Copper Rx for Sick Buildings

Just as people who have a contagious illness can seem perfectly normal, "sick" buildings may look fine on the outside, but inside the air could be teeming with germs, pollutants and irritants that may be dangerous to anyone who comes in contact.

The Occupational Safety and Health Administration estimates that up to 30 percent of all nonresidential buildings in the United States are sick or have indoor air quality (IAQ) so poor that it can adversely affect the health, productivity and livelihood of occupants. According to the consulting firm, Christopher Collets and Associates, heating, ventilation and air conditioning (HVAC) systems contribute to poor indoor air quality in more than 60 percent of all sick buildings. Specific pathogenic risks in HVAC systems include bacteria like Legionella and Mycobacterium and molds such as Aspergillus niger.

Recent studies have shown that copper components can attack the source of the IAQ problems that emanate from commercial HVAC systems. The antimicrobial nature of copper has long been recognized and put to good use. Metal surfaces made of copper or copper alloys, such as brass, bronze and copper-nickel-zinc (commonly known as nickel silver), demonstrate a natural ability to retard the growth of algae, fungus and molds, viruses and bacteria. Studies have shown that the antimicrobial properties of uncoated copper and its alloys are continuously effective and actually increase over time as the metals oxidize and tarnish.

Ongoing research by Dr. C.W. Keevil at the University of Southampton in England, funded in part by the Copper Development Association, is providing additional insight into copper's germ-fighting properties. Dr. Keevil's experiments involved placing a known quantity of mold spores on both copper and aluminum test samples, then counting the amount of viable spores over a period of time. The test for Aspergillus niger (black mold) showed that after six hours all of the spores on the aluminum sample were still viable, while spores on the copper sample were virtually eliminated. In a follow-up test, A. niger spores in a nutrient broth were placed on copper and aluminum and incubated at a temperature of 98.6ºF, which is ideal for spore germination. After 10 days, no observable spores were present on the copper sample, while the spores germinated and grew unrestricted on the aluminum sample. Experiments performed on Methicillin-resistant Staphylococcus aureus, as well as on E. coli O157:H7, and Streptococcus, all produced similar results.

Commercial HVAC systems that include copper fin and tube heat exchangers may not only help improve indoor air quality, they also offer exceptional thermal performance, durability, efficiency and lower life-cycle costs. When it comes time to specify commercial HVAC components like heat exchanger tubes, fins, filters and condensate drain pans, architects, engineers and installers would do well to remember: "Do it proper. Do it copper."

Visit www.copper.org for more information on copper's antimicrobial properties and its use in commercial HVAC systems. **HP**