RELIABLE, QUANTIFIABLE MEASUREMENT OF UVC RADIATION NECESSARY FOR EFFECTIVE DISINFECTION

UVKey™ eliminates efficacy guesswork by providing accurate numeric measurement of the UVC dose

- UVC germicidal technologies are effective, quick disinfecting solutions to help prevent HAIs
- Precise measurement of the UVC dose is a critical quality assurance measure
- **UVKey** ensures optimal dosage and consistency for controlled operations

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Protecting people from infections is critical to responsible healthcare operations, but traditional cleaning methods are not enough.

The CDC estimates that healthcare-associated infections (HAIs) kill more people each year globally than car accidents, breast cancer, and AIDS combined, costing the U.S. healthcare system an estimated $30-45 billion each year.[1]

According to the Alliance for Aging Research, in the United States alone, about 99,000 people die every year due to hospital-acquired HAIs.[2]

HAIs also result in prolonged hospital stays causing significant economic hardships to patients and putting significant strain on available medical resources.

To prevent HAIs, hospitals have adopted various strategies for disinfecting rooms and sterilizing equipment such as frequent hand washing, protective barriers (gloves, face masks, face shields, etc.), and regular cleaning of high-touch areas with disinfecting wipes and bleaching agents. While these methods have been effective to various degrees, there are still pressing needs in the hospital community to achieve a higher level of disinfection/sterilization to minimize the impact of HAIs.

1 Centers for Disease Control and Prevention. (2017, December 14). Healthcare-associated infections (HAIS). Centers for Disease Control and Prevention. Retrieved March 10, 2022, from https://www.cdc.gov/winnablebattles/report/hais.html

2 Chronic Disease and Medical Innovation in an Aging Nation. (2013). Chronic disease and medical innovation in ... - aging research The Silver Book®: Healthcare Associated Infections. The Silver Book®: Healthcare Associated Infections. Retrieved March 10, 2022, from https://www.agingresearch.org/app/uploads/2017/12/SilverBook20InfectDisease20Fact_final.pdf

Use of ultraviolet (UV) energy at 254 nm has been shown to be effective in providing enhanced levels of disinfection.

Figure-1

UVC rays inactivate microorganisms by destroying their nucleic acid and disrupting their DNA, disabling their vital cellular function and ability to replicate. Many scientific studies have been conducted to understand and quantify the efficacy of UVC radiation on various bacteria and viruses.

A dose of 15 mJ/cm2 is adequate to achieve 3 log reduction in deactivation for Escherichia coli (EColi).[3]

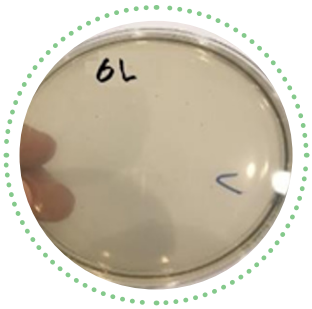

Figure-2

An independent biological study was conducted using UVC low pressure mercury lamp emitting 254 nm with UVC measurement by an EIT radiometer. As evidenced by the Arag plate study, the colony forming units (CFU) for unexposed sample was 3200 (Figure-1), whereas after exposure to 60 mJ/cm2 UVC radiation, the CFU was near zero (Figure-2). This result shows the effectiveness of the UVC radiation and measurement technique.

The scientific community has unequivocally proven that UVC germicidal irradiation is an effective decontamination method.

3 Adel Haji Malayeri, Madjid Mohseni, Bill Cairns, and James R. Bolton. "Fluence (UV Dose) Required to Achieve Incremental Log Inactivation of Bacteria, Protozoa, Viruses and Algae." Retrieved from https://uvsolutionsmag.com/stories/pdf/archives/180301_UVSensitivityReview_full.pdf

Increased reliance on UVC germicidal technologies necessitates quality assurance measures.

The ongoing COVID pandemic has further raised awareness around the use of UVC energy to achieve required disinfected surfaces and work environments. Typically, healthcare professionals have relied on the estimated UV output at the target to be disinfected to ensure desired clean environment. This dependence has been due to the lack of easy, reliable, and cost-effective ways to measure the residual biological contaminants in the field in real-time.

There is an increased need to measure true UVC output at the target.

In the absence of accurate measurement devices, most users have opted to overexpose the target with higher UV intensity and exposure time. This tactic results in additional costs for electricity, staffing, life-time degradation of lamps, larger inventory, and unwanted damage to room accessories and fixtures, among other things. Additionally, there have been numerous reports of suppliers selling UV sources that emit UV radiation in bands other than UVC, and falsely claiming their effectiveness for disinfection.

Accurate, reliable, and repeatable UVC measurement has become a necessity to ensure that critical disinfecting technologies are working as they should. Hence, a reliable UVC measurement device has become a “must-have” tool for all end users.

The **UVKey**™ radiometer provides accurate numerical measurement of the UVC dose.

"What you can't measure, you can't control"—as said by Lord Kelvin—inspired EIT to produce a highly reliable radiometer that is easy to use and provides consistent, quantifiable measurement of UVC radiation at the target surface. Leveraging its 45 years of experience in serving the industrial UV curing market, EIT has introduced its first UVC radiometer, the **UVKey**.

UVKey has a germicidal 254 nm response and dynamic range optimized for UVC treatment of hospital rooms and other disinfection applications. It provides the accurate NIST traceable numerical display of the dose (mJ/cm2) and thus eliminates ambiguous color interpretation by the user and/or lot-to-lot variations associated with radiochromic films. Single-button operation and a small design make it easy to use. **UVKey** is IP67 sealed to protect from dust and fluid splashes.

What you can measure, you can control.
Contact EIT today!

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UVKey™ Specifications

Feature	Description
Full Scale Operating Range	10 mW/cm^2
Display Resolution / Threshold	1 µW/cm^2 / 15 µW/cm^2 (Approximately)
Displayed Energy Value	Values < 1 Joule (0.001-999.9 mJ/cm^2) displayed in mJ/cm^2 Values ≥ than 1 Joule (1.000-999.9 J/cm^2) displayed in J/cm^2
Spectral Response	245-265 nm minimum, Spectral out of band blocking of Optical Density (OD) > 4 average
Spatial Response	Approximately Lambertian (Cosine)
Accuracy	Typically, ± 5% or better; ± 10% of reading plus ±0.2% of full scale
Repeatability	Typically, better than 0.5%; <1% maximum
Calibration	Calibration on low pressure mercury source, NIST Traceable
Sample Rate	1 Hz (One reading/second)
Display-Interface	Single button operation 4 Digit LCD display of energy (mJ or J/cm^2), floating decimal point
Operating Life Time / Shelf Life	6 Months from user initialization / 1 Month
Calibration Period	6 Month (recommended) or 500 Joules/cm^2 (maximum)
Temperature Ranges	Operating: +10°C to +50°C / Storage: -30°C to +70°C
Dimensions / Weight	Unit size 2.0” x 1.5” x 0.5” (50.8 x 38.1 x 12.7 mm) / 0.7 oz. (19.8 grams)
Battery / Materials / Electronics	Lithium Manganese Dioxide Non-Rechargeable / Thermoplastic Polymer
Electronics / Environmental	IP67 sealed case / RoHS3 compliant

UVKey was tested and passed each of the following standards:

FCC Radiated Emissions Part 15.109 ICES-003: 6.2
2014/30/EU: Electromagnetic Compatibility
IEC 61326-1: 2012