The Virus Sanitization Evaporator
Aerostatic™ Disinfectant Applicators
A White Paper for Global Special Effects, Inc.

INTRODUCTION:

Due to increasing population densities around the World, an ever-growing global economy, and easy access to rapid long distant transit, we are at a constant risk for uncontrollable spread of human infectious diseases. Such notable events are the 2003 SARS (Severe Acute Respiratory Syndrome) epidemic, the 2012 MERS (Middle East Respiratory Syndrome) outbreak, the uncontrolled spread of Ebola in 2014, and most recently the novel Coronavirus (COVID-19) pandemic starting in 2019 have demonstrated our vulnerability as a human race. What each of these events has shown that these events are becoming more common and create rapidly evolving situations and the need to quickly react to prevent the spread of the viruses and decontaminate large areas. The recent Coronavirus (COVID-19) has shown the glaring need for rapid development and implementation of mitigation strategies.

The primary mechanisms for infection are close human-to-human contact and exposure to small droplets of infected fluids produced primarily during coughing, sneezing, or breathing. Social distancing, wearing appropriate Personal Protective Equipment (PPE) and practicing proper hygiene drastically decrease the spread of infectious diseases. A secondary infection mechanism is contact with exposed surfaces such as doorknobs, handrails, tabletops, etc. Studies have shown that the novel Coronavirus (COVID-19) can survive for up to 72 hours on plastic and stainless-steel surfaces *(National Institute of Health).* Although, COVID-19 and the vast majority of other viral and bacterial pathogens can be eradicated with the use of common household disinfectants *(World Health Organization, n.d.)*, applying the chemical agents according to manufacturer's recommendations limits their efficacy. The traditional process of applying these products by hand spraying and then wiping down the entire surface to ensure even coverage is very time consuming and inconsistent. Aerosol spray applicators disperse the cleaning agent over large areas but do not always provide uniform coverage on critical surfaces. The most effect aerosol sprayers create an ionic charge on the fluids being dispersed so that they have an inherent attraction to the surfaces being treated *(EPA, effectiveness of ES sprayers)*. The Virus Sanitization Evaporators manufactured by Global Special Effects Inc. provides an Aerostatic™ charge on the aerosol solution as it is being dispersed that offers exceptional attraction of the disinfectant solution to surfaces being treated.

Electrostatic spray technology has been used in several different industries to improve efficiency and precision and reduce overspray, make is ideal for application of disinfectant and cleaning solutions. The basic operating principle is to create an imbalance of electric charge in the solution. Like charged aerosol particles tend to repel one another which aides in dispersion of the mist leaving the application nozzle. The particles are attracted to oppositely charged surfaces. The attraction force is greater than the force of gravity allowing the disinfectant particles to wrap around and attach to irregular surfaces not directly exposed to the aerosol stream as depicted in Error! Reference source not found.. The two-primary means of creating a charge imbalance in commercially available electrostatic disinfectant sprayers are Corona Charging (CC) and Triboelectric Charging (TC). In CC method, the aerosol particles pass through an electric field produced by an electrode operating at up greater than 10,000 volts. The electrode must be precisely positioned in the center of the flow. In TC, the charge imbalance or static is generated by friction created by the kinetic motion of the particles and interaction with as dissimilar materials as the particles move through the system.

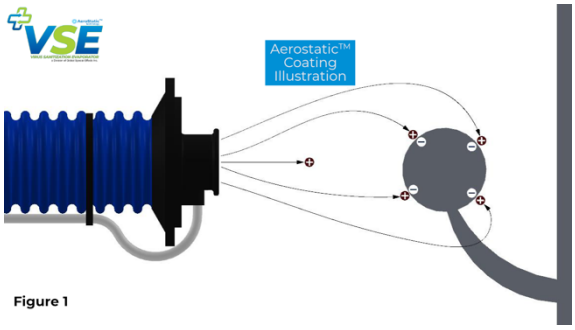

Figure 1

SOLUTION:

Global Special Effects (GSE), Inc. greatly improved the Triboelectric Charging technology to produce a series of highly efficient electrostatic spray systems. The GSE Virus Sanitization Evaporators provide an Aerostatic™ charge on the aerosol solution in three distinct ways: 1) the disinfectant solution is pumped from a storage tank via a high-pressure electric pump through a polymer feed line selected to maximize the production of static charge as solution flows to the

nozzle. 2) The second solution enters a highly turbulent air stream generated by 1400-Watt axial fan to which generates flow patterns that increases friction between the air molecules and surrounding surfaces. 3) The high velocity air/disinfectant flow travels through a polymer ducting line selected for preferable static charge generation to the discharge nozzle where the disinfectant solution is finally introduced into the air stream. The specially designed application nozzle (patent pending) converts the majority of the air flow back to a controlled laminar flow and creates a spray pattern that mixes and distributes the disinfectant solution over the desired target coverage area. The Aerostatic™ process has greatly improved efficiency, control and created a great ability to spray over large areas compared to currently available systems.

The GSE team developed three electrostatic spray systems that performed exceptionally well as a large area disinfectant and sterilization machine to meet the spectrum of decontamination requirements. The **CK-Mini** is light weight and easy to use by one person. The **CK-Commercial** is a single operator industrial grade machine placed on a cart with a 25 ft hose ideal for disinfecting large areas such as office buildings. The **CK-Storm** is a large-scale industrial machine designed for disinfecting massive areas such as auditoriums, stadiums, cafeterias, etc.

COMPANY BACKGROUND:

Global Special Effects (GSE), Inc is the largest special effects company in the world. Owned by Francisco Guerra, the company specializes the invention and manufacture of atmospheric machines such as those that create evaporative snow, foam, rain and fog weather effects that have appeared worldwide on television, in films, and at major theme parks. Inspired to help by the global COVID-19 pandemic, the company drew upon its long history and expertise in disbursement of various liquid solutions and began experimenting with its existing equipment to devise a method to convert their systems for use with disinfectants.

The Virus Sanitization Evaporators utilizing Aerostatic™ technology are a great fit for rapid disinfection of small to large scale surfaces in a timely manner to help protect people from current and future infectious disease challenges. In addition, Global Special Effects offers unprecedented warranty, extraordinary technical support, and unparalleled knowledge for specialty disbursement of fluid agents. Global Special Effects, Inc. should be your first choice for electrostatic disinfectant sprayers.

References

EPA. (n.d.). effectiveness of ES sprayers.

EPA. (n.d.). List N of disinfectants reference.

National Institute of Health. (n.d.). Surface stability reference.

World Health Organization. (n.d.). Web citation needed here.