RICKARD

INTELLIGENT COMFORT CONTROL

6

THERMAL VARIABLE VOLUME CEILING DIFFUSER

VCD,VRD,VSD 4/5

- GREEN TEMPERATURE OFFSET FOR WINTER
- HEATING AND COOLING CHANGEOVER
- EXCELLENT THROW & FLOW
- MECHANICAL THERMAL MECHANISM
- LOW NOISE
- HIGH INDUCTION
- NO MAINTENANCE
- 10 YEAR WARRANTY

FEATURES

The Rickard Variable Volume Thermo-Disc Ceiling Diffuser is a thermally powered VAV diffuser which contains a built in temperature sensing & volume control mechanism. In appearance the construction of the THERMO-DISC is identical to the popular electronically controlled Vari-Disc range of diffusers, but has the advantage that it requires no external wiring or power supply. The Thermo-Disc is available in two basic options—the Series 5 is a cooling only VAV diffuser while the Series 4 will provide full VAV control in both cooling & heating modes. Change-over between cooling & heating control modes is automatic & is carried out by means of our unique PATENTED thermal mechanism.

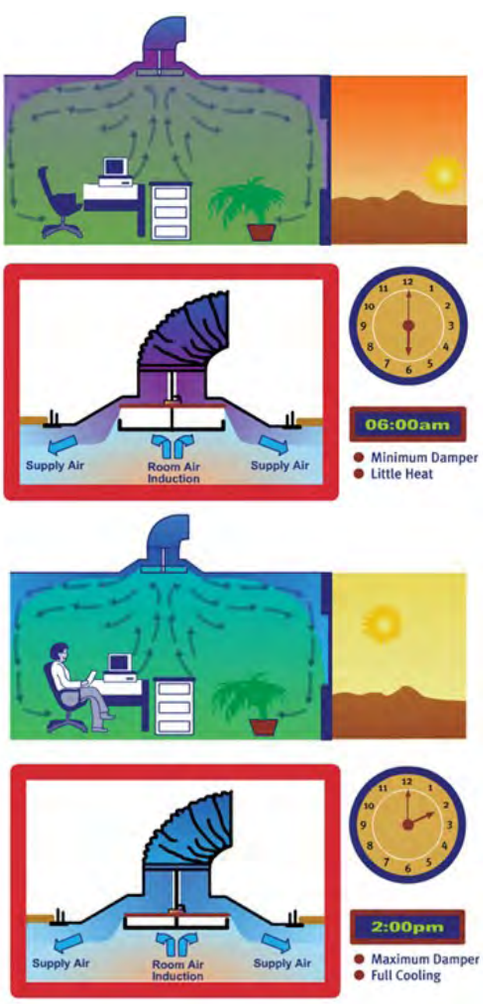
Supply air is discharged horizontally in UNIFORM 360º radial pattern while the Variable Geometry feature ensures that adequate room air movement is maintained throughout the full range of volume variation.

All diffusers are manufactured from sheet steel & finished in a chip resistant epoxy powder coating available in a wide range of colours.

PERFORMANCE

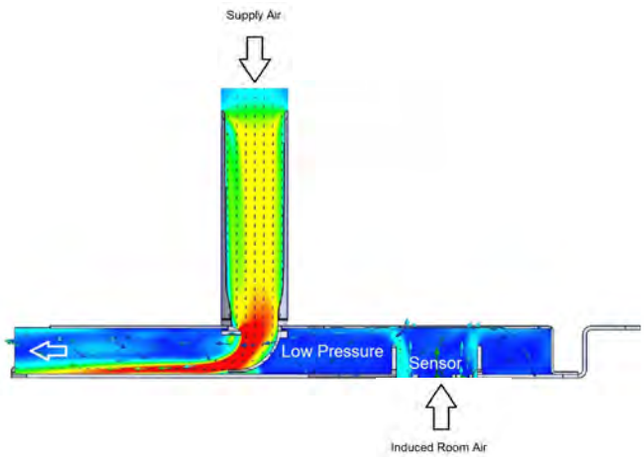
Rickard VAV Diffusers control Room Temperature by adjusting the volume of air at the diffuser outlet. By changing the diffusers exit geometry, Coanda, Air Velocity and Throw is maintained at minimum and maximum volume. This technology prevents cold air from dumping at minimum, ensures excellent ventilation, air mixing, Air Change Effectiveness (ACE) and therefore thermal comfort (ADPI).

Rickard VAV diffusers reduce pressure loss in the system due to their aerodynamic design and the absence of restrictions in the duct work.



ACCURACY

Every THERMO-DISC diffuser controls its own zone by using forced induction technology to ensure its temperature sensing element is reacting to within 1.5°C of room temperature. By using on-board sensing, inaccuracies caused by incorrect wall thermostat placement, layout changes or walls affected by external loads can be eliminated.



ENERGY EFFICIENCY

Unique temperature set point adjustment with heating offset adjustment. Energy can be saved by offsetting the set point lower in winter. Since occupants are conditioned to a colder environment in winter and are dressed more warmly a lower control temperature feels more comfortable. It is possible to offset the set point higher or lower -2 to +2°C (-4 to +4°F).

Receive Management, Indoor Environmental Quality and Energy Efficiency Credits by using Rickard VAV Diffusers.

CAPITAL & OPERATING COST

The THERMO-DISC is a self-powered Variable Geometry VAV diffuser which requires no outside power source or wall thermostats.

Low diffuser height (100mm) can reduce a buildings overall cost by reducing the height of the ceiling void.

FLEXIBILITY

Since the THERMO-DISC is a self-contained unit, it can be easily moved or additional diffusers added.

AESTHETICS

The Rickard range of ceiling diffusers offers a clean uncluttered look. The design hides the internals, is pressed to lie flush with the ceiling and comes in a range of colours and styles to satisfy different tastes.

COMMISSIONING

VAV diffusers are inherently simple to commission and Rickard THERMO-DISC diffusers make it even easier. The internal damper (control disc) is manually opened by detaching the diffuser face, unhooking the control disc springs and rotating the diffuser face back into place.

Adjustable minimum control disc limits allow designed airflow volumes to be achieved.

INSTALLATION

Included plastic packaging can be used to protect the Tile once installed.

Light weight Diffuser.

Tile can be installed separately to the active sub assembly if required.

MAINTENANCE

The Rickard THERMO-DISC does not require regular maintenance. Working components are all accessible from below the ceiling and skilled labour or special tools are not required. Life cycle testing exceeds 20 years of operation.

WARRANTY

Rickard offers a 10 year warranty on its thermal actuator. Please see Terms and Conditions.

SAFETY

Working plastic components are moulded in glass reinforced Makrolon – Makrolon is flame retardant and chlorine and bromine free when burnt. The Rickard Thermo-Disc and Electronic actuators are moulded in Makrolon and are UL Certified.

Stainless steel safety cable supports the working sub-assembly when detached from the back pan.

APPLICATION

VAV COOLING (VCD, VRD, VSD 5)

VAV COOLING AND HEATING (VCD, VRD, VSD 4)

The RICKARD VARIABLE GEOMETRY THERMO-DISC CEILING DIFFUSER is designed for general building zones where uniform radial discharge is the most suitable and desirable supply air distribution pattern. The basic diffuser is available in a wide range of options to suit every individual requirement.

Optimum performance in terms of uniform air distribution and low noise levels have been combined with simple construction and aesthetically pleasing appearance to provide a unit which is both functional and reliable. All diffusers are of steel construction and are finished in a chip resistant baked epoxy coating which is available in a wide range of colours to suit architectural requirements.

OPERATION

Room temperature is controlled by varying the supply air in accordance with demand. No other system is more energy efficient since the volume is controlled to exactly match the requirements of the space served by the diffuser.

Volume control is achieved by moving the disc, know as the control disc, vertically up & down within the diffuser so as to vary the aperture through which the air passes. This results in the "Variable Geometry" concept which effectively maintains constant air movement throughout the range of control from 100% down to as little as 25%.

The position of the control disc is varied by means of a wax filled thermal element which responds to changes in sensed room temperature. The wax contained in the thermal element melts at the formulated temperature to expand or contract. With a rise in sensed temperature the expanding wax extends the plunger, causing the amplifying lever-arm mechanism to move the control disc such that the supply air volume is changed to the extent that is required to maintain constant Room temperature. When the wax cools down the plunger retracts under the action of the return spring, causing the control disc to move in the opposite direction to counter the change in sensed temperature.

The room temperature sensing element is located behind the induction cap in the diffuser appearance panel, known as the trim plate. This is the ideal position to sense room temperature owing to the high rate of induced room air across the trim-plate.

COOLING/HEATING THERMO-DISC

The Series 4 Cooling/Heating Thermo-Disc Diffuser is identical in appearance to the series 5 cooling only version, the only difference being the addition of a second thermal element within the mechanism which automatically changes the action of the diffuser when the system goes into the heating mode. This allows full VAV control of the room when warm air is being supplied to the diffuser.

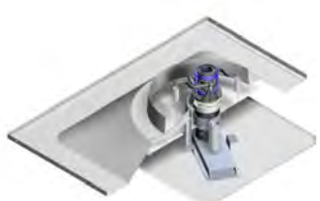
The cooling/heating change over thermal element is similar to that used for sensing room temperature allowing heating change over to be initiated when the supply air temperature is elevated to 24ºC (75ºF) and is completed when the supply air temperature reaches 31ºC (88ºF). Under these circumstances the diffuser will open as sensed room temperature decreases & vice verse. For best results the supply air temperature must be maintained 2ºC (3.5ºF) above or below the change over range.

ADJUSTMENT

Adjustment of the room temperature set point is achieved by rotating the blue temperature adjustment ring to the desired set point temperature. Adjustment of this ring sets the cooling set point in the Series 5 (Cooling only) actuator and sets the heating and cooling set point in the Series 5 (Heating and Cooling) actuator. It is possible to offset the heating set point from the cooling set point by adjusting the green temperature adjustment mechanism in a positive or negative direction.

To access the actuator, rotate the diffuser trim-plate counter clockwise & remove the entire trim-plate/mechanism assembly. The adjustment ring has calibrated temperature markings to suit individual occupant requirements.

NOTE: It is advisable that no change be made to the factory 22ºC factory setting until the space is occupied. This will provide for realistic operating conditions, after which individual diffusers may be adjusted to suit each individual occupant.



SELECTION

The first consideration when designing a system is to calculate the required supply air volume and temperature to satisfy room conditions at maximum heat loads. It is recommended that ducting is sized using static regain design principles. Supply air velocities in branch ducts should be between 3.5 and 7.5m/s (650 and 1500ft/min).

THROW

This is the distance from the centre of the diffuser to the point at which the supply air velocity has reduced to 0.25m/s (50ft/min) when measured 25mm (1 inch) below the ceiling and the control disc in the fully open position. Coning occurs when two airstreams travelling in opposite directions meet and result in a downward moving cone of air. A similar effect is experienced should a diffuser be positioned at a distance from the wall that is less than its throw. The air will strike the wall and flow in an inward direction such that the point at which the air reaches a velocity of 0.25m/s (50ft/min), the sum of the horizontal and vertical travel of the air is equal to the diffuser throw. Throw remains at acceptable levels throughout the range of air flows, a feature of the variable geometry VAV diffuser concept.

NOISE LEVEL REQUIREMENTS

The published diffuser noise level must be checked to ensure it is within the project specification. Published diffuser noise levels represent only the noise generated by the diffuser and do not take into consideration any duct-borne noise.

Noise Criteria ratings are taken for a standard office environment 2 m (6') from the diffuser.

DUCT STATIC PRESSURE

Diffuser performance has been established using diffuser neck TOTAL pressure, although that which is normally know or measured is duct STATIC pressure. What happens between the duct and the diffuser depends on the length and type of flexible duct being used. For simplicity, it can be assumed that the duct STATIC pressure is approximately equal to the diffuser neck total pressure. This is a valid assumption for systems where flexible duct lengths are not excessive and can be explained briefly as follows:

The static pressure loss due to friction in the flexible duct (±10Pa or 0.04ins wg) would normally be about the same as the velocity pressure in the neck of the diffuser and since total pressure is the sum of static and velocity pressure, we can say that neck total pressure is numerically approximately the same as duct static pressure. Although the tables reflect diffuser performance for neck total pressures ranging from 20-100Pa (0.04-0.40ins wg), caution should be exercised when selecting diffusers outside the 30-70Pa (0.12-0.28ins wg). At lower pressures air movement and induction may be insufficient and at higher pressures draughts and excessive noise may result.

Best results are obtained when diffusers are selected at pressures of 40-60Pa (0.08-0.24ins wg). Bear in mind that all diffusers served by a common duct will all operate at the same static pressure as controlled by the pressure control damper. Diffusers that are able to supply more air than required will be driven partially closed by the thermal element and therefore the system becomes self-balancing.

NOTE: Avoid upstream restrictions such as manually adjusted dampers or squashed flexible ducting. The reason being that at maximum flow, any restriction will result in a significant static pressure loss (which for some cases may be desirable) whereas at minimum flow conditions offer virtually no restriction, which will result in the static pressure at the diffuser being too high at minimum flow conditions causing over-cooling/heating.

Diffusers are factory set for an approximate minimum air quantity of 30% of the maximum levels reflected in the performance data section. It should be noted that the minimum air settings are only approximate and may require to be reset on site to compensate for the actual site system pressures.

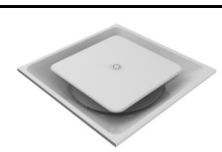
Total Pressure can be calculated as follows:

P total = P static + P velocity

P velocity = constant * (volume/1000)²

NECK SIZE	CONSTANT
150	1921.350
200	607.927
250	249.007
300	120.084

TYPES

VSD4/5 Large Cone 150 to 350mm S595/603mm	***VSD4/5 Medium Cone 150 to 300mm S495mm only***
	
VSD4/5 Small Cone 150mm S320-340mm	***VCD4/5 Medium Cone 150 to 300mm S495, 595 & 603mm***
	
VRD4/5 Medium Cone 150 to 300mm R580mm	
	

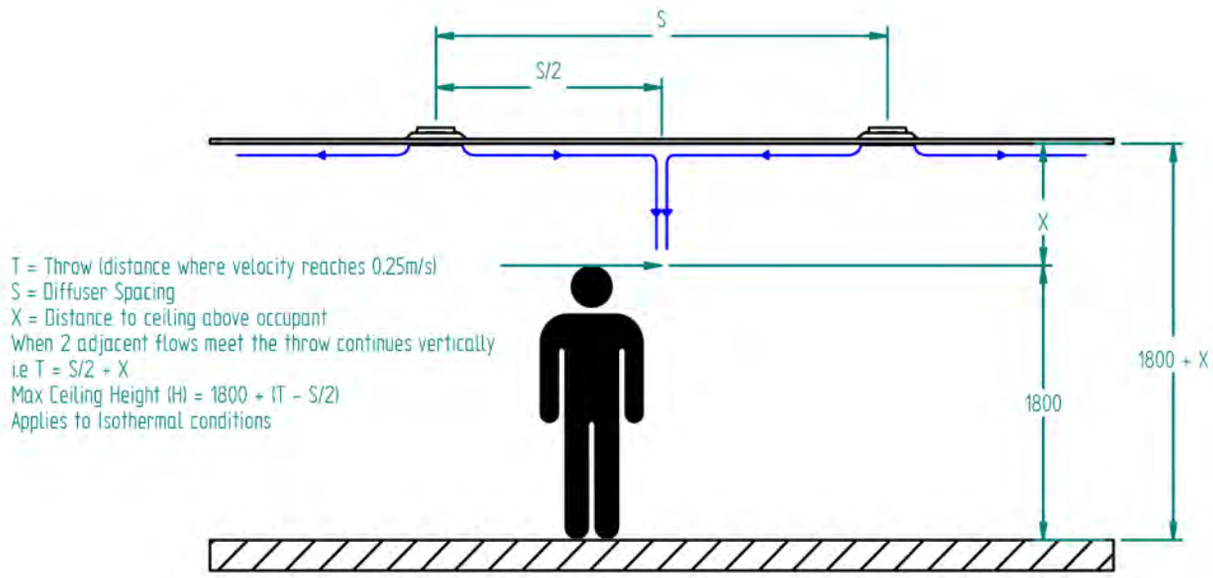
DETERMINING MAXIMUM CEILING HEIGHT

The drawing below describes how to determine the maximum ceiling height that can be achieved from a diffuser. Please see the diffuser performance data page for airflow, throw, noise and pressure information.

OPTIONS

JUBILEE CLAMP: Saves time and material when attaching the flex.

DETERMINING MAXIMUM CEILING HEIGHT



Small Cone	VSD						
SIZE	READING	NECK TOTAL PRESSURE (Pa)					
		20	30	40	50	60	70
150	FLOW l/s	61	74	85	95	104	110
	THROW m	1.89	2.16	2.48	2.62	2.77	2.81
	NC LEVEL	32	34	37	39	41	43

Medium Cone	VCD, VRD						
SIZE	READING	NECK TOTAL PRESSURE (Pa)					
		20	30	40	50	60	70
150	FLOW l/s	64	78	91	101	111	118
	THROW m	2	2.1	2.7	3	3.3	3.5
	NC LEVEL	-	-	-	-	26	28
200	FLOW l/s	107	127	147	165	180	195
	THROW m	2	2.6	3	3.2	3.6	3.9
	NC LEVEL	-	27	28	29	30	33
250	FLOW l/s	154	188	214	241	265	287
	THROW m	2.4	2.6	3.2	3.5	3.9	4.2
	NC LEVEL	-	27	29	31	33	36
300	FLOW l/s	191	235	273	306	336	364
	THROW m	2.5	2.8	3.3	3.7	4.2	4.6
	NC LEVEL	27	28	30	32	35	37

Large Cone	VCD350, VSD150-350 & VRD350						
SIZE	READING	NECK TOTAL PRESSURE (Pa)					
		20	30	40	50	60	70
150	FLOW l/s	62	76	88	98	108	115
	THROW m	2	2.1	2.7	3	3.3	3.5
	NC LEVEL	-	-	-	-	26	28
200	FLOW l/s	108	131	151	169	185	199
	THROW m	2	2.6	3	3.2	3.6	3.9
	NC LEVEL	-	27	28	29	30	33
250	FLOW l/s	145	176	201	226	249	270
	THROW m	2.4	2.6	3.2	3.5	3.9	4.2
	NC LEVEL	-	27	29	31	33	36
300	FLOW l/s	176	211	245	275	302	327
	THROW m	2.5	2.8	3.3	3.7	4.2	4.6
	NC LEVEL	27	28	30	32	35	37

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 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 (i.e. the difference between Sound Pressure Level (dB re:2 x 10^{-5} Pa) and Sound Power Level (dBW re: 10^{-12} watts) 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 diffuser air flow settings are approximate & may require to be reset on site to compensate for actual site system pressures.

Performance Data applies to Standard Air having a density of 1.2 kg/m3.

GREEN BUILDING BENEFITS

INTRODUCTION

There is an increased focus on green in modern buildings, and a focus to improve the green rating of existing buildings.

This section highlights how Rickard product may help to get a building project certified as green.

Rickard low pressure VAV diffusers can have an impact the following green credits

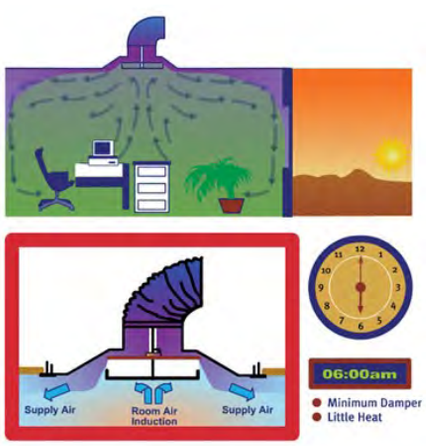
- Management credits
- Indoor Environmental Quality credits
- Energy credits

MANAGEMENT CREDITS

BUILDING TUNING

Diffusers are self balancing, and fine-tune air delivery to the precise needs of the office.

This is achieved through the modulation of a diffuser control disc that is activated by electronic controls to ensure that the correct amount of air is released into the room thereby controlling room conditions.



COMMISSIONING

Since these diffusers are essentially self balancing, there is no need to balance the airflow to every variable geometry diffuser. The commissioning engineer need only ensure that the diffuser most likely to be starved from air, typically at the end of the run, has enough air at maximum load conditions.

INFORMATION MANAGEMENT

Modern BMS compatible VAV diffuser controls allow for intelligent building and central plant decisions based on information available from every diffuser. Building conditions can be controlled and modified centrally. See MLM controls booklet for more information.

INDOOR ENVIRONMENTAL QUALITY CREDITS

INDIVIDUAL COMFORT CONTROL

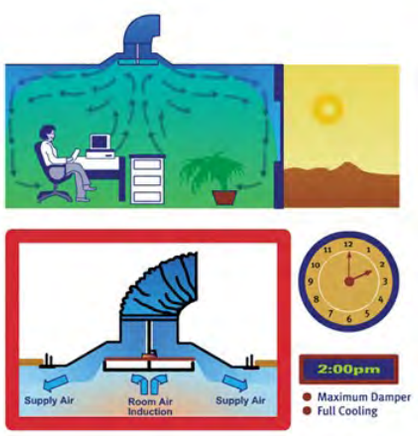
Every Variable Geometry VAV diffuser can individually control conditions in the occupied space where it is fitted. Every diffuser can be fitted with an on-board space sensor, or a Wall mounted space sensor with set point adjustment capabilities.

THERMAL COMFORT

Compliance with Ashrae 55-1992 is possible when using VAV diffusers. A VAV Diffuser is the only HVAC product that directly effects comfort.

AIR CHANGE EFFECTIVENESS

Rickard VAV diffusers will ensure that air is mixed effectively in the occupied space even when supplying Minimum Air volumes



ENERGY CREDITS

ENERGY IMPROVEMENT

Low Pressure VAV diffusers save energy due to the following benefits:

- Rickard VAV diffusers eliminate the pressure drop associated with VAV boxes required in a VAV box variable volume air supply system. This result in a central plant that use less Fan energy.
- Rickard VAV diffusers save energy since no area in the building is over cooled, or over heated. Every diffuser measures local space conditions and varies the amount of air to meet the demands of that area.
- Rickard VAV diffusers with occupancy sensors ensure that only occupied spaces are supplied with air. This can save a huge amount of fan energy since only 50% to 70% of space, depending on the type of building, is occupied at any one time during business hours.

ELECTRICAL AND TENANCY SUB-METERING

Sub-metering can be achieved because Rickard Controls and Neck Heaters are powered via separate circuits.

PEAK ENERGY DEMAND REDUCTION

Heating on different diffusers can be staggered to reduce total building peak demand.

Heater output can be limited per zone or per diffuser to reduce power requirements during peak demand periods.

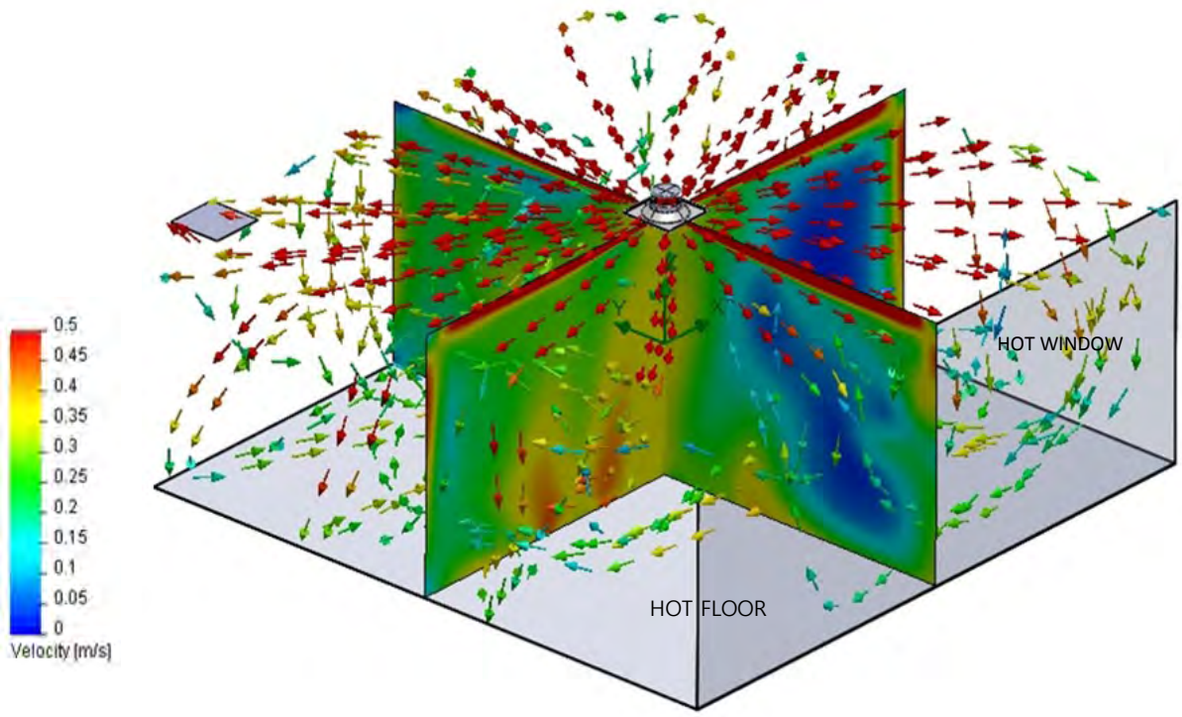
THROW AND EXIT VELOCITY

It is a feature of the variable geometry VAV diffuser concept to maintain throw at an acceptable level throughout the range of air flows. This is achieved by changing the exit geometry for reduced airflow, This maintains the exit velocity, which in return will maintain the throw. Throw is the distance from the diffuser at which the air velocity drops below 0.25 m/s.

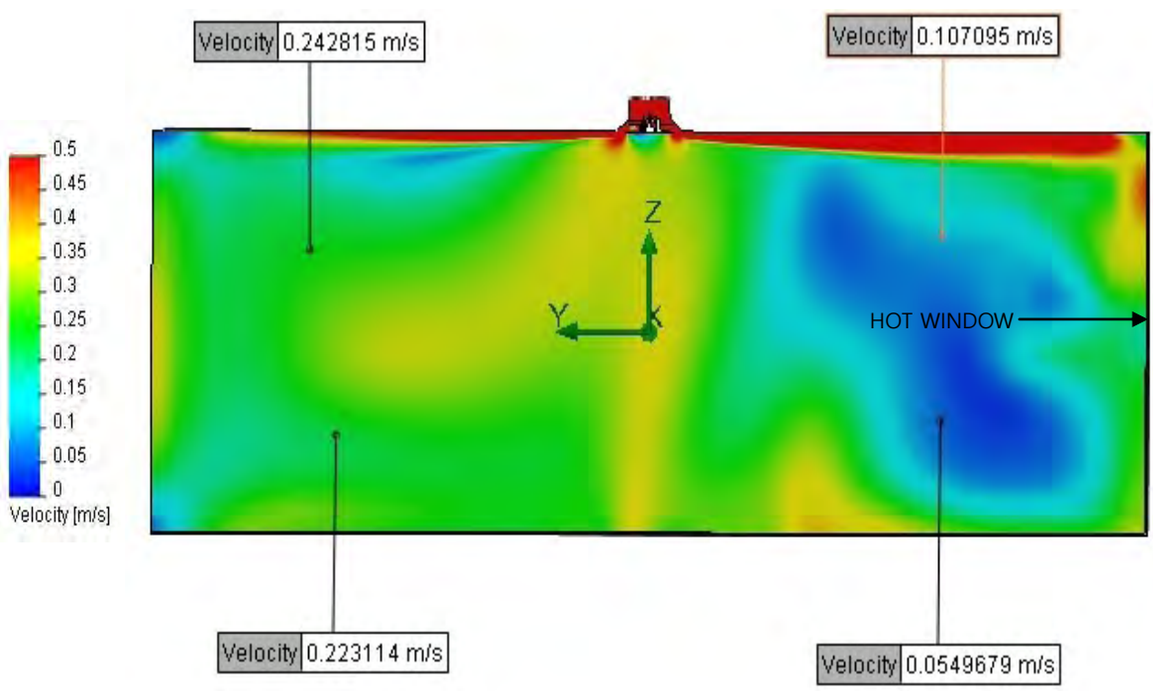
If air velocity is too high in the occupied space, drafts will be experienced and ADPI values will suffer.

VAV diffusers rely on a high velocity air stream to maintain coanda and throw next to the ceiling. Care must be taken to select the correct diffuser for the size of the space and to meet load requirements.

Correctly selected diffusers allow for effective room air circulation without drafts as shown in the CFD analysis below.



VELOCITY VECTOR PLOT (VCD 300mm; Control Disc 30% open; Supply 12°C; Room 7m x 7m)



VELOCITY VECTOR PLOT (VCD 300mm; Control Disc 30% open; Supply 12°C; Room 7m x 7m)

AIR CHANGE EFFECTIVENESS

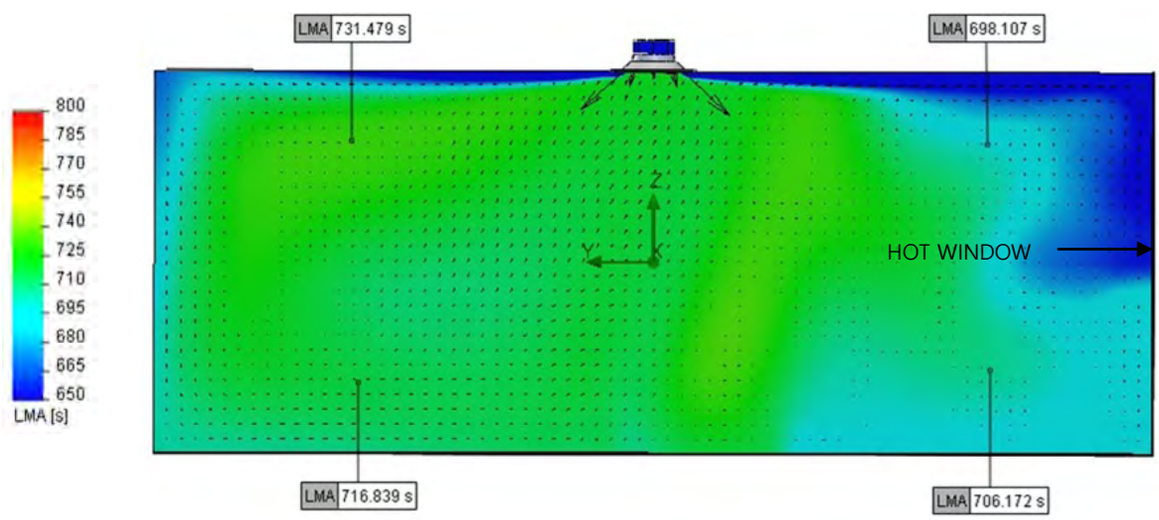
Air Change Effectiveness (ACE), is defined as the age of air that would occur throughout the room if the air was perfectly mixed, divided by the average age of the air that occupants would inhale.

An Air Change Effectiveness of 1 indicates perfect uniform mixing in the room. If ACE is lower than 1, it is an indication that the air is short-circuiting between the supply air diffuser and the return air grill.

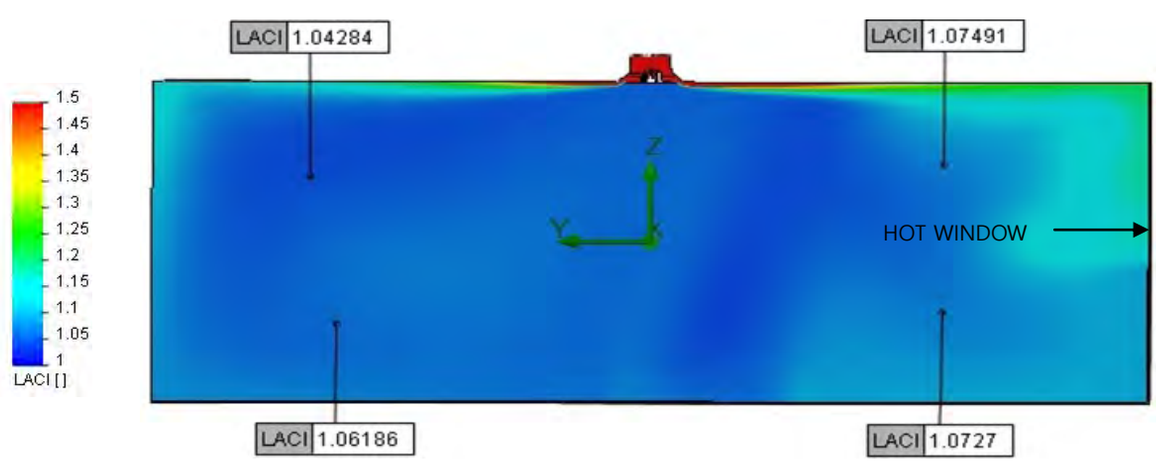
An ACE value of higher than 1 is possible when air diffusion allows a higher ventilation rate in the occupied space than in the rest of the room.

Low Pressure VAV diffusers maintain acceptable Air Change Effectiveness values even when turned down to minimum supply air volumes.

The CFD clip below gives an representation of the Mean Age of the Air throughout a typical room that is fitted with a Variable Geometry VAV diffuser.



LOCAL MEAN AGE OF AIR (VCD 300mm; Control disc 30% open; Supply 12°C; Room 7m x 7m)



LOCAL AIR CHANGE INDEX (VCD 300mm; Control Disc 30% open; Supply 12°C; Room 7m x 7m)

LACI close to 1 indicates acceptable room air mixing

LACI = LMA/time taken to fill room with air

ADPI PERFORMANCE

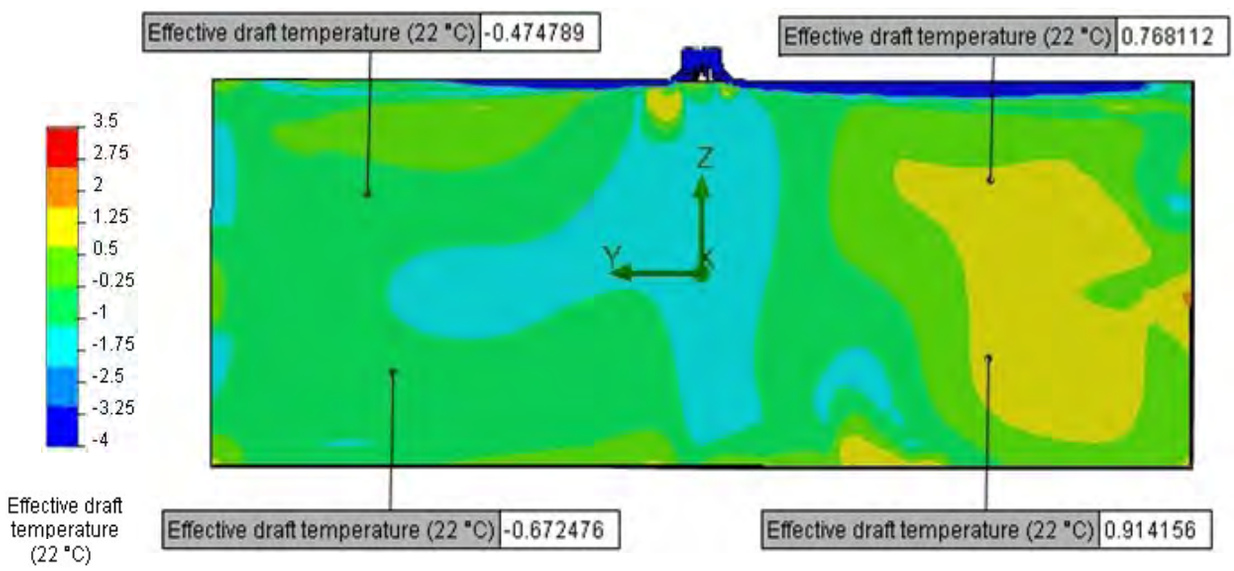
Air Diffusion Performance Index (ADPI) statistically relates the air temperature and air speed in the occupied space to the occupants' thermal comfort.

ADPI is calculated as the percentage of locations in the conditioned space that meet comfort standards.

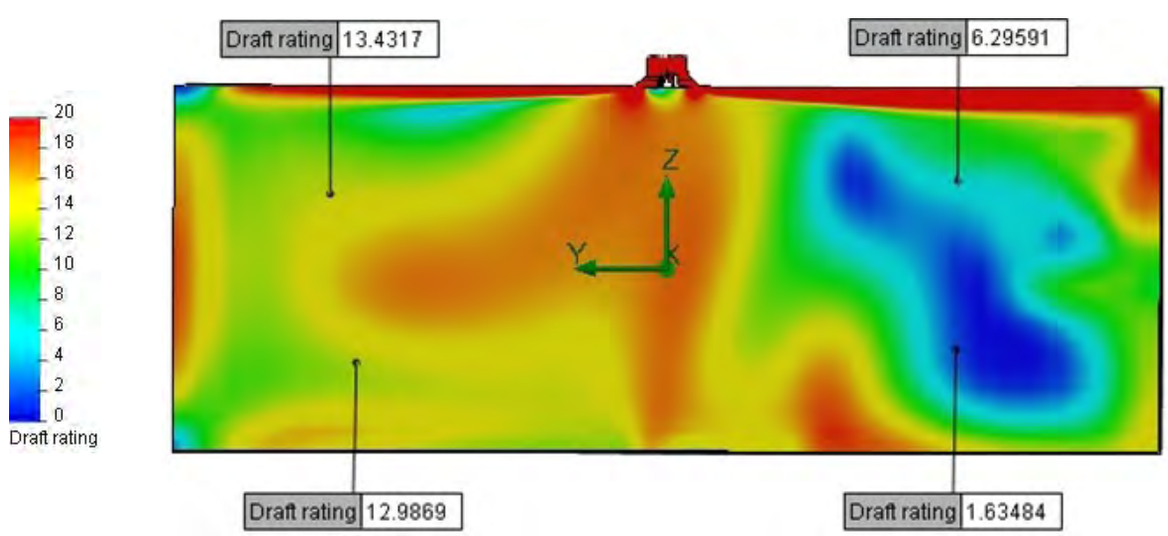
The "2009 Ashrae Handbook: Fundamentals" indicates that conditions in the occupied space is acceptable when:

- the air velocity is below 0.35 m/s
- the effective draft temperature is larger than –1.5 and smaller than 1. The effective draft temperature is calculated around setpoint. (Tc is 22°C in the plot below)
- the Draft Rating is smaller than 20. The Draft Rating is the number of people that would be uncomfortable due to draft.

Rickard VAV diffusers that are correctly selected for the size of the occupied space and the load in the occupied space, will maintain goof ADPI values throughout the range of control disc movement.



EFFECTIVE DRAFT TEMPERATURE (VCD 300mm; Control Disc 30% open; Supply 12°C; Room 7m x 7m)



DRAFT RATING (VCD 300mm; Control Disc 30% open; Supply 12°C; Room 7m x 7m)

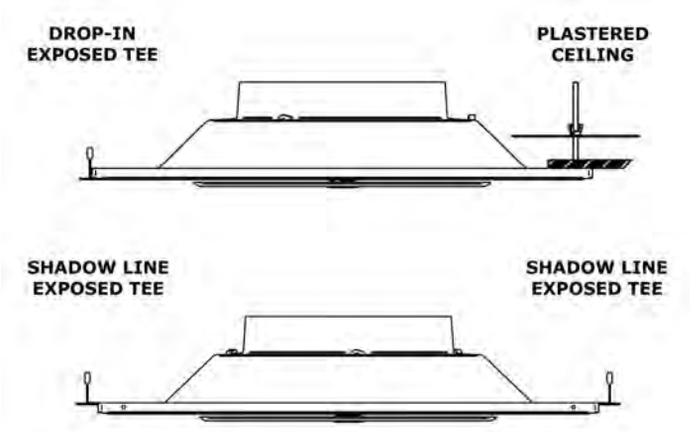
OPTIONS

The Rickard Ceiling Diffuser Range supports a wide range of diffusion unit styles.

EXPOSED TEE CEILING GRID

1. SQUARE DIFFUSER
   - i. Drop-in Flush Mounting
   - ii. Drop-in Shadow Line

The basic diffuser drops into a square opening between ceiling tees. Flush Mounting and Shadow Line styles are available. These can be supplied with the following mounting plate sizes, 495x495mm, 595x595mm & 23¾x23¾" to suit 500x500mm, 600x600mm & 24x24" ceiling grids respectively. Specials sizes are available on request.



BAFFLED CEILING OR MOUNTING IN FREE SPACE

1. SQUARE DIFFUSER
   - i. 4 Point Fixing (4 Brackets for threaded rod connection)
2. ROUND DIFFUSER
   - i. 3 Point Fixing (3 Brackets for threaded rod connection)
   - ii. Hard Duct Connection (no accessories required)

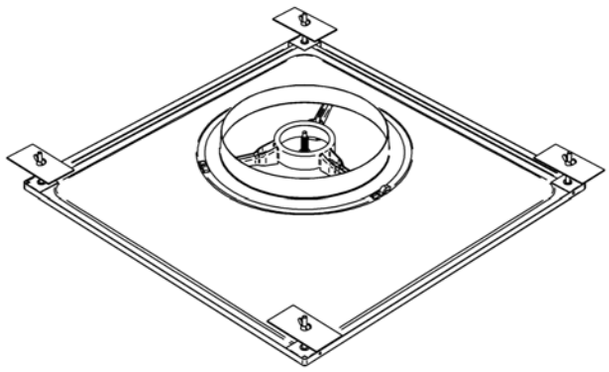
Baffled ceilings require an unusual treatment which is not illustrated. Normally this ceiling requires a square tile with suspension points fitted at each corner thereby enabling support from the top edges of the baffles. Large diffuser mounting plates are particularly beneficial in the baffled ceiling as there is otherwise little opportunity for the Coanda effect to help distribute conditioned air across the ceiling. This may result in inadequate throws and poor room air movement.

PLASTERED CEILING

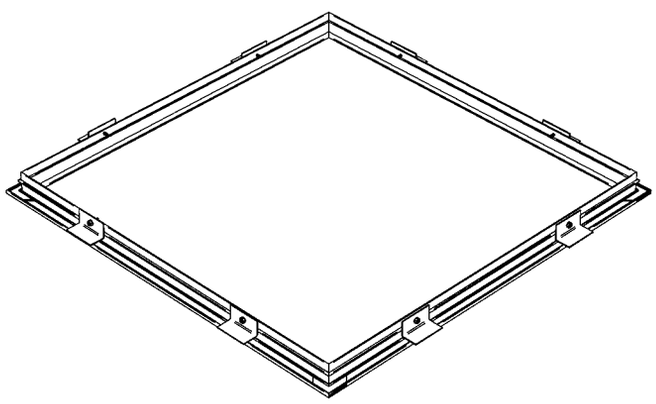
1. SQUARE DIFFUSER
   - i. 4 Point Fixing (4 Brackets with Backing Plates)
   - ii. T-Frame (Square Frame to allow Drop-in Flush Mounting)

In the case of mounting square diffusers into plastered ceilings, two methods of fixing may be used. Concealed fixing is achieved by four fixing studs secured in the corners of the mounting plate. These pass through the ceiling and, with the use of backing plates, are used to secure the diffuser to the ceiling. A further option for fixing into a plastered ceiling is with the use of a T-frame which is an optional extra. This is fixed to the ceiling and the diffuser then drops into it.

4 POINT FIXING (4 BRACKETS WITH BACKING PLATES)



T-FRAME (DROP-IN MOUNTING FOR PLASTERED CEILINGS)

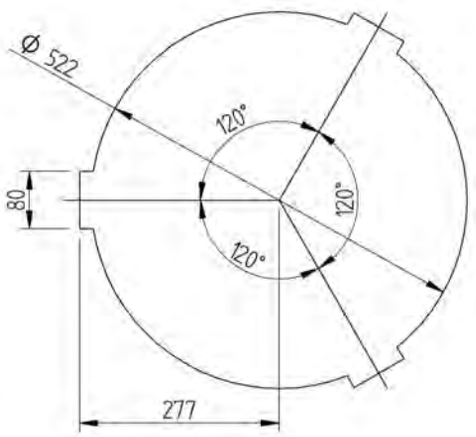


2. ROUND DIFFUSER
   - i. 3 Point Fixing (3 Brackets to allow Bayonet attachment)
   - ii. T-Ring (Circular Frame to allow Drop-in Flush Mounting)

Apart from the usual four-corner style, the Rickard Ceiling Diffuser is also available in a circular format. This model is most often combined with round down-lighters to preserve the circular pattern, and in particular with plastered ceilings. It also offers the absolute minimum interruption to the ceiling for those who prefer to have its unbroken regularity maintained.

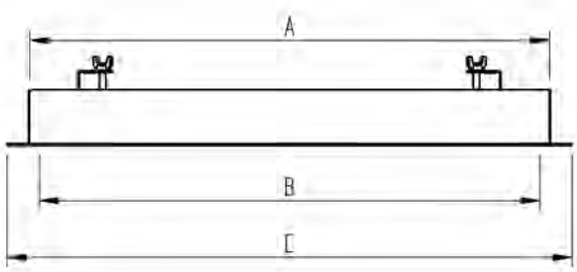
Fixing of round diffusers in a plastered ceiling often presents a problem because of restricted access to the ceiling void. This problem is overcome with a diffuser that is fitted with three clips that allows the Diffuser to be twisted and clipped into a hole created in the ceiling. The installer need only cut a round hole with three notches (stencils provided with each order) and the diffuser twisted into place. Removal is as easy, a simple twist in the opposite direction and the

PLASTERED CEILING CUT-OUT DETAIL FOR ROUND DIFFUSERS



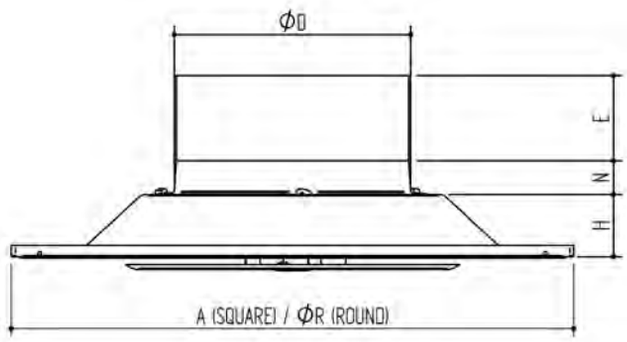
Alternatively, a T-Ring is available to allow Drop-in Flush Mounting of a standard Round Diffuser. The T-Ring is mounted flush with the ceiling after a round hole with a diameter of 590-600mm is cut into the plaster board. Four threaded brackets draw the T-Ring flush against the ceiling to ensure a neat finish.

T-RING (DROP-IN MOUNTING FOR PLASTERED CEILINGS)



T-RING GENERAL DIMENSIONS					
NOMINAL SIZE	**A**	**B**	**C**	**DIFFUSER DIAMETRE**	**CUT-OUT SIZE**
580	585	565	625	580	600

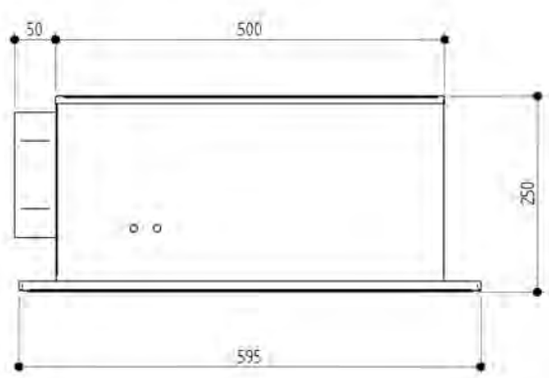
CEILING DIFFUSER GENERAL DIMENSIONS

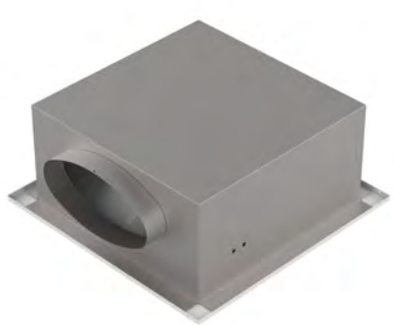


Nominal Size	Dimensions (mm)							
	Ø D	A	H	N	Ø R	E		
150	153	495 x 495	74	28	580	Heater Neck	Airflow Sensor	Airflow Switch
		595 x 595						
200	200	495 x 495	71	33				
		595 x 595						
250	250	495 x 495	66	34		90	115	125
		595 x 595						
300	293	495 x 495	65	35				
		595 x 595						
350	346	595 x 595	63	43				

CEILING DIFFUSER WITH PLENUM GENERAL DIMENSIONS

(Used when ceiling space is limited)





Note: Plenums create a significant pressure drop

(Performance data will not apply)

Diffuser Style				Ceiling Diffuser Mounting Types							
				Exposed Tee		Baffled Ceiling		Plastered Ceiling Surface Mounting			
Model	Diffuser Shape	Diffuser Size	Neck Size	Drop-in Flush Mounting	Drop-in Shadow Line	4 Point Fixing Brackets	3 Point Fixing Brackets	4 Point Fixing & Backing Plate	3 Point Bayonet Fixing	T-Frame	T-Ring
CCD3 MC VCD1/4/5 MC	Square	495x495	150-300	•	o	•	o	•	o	•	o
	Square	595x595	150-300	•	•	•	o	•	o	•	o
	Square	23¾"x23¾"	6-12"	•	•	•	o	•	o	•	o
CCD3 LC VCD1 LC	Square	595x595	350	•	o	•	o	•	o	•	o
	Square	23¾"x23¾"	14"	•	o	•	o	•	o	•	o
CSD3 SC VSD1/4/5 SC	Square	320x320	150	•	o	•	o	•	o	•	o
CSD3 LC VSD1 LC	Square	595x595	150-350	•	o	•	o	•	o	•	o
	Square	23¾"x23¾"	6-14"	•	o	•	o	•	o	•	o
VSD4/5 LC	Square	595x595	150-300	•	o	•	o	•	o	•	o
	Square	23¾"x23¾"	6-12"	•	o	•	o	•	o	•	o
CRD3 VRD1/4/5	Round	580	150-300	o	o	o	•	o	•	o	•
CRD3 LC VRD1 LC	Round	580	350	o	o	o	•	o	•	o	•

Ceiling Diffuser Naming Convention														
C	**V**	**C**	**R**	**S**	**D**	**W**	**1**	**3**	**4**	**5**	**SC**	**MC**	**LC**
Constant / Variable Volume		Trim Plate			Diffuser Type		Actuator Type				Cone Size		
Constant	Variable	Round	Round	Square	Diffuser	Swirl	Electronic	Manual	Thermal Cooling Only	Thermal Heating & Cool-ing	Small Cone	Medium Cone	Large Cone
		Back-pan Shape											
		Square	Round	Square									

e.g. VCD1 MC

C	V	C	R	S	D	W	1	3	4	5	SC	MC	LC
Constant / Variable Volume		Trim and Cone Shape			Diffuser Type		Actuator Type				Cone Size		
Constant	Variable	Round	Round	Square	Diffuser	Swirl	Electronic	Manual	Thermal Cooling Only	Thermal Heating & Cooling	Small Cone	Medium Cone	Large Cone
		Outside Back-pan Shape											
		Square	Round	Square									

V	C	D	1	MC
Variable Volume	Round Trim Plate Square	Diffuser	Electronic	Medium Cone

Electronic Variable Volume Diffuser with Square Back-pan, Round Medium Cone Trim and Cone