http://www.exshopthai.com

A Brief History of E-coat

Origin

Even though E-coat has been with us since the 1930, it is mainly due to large interest and capital investment in the 70's by the automobile industry for primers that made it popular. Since then the technology has found its way into the more decorative and functional (non primer) single coat application like CLEARCLAD.

Timeline

1940's - Experimentation into electodepositing phenolic resin coatings onto electrical wire on a continuous basis.

1950's - Full scale development of electrodeposition of anti-corrosive paint primers onto automobile bodies.

1960's - Development of exterior durable, light colored electropaint resin systems suitable for domestic appliances, architectural aluminum etc.

(Principle technology so far - anodic)

1970's - Cathodic technology displaces anodic as the principle system in the automobile industry. Such systems are adapted for small scale use in the electroplating industry (circa 1978).

1980's - Technology continues to evolve as protective coatings for the metal finishing industry.

So, what is E-coat?

Process Mechanism

E-coat is an emulsion of organic resins and de-ionized water, which is in a stable condition. The e-coat solution also comprises of some solvent and some ionic components. When a D.C. voltage is applied across two immersed electrodes, the passage of current is accompanied by electrolysis of water. This results in oxygen gas being liberated at the anode (positive electrode) and hydrogen gas liberated at the cathode (negative electrode). The liberation of these gases disturbs the hydrogen ion equilibrium in the water immediately surrounding the electrodes. This results in a corresponding pH change and this in turn de-stabilizes the paint components of the solution and they coagulate onto the appropriate electrode.

- Cathodics electropaints are stable except at high (alkaline) pH. Anodics are stable except at low (acid) pH
- Electrolysis of water causes the cathode to become alkaline and the anode to become acid.

Electrophoresis is a well documented process whereby electrically charged particles in a conductive medium will migrate to the electrode bearing the opposite charge under the influence of D.C. voltage. Although many technical descriptions of electropaint ascribe electrophoresis to the deposition process it is not the predominant mechanism. However, it is very common to refer to electropaint as "Electrophoretic"

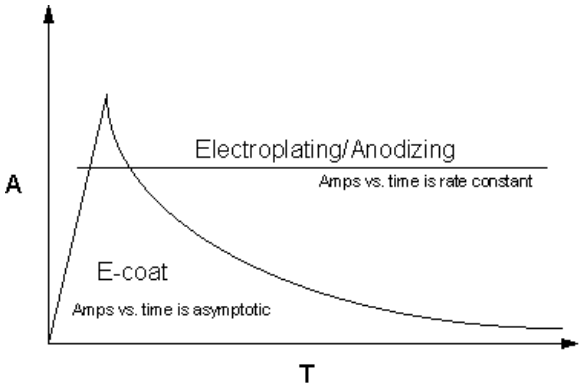
How is it applied

Application

An unfinished product is immersed in a bath containing the electrophoretic paint emulsion, and then an electric current is passed through both the product and the emulsion. The paint particles that are in contact with the product adhere to the surface, as described in the above mechanism, and build up an electrically insulating layer. This layer prevents any further electrical current passing through, resulting in a perfectly level coating even in the recessed parts of complex-shaped goods. The product is then removed from the paint bath and baked in an oven.

How does this compare to plating

Due to the insulating nature of the deposit as described above, it is possible to accurately control the thickness over the part. Whereas with plating and anodizing thickness is controlled by amp/time relationship;



With e-coat the thickness is controlled by voltage. Time is not as critical, as once the part is coated and insulated, no more coating will take place. Depending on surface area and complexity of the parts, most coating is easily accomplished with 2 minutes. This highlights one of the big equipment differences. Plating and anodizing require low voltage and high amperage rectification. E-coat requires high voltage and low amperage (1 sq. ft. draws 1.5 amps max) rectification.