WHITEPAPER: UV DISINFECTION FOR

Room Air Purification

SINCE 1963 ATLANTIC ULTRAVIOLET CORPORATION®

The Issue: Germs in the Air

When someone in your home or office is carrying an illness, keeping it to themselves is not easy. Every time they cough, sneeze, or laugh, millions of bacteria or virus particles spew through the air. Others nearby can breathe in these microbes, which can also be carried throughout a room by air currents. After germs rest on doorknobs, tables, chairs, and cabinet handles, they can be picked and infect people who touch these surfaces.

Microorganisms and fungi from outside can also make their way inside and will spread. Irritants can trigger and exacerbate allergies and asthma. Some of these microbes could also be disastrous for people with compromised immune systems.

Homes and offices are the perfect environment for these microorganisms to reproduce quickly. According to the EPA, people spend an average of 90% of their time indoors, and the concentrations of some indoor pollutants are often two to five times higher than what's found outdoors.[1]

"Most pollutants affecting indoor air quality come from sources inside buildings, although some originate outdoors."

U.S. Environmental Protection Agency [1]

How UV-C Works

UV light is made up of three wavelength ranges (UV-A, UV-B, and UV-C). UV-C lamps emit wavelengths at 254 nanometers, which destroy the DNA of harmful microorganisms and hinder their ability to multiply. Unwanted microbes eventually die off, making interiors safer and healthier.

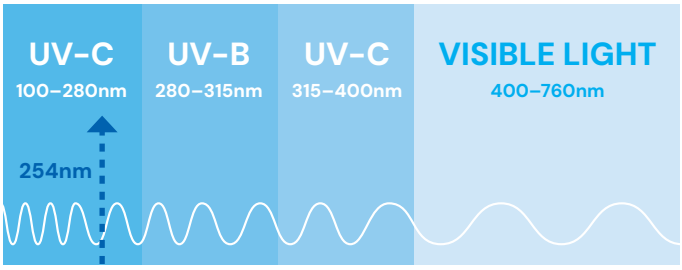

Figure 1: A Portion of the Electromagnetic Spectrum

Documented Evidence

A Harvard engineer implemented a 4-year study utilizing upper room ultraviolet germicidal irradiation (UVGI) in a Philadelphia school classroom.[2] The results of the study documented a drastically diminished infection rate among students in the classrooms equipped with UV fixtures (13.3% vs 53.6% in classrooms without UV).

When compared with four other room air cleaning models, upper room UVGI was shown to have the lowest cost per equivalent room air change (see Figure 2A) and was nearly 10 times more cost-effective than mechanical ventilation in that setting (Figure 2B).[3] A room air change occurs when 63% of contaminants within a room are removed.

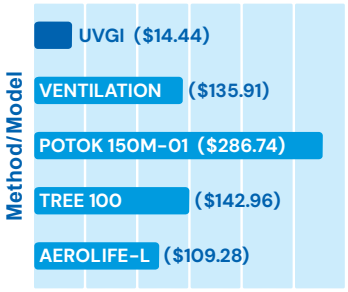

Figure 2A: Cost per equivalent room air change

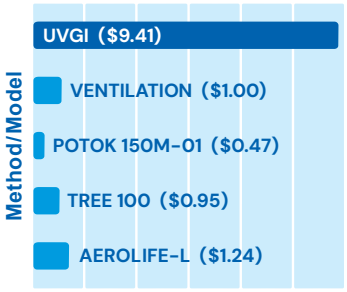

Figure 2B: Economical efficiency of room air cleaners

UV-C Doses

The UV-C doses below will inactivate airborne microbes that can spread in homes and office buildings. Millijoules per square centimeter (mJ/cm^2) is the measurement of energy produced by germicidal UV lamps over a certain amount of time.

Microorganism	UV Dose (mJ/cm^2)
Influenza	1.20
Adenovirus (various types)	34.0–116.0
Coxsackie	6.30
Tuberculosis	10.0
Morbillivirus hominis (measles)	4.40
Streptococcus pyogenes	.80
SARS-CoV-2 (COVID-19)	5.0

Table 1: UV-C Doses to Neutralize Airborne Microbes

UV-C Solutions

Both of the room air disinfection strategies shown below are designed to carry out room air changes in occupied spaces.

UV Room Air Sanitizers

Our **Sanitaire®** models conduct room air changes by drawing air in with a blower, exposing that air to UV rays within its chamber, and then releasing it back into the room. To treat areas that are well ventilated, we recommend a Sanitaire® model that will yield a minimum of three equivalent room air changes per hour. In areas that are poorly ventilated and areas that present a higher than usual risk of airborne infection (such as a crowded office area), install a model capable of six room air changes per hour. Available in wall mounted, ceiling mounted, and mobile models.

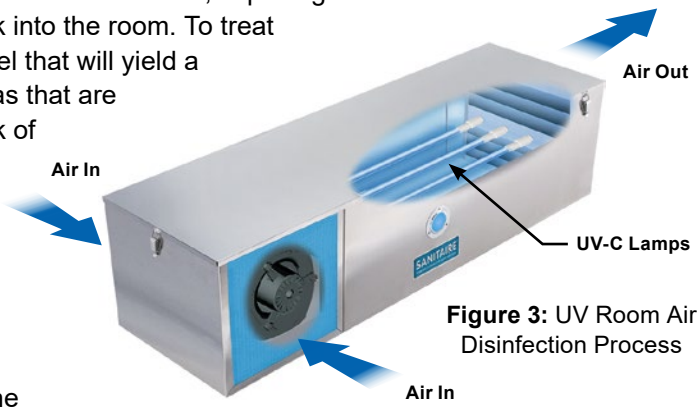

Figure 3: UV Room Air Disinfection Process

Upper Room UVGI

Our **Hygeaire®** upper air disinfection fixtures project long rays of UV-C light across the upper portion of a room, neutralizing the bacteria and viruses carried by convection currents. Wall mounted models must be installed on a plumb, vertical surface that is at least 7 feet from the floor and able to support 16 pounds.

These models are ideal for crowded interiors lacking ventilation, such as schools, medical centers, and homeless shelters. At the St. Agnes Shelter in New York City, eleven Hygeaire® wall mounted units were installed, hindering the transmission of airborne disease among residents and staff. *The Rensselaer Polytechnic Institute* recommends UVGI for control of infectious *Tuberculosis, Influenza,* and *Measles* pathogens within buildings.[4]

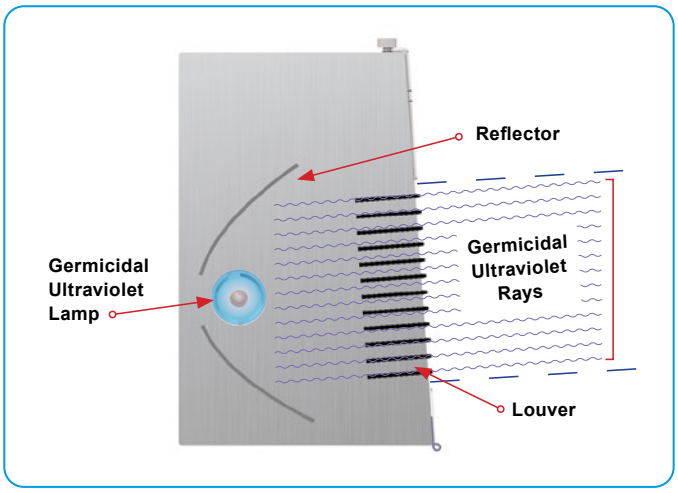

Figure 4: Hygeaire® UV-C Ray Emission (side view)

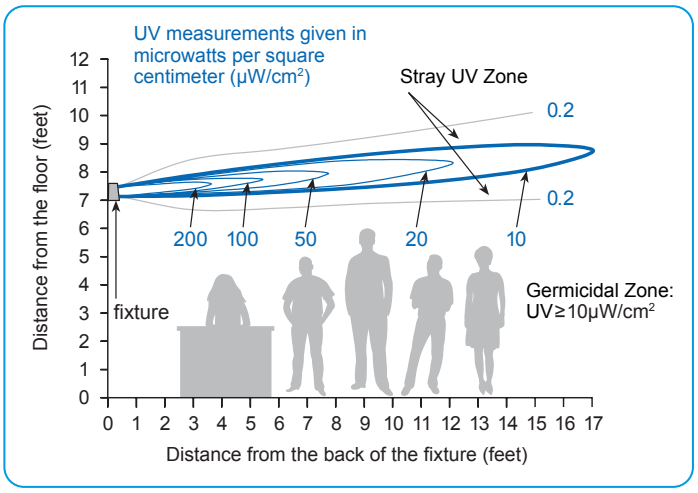

Figure 5: Distribution of UV rays from Hygeaire®

Sources

1. EPA. “Indoor Air Quality.” https://www.epa.gov/report-environment/indoor-air-quality
2. Reed, Nicholas. “The History of Ultraviolet Germicidal Irradiation for Air Disinfection.” *Public Health Reports*. Vol. 125, No. 1, January–February 2010. Pages 15–27. https://journals.sagepub.com/doi/epdf/10.1177/003335491012500105
3. Nardell, Edward A. “Air Disinfection for Airborne Infection Control with a Focus on COVID-19: Why Germicidal UV is Essential.” *Photochemistry and Photobiology*, Vol. 97, No. 3. May/June 2021. Pages 493-497 https://onlinelibrary.wiley.com/doi/10.1111/php.13421
4. Rensselaer Polytechnic Institute, Lighting Research Center, “Controlling Tuberculosis Transmission with Ultraviolet Irradiation.” 2003. https://ultraviolet.com/wp-content/uploads/2025/09/tuberculosis-upper-air-UV.pdf

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