



## HIGH-PERFORMANCE AIR SYSTEMS

Variable Air Volume Diffusers

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# ACUTHERM BY PRICE VAV DIFFUSER SYSTEMS

High-performance air systems demand modern design approaches with leading-edge products and technology in order to optimize comfort and reduce energy consumption.

A comfortable environment is achieved by providing the smallest possible zones of temperature control, allowing for individual temperature distribution and better air movement. Reduction in energy is realized by designing a low-pressure HVAC system that allows for maximum turndown while maintaining temperatures.

## ACUTHERM BY PRICE VAV DIFFUSER SYSTEMS PROVIDE:

- D Comfort**  
With each VAV diffuser acting as an individual zone of control, every area of a building can have separate, optimized temperature settings. The individual occupant selects a personal comfort setting, and average temperature is maintained within 1.5°F/0.9°C. Acutherm by Price VAV diffusers provide a constant discharge velocity with improved comfort as a result of higher throw, no dumping, improved room air movement and uniform temperature distribution.
- D Energy Savings**  
Acutherm by Price VAV diffusers allow for low-pressure, low-energy consumption systems. Our energy-efficient VAV diffuser systems prevent overcooling and overheating – resulting in 10%–47% energy savings when compared to other HVAC systems. Energy savings is produced from three sources: small zones, low turndown and pressure drop and low system pressure.
- D Sustainability**  
Sustainable buildings are designed to be environmentally responsible and resource efficient throughout their life cycle. For sustaining long-term usefulness, Acutherm by Price’s VAV diffuser systems are exceptionally adaptable to office changes. No diffuser zone is split when office walls are put up or moved. The modular concept and flexibility provided by a VAV diffuser system guarantees that any changes in the floor plan need not trigger expensive and disruptive changes to the HVAC system.

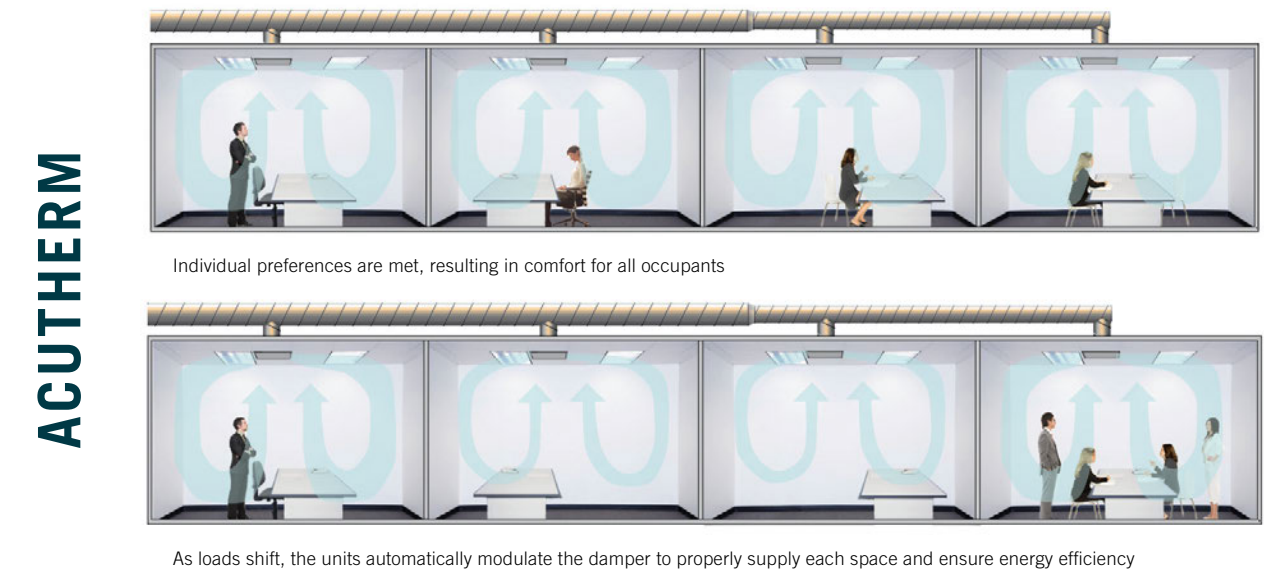
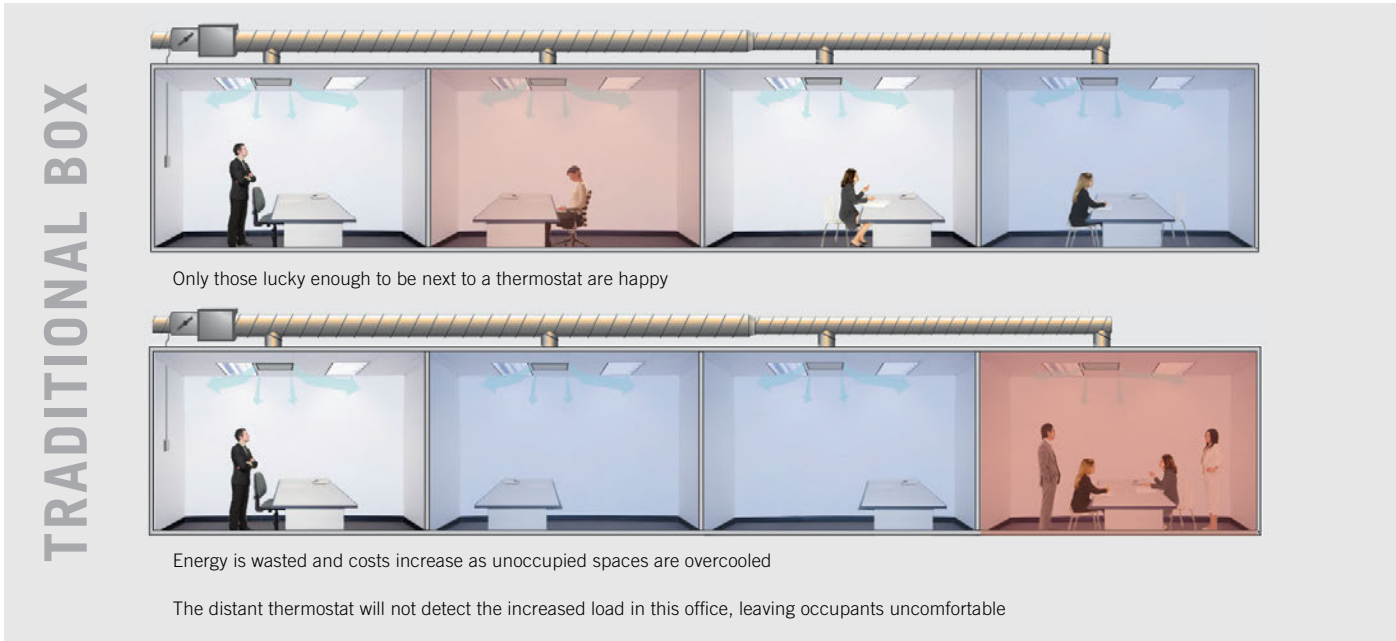


# COMFORT

Personal thermal comfort stems from appropriately sized zones of control. Creating many small zones provides exceptional levels of control, leading to outstanding occupant comfort.

## Individual Thermostat Control

VAV diffusers are a cost-effective and practical way to provide this level of personalized control. Each VAV diffuser has an individual thermostat and built-in damper, allowing it to act as an individual VAV zone of control. The damper is continuously adjusted to vary the volume of airflow (warm or cold) into the room in response to room temperature and set point.

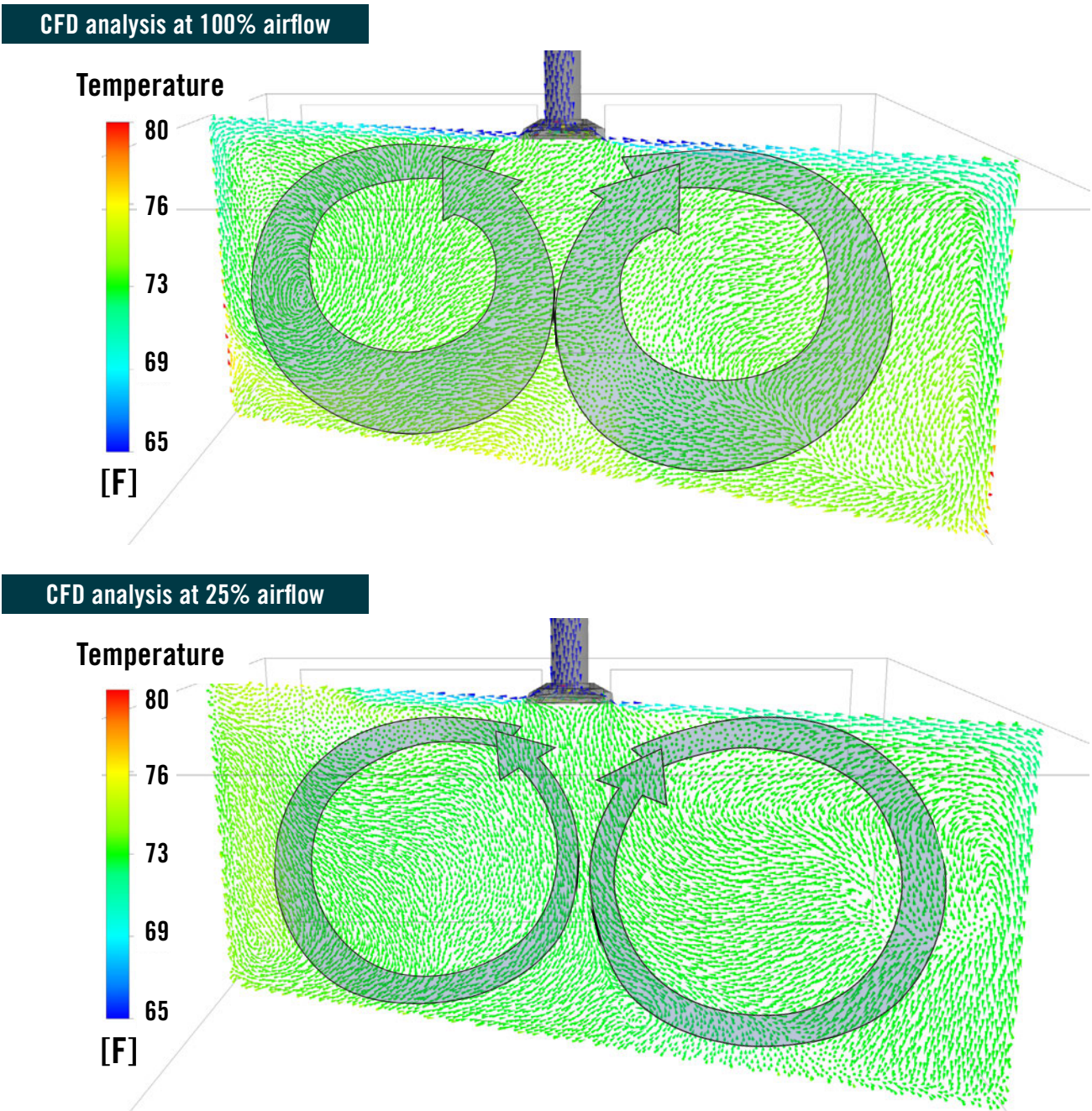


## Better Room Air Mixing

With an adjustable damper built right in, VAV diffusers are able to enhance occupant comfort by varying the discharge opening as they vary air volume. The result is an almost-constant discharge velocity, with the benefits of a better throw, no dumping, a higher level of room air movement and a uniform temperature distribution, even at low supply air volumes.

## Room Mixing Comparison

Computational fluid dynamics (CFD) analysis shows effective room air mixing with the VAV diffuser both at 100% open (top) and at 25% open (bottom).







Savings from Three Sources

VAV diffusers allow for low-pressure, low-energy consumption systems. The energy savings of systems designed using VAV diffusers can be broken down into three main sources:

- Small zones
- Low turndown and pressure drop
- Low system pressure

Small zones

Many small zones provide individual temperature control to prevent overcooling or overheating when spaces are unoccupied.

Low turndown and pressure drop

VAV diffuser systems do not have a velocity limitation because pressure independence is achieved by measuring only static pressure. The static pressure damper in a VAV diffuser system may be oversized to minimize pressure drop without the penalty of increasing minimum flow.

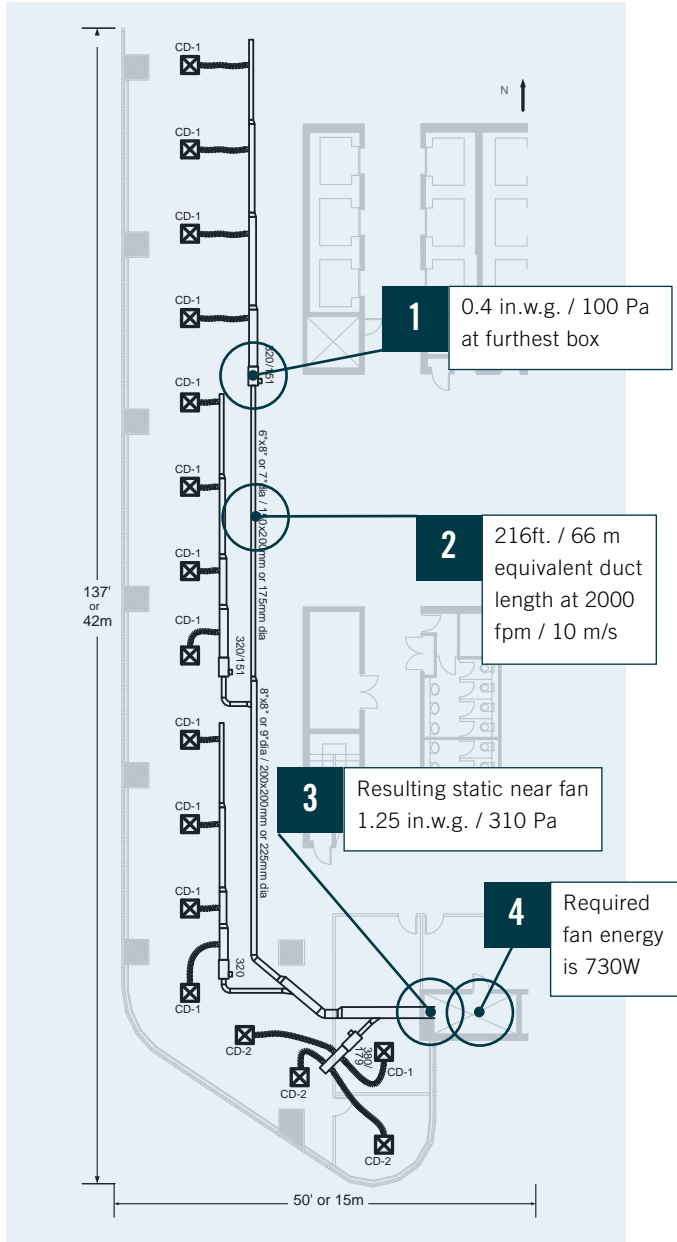
Low system pressure

VAV diffuser systems require low duct pressure, which reduces the required fan horsepower and, in turn, the energy required to operate the system.

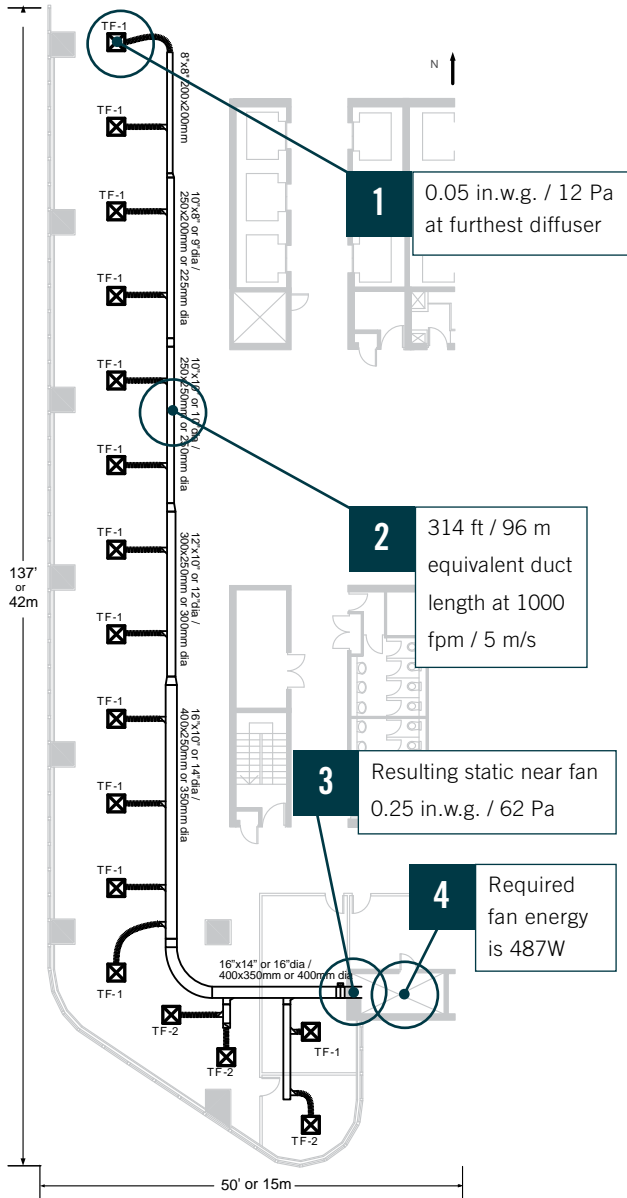
Low Pressure Drop Comparison

Compared to other systems, the low-pressure, low-energy systems designed around VAV diffusers require less fan horsepower and prevent the overcooling and overheating of spaces. The example below shows 33% energy savings compared to traditional VAV box systems.

TRADITIONAL VAV BOX SYSTEM



VAV DIFFUSER SYSTEM



33% FAN ENERGY SAVINGS



# SUSTAINABILITY

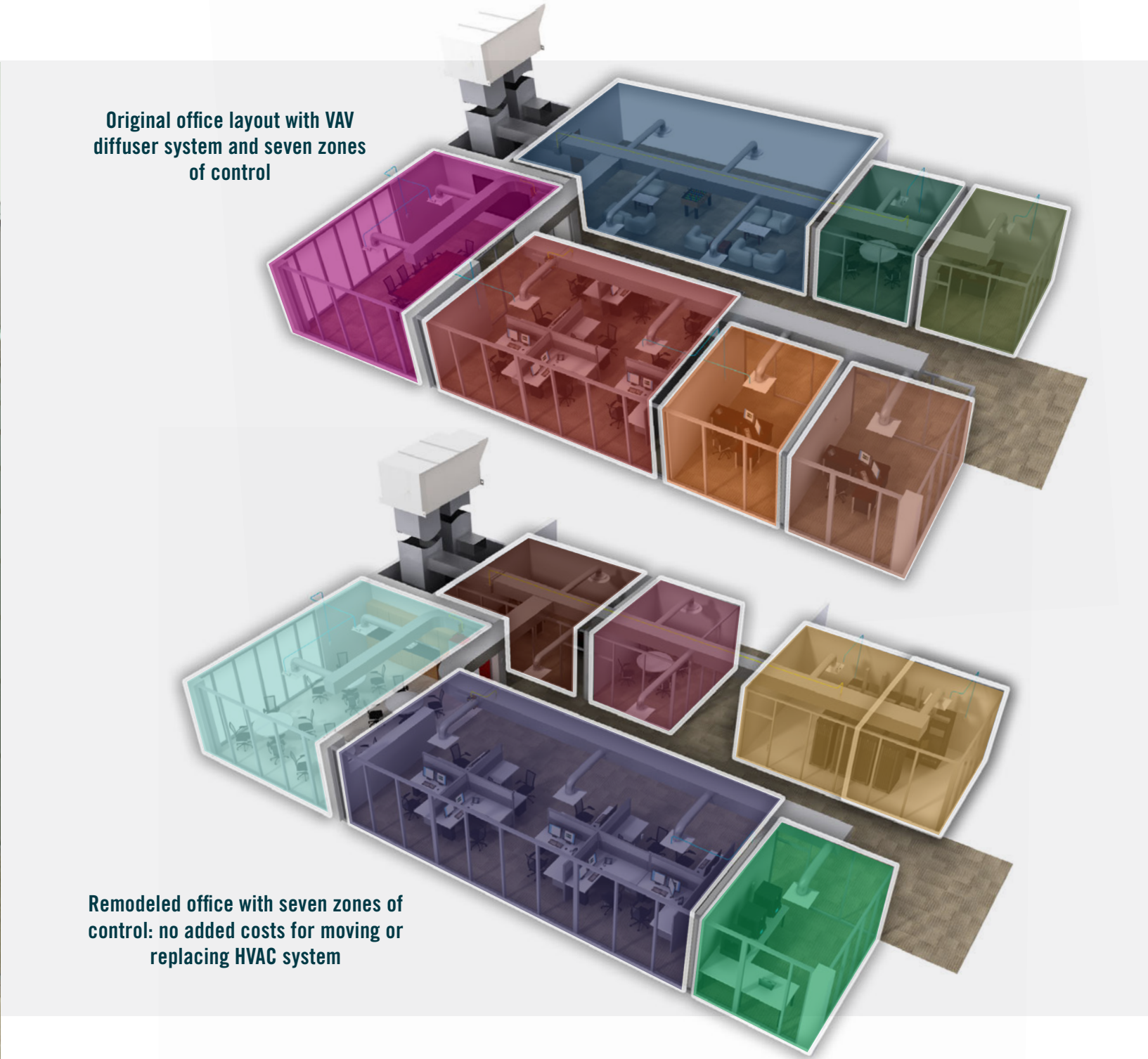
## Enduring Ease-of-Use

Acutherm by Price VAV diffusers have a long life span and offer simple maintenance. Thermally powered units do not require any wiring and, aside from set point adjustment, are virtually maintenance free with 45+ years of proven operation. Motorized diffusers make use of long-life brushless motors to reduce maintenance requirements and provide near-silent operation.

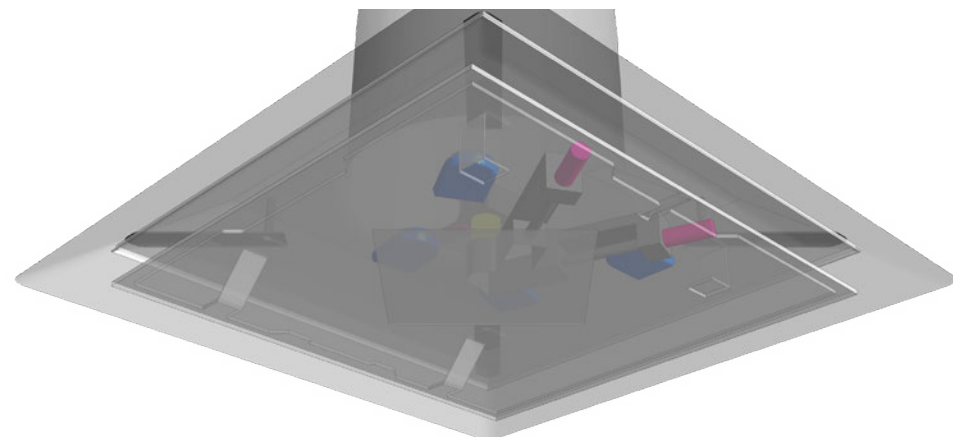


## Future-Proof Flexibility

VAV diffuser systems are exceptionally adaptable to office changes. The modular concept and flexibility provided by a VAV diffuser system means that any changes to the floor plan need not trigger expensive and disruptive changes to the HVAC system.





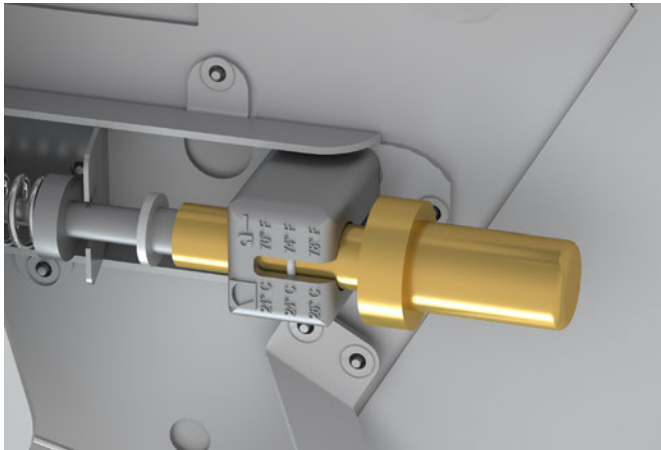


Each VAV diffuser is a ceiling diffuser with an individual thermostat and built-in VAV damper, allowing it to act as an individual VAV zone of control. The damper is continuously adjusted to vary the volume of airflow (warm or cold) into the room in response to room temperature and set point. When supply air is warm, the VAV diffuser operates in heating mode, and the damper opens in response to a drop in room temperature. When the supply air is cold, the VAV diffuser operates in cooling mode, and the damper opens in response to a rise in room temperature.

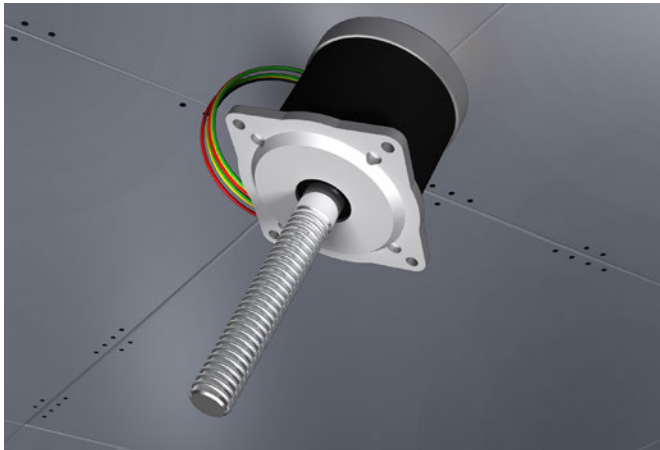
**Separate room temperature set points for heating and cooling are individually adjustable and average temperature is maintained within 1.5°F/0.9°C.**

As with all diffusers, air circulates around the room in a circular motion. Secondary air rises under the diffuser, passes beneath the diffuser plaque and entrains with the primary air at the outside edge of the diffuser. This secondary air best represents average room temperature.

To monitor average room temperature, a continuous sample of secondary air is drawn around the plaque past the room thermostat(s). This is accomplished by feeding primary air through venturi nozzle(s). Primary air blowing through the nozzle(s) creates just enough vacuum to draw some secondary air around the plaque, over the thermostat(s) and out the other side.

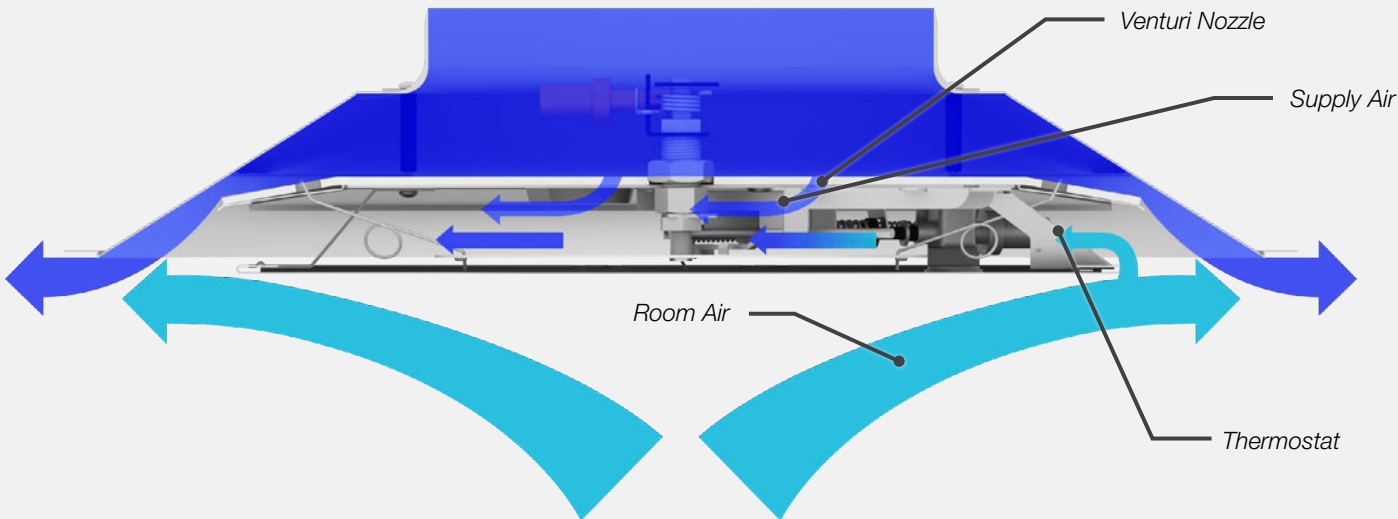


Thermostat and actuator – contains a blend of petroleum distillate waxes; the waxes melt and expand, driving a piston with a precise movement per degree temperature change

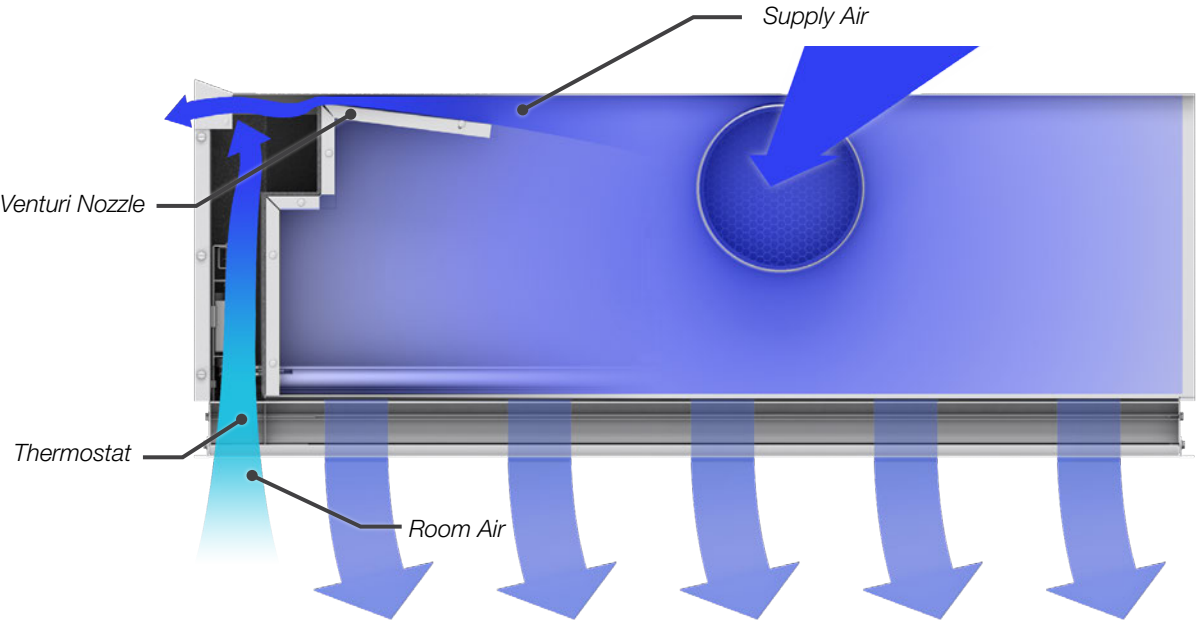


For electric diffusers, quiet, long-life, brushless motors provide repeatable and reliable control

Positive induction mechanism – a continuous sample of room air drawn over the individual thermostats



The high velocity discharge from the diffuser entrains room air into the supply air resulting in a rising column of room air under the diffuser. A small amount of supply air passed through a venturi nozzle creates an area of low pressure in the diffuser that induces a sample of room air over the thermostat. Room air is positively induced over the thermostat independent of diffuser damper position.





# VAV DIFFUSER SYSTEM OPTIONS

As energy costs continue to rise, managing energy while balancing tenant comfort and operational costs is a significant challenge for commercial building owners and managers. A building automation system (BAS) is an option that provides monitoring of entire building systems with single-source control and troubleshooting. Acutherm by Price's VAV diffuser system is designed to work cooperatively with a wide range of BAS options. Whether you're looking for simple individual temperature control with no energy required for operation or full-scale networking for system scheduling, monitoring, reporting, troubleshooting and more, this guide will help you determine what is best for your building needs and budget.

## Mechanical Thermal Diffusers

### THERMA-FUSER SERIES

Our thermally actuated VAV diffusers are simple to install, require no maintenance, come with a 10-year warranty and offer the lowest cost per zone of control.

## Digital Electric VAV Diffusers

### ADVANTAGE SERIES INTEROPERABLE SERIES

Our digital electric VAV diffusers use a controller and electric motor, allowing for an increased range of set points, and are available for both stand-alone and BACnet networking applications.

## SYSTEM OPTIONS

FEATURES	THERMAL		ELECTRIC		HYBRID	
	Therma-Fuser stand-alone thermally powered VAV diffusers	Therma-Fuser diffusers + wall adjuster + room temperature sensor	Advantage stand-alone electric motor VAV diffusers	Interoperable BACnet building network VAV diffusers	Therma-Fuser VAV diffusers +	Interoperable VAV diffusers
Individual temperature control, superior air distribution, energy-saving adaptable system	✓	✓	✓	✓	✓	✓
No diffuser maintenance	✓	✓			✓	
No diffuser wiring	✓					
BAS only monitors parts of system requiring periodic maintenance	✓					
Monitors room air temperature		✓	✓	✓		✓
Monitors and adjusts room temperature set points		✓	✓	✓		✓
Monitors diffuser supply air temperature			✓	✓		✓
Monitors diffuser supply air volume			✓	✓		✓
Network protocol	Analog		BACnet	BACnet		BACnet
Other network functions			✓	✓		✓
Diffuser power	Thermal	Thermal	Electric motor	Electric motor	Thermal	Electric motor
Installed cost	\$	\$\$	\$\$	\$\$\$	\$\$	
Warranty*	10 year	10 year	2 year	2 year	10 year	2 year

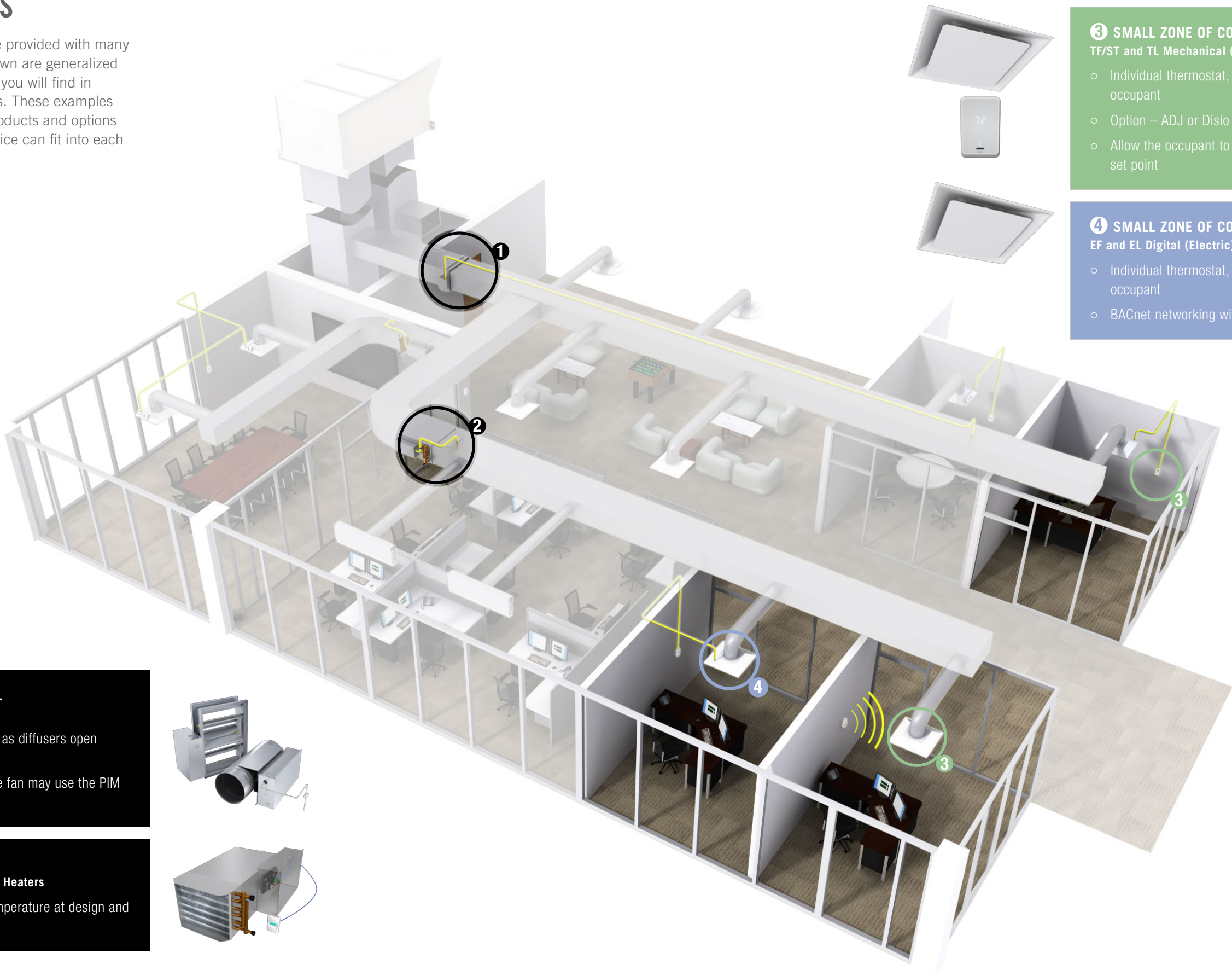
\*Not applicable to options and accessories



# TYPICAL ZONES & VAV DIFFUSER SYSTEM OPTIONS

A comfortable environment can be provided with many different strategies. The zones shown are generalized examples of typical configurations you will find in many of today’s built environments. These examples demonstrate some of the many products and options available and how Acutherm by Price can fit into each particular zone.

## EXAMPLE ZONE: SMALL OFFICE



### 1 STATIC PRESSURE CONTROL PIM Pressure Independence Module

- Provides static pressure control as diffusers open and close
- Systems with a constant-volume fan may use the PIM as a bypass

### 2 DUCT HEAT Acu-Zone Hot Water or Electric Duct Heaters

- Provides constant supply air temperature at design and low airflow rates

### 3 SMALL ZONE OF CONTROL TF/ST and TL Mechanical (Thermal) Diffusers

- Individual thermostat, individual set points for each occupant
- Option – ADJ or Disio
- Allow the occupant to easily adjust the temperature set point

### 4 SMALL ZONE OF CONTROL – NETWORKED EF and EL Digital (Electric) Diffusers

- Individual thermostat, individual set points for each occupant
- BACnet networking with building automation system



# TYPICAL ZONES & VAV DIFFUSER SYSTEM OPTIONS

## EXAMPLE ZONE: OPEN OFFICE



### 1 STATIC PRESSURE CONTROL PIM Pressure Independence Module

- Provides static pressure control as diffusers open and close
- Systems with a constant-volume fan may use the PIM as a bypass



### 2 TYPICAL ZONE – STAND-ALONE TF or ST Square Plaque Diffusers

- Provides comfort and energy savings of individual temperature control
- Easy adaptability to office changes
- Maintenance-free operation

### 3 ARCHITECTURAL EXPOSED DUCT CEILING STR Round Diffuser

- Round shape blends with architectural features or exposed round duct work





# TYPICAL ZONES & VAV DIFFUSER SYSTEM OPTIONS

## EXAMPLE ZONE: OPEN OFFICE WITH PERIMETER



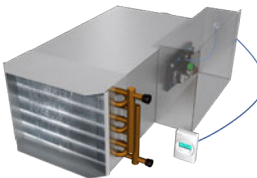
### 1 STATIC PRESSURE CONTROL PIM Pressure Independence Module

- Provides static pressure control as diffusers open and close
- Systems with a constant-volume fan may use the PIM as a bypass



### 2 DUCT HEAT Acu-Zone Hot Water or Electric Duct Heaters

- Provides constant supply air temperature at design and low airflow rates



### 3 ELEGANT LINEAR DESIGN TL Linear Slot Diffuser

- Ideal for ceiling or sidewall applications
- Streamlined aluminum extrusions provide continuous, slim architectural appeal






# TYPICAL ZONES & VAV DIFFUSER SYSTEM OPTIONS

## EXAMPLE ZONE: SMALL MEETING ROOM





**2 SPECIAL ZONE**  
**– INTERMITTENT USE**  
 Advantage with Occupancy Sensor

- Balances comfort and energy
- Changes temperature and minimum flow set point when space is unoccupied

**1 STATIC PRESSURE CONTROL**  
 PIM Pressure Independence Module

- Provides static pressure control as diffusers open and close
- Systems with a constant-volume fan may use the PIM as a bypass





# TYPICAL ZONES & VAV DIFFUSER SYSTEM OPTIONS

## EXAMPLE ZONE: LARGE MEETING ROOM



### 1 STATIC PRESSURE CONTROL PIM Pressure Independence Module

- Provides static pressure control as diffusers open and close
- Systems with a constant-volume fan may use the PIM as a bypass



### 2 DUCT HEAT Acu-Zone Hot Water or Electric Duct Heaters

- Provides constant supply air temperature at design and low airflow rates



### 3 SPECIAL ZONE – HIGH MAX CAPACITY AND INTERMITTENT USE

Advantage with CO<sub>2</sub> Sensor and Drone

- Balances ventilation and energy
- Reduces minimum flow rate when high-occupancy areas are unoccupied





# VAV DIFFUSER PRODUCTS



**2 x 2 ft. Square Diffuser with Blade Damper**  
(24 in. / 600 mm square)

**Therma-Fuser Series** – TF / **Interoperable Series** – EF

Four-blade dampers provide superior throw with 66 linear inches of variable discharge area.

<b>Inlet diameter</b>	6/8/10/12 in.	150/200/250/300 mm
<b>Pressure ranges</b>	0.05 to 0.25 in.w.g.	12 to 62 Pa
<b>Air volumes</b>	100 to 720 CFM	45 to 340 l/s
<b>Throw<sup>1</sup></b>	3/4/6 to 12/14/17 ft.	0.9/1.2/1.7 to 3.6/4.2/5.1 m
<b>Noise<sup>2</sup></b>	<15 to 34 NC	<15 to 34 NC



**2 ft. Round Diffuser with Disc Damper**  
(24 in. / 600 mm round)

**Therma-Fuser Series** – STR

With all the performance and air distribution of the ST, the round model has been developed for aesthetic consideration.

<b>Inlet diameter</b>	6/8/10/12 in.	150/200/250/300 mm
<b>Pressure ranges</b>	0.05 to 0.25 in.w.g.	12 to 62 Pa
<b>Air volumes</b>	105 to 740 CFM	50 to 350 l/s
<b>Throw<sup>1</sup></b>	<1/1/3 to 9/11/13 ft.	0.3<0.3 /0.9 to 2.7/3.4/4.0 m
<b>Noise<sup>2</sup></b>	<15 to 38 NC	<15 to 38 NC

<sup>1</sup>Throw at v<sub>i</sub>= 150 / 100 / 50 FPM / 0.25 / 0.50 / 0.75 m/s

<sup>2</sup>Noise based on L<sub>w</sub>(10<sup>-12</sup> watts reference) - 10 dB



**2 x 2 ft. Square Diffusers with Disc Damper**  
(24 in. / 600 mm square)

**Therma-Fuser Series** – ST

Easy adjustment minimum flow dial. One stop lever for balancing.

<b>Inlet diameter</b>	6/8/10/12 in.	150/200/250/300 mm
<b>Pressure ranges</b>	0.05 to 0.25 in.w.g.	12 to 62 Pa
<b>Air volumes</b>	105 to 740 CFM	50 to 350 l/s
<b>Throw<sup>1</sup></b>	<1/1/3 to 9/11/13 ft.	<0.3/0.3/0.9 to 2.7/3.4/4.0 m
<b>Noise<sup>2</sup></b>	<15 to 38 NC	<15 to 38 NC



**1 x 1 ft. Square Diffuser with Blade Damper**  
(12 5/8 in. / 320 mm square)

**Therma-Fuser Series** – TK

Specially designed for small task conditioning. Four-blade damper provides superior throw.

<b>Inlet diameter</b>	6 in.	150 mm
<b>Pressure ranges</b>	0.05 to 0.25 in.w.g.	12 to 62 Pa
<b>Air volumes</b>	115 to 265 CFM	55 to 125 l/s
<b>Throw<sup>1</sup></b>	4/6/8 to 8/10/13 ft.	1.2/1.7/2.5 to 2.5/3.0/4.0 m
<b>Noise<sup>2</sup></b>	<15 to 37 NC	<15 to 37 NC



**Linear Diffuser – Ceiling, Wall, Individual or Continuous**  
**Therma-Fuser Series** – TL / **Interoperable Series** – EL

**Advantage Series** – ADVL

Elegant linear design for individual units or continuous linear slots. VAV diffusers with streamlined aluminum extrusions to provide a slim architectural shape. Ceiling and sidewall applications.

<b>Length</b>	24/36/48/60 in.	600/900/1200/1500 mm
<b>Slots</b>	Multiple slots and blow patterns available	
<b>Pressure ranges</b>	0.05 to 0.25 in.w.g.	12 to 62 Pa
<b>Air volumes</b>	45 to 960 CFM	20 to 455 l/s
<b>Throw<sup>1</sup></b>	2/3/4 to 25/33/40 ft.	0.6/0.9/1.2 to 7.6/10.0/12.2 m
<b>Noise<sup>2</sup></b>	<15 to 42 NC	<15 to 42 NC



**2 x 2 ft. Square Diffusers with Disc Damper**  
(24 in. / 600 mm square)

**Advantage Series** – ADV

Designed to provide a greater range of operation and increased speed of response required by some projects.

<b>Inlet diameter</b>	6/8/10/12 in.	150/200/250/300 mm
<b>Pressure ranges</b>	0.05 to 0.25 in.w.g.	12 to 62 Pa
<b>Air volumes</b>	115 to 730 CFM	54 to 344 l/s
<b>Throw<sup>1</sup></b>	4/6/10 to 9/12/16 ft.	1.2/1.8/3.0 to 2.7/3.7/4.9 m
<b>Noise<sup>2</sup></b>	<15 to 40 NC	<15 to 40 NC

<sup>1</sup>Throw at v<sub>i</sub>= 150 / 100 / 50 FPM / 0.25 / 0.50 / 0.75 m/s

<sup>2</sup>Noise based on L<sub>w</sub>(10<sup>-12</sup> watts reference) - 10 dB

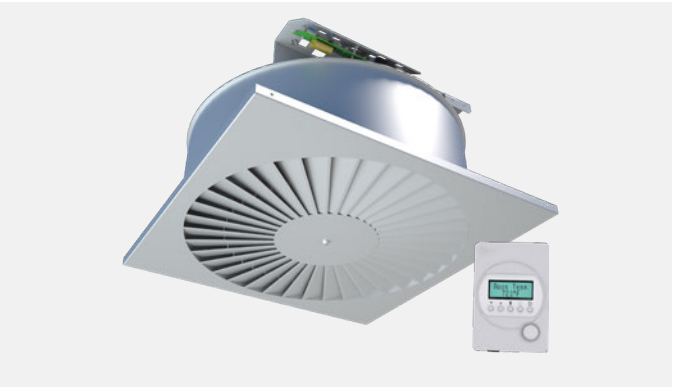


**2 ft. Round Diffuser with Disc Damper**  
(24 in. / 600 mm round)

**Advantage Series** – ADVR

The pleasing round shape blends in with round architectural features or exposed round duct work.

<b>Inlet diameter</b>	6 / 8 / 10 / 12 in.	150/200/250/300 mm
<b>Pressure ranges</b>	0.05 to 0.25 in.w.g.	12 to 62 Pa
<b>Air volumes</b>	120 to 720 CFM	59 to 340 l/s
<b>Throw<sup>1</sup></b>	3/4/7 to 10/12/17 ft.	0.9/1/1.2/2 to 3.0/3.7/5.2 m
<b>Noise<sup>2</sup></b>	<15 to 42 NC	<15 to 42 NC



**2 x 2 ft. Swirl Face Diffuser with Disc Damper**  
(24 in. / 600 mm square)

**Advantage Series** – ADVS

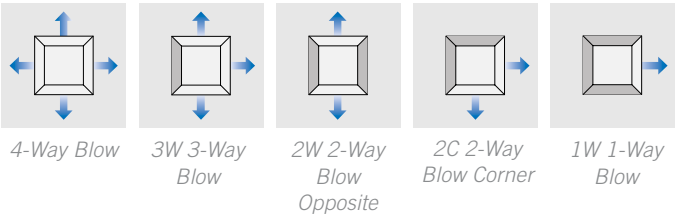
The swirl face provides a modern, aesthetically pleasing appearance combining a high-induction geometry with a VAV damper.

<b>Inlet diameter</b>	6 / 8 / 10 / 12 in.	150/200/250/300 mm
<b>Pressure ranges</b>	0.05 to 0.25 in.w.g.	12 to 62 Pa
<b>Air volumes</b>	130 to 525 CFM	61 to 248 l/s
<b>Throw<sup>1</sup></b>	1/2/4 to 5/8/12 ft.	0.3/0.6/1.2 to 1.5/2.4/3.7 m
<b>Noise<sup>2</sup></b>	<15 to 41 NC	<15 to 41 NC

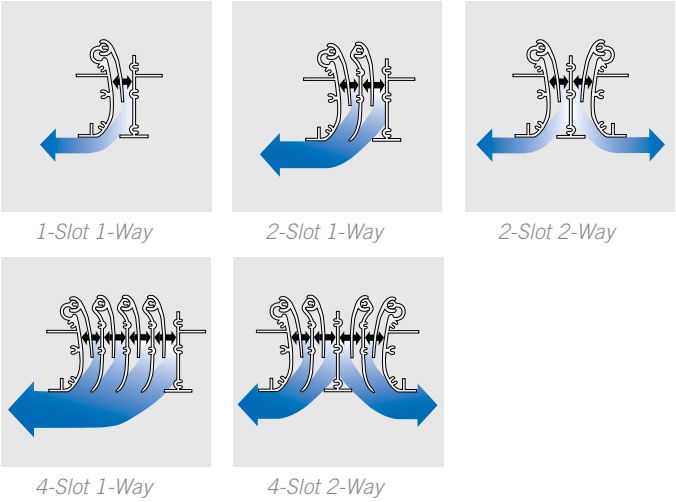


BLOW PATTERNS

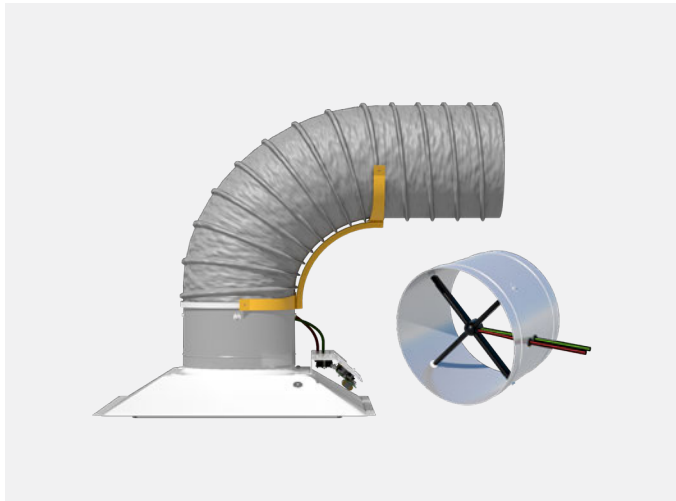
Custom air-blow patterns are available for most models. Contact Acutherm for additional information.



Linear Therma-Fuser Diffuser



OPTIONS & ACCESSORIES



DMSA Airflow Measurement for Advantage Series Diffusers

The Diffuser Measuring Station (DMSA) is an optional addition to the Advantage VAV diffuser providing airflow measurement at each Advantage master diffuser.



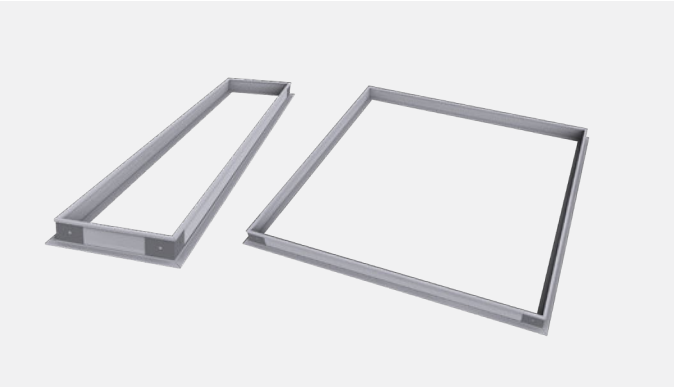
**Wall Adjusters and Thermostats**  
**Therma-Fuser Series** – DISIO Display Adjuster, Digital Wall Adjuster and Wireless Wall Adjuster  
**Interoperable Series** – BACnet Wall Adjuster  
**Advantage Series** – TSTAT\*  
Acutherm by Price's Wall Adjusters for VAV diffusers allow the occupant to easily adjust the temperature set point. The Wall Adjuster is available in a wired or wireless model. Wall Adjusters are easily integrated to BAS with a protocol-independent interface. Acutherm by Price's thermostats for Advantage and Interoperable series diffusers provide both room temperature and occupant adjustable room temperature set point.

\*There are several options for the Advantage, including LCD display, occupancy and CO<sub>2</sub> sensors.



**Acutherm Pressure Relief Collar and Relief Ring**  
**All Models**  
The Acutherm Pressure Relief Collar and Relief Ring are both inexpensive solutions when duct pressures are higher than desired. When the diffuser reduces the air flow into the room, these devices bypass the excess air into the plenum return system. Relief Rings are smaller than Relief Collars but are limited to 6, 8 and 10 in. inlets.

	Inlet sizes	Height
Relief ring	6/8/10 in. 150 / 200 / 250 mm	3 1/4 in. 121 mm
Pressure relief collar	6/8/10/12 in. 150 / 200 / 250 / 300 mm	8 in. 203 mm



**Ceiling Approaches**  
**All Models**  
Acutherm offers a variety of ceiling frames to suit most ceiling types. Diffusers installed in special ceilings should be installed such that obstacles are not below the plane of the diffuser casing extended. Breaking this plane risks breaking Coanda and could allow primary air to drop.



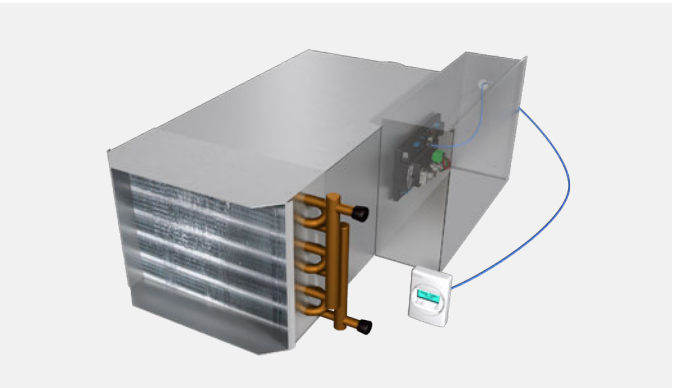
**Acu-Zone Electric Zone Heater**  
**Therma-Fuser Series** – AZON-I-E & AZON-II-E  
The Acu-Zone electric zone heaters use a patented airflow sensor and the most advanced modulating SCR (silicon controlled rectifier) proportional heat controller to vary the electrical power through the coil.

Electric heating units are available in round, square and rectangular sizes.

Control	SCR	SCR
Inlet/outlet diameter	Round, rectangular or square	
Heating	Up to 21 kW/sq. ft.	up to 226 kW/m <sup>2</sup>
Air volumes	Varies by size	
Power	Varies by size	



**Static Pressure Control**  
**All Models**  
The Acutherm Pressure Independence Module (PIM) helps VAV diffuser to operate quietly at both full flow and turndown conditions by providing pressure independence as either a modulating bypass or zone damper. It can be supplied with or without a damper, square/rectangular opposed blade or round damper with peripheral gasket. Tested to ASHRAE 130 and AHRI 880.



**Acu-Zone Hot Water Zone Heater**  
**Therma-Fuser Series** – AZON-II-W  
The Acu-Zone hot water zone heaters use a modulating PI (proportional/ integral) heat controller to vary the hot water through the coil and prevent excessive valve cycling.

Control	PID	PID
Valve <sup>1</sup>	PICCV or CCV	PICCV or CCV
Coil inlet diameter <sup>2</sup>	6/8/10/12/14/16 in.	150/200/250/300/350/400 mm
Coil heating <sup>2</sup>	5 1 to 111.6 MBH	17.4 to 380.9 kW
Coil air volumes <sup>2</sup>	200 to 3300 cfm	94 to 1557 l/s

<sup>1</sup>Optional pressure-independent, two-way or three-way valve

<sup>2</sup>Optional one- or two-row coil



## SYSTEM DESIGN

The Acutherm by Price VAV diffuser is a simple stand-alone or networked device that provides VAV control when supplied with air in a suitable range of temperature and pressure.

## Supply Air Temperature

When supplied with cool air, the VAV diffuser dampers modulate open on a rise in room temperature. When supplied with warm air, the dampers open on a room temperature drop.

Cool air should be a constant temperature not less than 50°F/10°C for standard models and warm air at a constant temperature of not more than 120°F/49°C. The constant discharge velocity of VAV diffusers at varying airflows provides good room circulation, which reduces stratification. Keeping heating supply air temperatures as low as possible will further reduce room air stratification to a negligible level.

Changeover from cooling to heating occurs as the supply air rises from 76°F/24.5°C to 80°F/26.5°C and change back from heating to cooling occurs when the supply air drops from 72°F/22°C to 68°F/20°C.

## Static Pressure

Noise level at any air diffuser is influenced by air velocity through the diffuser, which is, in turn, a function of static pressure in the neck of the diffuser. Noise level at a VAV diffuser will not increase as it closes if the static pressure in the neck is held constant. As static pressure in the neck increases, sound level increases.

Static pressure at the inlet of the VAV diffuser must be high enough (0.05 in.w.g. /12 Pa or more) to obtain the required air volume for room air induction. Static pressure above 0.25 in.w.g. / Pa may cause the sound level to become noticeable (NC35).

### Performance Requirements:

### Supply Air Temperature

- + Constant temperature. May be reset to another constant temperature.
- + Cooling between 50°F/10°C and 68°F/20°C.
- + Heating between 80°F/26.5°C and as low as possible but not to exceeding 120°F/49°C.

### Static Pressure

- ✚ High enough for required air volume. No lower than 0.05 in.w.g. / 12 Pa.
- ✚ Below rated static pressure for design sound level. No higher than 0.25 in.w.g. / 62 Pa suggested.

## Location

Because VAV diffusers control room temperature by sensing room air induced up the center of the space, care should be taken not to disturb room air induction and entrainment. For example, location next to walls or dropped lights results in the reflection of primary air back at the VAV diffuser. Relocate either the VAV diffuser or use directional blow baffles.

## Duct Design

The goal of a high-performance duct design is to design for lowest possible static pressure while providing ample air to each space. For example, if Therma-Fuser diffusers are to deliver nominal volume at inlet SP of 0.15 in.w.g. / 37 Pa, and if a maximum SP of 0.25 in.w.g. / 62 Pa is to be held for quiet operation, size the duct for a maximum pressure drop of 0.1 in.w.g. / 25 Pa between the first and last takeoff.

Manual balancing dampers should be used at the takeoff for each diffuser. Manual balancing dampers may not be required with ducts designed to Acutherm by Price specifications.



# SYSTEM DESIGN CHECKLIST

Note: This is a general checklist. For detailed recommendations about specific systems, visit [www.acutherm.com](http://www.acutherm.com).

JOB NAME \_\_\_\_\_

## 1. DIFFUSER SIZE AND LOCATION

- Air volume sufficient for rooms needs. Correct inlet sizing for available static pressure.
- All VAV diffusers within 2 ft. of wall equipped with three-way blow away from wall.
- Multiple VAV diffusers in same room – space no less than two times the 150 fpm / 0.76 m/s throw; use three-way blow if closer.

## 2. SUPPLY AIR TEMPERATURE –

Cooling minimum 50°F/10°C  
Heating maximum 120°F/49°C  
Changeover: To heating 80°F/26.5°C  
To cooling 68°F/20°C

### • Source of cooling:

☐ Chilled water AHU ☐ DX

### • Source of heating:

☐ AHU heat ☐ Gas ☐ Hot water ☐ Electric ☐ Steam  
☐ Duct heat  
☐ Heat pump

☐ Separate perimeter heat – ☐ Baseboard ☐ Radiant panels ☐ Separate duct

### • Portions of building in one master zone:

☐ One exterior *Note: Separate master zones are preferred for the interior and each exposure*  
☐ More than one exterior  
☐ Heat pump  
☐ Other \_\_\_\_\_

### • Source of cooling:

☐ Fan runs continuously

### • Location of thermostat (or BMS sensor) used to control the AHU water valves or DX compressor:

*Note: Do not use a return air thermostat (sensor)*

☐ System using some Therma-Fuser diffusers and some fixed opening

☐ Room thermostat or sensor located in room of highest heating and cooling load. Fixed opening diffuser used in this room.

☐ Complete System

Preferred approach – supply air control / room changeover

☐ Supply air temperature controlled by discharge air thermostats (sensors)

☐ Mode selected by changeover thermostat (sensor) in the room. Therma-Fuser diffuser with minimum flow stops in this room

# SYSTEM DESIGN CHECKLIST

Note: This is a general checklist. For detailed recommendations about specific systems, visit [www.acutherm.com](http://www.acutherm.com).

## 3. STATIC PRESSURE —

Inlet minimum 0.05 in.w.g. / 12 Pa or high enough for required air volume.  
Inlet minimum 0.05 in.w.g. / 62 Pa for NC 35 or less.

### • Control:

☐ Less than 30% turndown of system air – static pressure control usually not necessary.

☐ Over 30% turndown of system air.

Static pressure control with:

☐ Fan control

☐ Variable speed drive

☐ Other \_\_\_\_\_

☐ Zone control damper

☐ Bypass

☐ Damper

☐ R-rings: use only with ceiling plenum return

☐ Both fan and zone control

Acutherm PIM

☐ Static pressure sensor located two-thirds or three-quarters of the equivalent duct length between control and end of duct.

### • Duct Design:

Supply:

☐ Static pressure no higher than 0.25 in.w.g. / 62 Pa at the first takeoff downstream from the static pressure control.

☐ Sufficient static pressure at the last VAV diffuser to obtain the required airflow. Size last VAV diffusers larger to achieve required flow.

- Zone dampers are necessary where pressure losses in ducts are too high. Manual balancing dampers should be used at the takeoff for each diffuser. Manual balancing dampers may not be required with ducts designed to Acutherm specifications.

Return:

☐ Ceiling plenum

☐ Ducted

☐ Other

One return for each diffuser preferred.  
Minimum of one return per room.



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