

November 2016



The LEADING Edge

Cortec® Laboratories Discovers and Patents yet Another Innovative Environmentally Friendly Corrosion Protection Technology!

In recent years, Cortec® Laboratories made a significant discovery on protecting pipeline casings and enclosed tubular spaces from corrosion. Now Cortec® is gaining official recognition for that discovery through the awarding of a US patent for **CorroLogic® VpCI® Filler**! This innovative environmentally friendly product is made of biodegradable materials and meets an important need for protecting the inside of closed environments from corrosion for long periods of time.

Cortec® Laboratories began developing **CorroLogic® VpCI® Filler** as a solution to the challenge of protecting against corrosion in annular void spaces between pipelines and their casings. Answering the request of a North American pipeline corrosion engineering group, Cortec® Laboratories researched and discovered that it could provide an excellent solution by creating a two part filler product powered by Cortec's proprietary VpCI® Technology. With little to no surface preparation, liquid VpCI® concentrate can be mixed onsite with water. Just prior to pumping the liquid into the void structural space, a gelling agent can be added to the liquid, causing it to increase in viscosity and set into a gel inside the structure at a pre-calculated time.

CorroLogic® VpCI® Filler offers many advantages in terms of corrosion protection. While the filler gel discourages the infiltration of air and water inside the enclosed space, the special blend of VpCIs provide long-term liquid, vapor-phase, and interface protection against corrosion. VpCIs are designed to migrate through various substances, allowing them to reach even under disbonded coatings to form a molecular layer of corrosion protection on the metal surface. Should the protected space be inadvertently subjected to moisture or outside air infiltration, the protective molecular layer will be replenished by continuous vapor redeposition. The filler also resists bacterial corrosion.

In addition to superior corrosion protection, Cortec® Laboratories has made **CorroLogic® VpCI® Filler** with safe, environmentally friendly, and adaptable properties. The product is made of biodegradable materials and is non-flammable, non-toxic, and nitrite- and phosphate-free. It resists biological attacks and can be removed simply by washing it off the metal surface. The filler is electrically conductive and can therefore be used in conjunction with cathodic protection if desired. Should cathodic protection fail, the filler will still provide a source of VpCI® protection to vulnerable internal surfaces.

Cortec's innovative discovery is adaptable to several applications:

- Filling and protecting pipeline casings
- Filling and protecting tower support structures
- Filling and protecting tubular structures, pipes, and vessels

Market response has already shown that **CorroLogic® VpCI® Filler** meets a distinctive need in the realm of corrosion protection. Now that the long-awaited awarding of a patent is imminent, Cortec® is proud of the lab's innovative R&D achievement and is honored to be officially recognized as the creator of this exceptional product!

CorroLogic® VpCI® Filler complies with NACE Standard SP0208-2008, from Classes of Rust Preventatives referenced in Mothballing Manual, and meets requirements of NACE SP0200-2014 Standard Practice: Steel Cased Pipeline Practices.



Lab News

Safer, More Efficient Chemical Storage System Wins First Place Safety Innovation Award

This summer, a safety innovation contest at Cortec® inspired employees to develop an improved chemical storage system in the lab. Despite the recent growth at Cortec® Laboratories, chemical storage had remained the same. An inventory and organization solution was needed for raw materials, product samples, and other experimental chemicals.

Putting their minds together, Casey Heurung (Technical Service Engineer), Ishan Mishra (Regulatory Assistant), and Anne Carlson (R&D Engineer) developed an improvement plan that enhances both safety and efficiency in Cortec® Laboratories. Chemicals are now grouped together according to type, with more dangerous chemicals stored in a location designed for that purpose. Storage containers for deep shelves allow better ease of access and lower risk of accidental spillage.

The project designates the future implementation of a software inventory system that will enable better tracking of samples, raw materials, and possibly tests and other lab components. Once the new system is in place, new chemicals, samples, or raw materials can be barcoded and scanned into the system upon receipt, making it much easier for lab members to manage supplies and reordering of chemicals.

The team notes that this reorganization and consolidation has already improved efficiency and safety and states, “Going forward, this system will completely rejuvenate the lab’s protocol for storage of chemicals and products.”

The project won first place in the safety innovation contest.



Casey Heurung (left), Ishan Mishra (center), and Anne Carlson (right)

New Lab Microscope Camera Enhances VpCI® and Corrosion Analysis

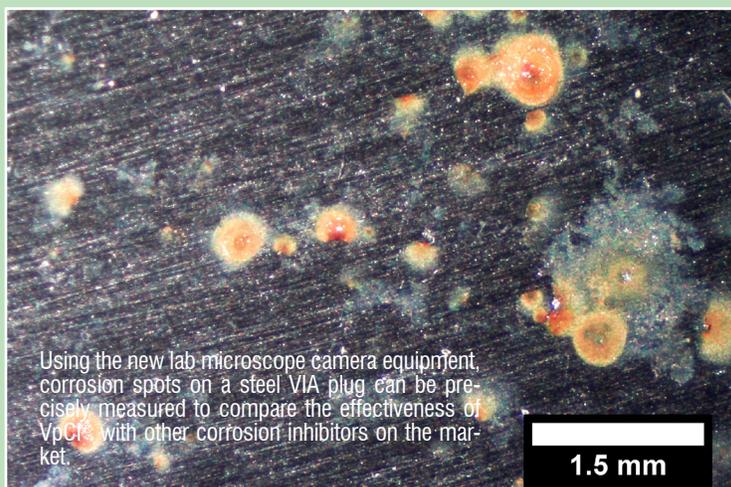
Director of Cortec® Laboratories, Robert Kean, PhD, says the lab has long used microscopes as part of its analytical tool set. They are useful for new product development, product/process troubleshooting, and other analytical tasks. Many of Cortec’s VpCI® products incorporate powdered materials. The size and shape of the particles can influence performance and a microscope is the best tool for examining that.

The lab has recently upgraded its microscopy capabilities with the simple addition of a microscope camera. This allows lab members to capture images from the microscope and apply sophisticated image analysis tools to extract useful data from the image. For example, they can count number and size of particles in the image or quantify the percent of the surface area that is corroded. They can easily measure dimensions of fibers or other microstructures.

Sen Kang, PhD, Senior Corrosion Engineer, explains that one practical use for the camera and accompanying technology is to evaluate whether a VpCI® product meets military specifications under VIA (vapor inhibiting ability) testing. Military specifications are very stringent, with the MIL-PRF-3420 performance specification requiring corrosion spots to be smaller than 0.3 millimeters, a unit difficult to measure by hand. Using the microscope camera and accompanying analysis tools, corrosion spots on the steel plugs from VIA testing of various corrosion inhibitors can be more easily and accurately counted and measured. Of note is the fact that VpCI® Technology is capable of producing VIA test results showing no corrosion spots at all!



The microscope camera allows Cortec® Laboratories to more easily and precisely analyze properties of VpCI® film.



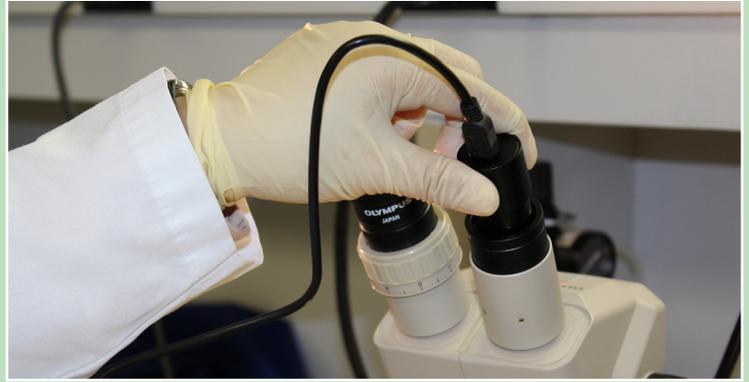
Using the new lab microscope camera equipment, corrosion spots on a steel VIA plug can be precisely measured to compare the effectiveness of VpCI® with other corrosion inhibitors on the market.

1.5 mm

Lab News



Sen Kang PhD, Senior Corrosion Engineer, adjusts the microscope to examine a sample of VpCI® film.



The simple addition of a camera to one of the microscope eye-pieces allows for greater precision and ease in analyzing Cortec's products.

Innovation Continues with the Release of Exceptional Corrosion Solutions

Cortec® continues to discover exceptional corrosion solutions. Among these are the 2016 releases of a biodegradable scale remover with powerful corrosion inhibitors, a fully recyclable moisture barrier alternative to polycoated and waxed papers, and a static dissipative corrosion inhibiting paper!

EcoClean® Biodegradable Scale and Rust Remover powered by Nano VpCI® is one of the fastest acting products on the market for dissolving heavy scale, corrosion, and naturally occurring oxides off metals. It contains powerful corrosion inhibitors to protect treated metals from flash rust. It is simple to use, non-toxic, and compatible with multiple metals:

- Iron
- Carbon Steel
- Stainless Steel
- Copper
- Aluminum
- Magnesium
- Various Alloys

EcoClean® Biodegradable Scale and Rust Remover reduces the cost of surface preparation and is effective in hard-to-reach areas, eliminating costly equipment dismantling. It is easy and safe to dispose. Using **EcoClean®** Biodegradable Scale and Rust Remover has the following benefits:

- Improvement of flow in pipes obstructed by scale
- Enhanced heat-transfer efficiency on all heat-exchanger equipment by creating clean surfaces
- Safe scale removal on all water-contacting equipment surfaces including heat-exchangers, chillers, condensers, cooling towers, and pipes



This heavy-duty cleaner is an excellent choice for saving time and money on safe, simple, and effective descaling and de-rusting.



EcoShield® VpCI®-144 Super Barrier paper is an innovative recyclable packaging option for protecting metal items from both corrosion and the ingress of moisture into packaging. Instead of relying on polyethylene and waxed papers that cannot be recycled through normal channels, customers can now take advantage of the corrosion protection of VpCI® paper coating combined with a high gloss water-based barrier coating. This coating prevents moisture from reaching metal parts wrapped inside the paper and is combined with Cortec's exceptional VpCI® Technology.

In past testing, **EcoShield® VpCI®-144 Super Barrier** has rivaled the moisture barrier properties of polycoated paper and waxed paper. Unlike these two papers, **EcoShield® VpCI®-144 Super Barrier** is fully recyclable and repulpable and does not create an environmental problem.

EcoShield® VpCI®-144 Super Barrier shows excellent oil and grease resistance and can be used on both ferrous and non-ferrous metals for a variety of storage and shipping needs:

Lab News

- Metal production
- Metal forging and die casting
- Metalworking
- Finished products
- Electrical and electronic components

EcoShield® VpCI®-144 Super Barrier is commercially equivalent to MIL-P-3420E and conforms to NACE Standards TM0208-2008 and RP0487-2000. It is another excellent example of Cortec's innovative ability to create effective environmentally friendly corrosion protection solutions.

Ecosonic® ESD Paper powered by Nano VpCI® is a quality corrosion inhibiting product that Cortec® has developed for the protection of sensitive electrical and electronic items. The product eliminates static electricity buildup through the use of an environmentally friendly coating made from soybean oil and coated on the surface of the paper. **Ecosonic® ESD Paper** performs better on the static half-life test than papers with conventional anti-stat coatings consisting of alkyl ammonium chlorides, typical ethoxylated amines, typical imidazolines, phosphate esters, and nonionic based antistatic coatings. Its antistatic properties are independent of temperature and pH.

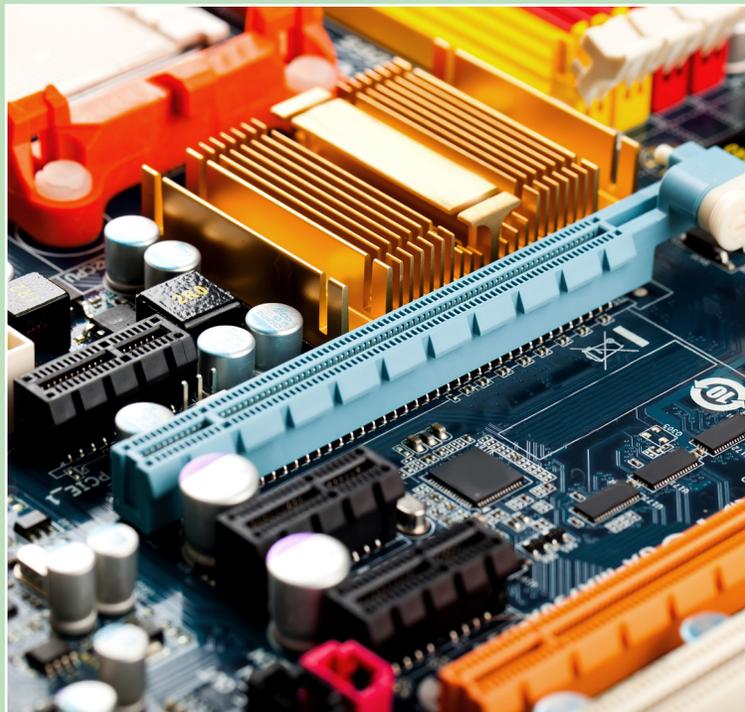
Coming Soon

Ecosonic® ESD Paper combines corrosion inhibition, electrostatic discharge protection, and packaging into one step with a fully recyclable/repulpable paper for both ferrous and non-ferrous metals. It conforms to performance specifications for MIL-PRF-81705D and MIL-PRF-3420G. The coated paper is non-toxic and does not contain any nitrites, phosphates, silicates, or other hazardous compounds. It can simply be wrapped around the sensitive parts, folded together at the edges, and taped in place to provide protection from static electricity buildup and corrosion.

There are many applications for **Ecosonic® ESD Paper**:

- Printed circuit boards (PCBs)
- PCB components
- Integrated circuits
- Telecommunications equipment
- Electrical panels
- Electrical enclosures
- Batteries
- Numerous other electrical, multimetal materials

Ecosonic® ESD Paper provides contact, vapor, and barrier phase corrosion inhibition. It promises to be an excellent resource for the Electronics Manufacturing Service industries or anyone needing a straightforward solution to corrosion and static electricity!



4119 White Bear Parkway, St. Paul, MN 55110 USA
Phone (651) 429-1100, Fax (651) 429-1122
Toll Free (800) 4-CORTEC, E-mail productinfo@cortecvci.com
Printed on 100% post compostable  recycled paper

Created: 11/16

Cortec®, BioCorr®, BioCortec®, BioCushion™, Boiler Lizard®, Closed Loop Toad®, Cooling Tower Frog®, VpCI®, VmCI-307®, Eco Works®, EcoAir®, Eco-Corr® Film, EcoLine®, EcoClean®, EcoShield®, EcoWeave®, Eco Emitter®, EcoSol®, Eco-Tie®, Eco-Card®, EcoShrink®, Eco Wrap®, Eco Film®, Cor-Pak®, CorShield®, CorSol®, Corrosorber®, CorWipe®, CorrVerter®, Corr Seal®, CorrLam®, CRI®, Desicorr®, ElectriCorr®, GalvaCorr®, Super Corr®, HPRS®, CRI®, MCI®, MCI Grenade®, Milcorr®, and Rust Hunter® are trademarks of Cortec Corporation.

©Cortec Corporation 2016. All rights reserved.