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# UV Technology

Paves the Way for Improved Work Environments

**U**V-C is defined as short-wave UV (100 to 280 nanometers). This type of UV is commonly used in sterilization processes. Prolonged exposure to UV-C causes severe biological damage. This type of damage is what makes UV-C effective in HVAC applications. The light emitted by the lamps causes cellular damage to microorganisms and biological growth, effectively eliminating them from the system.

Three main elements are required to facilitate microorganisms and biological growth: dampness, darkness, and cool air. HVAC cooling coils provide the perfect environment for this growth.

To effectively kill and eliminate biological growth and microorganisms, two elements are required of a UV-C germicidal-lamp system: intensity and exposure time. Placing a high-intensity UV-C germicidal lamp over the "A" coil in split-system applications or directly illuminating the cooling (evaporative) coil in a rooftop or air-handling unit provides both of these elements. UV-C lamp output is based on the lamp and the ballast, so intensity is achieved by selecting the appropriate product. Because the cooling coil is a fixed component within the system, the exposure time is unlimited.

Installing UV-C over or near the evaporative coil to completely illuminate the coil provides several benefits:

- *Energy conservation and cost savings.* Keeping the coil clean allows the HVAC equipment to maintain its optimum efficiency. Chemical cleanings are effective the day they are done, but growth starts almost immediately, lowering the equipment's efficiency.

- *As proven by recent medical studies, a cleaner and healthier environment for employees and customers.* UV-C lamps offer an environmentally friendly alternative to harsh coil-cleaning chemicals. UV-C lamps will kill biological growth on the coil, helping to prevent allergies and illness associated with biological growth. A recent medical study published in *The Lancet* states, "Operation of UVGI resulted in 99-percent reduction of microbial and endotoxin concentrations on

eradicated surfaces within the ventilation systems." The study further states that, "On the basis of within-person estimates, use of UVGI was associated with significantly fewer work-related symptoms overall, as well as respiratory and mucosal symptoms, than was non-use."

There are currently three types of UV-C germicidal lamps available for the light-commercial market. The type of heating and cooling equipment determines which UV-C product should be installed.

For residential-style split systems, most UV lamps available feature a UV-C lamp that is installed above the "A" coil by drilling a hole in the supply plenum or coil section and inserting the lamp. The electrical components are housed in a National Electric Manufacturers Associate Type I (NEMA 1) housing. These units typically feature fused protection, a site pipe to enable the user to safely check lamp operation, and a safety switch to shut the lamp off during service.

For rooftop units, there are two basic types of UV lamps available: external NEMA units and internally mounted units.

NEMA units are installed by drilling a hole in the roof or side of the rooftop equipment and inserting the lamp into the unit equipment to illuminate the coil.

Internally mounted units are designed to be installed completely within the air-handling system without requiring any penetration of the air-handling equipment. They can be installed in multiple configurations to cover every coil size.

UV-C germicidal lamps are a proven technology with significant benefits for business owners, their employees, and their customers. In fact, the United States Government Services Administration mandates the use of UV-C germicidal lamps downstream of all cooling coils and over all drain pans installed in new government buildings. All building owners should bring their buildings up to this higher standard.

Aprilaire offers a complete line of UV-C germicidal lamps for virtually all of your residential and light-commercial applications.