

Exploring Electrostatic Sprayer Claims of Efficiency, Coverage, and Ease of Use – White Paper

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Cleaning and disinfecting are commonly performed using a manual trigger spray bottle and wiping. However, germs and bacteria can live and spread into hard-to-reach places that cannot be reached by manual spray bottle and wiping methods.¹ Fortunately, electrostatic spray technology is an innovative, ergonomically improved solution that can be used to efficiently kill germs left behind in the nooks and crannies of shared objects.^{2,3}

Not all electrostatic technologies are the same, and not every electrostatic sprayer will work for all occasions. Clorox[®] electrostatic sprayers (specifically Clorox[®] Total 360[®] Electrostatic Sprayer and Clorox[®] TurboPro[™] Electrostatic Sprayer), however, are approved for use in various environments and have proven to be beneficial in helping to keep public spaces safer and healthier.⁴⁻¹² Our CloroxPro[®] scientists have found that there are three primary benefits to utilizing Clorox[®] electrostatic sprayers: efficiency, coverage, and ease of use.

Clorox[®] electrostatic sprayers can be up to 15X more efficient than trigger sprayers

Clorox[®] electrostatic sprayers provide efficiency over traditional, manual trigger spray and wipe methods. Efficiency is defined by coverage area, time, and the amount of liquid used. More specifically, our CloroxPro[®] scientists expressed efficiency as a ratio of surface area covered per minute (in sqft/min) divided by the amount of liquid sprayed over a surface area (in mL/sqft). Using this formula, greatest efficiency is achieved when the largest area is covered in the least amount of time and with the least amount of liquid.

Due to the mass shortage in cleaning professionals, many employers want to improve cleaning efficiency and increase custodial training to maximize output from their current employees.¹³ To evaluate cleaning efficiency, CloroxPro[®] scientists compared Clorox[®] electrostatic sprayers to traditional trigger sprayers. For the trigger sprayer evaluation, the team included an additional wiping step to account for differences in the spray pattern and typical use between the two delivery mechanisms. Clorox[®] electrostatic sprayers deposit smaller droplets on a surface resulting in an even layer of coverage which dries on its own, eliminating the need to wipe the surface. In contrast, trigger sprayers deposit large droplets on a surface that often have uneven application and require an additional wiping step.^{14,15} When using the above efficiency calculation, CloroxPro[®] scientists found that Clorox[®] electrostatic sprayers can be up to 15 times more efficient versus a trigger sprayer. In other words, Clorox[®] electrostatic sprayers achieve greater coverage in less time and use less liquid to accomplish the same goal.¹⁶

Clorox[®] electrostatic sprayers achieve greater coverage than traditional sprayers

Disinfectant Charge & Droplet Size

The efficiency and coverage of electrostatic devices are impacted by the charge and size of the droplets sprayed. Foggers and misters can more evenly distribute a disinfectant compared to a trigger or pump sprayer, but the droplets are not charged, which means that some regions of surfaces may not be disinfected. Additionally, misters and foggers typically deliver tiny droplets (average size around 10–30 microns)^{14,15} that are within the respirable range (typically anything below 30 microns),^{14,15,17} meaning that droplets can be inhaled into the lungs. Small droplets from foggers and misters passively land on surfaces based on the direction of spray. The droplets remain suspended in the air, often creating a “fog,” before finally being pulled down by gravity. This results in disinfectant filling the room and is the reason why extensive Personal Protective Equipment (PPE) and instructions for sealing vents prior to fogging are required. Foggers also typically require leaving the area during fogging and extended re-entry times after treatment, which can increase the time required for room turnover.¹⁸

Electrostatic sprayers, on the other hand, emit medium-sized droplets (average > 40 microns),^{14,15} which are generally too large to be inhaled into the lungs. Clorox[®] electrostatic sprayers deliver electrostatically

charged droplets with an average size of 40–80 µm that are attracted to surfaces to improve thoroughness of surface coverage.¹ Because of the charge, droplets do not remain in the air, but instead rapidly cover surfaces. This also allows operators to target specific surfaces for disinfection. For this reason, vents do not need to be sealed and there are generally no or very low re-entry times for bystanders when using electrostatic spray technology.

Chemistry Compatibility with Electrostatic Technology

Only EPA-approved products labeled for use with electrostatic sprayers should be used through electrostatic spray technology.¹⁹ Clorox[®] electrostatic chemistries are EPA-registered and have been tested through the Clorox[®] electrostatic sprayers to ensure the levels of product in the air are below established limits.¹⁹ Clorox[®] electrostatic chemistry options include disinfectant cleaners (Total 360[®] Disinfectant Cleaner, and Turbo Pro[™] Disinfectant Cleaner), sporicidal disinfectants (Spore¹⁰ Defense[™] Cleaner Disinfectant), and food-safe sanitizers (Anywhere[®] Daily Disinfectant & Sanitizer).²⁰ Moreover, Clorox[®] electrostatic chemistries are specifically designed to contain minimal ingredients and no fragrances to prevent excessive odor or irritation.

PPE and re-entry requirements also vary based on product chemistry. Some EPA-registered disinfectants, like peroxide or quat based chemistries, may require additional PPE when used with an electrostatic sprayer and longer re-entry times after use. Our trusted Clorox[®] electrostatic chemistries, however, have no re-entry times, excellent performance, and broad surface compatibility.²¹ As with any product, users should always review and follow the product's directions for use.

Clorox[®] electrostatic sprayers significantly reduce ergonomic occupational risk versus manual trigger sprays

Musculoskeletal injuries are common occupational injuries affecting cleaning professionals. Ergonomic risks, such as repeated bending and twisting at the waist, and repetitive motions from the shoulders and wrists, increase the risk of occupational injury.²² Devices should be ergonomically designed so that operators can use them comfortably throughout the course of their shift. Designed with ergonomics in mind, newer handheld electrostatic sprayers are engineered to reduce repetitive motions needed to spray surfaces. Bending at the waist is less necessary because the user can spray the surface from 2–4 feet away. The repetitive motion of squeezing a trigger is eliminated because the device remains on with a single push.¹ The S-shaped motion that is recommended to spray surfaces also eliminates unnecessary movement at the wrist and shoulders.

In a recent real-world study, the CloroxPro[®] research team investigated the potential ergonomic impact of using electrostatic sprayers to disinfect high-touch surfaces in five rooms (restroom, classroom, cafeteria, shared office space and weight room).²² Eight custodians of different experience levels from Mount San Antonio College volunteered to participate in the study using the Clorox[®] Total 360[®] Electrostatic Sprayer, Clorox[®] TurboPro[™] Electrostatic Sprayer, and a manual trigger spray. Before testing began, all operators received hands-on training on how to best use the devices to ensure proper and efficient use. The tests for each participant were all captured on video, which were later reviewed by a certified ergonomist who provided a score on the Rapid Entire Body Assessment (REBA) scale. REBA is a test method designed to rapidly assess ergonomic risks for workers and is used to identify and correct issues that may lead to musculoskeletal injuries.

Significantly lower ergonomics occupational risk was observed when using the electrostatic devices versus the manual trigger spray. On the REBA scale, using a manual trigger spray scored an average 7.4 points, placing it in a medium-high risk category for injury. On average, using the Clorox[®] Total 360[®] cart reduced REBA scores by 3.6 points ($p = 2.7 \times 10^{-5}$) and 2 points for Clorox[®] TurboPro[™] ($p = 0.001$).²² These scores correspond to lower risk levels. Using electrostatic devices to disinfect high-touch surfaces reduced ergonomic risk factors for all study participants, even first-time users. The results of this real-world study demonstrated that electrostatic devices may be used to reduce ergonomic risk factors for custodians, and additional training on ergonomics with devices may reduce these risk factors even further.

One size does not fit all

Clorox[®] electrostatic sprayers are more than devices—they are effective application systems. Electrostatic

sprayers are now offered in various shapes and sizes to accommodate all types of usage occasions. Using charged solutions, Clorox® electrostatic sprayers can cover more surfaces in less time and provide extra assurance that all sprayed surfaces are covered, including curved or oddly shaped objects. Clorox® electrostatic sprayers are designed with ergonomics in mind, making surface disinfection more achievable and poses less risk of injury for the cleaning staff. This unique blend of efficacy, coverage, and ease of use make Clorox® electrostatic sprayers a differentiated option that demonstrates a commitment to providing a safe environment for staff and the people that use the spaces being treated.

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