Frequently Asked Questions

Access Floors

Q. How should an appropriate panel grade be selected for a project?

A. Panel grades are typically selected based on three loading criteria: concentrated, ultimate and rolling load capacity. Concentrated and rolling load ratings for panels are based on tolerable deflection and permanent deformation allowances under design loads. Ultimate load capacities are based on tolerable safety factors. The task for the project specifier is to match expected floor loads with floor capacity. For an explanation of how to translate panel load ratings into actual floor capacity numbers for concentrated and rolling loads, see Section 3 of the Best Practices Design Manual, Access Floors.

Q. How do you translate a panel's rolling load rating into rolling load capacity of the floor?

A. A panel's rolling load rating represents its capacity to support one loaded wheel crossing it at a time. To translate the rating into actual floor capacity, you need to map the wheel spacing of your moving device. If the device has four wheels spaced more than 24 inches apart, then the load will be distributed to four separate panels. If this is the case, and the load is evenly distributed, then the floor's capacity *for that device (with payload)* is four times the panel rolling load rating. For example, ConCore® 1000 panels, rated at 600 lbs., will provide a floor with a maximum rolling load capacity of 2400 lbs. – for moving devices with wheels spaced more than 24 inches apart. In another case, if a four-wheel device is *less than* 24 inches wide (but has front-to-back wheel spacing more than 24 inches), then the capacity for that device on a ConCore® 1000 floor is 1200 lbs. This is because the front and back sets of wheels have the ability to traverse a single panel at a time – thereby loading a panel with 600 lbs. – the panel's rated capacity.

Q. What is the amount of vertical clearance beneath the access floor?

A. The vertical clearance is simply determined by subtracting from the access floor height the *depth of the access floor panel*. The panels are 1-3/8 inches deep (regardless of panel grade – the thickness of heavier steels used in stronger panels is inconsequential). In a stringer system, the bottom of the stringer will be even with the bottom of the panel and therefore will not reduce the clearance. When laminated panels are used, the thickness of the covering must also be subtracted from the access floor height.

Q. What type of covering should be specified for the purpose of static control in a computer room or data center?

A. Standard high pressure laminate (HPL) typically provides the necessary static protection for computer rooms and data centers. HPL is classified as an anti-static covering, meaning that it has low static generation. Where static discharge is a concern, the static control requirement is usually specified numerically, with the following wording: electrical resistance of floor covering shall fall within the electrical resistance range of 150,000 ohms (1.5×10^5) to 20 billion ohms (2×10^{10}). The Nevamar and Formica HPL tiles offered by Tate, which have a minimum resistance of *one million* ohms (10^6), fall within this range. Anti-static HPL is occasionally specified by dictating compliance with a standard known as the *IBM Resistivity Range* – which established the resistance range of 150,000 to 20 billion ohms. The standard was designed to protect individuals from low voltage electrical shocks that might occur when working with electronic equipment on an access floor – while allowing a sufficient discharge rate to prevent hazardous build-up of static electricity.

Q. What are the issues to consider when selecting a low floor height system?

A. There are several considerations in access floor options in the 2.5 to 4-inch finished floor height range:

- Will the cross-sectional space between support pedestals provide adequate room for cables and power distribution boxes?
  – The space between the pedestals must provide adequate space for cabling. A system with pedestals 24 inches on center provides a 23-inch-wide wireway path. This should alleviate concerns over inadequate cable space.
  – A system with pedestals 24 inches on center allows power distribution boxes and service modules to be placed without having to cut away closely spaced pedestal supports that may be in the way. Missing pedestal supports will leave weak spots in the floor.
- Are the pedestals height-adjustable?
  Pedestals should be height-adjustable to avoid 'spongy' floor areas where fixed pedestals do not quite rest on low spots in the subfloor. High spots in a slab may require the removal of fixed support pedestals -- decreasing panel performance.
- How many panel strengths are available?
  There should be more than one panel grade available to accommodate different floor loading conditions. Steel wrapped fiberboard panels that come in only one grade may not adequately support heavy equipment and rolling loads.
- What is the panel's ultimate load capacity?
  A floor panel system with a low ultimate load safety factor (less than 1.5) will require more frequent panel replacements due to damage from unusually heavy loads. Even if a panel with a low safety factor does

not actually reach its point of failure when overloaded, it may be damaged enough to require replacement.

- Will a floor system that is designed to conform to the contours of a concrete slab be a suitable platform for modular furniture and partitions?
An adjustable height pedestal system can accommodate uneven or sloping subfloors and be laser-leveled to within 1/8 of an inch.

- Will cut panels comply with fire codes when the core materials are exposed? Cement-filled panels are fully non-combustible even when the core materials are exposed. Panels containing combustible materials may require the attachment of separate enclosure pieces where they have been cut.

- Is there a panel to pedestal engagement feature that reliably positions the panels and keeps them in place without the aid of fasteners?
A self-positioning and panel retention feature makes panel installation simpler for users and allows panels to be permanently installed without screws.

Q. How is the fire-resistance of an access floor system assessed?

A. The fire resistance of an access floor system is assessed by results obtained when it is tested in accordance with the ASTM E-84 test method, which is often used to satisfy building code requirements of interior ceiling, wall and floor materials. This test is often referred to as the Flame Spread and Smoke Development test. ASTM E-84 is only the test method – it does not set requirements for materials. The most widely accepted classification system, *NFPA Life Safety Code 101*, classifies materials with respect to Flame Spread and Smoke Developed, as shown below.
The flame spread classification is based on the premise that the higher the number, the greater the hazard. Access floor systems are required to fall within Class A.

- Class A Interior Wall & Ceiling Finish Flame Spread – 0 - 25
Smoke Developed – 0 - 450

- Class B Interior Wall & Ceiling Finish Flame Spread – 26 - 75
Smoke Developed – 0 - 450

- Class C Interior Wall & Ceiling Finish Flame Spread – 6 - 200
Smoke Developed – 0 - 450

Tate's systems receive *Class A* ratings based on the following results:

- Bare ConCore® panels on bolted stringer understructure
Flame Spread Index: 5
Smoke Developed Value: 4

- ConCore® panels laminated with high pressure laminate tile
Flame Spread Index: 0
Smoke Developed Value: 10

When writing a performance specification for an access floor system, the fire-resistance requirement can be written as follows:
Flame Spread and Smoke Development values for access floor test sample shall fall into NFPA 101 Class A Interior Wall & Ceiling Finish Category when tested for flammability in accordance with procedures outlined in ASTM E-84-1998. Flame Spread value shall fall within 0-25, Smoke Developed value shall fall within 0-450.
Note: The ASTM E-84 method can be substituted for similar test methods with the following designations: UL No. 723; NFPA No. 255; UBC No. 8-1.

Q. Are sprinkler systems ever required beneath an access floor?

A. This question is answered by NFPA Publication 13, *Standard for the Installation of Sprinkler Systems, 1983*. It states: "sprinklers shall be installed in all concealed spaces enclosed wholly or partially by *exposed* combustible construction, as in walls, floors and ceilings…" Tate's access floor components are noncombustible and therefore do not generate the need for sprinkler systems. So long as other construction materials exposed to the concealed space are noncombustible there is no requirement for sprinklers beneath the access floor. Where other combustible materials will be exposed to the enclosed space, NFPA does allow sprinklers to be omitted under certain conditions. These conditions are identified in Publication 13.

Q. How are access floors designed to meet seismic requirements in regions subject to risk of earthquakes?

A. Access floor pedestals come in various design strengths; stringers are available to increase the lateral load capacity of systems. Where seismic risk exists, an access floor will be designed to meet seismic requirements by selecting a specific understructure system that will withstand the potential seismic forces of the region. The potential seismic forces of a region are typically calculated in accordance with the provisions of either the 1997 Uniform Building Code (UBC) or the BOCA National Building Code. An understructure system's ability to withstand lateral loading can be determined two ways: by conducting pedestal overturning moment tests in a lab environment – or by structural calculations performed by a Professional Engineer. The 1997 UBC guideline is predominately used in the west and considers such factors as soil type and the building level where the access floor will be located. In seismic zone 4, the proximity of the building to fault lines is also considered. Other factors to consider in any analysis are access floor height, average floor live loads and building usage. The BOCA guideline has historically been used in the northeast. Tate can provide understructure *recommendations* in accordance with either code. The project architect typically specifies the code to use to calculate the potential seismic loads and the seismic zone the building is designed for. Tate will conduct a *seismic* *analysis* based on the specified parameters and then compare the calculated seismic load with the test-proven ability of a specific understructure system to resist lateral loading. Our recommendation will indicate whether stringers should be used, which pedestal type should be used and whether adhesive or mechanical anchors should be used for subfloor attachment.

Understructure recommendations can be obtained by contacting Tate's Technical Services department. The following jobsite information is required to conduct a seismic analysis:

For UBC and BOCA analysis:

- Access floor finished floor height.
- Live load (50 lbs., 100 lbs., other)

For UBC analysis (refer to 1997 UBC Volume 2):

- Seismic zone for which building is designed.
- Type of occupancy (standard or essential/hazardous)
- Access floor building level and total number of levels in the building.
- Soil type.
- Seismic zone 4: If applicable, indicate the building's distance from the following fault types:
  – Type A fault within 10 km
  – Type B fault within 5 km

For BOCA analysis (refer to BOCA National Building Code/ 1999):

- Effective peak velocity-related acceleration
- Performance criteria factor

Q. Will any of Tate' s access floor components contaminate the environment with electrically conductive zinc crystals, commonly known as 'zinc needles' or 'zinc whiskers' ?

A. No, only steels that have a zinc-electroplated coating have the potential to grow zinc whiskers. Tate's panels and understructure components are not zinc electroplated. The panels are protected by an electrically deposited coating of epoxy paint. Our understructure components have a *hot dipped* galvanized coating – which is not associated with zinc whisker contamination.

Q. What is the sound isolation rating for the access floor?

A. An access floor system receives a single-number rating called *normalized noise isolation class* (NNIC) that represents the sound isolation between two enclosed spaces (in this case the enclosed spaces are on top of an access floor). The more familiar *sound transmission class* (STC) is a single-number rating that represents the isolation of airborne sound provided by a barrier. Both ratings are derived from the ASTM E413 test method, *Standard Classification for Rating Sound Insulation*. Consequently, the NNIC rating is nearly identical to the STC rating and can be used as a basis for comparison. Based on lab tests conducted at the Geiger & Hamme Acoustical Laboratories, The ConCore®/ PosiLock™ system, when covered with 18-inch carpet tiles, achieved a NNIC rating of 53 when tested per ASTM Designation E413-73. A copy of this test report is available by contacting Tate's Technical Hotline at 1-800-231-7788.

Q. What are the standard covering options for factory–laminated panels?

A. There are several standard coverings that have been used with access floors for over two decades, and comprise the majority of factory laminations today.

High Pressure Laminate (HPL)

- Used in: Computer rooms, data centers, switch rooms, equipment rooms, file storage areas, corridors, high load/high traffic areas, light manufacturing, cafeterias.
- Attributes: low static generation and retention, high-durability, long-wearing, requires no sealing, waxing or mechanical buffing.
- Electrical resistance: 1,000,000 ohms to 20,000 megaohms (1.0×10^6 to 2.0×10^{10} ohms)
- Composition: Specially formulated surface sheet over a melamine impregnated print pattern sheet. Several core layers of phenolic resin-impregnated kraft paper.
- Brands: Nevamar (www.nevamar.com); Formica (www.formica.com)

Conductive High Pressure Laminate

- Used in: Ultra sensitive environments such as electronics manufacturing and assembly factories, clean rooms, healthcare facilities.
- Attributes: Same as standard HPL except allows rapid bleed down of static electricity charges.
- Electrical resistance: 25,000 to 1 million ohms (2.5×10^4 to 1.0×10^6)
- Composition: Same as standard HPL except that it utilizes conductive paper backing.
- Brands: Nevamar (www.nevamar.com)

Conductive Vinyl Tile and Static Dissipative Vinyl Tile

- Used in: Ultra sensitive environments such as electronics manufacturing and assembly factories, clean rooms, chemical and electronic labs, healthcare facilities.
- Attributes: Allows rapid bleed down of static electricity charges, provides resistance to numerous chemicals.
- Conductive tile electrical resistance: 25,000 to 1 million ohms (2.5×10^4 to 1.0×10^6).
- Static dissipative tile electrical resistance: 1 million to 100 million ohms (1.0×10^6 to 1.0×10^8).

- Composition: Vinyl with conductive carbon elements distributed throughout.
- Brands: VPI (www.vpiflooring.com)

Vinyl Composition Tile (VCT)

- Used in: Hallways, services areas, cafeterias, common areas, healthcare and education interiors.
- Attributes: Many unique patterns and colors, easily applied to adjoining concrete slabs along side access floors.
- Electrical resistance: VCT is an insulator
- Composition: polyvinyl chloride resin binder, fillers and pigments.
- Brands: Armstrong (www.armstrong.com); Azrock (www.domco.com); Mannington Essentials (www.mannington.com); Tarkett (www.tarkettna.com)

Rubber Tile

- Used in: Schools, healthcare, lobbies, trading floors, hallways, heavy traffic areas, light industrial areas, electronics manufacturing, retail, institutional and commercial environments, clean rooms, R&D labs.
- Attributes: Extensive color and design range, textured surfaces available, high wear resistance, sound absorbing, slip resistant, chemical resistant.
- Electrical resistance: available with an electrical resistance range of 10^6 to 10^9.
- Composition: Synthetic rubber
- Brands: Nora Rubber Flooring (www.norarubber.com).

Luxury vinyl tile, linoleum, cork, carpet, marble, stone, etc. are available upon request. Contact Tate's Technical Department for more information.

Q. How should the access floor be grounded?

A. Grounding of an access floor is accomplished by connecting grounding wires to the pedestal heads with connectors available from electrical supply companies. The type of understructure used determines the quantity (or networking) of building ground wires required for the system.

- The *stringered* and *CornerLock* systems require a minimum ground wire attachment of one connection for every 3000 square feet of access flooring. (The use of stringers or cornerlock screws simplifies the ground wire requirement because they provide metal continuity between pedestals.)
- The *stringerless (freestanding)* understructure system requires a minimum ground wire attachment to every other pedestal to insure proper dissipation of an electrical charge.

The ultimate design (including the determination of the number, type, and actual installation of building ground wires) should be designed by the project electrical engineer and installed by an electrician.

Our wire recommendation is to use a #6 AWG copper wire. We suggest bonding the access floor using components that are available from electrical supply companies. It is a good idea to have a copper bus bar located somewhere centrally under the access floor. This allows the facility to have a common consolidation point to terminate all bonding conductors. A single bonding conductor can then be taken back to the electrical panel that is supplying power to the equipment in the room. This helps to eliminate any stray ground currents that could be floating in the understructure.

Q. What are the guidelines for cutting access floor panels?

A. *(Refer to Section 6 of the Best Practices Design Manual, Installation)*
Cuts are necessary in perimeter wall and obstruction situations, and to house PVD Servicenters™, grommets, diffusers, and the like. When planning for cut panels, please be aware of the following options:

Factory Cutouts
Tate offers factory cut panels to accommodate all of our standard accessory components. These include three standard grommet sizes, grille and diffuser cutouts, and PVD/MIT cutouts. In addition, internal and perimeter cuts are available for cable pass-thru requirements. When special cutouts are required, please be sure to include a sketch along with the required location on the panel.

Field Cutouts
There are several methods for cutting access floor panels in the field. Listed below are the recommended tools based on the type of cut required. Proper safety measures should be taken at all times. Refer to Tate's Installation Manual when cutting. Safety equipment should include earplugs, safety glasses; full clear plastic face shield, and safety shoes/boots.

Recommended Cutout Sizes:
The largest recommended cutout size in the access floor panel shall be no more than 15_ x 15_ (or other shapes with an area no greater than 225 in^2). Large cutouts should be no closer than three inches from the edge. This allows sufficient room to accommodate additional support pedestals required to reinforce the panel's design load capacity.

Load Capacity of Cut Panels:
Any cutout in the access floor panel will affect its performance. When the access floor specification requires all panels to meet the design load requirements, *including the cut panels*, it is necessary to support the cut panel with additional pedestal supports (see "Supporting a Cut Panel") or use panels that have a load capacity two grades higher than the base panel specification.*

Internal circular cutouts
Internal rectangular

cutouts
External cutouts
Drill press (preferred)
Hand-held drill (speed approx. 125rpm)
Reciprocating saw
Hand-held drill for pilot hole and
reciprocating saw for cutting hole
Bandsaw – Rockwell model #28-300,
Powermatic model 143 or MA615 mobile
(20 amp service required – speed approx.
450 ft./min.)
Reciprocating saw
Bi-metal hole saw with pilot drill
(ie: Lennox or Starrett
Bi-metal 14 tooth, __wide x 0.034__ thick blade
(reciprocating saw)
Bi-metal 14 tooth, __wide x 0.034__ thick blade
Bi-metal 14 tooth, __wide x 0.034__ thick blade

However, as a guideline, a floor panel cut within a 4__ perimeter band and with a cutout no larger than our current High Capacity PVD Servicenter™ (10__ x 10__) will withstand at least 1_ times its design load capacity without failure.
A floor panel cut with a 3_ wide x 6_ long notch through its edge member will support approximately one time its design load rating without failure.
**Important Note: There will be a thickness difference when using panels with higher grades on cut panels. This panel flange thickness difference will show on applications using PosiTile® carpet and therefore is not a recommended solution.*

Protective Trim for Openings:
Protective trim around cut edges should be used when cables or wiring are fed through the cutout. The trim protects the cables from potential fraying against the cut panel edge. Tate offers Grommets (rigid plastic inserts) for all our standard circular factory cutouts and universal plastic trim and corners for cutouts that are square/rectangular.

Supporting a Cut Panel:
When it is necessary to retain the design load capacity of a panel after it has been cut, an effective solution is to use additional pedestal supports. Guidelines for the number and location of additional supports are shown here.
Support Pedestal
Additional Support Pedestal

Frequently Asked Questions

Underfloor HVAC

Q. Where can I learn more about underfloor air distribution (UFAD)?

There are many resources available to lean about UFAD systems. Tate recommends finding non-biased sources when researching the performance and benefits of UFAD to conventional air distribution (CAD) systems. That's not to say that all those who support or question UFAD are biased however both sides must be evaluated before forming a decision. Associations that are open to participation/sponsor from anyone such as ASHRAE (www.ashrae.org), The Center for the Built Environment (www.cbe.berkeley.edu) and the government supported website: Whole Building Design Guide (www.wbdg.com) are good examples of non-biased sources.

Organizations such as SMACNA and SMWIA and the research generated through their non-profit organizations NEMI and NCEMBT should be evaluated with the knowledge that underfloor service distribution systems significantly reduce (up to 90%) the amount of sheet metal ductwork required to deliver conditioned air to an occupied space.

Our recommendation when evaluating information is to always consider the source, search for alternative view points, and draw your own conclusions.

Q. What happens when the underfloor air plenum area gets dirty?

A. Prior to installation of the flooring system, the concrete pad should be cleaned and sealed. By the time the flooring is installed, most of the dust creating construction work should be completed. Little dirt should get into the plenum area after construction. If material does get into the plenum, it can be vacuumed out. If debris gets into the MIT unit, it can be wiped out with a damp cloth, or cleaned out with a vacuum cleaner.

Q. Where do you locate the return air grilles?

A. If you have a drop ceiling, put them around the perimeter directly above the glass in order to capture the chimney effect. If you do not have a drop ceiling, use high wall rectangular or linear diffusers. In general they should be away from the core areas.

Q. What is the Chimney effect and how does it affect building load calculations?

A. The chimney effect, also known as Thermal Bypass, is the convection that takes place at the skin of a building. A large portion of the heat entering the space from the skin of a building convects directly up the skin and into the return plenum without becoming part of the space sensible load, and therefore does not need to be handled with cooling air supplied to the space.

Q. What' s the longest distance we can send the air from the outlet of the supply duct?

A. As a rule of thumb, 50' is the furthest distance you can send the air from the supply outlet to the MIT unit. The actual distance varies with a number of variables such as plenum height, airflow rates, supply temperature and building construction.

Q. Is there any load under the floor from the cabling and Modular Wiring components?

A. Not any appreciable load comes from this equipment and is not required to be included in load calculations

Q. What is the typical Heat transfer through floor?

A. 0.6 – 1.0 watt/ft$_2$ from the occupied space to the supply air plenum

Q. Why would my cooling load on the chillers and AHU be theoretically lower with underfloor air system and should I consider this reduction in my planning?

A. Fan horsepower, and the resulting heat generated by the fan motors is lower with an underfloor system. Less transmission of heat from the exterior to the interior of the space will occur in cooling mode since the air in the stratified zone is warmer than compares to an overhead well mixed system. Thermal storage of the slab can be considered in chiller energy savings calculations. Air is hotter in the stratified portion of the space, exhaust air is at higher enthalpy and kicking out higher energy. These reductions are minor and should not affect the load calculations.

Q. Why can we go to a thermostat setting of 77º–78º vs. traditional overhead at 75º F?

A. There are several components to this. First is that we recommend that the space relative humidity be kept at a maximum of 55%. Secondly, is the fact that while the thermostat is set at 77 or 78 degrees Fahrenheit, there is actually a temperature gradient from the floor, at approx. 72 degrees to the thermostat, which is set at 77 or 78 degrees.

Q. How far does the perimeter MIT box need to be from the wall?

A. 4.5” from wall to provide clearance for the Honeywell actuator. When using Tate floor, the hole is already 4.5” from edge of panel. Generally, the exterior perimeter MIT box should be located in the first full floor panel in from the skin of the building.

Q. Where should you locate carbon dioxide sensors?

A. In the space 4-5 ft off the floor, adjacent to the thermostat.

Q. What is the leakage in a raised floor system?

A. All are different, however, generally with Tate flooring and carpet tile, approximately 0.2 cfm per ft_2. Floor electrical boxes leak 5 cfm each and the MIT-C boxes leak 9 cfm when the damper is fully closed. This will provide a large component of most buildings’ minimum air requirements.

Q. What happens if you put furniture on the diffusers?

A. Placing furniture on top of the MIT diffusers will alter the designed air pattern and is not recommended. If the diffuser is located where a piece of furniture will be placed, the best solution is to move the diffuser to the next available floor tile.

Q. NFPA-90A, Section 2-3.6.3.1 Location of Air Outlets, says, "Air outlets shall be located at least 3" above the floor. Exception: Where provisions have been made to prevent dirt and dust accumulations from entering the system." How do we address this?

A. The inherent design of the MIT box chassis will not let debris into the floor plenum. Any debris that falls into the MIT box will be trapped in the base of the box until removed or cleaned.

Q. How can we be assured the 62ºF supply air will be adequate for the space?

A. Supplying the space with air between 60º and 63º degrees Fahrenheit has been calculated and tested in the lab under numerous load conditions and settings. The resulting temperature and comfort have consistently been acceptable. More importantly, current installations are working well and have received excellent comfort comments from the occupants.

Q. How do we handle heating all glass perimeter walls on high rises or mid rises?

A. The method of handling this type of perimeter is the same as handling any other perimeter situation. The difference is the number of heating units employed to handle the heating load. The number of floors will not affect the method of handling the heating load.

Q. How do we calculate the total supply air to the conditioned space? Do we size the load of the building as conventional and then size the coil/units as conventional as well?

A. We size the total air supply quantity according to the CEV space sensible load (for detailed information, see ‘Load Calculation Guidelines’ section 11, pages 22-26). The air handler and coil are sized similar to the way that they would be sized for a traditional overhead system, using the diversity of the building.

Q. Does each box need a controller and T-Stat? Doesn't this add cost to the project?

A. No, a controller, or Power Control Module, can operate up to 14 MIT boxes chained together. A thermostat can serve several controllers that are chained together.

Q. What do we do in a rest room situation? Keep it raised floor? The plumbing will create problems with the raised floor.

A. Restrooms can either be raised floor, or raised slab. The raised floor used in a restroom can be several inches lower than the remaining floor slab with a several inch thick lightweight concrete layer poured on top. The fixtures should be wall mounted. Floor drains can be placed in the concrete layer poured on the raised floor.

Q. How do we introduce OA to a mid-rise building? How do we bring back return air on a single story building (ducted or open plenum)?

A. Outside air is introduced to the system in the same manner that it is introduced in a traditional overhead system. The air handler, whether one per floor, or one that serves several floors will be the point of introduction of ventilation air. Energy recovery ventilation units will further add to the energy savings realized by the system. If there is a drop ceiling in the space, open plenum return is the appropriate choice. If there is no ceiling in the space, an open plenum return air path will suffice, but some ductwork is recommended in large floor plates to help maintain the stratification of heat in the space. Only a minimal amount of ductwork is required for the return air system

Q.Won't dirt and refuse settle into the plenum over time and then be carried by the plenum air through the MIT into the space?

A. If dirt or debris gets into the plenum it should be immediately cleaned. Remember that the plenum is under a slight positive pressure, so dust will not tend to penetrate the cracks between the floor tiles. Studies of underfloor distribution systems have indicated that the airborne particulate is lower than that of an overhead system.

Q. Energy costs - how do you bill the multiple tenants if a single AHU or two AHU's are serving the common plenum?

A. If multiple tenants are sharing space that is served by a common plenum, billing can be handled through the Building Automation system.

Q. Is it more, less or the same airflow with this system compared to an overhead system?

A. Every situation is different, but as a rule of thumb, the airflow requirements are slightly less with a FlexSys™ application than they would be with an overhead system.

Q. What are budgetary numbers for the system vs. traditional VAV applications for various typical floor plans ($/ft$_2$)?
A. Every situation is different, but as a rule of thumb, installed costs of a FlexSys™ application are slightly lower than an overhead VAV system.

Q. Schedule of events – what goes in when. What is the York/Tate recommendation to the construction team?

A. Sequence of construction of the Building Technology Platform:

- Clean floor slab.
- Apply any coatings or sealant to the floor.
- Mark the location of the flooring pedestals.
- Install perimeter MFT units, and all required ductwork, and control cables.
- Install underfloor wiring for power and voice/data.
- Install floor pedestals
- Install floor tile, leaving open spaces that will have MIT boxes or power/voice/data terminals.
- Install MIT Boxes and power/voice/data terminals.

Q. Fire corridors on raised floor and duct penetrations below. Is the floor fire rated? What does the Code require?

A. The floor is not fire rated. Any penetrations in fire rated walls below the floor will require fire and/or smoke dampers. This is the same criteria for ductwork above a raised ceiling in an overhead VAV application.

Q. What is the best placement of the terminals for various typical floor plans or furniture layouts?

A. Terminals should be installed in a grid pattern for even distribution of air. The load of the space will determine the density. If there is a conflict with furniture, move the terminal to the next closest panel.

Q. Do you have to account for the normal 1 Watt/ft$_2$ of radiation effect through the floor when sizing heating coils?

A. The cooling effect of the floor should be accounted for in the perimeter heating design.

Q. Can FlexSys™ be used if Tate is not the underfloor supplier?

A. Yes. However, York and Tate can offer a complete system solution through their alliance.

Q. Do the extremely high humidity conditions in Florida represent a special challenge considering we are bypassing air around the cooling coil?
A. We are only bypassing return air around the coil, so high humidity areas should not be a problem. All of the ventilation air introduced to the building passes through the cooling coil to be dehumidified.

Q. Some literature shows heating coil in the bypass section of the Air Handling Unit. Are there advantages to putting it there?

A. Yes, in the event that the building heat has been set back over an unoccupied period, the return air may not be warm enough to quickly bring the supply air up to temperature. Placing a heating coil in the primary air stream of the AHU can accomplish the same goal, but at an increased cost. General building heat should be provided for through the MFT.

Q. Placement suggestions for MIT's in cubicle areas, conference rooms, auditoriums, etc.
A. It is not necessary to have an outlet in each cubicle. Outlets should be spaced evenly along the aisle. As a general rule, one terminal can serve three (3) cubicles. In an auditorium situation, terminals should be placed in the aisles to avoid drafts on the occupants. Conference rooms should have the terminals placed along the outside of the room to avoid conflict with furniture and occupants.

Q. Can I use ADPI to evaluate an Underfloor Air Distribution System?
A. The goal of using ADPI methodology is to achieve a perfectly well mixed system and uniform conditioned space. Applying this methodology as a measure of the performance of a UFAD system is neither correct nor realistic. Well-performing UFAD systems are not designed to create a well mixed space instead they seek to promote some amount of stratification in the occupied zone (up to 5°F, according to ASHRAE Std. 55-2004). Under partial load conditions this 5° stratification becomes more prevalent and will decrease ADPI values below the acceptable levels recommended for overhead systems.

Furthermore, ASHRAE Standard 113-2005, it is clearly stated in Appendix B on page 7: "The ADPI method for mixing systems should be applied to **traditional overhead air distribution systems under cooling operation only**."

Q. How do I help ensure the underfloor air delivery plenum is properly sealed?
A. Tate has provided three best practices guides (http://www.tateaccessfloors.com/resources/plenum_guides.aspx) to aid in the proper design and construction of an underfloor air distribution

(UFAD) system. Trade specific guides have been created for the Architect, General Contractor, and Commissioning Agent extracted from lessons learned through Tate's experience working on a wide range of UFAD projects. These guides will help to ensure the proper sealing and reduction of underfloor air leakage in an access floor air plenum. Furthermore, Tate believes a holistic approach to design and construction should be used and recommends regular consultation be held with key individuals on the design and construction team throughout the entire process. You can also take our online constructability (http://www.aecdaily.com/en/1434905) course and receive continuing education credits while you learn how to reduce the risk of uncontrolled air leakage.

Frequently Asked Questions

Manufactured Modular Wiring

Q. What is Modular Wiring?

A. Modular Wiring is a totally modular branch circuit distribution system (3-phase, 4-wire) entirely prefabricated and factory assembled including cabling from the power panelboard board to the convenience outlet receptacle. This ‘relocatability’ feature is becoming increasingly important because of the need for constant floor plan changes in the workstation environment found in today’s buildings. Because Modular Wiring is so quickly and easily put in place, its installed cost can be 40-70% less than traditional pipe and wire configurations (which are almost impossible to relocate).

Q. Why is the wiring described as ‘modular’?

A. The primary reason is because you can plug or unplug the entire system from the panelboard to receptacle. The ‘workhorse’ of the system is the Extender Cable. It can be used anywhere along the system. There is absolutely no need to fuss with a lot of different cables. The Extender Cable is interchangeable anywhere along the entire length of the system.

Q. Can you tell me more about the ‘relocatability’ feature?

A. Modular Wiring gives you absolute flexibility upon installation and complete relocatability on an ‘as needed’ basis as floor plans rapidly change in today’s workstation environments. Because Modular Wiring is made up of four parts, Homerun Cable, Main Distribution Box, Extender Cables and Access Floor Module, it can be plugged and unplugged simply and instantly. Traditional pipe and wire configurations are difficult to relocate and are not attuned to the velocity or needs of computer-driven corporations or government installations.

Q. What are the benefits that would convince an engineer to specify Modular Wiring?

A. Modular Wiring adequately supplies the type, quantity and variety of circuit receptacles needed for any conceivable engineering layout. Modular Wiring contains oversized Super Neutrals, so there is no danger of overheating the neutral conductor or non-liner loaded circuits and therefore manages the harmonics problem. Specifying engineers will receive, without any cost to them, AutoCad™ Assisted Design Layouts. Modular Wiring represents an advanced state-of-the-art solution that attempts to solve the problems of today’s constantly changing building enviromnents. This system is adaptable to future change.

Q. Is Modular Wiring ‘proprietary’ or is it adaptable as a generic solution?

A. No, all you need to convert this system to any other wiring method is a one-half inch knockout in a standard electrical box.

Q. Is there an accelerated depreciation benefit with Modular Wiring?

A. Yes, because it can be moved or relocated and may not be viewed by the IRS as fixed property, but seen as personal, tangible property and therefore may be eligible for 5-7 year accelerated depreciation. When computing your return investment you will find that Modular Wiring will virtually pay for itself within 5-7 years. This compares favourably to the other traditional formal wiring methods. To properly assess all the ramifications, you should consult your tax advisor.

Q. How does Modular Wiring differ from traditional pipe and wire solutions?

A. The primary difference is that the entire system is prefabricated. Modular Wiring has the capability of running both Isolated Ground Circuits, as well as, Standard Power Circuits in one cable. Modular Wiring is also pre-assembled and pre-packaged, which will be delivered to the job site and distributed on a floor-by-floor basis for easy installation.

Q. Is the installed cost of Modular Wiring actually less than taditional pipe and wire installations?

A. Yes. The bottom line benefits to an owner are enormous. Modular Wiring installation can be accomplished in approximately 70% less time than traditional pipe and wire configurations. A three man crew on average, and depending on the density of the job, could install as much as 15,000 ft^2 per day. It is estimated the same job with pipe and wire would take three days or three times as long.