

## Wake-Up Call

© 2001 Jeffrey C. May, M. A.

Adapted from an article published in "Filter Forum" (Jan. 2002)

In real estate jargon, advice to the buyer is summarized by the terse phrase "location, location, location." If there were comparable advice for the building owner with air conditioning, it would be "filtration, filtration, filtration." Why is it then that when I ask owners about their filter, the most common reply is "what filter?"

Few if any building owners (or even HVAC contractors for that matter!) are aware of what filtration is for. The former have the notion that a filter will create clean air for breathing; the majority of the latter, judging from the installation and maintenance inadequacies I see, must feel that filtration is nothing more than an annoyance. Filters are the victims, always too big or too small, that get crushed or hung up on the thoughtfully placed, sheet-metal screws.

To understand the true significance of filtration, you must step back from the equipment and consider three very simple principles: first, whenever and wherever warm, humid air is cooled, water will form by condensation; second, all indoor dust contains nutrients for bacteria, yeast and mold; and finally, wherever dust is wet for more than a few hours, these microorganisms will grow. (Has anyone ever turned on a cooling system that did not stink initially?)

The relevance of these principles should be obvious to anyone, but for some reason much of the HVAC industry, medical community and public have failed to grasp their significance. Because virtually all filtration is inadequate, nearly all air conditioning coils, condensate trays and fibrous liners are soiled. Since all of these components are either physically wet or exposed to high humidity, dust from almost every one of the hundreds of fan coil units I have sampled was contaminated with active growth of microorganisms.

Is there any relevance to all of this? Right now the medical community and the public are asleep, though some are awakening from their moldy nightmares. When more people realize what has been going on, they are going to look for someone to blame. Air conveyance systems, particularly if they also serve as sources of heat, can be an enormous source of bioaerosol-airborne particulates resulting from the growth of microorganisms thriving in the system. The bioaerosol from HVAC systems can cause allergy, asthma, chronic cough and hypersensitivity pneumonitis (HP) to name a few. HVAC equipment with microbial contamination - rather than "tight buildings" or inadequate ventilation - is the cause of the majority of IAQ problems in "sick buildings."

Proper maintenance (of a well-designed system) is the only way to avoid creating conditions that can lead to these illnesses; optimizing filtration is the building owner's most important preventative tool! There should never be nutrients (dust) on an air conditioning coil, in a condensate pan or on

the fibrous lining material near the coil. The only way to keep these surfaces clean is with at least MERV 6 (or 8) efficient filtration such as that provided by typical media filters. Filter enclosures must be airtight to the exterior and filters installed so that no air bypasses them.

We must stop kidding ourselves and the public about filtration. How can a typical fiberglass filter that I can clearly see through adequately collect microscopic particulates? These filters are actually worse than useless because not only do they provide totally inadequate filtration for any cooling system, they also provide the building owner with a false sense of confidence. In any given system, the most efficient filter possible should be used. If more powerful blowers are needed, so be it. Up to now, energy-cost savings have driven HVAC design. It's time to realize that the increased costs associated with providing and maintaining good IAQ can no longer be avoided.

From an IAQ perspective, the HVAC industry has a long way to go before newly installed equipment will provide adequate protection; and an even longer road to travel before making the existing installations safe. No gimmicks, such as UV irradiation, bypass HEPA filters (for a small fraction of the air stream) or chemically treated filters will ever substitute for the real thing: clean fan coil surfaces free of growing microbes. This condition can only be provided by efficient filtration and intelligent filter maintenance.

Nearly every cubic foot of air in a typical building has been blown over some type of coil or coarsely lined surface. Some of that air will end up in an occupant's lungs and therefore the health of every individual who breathes indoors is the responsibility of building designers, engineers and maintenance personnel. Let's hope that the HVAC community wakes up to this realization before the legal community does!