Smoke, Mirrors, UVC, Ozone, PCO ….

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I am sure by now you have all been asked or have questions yourself about the use of UV in an HVAC system. Why? What's the point? Does it work? How? Isn't it all just smoke and mirrors?

The truth is, it does work! UVC is effective, it will save you and your organization money, and it will lead to better IAQ and happier, healthier employees. This is no parlor trick, this is fact. The US government added UV to their 2003 Facilities Standards Guide. They require the installation of UV lights downstream of the coil to control the growth of bacteria and microorganisms on the coil, and in the condensate pan. (Reference: GSA 2003 Facilities Standards http://www.gsa.gov)

Germicidal Ultraviolet radiation (UVC) has been proven to be a safe, effective, and economical way to destroy bacteria, mold, and microorganisms in water, on surfaces, and in the air for decades. UVC is part of the Electromagnetic spectrum, more specifically 185-260 nanometers. UVC works by disrupting the DNA in the cell nucleus of a microorganism. When exposed to shortwave radiation from UVC lamps the DNA mutates, and it can not make a proper copy of itself, which is a key component to cell replication. Without the individual cell being able to duplicate itself, the colony will not propagate and will therefore die. The growing trend these days is to install UVC in HVAC systems to irradiate the cooling coil and keep it free from mold, mildew, bacteria and microorganisms. This will result in several benefits to the end user. Keeping the coil free from contaminants will reduce the pressure drop; improve the heat transfer, and increase system efficiency and capacity. All of these will result in a direct energy savings for the end user. In addition, installing UVC lamps will eliminate the need for having to physically clean the coils with harsh sometimes toxic chemicals. This means a further savings on manpower and cleaning supplies. There are also more intangible savings from installing UVC lamps in HVAC systems. In a report commissioned by the California Energy commission, and a recent article in the Lancet Medical journal it was observed that the addition of UVC lights in the air handling system led to a 20% reduction in employee absenteeism and a 60% reduction in breathing related issues.

In some applications where odor control is desired we will enhance the UV system by incorporating a small amount of ozone. Ozone is produced when O2 molecules split into two Oxygen atoms (O1) and each of these atoms bonds with another O2 molecule, to form O3 or Ozone. The bond created when the third Oxygen atom (O1) attaches itself to the oxygen molecule (O2) is relatively unstable. The tendency is for this unstable bond to break and release the third Oxygen atom. This loose Oxygen atom will look to bond to other substances, like odors or pollutants and the original Ozone molecule (O3) will revert back to O2. The odor or pollutant becomes oxidized and converted to a harmless inactive molecule. Another way to enhance the effectiveness of UVC lights is to add a filter or carrier coated with a catalyst such as Titanium Dioxide (TiO2) in the chamber with the lamps. This is typically referred to as "photo-catalytic oxidation". The Photo-catalytic oxidation process is created using ultra-violet light and a catalyst as described above. When the UV energy shines on the catalyst, a reaction takes place that releases oxygen and hydrogen molecules called hydroxyl radicals. These hydroxyl radicals bond to the contaminants and aid in the reduction of odors, fumes, and gas phase molecules.

All of the options above are safe and effective. Which one is right for you will depend on your application and goals. American Ultraviolet has been providing IAQ solutions for over fifty four years. American Ultraviolet Company is one of the few UV suppliers that can offer solutions for water, surface and air sterilization applications. Our two state of the art manufacturing plants, experienced Engineering staff, and five strategically located Sales offices throughout the United States puts us far ahead of the competition with regards to sales, service, and quality.

Our latest improvement for the HVAC industry is a system that allows the retro-fitting of an existing unit in hours..... not days! Our unique system ships to the jobsite fully assembled and wired. Each unit is custom designed and built for the application. The system is carried into position and secured, the lamps are installed, and the power is connected. We sell these systems as a package that includes all of the necessary components to perform a proper installation. All of the wiring, framing members, door limit switches, and "UV in use" warning signs are provided, along with the technical support and expertise necessary to insure a successful installation on each and every project.

These systems are currently installed in homes, Government buildings, Hospitals, Schools, and Pharmaceutical production facilities. The photos below show one of our more recent installations. Please feel free to contact us with any questions, or for help in finding a solution to your IAQ challenges.