



Wiremold

Wiring and Air Handling Under Raised Floors

Raised floor systems are an increasingly important component of green building design. One benefit is flexible wire and cable pathways, often including modular manufactured wiring systems. Another plus for raised floors is underfloor HVAC distribution that provides consistent temperature, ventilation, humidification, and air quality throughout the facility.

Underfloor displacement air ventilation technology is often used in place of conventional variable air volume (VAV) distribution. Instead of using overhead ductwork to heat and cool a space, a raised floor system introduces air through the floor tiles. The newly introduced air mixes with existing room air and moves upward. Return air grilles located above the occupied zone remove the hot air from the room. These systems can provide up to 10 percent improvement in HVAC efficiency, and fan size and the amount of ductwork required.

However, co-locating wiring and air handling requires that special attention be paid to the raised floor boxes that provide power, voice, data, and video. These boxes must be designed and manufactured so as not to allow air to escape through them.

There is also considerable confusion about terms such as "plenum" and "environmental air spaces" in raised floor applications. The use and definition of the word "plenum" as it applies to raised floors varies widely within the industry. Because its interpretation is very important in specifying raised floor products, such as floor boxes and manufactured wiring systems, confusion can be significantly reduced by understanding the definitions used by UL and the National Electrical Code. Legrand/Wiremold recommends the only definition that should be used is the NEC definition. This ensures that the correct products are specified for particular applications.

Code Specifics

NEC Article 100 defines a plenum as follows: "A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system." This definition makes it clear that the definition of a plenum is not intended to apply to a space that is used for environmental air.

NEC Section 300-22, Wiring in Ducts, Plenums, and Other Air Handling Spaces, is very specific about what, if any, wiring is permitted in these spaces:

" NEC Section 300-22(a) Ducts for Dust, Loose Stock, or Vapor Removal prohibits the installation of wiring systems of any type in these areas.

" NEC Section 300-22(b) Ducts or Plenums Used for Environmental Air limits the legal wiring methods and equipment which may be installed in ducts and plenums, such as sheet-metal ducts, specifically fabricated to transport environmental air.

" NEC Section 300-22(c) Other Spaces Used for Environmental Air places less stringent limitations on the legal wiring methods and equipment which may be installed in spaces used for environmental air handling purposes other than the ducts and plenums specified in Section 300, parts (a) and (b) above. This section applies to the space over a suspended ceiling or beneath a raised floor that is used for environmental air handling purposes. Whether the space in question is used for supply air or return air is not relevant to the application of this section although this could effect temperature considerations.

It should be noted that the NEC places a different set of restrictions on the wiring methods and equipment which may be installed beneath raised floors in computer rooms. These fall within the scope of NEC Section 300-22(d).

Specification Guide

To recap, a raised floor space is a plenum only if it was specifically fabricated to transport environmental air. There is a fairly straightforward way to determine whether wiring is to be located in a plenum or in a "space used for environmental air." One should examine the space in question, taking note of what structures form its boundaries. If the only surrounding structures are floors, ceilings, and other structures whose primary function is something other than air handling, then this is not a plenum. If however, the wiring is to be located within a structure whose primary purpose is air handling, then the wiring is in a plenum and NEC Section 300-22(b) applies.

Walkerflex? manufactured wiring systems and FloorSource products, manufactured by Legrand/Wiremold, are UL listed to meet all the requirements of Standard UL 183 "Manufactured Wiring Systems." They also meet the requirements for NEC Section 300-22(c). Legrand/Wiremold makes no claim as to their use within plenums. To investigate claims that other products are approved for plenums, the applicable standards from UL and NEC should be reviewed carefully to be sure the definition of the word "plenum" is used correctly.

Conclusions

Not using the definition of a plenum spelled out in SEC Section 300 can lead some people to mistakenly insist that any raised floor cavity is a plenum. It would be unfortunate for them to rule out allowable floor boxes and manufactured wiring systems on this mistaken assumption. On the other hand, it is illegal to install a product designed for spaces used for environmental air handling purposes other than plenums in a space

that is, in fact, a plenum. To eliminate confusion, the only definition that should be used is the one provided by the NEC.