



1. Who is UVDI?

UltraViolet Devices, Inc. (UVDI) has built one of the world's most comprehensive research, development and engineering teams dedicated to the application of Ultraviolet (UV) Technology. Our teams include PhD's, Professional Engineers and Scientists who specialize in the field of germicidal irradiation and mechanical systems. Combined with PhD level research of UV germicidal protection, UVDI continues to deliver to the industry and end users proven products and solutions based on real science and technology. Additional information on UVDI is available on our web site at www.uvdi.com. Information on our Altru-V product line is available online at www.altruv.com

2. What is ALTRU-V?

Altru-V is the line of products from UVDI that apply real science for HVAC maintenance. By applying real science and engineering and the relentless cleaning power of ultraviolet light, Altru-V products are optimizing HVAC maintenance by replacing outdated chemical and cleaning techniques that can be both costly and dangerous. The results are lower operating costs, safer environments for maintenance personnel and occupants, and cleaner air.

3. What is UV "C" or UV "GI"?

The letters "UV" relates to the entire UltraViolet spectrum. This spectrum is broken down into four frequency ranges: Vacuum (VUV), Short Wave (UVC), Middle Wave (UVB) and Long Wave (UVA). UVC is the frequency that is the most germicidal and the term UVGI refers to Ultraviolet Germicidal Irradiation as is used by Federal Agencies such as OSHA, NIOSH and the CDC when directly referring to UVC.

4. What is UVC?

UV-C is a magnetic waveform, and like all waveforms emanating from the sun its properties are unique to its frequency. This "C" part of the UV family has germicidal affects, especially the 260-nanometer frequency. When mercury is vaporized in low-pressure plasma, the most prominent spectral line is 253.7 nm, which is very close to 260. Westinghouse light division was first to commercialize the low-pressure mercury vapor [light] in the early 1930's.

5. How does UVC affect germs and mold?

In the simplest of terms, a microorganism's nucleus or DNA is the target of the 253.7 nm wavelength. It destroys DNA causing cell death or making replication (cell division) impossible. UVC also degrades simple organic material at the molecular level.

6. Does UVC work?

Yes, thousands of references to this efficacy can be found in literature and in actual applications. One is the Extended Abstract from NIOSH and the University of Cincinnati wherein UVC was tested against the heartiest of bacteria. Along with this is the Tulsa University study conducted at the Public Service Company of Oklahoma wherein a two-log (99%) reduction of surface and airborne mold was achieved using UVC Tubes. UVC is used worldwide, more in other countries per capita than in the US.

7. What is deactivation?

Doses of UVC energy may not cause immediate cell death but the microbe may be "deactivated". This means that some function may still exist but replication is impossible so the organism is not viable. Continuous doses over time have been shown to hasten cell death.

8. Does UVC from UVDI produce ozone?

No. Many UVC devices do produce ozone but the UVDI units do not. A special compound associated with the quartz attenuates all frequencies below 200 nm, thus eliminating the possibility of ozone production.

9. Are All UV Lamps The Same?

Not all UVC lamps are created equal. Our HVACR line of Altru-V products from UVDI uses the Philips brand of Germicidal UV Lamps (UV-C) which utilize a unique sodium – barium silicate soft glass. The protective coating on the inside of Philips lamps minimizes the effect of mercury absorption into the surface of the glass. Non-coated glass or a quartz tube absorbs the mercury faster and thus minimizes the output of UV. Non-coated glass or quartz tubes also require more mercury within the lamp to compensate for loss of mercury into the glass wall.

10. How much mercury in a lamp?

UVC lamps from UVDI utilize 3 mg of mercury per lamp whereas quartz UVC lamps can exceed 100 mg's of mercury. Extensive testing has been done on the long-term performance of both soft coated glass UVC lamps (UVDI/Altru-V) and quartz glass UV lamps. The results show that after 9,000 hours of operation, the quartz lamps tested were producing only 53% of their original output, whereas the Philips coated soft-glass lamps averaged above 80%.

11. Does it replace filters?

No, a UVC fixture is an air conditioning component that is in addition to other system parts. These include the Surface, heating core, fan, dampers, humidifiers, filters, etc. All are designed to do some form of work within the air handler or on the air.

12. Don't filters remove Microorganisms?

Yes, in an infectious disease application the efficiency and location of a filter should always be a concern. More recently they have been associated with an approach referred to as "catch and kill". The filter goal is to provide a reduction in the total number of microbes and with TB the idea is to approach or achieve elimination. With the proper filter, UVC helps to kill what has been caught. Thus, for a given microbe, the filter effect is a necessary part of the calculations for determining the resulting concentration per unit volume. However, as viruses can be as small as 0.02 micron, the target organism needs to be known to provide a predictable result. More important here though is that filters do not abate microbial growth on Surfaces, in drain pans or in plenum's and ductwork.

13. How do you size it?

UVDI utilizes a proprietary program developed by Dr. Walter Kowalski of Penn State University to precisely size UVC applications. The program sizes each application based on its goals: IAQ, improved heat transfer, reduced maintenance and odor, as well as killing infectious disease particles. UVDI should always be consulted for sizing applications involving infectious disease particles.

14. Is it hard to install?

No, installation instructions are available for every model and layout drawings can be provided for fill-in dimensional specifics. Depending on the fixture size and style, installation time can average about 15-20 minutes per fixture.

15. Where is it installed?

UVDI fixtures are designed specifically for installation in HVACR applications. On existing systems infestations always exist, therefore, the best results are obtained when the fixture is located close to the source of the offending surface (Optimally at 12 inches away from the surface). The software program used by UVDI sizes applications for the highest efficacy in eliminating surface and waterborne microbes.

16. Do you clean a surface first?

The results are much more dramatic when you don't but it's really all a matter of time. UVC will degrade much of the organic material on and often within a surface in a time frame unique to the application, but usually 30 days or less. The depth, type and amount of contamination are all determining factors on the amount of time needed on an existing application.

17. How does one know it is working?

There are several ways to demonstrate the many things taking place. One is to use a contact plate containing malt agar. Before the lights are installed, the surface is lightly touched and the plate is allowed to incubate for about 96 hours. After the lights are installed, a like procedure is performed in the same place. What is often seen is a 98% + reduction in organism activity. Some of the other ways are:

A visible reduction of mold will be seen in a very short period of time.

Coil pressure drop has been shown to drop as much as 30% in 30 days (depending on Surface cleanliness and water activity), of course there is usually an associated rise in system airflow. Drain pans and drain pan water become significantly cleaner.

All line-of-site surfaces, i.e. insulation, will start to look much cleaner.

Most of the associated odors from the contaminants will disappear.

Many IAQ complaints are shown to be reduced.

18. Is UVC harmful?

No, UVC does not have the penetrating power of UV-A & UV-B. But enough exposure can superficially make your skin red and your eyes feel like there is sand in them. This usually recedes in 24 to 30 hours. When precautions are followed, even minor inconveniences can be avoided.

19. Are UVDI products UL Listed?

Yes. For complete safety, UVGI fixtures shall have been tested and Listed as UL/C-UL under Category Code ABQK (Accessories, Air Duct Mounted), UL Standards: 153, 1598 & 1995 respectively, no exceptions.

20. What is the warranty?

The fixtures and tubes are warranted for 1 year.

21. What are the limits of temperature, humidity and velocity?

Unlike conventional UVC fixtures, UVDI fixtures are designed to UL specifications such as being of drip-proof construction and perfect electronic function at 55-135°F. The same parameters as found in HVAC equipment. Essentially, UVDI UVC fixtures have no limits in HVAC equipment as they were designed specifically for that use. Rules of thumb are 55-135° F, 99% RH and 1000 fpm respectively. Please contact the factory for safety when operating outside these boundaries.

22. How do you dispose of the used tubes?

UVDI products fall into the same category as fluorescent lights. All users should dispose of them the same way they dispose of their fluorescent lights and follow any EPA and state guidelines. Large users should already have a fluorescent light program in place that simply includes the germicidal lights.

23. Should the tubes be cycled with the fan or run continuously?

When all things are considered, the best case is for running them continuously. Like fluorescent lights they run better and longer when running continuously. For maximum effectiveness, always run them continuously.

24. How do you know when to change the Tubes?

For infectious disease applications, change-out should be performed using a radiometer and following factory specifications. For IAQ or mold control changing the lamps when their output decreases by 20% is common, this usually occurs in about 12 months.

25. Do the lights need cleaning?

UVDI tubes will usually degrade common organic debris that may accumulate on the tube; therefore, periodic cleaning is usually not required.

26. How do you clean them if you think you need to?

Cleaning could be necessary if the tube has been touched, etc. 99% pure alcohol and a lint free cloth are best to not leave too many impurities behind.

27. What if microbes are attached to dust particles?

In HVAC systems microbes of concern are either located on a surface or are airborne. UVC will usually degrade simple surface organic materials to unhide the target microbe and destroy it. Airborne microbes are unhidden as much of the dust is removed by the filter system and then as the microbe enters the air conveyance system it is tumbling or will tumble allowing for near 360° global UVC energy absorption. In infectious disease specific installs, air filters greater than 85% ASHRAE Dust Spot are used so not many microbes pass through, especially still attached to dust.

28. If I can't see UVC energy, what do I see?

The blue color comes from an inert gas in the tube. The tube can be lit (and blue) yet not produce much if any UVC energy at all. Remember that UVC is in the non-visible part of the light spectrum

29. Do I need UVC if I use treated filters?

Microbes caught by an anti-microbial treated filter have been shown to die away but there are many more years of evidence that microbes caught by untreated filters also die away! However, it does not in any way address the growth of microorganisms on other surfaces and in drain pans, which lead to the eventual buildup of organic material. In these latter and more important issues, UVC is the only non-chemical continuous source control.

30. Can UVC save energy?

Yes, UVC degrades organic build-up on coils for two eventual results: 1. The pressure drop across the coil declines to “as built/design” conditions. 2. The leaving air average wet-bulb temperature drops. Energy savings are therefore through increased heat absorption (transfer), reduced air horsepower (or increased air volume) and/or reduced run time, including the condenser. Reductions and increases always manifest themselves in some ultimate form of energy saving work. Using the UVDI Energy Calculator program is an excellent way to demonstrate savings potential.

31. Do Surface bio-films affect performance?

Published papers document Surface heat exchange efficiency reductions of up to 30% from the build-up of organic material. Also, the vast amounts of Surface cleaning chemicals and machines along with the many “replacement coil” manufacturers tend to attest to the prevalence of the problem.

32. What if I can't see mold on a surface?

Even a very slight visual occurrence would require millions of microorganisms per square inch and most of that which was thought to be simple dirt is usually fungi laden micro-nutrients. Also, a greater amount of nutrient and mold activity can be within the coil rather than on the visible part of the fins. In fact some more notable IAQ problems have occurred in so-called dry climates where visible or leading edge microbial activity or even so called dirt was not apparent.

33. Can UVC be installed in packaged rooftops or outdoor units?

NEMA style fixtures using single ended tubes have been designed specifically for rooftops and other outdoor systems. Please refer to our V-Strike models.

34. Can UVC be installed in small units?

Yes, unit ventilators, heat pumps and fan coil units, etc. are all candidates for UVC as they are often the dirtiest, most inefficient and IAQ problematic machines in existence.

35. Will UVC kill 100% of all airborne microorganisms?

Usually not, though very important are the big microbe number reductions and UVC is the perfect and sometimes the only choice to get the job done. Also, the process produces no secondary contamination!

36. Is UVC expensive?

In commercial, industrial or institutional buildings, the costs for lost heat exchange efficiency; air horsepower, surface cleaning and drain pan tablets already exceed the cost of a UVC install. This excludes routine labor, downtime, complaint service, absenteeism and litigation and the costs of lost work, play and companionship or duct cleaning, service calls and system change-out. The replacement tubes of course are far less yet.

37. Why are we hearing more about bioaerosols?

It might be that it plays well on the mystique of poor IAQ. The scientific researcher who popularized the word “bioaerosol” is Dr. Harriet Burge. Her position was and is that bioaerosols account for a larger portion of the IAQ issue than was commonly thought. The fact that she was both right then and now is why UVC is so popular today.

38. Are bioaerosols a bigger problem now?

There are two main reasons why we find more microbial activity today than in years gone by. First is time clock operation wherein A/C systems are shut down to conserve energy. During system off-periods, wet coils and drain pans along with ambient temperatures near perfect for accelerated microbial growth wreak havoc. Second is maintenance. Here systems are not cleaned as often as they were 30 years ago. Add system shutdown to the latter and one can visualize an increasing problem.

39. Can UVDI products be used at 50Hz?

Yes, all of our voltage options can, as they are independent of line frequency.

40. Can UVC Tubes be used in TB applications?

Yes, and UVDI has other materials on this subject that could be read. Contact UVDI for further information.

41. Why Should I Choose UVGI Products From Altru-V?

UVDI, through the design of its Altru-V brand of commercial UVC products has brought to bear decades of scientific research of UV to HVAC systems. By utilizing the science of UVC, Altru-V has introduced V-Smart software to take the guess work out of UV system design. V-Smart Select allows the user to understand how much UV energy is necessary to return HVAC system capacity and deliver proven energy savings. V-Smart Save predicts the annual energy savings and payback timeframe for the installation of the UVC system. Our UVC fixtures (also referred to as ultraviolet germicidal irradiation or UVGI) are designed for ease of installation (e.g. V-Mods track mounted “plug & play” design), use the most environmentally friendly (lowest mercury content) and cost effective UV lamp on the market and are UL/CUL listed for safety. All Altru-V products are manufactured in an ISO 9001:2000 certified plant, ensuring the high quality of every fixture.

42. Who do I contact for sizing an application?

Contact your local UVDI Representative or Marty Albert, Central Region Manager for UVDI. Marty can be reached at (815) 553-0623. Our corporate office, manufacturing and R&D facility is located in Valencia, CA, USA.

Insist on using...



From

