

The Battle against Coronavirus: Surface Disinfection with Electrostatic Sprayers

By Barbara M. Soule, RN, MPA, CIC, FSHEA, FAPIC, and Chris Wiant, MPH, PhD
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In a nutshell...

This article introduces electrostatic sprayers as an efficient method of applying liquid chemical disinfectants to surfaces. This technology may have significant advantages in helping to control infection during the coronavirus (COVID-19) pandemic.

Surface disinfection is an important strategy in the battle against coronavirus, and it is a strategy that continues to evolve. Businesses and institutions are increasingly using an innovative device known as an *electrostatic sprayer* to ensure quick, efficient coverage by liquid disinfectants on surfaces, especially large areas or intricately shaped surfaces. For example, [airlines](#) are using electrostatic sprayers to disinfect cabins between flights; the College of William & Mary [announced recently](#) it has purchased electrostatic sprayers to disinfect surfaces on campus; and the interiors of South Carolina [school buses](#) will be treated with electrostatic sprayers twice each day during the current school year.



Disinfectant is applied to exercise equipment through an electrostatic sprayer using a backpack model. Sprayer systems are available in handheld and rolling cart models. Applicator protections can include face shields and masks.

Full 360 Degree Coverage

Electrostatic sprayers are designed to quickly achieve complete surface coverage with disinfectants. Sprayed droplets take on a positive charge as they exit the spray nozzle. Because most environmental surfaces have a negative or neutral charge, positively charged droplets of disinfectant are attracted to targeted surfaces. As spraying proceeds, these positively charged droplets repel one another as they impact a given surface, which causes them to spread out and wrap around three-dimensional objects. The result is an even coating of disinfectant, including on hard-to-reach areas.

An August 2020 [study](#) published in the *American Journal of Infection Control* evaluated the application of a dilute bleach solution through an electrostatic sprayer to decontaminate items such as wheelchairs,

portable equipment, and waiting room chairs. The authors cite a reference¹ supporting the fact that “thoroughness of manual cleaning is often inadequate, and application can be challenging and time-consuming particularly when surfaces are irregular or large open areas are being cleaned.” They found that applying a dilute sodium hypochlorite bleach solution with an electrostatic sprayer “could provide rapid and effective decontamination of portable equipment and large open areas.” Although the researchers admit they did not compare the efficacy and efficiency of the electrostatic spray technology with ultraviolet (UV)-C light (another technology used to disinfect large areas), they note that UV-C light is not ideal for disinfecting irregularly shaped devices with multiple angles, such as wheelchairs. The problem is the potential “shadowing” or blocking of UV-C light on intricately configured objects. They conclude the electrostatic spray technology could be “most useful for items and areas that are not amenable to standard cleaning and disinfection.”

A 2018 U.S. Environmental Protection Agency (EPA) [study](#) compared electrostatic sprayers with traditional sprayers used to apply chlorine bleach to decontaminate personal protective equipment used in bioterrorism exercises. The researchers reported bleach applied using electrostatic sprayers destroyed pathogens as effectively as when it was applied using traditional sprayers, but generated some 75 times less liquid waste!

Electrostatic Sprayers and Coronavirus

EPA maintains a list of disinfectant products approved for use against the COVID-19 virus. “[List N](#),” as it is known, includes new application methods, including electrostatic sprayers, for approved disinfectants. [EPA announced](#) recently it has developed an expedited review process to add electrostatic spray application directions for use on disinfectant labels. Manufacturers of approved products or new products may take advantage of this accelerated review process.

An Ingenious Use of Chemistry

The coronavirus pandemic has changed our lives in countless ways. We are probably all more aware than ever of viral infection risks and have made adjustments in our daily lives to minimize these. When was the last time you shook hands with someone? Planned or attended an indoor gathering with friends? Innovations such as applying disinfectants to surfaces through electrostatic sprayers could be popularized during the pandemic, adding a strategic new weapon in the fight against infectious diseases. Used appropriately, we think electrostatic sprayer technology is an ingenious variation on the use of chemistry for public health.

Barbara M. Soule, RN, MPA, CIC, FSHEA, FAPIC is an Infection Preventionist and a member of the Water Quality & Health Council. Chris Wiant, MPH, PhD, is Chair of the WQ&HC and recently retired as the founding president and CEO of the Caring for Colorado Foundation. He is also a former member of the National Drinking Water Advisory Council.

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¹ Donskey CJ. Decontamination devices in health care facilities: practical issues and emerging applications. *Am J Infect Control.* 2019;47S:A23–A28.