



Introduction

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

UFAD	Mixing Systems
63-65°F supply air	55°F supply air
Mixes the “occupied zone” only	Mixes the entire space
Stratified temperature and contaminant levels	Uniform temperature and contaminant levels



What is stratification?

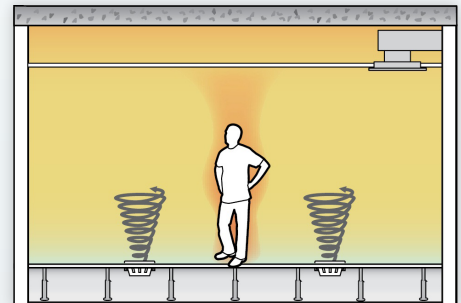
Stratification refers to a non-uniform temperature throughout a zone, with higher temperatures towards the ceiling and lower temperatures towards the floor. In a stratified room, return air is warmer and has a higher concentration of particles than supply air does.

What is the occupied zone?

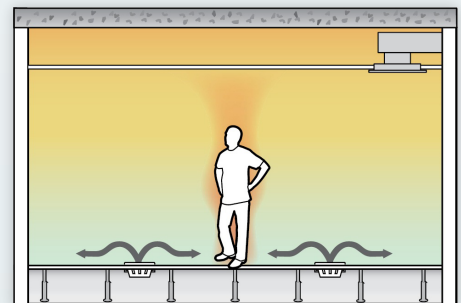
The occupied zone refers to the space in a room that begins one foot from all walls and extends from the floor to six feet above the floor. Mixing the occupied zone instead of the whole space can result in energy savings in spaces with high ceilings.

Price offers both turbulent flow (mixing) and displacement flow underfloor diffusers

Turbulent Flow



Displacement Flow



Displacement diffusers result in more pronounced stratification and lower velocity profiles in the room, often leading to improved indoor air quality and thermal comfort.

Advantages

Flexibility

Diffusers installed in a raised floor can be reconfigured at a fraction of the time and cost of an overhead system. Given the prevalence of churn in a modern office environment, a highly configurable HVAC system can be a great cost savings in these environments.

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.

Thermal 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

UFAD conditions only the first six feet of space in a room, reducing supply air requirements, and reducing chiller and primary fan capacity as a result.

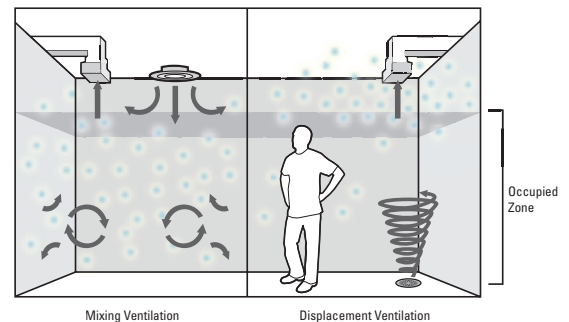
UFAD and LEED

UFAD systems can add LEED points to a building in the following categories.

- Energy & Atmosphere
- Indoor Environmental Quality



Reconfiguring UFAD systems is simple, as there are no adjustments necessary to ductwork and the tiles are easily accessible.



The concentration of air pollutants in the occupied zone (under six feet) is lower in UFAD systems compared to overhead systems due to room air stratification.



Flow can be adjusted directly at the diffuser, allowing for individual comfort control.

Applications



Office Buildings

Open plan offices are the most common applications of UFAD as they benefit the most from having a raised floor due to:

- Modular power, voice, and data
- Individual comfort control
- Reduced cost of churn

The International Facilities Management Association estimates the average cost of a move in a government setting is \$1,340; however, with a UFAD system, that figure could be reduced by more than half.

These cost savings, combined with the energy savings, and indoor air quality of UFAD make this technology a natural fit in office building applications.





Libraries

UFAD offers the flexibility to adapt the diffuser arrangement when library stacks are reconfigured, and presents great energy saving potential in areas with high ceilings. Additionally, the low noise levels generated by UFAD systems make them ideal for libraries.

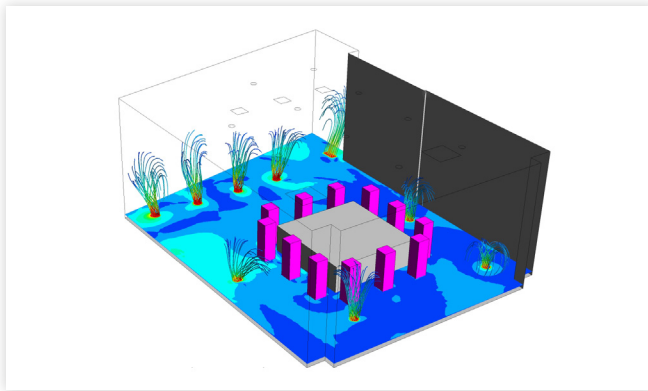
Casinos

Casinos are another applications to which UFAD is particularly suited. Similar to office buildings, churn is common in casinos as gaming equipment is subject to reconfiguration. The ability to quickly and cost-effectively reconfigure the HVAC system is of great benefit in these buildings.

In addition, some casinos allow patrons to smoke, producing an environment rife with pollutants in a completely mixed system. A UFAD system, however, stratifies room air, leading particles to collect at high levels outside the breathing area.

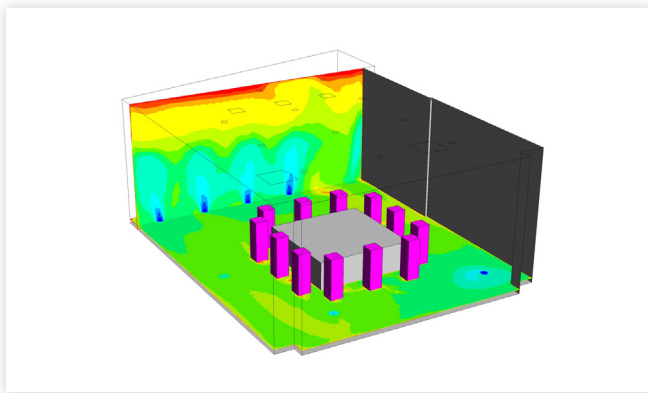


Resources and Support



Computational Fluid Dynamics (CFD) Modeling

CFD provides a means to validate design before construction and the confidence that the system will perform as intended in the field. Price's CFD team is amongst the most experienced and proficient in the industry, and we encourage designers to work with us to validate their UFAD designs.



PRCN: Price Research Center North

Price's state-of-the-art research laboratory, Price Research Center North, features the most advanced UFAD flow visualization chambers, testing facilities, and mock-up rooms in North America.

Flow visualizations and mock-ups allow designers to simulate field conditions and evaluate system performance – providing them with the confidence that their space will perform as expected in the field.

Ask about our mock-up services on your next job, or better yet, visit PRCN yourself and tour our facilities.





Applications Support

Price is a service oriented company and has a dedicated UFAD applications team devoted to answering your questions quickly, completely, and correctly. We are here to help – our applications team regularly provides support on:

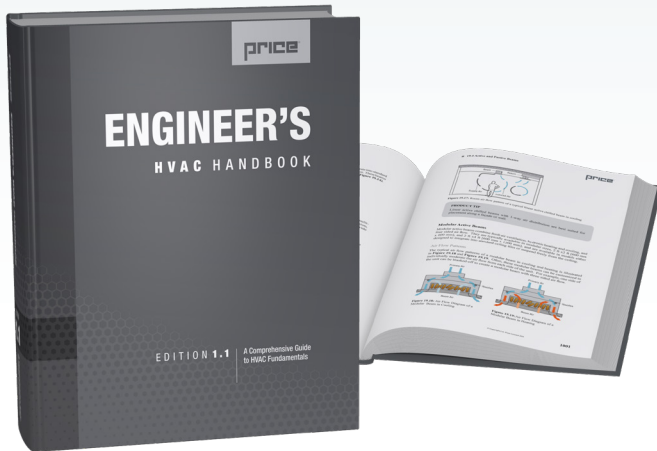
- Model Selection
- Layout Assistance
- Calculation Assistance
- On-site Training
- On-site Performance Validation

Price Training Programs and Webinars

The Price Training Programs (PTP) provides Consulting and Design Engineers with the training needed to specify and select air distribution equipment to best meet their design criteria. The UFAD course covers everything you need to know about displacement products, including:

- Introduction to UFAD
- Theory behind UFAD
- UFAD Products Available
- Design Considerations
- Control Zones

Our webinars are another excellent way to learn about specific topics while gaining professional development hours. Visit priceindustries.com to register today!



Price Engineer's HVAC Handbook

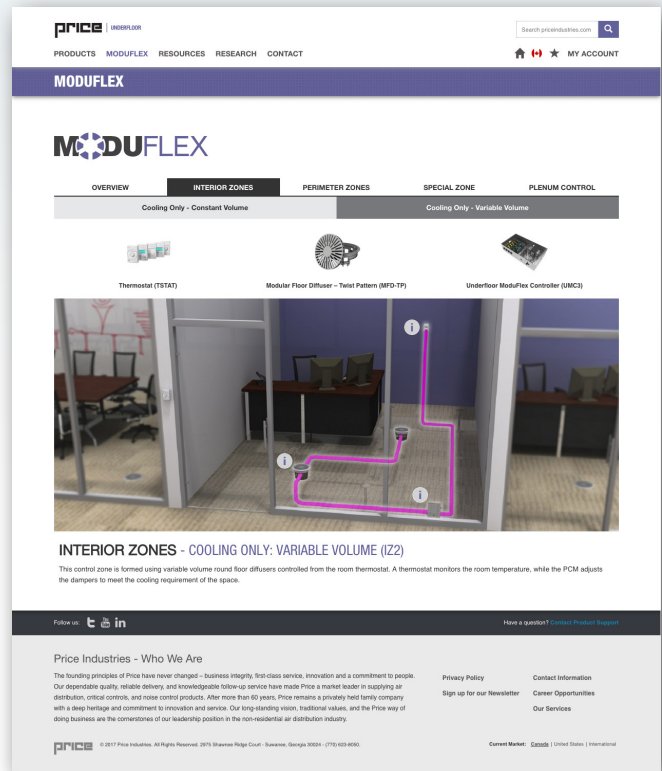
The Most Comprehensive Guide to HVAC Fundamentals

The Price Engineer's HVAC Handbook is a compilation of the engineering knowledge related to the application of air distribution and noise control products and approaches gained at Price over the past 60 years.

Within the handbook, chapters on UFAD and its applications feature liberal use of examples and graphics to help illustrate and explain concepts and systems.

Chapter 17: Underfloor Air Distribution

Contact your local Price sales representative to reserve your copy, or view the digital copy on our website today!



Underfloor Microsite

The Price Underfloor microsite is the ultimate online resource for those looking to learn more about sustainable HVAC technologies like displacement ventilation.

The site features:

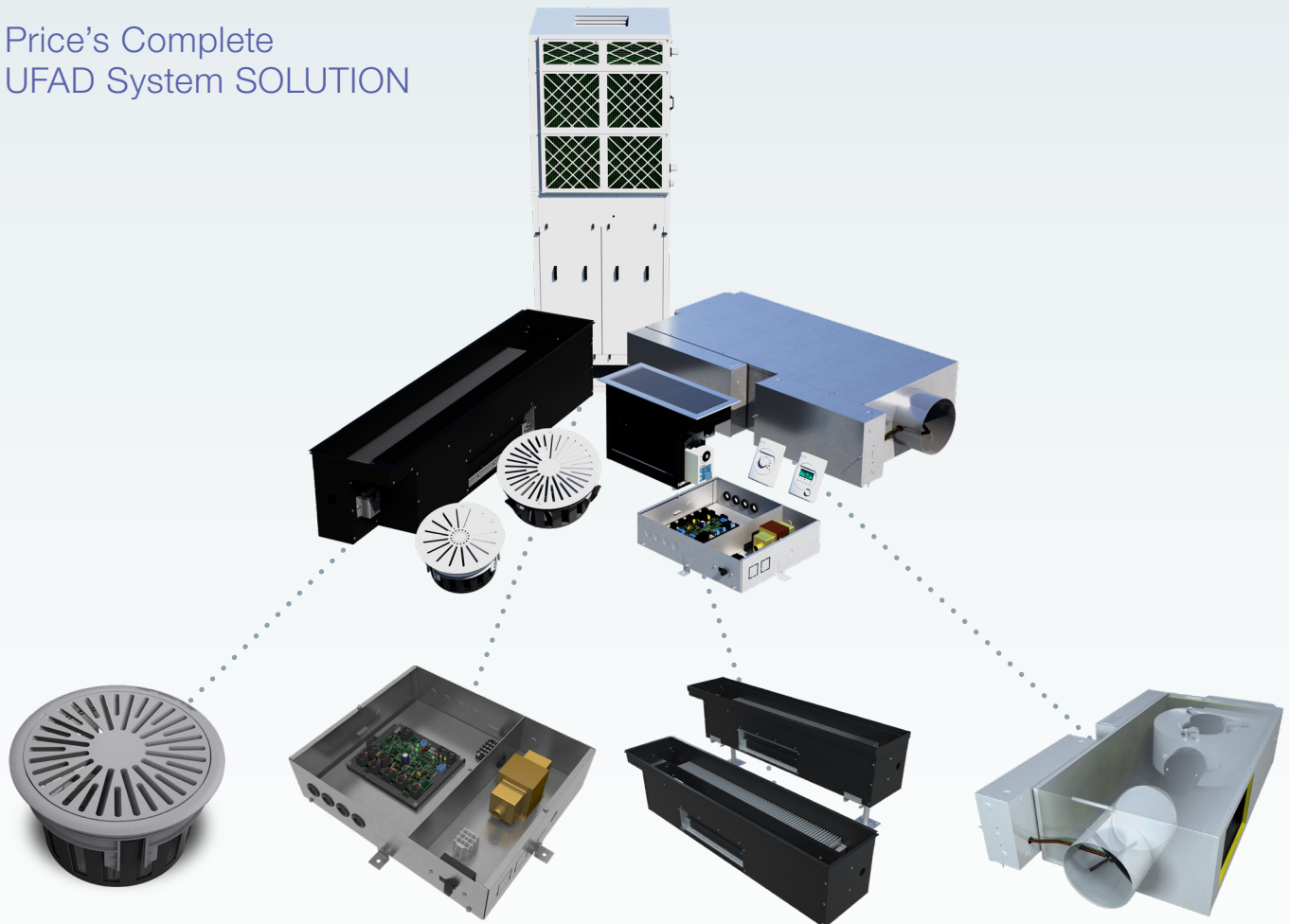
- Product Information
- Research Papers
- Case Studies
- Training Modules
- Smoke Test Videos
- Product Videos

Visit priceindustries.com today!

Complete UFAD Systems

Price offers the most diverse and customizable product suite in the UFAD market, from grilles and diffusers to terminals and controls, as well as a variety of accessories.

Price's Complete UFAD System SOLUTION



Round Floor Diffusers

Round floor diffusers are most commonly used in building interiors. Available in both aluminum and plastic.

Power and Control Module

Price's BACnet compliant controllers complete the system and thermostats.

Linear Plenum Terminals

Floor plenums are an excellent way of providing perimeter heating and cooling.

Underfloor Terminals

Price terminals offer a variety of air control options.

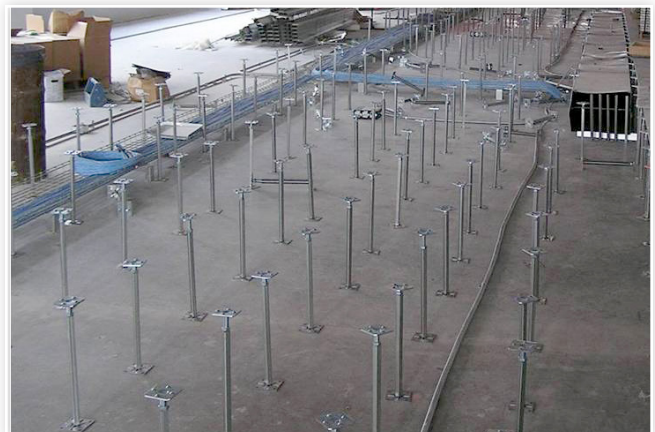
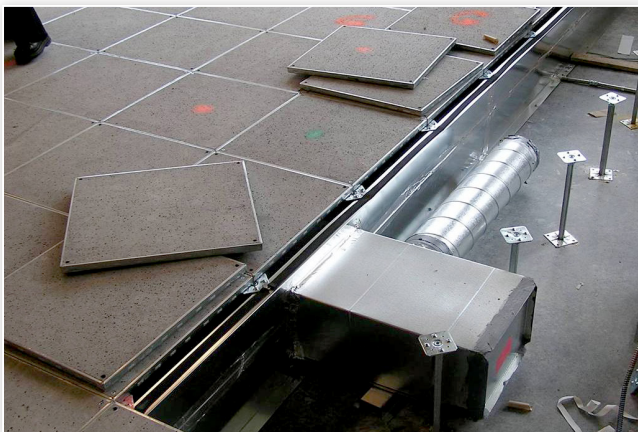


Price Commissioning Service

Price offers an industry-leading **commissioning** 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
- Controls integration assistance
- Commissioning of all Price UFAD equipment, including functional testing.
- On-site product review and troubleshooting
- Training and education for owner, occupants, and maintenance personnel.

Using Price's complete UFAD systems in conjunction with our commissioning service is a great way to **ensure absolute confidence in your Price UFAD system.**



Product List

Round Floor Diffusers



MFD-DP
Displacement Flow

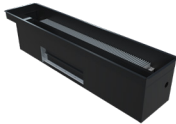


MFD-TP
Twist Flow

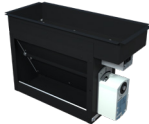
Linear Floor Grilles



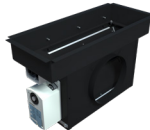
LNT
Integrated Heater
for Recirculation



LNT-VAV
Integrated Heater
for Recirculation
and Plenum
Damper



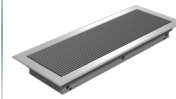
LPT-VC
Variable Volume
Plenum Damper



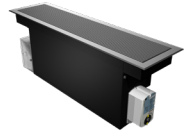
LPT-HC
Heating and
Cooling Inlets



LFT
Linear Plenum
with Integral Fan

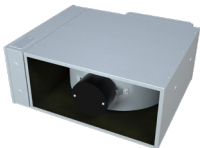


DFGL
Displacement
Flow Floor Grille



LFGH
Integrated Heat

Underfloor Terminals Underfloor Controls



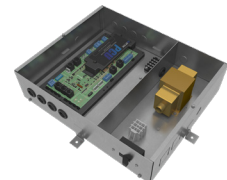
FDU
Fan Terminal
Booster Unit



PCM-UMC3
Power and Control Module
with UMC3 board



UMCB
Underfloor Modulating
Controller Box for Terminals



PCM-PCU
Power and Control Module with
PCU board for pressure control

Accessories

Mounting Systems

- Press Fit Gasket
- Zip Clip

Diffuser Baskets

- Short and standard
- Damper and no damper

Round Floor Boot Plenums

- Used with round floor diffusers for a ducted connection rather than pressurized plenum

Custom Systems

Don't see what you're looking for? Give us a call and we'll design a system to fit your specifications.

priceindustries.com

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