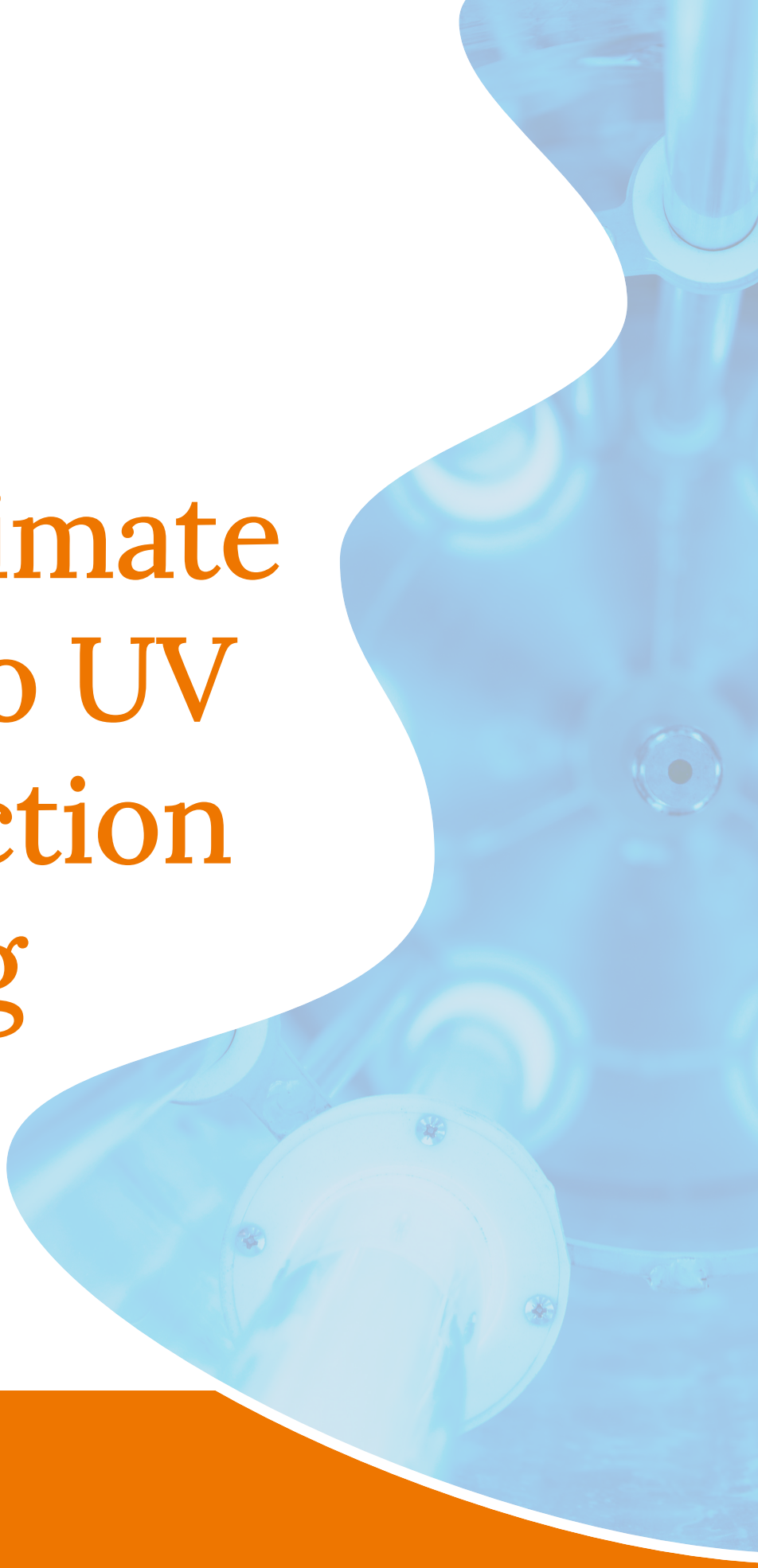
Citra

Lighting Design | Controls | Ambient Intelligence

The Ultimate Guide to UV Disinfection Lighting



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Ultraviolet (UV) light is an effective and well-established tool for inactivating harmful microbes. By producing DNA- and RNA-damaging electromagnetic energy, UV light renders bacteria, fungi, and viruses unable to function or reproduce. UV-C radiation—the high-energy portion of the UV spectrum—exhibits the most germicidal activity and has been used for decades to decontaminate air, surfaces, and drinking water. Healthcare environments take advantage of UV-C's germicidal capabilities to deactivate *Clostridium difficile* (C. diff) and other challenging pathogens that contribute to healthcare-associated infections.

The Benefits of UV Disinfection Lighting

UV lighting offers several clear benefits over alternative disinfection methods:

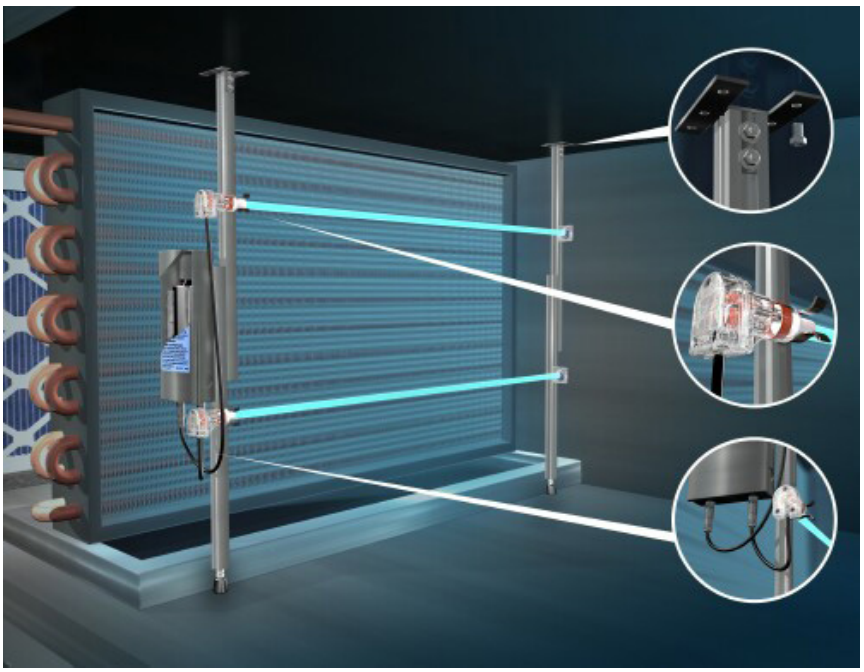
- Unlike harsh chemical disinfectants, UV light is non-toxic and safe if used correctly.
- Because it kills such a wide range of pathogens, UV light is an extremely effective disinfectant for air, water, and surfaces.
- Since UV light is a physical disinfection method, microbes are unable to build immunity and acquire resistance to it.
- While portable UV wands and lamps provide flexibility, UV lighting can also be installed in spaces as permanent fixtures that can operate autonomously.
- UV disinfection lighting is an affordable and low maintenance sanitation method.

The Different Types of UV Disinfection Lighting

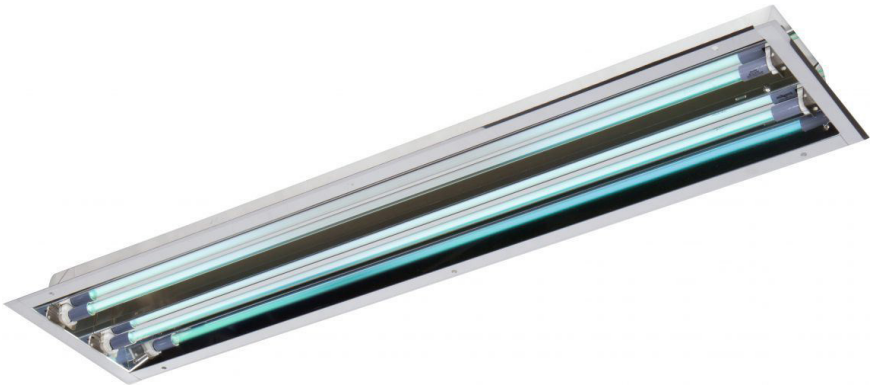
UV disinfection technologies are available in multiple forms, including:

- **Upper-air UV fixtures.** Upper-air fixtures allow for continuous upper-air UV irradiation to disinfect spaces, minimizing the risk of allergies, colds, flu, and other illnesses. These technologies take advantage of the fact that infectious particles tend to move from the lower part of the room to the upper 'germicidal zone.' Microbial inactivation is achieved through repeated UV exposure of the air over time as it cycles through the space.

- **UV light for HVAC systems.** As air passes through an HVAC system, the wet surface of the unit's cooling coil accumulates debris and creates an ideal environment for microbial growth. UV lights can be integrated into HVAC units to inhibit this growth and prevent microbial spread during air circulation. In order to be effective, however, the UV dosage being delivered to the coil's surface and the moving air stream must be properly calculated. Many UV providers fail to consider these variables, quoting dosage estimates based simply on the HVAC unit's tonnage instead. For optimal efficiency, buyers should establish a specific design guideline based on the level of microbial inactivation required for their application. Some systems, for example, are specifically designed to enable a 99.9% inactivation of airborne coronavirus particles.



- **UV-C fixtures.** Studies have found that the germicidal activity of UV light peaks at approximately 265 nm. Located in the 100-280 nm range, UV-C light is highly effective for cleaning air treatment systems, as well as preventing biofilm formation on the surface of water reservoirs. Mountable UV-C fixtures are an attractive form of UV disinfection lighting since they have low capital costs and are relatively easy to install, operate, and maintain.



- **Mobile units.** Another way to take advantage of UV light's disinfecting properties is through the use of mobile UV-C units. These durable devices use Teflon-encapsulated emitters to sanitize spaces in a safe, convenient, and reliable manner. To achieve balanced and uniform irradiation of the space, the room dimensions and the presence of any UV light-blocking obstacles should be considered when determining the optimal UV dose. Establishing proper UV disinfection cycle times is critical for achieving the dosage required to deactivate coronavirus and other pathogens.

The Different Applications of UV Disinfection Lighting

UV lighting is an incredibly versatile disinfection method that can be deployed in virtually any type of space. These technologies have been used for decades in research and industrial settings, including:

Food & Beverage

- Food processing
- Dairy processing
- Bakeries
- Food packaging plants
- Conveyor belts

Scientific

- Laboratories
- Cleanrooms
- Pathology labs

Manufacturing

- Pharmaceutical
- Electronic
- Cosmetic
- Conveyor belts

In response to heightened concerns about cleanliness and safety in public spaces, UV technologies are becoming increasingly popular in a number of commercial environments as well:

- Schools and universities
- Office and government buildings
- Places of worship
- Grocery stores
- Retail environments
- Sports facilities
- Convention centers
- Hotels
- Restaurants

Citra's Unique, Solution-Based Approach to UV Lighting

Rather than simply selling a commodity, Citra works closely with clients to develop application-specific UV lighting solutions based on their goals and budget. Our multifaceted, systematic approach optimizes UV lighting strategies for each unique space, providing the highest level of disinfection for maximum occupant safety.

By taking a more holistic view that incorporates numerous surface and air disinfection strategies in conjunction with each other, we are able to deliver a comprehensive and highly effective disinfection solution for virtually any facility or environment. We can incorporate one or more of the following strategies, allowing us to tailor the solution to the needs of the application:

AIR DISINFECTION	
LEVEL ONE	**LEVEL TWO**
HVAC Air Treatment	**Early Air Treatment**
Air Handling Unit (AHU) Mounted UV System	Ceiling Mounted UV Based Air Purifier
Roof Top Unit (RTU) Mounted UV System	Wall Mounted UV Based Air Purifier
In-Duct Mounted UV System	Floor Mounted UV Based Air Purifier
Split Unit Mounted UV System	
PTAC Units Mounted UV System	
Fan Coil (FC) Mounted UV System	

SURFACE DISINFECTION	
LEVEL ONE	**LEVEL TWO**
All Surface Treatment	**Targeted Surface Treatment**
Ceiling Mounted UV Fixture	Electrostatic Sprayer
Wall Mounted UV Fixture	High Power UV Wand
Mobile (Portable) UV Fixture	

Level One Air Disinfection

Level One Air Disinfection solutions incorporate UV treatments into the HVAC system throughout the facility. These treatments may include:

- Air handling unit (AHU) mounted UV system
- Rooftop unit (RTU) mounted UV system
- In-duct mounted UV system
- Split unit mounted UV system
- PTAC units mounted UV system
- Fan coil (FC) mounted UV system

Level One Surface Disinfection

Level One Surface Disinfection solutions focus on full-room disinfection, sanitizing all surfaces within a room. Tools at this level may include:

- Ceiling-mounted UV fixtures
- Wall-mounted UV fixtures
- Mobile (portable) UV fixtures
- UV disinfection robots

Level Two Air Disinfection

Level Two Air Disinfection solutions offer more intense and focused treatment of early air at the room level to provide more comprehensive air treatment. Level Two systems may incorporate the following:

- Ceiling-mounted, UV-based air purifiers
- Wall-mounted, UV-based air purifiers
- Floor-mounted, UV-based air purifiers
- Upper air UV fixtures

Level Two Surface Disinfection

Level Two Surface Disinfection solutions target high-traffic or high-risk surfaces with specific treatments. These targeted surface treatments may include:

- Electrostatic sprayers
- High-power UV wands

Our team works with the customer to understand the specific details of their HVAC system and the various surfaces within the facility, ensuring that we can recommend a UV light disinfection system that provides maximum benefits based on the operation and facility condition.

Why Citra?

Citra is an innovative tech-based lighting technology company specializing in the development of custom lighting solutions for:

- Lighting Modernization Projects (Lighting Retrofit)
- Smart Building/Net Zero Building (Lighting Based IoT)
- Disinfection of Air & Surfaces (UV Lighting)

We provide a variety of benefits such as:

- Optimal Illumination Levels
- Maximum Energy Savings
- Building Intelligence. Data to Drive Operational Efficiencies.
- Safe Environment for Building Occupants

Our knowledge of UV disinfection technology combined with decades of engineering experience makes us uniquely qualified to develop lighting solutions for virtually any industrial or commercial space. Based on a thorough evaluation of your facility, we can design and implement everything from simple upgrades to advanced lighting and sensor systems connected through cloud-based IoT technologies. As a minority- and woman-owned business, diversity and inclusion also play an integral role in all aspects of our operation.

UV lighting technologies provide a highly effective non-chemical approach for killing microbes in the air, in liquids, or on surfaces. Using motion sensors, IoT platforms, configurable systems, and other advanced technologies, Citra provides intelligently engineered UV disinfection lighting solutions for everything from laboratories and hospitals to office buildings and hotels.

To see how our UV lighting systems can improve the cleanliness and safety of your space, please contact us today.

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