

**Description:**

The purpose of the section is to highlight the UMCP Design Standards for the control of sound associated with HVAC duct controls.

**Related Sections:**

- TBD

**Effective Date:**

- July 10, 2009

**Applicable Standards:**

- TBD

**General Requirements:****1. General Sound Control Methods**

- Prohibit ceiling plenums and mechanical rooms used as return air plenums.
- Install a system of return air sheet metal ductwork throughout the building is the alternative. Such a system adds around \$2.50/s.f. to construction cost, approximately 1.6% of the total construction cost.
- However, it is difficult to consider this a premium:
  - Ceiling plenums are common in commercial applications, where flexibility in office layouts is a paramount concern. Space layouts in institutions are more permanent and institutions generally rely on return air ducts, and use HVAC concepts that support them.
  - Absent a return air duct system, speech privacy between adjacent spaces must be developed, and the cost of accomplishing this can exceed \$2.50 / s.f.

**2. Duct Liner**

- Control of sound in HVAC systems is necessary. It is accomplished by one of the following methods:
  - Mechanical means such as oversized, more costly ducts ( for low air velocity), sound traps inserted into ducts custom fabricated sound attenuators. The premium cost implications are obvious.
  - “Noise cancellation” electronically generated sound, the mirror image of the offensive noise - propagated such that it cancels the offensive noise. Again, the premium cost implications are obvious.
- Acoustical (fiberglass) duct liner:
  - Fiberglass liners which erode and discharge particles into the HVAC supply air stream, have been implicated in IAQ problems. Also, fiberglass duct liner which becomes wet can harbor colonies of microbial growth, with IAQ liability implications.
  - Fiberglass, including fiberglass duct liners, has not been declared an IAQ issue, so the University chooses to not impose an outright ban on the use of the material. The University reserves the right to ban the product in special cases, and the program will state this.
- Instead, the University requires that all duct liner, where used, be polymer coated.
  - The University’s requirement for coated fiberglass liners parallels the industry trend toward standardizing on this variation on the formerly common (uncoated) duct liner material.
  - Uncoated fiberglass duct liner will shortly become unavailable, so the cost premium for the coated variety is, we suggest, a moot point.
  - The limitation on the application of even coated fiberglass duct liner (where the application is subject to wetting) mandates alternative (closed cell foam) materials, at a premium of around

\$2.50 per s.f. of liner, but the premium applies only to a very limited area of the entire duct system.

- To quantify: In a 100,000 s.f building renovation project, with a \$15, 000,000 budget (1999 dollars), 300,000 s.f. of duct surface area would be typical. Of that, 10% of the liner area is likely to be subject to wetting, thus prescribed to be a more expensive, closed cell product.
- 30,000 s.f. at \$2.50 / s.f. = \$75,000; less than one half of one percent first cost premium to the project. \$75,000 is also less than the cost of the typical mechanical means of HVAC noise control such as low speed fans, large ducts, insertion sound traps (attenuators) etc.
- The avoidance of IAQ liability, we submit, compensates for the slight cost premium