AeroMed® InFluence™ Technology

Driving Upper Air UV into the Next Generation

AeroMed® Integrity

As a trusted partner for critical environmental applications, we are committed to serving our clients' needs with integrity, honesty and trust.

AeroMed® Reputation

AeroMed environmental infection control products are used by healthcare facilities and clinical researchers around the world.

AeroMed® Engineering

AeroMed products are designed specifically for critical applications like yours. We have unparalleled product flexibility leading to equipment that better fits your specific needs.

History of UVGI

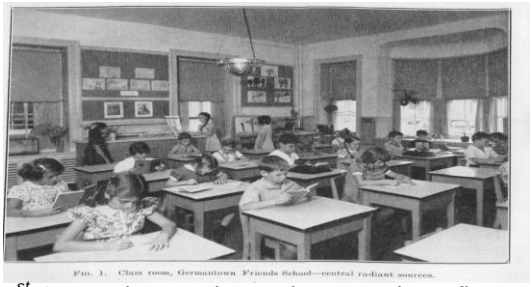
The term Ultra Violet (or UV) is used to describe a band of electromagnetic radiation that is not visible to the human eye. The energy associated with UV may be imparted to matter with which it interacts.

When airborne pathogens such as viruses, mold and bacteria are exposed to UV radiation, the energy from the UV breaks the molecular bonds within their DNA, inactivating them, rendering them unable to reproduce or cause infection.

Upper air germicidal ultra violet units are designed to irradiate air that may be potentially contaminated with pathogens. These fixtures have been used in healthcare facilities for several decades to protect occupants but there has been little change in design over that time.

1st Generation Upper Air UV Fixtures

The first upper air UV fixtures were introduced in the 1930's and were typically installed in rooms with high ceilings. As such they did not require any baffles. These fixtures were shown effective against measles, chickenpox and mumps in a classroom setting.



1st Generation Pendant style upper air UV fixture

2nd Generation Upper Air UV Fixtures

With the progression of time and the change in construction in favor of lower ceiling heights, the need to change the design of upper air fixtures became apparent. A minimal number of baffles were added in an attempt to block stray UV radiation and prevent exposure of the building occupants to UV. With the dramatic reduction in tuberculosis cases in the United States, these fixtures eventually fell out of widespread use.

3rd Generation Upper Air UV Fixtures

In the late 1980's the realization that tuberculosis cases in the US were on the rise for the first time in 200 years lead to the reintroduction of upper air UV fixtures in healthcare facilities. The early 1990's saw the first improvement in these types of fixtures in several decades. As ceiling heights continued to be lowered, and with the establishment of threshold limit values (TLVs) for UV exposure, the need to reduce stray UV light from these fixtures became apparent.

Baffle systems that were deeper and more tightly spaced were developed. To compensate for the resultant drop in UV output, higher intensity bulbs were applied and more attention was paid to the shape of the reflectors behind the UV lamps and to the materials used to make them. These 3rd generation (3G) units have been the industry standard for the past two decades, again, with little or no advancement in design.

The Global Tuberculosis Crisis

Tuberculosis has become a growing global health emergency. With the advent of multi drug resistant (MDR-TB), extensively drug resistant (XDR-TB) and now, totally drug resistant (TDR-TB) tuberculosis, developing and larger countries alike are struggling with how to best protect staff who provide care for TB patients and how to best prevent the spread of TB within healthcare facilities.

The question becomes "*what can we do that is effective at reducing transmission in healthcare settings while not exceeding equipment or maintenance budgets*"?

In certain locations the installation of HEPA air purifiers and negative pressure isolation rooms is not financially feasible. The installation of 3rd generation (3G) UV fixtures may be helpful and affordable but not as effective as desired. What can be done then to increase the effectiveness of these fixtures without increasing the cost to purchase or maintain them?

The Quest for a Better Upper Air UV Fixture

In order to design a better UV fixture, a determination needed to be made up front as to what would define a better fixture. The criteria for a better design were as follows:

1.) Research has shown that the effectiveness of a UV fixture is not measured by the UV wattage of the lamp within the unit but is measured by the effective UV that leaves the fixture and the UV fluence that it creates within the space. A better design would lead to higher UV output.

2.) The fixture must create an enhanced fluence without sacrificing the safety of the people within the space being irradiated.

3.) The fixture should create more fluence without expending more energy and without increasing the purchase price.

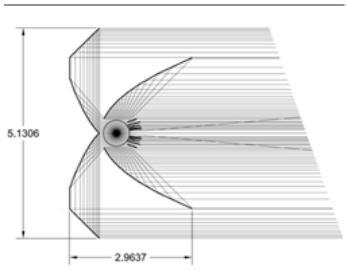
AeroMed's InFluence Technology ushers in 4th Generation (4G) of Upper Air UV Fixtures

InFluence (a combination of **I**rradiatio**n** and **Fluence**) technology combines safety and low cost in a fixture that delivers a higher rate of fluence within an irradiated space.

Higher UV Output

Only a very low percentage of UV energy created by a lamp ever leaves most fixtures and has an effective germicidal impact on the surrounding environment. This is due in part to poor reflector design, the need to baffle stray light for safety, and the fact that UV energy coming off the back of the lamp is reabsorbed into the lamp. The goal of InFluence technology is to harness this previously wasted energy and direct it into the upper air.

A major feature of InFluence Technology is the use of multiple parabolic reflectors to direct an increased amount of UV energy forward from the lamp. When energy from a UV lamp is generated from the focal point of a parabola, it is reflected forward in parallel (or collimated) beams of UV light.



InFluence Technology using Multiple Parabolic Reflectors

While at least one of the 3rd generation fixtures uses a parabolic reflector, all of the light from the back of the bulb is lost as is much of the light coming off of the front of the bulb. With InFluence technology, the rear, ineffective portion of the parabolic reflector is removed. This allows the UV light from the back of the bulb to strike a series of other, specially configured parabolic reflectors that direct that light around the primary reflector and out the front of the fixture. Also, smaller parabolic reflectors are positioned in front of the bulb, straightening what would be stray light and creating a collimated beam of light that is parallel to the light coming off of the other reflectors.

A second drawback of earlier generation fixtures is that the angle of irradiation was limited. UV radiation comes off of lamps in a spherical pattern from all points of the lamp arc. A good portion of this useful UV energy is blocked by the sides of early generation units. Fixtures using the InFluence technology design have open sides allowing for a wider angle of UV radiation to project from the fixture. A 3G UV fixture would have an angle of irradiation of approximately 130° while a fixture using InFluence technology would have an angle of irradiation of approximately 170°.

Increased UV Fluence

UV Fluence is defined as the amount of UV energy that an organism is exposed to. Higher levels of UV in the in the upper air of the entire space will create a greater fluence of UV. The InFluence technology fixtures give a combination of a higher output of UV, a thicker band of high output UV and a wider angle of irradiation lead to higher fluence values within a space. Higher fluence values will lead to improved germicidal impact, ultimately creating a safer environment for patients, staff and visitors.

While a great deal of effort has been made to increase the UV output and fluence levels created by these fixtures, doing so at the expense of safety would not be acceptable. The unique baffle design on units using InFluence technology help reduce the amount of stray light to a minimum. The distance from the UV lamp to the baffles are staggered, baffles at the top and bottom of the fixture extend out further to block stray light, while the baffles in the center of the fixture are closer to the bulb and have mini-parabolic reflectors attached to straighten out what could become stray light.

Better performance without increased cost!

Traditionally, consumers have been faced with the choice of buying a better product or sacrificing performance to stay within their budget. AeroMed Infinity UV fixtures using InFluence technology typically cost the same or less than 3rd generation UV products.

Going green saves green! AeroMed Infinity UV fixtures have a higher output of UV while using traditional low cost UV lamps. This increase in output efficiency is achieved without having to spend more money for the fixture, the lamps or the energy to run them saving the end user on both installation and energy expenses!

An additional benefit is that in certain settings you may be able to purchase fewer fixtures to obtain the desired levels of performance. This is made possible by the higher UV output of the fixture instead of the UV wattage of the bulb in the fixture.

Infinity™ Upper Air Germicidal UV Fixture

AeroMed® Innovation

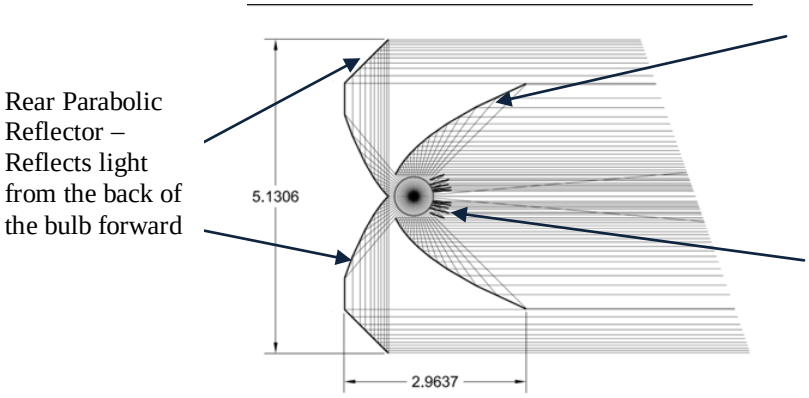
AeroMed continues to drive the evolution of infection control engineering in healthcare and bio-terror applications.

AeroMed® Compliance

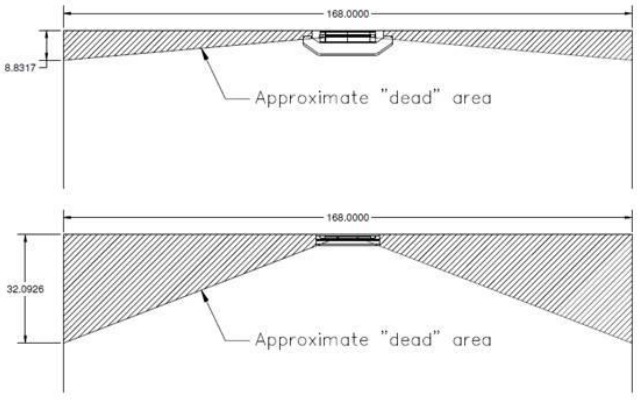
Through our products, services and consulting, AeroMed , partners with your facility to achieve and maintain compliance with industry codes, standards and guidelines.

AeroMed® Experience

With over twenty years of experience in environmental infection control, AeroMed has unparalleled experience in the healthcare industry.



The Infinity unit is the first fixture to use multiple parabolic reflectors to direct the UV energy out of the fixture. The geometry of a parabola is such that all energy coming from a correctly located focal point is emitted from the fixture as parallel or collimated light. In typical fixtures light coming off of the front and rear of the bulb is lost and is not reflected forward.



Wider Angle of Irradiance – The AeroMed Infinity fixture (left/top) has a wider angle of irradiance than typical UV fixtures (left / bottom). A typical fixture has over 350% more area that is not irradiated than the Infinity unit. The Infinity is a "green" product that does not create more UV energy but allows more of that energy to leave the fixture, increasing efficiency and performance, creating a safer environment.

Using AeroMed's InFluence™ technology increases performance while using standard components. This increase in output may allow the user to install fewer units and still create the necessary irradiance levels throughout the space. This will reduce the cost of the initial installation while also reducing the cost of maintain and powering the equipment.

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