



# Getting a Handle On

**D**uring the construction phase of an under-floor air-distribution system (UFAD), contractors must be aware that the floor slab, ceiling, walls and column enclosures are the structure of the supply and return airways, and they must preserve the integrity of the airways. This means informing all trades of their responsibility with respect to sealing the airways.

To ensure the proper installation and operation of the underfloor system, here is a typical sequence of interior construction that takes place only after final design-lay-out drawings have been issued:

- Install and finish all fire-rated demising walls.
- Install ceilings and ceiling systems.
- Complete the floor slabs, seal them as dictated by building codes and project specifications, and check that they are level.
- Mark the raised-access floor (RAF) pedestal-sup-

# UFAD

port-grid layout on the floor slab, being certain the grid lines match up with the main supply and branch ductwork.

- Install and prepare all fan-powered units, diffusers and any associated ductwork before the RAF is installed.

- Install pressure-control dampers and fire/smoke/control-zone dampers (FSDs), fan-terminal ductwork and branch ductwork while the RAF is being installed to assure proper room for the ductwork.

- Clean and vacuum the slab before cabling is installed. A clean airway prevents dust from being blown throughout the space during startup.

- Install all wiring systems on the slab and coordinate the systems with the floor-pedestal marks.

- Set up a workstation to install the UFAD terminals in the RAF panels, expediting the installation of floor pedestals, panels and power-voice-data (PVD) boxes. Overlay the wiring (preferably plug-and-play cabling) on the UFAD drawings. Unique tag numbers are often unnecessary for the UFAD drawings because there are typically only a few types of diffusers and fan terminals used.

- Install the RAF pedestals and panels, including those with UFAD terminals and PVD boxes. It is recommended that diffusers or control items not be installed along known partition lines or under furniture. Install diffusers in the correct orientation on floor panels and RAF panels to assure airflow patterns match the drawings.

- In larger floorplates, when the diffusers are located within 15 feet of the supply duct, try to install the diffusers with the inlet facing away (if possible because some diffusers have inlets on all sides and do not allow this) from the air supply to avoid a velocity effect from the ductwork.

- Orient directional grilles to provide the desired airflow pattern.



**For a successful UFAD installation, all trades must know their role and a typical sequence must be followed.**

At the perimeter, airflow should be directed along and/or away from the exterior walls, while grilles in the interior should create an outwards circular pattern.

- Construct partition walls on the top of the RAF, covering the floor and any openings or air-distribution terminals to keep construction debris from entering the floor airway.

- Apply finishes to the walls.
- Remove the covering from the RAF and vacuum.
- Lay carpet on the RAF panels.
- Install furniture.
- Ensure all plug-and-play cable connections are properly connected



# Construction <sup>Part 2</sup>

**The second of a two-part article recommends the best practices in the construction and commissioning phases to ensure a successful underfloor air-distribution system (UFAD)**

**BY JACK GEORTNER**

and engaged in mating connectors. (This can be accomplished earlier, when the RAF is installed, depending on the sequence of the trades.)

- ▶ Vacuum all construction debris in the diffusers. (This is not necessary if diffuser protective sheets were utilized earlier.)

- ▶ Commission the mechanical systems.

### Commissioning phase

Following the construction phase, it is time to commission the UFAD system, including an airway-leakage test and an airflow test. Begin by testing each primary supply fan to check for minimum airflow with all diffusers closed or at the minimum stop.

If uncontrolled leakage (leakage not coming through the diffusers and not what is expected through the floor) is too high, you need to find and correct the leakage. You also must retest the primary supply fan. Repeat the leakage test every few years or after any remodeling that includes reconfiguring the UFAD system.

An airflow/static pressure (SP) test determines that the system can provide adequate air to all diffusers. Typically, test one diffuser per zone and verify that the zone controllers are functioning properly (based on the predefined sequence of operation). Balancing the diffusers is necessary only on ducted diffusers (often used along the perimeter).

After commissioning, building owners and occupants assume responsibility for the optimal operation of the UFAD system. The owner or facility manager should secure a complete set of as-built drawings, establishing the grid system and locating all UFAD components and controls. It is recommended that you revise the grid system whenever changes are made to the system.

It also is important for the owner to train maintenance people to operate the UFAD system. Begin by pro-

viding them with applicable service manuals that explain the operation and maintenance of the system, and reviewing the manuals with them.

Pay special attention to the impact of room-temperature stratification on comfort and control, as well as the control functions to reset the relative humidity, supply-air temperature and floor SP, as needed. If applicable, explain any control options, such as providing a pocket digital assistant as a maintenance tool.

Finally, it is important to inform the building occupants about the UFAD system. You should stress the importance of periodic vacuuming of the underfloor airway as well as cleanup from spills. In addition explain the benefits of the system, including comfort, improved IAQ, flexibility and energy efficiency.

Furthermore point out the location of the diffusers and the availability of individual diffusers to meet special needs. Identify the location of thermostats and sensors for individual work areas or zones, their functions and how to use them. Finally, provide contact information to register comfort complaints.

Buildings with UFAD may require more thought during the design phase, especially when designers are working on their first building with UFAD. However, if you carefully follow best practices and the proper coordination occurs on the UFAD job, then the process can be smoother.

This will shorten the construction cycle, ensuring a successful commissioning process and, ultimately, securing the advantages in system flexibility, IAQ and energy efficiency that are contributing to the growth of UFAD. ♦

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