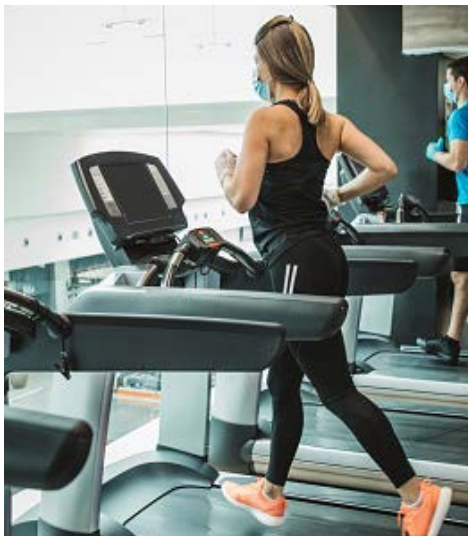
Air and Surface UV LED Solutions

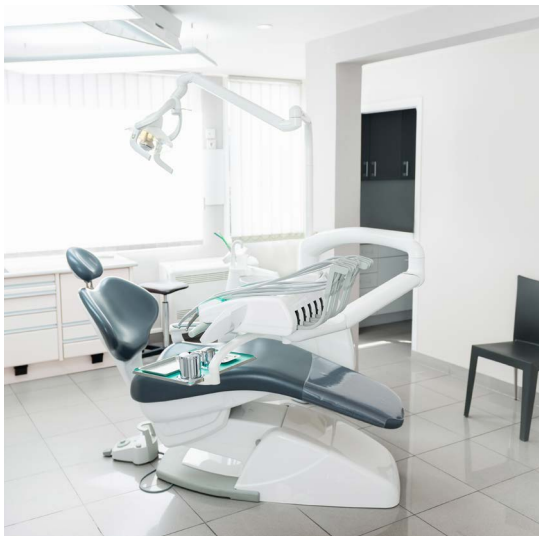
# Disinfection Lighting for Occupied Spaces

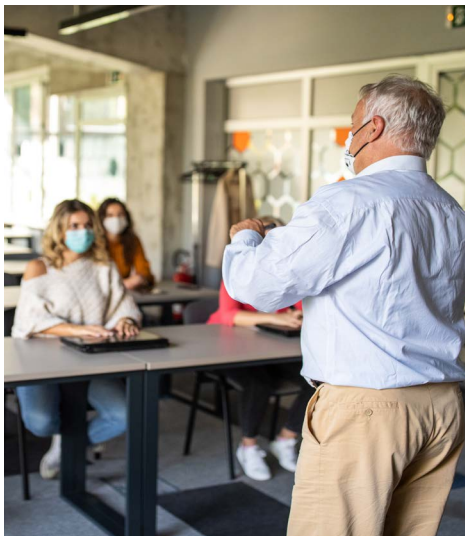
## 365DisInFx™ technology

Decades of UV and LED experience drive solutions for continuous disinfection.

Current







# Different Solutions for Different Needs

Meeting today's challenging demands for cleaner facilities requires complementary disinfection measures based on facility use and design. Current stands ready with disinfection UV solutions that provide an additive solution for both viruses in the air and bacteria on surfaces without time and occupancy constraints.

**Compliant** IEC 62471 – Photobiological Safety for Lamps and Lamp Systems standard and American Conference of Governmental Industrial Hygienists (ACGIH®) TLVs® guidelines for human exposure to UV.

**Continuous** Flexible LED solutions for 24-hour occupancy with UV dosage designed to operate below human health exposure limits.*

**Test-Driven** Third-party testing substantiates our claims and validates our predictive models; we continue to expand our testing to verify effectiveness against additional pathogens.**

## A Breakthrough in LED

### Now

**Traditional UV germicidal disinfection lighting**

Xenon discharge or mercury-based lamps deliver **uncontrolled high doses of UV** to inactivate pathogens.

For use in **unoccupied spaces** only or with safeguards required to eliminate possibility of direct exposure.

Lamp sizes that can create **limitations related to form factor.**

### Next

**LED disinfection lighting solutions**

**Controllable LED functionality** can be designed to emit high-efficiency low-dose UVC for **continuous use in occupied spaces.**

**Flexible design and application** integration due to LED system size.

*Of IEC 62471 Photobiological Safety for Lamps and Lamp Systems standard and American Conference of Governmental Industrial Hygienists (ACGIH®).
**Current  is certified through UL's Data Acceptance Program (DAP) to perform testing to the IEC 62471 safety standard.

Facility owners and managers must deal with the ever-changing backdrop of concerns related to spaces where people gather and interact.

**Current teams have been applying resources and design expertise in meeting this growing industry challenge.**

# 365DisInFx™ technology

## UVA

## UVC

**Unique offerings to help in disinfection strategy.**

### LDU Downlight, LBU Recessed and AVU Linear

- Delivers low-dose UVA to inactivate bacteria on surfaces
- Integrated into various light fixtures
- Fixture light source available with wired or wireless controls
- Glass lens transmits UVA

### LPU Device

- Delivers low-dose UVC to inactivate aerosolized viruses
- An easy-to-apply device
- Small (5" diameter, 1.2" deep), easy to install and fits most ceiling designs
- Similar in appearance to a standard smoke detector

## Disinfection Lighting for Occupied Spaces: 365DisInFx™

- LED-delivered solutions that help inactivate pathogens both in the air and on surfaces
- LED solutions designed to deliver 24-hour deactivation in occupied spaces
- Meets IEC 62471 standards and ACGIH® guidelines for 24-hour-a-day occupancy

365DisInFx™ UV technology addresses airborne pathogens and should be used in conjunction with proper PPE and cleaning protocols as part of a complete indoor disinfection strategy. If combining two or more UV solutions, please consult a trained product application representative to ensure the total irradiance (UV dose) does not exceed recommended human exposure limits. This may negatively impact inactivation rates.

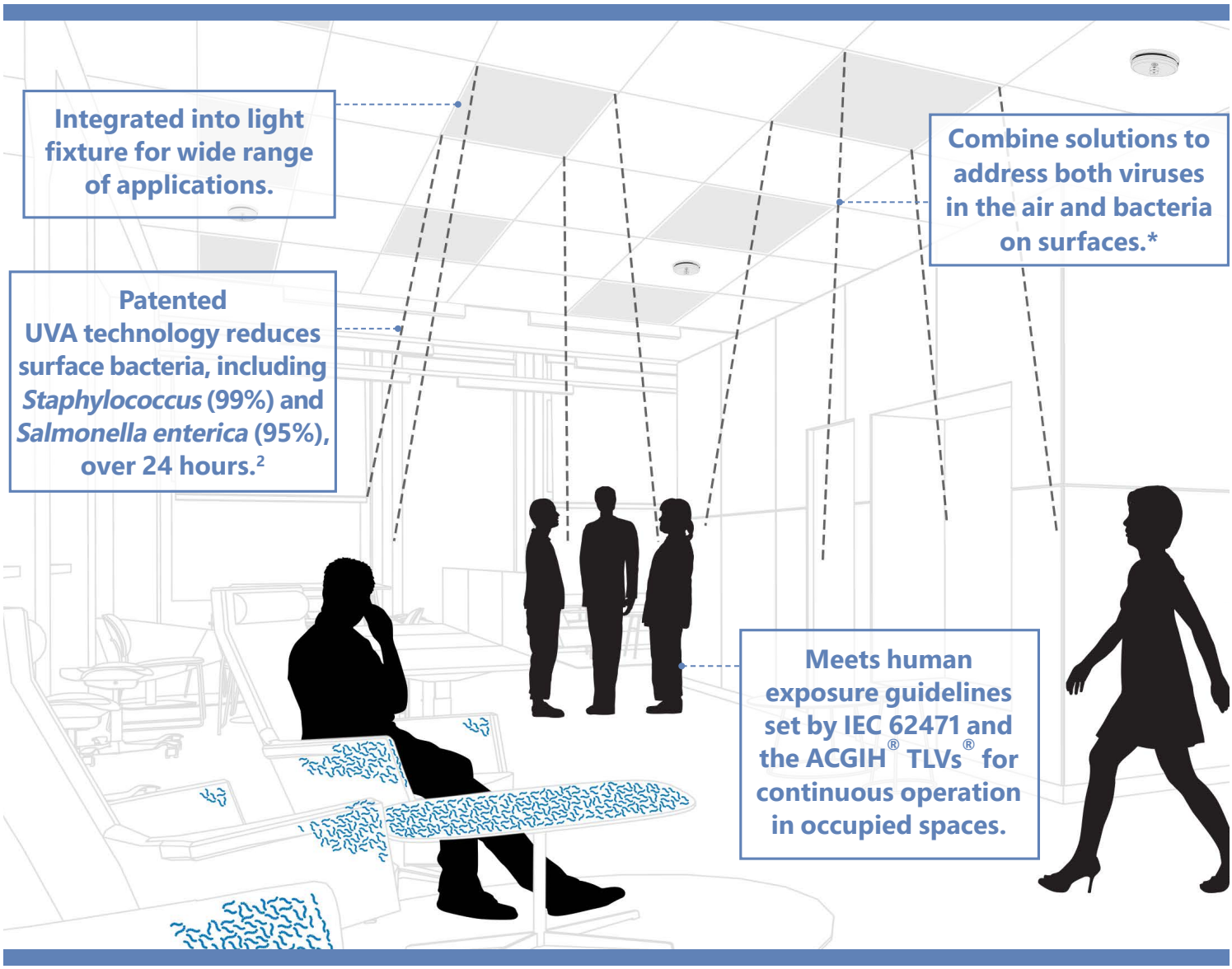
## Why Current?

We bring a long-standing and broad range of experience in light source and fixture technology. That, coupled with scientific know-how and investment, has led to highly effective solutions—targeting specific UV wavelengths—for surface and airborne pathogen deactivation.

# UVA Technology: *Surface Disinfection*

*Many bacterial and fungal pathogens are transmitted primarily through high-touch surfaces.*

**365DisInFx™ UVA technology integrated into the light fixture helps provide surface disinfection while lighting the space.**



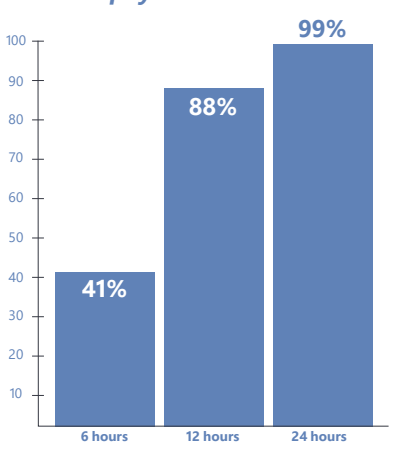

**24/7**

**Continuous Inactivation**

**Photoactivation helps render pathogen inactive**

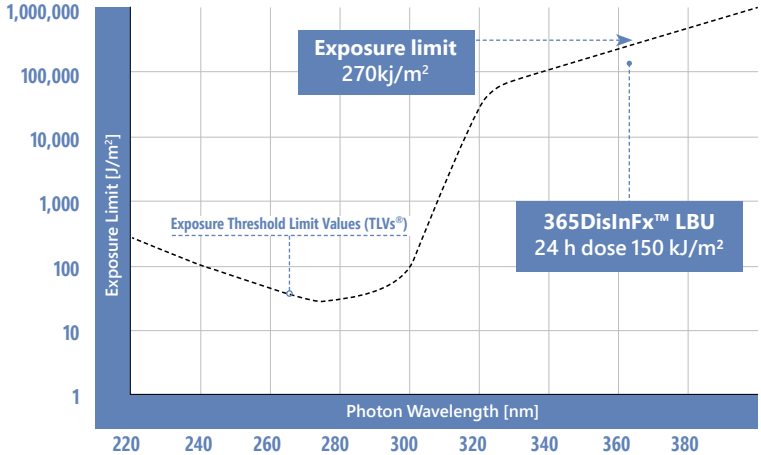
Inactivation over 24 hours*

***Staphylococcus aureus***




*0.5/m² and 24-hour exposure, predicted inactivation
Based on photobiological science and mathematical modeling

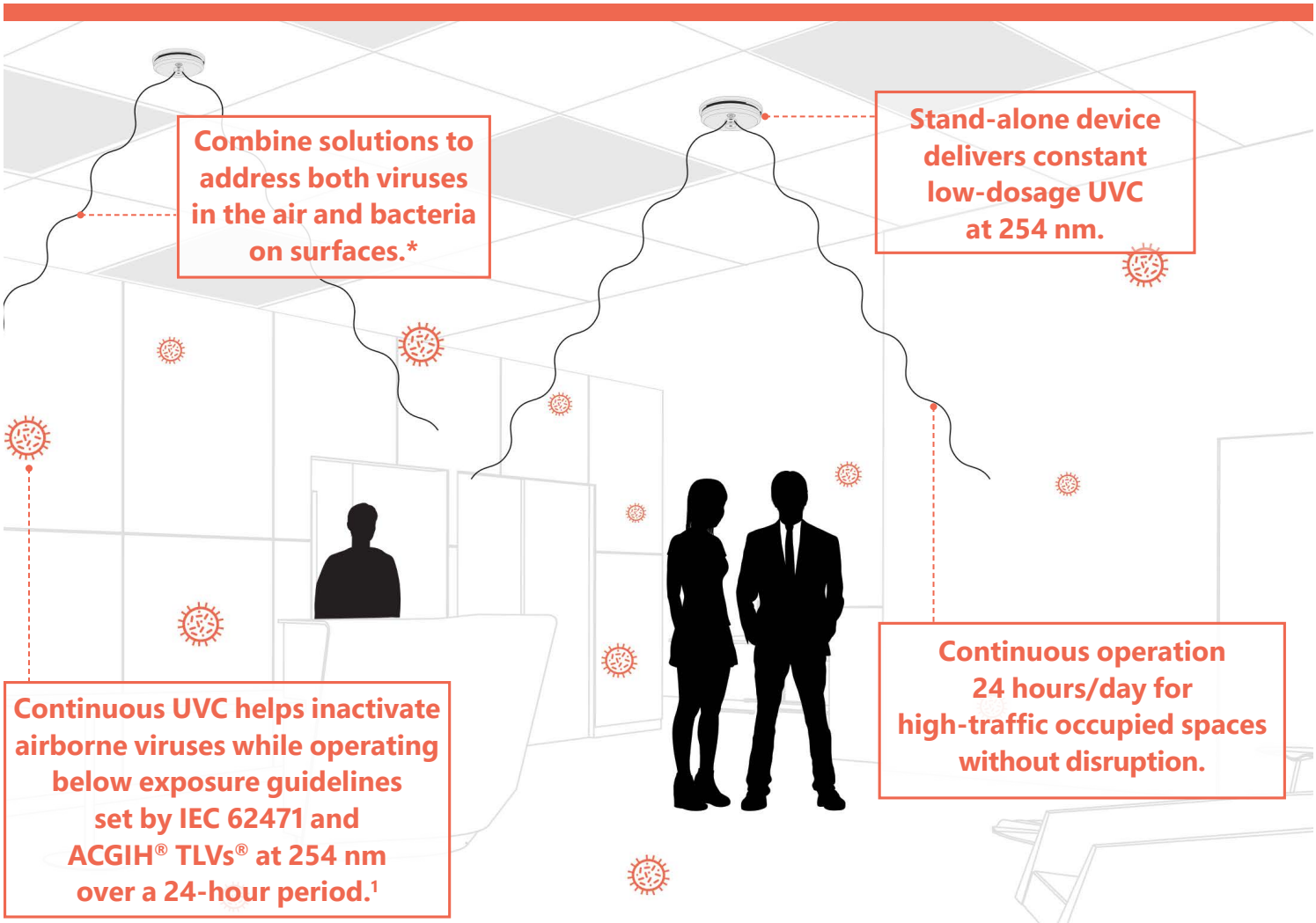
**ACGIH® Exposure Threshold Limit Value (TLVs®) vs. Wavelength**




Continuous low dosage at 365 nm inactivates surface bacteria and fungi below ACGIH® TLVs®

# UVC Technology: *Air Disinfection*

*While droplets fall quickly out of suspension, aerosolized viruses can remain airborne for hours.*
**365DisInFx™ UVC technology solutions can help reduce viruses in air.[1]**

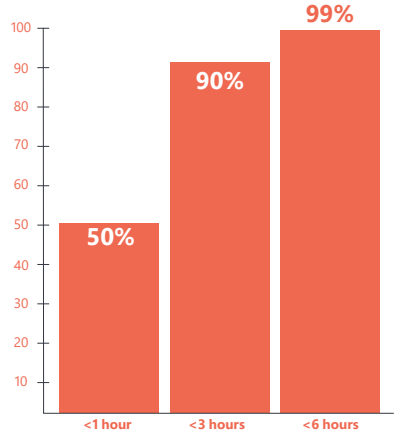



* If combining two or more UV solutions, please consult a trained product application representative to ensure the total irradiance (UV dose) does not exceed recommended human exposure limits. This may negatively impact inactivation rates.

**24/7**
**Continuous Inactivation**

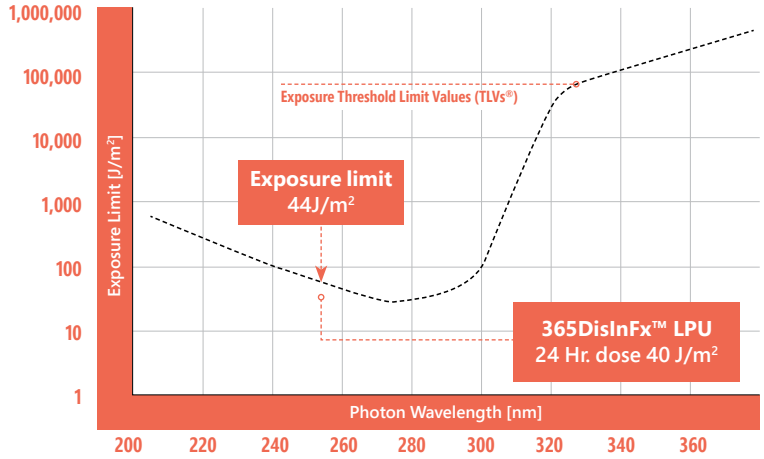
**Disrupts RNA of viruses to help inactivate them**

Projected* **Coronavirus** Inactivation




*32J/m² delivered over 24-hour exposure
Based on photobiological science and mathematical modeling

**ACGIH® Exposure Threshold Limit Value (TLVs®) vs. Wavelength**




Continuous low dosage at 254 nm inactivates aerosolized pathogens without exceeding ACGIH® TLVs®

Current has completed in-situation testing of its 365DisInFx™ UVC disinfection technology LPU series devices utilizing the aerosolized virus, bacteriophage MS2.

This benchmark testing with the bacteriophage MS2 resulted in 88% inactivation of the aerosolized virus in a 10-by-10-by-8-foot room within 4 hours. Applying the test results to 24-hour continuous operation of the 365DisInFx™ LPU would result in 44% inactivation of bacteriophage MS2 in 2 hours.

Bacteriophage MS2 is a nonenveloped virus that is commonly used as a surrogate for viruses that are pathogenic to humans. It is particularly useful as a surrogate because published scientific testing and literature support that bacteriophage MS2 is more resistant to UVC than certain enveloped viruses, such as coronaviruses and influenza.

Based on photobiological science and mathematical modeling, Current anticipates equivalent or better results for seasonal coronaviruses and SARS-CoV-2. When properly installed and configured for the space, continuous operation of the 365DisInFx™ LPU should provide 50% inactivation in the first hour of exposure, 90% inactivation (1 log) in 3 hours or less of exposure, and 99% inactivation (2 log) in 6 hours or less of exposure. Current continues to conduct additional confirmatory testing.

365DisInFx™ UVA disinfection technology was tested using in vitro methods (as described in Livingston[1] and Kvam[2]), which resulted in 99.7% reduction in MRSA on surfaces exposed to 3W/m$^2$ of 365 nm UVA over a single 8-hour period. Results of this testing also showed significant reduction over a similar exposure period of certain common pathogens including *Staphylococcus aureus, Enterococcus faecalis, Escherichia coli, Acinetobacter baumannii, Pseudomonas aeruginosa, Candida albicans* and *auris*, associated with hospital-acquired infections (HAIs). Photobiological science and mathematical modeling enables us to calculate expected inactivation rates for 24-hour continuous operation of the 365DisInFx™ UVA technology.

**Notes and Citations:**


1. Livingston SH, Cadnum JL, Benner KJ, Donskey CJ (2020) Efficacy of an ultraviolet-A lighting system for continuous decontamination of health care-associated pathogens on surfaces. Am. J. Infect. Control 48: 337-339. https://doi.org/10.1016/j.ajic.2019.08.003
   - inoculated steel disk carriers, modification of ASTM E-2197-02
   - using a benchtop device that delivered the 3W/m² irradiance

2. Kvam E, Benner K (2017) Disinfection via LED Lighting: summary of mechanism and results for 365nm-mediated inactivation of microbes.
   GE Global Research Technical Information Series
   2017GRC0545, GE Confidential (Class 3)
   Kvam E, Benner K. Mechanistic insights into UV-A mediated bacterial disinfection via endogenous photosensitizers.
   Journal of Photochemistry and Photobiology B: Biology. 2020;209:111899. doi:10.1016/j.jphotobiol.2020.111899.
   - inoculated steel disk carriers, modification of ASTM E-2197-02
   - using a benchtop device that delivered the 3W/m² irradiance


To see our most up-to-date third-party test results and complete product portfolio, go to **LED.com**

## Make an Informed Decision

**Understanding the complexities of available technologies and selecting the right solution are a decision you can make with confidence when you choose Current.**

- UV radiation can pose a risk of personal injury. Overexposure can result in damage to eyes and bare skin. To reduce risk of overexposure, equipment must be installed in accordance with manufacturer's site planning and application recommendations, including minimum ceiling height restrictions.
- UV solutions are intended for common high traffic spaces and not recommended for dwellings or home use.
- Installation of the devices should be performed by qualified professionals as detailed in Current's installation guide.
- To allow for occupancy during use, Current products comply with IEC 62471 – Photobiological Safety of Lamps and Lamp Systems standards and American Conference of Governmental Industrial Hygienists (ACGIH®) TLVs® guidelines when installed as directed.
- Current's UV products are meant to be used in conjunction with other protective measures like manual cleaning and the use of proper PPE. They are not a substitute for other measures.
- Current products are not intended for use as a medical device.
- If combining two or more UV solutions, whether from Current and/or other manufacturers, please consult a trained product application representative to ensure the total irradiance (UV dose) does not exceed recommended human exposure limits. To the extent UV solutions are combined, it may impact inactivation rates.

Current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