PPG brings electrocoat technology to Taiwan's fastener industry

An Introduction to PPG

PPG Industries is a leader in its markets; is a streamlined, efficient manufacturer; and operates on the leading edge of new technologies and solutions. PPG is a leading coatings and specialty products and services company, servicing customers in construction, consumer products, industrial and transportation markets and aftermarkets. PPG has manufacturing facilities and equity affiliates in more than 20 countries around the globe, with head office based in Pittsburgh, USA. See PPG's corporate web site for more information www.ppg.com.

PPG developed the cathodic epoxy electrocoat technology and introduced it first to the automotive industry in 1976 as a primer. Since then, PPG has continued to lead the electrocoat technology field, with new generations of electrocoat technology being commercialized in more and more end uses.

In 2001 PPG introduced a specifically formulated product range of cathodic epoxy electrocoat for the fastener market. Automotive, industrial and construction fasteners have been coated with both PPG's anodic and cathodic electrocoat products.

The technology advantages of the cathodic electrocoat has lead to the ongoing replacement of anodic electrocoat in the fastener and small parts market. Hence, with the opening of PPG's fastener coating application centre in Kaohsiung Taiwan, the latest generation of PPG's cathodic electrocoat products was introduced as the main product line.

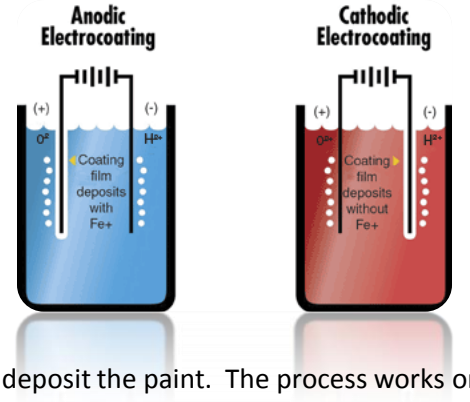
Alltech Engineered Finishes is the exclusive applicator in Asia Pacific using PPG's latest generation of Electropolyseal™ coating finishes. The application centre is located in Kaohsiung, Taiwan just 5 mins from the airport and has been in commercial operation since 2006, serving the automotive, industrial and construction fastener markets. The Alltech application centre is fully operational based on the ISO9001:2000 and ISO/TS16949:2002 quality systems standards.

PPG has brought the latest generation of fastener cathodic electrocoat technology to Taiwan by providing Alltech's coatings application services to the fastener industry. No other coating company invests as much in electrocoat technology pure research and development as PPG.

The Allison Park research centre in Pittsburgh is the hub of continuous technology advancement in electrocoat coatings and in many other areas of breakthrough technology development. PPG has been awarded with recognition as a coatings industry technology leader, with thousands of technology patents, including breakthrough new technology developments.

The technology support from PPG USA is a solid support network, which extends successfully to Alltech Engineered Finishes, the PPG fasteners application centre in Taiwan. Within Taiwan, PPG has been supplying electrocoat products to the Automotive OEM and Industrial markets for decades. Therefore, technical and application expertise in pretreatment and electrocoat has been well established in Taiwan for years. The PPG family of technical experts in both pretreatment, electrocoat and equipment engineering is all part of the Alltech support network.

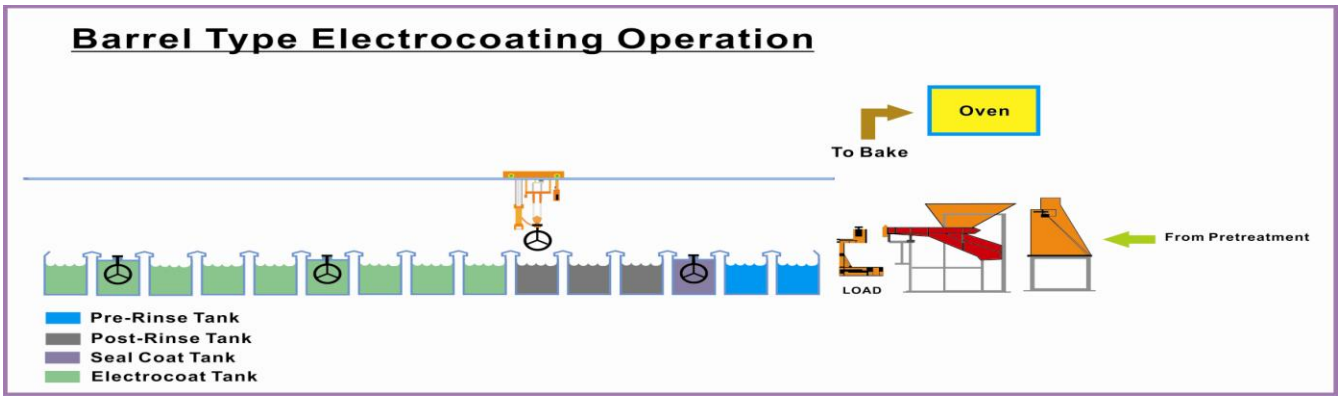
What is electrocoat?



Electrocoat is a paint consisting of waterbased solution of pigments, resin, water and additives. There are anodic and cathodic electrocoats. There are also acrylic and epoxy electrocoats. Each type of electrocoat has it's specialty end use and advantages. PPG Alltech uses the latest generation of cathodic epoxy electrocoat for coating fasteners and small metal parts.

What is the application method of electrocoating?

Electrocoating is a method of painting which uses electrical current to deposit the paint. The process works on the principle of 'opposites charges attract'. 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 required thickness. At the required, the film insulates the part; electrical attraction stops and electrocoating is complete. This is the reason there is **no recess head fill and no thread fill**. Once the surface is insulated, the electrocoating process stops, hence it is precisely controlled. Depending on the polarity of the charge, electrocoating is classified as either anodic or cathodic. After the electrocoat paint has been applied, the fasteners are water rinsed and then cured through a baking oven.



What is Electropolyseal™?

The Electropolyseal coating finishes are a product range of fastener coatings including the cathodic electrocoat that have superior corrosion resistance and appearance . They use proven electrocoat technology to impart a tough and durable coating film on fasteners.

Electropolyseal Comparison Chart

	Electropolyseal III	Electropolyseal IV	Electropolyseal V	Zinc Rich Dip Spin
Salt Spray	200~300 hours	300~600 hours	1000~1500 hours	480~840 hours
Base Coat	Phosphate	Zinc Rich	Zinc plate or Zinc-nickel plate	Zinc Rich
Coating Thickness	15~20 microns	15~20 microns	20~25 microns	15~25 microns
Corrosion Resistance	Good	Excellent	Excellent	Excellent
Torque Characteristics	Excellent	Exellent	Excellent	Excellent
Color	Black, Gold, Green, Gray	Black, Gold, Green, Gray	Black, Gold, Green, Gray	Gray to Sliver
Application	POWERCRON Electrocoat	Zinc Rich base + Electrocoat topcoat	Electroplate + Electrocoat	Two or Three-coat dip spin system

What salt spray corrosion resistance can be expected from the Electropolyseal™ coating finishes?

The Electropolyseal™ III system can achieve 240 hours of corrosion resistance in salt spray testing and a minimum of 15 cycles Kesternich SO_2 testing. The Electropolyseal™ IV system can achieve 500-800 hours. Electropolyseal™ V system can achieve 1000 hours and depending on the requirement, it can be tailored to meet higher salt spray corrosion performance beyond 1000 hours. Salt spray testing is conducted per ASTM B117-03 at PPG Alltech, for every customer lot number.

Is Electrocoat ROHS compliant?

PPG's Electropolyseal™ system is fully ROHS compliant. This means that it does not contain hexavalent chrome or any of the listed items under the ROHS requirements. In fact, it does not contain any chrome at all, it is chrome free. This is a big advantage for meeting the European and other environmental requirements.

Can Electropolyseal™ finishes meet torque tension requirements?

All of the Electropolyseal™ coating finishes have torque modification built into them. These finishes meet the North American OEM requirements for torque tension.

What Kesternich SO_2 corrosion resistance can be expected from the Electropolyseal™ coating finishes?

The Electropolyseal™ III, IV and V systems can achieve a minimum of 15 cycles Kesternich SO_2 corrosion resistance. Kesternich testing is conducted per ASTM G-87 at PPG Alltech, for every customer lot number if Kesternich performance is required.

Electropolyseal V
Samples after tests of
1,000 Hour Salt Spray
30 cycle Kesternich

How about the ACQ wood end use?

Electropolyseal™ V has been tested and passed both internally at PPG's Electrocoat Technology laboratory in USA and by the Michigan State University, using the 120 days testing regime. The results are excellent and PPG Alltech's product has already been commercialized in the fastener market for ACQ wood use.

Does Electropolyseal™ cause hydrogen embrittlement?

The Electropolyseal™ III and IV systems do not cause hydrogen embrittlement. The reason is that the phosphated coating film used as the basecoat for the top coating (either electrocoat in III or zinc rich/electrocoat in IV) allows any hydrogen to be released due to the porous nature of the phosphate coating. A severe test regime was conducted by both PPG and by a major customer in Taiwan to prove that the phosphated coating film would not cause hydrogen embrittlement. The metal part was acid pickled for 2 times and 3 times the normal immersion time and then phosphated. Hydrogen embrittlement testing was conducted and all parts tested passed without any signs of failure.

Electropolyseal™ V uses plating as the basecoat and as such, the possibility of hydrogen embrittlement is present. However, testing of plated parts prior to electrocoating by Alltech's preferred plating suppliers has shown no signs of hydrogen embrittlement failure. PPG Alltech plays an active Supplier Quality Management role with the preferred plating suppliers to ensure excellent consistency of plating quality.

What is PPG doing to provide even lower cost finishes for fasteners to help cost challenges?

PPG is currently conducting research for more advanced and cost effective coating finishes to meet demand for further cost effective finishes. PPG's Electropolyseal™ systems are already very cost competitive but we recognize the need to keep working on cost engineering to maintain the primary position as the most high performance cost effective finish in the market.

On what kind of fasteners can the Electropolyseal™ finishes be applied on?

Most types of fasteners and small metal parts can be coated at PPG's Alltech application centre. Each fastener is individually evaluated to determine suitability by the PPG Alltech team. Your fasteners are treated individually and processing parameters are designed to ensure optimum final product results. Fully automated computer controlled state-of-the-art application equipment enables consistent control of processes.

Why should an end user switch to PPG electrocoat finishes?

Precise coating thickness control results in no recess head fill or thread fill.
ACQ compatible.
Excellent corrosion resistance, consistently.
Excellent colour control, consistently.
ROHS compliant, not just hexavalent chrome free, but totally chrome free.
No hydrogen embrittlement for phosphate/oil, Electropolyseal™ III and IV.
Cost competitive for the equivalent or better product performance.
PPG's quality systems area a global standard, based on decades of experience as a leading Automotive OEM coating supplier all over the world.
Supply chain simplification from PPG Alltech's one stop shop service package.

Switching to electrocoat finishes from PPG Alltech Taiwan enables simplication of current fastener industry supply chains. Instead of sending parts to multiple secondary/tertiary processors (e.g. heat treater, platers, coaters), send your plain or heat treated parts direct to Alltech and we will send you back fully finished product which is ready to be shipped to your end use customer. Whatever makes your supply chain work best for you, Alltech is at your service.

Contact us at PPG's Alltech Engineered Finishes, your choice for coating technology, quality product and quality service to meet the growing needs of your business. Come to see our application centre and meet our qualified and energetic team…see the difference for yourself!

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