

Demand For Ultraviolet Irradiation For Germicidal Solutions Surges During Coronavirus Pandemic

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Since the coronavirus pandemic began, the ultraviolet irradiation industry has seen an unprecedented surge in demand for germicidal solutions. UV-C light is a short-wavelength, ultraviolet light that kills germs by inactivating a microorganism's DNA. Germicidal UV-C energy is just one of three proven methods identified by ASHRAE of controlling airborne infection. The other two are ventilation and particle filtration.

However, although UV-C is effective in killing other varieties of coronaviruses, such as SARS and MERS, scientists do not yet know about the impact of UV-C on COVID-19. The ultraviolet germicidal waveform (253.7 nm) kills every known microorganism including bacteria, viruses, molds and other pathogens – even antibiotic-resistant superbugs.

Proven, Mainstream Technology



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Therefore, it's incumbent on facility engineers to use multilayer preventative infection-control measures such as germicidal UV-C to help ensure that whatever pathogen is not "killed" by one method (say filtering or cleaning) is inactivated by another (UV-C). UV Resources, Santa Clarita, Calif., helped establish ultraviolet air and surface treatment as a mainstream technology.

However, there is still a surprising amount of doubt and misinformation surrounding the application of UV-C technology, says Daniel Jones, President, UV Resources. *"We have redoubled our educational focus and hired a communications manager to oversee these efforts,"* he said.

air distribution systems

"While some bacteria and viruses are more susceptible to UV disinfection than others, all microorganisms tested do respond at the appropriate doses," says Jones. *"And, unlike antibiotics and vaccines, there is no way for microbes to develop a resistance to the germicidal energy of UV-C."*

In-duct germicidal UV-C systems are installed in air-handling units or air distribution systems to inactivate microorganisms that propagate allergens and to disinfect moving airstreams "on-the-fly," translating into better indoor air quality (IAQ), improved occupant productivity, and lower incidences of sick days.

emergency waiting rooms



Operating 24/7/365, upper-room germicidal fixtures can inactivate microbes in under a second

A UV-C lamp system is a complete solution that includes a UV-C lamp, wiring harness or some means of connecting the lamp to an electronically-matched ballast, and can include accessories

such as lamp/ballast monitors, safety switches, viewport/access doors and lamp timers.

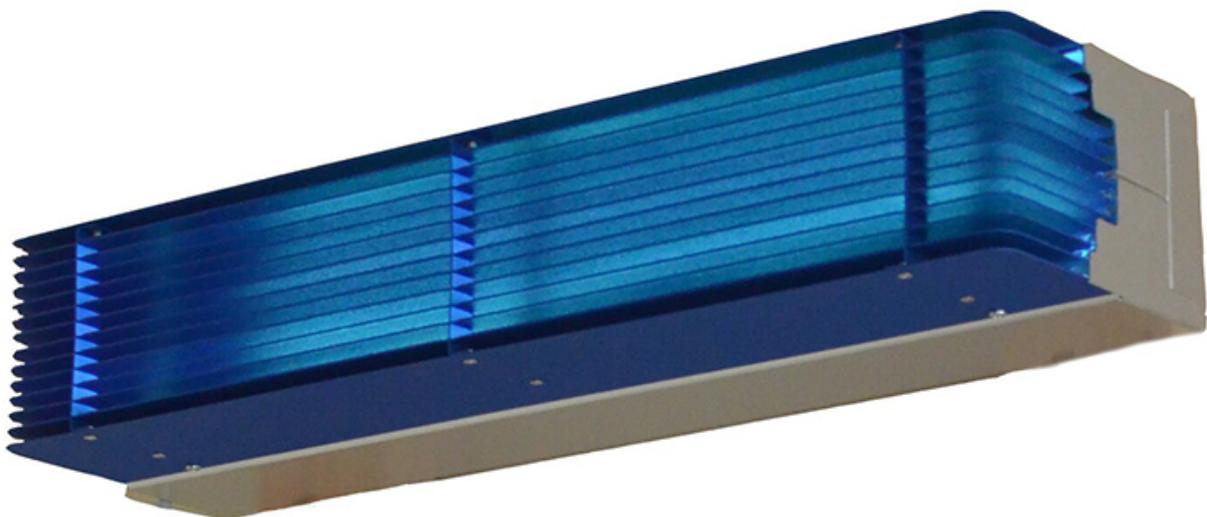
Upper-room germicidal UV-C fixtures — ideal for infection control — work by interrupting the transmission of airborne infectious diseases in high traffic communal areas.

Immunocompromised and contagious individuals in emergency waiting rooms, urgent care facilities, doctor offices or senior living centers increase the potential for community spread by positioning potentially undiagnosed/untreated patients near others.

upper-room germicidal fixtures

The upper-room UV-C fixtures utilize the natural rise-and-fall of convection or mechanical air currents to lift airborne infectious agents above seven feet, where they are exposed to UV-C irradiation and killed. Operating 24/7/365, upper-room germicidal fixtures can inactivate microbes in under a second, including measles, mumps, TB, and cold viruses.

These fixtures are wall-mounted and use baffles to direct the UV-C energy upward and outward ensuring that no UV-C energy enters the occupied portion of the room. Kill ratios of up to 99.9% on a first-pass basis have been modeled, and concentrations are further reduced by each subsequent pass of recirculated air (“multiple dosing”).



The powerful GLO Upper-Room Germicidal Fixture from UV Resources delivers up to 350% more irradiance than conventional upper air UV systems

elevate infection control

“Healthcare and commercial office buildings have traditionally represented the early adopters of UV-C technology to disinfect airstreams, HVAC surfaces and the upper air,” says Jones. “The healthcare industry has once again led the surge in use of UV-C during this current pandemic. However, the unprecedented global impact of this pandemic will elevate infection control and life-safety issues to the forefront of vulnerabilities that can lead to business-crippling crises in every business across every industry.”

Just as no one would operate an HVAC system without air filters, the time is near when no one will operate HVAC/R systems without UV-C installed, says Jones. However, UV-C technology has long been misunderstood and therefore under-utilized in the HVAC market.

Air-stream disinfection systems



Upper-room UV-C fixtures cost as little as \$2.50 - \$3.10 per square foot of treated space

UV Resources has been a key driver in advancing this technology; collaborating on UV-C research, authoring white papers and technical articles aimed at educating, and leading the industry’s expansion through science and education. *“Indeed, our industry educational roots can be traced to our late founder and respected industry leader, Forrest Fencl, who pioneered the modern application of UV-C in HVAC/R equipment and contributed countless hours serving ASHRAE as a Distinguished Lecturer on UV-C,”* says Jones.

Upper-room UV-C fixtures cost as little as \$2.50 - \$3.10 per square foot of treated space. Air-stream disinfection systems range from \$0.60 - \$0.80 per cfm (cubic feet per minute), and HVAC Surface Disinfection systems are approximately \$0.15 - \$0.20 per cfm, literally bargains when compared to human lives, lost productivity, healthcare costs and healthcare resources.

air conditioning system

It's easy to think of UV-C as high-tech and therefore expensive, but this simply isn't true. A UV-C coil irradiation system has an average installed cost of \$0.20 per cfm, and many users report that their cost for an installed UV-C system featuring high output lamps was even less.

Using a 10,000-cfm system as an example, the installed UV-C fixtures would cost \$2,000, with an annual operating cost of \$188 at \$0.10/kW – operating 24/7/365. That is less than 1% of the average power savings gained through a more efficient (better heat transfer and lower pressure drop) air conditioning system.

reduce energy consumption

Virtually all commercial HVAC/R systems are potential candidates for UV-C because of the universal benefits it brings, including:

- ┌ destruction of surface and airborne microorganisms;
- ┌ the restoration and preservation of heat transfer and airflow capacities to "as-built" condition;
- ┌ improved indoor air quality; and
- ┌ reduced maintenance.



On the human side, providing 'clean air' has taken on a whole new meaning of providing a safe environment"

Adding UV-C to existing HVAC/R systems can reduce energy consumption by up to 25%, while improving IAQ, airflow volume and comfort levels. Users report that UV-C installations are very cost-effective, with many customers achieving paybacks in less than six months on energy use alone. They also report that UV installations cost no more, and sometimes less, than a professionally executed coil cleaning.

efficiency-enhancing technology

The focus at this moment for engineers and facility managers is infection control and improved IAQ. By using UV-C, in both upper-room and in HVAC systems, they can have the dual benefit of providing a healthier environment for occupants and reducing the performance-robbing impact of bacterial buildup on AHU cooling coils.

“On the human side, providing ‘clean air’ has taken on a whole new meaning of providing a safe environment,” says Jones. Cost-concerned managers should understand that UV-C fixtures can be installed for an average of <\$0.20 per cfm – a fraction of the 10-25% potential energy and maintenance savings yielded by the efficiency-enhancing technology, he comments.

Author Profile



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