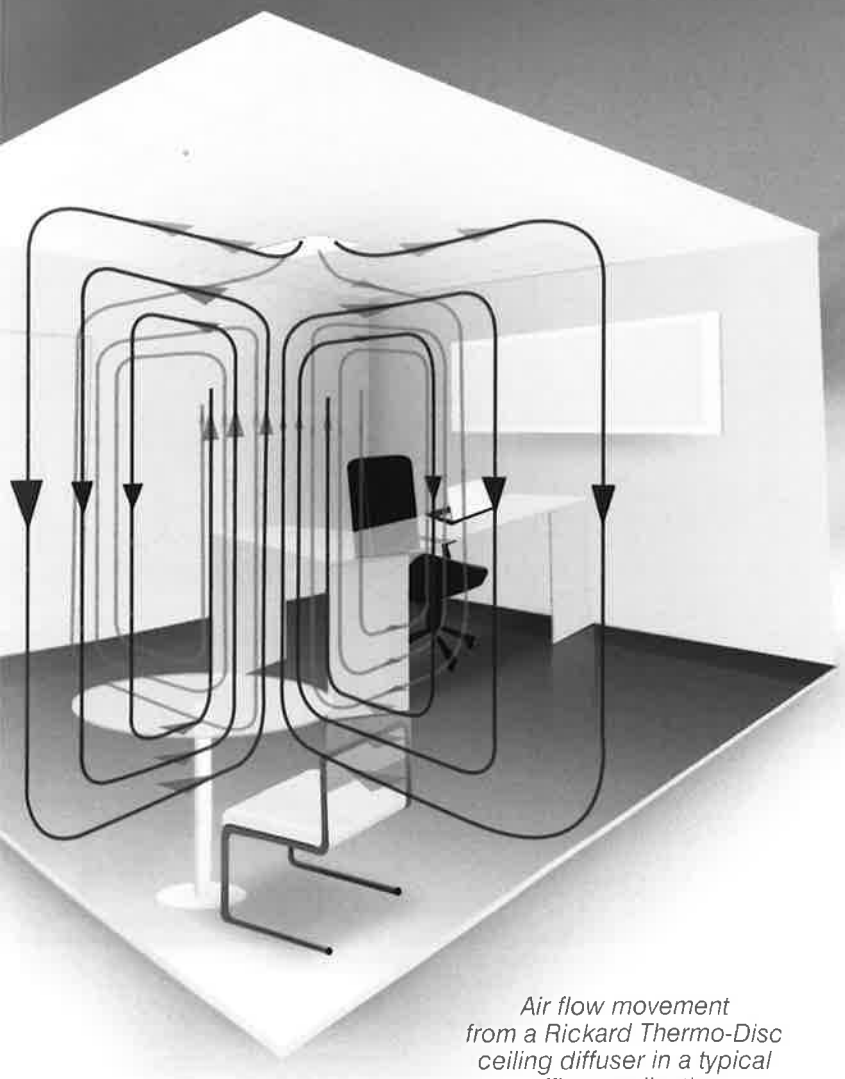

1
2
3
4
5
6
7

Thermo-Disc VAV ceiling diffusers



The thermo-disc diffuser is lightweight, easy to install and ideal as a retrofit solution. They aim to provide comfort in buildings that are mostly well ventilated, but experience specific areas that are either too hot or too cold and cause a reduction in comfort. This is often a result of internal factors such as computers, photocopiers and a high number of occupants but can also be attributed to a buildings orientation and lack of shading.

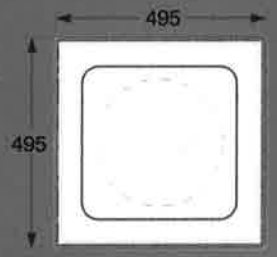
The thermo-disc diffusers are available in two styles; square to square and square to round, and neck sizes ranging from 150 to 300mm. Each neck size is available in finished dimensions of 495 and 595mm square.



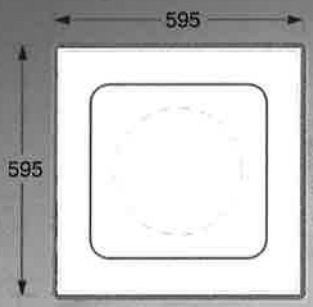
Air flow movement from a Rickard Thermo-Disc ceiling diffuser in a typical office application

Range dimensions

Square to Square style

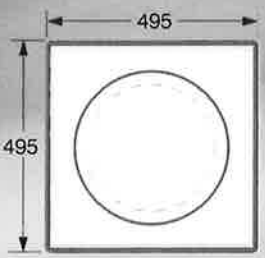


Neck/Spigot size:
Ø150
Ø200
Ø250
Ø300

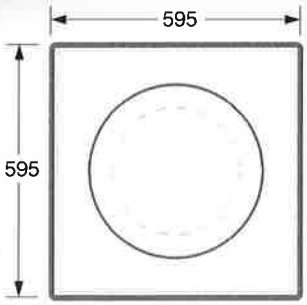


Neck/Spigot size:
Ø150
Ø200
Ø250
Ø300

Square to Round style



Neck/Spigot size:
Ø150
Ø200
Ø250
Ø300



Neck/Spigot size:
Ø150
Ø200
Ø250
Ø300

Dimensions in mm

Effective duct design section

The aim for all HVAC designers is to create an effective environment control system and maximise energy efficiency. Good duct design is a key part of this process.

It is important to note

VAV Diffusers are designed to operate on a low pressure, pressure dependant duct design. Good duct design practices are important since the diffusers neck total pressure should be maintained between 20 and 60Pa. When good duct design is applied VAV diffusers offer independent room comfort control and optimised energy efficiency.

There are three main diffuser take-off problems, in this section we will discuss each. It is important to note that excessive pressure losses in branch ducts should be avoided. If good duct design principles are applied, excessive diffuser pressures at minimum damper positions are unlikely.

Excess pressure usage wastes energy and raises running costs. The difference in pressure between minimum and maximum air setting is what causes excess pressure across a diffuser and what can cause noise issues.

The Design example on this page shows how to use Static Regain for effective duct design. This examples show how simple the duct design is using static regain and how the perimeter and internal zones can be layed out.

Key

- Supply air ducting
- Return air ducting
- Exhaust air ducting
- Duct air pressure sensor
- (T) Wall thermostat
- (M) (S) Variable air volume diffuser master/slave symbol
- Variable air volume diffuser master/slave connection to thermostat

T-Junction

A common take-off is a right angle T-Junction (Fig. A), which can cause significant pressure losses. This is due to the turbulence created when the air needs to follow a sharp turn.

A better option is a curved take off (Fig. B) which will allow for better airflow and improves performance significantly. A curved take off will also prevent the pressure differences and noise at minimum and maximum airflows.

Common

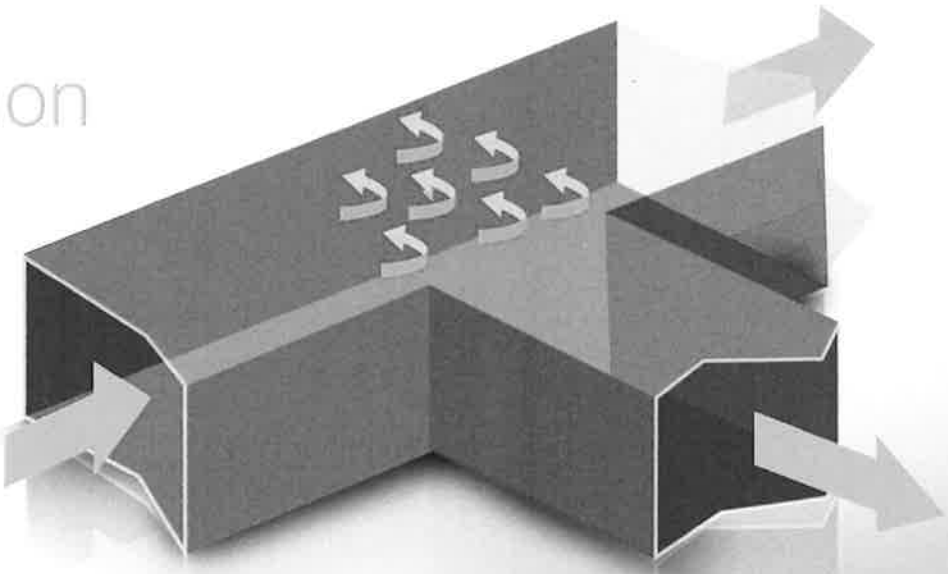


Fig. A

Better

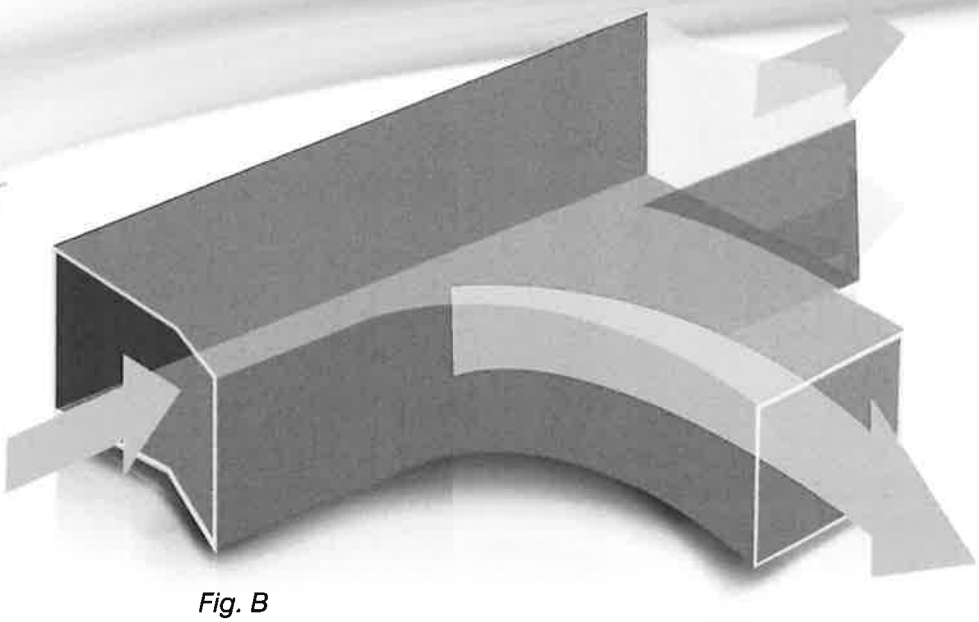
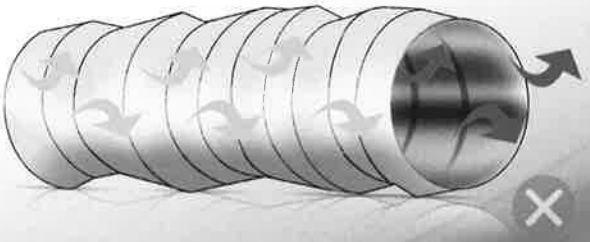


Fig. B

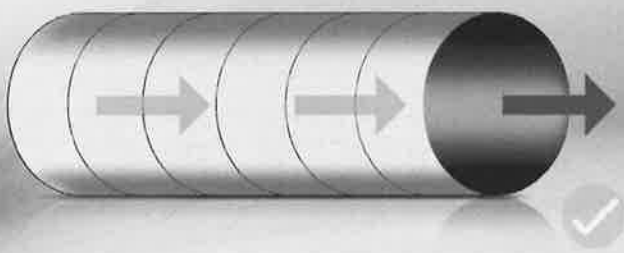
Flex length

The most common duct design mistake is the use of excessive lengths of flex. When this occurs the diffusers pressure can vary significantly between minimum and maximum control disc position. The resultant pressure increase at minimum can result in over cooling and noise. Ideally hard duct or less than 1.5m of flex should be used.

Don't

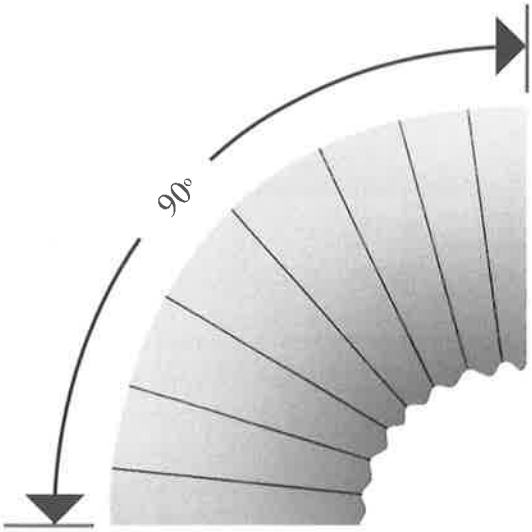


Do



Flex bends

Flex bends are important to create an even bend and reduce friction losses. Flex brackets are available to ensure this is possible.



Equal Friction Duct Design - VAV Diffusers

Most engineers use the equal friction method of duct design. Many retrofit projects with VAV Diffusers will have ductwork designed using equal friction. The equal friction method has ducts sized for a constant static pressure loss due to friction per unit length.

The equal friction method of duct sizing will work satisfactorily for low pressure systems with variable geometry diffusers;

- The branch velocities should be between 4-6 m/sec
- The duct run should be short enough so that the pressure drop from the beginning to the end falls within the 10% to 20% range that the VAV Diffusers can accommodate
- Flexible duct must be short, with a maximum length of 1.5m recommended
- Zones to be downstream of the PCD to ensure proper temperature control
- Good duct design principles should be used

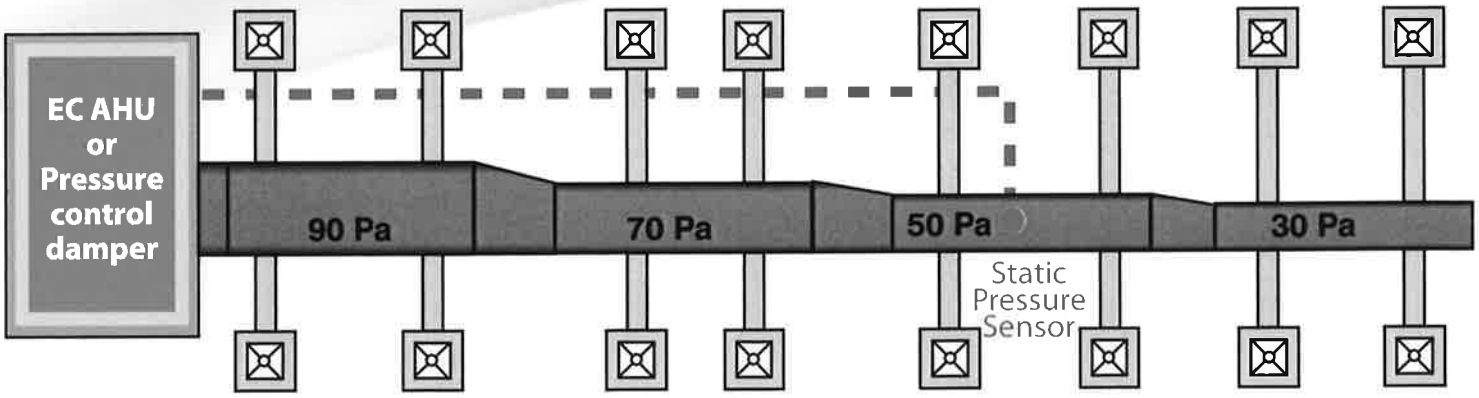
If the duct run is short and the velocities are kept low, the friction rate per metre of duct will be low resulting in small static pressure losses.

In the example below, you may require a static pressure of 90 Pa at the start of the run to satisfy 50 Pa halfway and 30 Pa at the end of the duct run.

Using the Equal Friction duct design will yield increased individual comfort and controllability, with some improvement in energy efficiency.

Equal friction is commonly used for short duct designs.

For long or complex duct design, "static regain" is typically used.



Example of a simple variable geometry VAV system, using equal friction duct design

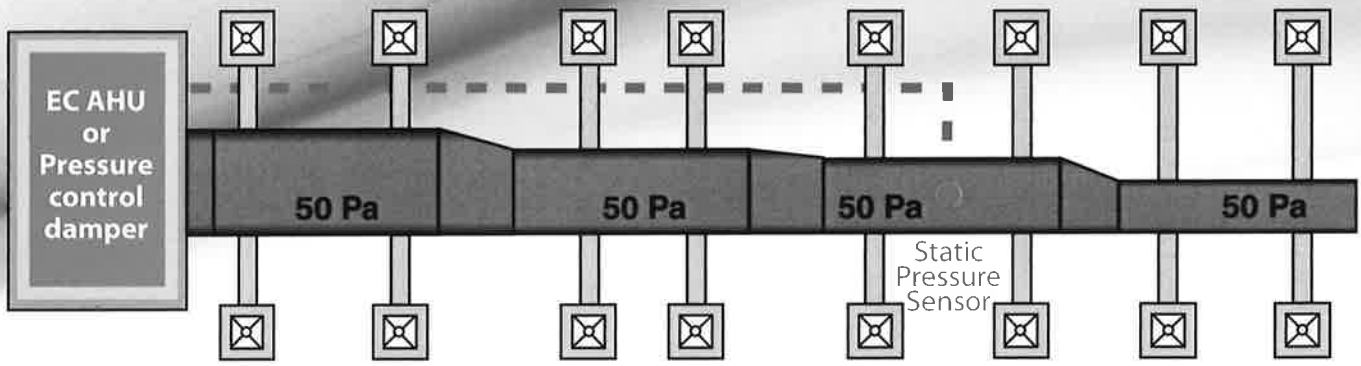
Static Regain Duct Design - VAV Diffusers

In Static Regain duct design, the objective is to obtain the same static pressure throughout the duct run. Static regain duct design uses the reduction in air velocity, and therefore the reduction in air velocity pressure, after each duct section to regain the static pressure loss due to friction in the preceding duct length.

Total pressure = Velocity pressure + Static pressure
(Tp=Vp+Sp)

If there is no change in total pressure, a reduction in velocity pressure results in an increase in static pressure.

Using the static regain method of duct design, the increase in static pressure at each branch offsets the friction loss in the succeeding section of the duct. The static pressure should then be the same before each VAV Diffuser and at each branch. The pressure profile would be the same as the diagram below.



Example of a simple variable geometry VAV system, using static regain duct design

This design shows an even duct pressure of 50 Pa throughout the run.

Using Static regain duct work will result in the duct size reducing to some extent from the beginning to the end. Due to lower duct velocities, the duct dimensions are typically slightly larger than when using the Equal Friction duct design method.

The increase in cost is offset by;

- Operating cost reduction
- Less ducting since more than one zone can be on the same duct run
- Savings in system balancing time

Using Static Regain duct design will yield increased individual comfort, controllability and greatly improve the energy efficiency of a building.

The major advantage is the fact that the static pressure profile along the full length of the ducting will be very close to what is desired for Optimal Performance of the Variable Geometry Diffusers.

Other considerations;

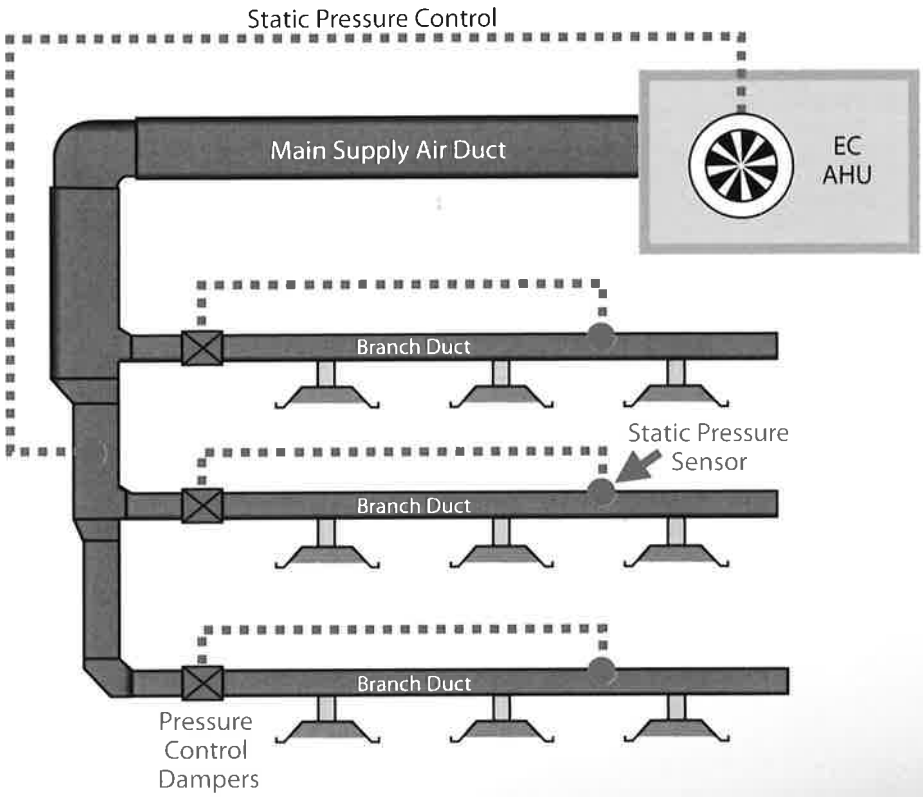
- Every VAV Diffuser has it's own built-in motorised damper, therefore there is no need to fit a separate balancing damper
- Minimum and Maximum air can be controlled electronically
- Flexible duct runs of more than 1.5m can also effect the operation of the VAV Diffusers due to friction losses
- Constant Diffusers can be used to reduce cost in open plan areas because the pressure is constant throughout the ductwork

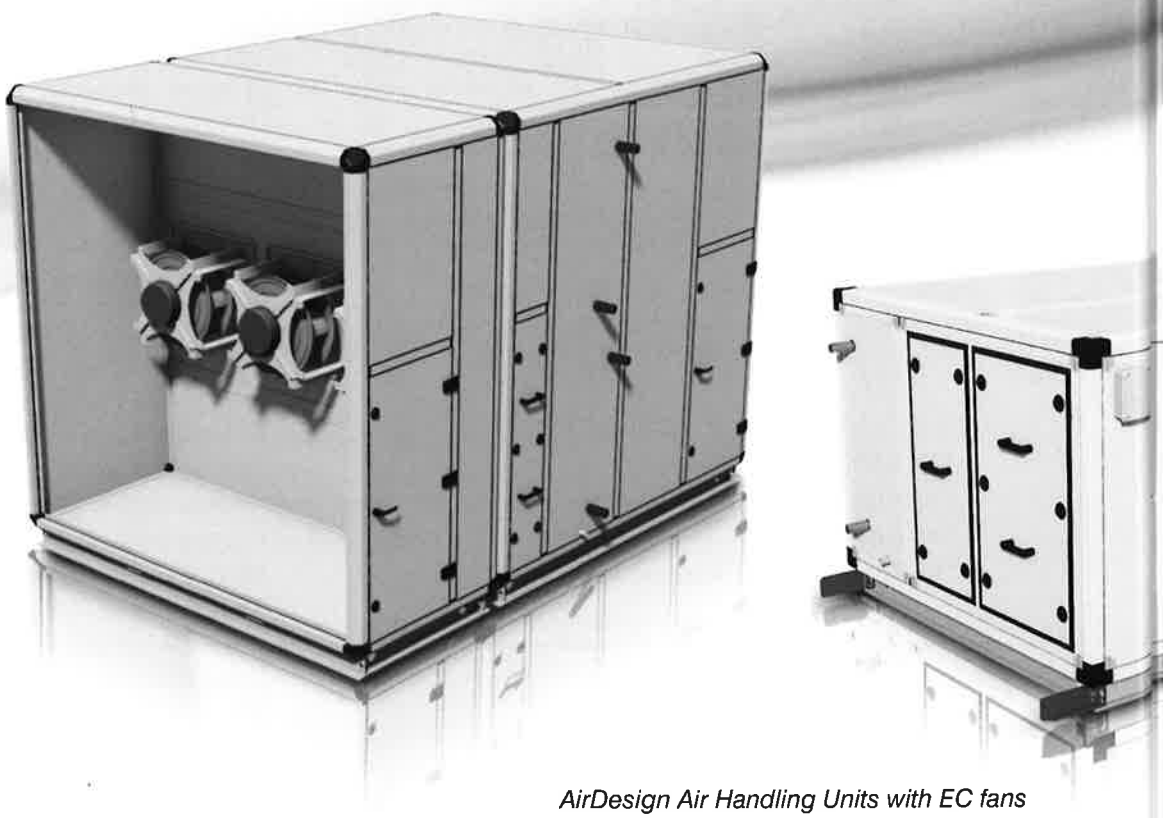
A Complex Variable Geometry VAV System Overview

This drawing illustrates the basic design of a low pressure, pressure dependant variable geometry VAV diffusion system with multiple duct pressure levels.

The VAV Diffusers will operate correctly;

- With the duct pressures at 10% below to 20% above the design levels
- The pressure sensor positioned correctly at 2/3 down the length of the ducting
- The ducting designed with a relative even pressure profile





AirDesign Air Handling Units with EC fans

Installation & Commissioning Guide

This section will discuss a five step process to successfully install and commissions VAV Diffusers into a large building.

Note; depending on the features used not all points may be required.

Step 1 - Planning

It is important to plan the installation as information is captured during the installation process and then passed onto each step.

- Mark up drawings with key information
    - Diffuser locations
    - Neck size
    - Type - master, slave or constant
    - Air flows required (Min & Max)
    - PSU locations – 4 PSUs to every MCU
    - MCU locations – MCUs are daisy chained together on building ethernet

PSU – Power Supply Unit
MCU – Master Communication Unit

Step 2 - Installation

Now the installation can be conducted. The cable can be pre-fitted or fitted along with the diffusers. Every diffuser comes with a connection cable, if you want to rough-in the cables please let Fantech know so they can be ordered separately.

- Components to be installed
    - Diffusers
    - Diffuser Cables
    - PSU to MCU cables
    - PSU power, GPO
- **Never cut any of the inter-linking cables**
- Record which PSUs are connected to which channel on the MCU on the drawing
- **Record the unique diffuser serial number on the drawings next to each diffuser**
- Check each diffusers LED flashes to indicate power and communications
- Use Rickard MLM Pre-Commissioning Tool (Free Software Package) to drive the diffusers individually down and up to confirm operation (Note; this tool is for Pre-Commissioning the Rickard Diffuser Network only)



AirDesign®
When Performance Counts



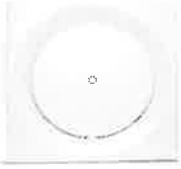
Diffuser specifications and performance

Electronic Variable Disc Diffuser Range

Square to Square Diffuser



Square to Circle Diffuser

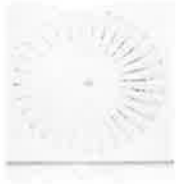


Round to Round Diffuser



Neck size (mm)	Style	Part Numbers 495mm x 495mm	Part Numbers 595mm x 595mm		Neck Total Pressure (Pa) 20	30	40	50	60	70	80	90	100
150		VSD1501S495	VSD1501S595	Air flow (L/s)	63	77	88	99	108	117	125	133	140
		VCD1501S495	VCD1501S595	Throw (m)	2.0	2.1	2.7	3.0	3.3	3.5	3.7	4.0	4.2
		Not available	VRD1501S580	NC Level (NC)	-	-	-	-	26	28	31	33	35
200		VSD2001S495	VSD2001S595	Air flow (L/s)	96	118	137	153	169	184	195	207	218
		VCD2001S495	VCD2001S595	Throw (m)	2.0	2.6	3.0	3.2	3.6	3.9	4.2	4.5	4.7
		Not available	VRD2001S580	NC Level (NC)	-	27	28	29	30	33	36	38	40
250		VSD2501S495	VSD2501S595	Air flow (L/s)	140	171	198	221	242	261	279	296	313
		VCD2501S495	VCD2501S595	Throw (m)	2.4	2.6	3.2	3.5	3.9	4.2	4.5	4.7	5.1
		Not available	VRD2501S580	NC Level (NC)	-	27	29	31	33	36	38	40	42
300		VSD3001S495	VSD3001S595	Air flow (L/s)	176	216	250	280	307	332	355	377	398
		VCD3001S495	VCD3001S595	Throw (m)	2.5	2.8	3.3	3.7	4.2	4.6	4.8	5.2	5.4
		Not available	VRD3001S580	NC Level (NC)	27	28	30	32	35	37	39	41	43
350		Not available	VSD3501S595	Air flow (L/s)	246	301	349	389	426	461	492	523	551
		Not available	VCD3501S595	Throw (m)	2.7	3.2	3.6	4.1	4.5	5.0	5.5	5.7	5.9
		Not available	VRD3501S580	NC Level (NC)	27	28	30	32	35	38	40	43	45

Square to Swirl Diffuser



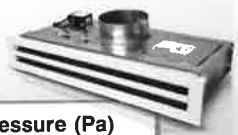
Round to Swirl Diffuser



Neck size (mm)		Part Numbers 595mm x 595mm		Neck Total Pressure (Pa) 30	40	50	60	70
150		VSW1501S595	Air flow (L/s)	68	79	88	96	104
		VRW1501S580	Throw (m)	1.8	2.1	2.3	2.5	2.7
			NC Level (NC)	26	29	31	33	35
200		VSW2001S595	Air flow (L/s)	112	130	145	159	172
		VRW2001S580	Throw (m)	2.2	2.5	2.8	3.1	3.3
			NC Level (NC)	28	31	33	35	37
250		VSW2501S595	Air flow (L/s)	159	183	205	225	243
		VRW2501S580	Throw (m)	2.9	3.3	3.7	4.1	4.4
			NC Level (NC)	29	33	35	37	39
300		VSW3001S595	Air flow (L/s)	194	224	250	274	296
		VRW3001S580	Throw (m)	2.9	3.3	3.7	4.1	4.4
			NC Level (NC)	30	33	36	38	40

Electronic Variable Linear Diffuser





Neck size (mm)	Width size (mm)	Part Numbers Single Slot (80mm, high)	Part Numbers Dual Slot (120mm, high)		Neck Pressure (Pa) 30	40	50	60	70	Neck Pressure (Pa) 30	40	50	60	70	Neck Pressure (Pa) 30	40	50	60	70
150	600	VLN6001/1	VLN6001/2	Air flow (L/s)	41	48	53	59	64	54	62	69	76	82	41	48	53	59	64
				Throw (m)	4.5	4.8	5.1	5.4	5.6	3.2	3.4	3.6	3.8	3.9	6.4	6.9	7.3	7.6	7.9
				NC Level (NC)	30	33	35	37	39	30	33	35	37	39	30	33	35	37	39
200	900	VLN9001/1	VLN9001/2	Air flow (L/s)	71	82	92	99	108	85	98	109	120	129	71	82	92	99	108
				Throw (m)	5.5	5.9	6.3	6.6	6.8	3.9	4.2	4.4	4.6	4.8	7.8	8.4	8.9	9.3	9.7
				NC Level (NC)	32	35	37	39	41	32	35	37	39	41	32	35	37	39	41
250	1200	VLN12001/1	VLN12001/2	Air flow (L/s)	96	111	124	135	146	118	137	153	168	181	96	111	124	135	146
				Throw (m)	6.4	6.9	7.3	7.6	7.9	4.5	4.8	5.1	5.4	5.6	9.0	9.7	10.3	10.7	11.2
				NC Level (NC)	33	36	38	40	42	33	36	38	40	42	33	36	38	40	42
300	1500	VLN15001/1	VLN15001/2	Air flow (L/s)	118	136	151	166	179	155	179	199	218	236	118	136	151	166	179
				Throw (m)	7.1	7.7	8.1	8.5	8.8	5.0	5.4	5.7	6.0	5.2	10	10.8	11.5	12.0	12.5
				NC Level (NC)	34	37	39	41	43	34	37	39	41	43	34	37	39	41	43

Performance data applicable for Dual Slot Linear Diffusers only

Throw data is taken 25mm below the ceiling on a line through the centre of the diffuser with the control disc fully open & an air velocity is at 0.25m/s.

Noise criteria levels apply to a single diffuser mounted in a room having a Sound Absorption of 10dB in octave bands having centre frequencies from 125Hz to 8000Hz (ie. the difference between Sound Pressure Level (dB re: 10^{-6} Pa) and Sound Pressure Level (dB re: 10^{-12} Pa) is equal to 10dB). These levels represent only the noise generated by the diffuser and do not take into account any duct-borne noise.

Diffusers are factory set for a minimum of 30% of the maximum flow levels reflected above. It should be noted that minimum air flow settings are approximate & may require to be reset on site to compensate for actual site system pressures.

Electronic Variable Wall/Bulkhead Diffuser



Width size (mm)	Part Numbers (100mm, high)		Standard Electric Duct Static Pressure (Pa)			
			20	30	40	50
300	WBD3001/100	Air flow (L/s)	58	75	90	95
		Throw (m)	5.2	6.4	7.2	8.3
		NC Level (NC)	28	32	36	38
350	WBD3501/100	Air flow (L/s)	80	102	113	122
		Throw (m)	7.2	8.2	9.5	10.1
		NC Level (NC)	29	33	37	39
400	WBD4001/100	Air flow (L/s)	100	130	149	155
		Throw (m)	7.8	8.6	10.4	10.7
		NC Level (NC)	29	33	36	38
450	WBD4501/100	Air flow (L/s)	105	140	153	160
		Throw (m)	7.0	8.4	9.1	10.7
		NC Level (NC)	29	33	37	39
500	WBD5001/100	Air flow (L/s)	110	144	162	170
		Throw (m)	8.4	9.4	10.0	11.4
		NC Level (NC)	29	34	37	39
550	WBD5501/100	Air flow (L/s)	120	156	185	200
		Throw (m)	8.2	9.5	10.6	11.7
		NC Level (NC)	30	34	38	40
600	WBD6001/100	Air flow (L/s)	135	178	205	216
		Throw (m)	8.6	9.9	11.4	12.6
		NC Level (NC)	30	34	38	40
650	WBD6501/100	Air flow (L/s)	160	215	252	275
		Throw (m)	8.8	10.3	11.7	13.0
		NC Level (NC)	30	33	38	41

Width size (mm)	Part Numbers (150mm, high)		Standard Electric Duct Static Pressure (Pa)			
			20	30	40	50
500	WBD5001/150	Air flow (L/s)	165	219	258	292
		Throw (m)	8.7	10.0	11.4	12.8
		NC Level (NC)	30	35	39	41
550	WBD5501/150	Air flow (L/s)	190	250	288	302
		Throw (m)	8.8	10.5	11.2	12.8
		NC Level (NC)	30	34	38	41
600	WBD6001/150	Air flow (L/s)	215	285	330	350
		Throw (m)	9.2	11.6	13.1	15.9
		NC Level (NC)	31	35	38	41
650	WBD6501/150	Air flow (L/s)	230	300	350	370
		Throw (m)	9.4	10.3	13.0	15.0
		NC Level (NC)	32	35	39	42
700	WBD7001/150	Air flow (L/s)	267	329	378	410
		Throw (m)	9.7	11.0	14.0	15.0
		NC Level (NC)	32	35	39	42

Electronic Control Range



Part Numbers	Description
RICK-OBCKIT	On-Board Controller
RICK-WSKIT	Wall thermostat
RICK-WSKIT2	Wall thermostat (new)
RICK-OCWSKIT	With occupancy sensor
RICK-MLMPS	Power supply unit
RICK-CU-USB	USB connection module



Light controller	
Part Numbers	**Description**
RICK-CU-LIGHT	Rickard light controller
RICK-CU-OCC	Occupancy sensing module



Master Communication Module	
Part Numbers	**Description**
RICK-CU-RICK	Base model
RICK-CU-BNIP	BacNet/ IP BMS Interface
RICK-CU-BNTP	BacNet ms/ tp BMS Interface
RICK-CU-LW	LonWorks BMS Interface

Relief Ring	
Part Numbers	**Neck size**
RICK-RELIEF200	200mm
RICK-RELIEF250	250mm
RICK-RELIEF300	300mm
RICK-RELIEF350	350mm

Control Cables		
Part Numbers	**Description**	**Length**
RICK-CA-SLA8	Control Harness Standard	8m
RICK-CA-EXT2	Control Harness Extender	2m
RICK-CA-EXT8	Control Harness Extender	8m
RICK-CA-EXT25	Control Harness Extender	25m
RICK-CA-EXT35	Control Harness Extender	35m
RICK-CA-CU003	PSU to MCU Power Cable	300mm
RICK-CA-CU01	PSU to MCU Comms Cable	1m
RICK-CA-CU20	PSU to MCU Comms Cable	20m
RICK-CA-CU40	PSU to MCU Comms Cable	40m
RICK-CA-CU80	PSU to MCU Comms Cable	80m

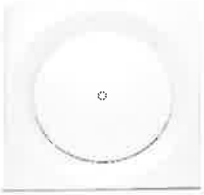
Airflow Sensors	
Part Numbers	**Description**
RICK-SENS-AF150	Airflow Sensor 150mm Dia Neck
RICK-SENS-AF200	Airflow Sensor 200mm Dia Neck
RICK-SENS-AF250	Airflow Sensor 250mm Dia Neck
RICK-SENS-AF300	Airflow Sensor 300mm Dia Neck
RICK-SENS-AF350	Airflow Sensor 350mm Dia Neck
RICK-SENS-AF600	Airflow Sensor VLN 600
RICK-SENS-AF900	Airflow Sensor VLN 900
RICK-SENS-AF1200	Airflow Sensor VLN 1200
RICK-SENS-AF1500	Airflow Sensor VLN1500

Thermal Variable Disc Diffuser Range

Square to Square Diffuser



Square to Round Diffuser



Neck size (mm)	Style	Part Numbers			Neck Total Pressure (Pa)								
		495mm x 495mm	595mm x 595mm		20	30	40	50	60	70	80	90	100
150	□	VSD1504S495	VSD1504S595	Air flow (L/s)	63	77	88	99	108	117	125	133	140
				Throw (m)	2.0	2.1	2.7	3.0	3.3	3.5	3.7	4.0	4.2
	○	VCD1504S495	VCD1504S595	NC Level (NC)	-	-	-	-	26	28	31	33	35
200	□	VSD2004S495	VSD2004S595	Air flow (L/s)	96	118	137	153	169	184	195	207	218
				Throw (m)	2.0	2.6	3.0	3.2	3.6	3.9	4.2	4.5	4.7
	○	VCD2004S495	VCD2004S595	NC Level (NC)	-	27	28	29	30	33	36	38	40
250	□	VSD2504S495	VSD2504S595	Air flow (L/s)	140	171	198	221	242	261	279	296	313
				Throw (m)	2.4	2.6	3.2	3.5	3.9	4.2	4.5	4.7	5.1
	○	VCD2504S495	VCD2504S595	NC Level (NC)	-	27	29	31	33	36	38	40	42
300	□	VSD3004S495	VSD3004S595	Air flow (L/s)	176	216	250	280	307	332	355	377	398
				Throw (m)	2.5	2.8	3.3	3.7	4.2	4.6	4.8	5.2	5.4
	○	VCD3004S495	VCD3004S595	NC Level (NC)	27	28	30	32	35	37	39	41	43

Ducting - for VAV Diffusers

Duct



Part Numbers	Description
DUCT150-1.5MPK	Duct Flexiable 150Dia X 1.5m Long
DUCT200-1.5MPK	Duct Flexiable 200Dia X 1.5m Long
DUCT250-1.5MPK	Duct Flexiable 250Dia X 1.5m Long
DUCT300-1.5MPK	Duct Flexiable 300Dia X 1.5m Long
DUCT350-1.5MPK	Duct Flexiable 350Dia X 1.5m Long

FlexRight Duct Elbow



Part Numbers	Description
FR-2	FlexRight Duct Elbow

In-Line Heaters



Part Numbers	Description
RICK-CU-INLH150	150 Diameter with heater capacity 750W
RICK-CU-INLH200	200 Diameter with heater capacity 1000W
RICK-CU-INLH250	250 Diameter with heater capacity 1500W
RICK-CU-INLH300	300 Diameter with heater capacity 2000W
RICK-CU-INLH350	350 Diameter with heater capacity 2500W

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Intelligent Ventilation

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