

# **CODE 3**®

# ANTIMICROBIAL LIGHT



[CODE3ESG.COM](http://CODE3ESG.COM)

# ALWAYS ON ALWAYS PROTECTED



## ANTIMICROBIAL LIGHT KILLS<sup>1</sup> VIRUSES, BACTERIA, FUNGI, YEASTS, MOLD AND SARS-COV-2

Maintaining a clean public service vehicle is critical to keeping the public healthy and safe. Each time someone enters the vehicle, new bacteria is introduced causing build up over time, and leading to potential contamination. As vehicle operators focus on keeping the public safe and traveling to the next destination, the passenger area of the vehicle may not be entirely cleaned between each use, and even routine cleaning may not adequately rid high-touch surfaces of potentially dangerous bacteria.

High-touch areas require constant attention in order to minimize contamination and reduce exposure to bacteria. When illuminated, Code 3's Antimicrobial Light with Vyv's advanced UV-free technology continuously prevents growth of bacteria, fungi, yeasts, mold and kills<sup>1</sup> viruses. Alongside ridding sensitive areas of bacteria build up, Code 3's Antimicrobial Light is also proven to kill<sup>1</sup> 98% of SARS-CoV-2, all while simultaneously providing illumination with precisely engineered wavelengths of visible light.

Bacteria lives on surfaces for days, weeks, and even months. Routine and spot cleaning with traditional methods are not enough to minimize risk, especially throughout the course of a typical shift. The Antimicrobial Light delivers a useful, visible light that prevents bacteria, viruses, and microbes from growing in the most critical of public service vehicles.

Code 3 will assist customers with all orders to ensure optimum performance and adequate coverage for the application.

<sup>1</sup>Testing on a non-enveloped virus (MS2 bacteriophage) showed a 97.12% reduction in controlled laboratory testing in 8 hours on hard surfaces. Testing on SARS-CoV-2 (enveloped virus) showed a 98.45% reduction in controlled laboratory testing in 4 hours on hard surfaces. Testing on Influenza A (enveloped virus) showed an 84.51% reduction in controlled laboratory testing in 8 hours on hard surfaces. Testing on MRSA and E. coli showed 90%+ reduction in controlled laboratory testing in 24 hours on hard surfaces. Results may vary depending on the amount of light that is reaching the surfaces in the space where the product is installed and the length of time of exposure. Use of Vyv antimicrobial light is not intended to replace manual cleaning and disinfection practices.





# IEC 62471 CERTIFIED

Code 3's Antimicrobial Light, with Vyv technology meets international standards (IEC 62471) for continuous use around people and animals. The light output falls within the visible light spectrum offering continuous use — without the concern for adverse effects caused by ultraviolet light.



12-24V | 1.5A  
0.5" D x 9" Diameter

MODEL	LEDS	CONNECTOR	ILLUMINATION
PCL-LED-VV	48	Bare Leads	■
PCL-LED-VV-P	48	Deutsch	■

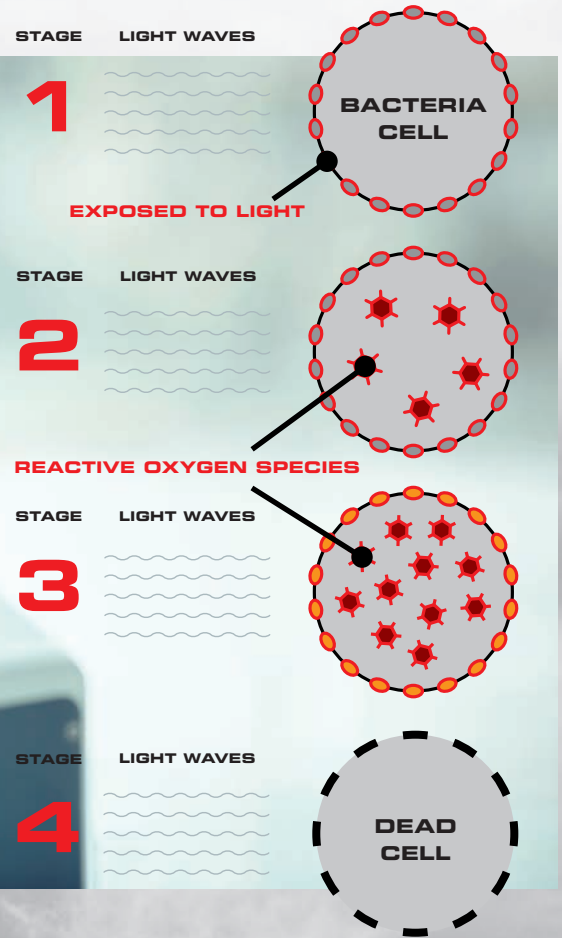
## USER BENEFITS

- Utilizes proven Vyv technology that prevents microbial growth on high-touch surfaces in interior environments that are directly exposed to the light
- Provides effective white lighting that delivers consistent and reliable illumination throughout the service life of the vehicle
- Easily installs and integrates with existing overhead fixtures; compliant with Triple-K protocols

## VEHICLE USAGE

- Emergency medical services (EMS) vehicles
- Search and rescue vehicles
- Police vehicles
- Fire apparatus
- Prisoner transport vans
- Crime scene vehicles

# HOW DOES IT WORK?



## THE SCIENCE

Antimicrobial Lights provide surface protection and deliver quality light to illuminate any workspace in emergency response vehicles. The devices operate within a spectrum of visible light that prevents bacterial and viral growth while creating an inhospitable environment for microbes by photo-activating porphyrin molecules found in bacteria, yeast and fungi. This photo-activation process produces reactive oxygen species (ROS), which are specifically toxic to these organisms. In high doses, ROS causes irreparable damage to their cellular structure, which leads to total breakdown. These activated molecules are unique to bacteria, virus, yeast, and fungi cells, which are not found in human or animal cells.

Both independent and third party testing has confirmed significant reduction in both microbial colonies and viral contamination via the use of Antimicrobial Light. Vyv's advanced light technology is proven to kill up to 98% of SARS-CoV-2, the virus that causes COVID-19.

## TESTING

Vyv's technology meets all criteria for the IEC 62471 photobiological test and falls into the exempt group (RG 0), "where no optical hazard is considered reasonably foreseeable, even for continuous, unrestricted use." This refers to long-term, continuous exposure to Vyv's visible light range. Vyv's wavelengths are between 400 to 420 nanometers, which target a specific type of porphyrin molecule that is unique to bacteria, virus, mold and fungi cells. Additionally, the wavelengths Vyv's technology emit fall outside the blue light zone that is generally considered harmful after prolonged exposure.

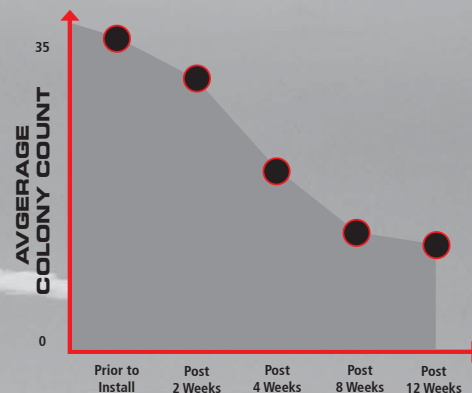


# WHAT ARE THE EFFECTS OF ANTIMICROBIAL PREVENTION?



## CONTINUOUS CLEANING

Vyv, an innovative leader in clinical research, has proven the efficacy of their proprietary technology in extensive controlled laboratory testing. One study, conducted in a hospital's active trauma room, showed sample colony counts were statistically significantly lower after Antimicrobial Lights were installed vs. pre-install colony counts. As early as two weeks after installation, the samples collected from the trauma room showed marked reductions in overall bacteria colony counts. In just eight weeks after installation, they recorded statistically significant reductions. All post-install samplings showed lower average colony counts than in all pre-install samplings.



## CASE STUDY ABSTRACT - WHITE LIGHT DISINFECTION IN AN ACTIVE TRAUMA ROOM

**Partner/Study Location:** Samaritan Hospital, a member of St. Peter's Health Partners in Troy, NY

**Study Objective:** Test efficacy of Vyv's Antimicrobial + Light Mode at reducing surface contamination in an active Emergency Department trauma room

**Test Parameters:** RODAC contact plates were pressed to 5 different surfaces/sites per sampling time and incubated. Colony counts were obtained by counting the colonies that grew on each plate.

Sampling occurred for 5 days each sampling week, for a total of 25 sites per week. Samples were taken for 2 weeks pre-install and at weeks 2, 4, 8, and 12 post-install.

**Conducted by:** Lead Microbiologist at Vyv

**Study Conclusions:** This study showed a decrease in the average colony count starting at 2 weeks post installation and reached a statistically significant reduction to pre-install levels by week 8 post-install.

# VYV TECHNOLOGY PROVIDES CONTINUOUS ANTIMICROBIAL PROTECTION FROM VIRUSES<sup>1</sup>, BACTERIA, FUNGI, YEAST, MOLD WITH VISIBLE LIGHT

ANTIMICROBIAL LIGHT TECHNOLOGY HAS BEEN TESTED TO BE EFFECTIVE AGAINST THIS LIST OF THE MICROORGANISMS

## BACTERIA

### GRAM POSITIVE

- Staphylococcus aureus (incl. MRSA)+
- Staphylococcus epidermidis++
- Staphylococcus hyicus++
- Clostridium perfringens++
- Clostridium difficile+
- Enterococcus faecalis (incl. VRE)+
- Streptococcus pyogenes+
- Streptococcus thermophilus+
- Listeria monocytogenes+
- Bacillus cereus+
- Mycobacterium terrae++
- Lactobacillus plantarum+
- Lactobacillus brevis+

## BACTERIA

### GRAM NEGATIVE

- Acinetobacter baumannii (incl. MDRA)+
- Pseudomonas aeruginosa+
- Klebsiella pneumoniae++
- Proteus vulgaris++
- Escherichia coli+
- Salmonella enteritidis+
- Shigella sonnei++
- Serratia spp. (incl. S marcescens)+
- Salmonella typhimurium+
- Enterobacter aerogenes++

## BACTERIA ENDOSPORES

- Bacillus cereus++
- Clostridium difficile+

## YEAST & FILAMENTOUS FUNGI

- Aspergillus niger+
- Candida albicans++
- Saccharomyces cerevisiae+

## VIRUSES

- SARS-CoV-2++
- Influenza A++
- Enveloped Viruses++
- Non-enveloped Viruses+

+ Tested on Vyv technology under controlled laboratory conditions

++ Tested using 405nm technology by other third party researchers

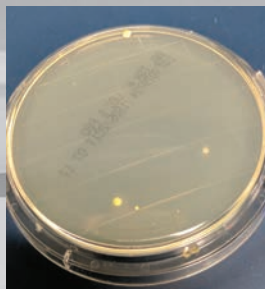
## RESULTS OF EXPOSURE OVER TIME

Vyv conducted a study to demonstrate how Code 3's Antimicrobial Lights compared with traditional LED patient compartment lights. Methicillin-resistant staphylococcus aureus (MRSA)<sup>2</sup> were grown, swabbed onto glass slides and allowed to dry. Half of the slides were placed under traditional patient compartment lights while half were placed under ECCO's with Vyv Antimicrobial LED lights — both were left exposed for 72 hours.

Visually compare the overall bacterial growth below to discover how the technology performed during the testing period.



Traditional LED light exposure



Code 3 with Vyv Antimicrobial LEDs

<sup>1</sup>Testing on a non-enveloped virus (MS2 bacteriophage) showed a 97.12% reduction in controlled laboratory testing in 8 hours on hard surfaces. Testing on SARS-CoV-2 (enveloped virus) showed a 96.76% reduction in controlled laboratory testing in 8 hours on hard surfaces. Testing on MRSA and E. coli showed 90%+ reduction in controlled laboratory testing in 24 hours on hard surfaces. Results may vary depending on the amount of light that is reaching the surfaces in the space where the product is installed and the length of time of exposure. Use of Vyv antimicrobial light is not intended to replace manual cleaning and disinfection practices.



# PRODUCT INSTALLATION



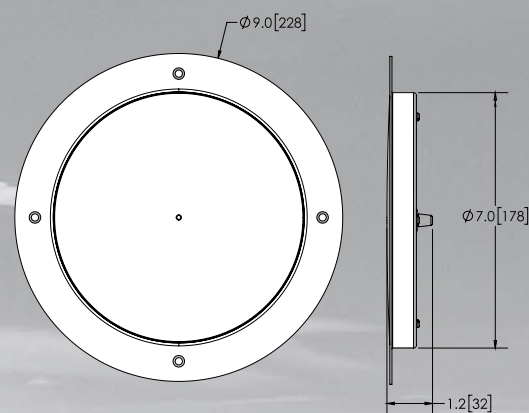
The Antimicrobial Light can be easily installed or retrofitted into existing industry standard cutouts.

## DESIGN FEATURES

- Features a tough polycarbonate lens and easy installation with a flush-mount design
- Vyv technology kills<sup>1</sup> viruses, bacteria, fungi, yeasts, mold
- Creates an inhospitable environment for bacteria and microbe growth while providing effective white lighting for use around people and animals
- Fits in a standard 7.0" cutout
- For optimal antimicrobial capability, replace all compartment lighting fixtures with Antimicrobial Light devices for continuous operation

## SPECIFICATIONS

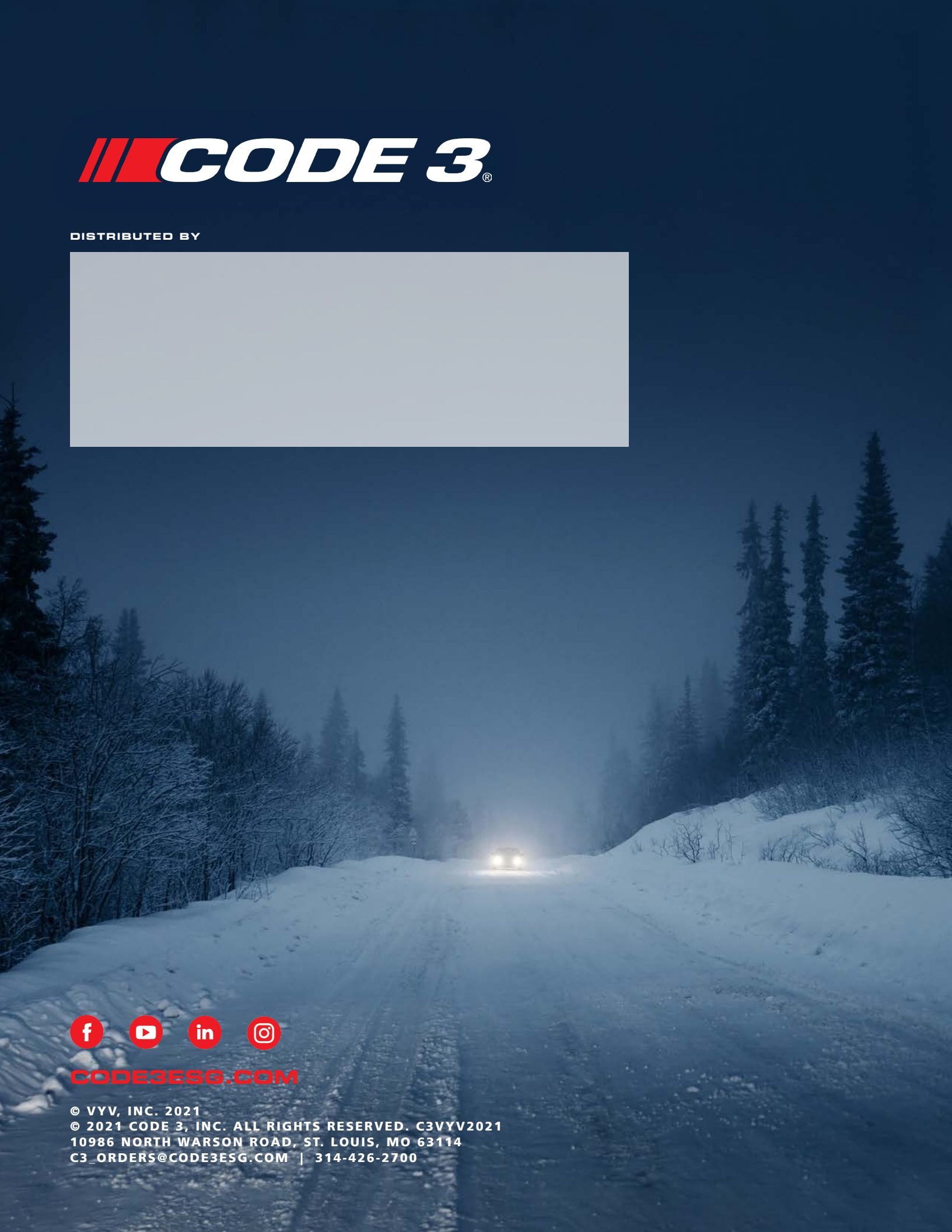
- 0.5" D x 9" Diameter
- Effective lumens: 750 bright mode and 250 dim mode
- 12-24V
- KKK-A-1822F certified and AMD compliant
- Internationally certified by IEC 62471
- 5 year, no-hassle warranty



These lights are designed for 24/7 continuous use for overhead installation in active, interior environments. Vyv's technology reduces the growth of bacteria in every area that it illuminates but may do so at different rates based on time and intensity. Code 3 strongly recommends that all existing patient compartment lights in an ambulance are replaced with Antimicrobial Lights with Vyv technology to achieve optimal results. The device output is designed to cover an effective floor-to-ceiling range found in most emergency vehicles (typically 10' H x 8' W).



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