ESS Electrostatic Spraying Systems

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To Whom It May Concern,

RE: Electrostatic Spraying Systems (ESS), technology explanation

Electrostatic spraying is an often misunderstood and inaccurately explained application process. Two common mistakes which are made and misconceptions are that:

- There is a single category and that all electrostatic sprayers are one in the same; and
- ESS sprayers are mistakenly referred to as "foggers", simply because their droplets are smaller than a more conventional sprayer.

Neither of these are correct, however there is one very important aspect that all electrostatic sprayers must abide by; droplet size. In order to apply an electrostatic charge to a droplet one must realize that the mass of a droplet has the most important influence on the efficacy of this application process.

During the development of the *Maxcharge* nozzle at the University of Georgia, it was determined that if a droplet has a mass that is too large it will fail to have sufficient charge and "wrap-around effect" to cover the targeted object on all sides, despite its charge. On the other end of the spectrum, if the droplets are too small and enter into the range of a fog, they lack sufficient volume to be effective.

There are also many myths that cloud the reality of what's happening in the process. Although charging a suspended droplet is important, it is equally important to understand how all of the droplets, or the spray plume, work to create the attraction. When a plume of droplets is expelled into free space, all carrying like charges, they induce an equal but opposite charge on any object that is grounded. (i.e.: a piece of equipment, wall, bed, or furniture) To clarify, grounding does not mean a (negative) polarity but rather having an electron supply from ground. Any grounded object can be induced to carry a negative or positive potential if exposed to a prevalent field charge of opposite potential. This is why seemingly non-conductive objects fight for the attraction of a single droplet. In layman's terms, the droplets form a mist which is immediately attracted to the nearest grounded objects, rather than being suspended in the air.

Generally speaking a fog is usually very very small droplets, many times in the 5 micron range. Whereas, as can be seen from the attached studies done by the USDA, utilizing the ESS Maxcharge nozzles, the average droplet leaving the ESS Maxcharge nozzle is approximately 40 microns, and much larger and heavier than a fog. I would refer you to the attachment, specifically the first example. In this study, the Volume Median Diameter (VMD) or "Dv50", refers to the midpoint droplet size (mean), where half of the volume of spray is in droplets smaller, and half of the volume is in droplets larger than the mean. In the study, the mean droplet size is 41.90 microns. The droplets are small enough to accept a strong charge, be attracted to nearby targeted objects, and wrap around these objects, but also large enough to not be merely a fog, floating in the air. It is important to also note in the study that the nozzle produces almost no droplets below about 4 or 5 microns, as in a fog. The difference in size and weight of a 40 micron droplet is drastically different from that of a tiny 4 micron droplet due to the fact that it is cubic volume in nature.

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