



CHRISTIE[®] **CounterAct[™]**

Powered by Care222[®] technology

November 2020



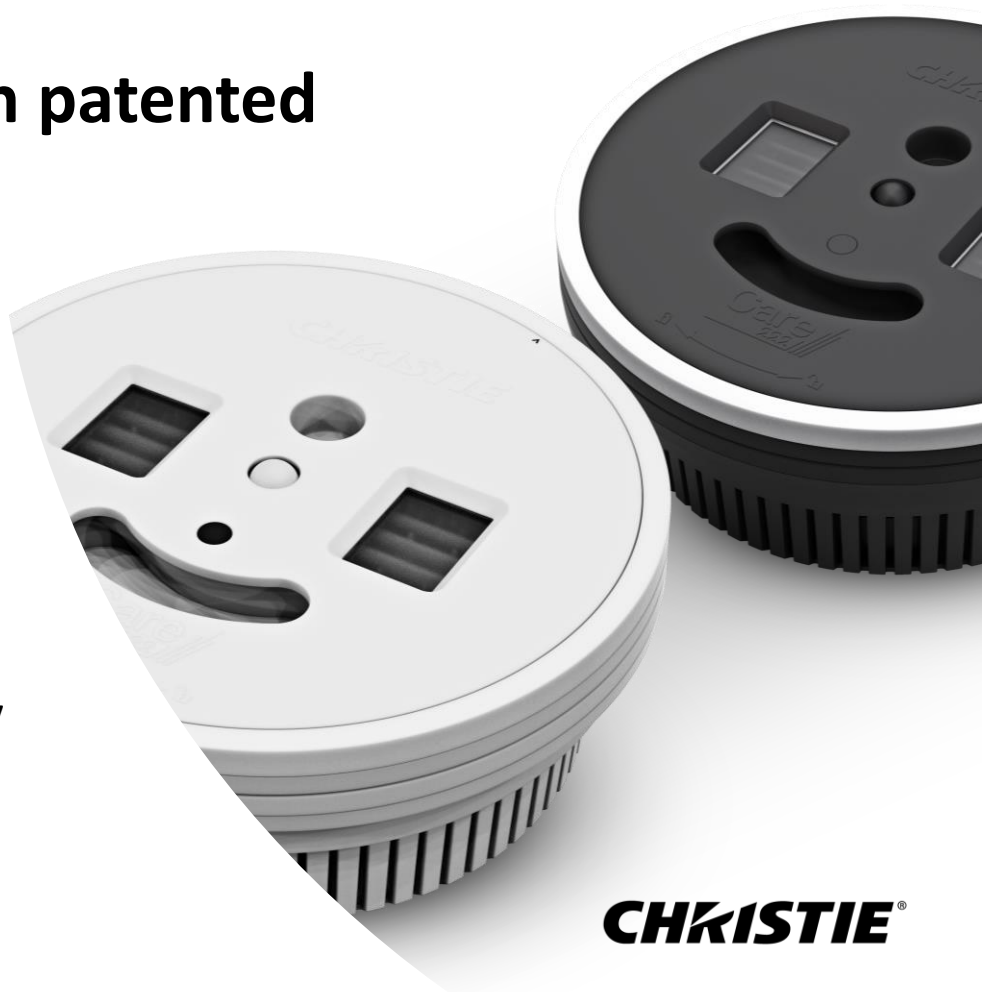
CHRISTIE[®]



Christie CounterAct with patented Care222 technology

A commercial UV disinfection light fixture with filtered 222nm far-UVC light that's effective and may be used when people are present.

CounterAct products with Ushio's patented Care222 technology emit filtered far-UVC light that significantly reduces pathogens in occupied and unoccupied indoor spaces. Care222 is the **only** far-UVC technology that's effective and **may** also be used around people.



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An added layer of defense for your guests

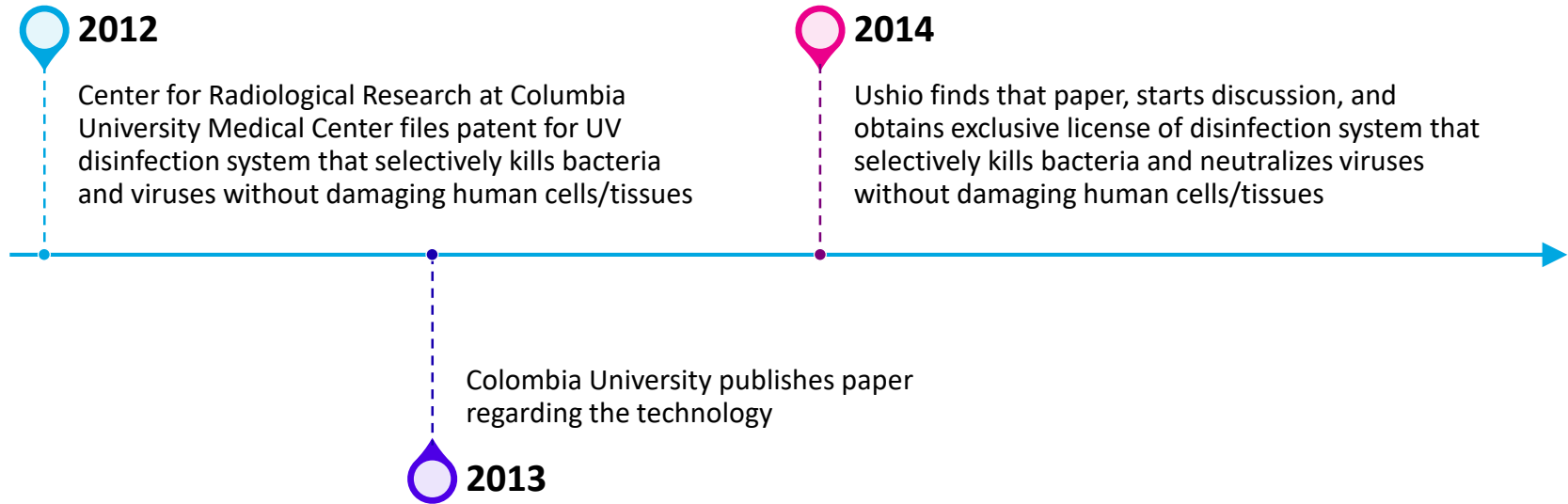
Breakthrough technology combats COVID-19

- Christie CounterAct™ uses patented Care222® UV technology
- Each unit contains 2 x 222nm filtered far-UVC excimer lamp modules
- Inactivates coronaviruses like SARS-CoV-2 that causes COVID-19, influenza, bacteria, and antibiotic-resistant superbugs on surfaces
- May be used with people present – shorter wavelengths of 222nm light cannot penetrate skin and eyes
- Mercury-free and energy-efficient
- Easy to install and control (via app)

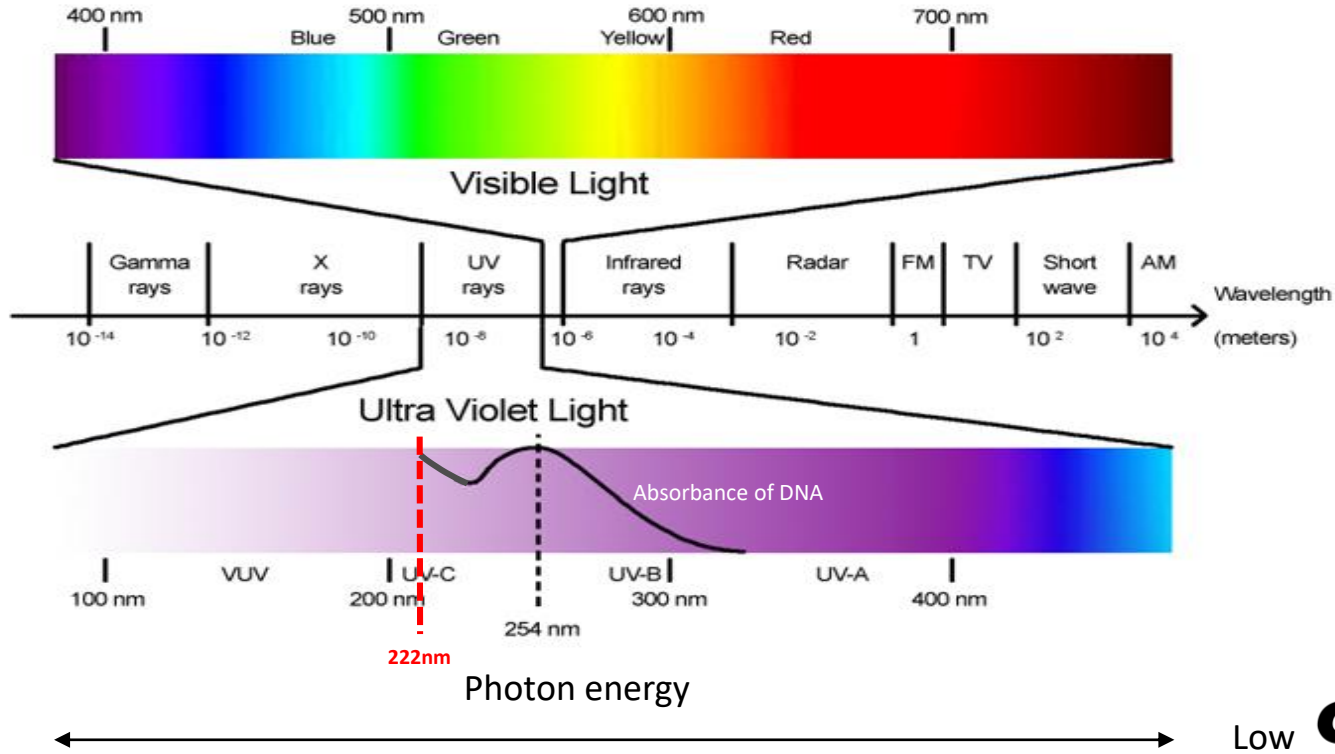


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Columbia University and Ushio Inc.



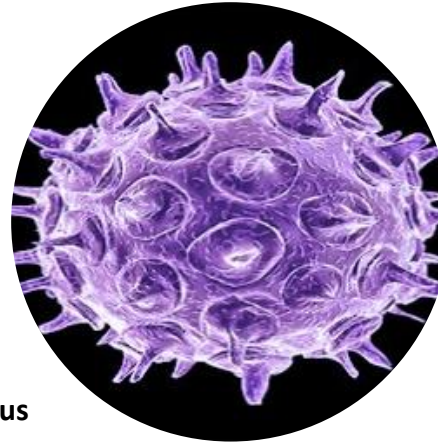
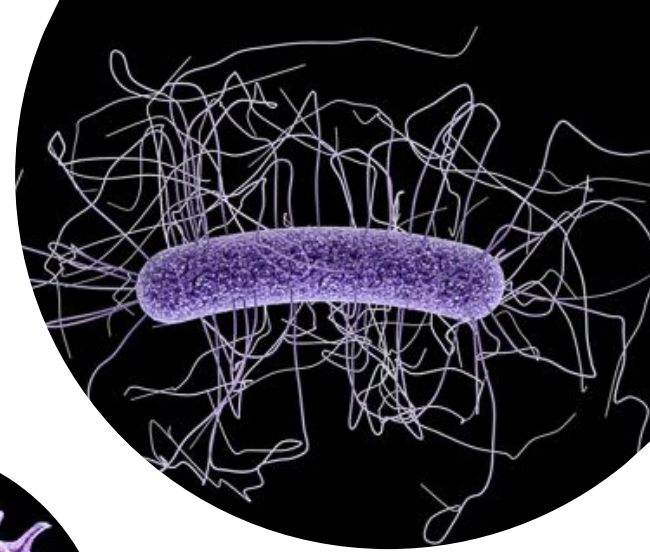
Care222 (on the UV spectrum)



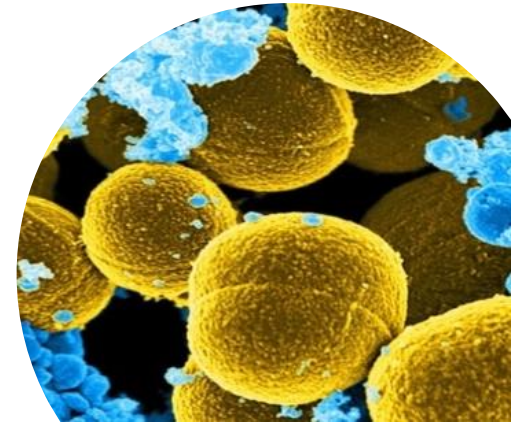
222nm vs. antibiotic-resistant superbugs

1. Ultraviolet light inactivates superbugs such as drug-resistant bacterial (MRSA), non-envelope virus (Norovirus) and spore bacteria such as C. Diff.
2. 222nm is more effective than 254nm against spore bacteria.
3. 222nm doesn't penetrate eyes or skin the way 254nm does.
4. Care222 technology can be used in public indoor spaces.

C. Difficile



Norovirus

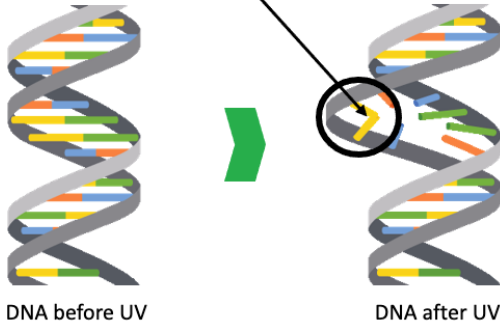


MRSA

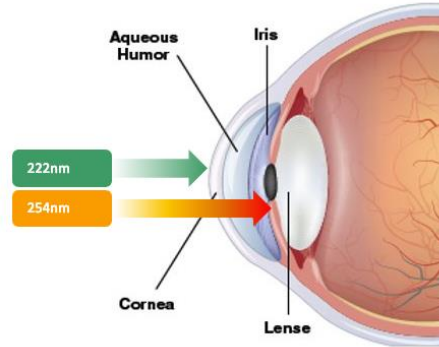
10M people are estimated to die from superbugs by 2050.

When 'too good to be true' is proven by rigorous scientific study

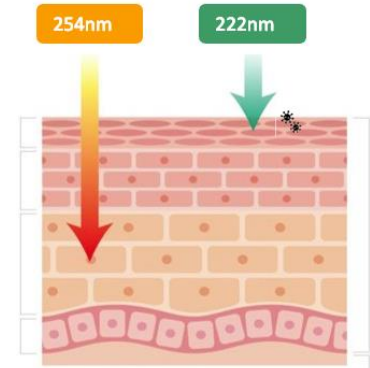
UV destroys DNA double-helical structure and constructs Pyrimidine dimers



Widely known mechanism of UV disinfection, which **never creates red-resistant microbial**



The cornea absorbs 222nm, unlike 254nm which penetrates our eyes



222nm is not absorbed by the skin like other wavelengths (won't cause cancer like other UV)

A few of our resources:

Buonanno Brian Ponnaiya David Brenner et al., Germicidal E Cacy and Mammalian Skin Safety of 222-nm UV Light, Radiation Research, 187(4):493-501. 2017

Narita K, Asano K, Morimoto And Igarashi T, Hamblin MR, Come on T And To. Disinfection and healing e cts of 222-nm UVClight on methicillin-resistant T.Fukuda et.al. 39th International Society of Orthopaedic Surgery and Traumatology, Orthopaedic World Congress in Montreal, Canada(2018)

Kazunobu Sugihara, Sachiko Kaizu, Masahiro Sasaki, Aiko Nishime, Ryuji Igarashi, Akihiro Ohira, Masaki Tanido The 40th Annual Meeting of the Japanese Society of Optical Medicine and Photobiology (2018)

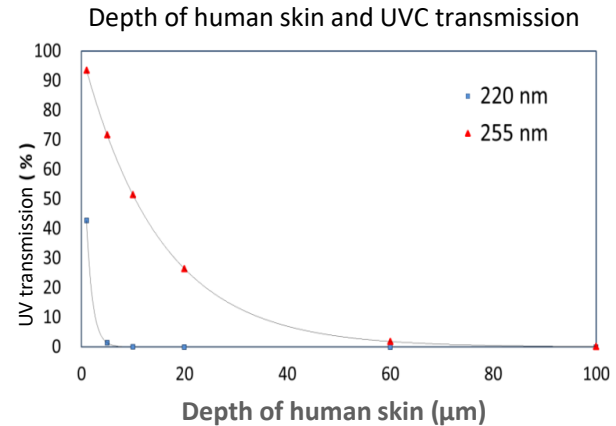
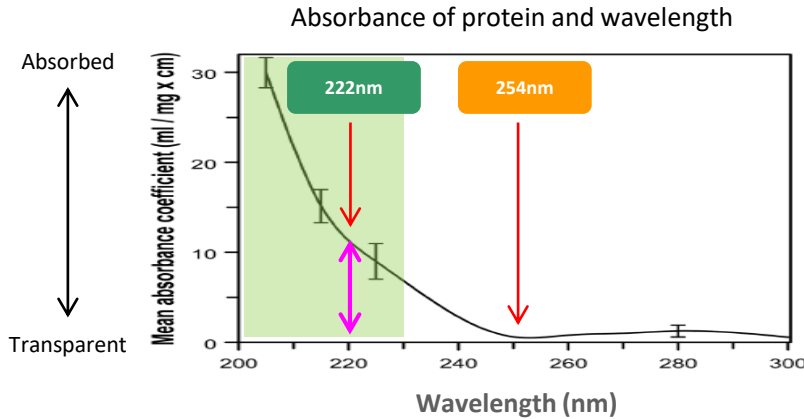
Sachiko Kaidzu, Kazunobu Sugihara, Masahiro Sasaki, Aiko Nishiaki, Tatsushi Igarashi & Masaki Tanido Free Radical Res. 2019 Apr 5:1-151. doi: 10.1080/10715762.2019.1603378. [Epub ahead of print]

Kazunobu Sugihara, Sachiko Kaizu, Masahiro Sasaki, Aiko Nishime, Ryuji Igarashi, Akihiro Ohira, Masaki Tanido The 40th Annual Meeting of the Japanese Society of Optical Medicine and Photobiology (2018)

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Care222 – May be used around people

Safe zone UVC



207nm UV Light - A Promising Tool for Safe Low-Cost Reduction of Surgical Site Infections. I: In Vitro Studies, PlosOne, 2013

1. 222nm is absorbed by protein 10 times greater than 254nm
2. Transmittance of 20μm thick human tissue at 222nm is below 0.01% and 40% at 254nm

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Powered by Ushio's Care222 technology

- › The filtered Care222 module may be used in unoccupied spaces **AND may be used where people are present**
- › Care222 module allow customers to obtain 100% light output in less than a second: conventional germicidal lamps start at only 50% output and take **several minutes** to achieve 100% output
- › The featured 12W 'B1 module' contains a **patented short pass filter** that eliminates longer wavelengths of more than 230nm that present a human health hazard
- › These mercury-free and instant-start excimer lamps are ideal for bathrooms, toilets, counter tops, and other occasional-use applications

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3log reduction = 99.9%

Care222 efficacy test data

Domain		Species		Dose for 3log reduction [mJ/cm2]	
				222 nm	254 nm
Bacteria	Vegetative	MRSA	Methicillin-resistant Staphylococcus aureus	15	10
		<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	8	4
		<i>Escherichia coli</i> O157	E. coli O-157	9	5
		<i>Salmonella typhimurium</i>	<i>Salmonella typhimurium</i>	10	4
		<i>Campylobacter jejuni</i>	<i>Campylobacter</i>	4	4
		<i>Bacillus subtilis</i>	<i>Bacillus subtilis</i> --- Vegetative cell	7	8
	Spore	<i>Bacillus cereus</i>	<i>Bacillus cereus</i>	44	90
		<i>Bacillus subtilis</i>	<i>Bacillus subtilis</i>	30	60
		<i>Clostridium difficile</i>	<i>Clostridium difficile</i>	30	60
Molds and Yeasts		<i>Candida albicans</i>	<i>Candida albicans</i>	24	40
		<i>Penicillium expansum</i>	Blue mold	50	50
		<i>Aspergillus niger</i>	Aspergillus niger Hypha (Mycelium)	>1000	>700
			Spore	>500	>700
Virus		MS2	Bacteriophage ms2	23	50
		<i>Feline calicivirus</i>	<i>Feline calicivirus</i>	24	24
		Influenza virus	influenza	6	6



Exposure limits

- UV light exposure limit guidelines defined by **ACGIH** (American Conference of Governmental Industrial Hygienists)

22 mJ/cm² / 8-hour period
= 0.76 uW/cm² over 8 hours

= 1.56 uW/cm² over 4 hours

= 3.12 uW/cm² over 2 hours

Time for 3log reduction 1 lamp @ 100% duty cycle

Current
ACGIH
standard

						1m	2m	3m	3.93m
			mJ/cm2	in Minutes	in Hours	10uW	2.7uW	1.26uW	0.76uW
Vegetative Bacteria	MRSA (Methicillin-Resistant Staphylococcus aureus)	15	329	5.5	25	92	197	329	
	Pseudomonas aeruginosa	8	176	2.9	13	49	105	176	
	Escherichia. coli O157	9	197	3.3	15	55	118	197	
	Salmonella Typhimurium	10	219	3.7	16	61	132	219	
	Campylobacter jejuni	4	88	1.5	7	24	53	88	
	Bacillus subtilis	7	154	2.6	12	43	92	154	
	Bacillus Cereus Spore	44	965	16.1	72	269	579	965	
	Bacillus subtilis Spore	30	658	11.0	49	183	395	658	
	Clostridium difficileSpore	30	658	11.0	49	183	395	658	
Molds and Yeasts	Candida albicans	24	527	8.8	40	147	316	527	
	Penicillium expansum	50	1097	18.3	82	306	658	1097	
Virus	MS2	23	505	8.4	38	141	303	505	
	Feline Calicivirus	24	527	8.8	40	147	316	527	
	SARS-Cov-2	3	66	1.1	5	18	39	66	

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System components @ launch

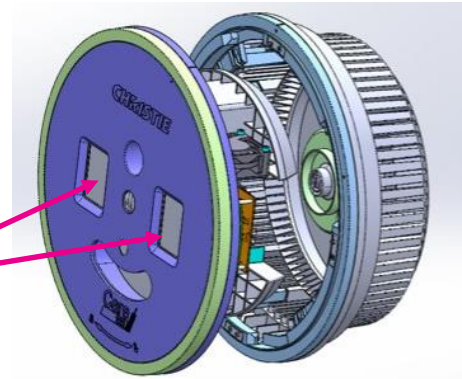


Control tablet

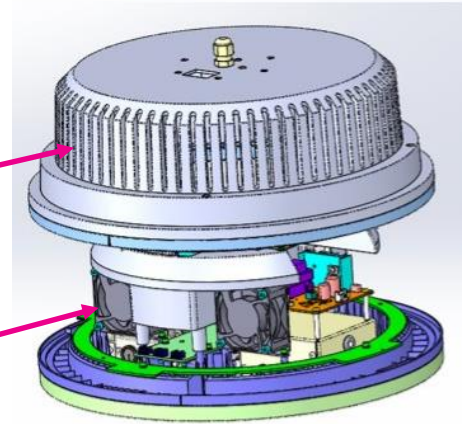


2-lamp fixture

Care222
lamps



Receiver box



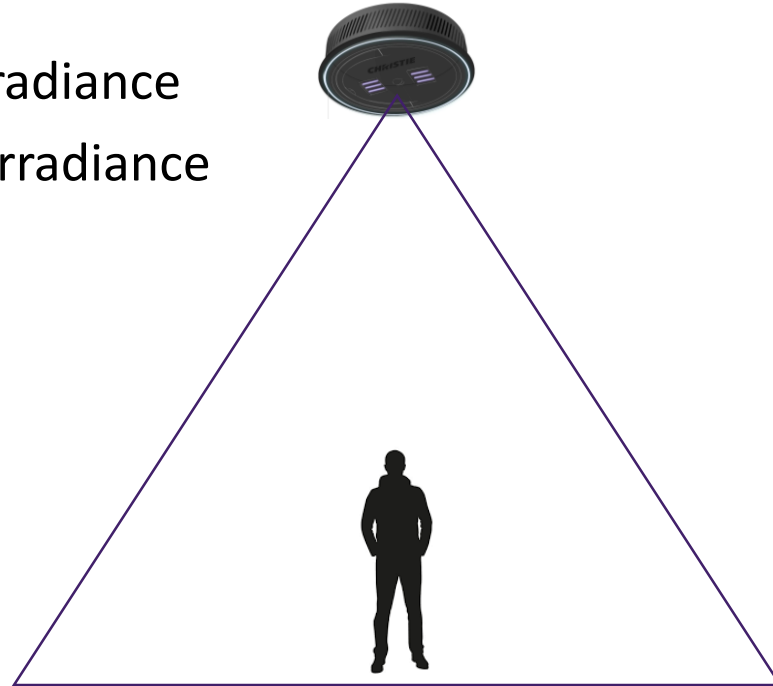
Lighting
module

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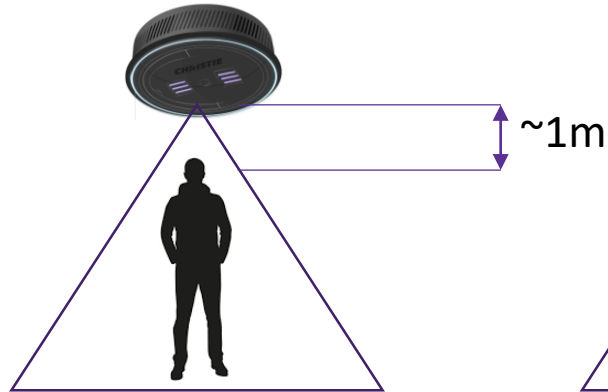
* Christie CounterAct fixture draws ~ 50W when irradiating

Intensity varies inversely with distance²

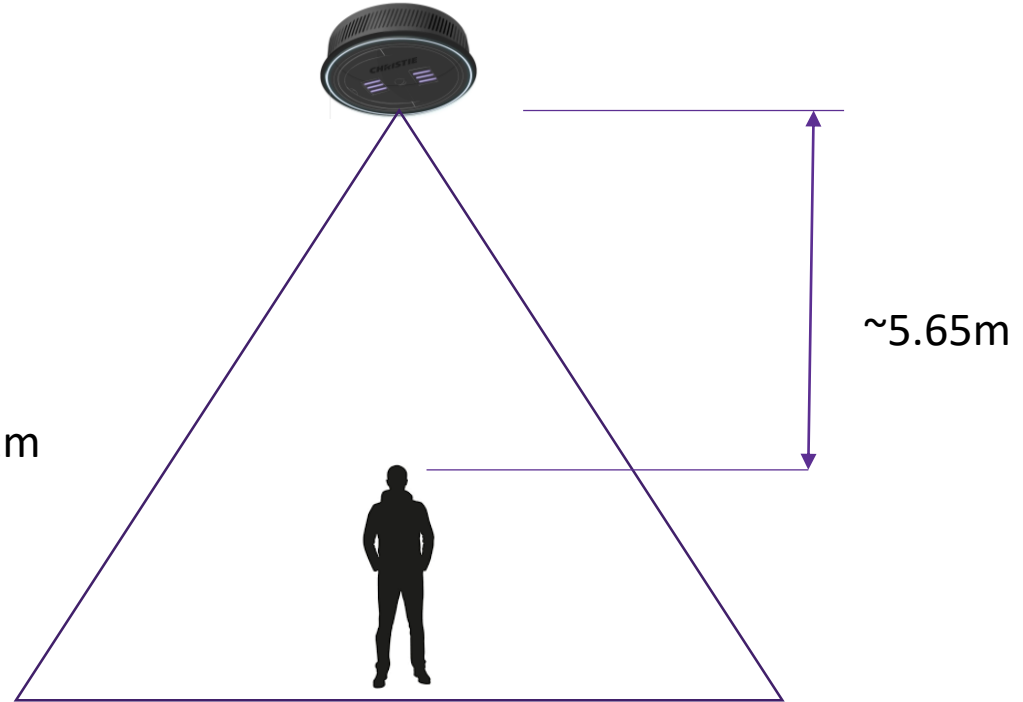
- Closer to device = higher irradiance
- Further from device = less irradiance



ACGIH limits (0.76uW) @ different distances



Duty cycle = 4%
On for ~2 min 2 sec / hour



Duty cycle = 100%

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Lamp lifetime: 3,000 hours

Lamp lifetime isn't affected by on/off transition.

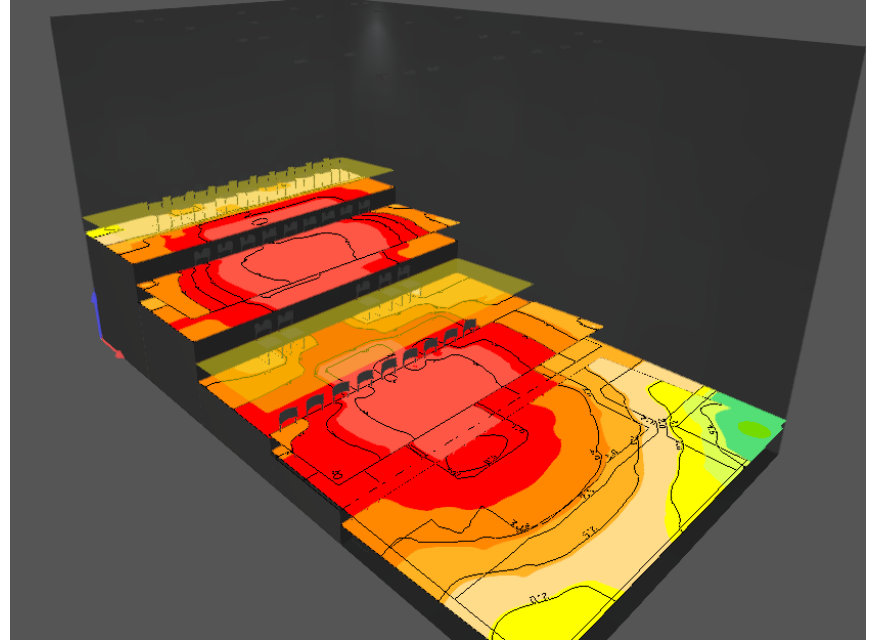
'On' time / day	Duty cycle	Lamp life (calendar days)
12 hours	100%	246 days (8 months)
8 hours	100%	370 days (1 year)
4 hours	100%	740 days (~2 years)
8 hours	50%	740 days (~2 years)
8 hours	25%	1,480 days (4 years)

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Custom design services

Christie offers consulting and installation services through our **Professional Services group** to help clients determine the best CounterAct deployment strategy to meet their needs.



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What is the core value proposition?



Christie® CounterAct™ with patented Care222® technology: A commercial **UV disinfection light fixture** with **filtered 222nm far-UVC** light that **significantly reduces pathogens** and **may be used when people are present**.

We offer user-interface and automation options that cater to the requirements of the entertainment industry as a complete solution – with control, monitoring, maintenance, and financing options

CHRISTIE®

Top 3 reasons to choose Christie CounterAct

1

CounterAct may be used when people are present

CounterAct products with patented Care222 technology and proprietary filters emit far-UVC 222nm light that cannot penetrate healthy human skin when used in accordance with operational specifications

2

It's effective

The patented far-UVC light that Care222 technology emits can reduce surface pathogens—including coronaviruses like SARS-CoV-2, influenza, bacteria, and even antibiotic-resistant superbugs

3

It's an added layer of defense

CounterAct products with patented Care222 technology emit far-UVC 222nm light that damages the RNA of pathogens like coronaviruses provide an added layer of defense when used in combination with other measures like washing hands

CHRISTIE®



We thought of everything

- › Easy-to-use – as easy to install as traditional commercial lighting fixtures, with maintenance via an app
- › Fast-acting – with instant on/off at full output power
- › Frequent on/off cycles don't affect lamp life
- › Able to operate over a wide range of ambient temperatures
- › Remote monitorable for easy programming and troubleshooting
- › Programmable – configurable so they can be effective against pathogens without exceeding existing exposure limits
- › Easy-to-service for straightforward lamp changes
- › Fixtures are available in black or white to fit existing color schemes
- › Available in both AC and DC power configurations
- › Flexible leasing options are available

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Key benefits

BENEFIT	FEATURE
Care222 is the ONLY filtered far-UVC technology that may be used around people	Use in occupied and unoccupied spaces
Discrete and not distracting to audiences looking for an “experience”	Surface mounted
Dual-lamp fixture mounts to existing drop ceilings for flush-mount installations Single-lamp version screws directly into an existing Edison-style “E26” connector	Ease of installation
Custom Android app allows for diagnostics, control, and easy programming of key variables ; configurable, fixtures can be programmed to be effective against pathogens in a variety of environments without exceeding existing ACGIH exposure limits	Configurable
Accomplish lamp changes in minutes	Ease of service

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Where can CounterAct be used?



THEME PARKS



CINEMA



MUSEUMS



GIANT SCREENS & PLANETARIUMS



IN YOUR LOBBY



**IN THE
RESTROOMS**



**IN THE
AUDITORIUM**



**AND ANY INDOOR
SPACES**

CHRISTIE®



Target markets, needs, and applications

Primary target market(s)	Needs	Applications
Cinemas Indoor theme parks and attractions	<ul style="list-style-type: none">• Safe and effective way to mitigate exposure and community spread of COVID-19 and future novel pathogens, influenza, bacteria and superbugs to large groups of people• Return to revenue generation	Theater auditoriums Indoor themed entertainment/rides Museums, science centers Arenas, stadiums Lobbies Washrooms
Secondary target markets	Needs	Applications
Government, corporate, retail, convention centers, houses of worship, cruise ships, prisons	<ul style="list-style-type: none">• Safe and effective way to mitigate exposure and community spread of COVID-19 and future novel pathogens, influenza, bacteria and superbugs	Schools, agencies, offices, lobbies, food courts, public transportation (trains, buses, planes)



SKUs

Description	NEW item number
Christie CounterAct-2 24VDC, Direct Wire, Black	174-002103-01
Christie CounterAct-2 24VDC, Direct Wire, White	174-003104-01
Christie CounterAct-2 100-240VAC, Direct Wire, Black	174-004105-01
Christie CounterAct-2 100-240VAC, Direct Wire, White	174-005106-01
Accessories	
Christie CounterAct-2 Receiver Box 100-240VAC, IEC plug, Black	174-102104-01
Christie CounterAct-2 Receiver Box 100-240VAC, IEC plug, White	174-103105-01

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Markets and regulatory

Country	Safety compliance mark(s) required	Other compliance mark(s) required
USA	UL	FCC, BQB mark (optional)
Canada	cUL	ISED
Japan	PSE	TELEC
China	CCC	SRRC
Taiwan	BSMI	NCC
France	CE	
Germany	CE	
Italy	CE	
Korea	KC	RRA
Poland	CE	
Brazil	INMETRO	ANATEL
Russia	EAC	RA-RoHS
Serbia	CE	RATEL
Spain	CE	
Thailand	CE	NBTC
Ukraine	Ukr SEPRO	



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CHRISTIE CounterAct™

Powered by Care222® technology

WELCOME BACK

Let's return to the places we love

Christie® CounterAct™ products with patented Care222® technology

CounterAct commercial UV disinfection fixtures contain Ushio Inc.'s patented Care222 lamps that emit far-UVC 222nm light that's shown to significantly reduce surface pathogens in occupied and unoccupied indoor spaces. It's the only far-UVC germicidal technology that may also be used around people, and the only with a proprietary filter that prevents longer UVC wavelengths from being emitted.



Get product updates

christiedigital.com/uv

christiedigital.com/commercial-uv-disinfection

Christie CounterAct with Care222

An added layer of defense for your guests



▲ Christie CounterAct[™] products with patented Care222[™] technology

The entertainment industry faces extraordinary challenges as a result of the global pandemic, including closed venues and steep revenue declines. Audiences want to return, but the presence of pathogens is a major concern. Manual cleaning requires professional cleaners and the repeated use of harsh chemicals, can only be performed when spaces are empty, its effects are temporary and can't continuously reduce pathogens.

Now there's a way to reduce pathogens when people are present

We know ultraviolet (UV) light pathogens. Businesses have disinfected spaces. However, UV wavelength can damage human skin and where unprotected people

Not all UVC light is created equal

CounterAct products contain far-UVC 222nm light, a wavelength that is effective against pathogens but doesn't penetrate healthy human skin.

There's nothing like

Care222 is the only UVC lamp with a pass filter that prevents UV light from penetrating human skin.

Reduces pathogens

A study conducted by Kohn Epidemiology Research Institute (KERI) found that far-UVC 222nm light emitted by CounterAct products can reduce the number of pathogens in the air by up to 99.9% in a 10-minute period.

Can far-UVC 222nm vs SARS-CoV-2 (COVID-19)

A world-first study published in the American Journal of Infection Control.

Hiroshima University entitled *Effectiveness of 222nm ultraviolet light in disinfecting SARS-CoV-2*



Introducing Christie CounterAct products with patented Care222 technology



▲ Preliminary prototype of a Christie CounterAct fixture, subject to change during product development.

Each CounterAct fixture contains two Care222 far-UVC excimer lamps with patented filters that significantly reduce surface pathogens like the SARS-CoV-2 coronavirus that causes COVID-19.

CounterAct products can be used throughout your venue - from your lobby and auditorium to your restrooms.

The patented Care222 modules used in our CounterAct products effectively inactivate pathogens, may be used when people are present, contain a proprietary filter¹, are mercury-free and fast-acting.

Top 3 reasons to choose CounterAct

- 1. May be used when people are present** - CounterAct products with patented Care222 technology and proprietary filters emit far-UVC 222nm light that cannot penetrate healthy human skin when used in accordance with operational specifications.
- 2. It's effective** - The patented far-UVC light that Care222 technology emits can reduce 99.9% of pathogens-including coronaviruses like SARS-CoV-2, influenza, bacteria, and even antibiotic-resistant superbugs.
- 3. It's an added layer of defense** - CounterAct products with patented Care222 technology emit far-UVC 222nm light that damages the RNA of pathogens like coronaviruses for an extra layer of defense when used in combination with other measures like washing hands.

We thought of everything

- Easy-to-use - As easy to install as traditional commercial lighting fixtures, with maintenance via an app.
- Fast-acting - With instant on/off at full output power².
- Frequent on/off cycles don't affect lamp life.
- Easy-to-service for straightforward lamp changes.
- Remote monitorable for easy programming and troubleshooting.
- Fixtures are available in black and white to fit existing color schemes.
- Available in both AC and DC power configurations.
- Able to operate over a wide range of ambient temperatures.
- Flexible leasing options are available.

WHITE PAPER

Using far-UVC 222nm light to inactivate deadly pathogens like SARS-CoV-2 coronavirus in the air and on surfaces of indoor spaces



Are you ready to put CounterAct to work in your venue?

[Visit our CounterAct landing page](#)

Let's talk! [Contact us today!](#)

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¹ A patented optical filter eliminates dangerous longer UVC wavelengths of more than 220nm.
² Unlike conventional germicidal lamps that start at only 50% output and take several minutes to achieve 100% output.

Christie CounterAct products with patented Care222 technology are not for use as or for medical devices or for use on humans or animals or to disinfect medical devices. The pathogen-reducing efficacy of Christie CounterAct products with patented Care222 technology and their use in occupied spaces is dependent on proper installation and operational specifications, in accordance with American Conference of Governmental Industrial Hygienists (ACGIH) guidelines. Any reference to effectiveness and/or inactivation of any reference to pathogens, bacteria and/or virus is not intended to offer any specific distribution of information as may be required by the U.S. Food and Drug Administration or other regulatory agencies. Environmental Protection Agency. The Care222[™] standard character mark and stylized logo mark are registered trademarks of Christie Digital Systems USA, Inc. in the United States, European Union, and United Kingdom.

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**Thank
You**



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