

Electrostatic Spraying

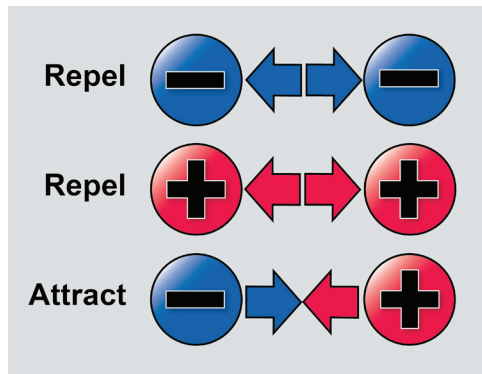
The Rise of Sprayers in the Cleaning Industry

Multi-Clean®

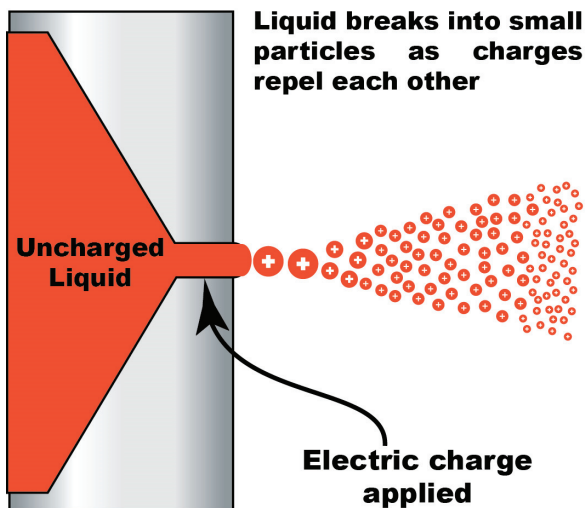
Electrostatic spraying is a method of applying a coating, cleaner, disinfectant, or other liquid, that involves applying an electric charge to a liquid in order to get it to fully cover a surface. The result is a more efficient process with numerous advantages. It is important to understand how electrostatic spraying works and why it is advantageous to use this method in order to get the most out of your cleaning processes. Electrostatic spraying of coating and other liquids has been around since 1940.

How it Works

The basic theory of electrostatic spraying is to apply a positive charge to the paint or liquid being applied. Using the basic principle that opposite charges attract, the liquid would then be attracted to the surface, allowing for a full, even coat of liquid on the surface.



This concept is combined with the process of atomization. By applying an electrostatic charge to the liquid, each particle becomes charged with the same positive charge. Again using the basic principle that opposites attract and similar charges repel, the particles are naturally repelled by one another, and freely break apart or atomize. This is the primary concept that allows for a more even coating.



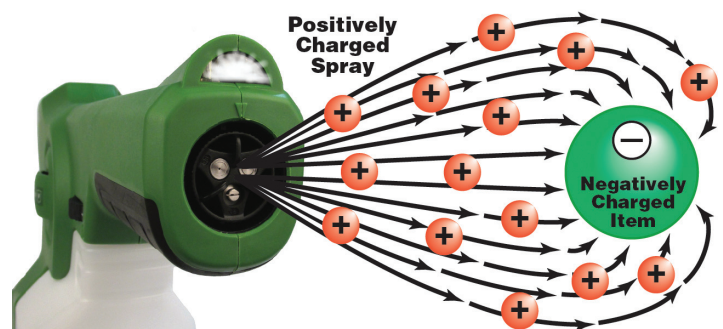
Advantages of Electrostatic Spraying

Electrostatic spraying has numerous advantages over conventional sprayers and other coating methods.

Most prominently, the electrostatic charge applied gives a more even, full coat compared other methods. When the positively charged paint is sprayed onto a negatively charged (grounded) surface, the paint particles are naturally and strongly attracted to the surface. Since the entire surface is negatively charged, the entire surface will be covered by the paint, leading to uniform coverage. At the same time, once the surface is covered to a certain thickness by the paint particles, the remaining airborne particles become too far away from the surface to be attracted by the negative charge. The remaining paint does not stick, leading to an even coat throughout the surface.

Another useful advantage to electrostatic spraying is that it can get to hard-to-reach areas, like crevices, around corners, and backsides of surfaces. The airborne paint will "seek out" uncoated surface to adhere to rather than already-coated material, as the attraction is stronger to the uncoated surfaces. This comes in handy as electrostatic spraying can reach areas that could not otherwise be reached when using brushes, rollers, or even other sprayers.

Conventional sprayers use a mechanical atomization method, where air pressure is used to break down the particles. This leads to a higher forward spraying velocity, and in turn there can be splatter or overspray. This doesn't happen with electrostatic spraying since air pressure is not used in the atomization process.



Relevance in the Cleaning Industry

At this point you may be asking yourself, "What does paint spraying have to do with cleaning?" The answer is, although electrostatic spraying has been used in the coatings industry for years, it is now becoming more relevant in the cleaning industry as well. Not by applying paint, but by applying cleaners and more notably, disinfectants.

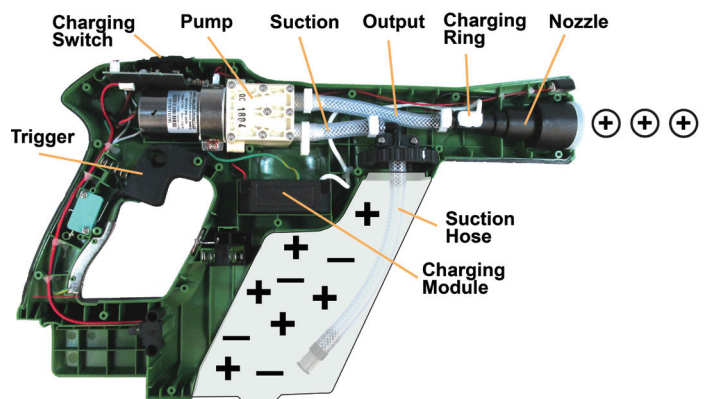
Much like paint can be electrostatically sprayed onto surfaces; virtually any liquid can be electrically charged and applied onto a variety of surfaces. When you look at common surfaces, such as walls, floors, and fixtures, they are naturally grounded, meaning they have a negative charge. So if a liquid is positively charged, as it is in an electrostatic sprayer, this liquid will fully coat almost any surface it is sprayed onto. This means that cleaners and disinfectants can take advantage of this technology as well. Electrostatic spraying lends itself particularly well in the areas of disinfecting and restroom cleaning.

In restrooms, virtually any surface can be a hotspot for bacteria and odors to grow. In cracks, under toilets and urinals, on the walls, and many more that we probably don't even think of when we are cleaning. By using an electrostatic sprayer system, all of these surfaces can be coated with a cleaner or disinfectant, and the restroom will be much more efficiently and completely cleaned.

Probably the most useful cleaning method that is being utilized with electrostatic spraying is disinfecting. When you think about the concept and process of disinfecting, electrostatic spraying is a perfect pair with it. You need to fully coat a surface and leave it wet for the recommended contact time, most often 10 minutes. Electrostatic spraying can help with both of these issues, and is much more effective than mop-and-bucket, spray-and-wipe, or cloth-and-bucket applications.

A big issue with disinfectants, regardless of the method of application, is ensuring that all surfaces are disinfected, meaning that disinfectant needs to be applied to all surfaces. This can become a problem when it comes to hard-to-reach areas or larger areas. Often we don't have the time or diligence to cover every surface in a room; we can miss surfaces like walls, undersides of tables, counters, and desks, and many more. Many cleaning professionals are trained to disinfect the "high-touch" surfaces, as they are most important. Electrostatic spraying eliminates the need to limit ourselves to only the most soiled surfaces. We can spray every surface in the room, fully disinfecting it, and saving a lot of time in the process. We can be assured that even those hard-to-reach areas are disinfected. This is a big deal in facilities where disinfection is paramount, like hospitals and schools. It also offers promise in controlling foodborne illnesses in restaurant or food processing facilities.

Another component of disinfecting is obtaining the necessary contact time with our disinfectants. For most disinfectants, this means ensuring the surface remains wet for 10 minutes. This is a big issue especially in spray-and-wipe disinfecting. In many instances, we spray a surface down and wipe it dry almost immediately. This is not ensuring a 10-minute contact time. A common rule of thumb used in the cleaning industry is that if we leave the surface visibly wet and let it air dry, we can assure we have achieved the proper contact time. Electrostatic spraying can solve this issue as it can be a "set and forget" type of application. For instance, in a restroom, after it has been cleaned, we can simply spray the entire room with our disinfectant and leave it to air dry. Once the disinfectant has dried and the restroom is opened up, it has been fully and properly disinfected. Electrostatic spraying can make the disinfection process much more efficient.



Does it Actually Work?

One concern with using electrostatic sprayer delivery methods is whether it will affect disinfecting efficacy. It is important to ensure that the disinfectant you are using with the sprayer is compatible, otherwise you may not actually be doing any disinfecting at all.

The main class of disinfectants use an active ingredient called quaternary ammonium chloride, or "quat." Since quat is a naturally positively-charged particle, it makes sense that this ingredient would be compatible with an electrostatic sprayer. Still, testing should be done with each disinfectant (or sanitizer) with a particular brand/model of electrostatic sprayer.



Test Results

At Multi-Clean (EPA Establishment No. 5449), we have performed testing using Multi-Clean brand EPA registered disinfectants and sanitizers with an electrostatic sprayer from Victory Innovations Company (Model VP200ESK). The purpose of the testing was to determine if the electrostatic sprayer had an impact on the level of the active ingredient and therefore, the pathogenic efficacy of the product(s). The EPA-approved Epton* procedure was used to determine the quat activity both before and after spraying through the Victory Innovations electrostatic sprayer. The results in Table I below show the activity level of three Multi-Clean disinfectants before and after spraying through the Victory Innovations sprayer.

In each case, the active ingredient level of each Multi-Clean Disinfectant and Sanitizer tested was not affected by spraying using the Victory Innovations electrostatic sprayer (model VP200ESK).

Test Results with Victory Innovations

Product	Activity Before	Activity After
Century Q 256	665	665
Millennium Q 64	707	703
Microcide TB	2100	2100
Chlorinated	2623	2605
E-Fecticide 128	1332	1341

Test method: EPA - Epton procedure.

- Error associated with this test method is ± 20 ppm.

- All products had a negative charge in activity that is not expected to have any effect on efficacy.

FAQ

Q. Can any disinfectant be used through electrostatic spray guns?

A. The particular disinfectants should be validated for use with each particular model or brand of electrostatic spray device to ensure that using this spray delivery method maintains the proper activity level. Quat disinfectants are inherently stable, but others such as those containing bleach or hydrogen peroxide are less chemically stable and may not be appropriate.

Q. Do surfaces need to be pre-cleaned before applying the disinfectant?

A. Since the electrostatic spraying method is a method of applying disinfectant and is not typically paired with a method of removing soils from surface, any surfaces that are believed to be previously soiled should be wiped and/or pre-cleaned.

Q. What type of safety and personal protection equipment are suggested?

A. The electrostatic spraying method disperses very fine, atomized particles into the air in order to coat surfaces. Done correctly, the transfer efficiency of the liquid particles onto a surface is very high, which means little or no airborne mists. It is recommended as a best practice to wear a standard dust/mist mask during the application along with eye and hand protection.

Q. Can other people be in the area when electrostatic spraying a disinfectant?

A. If the presence of others is required, everyone in the vicinity should wear recommended PPE.

Q. What are some applications where electrostatic spraying may offer benefits?

A. Some examples below:

1. Healthcare: Terminal Patient Room Cleaning.
2. Education: Classrooms, fitness equipment, wrestling mats, bathrooms, lunchrooms and buses.
3. Food Service: Sanitizing equipment & surfaces.
4. Odor Counteraction: Application of bio-enzymatic cleaners for odor counteraction in bathrooms and other enclosed spaces.

OSHA Regulations

To insure compliance with OSHA secondary container labeling rules, the sprayer cartridge should always be properly labeled.

*Standard Analytical Method for Determination of Active Quaternary in Anti-Microbial Concentrates or Formulations by Titration with Sodium Lauryl Sulfate.

For more information on disinfectants and sanitizers for a variety of purposes, visit www.multi-clean.com/products/disinfectants.