

Care222[®] Filtered Far UV-C Excimer Lamp Module

Filtered Krypton-Chloride 222nm Technology

FEATURES & BENEFITS

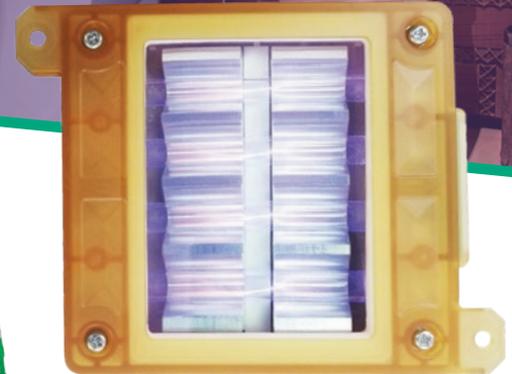
- Proprietary Safety Filter Technology Included to Ensure Narrowband 222nm Emission
- Mercury Free - Environmental Friendly
- Large Production Capacity
- Effective Germicidal Wavelength
- Effective Reduction of Viruses, Bacteria, and Spores
- Wide Operating Temperature
- Instantaneous On/Off at Full Output Power
- No Lifetime Reduction by Frequent On/Off Cycles

APPLICATIONS

- Surfaces
- Air



12W 24V B1 222nm Inverter



ADVANTAGES OF 222nm LIGHT

Comparison	222nm	254nm	280nm	405nm
Unoccupied Spaces Care222 [®] modules can be safely used in unoccupied spaces.	●●●	●	●	●●●
Occupied Spaces Filtered Care222 modules can be safely used in unoccupied and occupied spaces without posing a health risk to humans when used within the current exposure limits recommended by the American Conference of Governmental Industrial Hygienists (ACGIH [®]) or the requirements of IEC 62471. Exposure within the current ACGIH recommendations and IEC requirements allow microbial reductions using filtered 222nm far-UVC light sources in occupied spaces. Recent studies indicate that higher doses of filtered UV light emitted from Care222 modules pose a minimal health risk to human skin or eyes.	●●●	X	X	—
Bacteria Reduction Studies show 222nm is more effective than conventional UV sources at certain types of bacteria reduction. Please ask for our white paper on the comparison.	●●●	●●●	●●●	●
Spore Reduction Studies show that 222nm light is more effective at reducing most spores than 254nm light.	●●●	●●●	●●	—
Prevent Regrowth The regrowth of bacteria is a major factor in maintaining a clean environment. Initial studies of 222nm vs. conventional mercury lamp modules show that 222nm is more effective at reducing microbial regrowth than 254nm.	●●●	●	●	●

Comparison	222nm	254nm	280nm	405nm
Instant On/Off Features of the Care222 module allows customers to obtain 100% light output in less than a second, whereas 254nm lamps start at 50% output and take several minutes to achieve 100% output. This is ideal for bathrooms, toilets, counter tops, and other occasional use applications.	●●●	●	●●●	●●●
Environmentally Friendly No mercury means no environmental issues with disposal of the lamp module as well as no safety risk if the lamp module breaks. Mercury usage and disposal laws may make conventional UV lamps obsolete in the coming years.	●●●	●	●●●	●●●
Temperature 254nm lamps are sensitive to their environment. Operating temperatures colder than 20°C (68°F) and above 50°C (122°F) will significantly affect the UV output and the microbial reduction capability of 254nm lamps. The Care222 lamps have an operating range of below 0°C (32°F) to over 100°C (212°F) without affecting the output or microbial reduction capability of the lamps.	●●●	●	●	●●
Cost A Care222 solution costs more than conventional mercury lamps, but its mercury-free microbial reduction properties, instant on/off, smaller size, and environmental friendliness more than offset the cost difference for most applications.	●	●●●	●	●●●

Strength Level: ●●● Very Strong ●● Strong ● Weak

UV-C COMPARISON STUDIES

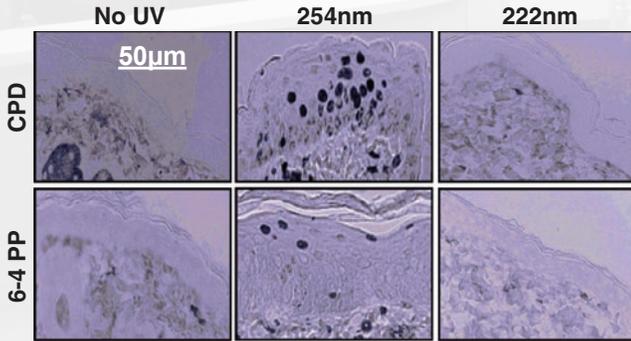


Fig. 1 Comparison of cross-sectional images of UVC-induced premutagenic skin lesions CPD (cyclobutane pyrimidine dimers) and 6-4PP (photoproducts) in the dorsal epidermis of mice. A UV dose of 157 mJ/cm² was used for both 254 and 222 nm¹.

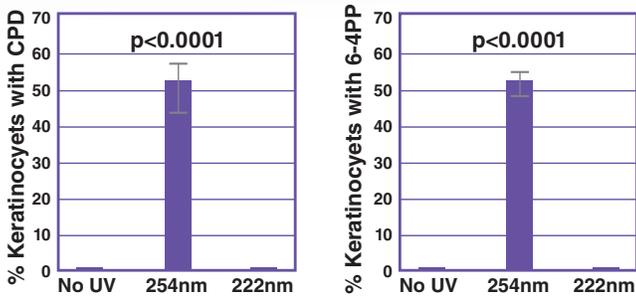


Fig. 2 & 3 Average percent of keratinocyte cells exhibiting dimers (Fig 2. - right CPD; Fig 3. - left 6-4PP) measured in UVC-induced premutagenic DNA lesions in nine randomly selected fields of view per mouse (n=3)¹.

Comparison (254nm vs. 222nm) for Spore Inactivation²

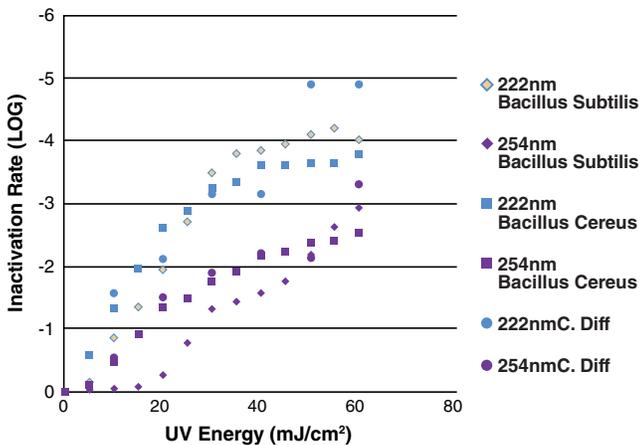


Fig. 4

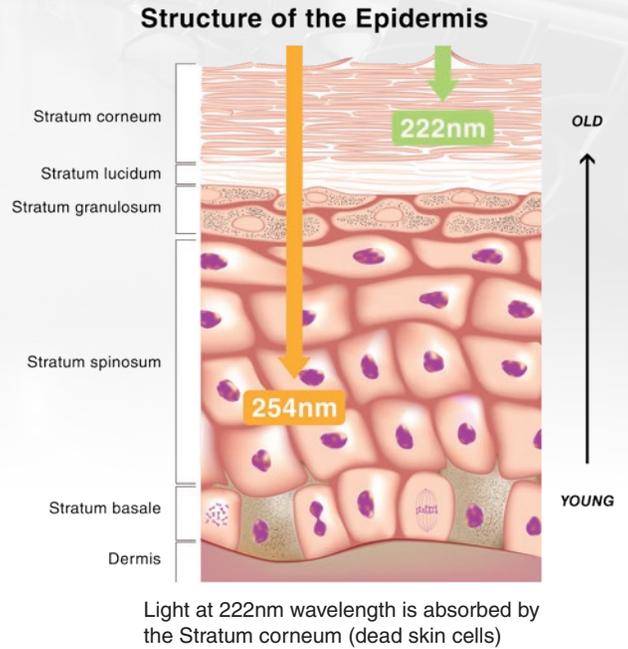
References:

¹ Buonanno, Manuela; Ponnaiya, Brian; Welch, David; Stanislauskas, Milda; Randers-Pehrson, Gerhard; Smilenov, Lubomir; Lowy, Franklin D.; Owens, David M.; Brenner, David J.. Germicidal Efficacy and Mammalian Skin Safety of 222nm UV Light. Radiation Research. 2017 April; 187(4): 483-491.

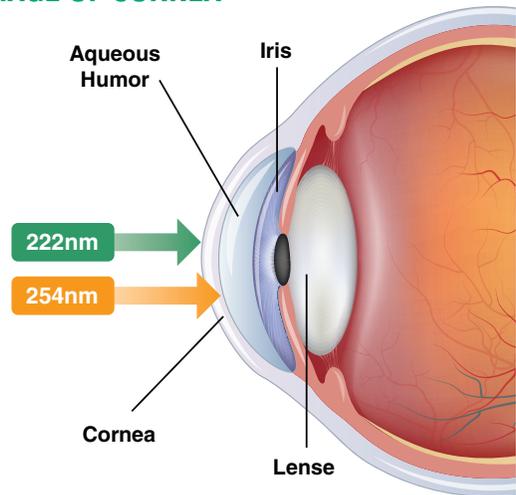
² Ushio Inc. Internal Data

³ Koložsvári, Lajos; Nógrádi, Antal; Hopp, Béla; Bor, Zsolt. UV Absorbance of the Human Cornea in the 240- to 400-nm Range. Investigative Ophthalmology & Visual Science July 2002, Vol.43, 2165-2168.

SKIN ABSORPTION SHOWING 222nm VS. 254nm



DAMAGE OF CORNEA



Light at 222nm wavelength is absorbed in the outer surface of the cornea and is much less likely to cause cataracts.³

All safety testing was done with Ushio's proprietary filter technology to provide only narrowband 222nm light emission.

