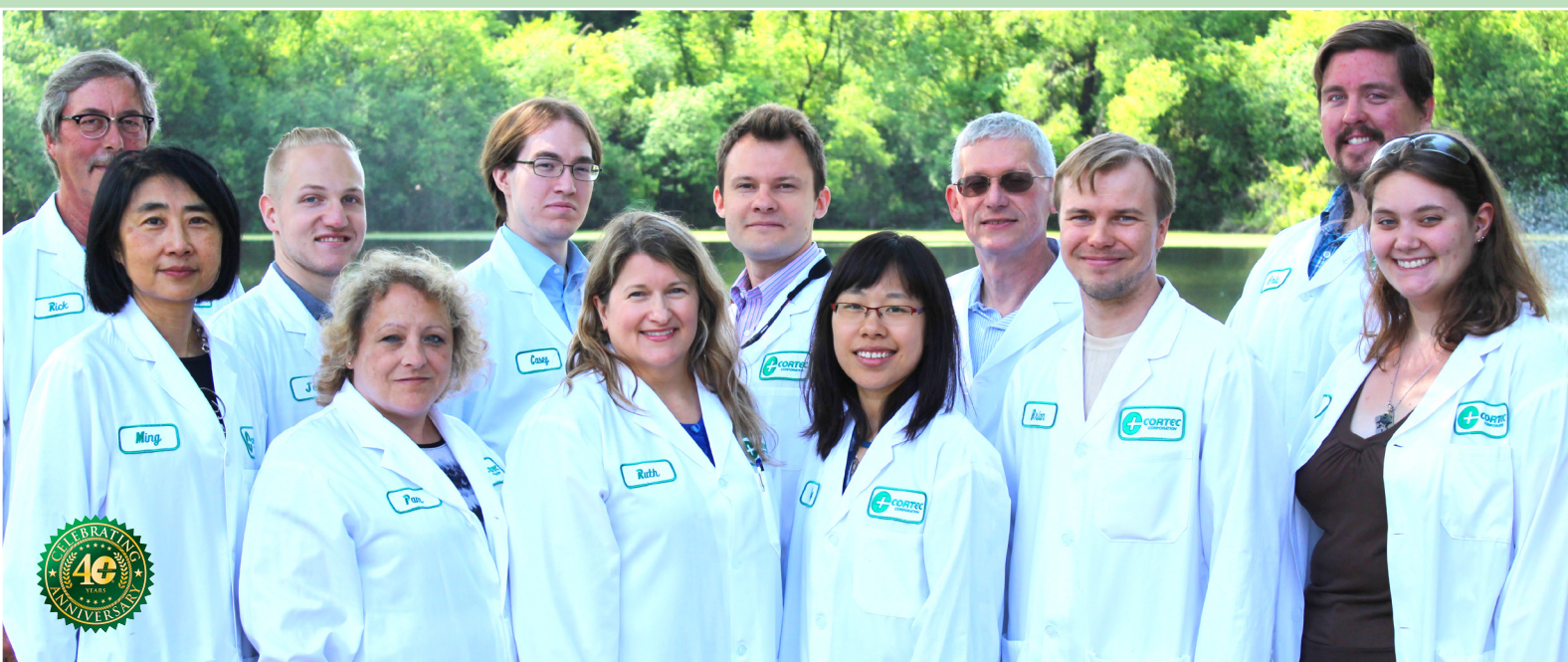




The LEADING Edge

Celebrating the Industry's Largest Patent Portfolio



The last half year saw formal granting of the 63rd patent awarded to Cortec® Corporation since its founding in late 1977. On December 13th, 2016, US Patent #9,518,328 was granted to Cortec® in recognition of the novelty of CorroLogic® VpCI® Filler (a gel product that protects against corrosion in annular void spaces between pipelines and their casings). It is another example of the successful innovation accomplished by Cortec® R&D over the course of nearly 40 years.

In a 2017 update of its corporate brochure, Cortec® reflected on the many achievements of Cortec's R&D and the wealth of corrosion control knowledge stored up in the program. The brochure states:

Our full staff of chemists, engineers, and researchers utilizes the latest technology and testing methods to develop Cortec's vast product line. With the industry's highest level of investment in research and development, Cortec® is deeply committed to exceeding the standards of quality and effectiveness. Today, the company owns numerous patents in both VpCI® and MCI® Technologies. In 1998, and again in 2000, Cortec® was included in the top 50 technology companies of Minnesota. Cortec® Laboratories is the only ISO-17025 certified lab in our

industry providing for excellence in testing, calibration, and interpretation of test data.

Our vision is to be an industry leader in innovations and new technologies especially when it comes to renewable and environmentally safe chemistries. Through decades of research, testing, and practical experience, Cortec® has amassed a wealth of corrosion control knowledge and intellectual property in the form of patents, trademarks, trade secrets, and copyrights. Cortec's leadership in innovation and patenting of VpCI® and MCI® Technology has enabled the company to acquire the industry's largest portfolio of 63 patents issued over the course of 40 years. . . . Cortec® applies for new product patents annually and holds over 100 registered trademarks in various countries around the world. Regular publication of technical papers is another factor that makes Cortec® a leading global voice in the field of corrosion control.

Cortec® Laboratories continues to move ahead with extensive research, testing, and product development to create a broad portfolio of practical and tailored solutions for customer corrosion needs.

Lab News

Cortec® University Provides Hands-On Visit to Cortec® Laboratories

The most recent Cortec® University took place February 21st-22nd and included hands-on application and troubleshooting advice in the lab. Participants divided into three groups to learn more about working with Cortec® products.



Rick Shannon (Coatings Chemist) took some of the visiting distributors out to the spray booth to show how to spray a VpCI® coating on metal panels and then check the wet film thickness with a handy pocket gauge.



John Wulterkens (Technical Service Engineer) showed his group how to troubleshoot VpCI®-377 application problems with a refractometer. Measuring product solution concentration with a refractometer can help the distributor decide if the customer needs a higher concentration of the fluid to prevent rust, or if contamination (indicated by a falsely high concentration reading on the refractometer) is causing product performance problems.



Casey Heurung (Technical Service Engineer) demonstrated rust removal and the benefits of heating VpCI®-422 to speed up the process. He also showed how unheated VpCI®-422 removes rust much more slowly, and how VpCI®-426 is a quicker rust removal alternative in situations where it would be difficult to heat VpCI®-422.

To learn more about the next distributor training opportunity in July, visit: <http://www.cortecvci.com/Publications/Marketing/Cortec-University-Sell-Sheet-03-17.pdf>

Cortec® Laboratories Contributes to and Benefits from NACE CORROSION 2017!

NACE CORROSION 2017 (March 26th-30th in New Orleans, Louisiana) was a time for Cortec® Laboratories to learn from and contribute to the technical knowledge of this important international corrosion event.

Robert Kean, Ph.D, Director of Cortec® Laboratories, spent much of his visit at the technical symposia, attending excellent presentations and absorbing new ideas to incorporate into the Cortec® R&D program. He took an active leadership role in NACE technical committees, attending several committee meetings including TEG 145 X "Vapor Corrosion Inhibitors and Rust Preventatives for Interim (Temporary) Corrosion Protection," which he currently Vice Chairs. He also made use of the time by networking on the expo floor with potential suppliers of new raw materials, lab equipment, or testing services.

Members of Technical Service who work in the lab also contributed heavily to the technical symposia by presenting two papers:

- "Comparing the Benefits of Environmentally Friendly Removable Coatings to Traditional Products for Protection of Assets Stored Outdoors" presented by Technical Service Manager Eric Uutala (co-written by Cliff Cracauer and John Wulterkens)
- "The Necessity and Challenges of Using a Float Coat for Preservation of Large Volume Storage Systems" presented by Technical Service Engineer John Wulterkens (co-written by Casey Heurung and Houssam Sabry)

In addition to the technical exposure, the event was a great time to connect with Cortec® representatives from around the globe!

Two Ways to Benefit from Cortec® Laboratories Testing Services

Testing Vapor phase Corrosion Inhibiting Ability of Hydraulic Fluids

As the only ISO/IEC-17025 accredited facility in the industry, Cortec® Laboratories performs a variety of tests to help users evaluate the effectiveness of products for their specific applications. Under this scope, Cortec® is certified to perform ASTM D-5534 "Standard Test Method for Vapor-Phase Rust-Preventing Characteristics of Hydraulic Fluids." This is a pass/fail evaluation of the vapor corrosion inhibiting effectiveness of the corrosion inhibitors added to a hydraulic fluid.

Having VpCIs in hydraulic fluids can be an important part of protecting hydraulic equipment from corrosion during storage or shipment. This is especially important where partial draining of fluids is preferred. Contact-only inhibitors will only protect the portion of the metal with which they are directly in contact, while Vapor phase Corrosion Inhibitors will disperse throughout an enclosed space and protect hard to reach areas above the level of the hydraulic fluid,

Lab News

as well as those in contact with the fluid. This is more cost-effective and successful, saving on fluid usage (contact inhibitors require complete filling of reservoirs to protect as much space as possible) and avoiding cumbersome draining, clean-up, or rust removal after storage.

Helping Customers Evaluate Aging Products

From time to time, customers will send an older VpCI® product to Cortec® Laboratories to test its continued effectiveness. This was the case with one of Cortec's distributors who wanted to know whether a six-year-old VpCI® film they had in stock would still provide effective corrosion protection if sold to customers.

As part of its testing services, Cortec® Laboratories tested the Cor-Pak® EX VpCI® film and found that it passed both razor blade testing (for contact protect) and VIA testing (for Vapor phase Corrosion Inhibiting ability), showing that the film was still effective much beyond its two-year recommended shelf life.

For anyone who is wondering about the effectiveness of an aging product, Cortec® Laboratories recommends sending the product in for testing before use, to ensure that the customer will get the needed protection. Results like those of the six-year-old film test exemplify both the effectiveness of Cortec® VpCI® and the usefulness of Cortec® testing services to help the distributor/customer make sound decisions on product use.



ASTM INTERNATIONAL

Cortec® Pursues Expanded Lubricant R&D Program



Cortec® Laboratories' growing lubricant R&D program has been busy seeking to develop unique, high quality lubricants that will exceed the performance of previous formulations and meet the needs of customers in ways that other lubricants do not.

Successful Reformulation

The lab has recently performed a successful reformulation of VpCI®-340 CLP that exceeds previous capabilities of this particular cleaning, lubricating, and protective (CLP) product. Though reformulation was initially prompted by the need to find a new raw material, the project turned into an intense upgrade project. The reformulation underwent extreme testing to ensure top quality product performance geared toward the demands of military standards.

In seeking to meet some of the highest requirements, Cortec® R&D came up with a product that has better corrosion protection, excellent lubricity, and the stability to maintain viscosity at extremely low temperatures. The reformulation will have many uses in addition to its main application for firearms. More product information will follow.

New Lubricant R&D

Cortec® is also investing many resources into providing a unique, superior portfolio of new lubricants for its customers. In order to do this, Cortec® R&D has been doing extensive research to understand how best to fill unmet needs in this important and extensive market.

Much goes into producing a high-quality, unique lubricant. In the first place, the lubricant market is bound to specific tests and standards that can be different than those normally used for VpCI® packaging or coatings. "It's all about specs," said Pavlo Solntsev, Ph.D., Cortec® Product Development Chemist. As an example, special specifications are in place just to allow a new product to be classified as a certain type of lubricant. For instance, gear oils must meet American National Standard Industrial Gear Lubrication: ANSI/AGMA 9005-F16 before they can even be called gear oils. This requires that the lubricants have certain basic physical properties even before any special properties are added.

Trial and Error

After preliminary research, Cortec® R&D began testing additives in lubricant samples to see how they would affect the lubricant's physical properties. This is a trial and error process that takes thought and persistence. For example, the first test of a particular lubricant produced a decrease in dropping point (i.e., the lubricant melted at a lower temperature than previously). However, on the second trial, Cortec® R&D was able to increase the dropping point, thus actually improving the lubricant's physical property. The next step will be to subject enhanced lubricant samples to standard tests to understand their other performance characteristics.

As lubricant R&D continues, Cortec® Laboratories looks forward to making many improvements in the corrosion protection, environmental friendliness, and versatility of a growing lubricant portfolio for its customers. Stay tuned for more updates as R&D meticulously makes progress toward producing exceptional oils and greases for the lubricant industry!

Cortec® Laboratories New Product Portfolio

Cortec® has released many exciting products that illustrate Cortec's versatile options for meeting specific user needs.

Coatings

Cortec's time-proven VpCI®-368 coating is more powerful with the addition of extra Vapor phase Corrosion Inhibitors in VpCI®-368 EVP. This is an excellent development for application in complex, sealed spaces where a greater concentration of vapor inhibitor is beneficial. The extra dose of Cortec® VpCI® vaporizes from the coating, fills the enclosed space, and adsorbs on difficult-to-reach surfaces. This is helpful on applications such as pipe internals where it is challenging to thoroughly cover all metal substrates.



Fuel Additives

Cortec® R&D responded to the problem of corrosion on carbon steel diesel fuel tanks for heavy equipment by designing VpCI®-706. VpCI®-706 is an additive that is fully compatible with diesel and biodiesel fuel and tailored to work in diesel tanks and systems. It provides superior corrosion protection for ferrous metal surfaces both in contact with the fuel and above the fuel level.

Rust Preventatives

EcoCorr™ Water-Based Rust Preventative powered by Nano VpCI® is a complete replacement for oil-based rust preventatives (RPs) used for temporary indoor protection of equipment and components. It is convenient to use and easy to clean. When applied to the metal surface by dipping, brushing, or spraying, EcoCorr™ forms a clear dry film that is suitable for robotic assembly of precision machined components. In most cases, the dry film of EcoCorr™ does not interfere with use and does not need to be removed, but this can be easily done when required.

VpCI®-277 is a rust preventative containing a biobased corrosion inhibitor in a non-flammable, low VOC solvent carrier. The product combines film-

forming additives with Vapor phase Corrosion Inhibitors to provide excellent multi-metal corrosion protection. VpCI®-277 leaves a dry, non-tacky, virtually undetectable film on the metal surface and is ideal for robotic assembly of precision components requiring tight tolerances. It was developed in response to a major auto manufacturer who needed a drier film, low VOC rust preventative that would also meet their solvent-based spec.

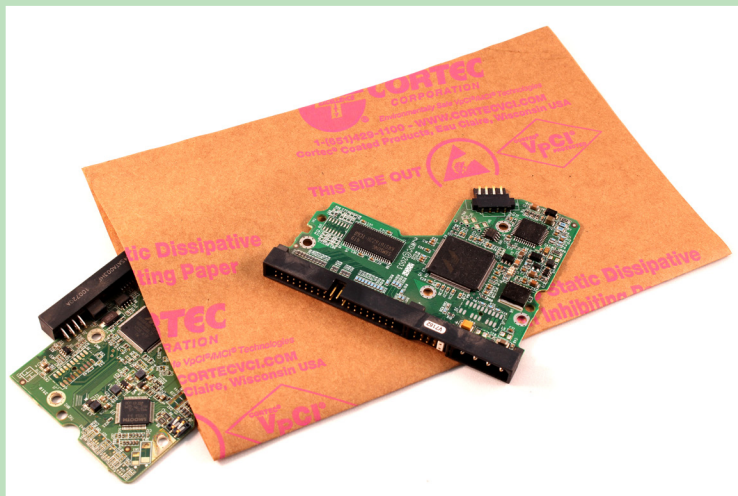
Specialty Dual Protection

Cortec's new EcoAir® Mold Release provides dual protection by combining lubrication with a biobased corrosion inhibitor for injection molds and other metal surfaces. When sprayed on the mold, EcoAir® Mold Release leaves a clear thin non-staining silicone coating that makes it easier to release rubber, plastic, or metal castings from their molds. The biobased corrosion inhibitor component forms a molecular passivating layer to guard the mold surface against aggressive species, protecting it from corrosion during operation and storage.

Packaging

EcoSonic® ESD Paper powered by Nano VpCI® eliminates static electricity buildup through the use of an environmentally friendly coating made from soybean oil and coated on the surface of the paper. Simply wrap your sensitive electronic metal items in EcoSonic® ESD Paper powered by Nano VpCI® and rest assured that your valuable items will be protected from damaging static electricity buildup and corrosion. EcoSonic® ESD Paper conforms to performance specifications for MIL-PRF-81705D (Static Decay Rate and Surface Resistivity).


EcoShield® Heat Sealable Paper is coated with a water-based heat sealable adhesive coating that makes it easy for industries to create their own custom-sized recyclable bags and envelopes! The paper is non-toxic, fully repulpable, and readily recyclable. These properties also make it an excellent choice for packaging situations where a product can be left in the bag and thrown into application conditions that will disintegrate the paper (e.g., certain concrete mixing situations).



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

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