溢昇興業有限公司
Year Development Limited

Health issue on UV lamp and Ozone

Ultraviolet Light and Ozone receive a lot of attention concerning indoor air quality. Both are nothing new. They have been used for decades in hospitals, medical applications and the food industry. We only discuss some points and the truth around our products.

The Technology of PureAir Air Purifier

- We employed a Photo hydroionization System that is an advanced oxidation system that consists of PureAir technology UVC-Ozone producing bulb targeted on a catalyst target, which produces low-level ozone. Hydro peroxides and super oxide ions (We called it PhotoPlasma).
- Effective on the air that passes through the system for mold, bacteria and VOC's, kill microbials and reduce odors.
- Low cost, low maintenance (yearly), and easy installation. Not only does this process treat the air that passes through the device, it sends low-level ozone (.04 ppm), hydro peroxides and super oxide ions (PhotoPlasma) into the room for complete coverage and continuing disinfection.

Ozone is a concern to some people even when it is within federal safety limits.(The Federal limit for ozone devices is .04 ppm.)

Health Effects for Ozone

Potential risk of experiencing:

Decreases in lung function
Aggravation of asthma
Throat irritation and cough
Chest pain and shortness of breath
Inflammation of lung tissue
Higher susceptibility to respiratory infection

Factors expected to increase risk and severity of health effects are:

Increase in ozone air concentration

Greater duration of exposure for some health effects

Activities that raise the breathing rate (e.g., exercise)

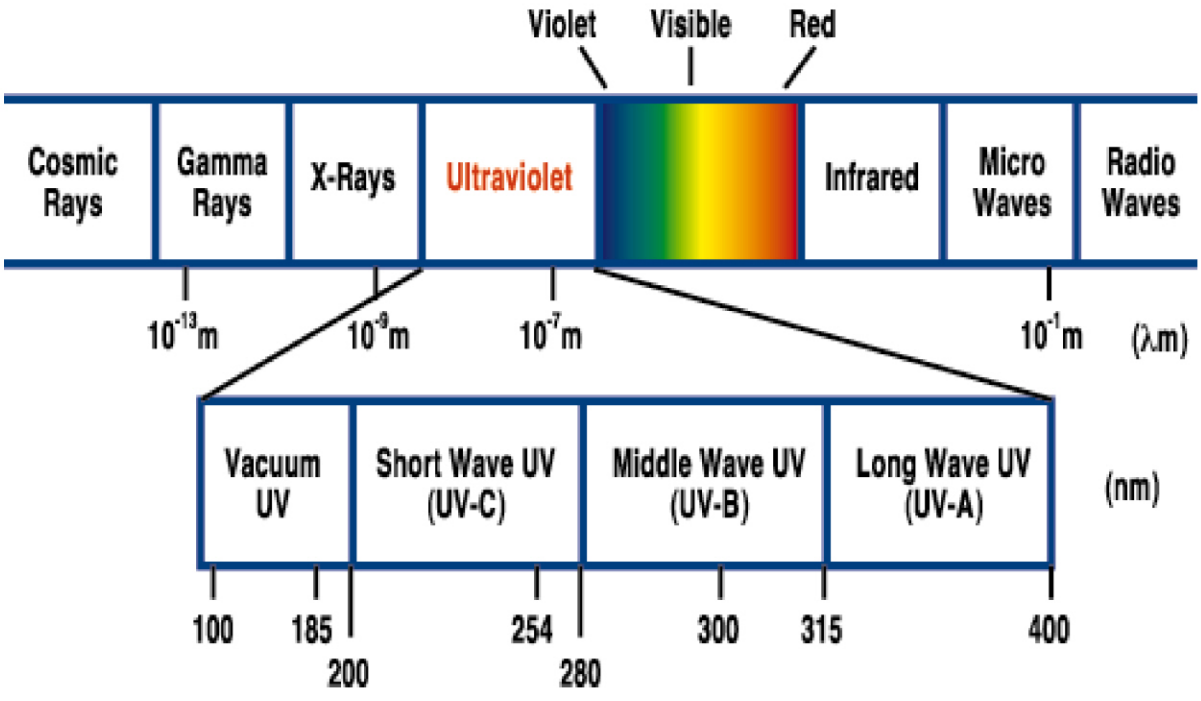
Certain pre-existing lung diseases (e.g., asthma)

Health Standards

- The **Food and Drug Administration** (FDA) requires ozone output of indoor medical devices to be no more than 0.05 ppm.
- The **Occupational Safety and Health Administration** (OSHA) requires that workers not be exposed to an average concentration of more than 0.10 ppm for 8 hours.
- **The National Institute of Occupational Safety and Health (NIOSH) recommends an upper limit of 0.10 ppm, not to be exceeded at any time**
- **EPA's National Ambient Air Quality Standard for ozone is a maximum 8 hour average outdoor concentration of 0.08 ppm**
- **(* ppm = parts per million)**

UV (ultraviolet) Light

Light is electromagnetic radiation, or radiant energy traveling in the form of waves. UV energy is found in the electromagnetic spectrum between visible light and and can best be described as invisible radiation.



Spectrum of UV

Categories of UV

UVA wavelengths(320-400 nm)

Are only slightly affected by ozone levels. Most UVA radiation is able to reach the earth's surface and can contribute to tanning, skin aging, eye damage, and immune suppression.

Longwave UV, also known as "blacklight", the major type of UV in sunlight, responsible for skin tanning, generally not harmful, used in medicine to treat certain skin disorders.

UVB wavelengths(280-320 nm)

Are strongly affected by ozone levels. Decreases in stratospheric ozone mean that more UVB radiation can reach the earth's surface, causing sunburns, snow blindness, immune suppression, and a variety of skin problems including skin cancer and premature aging.

A small, but dangerous part of sunlight. Most solar UV-B is absorbed by the diminishing atmospheric ozone layer. Prolonged exposure is responsible for some type of skin cancer, skin aging, and cataracts (clouding of the lens of the eye).

UVC wavelengths (100-280 nm)

Are very strongly affected by ozone levels, so that the levels of UVC radiation reaching the earth's surface are relatively small.

Also known as "shortwave" UV, includes germicidal (253.7nm wavelength) UV used for air disinfection. Unintentional overexposure causes transient redness and eye irritation, but does NOT cause skin cancer or cataracts.

Our UV lamp

A LP(Low pressure) mercury lamp generating 254 nm UV inside the tube. This 254 nm light is absorbed by “fluorophors” on the inner surface of the envelope, which then re-emit the light in the visible wavelengths. A quartz envelope allows the 254 nm UV light to come out into air or water. LP lamps are very efficient (35 – 40%) and have a long life (>8,000 h). The primary emission occurs at 254 nm, but there is an emission at 185 nm, which can be emitted from the lamp, if the quartz envelope is very pure. The power density of LP UV lamps

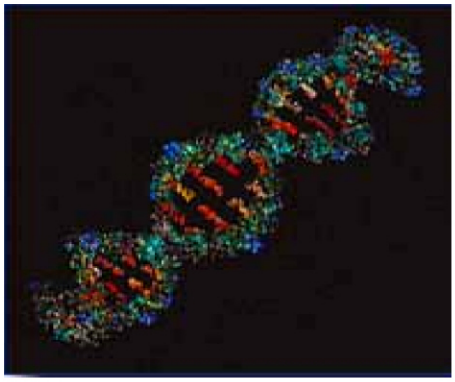
is low (about 0.2 – 0.3 W/cm), so that if the flow rate is large, a very large number of UV lamps will be required. Hence, LP UV lamps are used primarily in medium to low flow applications (e.g., for home systems, apartment buildings and small community water systems).

Effective for

- Disinfection, TOC Reduction, Ozone Destruction and Chlorine Destruction.
- Produce plasma for sterilization and air purification.

Disinfection

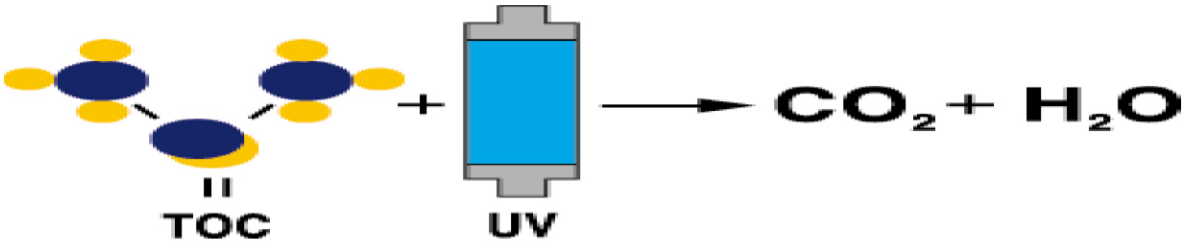
UV lamp for disinfection emits UV light of wavelength 253.7nm that penetrates the outer cell membrane of microorganisms, passes through the cell body, reaches the DNA and alters the genetic material. The microorganism is thereby destroyed in a non-chemical manner and is unable to reproduce.



All living organisms contain DNA (deoxyribonucleic acid). DNA provides the mechanism for all functions needed to sustain life.

TOC Reduction

UV systems are also used for the effective reduction of organics, commonly referred to as TOC (total oxidizable carbon).



Generated by a different quartz envelope material, the 185 nm wavelength for TOC reduction is shorter, and consequently more powerful than the 254 nm wavelength. In this case, UV energy promotes hydroxyl free radicals in varying degrees of photochemical excitement. These hydroxyl (OH-) free radicals break various chemical bonds of organics, which in turn produce chain reactions, oxidizing most

organics into CO2 and H2O - the basic building blocks of all organic compounds. Both TOC reduction and microbial destruction occur with the use of 185 nm UV systems. Our TOC reduction systems are capable of achieving <0.5 ppb TOC Specification.

Sammy Chung 2/2/2007