

## Electrostatic Spray Guns



### What is electrostatic painting? The history of electrostatic spray guns

Electrostatic is a term used for a special type of coating application equipment, developed in 1938. The first system was created whereby an electric charge could be applied into liquid paint and sprayed onto grounded objects. The particles of paint attracted to the surface of the object and little paint was wasted in the air. In other words, the particles can actually change direction in midair, even 180 degrees, to attract themselves to the grounded object!

### Why use electrostatic painting?

1) A conventional spray paint application only goes to the surface directly in front of the spray gun. An electrostatic coating application wraps the material around the substrate ensuring an even mill thickness of the coating system. This leaves behind a finished coating without the unevenness, high and low spots of conventional paint spray applications. Brush painting of these types of substrates cannot even be considered here due to their historically poor applications as well as being a non-atomized applied finish. In other words, electrostatic painting can coat uneven surfaces like poles, porous materials, fences, carvings, etc.

2) Atomization is the breaking down of a liquid by air pressure into a small particle mass, therefore creating a spray. This is how conventional paint spray equipment basically works. Air pressure is used to break down the paint and by doing so creates a radical forward velocity to blow paint onto the surface directly in front of the spray gun. As well as create a tremendous amount of damaging, unsightly overspray. In other words, Electrostatic painting saves a lot of paint and has very little overspray. You can expect to achieve almost 90% transfer efficiency.

### What can I paint?

Nearly any piece can be sprayed electrostatically. If the electrostatically charged paint "sees" a conductive grounded surface, it will be attracted to it. A nonconductive piece can be sprayed electrostatically by either putting it between the applicator and a conductive grounded surface or spraying the piece conventionally with a conductive primer. **Restroom Partitions... Elevators... Storage Units... Playground Equipment... Wire Products... Shower Stalls... Lockers... Office Furniture... Files... Desks... Bookcases... Shelving... Railings, Dental, Hospital & Manufacturing Equipment... Windows and Door Frames, Store Fronts, and Canopies... Windows and Door Frames, Store Fronts, and Canopies...** Other items: Many black rubber items have enough carbon content to be sprayable. Others, such as wood parts, sometimes have enough moisture to produce a ground sufficient to spray electrostatically. Nonconductive material may be pretreated with conductive spray coatings.

### What is the advantage and disadvantage of electrostatic/airless and air spray?

The finish required between an airless gun and an Electrostatic Air Spray gun are significant. Even ambient conditions can make a large difference. In general, electrostatics works best on small particles such as are common with an Air Spray product. Conventional airless produces larger particles and a high directional velocity and usually has a much higher fluid delivery than does Electrostatic Air Spray. In basics, the Electrostatics Air Spray offers more gain in efficiency and a much higher finish quality than airless. If the product is currently sprayed airless and a higher efficiency is needed, the best route is to go to an Electrostatic Air Assisted Airless technology. The operator can use the same pump/system as his old Airless and all that is needed is a small air compressor for the gun.

### What is the advantage and disadvantage of electrostatic/airless and HVLP and Reduced Pressure air guns?

HVLP and reduced pressure will produce higher finish quality; however, Electrostatic will create a more uniform and even coating, especially on non-flat surfaces.

---

### **Why should I choose an electrostatic spray gun over a conventional spray gun?**

Although an electrostatic gun may cost more, it has many advantages over a conventional spray gun. An electrostatic gun has a very high transfer efficiency (upto 98%) which results in a lower paint cost, less VOCs, less cleanup and faster production.

### **Does electrostatics work only when spraying metal pieces?**

No, nearly any piece can be sprayed electrostatically. If the electrostatically charge paint "sees" a conductive grounded surface it will be attracted to it. A nonconductive piece can be sprayed electrostatically by either putting it between the applicator and a conductive grounded surface or spraying the piece conventionally with a conductive primer.

### **Can electrostatics be used to paint something other than metal? If so, will you get the same benefits as spraying metal electrostatically?**

Almost any product can be finished electrostatically. Some may require pretreatment with chemical sensitizers to produce a conductive surface. With some products, a metal object may be placed behind the part to create a ground image for attraction. Many black rubber items have enough carbon content to be sprayable. Others, such as wood parts, sometimes have enough moisture to produce a ground sufficient to spray electrostatically. The many advantages and savings associated with electrostatic spraying justify the application of a pretreatment or preparation product. Material, maintenance, labor and filter savings alone help justify an electrostatic application, not to mention increased production.

### **Will painting electrostatically provide better adhesion?**

Painting electrostatically will give better transfer efficiency (more paint on the part) but not better adhesion. Adhesion depends on the condition of the substrate and the properties of the paint. Painting, in general, electrostatic or conventional, requires the same type of properly prepped surface before applying paint. Proper preparation is an important key to a good paint job.

### **Can waterborne paints be sprayed electrostatically?**

Yes. Waterborne paints are the most conductive paints made. This makes them ideal for electrostatic applications. However, when spraying waterborne paint electrostatically, the charge will be carried back to the fluid-supply system. Therefore, spraying waterborne paint electrostatically requires isolating the paint-supply system from contact with people.

### **What needs to be grounded when using electrostatic guns?**

All of the equipment, personnel and target parts in the spray booth area must be grounded. Any ungrounded object, or person, in the spray area can become electrically charged. Improper grounding can result in static sparking which can cause fire or electric shock.

### **Do I need to maintain 45 to 60% relative humidity for ideal powder coating conditions?**

The relative humidity of 45 to 60 percent is important for a few reasons. First, we are creating a corona field of charge around the gun via the electrode on the front of the gun. The moisture in the air is necessary to facilitate the ion bombardment on the particle to be charged. We are ionizing the powder particles and moisture in the air. If the moisture content is too low, the corona field is not as effective and results in lower transfer efficiency of the application process. Also, if the humidity is too low, there is a tendency for the material to create a tribo charge, which strips away negative ions and leaves the powder with a positive charge. We typically use negative charge for our corona guns. Relative humidity of the environment is important because if it is too humid, the powder will not fluidize as well or will create impact fusion. Too much moisture may seem obvious, but the powder will agglomerate when too moist. Therefore, maintaining 45 to 60 percent relative humidity is most effective in creating the ideal powder coating environment for most powders. As in most manufacturing processes, controlling variables within the process produces fewer rejects and reduces costs associated with rework and scrap. The bottom line is that changes in humidity can cause fluctuations in application deposition weights, thus increasing your reject rate. Maintaining relative humidity of 45 to 60 percent contributes to a consistent finish and reduced rejects.