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 contaminants.

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

<table>
<thead>
<tr>
<th>UFAD</th>
<th>Mixing Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>63-65°F supply air</td>
<td>55°F supply air</td>
</tr>
<tr>
<td>Mixes the “occupied zone” only</td>
<td>Mixes the entire space</td>
</tr>
<tr>
<td>Stratified temperature and contaminant levels</td>
<td>Uniform temperature and contaminant levels</td>
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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 level of contaminants 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.

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 contaminants 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
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 contaminants in a completely mixed system. A UFAD system, however, stratifies room air, leading contaminants 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.

Price Sustainable Building Website

The Price Sustainable Building Website 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.

Price Integrated Controls
Price’s BACnet compliant controllers complete the system and thermostats.

Linear Floor Grilles
Floor Grilles 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

- **RFDD/ARFDD**
  - Displacement Flow

- **RFTD/ARFTD**
  - Turbulent Flow

- **RFID/ARFID**
  - Inclined Flow

Linear Floor Grilles

- **LFGH-RC**
  - Integrated Heater for Recirculation

- **LFGH-RCV**
  - Integrated Heater for Recirculation and Plenum Damper

- **LFG-VC**
  - Variable Volume Plenum Damper

- **LFG-HC**
  - Heating and Cooling Inlets

- **LFG-F**
  - Fan Terminal Duct Connection

- **DFLG**
  - Displacement Flow Floor Grille

- **LFG-H**
  - Integrated Heat

Underfloor Terminals

- **FDBU**
  - Fan Terminal Booster Unit

- **UMC1/3**
  - Underfloor Modulating Controller 3

- **UMCB**
  - Underfloor Modulating Controller Box for Terminals

- **PCU/RPN**
  - Pressure Controller and Sensor

Underfloor Controls

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.
Product Improvement is a continuing endeavour at Price. Therefore, specifications are subject to change without notice. Consult your Price Sales Representative for current specifications or more detailed information. Not all products may be available in all geographic areas. All goods described in this brochure are warranted as described in the Limited Warranty shown at priceindustries.com. The complete Price product catalog can be viewed online at priceindustries.com.