



*Hampton Inn
Kansas City/Liberty, MO/*



1ST PERSON INTERVIEW

Jim Sorgen, CCE
Certified Chief Engineer
Hampton Inn

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REDUCING HOTEL HVAC MAINTENANCE COSTS WITH ULTRAVIOLET LAMPS

by **Mike Walrath**

Sales engineer — commercial products

Fresh-Aire UV

Many hotel maintenance staffs are spending large amounts of money annually cleaning mold and other biological growths attracted to the cool, dark and moist environments of air conditioning coils in PTACs, fan coil room units, rooftop package systems and other HVAC equipment. If not eliminated, the HVAC system's supply fan could aid in the spread of airborne mold spores potentially affecting guests' respiratory comfort and health. Ice machine chutes are also subject to a microbial 'slime' coating that indirectly exposes hotel guests to potential biological contaminant ingestion.

Cleaning these coils can be costly. In some cases, thousands of dollars in labor and chemicals, depending on how many units and whether the work is performed in-house or by outside contractors. Besides cleaning costs, mold and other biological films on coils restrict heat transfer that affects air conditioning efficiency.

Each of these issues can be completely eliminated with ultraviolet (UV) light systems installed near the evaporator coil and drain pan. The UV light sterilizes the surfaces it contacts keep them mold free.

How UVGI Works

UV light is grouped into three segments--A, B and C, which range in frequency between 90 to 400 nanometers. They all occur naturally in sunlight.

- UV-A (320-400 nanometers) is used for black lights and tanning beds.
- UV-B (280-320nm) causes sunburn.
- UV-C (200-280nm) is the most intense range. Because it's filtered out by the earth's atmosphere, microorganisms have never been exposed to it and have no defense against it. Ultraviolet germicidal irradiation (UVGI) technology uses UV-C to scramble microorganisms' DNA so they can't reproduce.

UVGI is effective against bacteria, mold, viruses, and allergens. UVGI lamps are typically positioned downstream facing the coils in air conditioning systems. Although effectiveness depends on exposure time and microorganism type, all viruses, bacteria, mold and other microbes are destroyed by UVGI light.

Hotels Currently Using UV

While some hotel engineers haven't embraced UVGI technology yet, there are many that have. John Melvin, chief engineer, Marriott's Hutchinson Island Florida Resort has installed a variety of UV light systems with great success. "The UV lights have cut back the routine maintenance in half that has to be done to air conditioning coils and ice machines," Melvin said. "The maintenance now (after applying UV) is basically cleaning dust off of the coils as the UV light doesn't allow microbial growth to form. It has also been great in maintaining a pleasant atmosphere (indoor air quality) without any outside odors."

Reba Management, Hilton Head Island, S.C., which manages several Hilton Head area resorts such as Coral Reef Resort, Island Links Resort and Port O'Call Shipyard Plantation installed 110 UV light systems consisting of one lamp (bulb) on each side of HVAC system evaporator coils. According to Robert Lehman, assistant director engineering, "In comparison to no UV light, the systems with installed UV lights remained much



A tubular rack system is quick and easy to install

cleaner and reduced any mold, mildew or odor potential in the units."

There are hundreds of hotels using UVGI as a prevention to mold and mildew development in HVAC units and ice machines. The technology is growing exponentially as progressive consulting engineers are specifying HVAC systems with UV lamps to keep maintenance costs low, improve indoor air quality and ensure optimum heat transfer and energy efficiency in new hotel construction.

Types of UV Systems and Installation

UV light systems can be installed easily by a qualified in-house maintenance staff or by a local contractor. Better UVGI manufacturers offer customer support to staff on installation or can recommend qualified contractors.

PTACs, fancoils and mini-split type air conditioners offer a unique challenge because they are so tightly packed with components. Fortunately, some manufacturers offer a tight-fit kit or UV light systems designed specifically for mini-split evaporator cases. Both system types can be installed in less



UVGI is effective for microbial disinfection of interior wall surfaces, coils and the supply airstream of air handlers

than an hour and typically cost well below \$200 per unit. The lamps themselves don't require labor-intensive fasteners, but instead are installed with an industrial adhesive below the coil and above the drain pan. The UV power supply is wired into the HVAC unit's 220 or 230V power supply.

Ice machines, which are subject to inspection in many states, are equally prone to microbial fouling. They too, can benefit from UVGI technology. Mold typically develops on the dark, damp chute environment, which is often in contact with humid air from the spray area, especially when the dispenser door is accessed or left open. The result is a slimy discolored microbial substance that can stick to ice as it descends from the chute.

Commercial kitchen ice machines are the most vulnerable because baking introduces airborne mold spores, and room temperatures are warmer while floor pressure washing and dishwashers create a high humidity atmosphere. This combination of spores, temperature, and humidity is conducive to mold growth. All ice machines can benefit from a UVGI system, however units in kitchens and outdoors in humid climates are the most prone to mold build-ups. Prices for an ice machine UV system range from less than \$200 for basic guest units up to \$800 for larger commercial units. They are easily installed by qualified in-house maintenance staff.

Another important UVGI use is in rooftop or mechanical room air handlers. Most commercial facility maintenance departments are capable of UVGI retrofits on existing air handlers. Those commercial UVGI systems typically cost between \$1,000 to \$4,000 in equipment costs per air handler or rooftop unit, depending on the coil size and lamp quantity needed for proper coverage. Installation labor generally requires two to six hours per unit.

“Generally, high quality UVGI systems are maintenance-free, with the exception of routine lamp replacement.”

Choosing the right UVGI system will add minimal additional maintenance workload to a facility's staff. Like most products, UV lamps come in good, better and best classifications. Generally, high quality UVGI systems are maintenance-free, with the exception of routine lamp replacement. A good manufacturer will typically send a factory technician to train the hotel maintenance department and supervise UVGI installations, especially if the retrofit project involves multiple units.

Asset Preservation Thru Improved Efficiencies

More and more it is the responsibility of the hotel engineer to initiate new technologies that can either preserve the property's building-system assets or increase energy savings through an improvement in operating efficiency. UV light systems offer the unique opportunity to do both. UV Lights can present a better environment for guests and reduce operational costs for the facility. As UV light systems are gaining acceptance as a proven method of killing mold on air conditioning and ice machine coils, these same UV light systems also reduce maintenance, improve HVAC coil heat transfer, and can potentially pay for themselves in as little as six to 12 months.

Mike Walrath is a 14-year HVAC industry veteran and the sales engineer for the commercial products division of Fresh-Aire UV, an international manufacturer of UV systems. Fresh-Air UV is a division of Triatomic Environmental Inc., Jupiter, Florida. <http://www.freshaireuv.com>