ELECTROCOATING

We Protect What's Important to You

MetoKote CORPORATION
Customers today demand higher quality and durability from the products they buy. Not only do they expect these products to perform well but they want the finish to look good and resist corrosion for a much longer period of time. The finishing processes offered by MetoKote are designed to do just that. One of those finishing processes is electrocoating.

Electrocoating is a method of painting which uses electrical current to deposit the paint. The process works on the principle of “Opposites Attract”.

**Opposite Charges Attract:**

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+  →  ←  −
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**Like Charges Repel:**

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←  +  +  →
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The fundamental physical principle of electrocoating is that materials with opposite electrical charges attract each other. An electrocoat system applies a DC charge to a metal part immersed in a bath of oppositely charged paint particles. The paint particles are drawn to the metal part and paint is deposited on the part, forming an even, continuous film over every surface, in every crevice and corner, until the coating reaches the desired thickness. At that thickness, the film insulates the part, so attraction stops and electrocoating is complete. Depending on the polarity of the charge, electrocoating is classified as either anodic or cathodic.

**Classifications of Electrocoating**

- **Anodic**
  - (+)
  - Water
  - Part
  - Deposition of Coating Film

- **Cathodic**
  - (+)
  - Water
  - Part
  - Deposition of Coating Film
The Electrocoat Process.

The electrocoat process can be divided into these four distinct zones:

- Pretreatment
- Electrocoat Bath and Ancillary Equipment
- Post Rinses
- Bake Oven

The pretreatment zone cleans and phosphates the metal to prepare the surface for electrocoating. Cleaning and phosphating are essential to achieving the performance requirements desired by today’s end user of the product. MetoKote analyzes the metals to be processed and chooses the most appropriate chemicals. A high quality zinc phosphate system using the immersion method is primarily used in MetoKote systems where steel and iron parts are to be coated.

The electrocoat bath and ancillary equipment zone is where the coating is applied and the process control equipment operates. The electrocoat bath consists of 80%-90% deionized water and 10%-20% paint solids. The deionized water acts as the carrier for the paint solids which are under constant agitation. The solids consist of resin and pigment. Resin is the backbone of the final paint film and provides corrosion protection, durability and toughness. Pigments are used to provide color and gloss.
Typical Electrocoating Process Sequence

Post Rinse Operation

Parts Being Unloaded After Curing is Complete

The post rinses provide both quality and conservation. During the electrocoat process, paint is applied to a part at a certain film thickness, regulated by the amount of voltage applied. Once the coating reaches the desired film thickness, the part insulates and the coating process slows down. As the part exits the bath, paint solids cling to the surface and have to be rinsed off to maintain efficiency and aesthetics. The excess paint solids are called “drag out” or “cream coat.” These excess paint solids are returned to the tank to create a coating application efficiency above 95%.

The bake oven receives the parts after they exit the post rinses. The bake oven crosslinks and cures the paint film to assure maximum performance properties. The minimum bake schedule is 20 minutes with part temperature at 375°F for most electrocoat technologies. However, MetoKote also applies a “low temperature cure” electrocoat material. This material has a minimum cure of 20 minutes at a part temperature of 180°F so that many assemblies containing seals, bushings, bearings, or oil can use the electrocoat process.
Electrocoat Technology Categories.
At MetoKote we categorize electrocoat technology by the way they are primarily used. Certain technologies tend to be most commonly used as a primer or as a topcoat.

As a primer:
Cathodic epoxy electrocoat is the most popular technology at MetoKote because of its superior adhesion and corrosion protection properties. It is designed to be compatible with a wide range of liquid and powder topcoat materials. Since this technology has good appearance properties it can also be a single coat where resistance to the ultraviolet rays from sunlight is not needed. Cathodic epoxy electrocoat materials available today are very environmentally friendly. These materials are used on piece parts where a cure temperature above 380°F is possible.

Anodic epoxy electrocoat materials are used in the same way as the cathodic epoxy electrocoat. Adhesion and corrosion resistance properties are generally better than commonly used liquid paint primer materials. Anodic epoxy electrocoat materials are used where components must be coated as assemblies that contain heat sensitive parts such as bearings and seals. The part temperature for curing can be as low as 180°F.

As a topcoat:
Cathodic acrylic electrocoat materials lend themselves to topcoat applications because of their very good resistance to the ultraviolet rays from sunlight. A big advantage is that only one coat is necessary. The overall adhesion and corrosion resistance properties are good when compared to popular liquid primer plus topcoat paint systems. Electrocoat technologies are generally restricted to a given color, however, in some applications additional color options are required. A good solution is to use cathodic acrylic as a one coat system for the primary product color. It can also be used as a primer to be topcoated with a liquid or powder topcoat material for multiple color options.
Outsourcing Decision.

An electrocoating system with the appropriate supporting equipment such as the treatment system for process fluids represents a significant capital and staffing investment. For low to moderate production volumes, outsourcing is an easy decision. It is the cost effective way to obtain the advantages of electrocoating for a product. However, when production volumes reach the levels where it would seem to be justified to install a system in-house, the outsource decision for electrocoating becomes more than a normal “make or buy” decision. It is also a “strategic” decision. It means “becoming a coater.” Considering an in-house coating system brings new meaning to the strategic question, “What is our business?”

MetoKote Advantages.

Here are a few of the advantages of outsourcing with MetoKote:

- **Project analysis**: MetoKote will assist with development and then support the most effective process to meet and exceed the customers’ goals.
- **Building and equipment**: MetoKote can design, build and manage these facilities for maximum efficiency specific to the customer’s product.
- **Coating application**: MetoKote will provide highly trained personnel for total custom coating system management.
- **Parts handling**: MetoKote is experienced in packaging, logistics, assembly, inventory control, masking and specialized fixturing.
- **Long-term management**: MetoKote’s unique “bundle” of skills related to painting technologies allows the customer to focus on the core business without the worries of operating a coating facility.
MetoKote offers electrocoating services in several different states within the U.S. and also in foreign locations. Other technologies such as powder coating and liquid painting are available at certain locations for additional coating service options. Call the MetoKote Corporate Marketing Office (419-996-7800) for a brochure showing a map of plant locations and a chart of services offered.

Regardless of the size of the coating program, MetoKote services should be considered.

MetoKote is known for the capabilities of its internal Technology Group, Equipment Division and experienced operating teams. These capabilities have earned MetoKote a reputation for providing a total, integrated, cost effective coating solution.