

SUSTAINABLE SOLUTIONS For High-Performance Buildings

BEAMS | RADIANT | VAV DIFFUSERS | DISPLACEMENT | UNDERFLOOR



MEETING YOUR DESIGN REQUIREMENTS

High-performance air systems demand modern design approaches with leading-edge products and technology in order to optimize comfort, reduce energy consumption and ensure the long-term sustainability of a building.

COMFORT

Price high-performance solutions can prioritize thermal comfort in nearly any application. Our systems will meet occupants' comfort needs by reducing draft risk, improving room air movement, preventing dumping and/or creating individual zones of temperature control.



ENERGY SAVINGS

High-performance solutions allow for low-energy consumption. Our energy efficient systems have been proven to provide 10%-67% energy savings when compared to other more traditional HVAC systems.



SUSTAINABILITY

For long-term sustainability, Price's high-performance solutions have modular options that ensure no comfort zones are split when office walls are put up or moved. The modular concept and flexibility provided by these systems guarantees that any changes in the floor plan will not trigger expensive and disruptive changes.

SOLUTIONS FOR EVERY APPLICATION

The individual project requirements drive which is the best solution. The best solution may include more than one product in a hybrid system. We offer a variety of products, each with different features, that meet specific needs within your sustainable building.

HYDRONIC SYSTEMS

Ceiling beams with water coils that use natural convection or induction to move room air over the coil treating the sensible load of the space.

CHILLED BEAMS

- Higher discharge air temperatures

Ceiling panels or sails with a water coil that use thermal radiation to modify surface temperatures to treat the sensible load of the space.



RADIANT PANELS/SAILS

- Perimeter comfort in extreme climates

COMFORT	- Higner discharge all temperatures - Lower noise levels	 Perimeter comfort in extreme climates Lower air velocities minimizing draft risk
ENERGY SAVINGS	 Higher heat transfer capacity of water increases efficiency Reduced air-side requirement reduces fan energy 	 Higher heat transfer capacity of water increases efficiency Higher chilled water temperatures can increase water-side economizer use
SUSTAINABILITY	 Energy-dense water minimizes electricity and fossil fuel usage Less ductwork reduces floor-to-floor heights and cost of building materials 	 Minimized fan horsepower and energy consumption reduces operating carbon Low-profile design reduces interstitial space taken up by the heating/cooling system
OTHER SYSTEM HIGHLIGHTS	 LOW MAINTENANCE No moving parts and lessened ductwork reduces maintenance needs REDUCED SIZE Reduced ductwork and mechanical equipment creates a cleaner-looking ceiling 	LOW MAINTENANCE - No moving parts and lessened ductwork reduces maintenance needs REDUCED SIZE - Reduce ductwork, reduced mechanical equipment

FIND YOUR SOLUTION

MIXED AIR SYSTEMS

STRATIFIED AIR SYSTEMS

Ceiling diffusers with individual thermostats and built in VAV dampers providing comfort conditioning of the space.



VAV DIFFUSERS

- Small zones of individual temperature control

- Better room air mixing for even temperatures

- Small zones of control mean no over-heating or over-cooling

- Low-pressure systems reduce fan horsepower
- Exceptionally adaptable to office changes
- System has an unusually long working life

- Lower pressure drop results in smaller fan needs

UNDERFLOOR

- Supply air introduced at a higher

- Buoyancy and thermal plumes move

PRODUCTS

the air, reducing draft risk

temperature

Floor diffusers suppling low-velocity air that uses

buoyancy and thermal plumes to move the air

up through the breathing zone to condition the

space.

- Lower supply air temperature increases economizer use

- System modularity provides flexibility for future office changes

- Environmentally advanced system

- Only the occupied space is conditioned

DISPLACEMENT

- Higher discharge air temperatures

DIFFUSERS

- Low face velocity

- Lower noise levels

Ceiling or wall diffusers suppling low velocity air

that uses the buoyancy and thermal plumes to

move the air up through the breathing zone to

condition the space.

- Higher return air temperature increases chiller efficiency
- Environmentally advanced system optimizes air quality and building efficiency

LOW MAINTENANCE

- Long operating life with no recommended spare parts
- Extended warranties
- ADAPTABLE
- Modular system easily adapts to office layout changes
- **AIR QUALITY**
- Creates a stratified environment where particles in the air are moved up and out of the occupied space
- Provides increased air change effectiveness
- FLEXIBILITY
- As load distribution shifts, the system will compensate, driving air toward the loads
- Modular system easily adapts to office layout changes

AIR QUALITY

- Creates a stratified environment where particles in the air are moved up and out of the occupied space

ARCHITECTURAL

- Good for high-ceiling and highoccupancy spaces
- Seamless integration into walls and furniture



QUICK GUIDE TO ACTIVE AND PASSIVE CHILLED BEAMS

Chilled Beams use water to move energy through a building and service the building's sensible (dry) cooling load, relying on the air-side simply to meet ventilation and latent (wet) load requirements.

This drastically reduces primary air volumes supplied to a space and leads to energy savings, improved comfort levels, and ability to effectively integrate a dedicated outdoor air system (DOAS).

COMFORT

Chilled beams typically run at a higher discharge air temperature when compared to most other HVAC systems (with the exception of Stratified Air Systems). Chilled beams are also quieter to operate, and provide excellent air distribution, leading to better occupant comfort and increased productivity.

ENERGY SAVINGS

Water is a natural resource that uses the least amount of horsepower to deliver heating or cooling, therefore maximizing energy efficiency. Chilled beams can help transfer the majority of the sensible space load on to water coils, which can present many advantages over all air and When correctly applied, chilled beams can save 30% or more when compared to both all-air and VRF systems. The ability to customize the design to building and climate requirements helps optimize the system.

SUSTAINABILITY

Chilled beams use water to transport heating and/or cooling throughout a space. Water has 3,500 times the volumetric heat capacity of air and as a result is much more efficient at transporting energy throughout the building. This is especially important considering heating and electricity generation accounts for around 23% of all greenhouse gas emissions*. These systems can also be paired well with geothermal heat pumps and other sustainable equipment.

*Global Greenhouse Gas Emissions Data | US EPA

MINIMAL MAINTENANCE

Typical chilled beam designs are sensible cooling only which leads to minimal in-space maintenance in most applications. Hydronic components are interchangeable and parts are readily available.

REDUCED SIZE

Reduced ductwork and reduced mechanical equipment provides a cleaner ceiling look and reduces equipment costs.

SAFETY

On average chilled beams use 66-75% less CFC/HFC refrigerant than VRF. Refrigerant used is factory sealed and isolated from building occupants.

VERSATILITY

With chilled beams you can customize the design to suit most buildings and climates in order to achieve an efficiency goal. Through tying in all the building mechanical components you can salvage energy and redistribute it throughout the building.

COSTS

Lower upfront costs

The versatility of the system allows you to design for every budget. Initial costs can be controlled through the proper selection of components, the implementation of technology, a well engineered control strategy, and a competitive bid process.

Lower lifecycle cost

Hydronic systems are designed for the life of the building. These systems are easily upgradeable as new technology evolves providing true unmatched energy efficiency.

HOW IT WORKS

Active Beams

Passive Beams

across the coil.

increased capacity.

High velocity primary air induces room air across the coil.

induced air into the room. Provide heating and cooling.

Require a separate ventilation

no primary airflow is supplied.

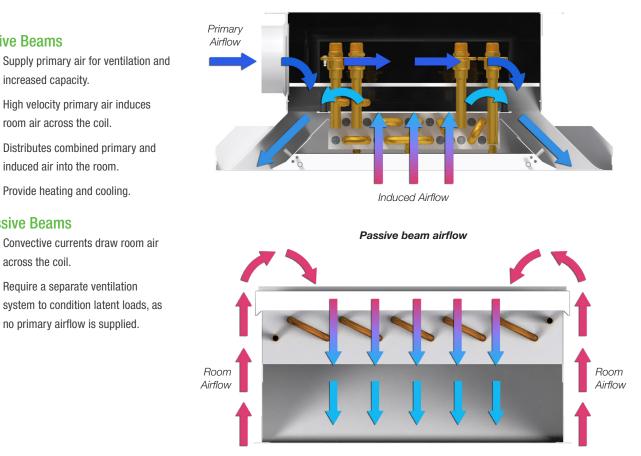
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Active beam airflow



QUICK GUIDE TO RADIANT HEATING AND COOLING

Radiant heating and cooling systems offer an energy-efficient alternative to all-air systems. In most cases, the supply air volume of the air handling system is limited in size to satisfy only the ventilation and latent loads, with the radiant system making up the balance of the heating and cooling loads.

COMFORT

Radiation conditions a space more comfortably than convection. Since radiant heating/cooling uses minimum primary air quantities, air velocities are lower in the occupied space, minimizing draft risk.

ENERGY SAVINGS

Using panels or sails to satisfy sensible room loads instead of all-air systems, greatly reduces the supply air volume required (typically by 60-80%). This leads to reduced fan power requirements and associated energy savings.

SUSTAINABILITY

Radiant ceiling panels use water to transport heating and/or cooling throughout a space. Water has 3,500 times the volumetric heat capacity of air and as a result is much more efficient at transporting energy throughout the building. This is especially important considering heating and electricity generation accounts for around 23% of all greenhouse gas emissions*. These systems can also be paired well with geothermal heat pumps and other sustainable equipment.

REDUCED MAINTENANCE

Due to the reduction in moving parts and mechanical equipment associated with radiant panels, these systems have lower maintenance costs than all-air systems.

*Global Greenhouse Gas Emissions Data | US EPA

IMPROVED AIR QUALITY

Radiant systems are typically partnered with dedicated outdoor air systems (DOAS) to deliver fresh outdoor air for ventilation purposes and avoid the recirculation of pollutants typical of allair systems.

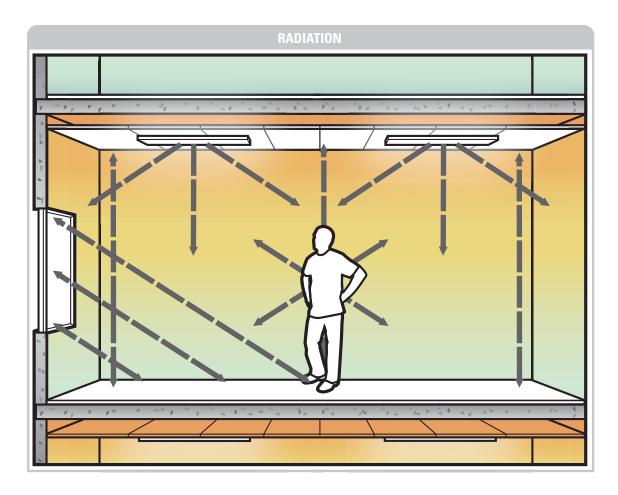
SMALLER FOOTPRINT

The reduced supply air volume of a hydronic system reduces ductwork requirements, resulting in the ability to reduce plenum heights. This allows radiant systems to be installed in tight spaces, and creates the potential for lower construction costs, higher ceilings, and more usable floor space. In addition, the air handling equipment is often downsized – saving cost and providing more flexibility in locating the equipment.

HOW IT WORKS

QUIET OPERATION

The reduction in air-side mechanical equipment inherent of a radiant systems results in less noise, and thus a quieter, more comfortable occupant experience. At water velocities below 4 fps, radiant panels and sails produce imperceptible noise levels.



Radiant panels add energy to or remove it from a room mainly using radiation with surfaces in the room, but also directly to occupants. To a lesser extent, the panels also heat or cool a room through convection of the room air as it is heated or cooled by the panel surface.



QUICK GUIDE TO VAV DIFFUSER SYSTEMS

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

COMFORT

Individual Thermostat Control

VAV diffusers are a cost-effective and practical way to provide 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.

ENERGY SAVINGS

VAV diffusers allow for low-pressure, low-energy consumption systems. These systems can be designed to provide up to 33% fan energy savings compared to traditional higher pressure systems. The energy savings can be broken down into three main sources:

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.

SUSTAINABILITY

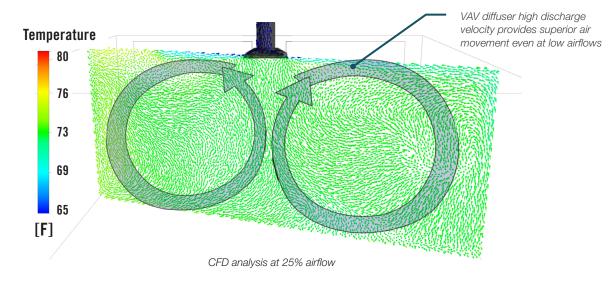
Sustainable buildings are designed to be environmentally responsible and resource efficient throughout their life cycle. For sustaining long-term usefulness, Price's VAV diffuser systems offer an unusually long working life and are exceptionally adaptable to office changes.

Low Maintenance

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.

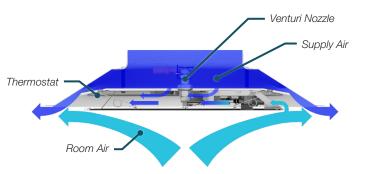
Adaptable Modular

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.



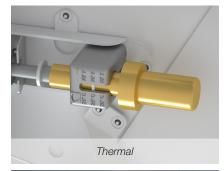
HOW IT WORKS

The built-in VAV damper is continuously adjusted to vary the volume of airflow into the room in response to room temperature and set point. Supply air temperature determines the diffuser's heat or cool mode. Separate room temperature set points are individually adjustable and average temperature is maintained within 1.5°F/0.9°C.



A continuous sample of room air is drawn around the plaque past the room thermostat(s) by feeding supply air through venturi nozzle(s), creating low-pressure at the thermostat to draw some room air around the plaque, over the thermostat(s) and out the other side.

Actuator Options







QUICK GUIDE TO DISPLACEMENT VENTILATION

Displacement Ventilation supplies air directly into the occupied portion of the space at low air speeds. The air rises as it comes in contact with occupants and carries particles and pollutants up into the non-occupied zone, where it is removed and filtered. It does all of this while being one of the most energy efficient and quiet methods of air ventilation on the market.

COMFORT

Displacement Ventilation supplies air at a low face velocity (typically 40 fpm) into the occupied zone and at a temperature around 10°F cooler than the set point. The increase in supply air temperature combined with the low velocity airflow results in superior thermal comfort.

ENERGY SAVINGS

Displacement systems present many opportunities for energy savings. The lower pressure drop asociated with displacement ventilation outlets and the corresponding selection of smaller fan components may allow for a reduction in fan energy. The supply air temperature is typically higher for displacement systems and can lead to free cooling from increased economizer hours. Combined with higher return air temperatures, the warmer supply temperature of displacement systems can cause an increase in chiller efficiency. Due to a high ventialtion effectiveness, the amount of outside air that must be conditioned can also be decreased. This is especially significant in humid climates, where dehumidification of outdoor air is a significant cost.

SUSTAINABILITY

Displacement Ventilation systems are environmentally advanced by taking advantage of naturally buoyant thermal plumes given off by occupants, lighting and equipment to drive air motion in an occupied space. Using these convective loads to stratify air rather than the momentum of air velocity at discharge results in improved air quality and overall building efficiency.

INDOOR AIR QUALITY

Because outside supply air is pooling at the floor level, personal thermal plumes draw air up the body. All of the warm and polluted air is extracted at the high return. When properly designed, there should alwasy be a greatrer amount of outside air in the breathing zone leading to higher ventilation efficiency.

The Environmental Protection Agency (EPA) suggests schools investigate using displacement ventilation:

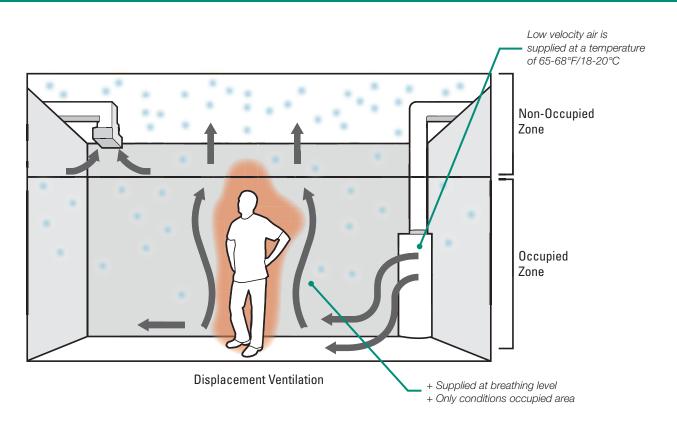
Designers should investigate a method called vertical displacement ventilation or thermal displacement ventilation. This approach successfully uses natural convection forces to reduce fan energy and carefully lift air contaminants up and away from the breathing zone.

REDUCED OUTDOOR AIR REQUIREMENT

The result of supplying the fresh air at low level and letting buoyancy drive the air through the space creates an improvement in air quality from a fully mixed system. ASHRAE recognizes this improvement and allows for a reduction in outside air required to condition a space.

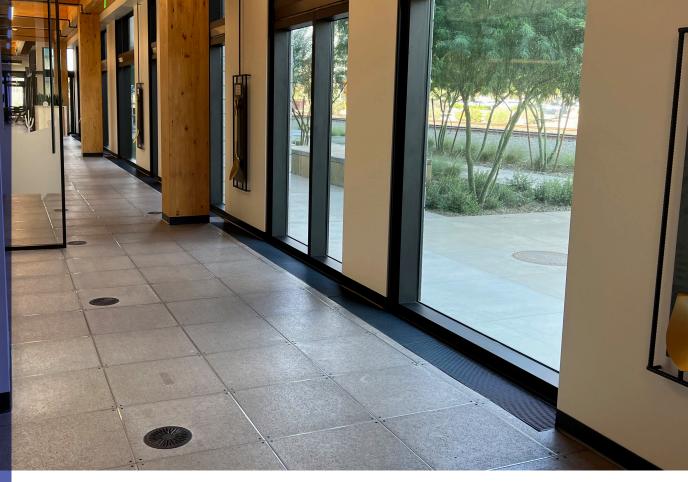
ARCHITECTURAL INTEGRATION

- + Can be integrated into structure and furniture elements to free up ceiling space.
- Available in various colors, sizes and custom finishes, seamlessly integrating into any space.
- + Special mounting options, inlet locations, and integrated utilities.
- Heavy-duty construction available for high traffic areas such as gyms, schools, and industrial settings.



HOW IT WORKS

UNDERFLOOR



QUICK GUIDE TO UNDERFLOOR AIR DISTRIBUTION

Underfloor Air Distribution (UFAD) is a system that typically delivers air from a pressurized air plenum beneath a raised access floor, relying on the natural buoyancy of air to remove heat and pollutants.

COMFORT

UFAD introduces supply air at a higher temperature than overhead systems, reducing the likelihood of a cold sensation.

In addition, local air supply can be controlled by the occupants, allowing the comfort conditions to be optimized.

ENERGY SAVINGS

By conditioning only the occupied zone (the first six feet of space in a room), UFAD reduces supply air requirements, and reduces chiller and primary fan capacity as a result.

SUSTAINABILITY

The modularity and flexibility of a UFAD system makes it ideal for providing sustained usefulness. In applications like modern office environments, where churn is common, a highly configurable HVAC system can also be a great cost savings.

INDOOR AIR QUALITY

UFAD systems offer improved ventilation effectiveness compared to overhead systems, as the supply air is delivered directly into the occupied zone, and particles naturally flow upwards into the return air system and out of the breathing area.

FLEXIBILITY

Diffusers installed in a raised floor can be reconfigured at a fraction of the time and cost of an overhead system.

FULL SYSTEM Interior Zone Applications

For most large open spaces with cubicles and open meeting areas, large interior zones may be thought of as having nearly uniform conditions. The whole zone has a relatively stable load during occupied hours and may be treated as such. Loads in the interior zone are predominantly composed of occupant, lighting, and equipment loads. These zones will be supplied air via a common main plenum. These zones typically only require cooling to maintain thermal comfort.

Perimeter Zone Applications

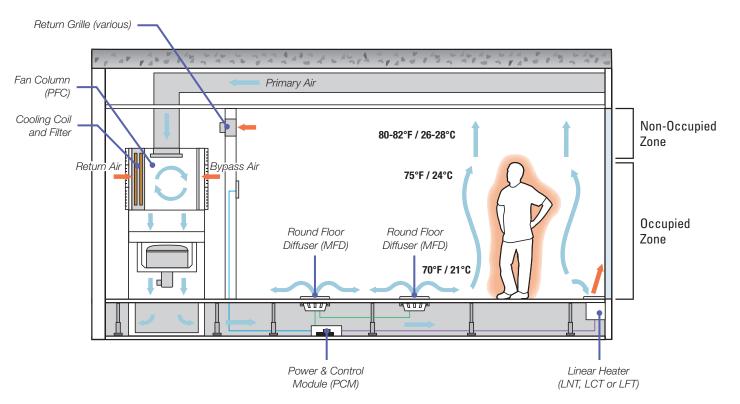
These zones are typically more complex than interior zones. Perimeter zones generally have larger and more varying loads and often require auxiliary heat. Using the proper system helps control heating and cooling requirements for the space. The following are the most common applications for conditioning perimeter zones.

Special Zone Applications

Conference rooms, meeting rooms and interior private offices can experience wide load swings due to intermittent occupancy or equipment operation. Interior zones with large swings in occupancy or equipment loads, or those that require smaller individual control zones, can also be thought of as special zones. There are several common options available to address these zones in order to maintain comfort levels in all areas.

Pressure Control

Office spaces are one of the more diversely loaded spaces which in underfloor applications can share a common pressurized plenum. Diffusers and grilles for UFAD are selected based on certain floor static pressures. This demands maintaining floor pressurization for proper comfort and system operation.



HOW IT WORKS

Typical UFAD system with vertical fan column and pressurized plenum

S OPTIONS



Price Controls work as part of a full system solution to provide superior air quality and performance.

They have been developed to the same exacting test standards as the other Price products which they are designed to complement.



APPLICATIONS

Price Controls has a product offering to support nearly any design. Rooftop unit controllers, thermostats, pressure control valves, smart controllers and the Disio Cloud Building Management System are just a few of the products that can support the efficiency of a sustainable HVAC system.

Whether a project is a new install, retrofit or tenant improvement, Price Controls can be applied to save time and increase endresult energy savings. This controller product offering can also offer the ability to monitor a building both locally and remotely for energy management with the Price HTML5 Web Server. Many controls are also pre-programmed for a specific application.

FEATURED PRODUCTS

Disio Cloud

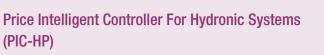
- + Two-step authentication
- + Comes with pre-loaded templates for Price controls
- + Access Web Server remotely or locally via smartphone or laptop
- + No software of license (USB key) required

Remote System Access

+ Access to the Disio Cloud via the Internet at disio.io/cloud or Disio app available in the App Store

Disio Display Thermostat

- + Capacitative touch
- + Sleek wedge design with anti-fingerprint glass
- + Universal inputs and outputs
- + Optional 3-wire BACnet MS/TP connection point



- + Includes BACnet networking as standard
- + Various sensor and thermostat options available



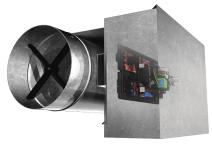
Power And Control Module (PCM)

- + Consolidated power and control enclosure for Underfloor applications
- + Equipped with an integral transformer for powering zone controllers, diffusers and terminals
- + Simple plug-and-play connections, with power and control being delivered via a single cable





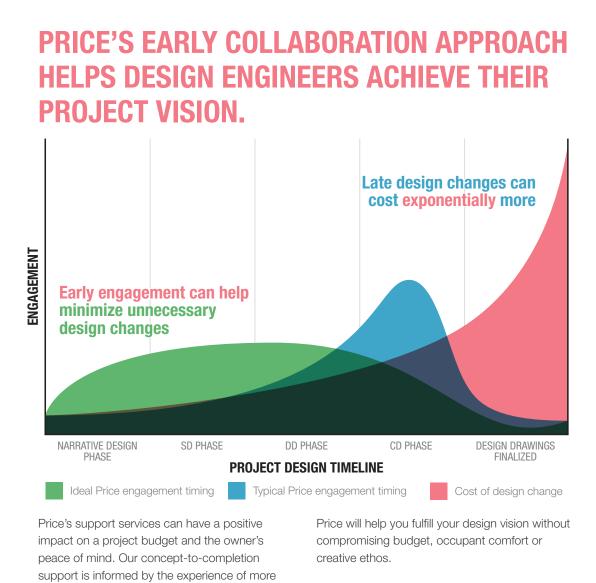


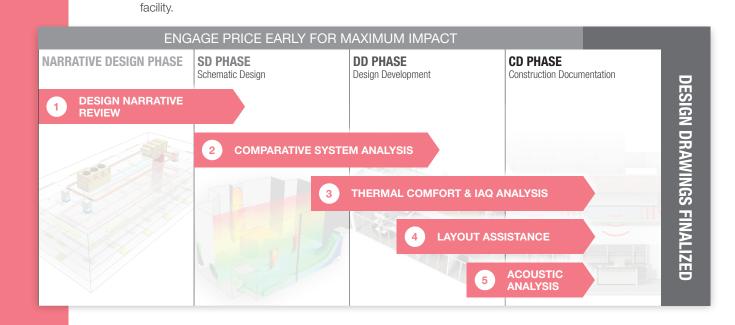


Duct Pressure Controller

- + The Price PCV is designed as a pressure control valve to regulate duct pressure in a VAV or VVT system.
- + The PCV uses a DDC controller to ensure that over or under pressurization of the duct will not occur.

SCDDDDD R





than 300 Price system engineers, the largest air distribution product offering in the market and a state-of-the-art HVAC research and testing

1. DESIGN NARRATIVE REVIEW

- + Building/campus cooling and heating strategy
- + High-level space goals: utilization, future feasibility

2. COMPARATIVE SYSTEM ANALYSIS

+ Compare system attributes: first cost, energy usage, installation, maintenance, thermal and acoustic performance review

3. THERMAL COMFORT & IAQ ANALYSIS

- + Zone-level system performance review
- + CFD analysis

4. LAYOUT ASSISTANCE

- + Zone-level layout and services review
- + Recommend typical zone solutions

5. ACOUSTIC ANALYSIS

- + Analysis from sound source to the receiver
- + Recommend mitigation strategy

EXAMPLE OF LAYOUT ASSISTANCE:

Traditional VAV terminal system compared to VAV diffuser system layout

CONSTRUCTION & BEYOND

Price offers an industry-leading start-up service, through which our trained Applications team will travel to the installation site and perform some or all the following valuable services:

- + Pre-construction meetings
- + Construction site walk-throughs
- + Installation examples
- + Factory start-up of Price equipment, including functional testing
- + On-site product review and troubleshooting
- + Training and education for owner, occupants, and maintenance personnel

Using Price's systems in conjunction with our on-site support service is a great way to ensure absolute confidence in your high-performance system.



HYDRONIC SYSTEMS



ACBC – Active Chilled Beam Cabinet



ACBR – Recessed Active Chilled Beam



ACBL – Linear Active Chilled Beam



ACBM – Modular Active Chilled Beam



LIU – Linear Induction Unit

PCBL - Linear Passive Chilled Beam



RIU – Retrofit Induction Unit



RPM – Modular Radiant Panel

MIXED AIR SYSTEMS



PLD – Prodigy Series Linear VAV Diffuser



PPD – Prodigy Series Square VAV Diffuser



PRD – Prodigy Series Round VAV Diffuser

MIXED AIR SYSTEMS



PSD – Prodigy Series Swirl VAV Diffuser



VBD – Varitherm Series Square VAV Diffuser with Blade Dampers



VKD – Varitherm Series Small Square VAV Diffuser



VLD – Varitherm Series Linear Slot VAV Diffuser



VPD – Varitherm Series Square

VAV Diffuser with Disc Dampers



VRD – Varitherm Series Round VAV Diffuser

STRATIFIED AIR SYSTEMS



DF1C – Rectangular 1-Way Corner Displacement Diffuser



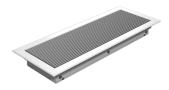
DF1L-HC – 1-Way Lay-In Diffuser with Heat-Cool Changeover



DFC – Displacement Flow Ceiling Diffuser



DFE – Exposed Displacement Diffuser



DFGL – Linear Displacement Floor Grille



DFR – Displacement Flow Recessed Diffuser

STRATIFIED AIR SYSTEMS



DFW – Displacement Flow In-Wall Diffuser



DFXi – Rectangular Industrial Displacement Diffuser



DGD – Underfloor Deflection Grille with Damper



DGU – Underfloor Deflection Grille





DLE – Displacement Linear Enclosure



DR360 – Full Round 360° Displacement Diffuser



DR180 – Half Round 180° Displacement Diffuser



DR90 - Quarter Round 90°

Displacement Diffuser



FDU – Underfloor Fan-Powered Booster and Terminal Unit



LFH – Linear Floor Heater



LCT – High-Capacity Heating/ Colling Terminal

LFG – Linear Floor Grille

STRATIFIED AIR SYSTEMS



LFP – Linear Floor Plenum



LFT – Linear Fan Terminal



LNT/LNT-LP - Linear Natural Convection Terminal



LPT – Linear Plenum Terminal with Damper



MFB – Modular Floor Boot



MFD – Modular Floor Diffuser



PFC – Price Fan Column



RFG – Roll-Up Floor Grille



RFM – Retrofit Floor Module

KEY CONTACTS

Bringing more than 100 years of combined experience, the team behind our innovative engineered products is committed to providing high-performance system solutions customized for any project requirements.

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