

AFE Chapter 21

“To Enhance the Value and Expertise of the Facility Professional.”

Newsletter

JANUARY 2007

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?

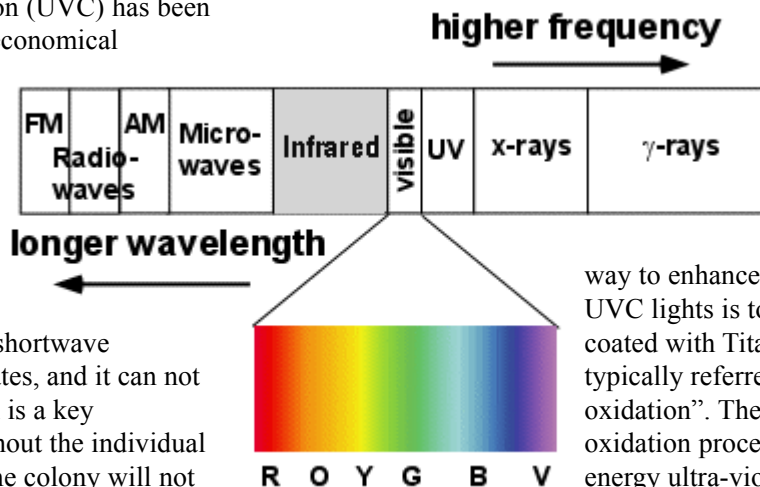
The truth is, it does work! UVC is effective, it will save you and your organization money, and it will lead to better IAQ and happier, healthier employees. This is no parlor trick, this is fact. The US government added UV to their 2003 Facilities Standards Guide. They require the installation of UV 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 Electro-magnetic 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 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 O_2 molecules split into two Oxygen atoms (O_1) and each of these atoms bonds with another O_2 molecule, to form O_3 or Ozone. The bond created when the third Oxygen atom (O_1) attaches itself to the oxygen molecule (O_2) 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 (O_3) will revert back to O_2 . 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 metal plate coated with Titanium Dioxide. This is typically referred to as “photo-catalytic oxidation”. The Photo-catalytic oxidation process is created using high energy ultra-violet light and a catalyst.

When the UV energy shines on the catalyst, a reaction takes place that releases an oxygen and hydrogen molecule 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. EM Cahill Company has been providing IAQ solutions for over fifteen years. After a few years of careful evaluation of UVC equipment manufacturers' EM Cahill decided to team up with the leader in UV technology, American Ultraviolet Company to bring our customers complete IAQ solutions. American Ultraviolet Company has been the leading supplier of ultraviolet equipment for over forty seven years. American Ultraviolet Company is one of

Smoke, Mirrors, UVC, Ozone, PCO... (Cont'd)

the few UV suppliers that can offer solutions for water, surface and air sterilization applications. Their two state of the art manufacturing plants, experienced Engineering staff, and five strategic locations through out the United States puts them 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, "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 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. ■



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2007 SCHEDULE OF EVENTS

- Jan. 17 RMSC scholarship/CHA presentation
- Feb. 21 Greece Athena School
- March 21 Strong National Museum of Play
- April 18 Southco
- May 16 UofR Optics Center
- June 18 GOLF - Shotgun Start!



Uncle Nick's Corner

Recipe for a Happy New Year

Take twelve fine, full-grown months; see that these are thoroughly free from old memories of bitterness, rancor and hate, cleanse them completely from every clinging spite; pick off all specks of pettiness and littleness; in short, see that these months are freed from all the past—have them fresh and clean as when they first came from the great storehouse of Time. Cut these months into thirty or thirty-one equal parts. Do not attempt to make up the whole batch at one time (so many persons spoil the entire lot this way) but prepare one day at a time.

Into each day put equal parts of faith, patience, courage, work (some people omit this ingredient and so spoil the flavor of the rest), hope, fidelity, liberality, kindness, rest (leaving this out is like leaving the oil out of the salad dressing— don't do it), prayer, meditation, and one well-selected resolution. Put in about one teaspoonful of good spirits, a dash of fun, a pinch of folly, a sprinkling of play, and a heaping cupful of good humor.

— Anonymous

Congratulations!

AFE Scholarship Winners!

MARGARET M. ANDERSON
RIT Mechanical Engineering/Aerospace Option
4.0 GPA

MICHAEL WAINWRIGHT
MCC Engineering Science
3.846 GPA

NICHOLAS J. RAPPA
RIT, KGCOE, Mechanical Engineering
3.066 GPA

Each scholarship recipient will receive a \$1,000 check from AFE. Awards will be presented at our January 17th meeting.