

The

# LEADING



Environmentally Safe VpCI/MCI Technology

May 2006

Dear Cortec's Friends and Colleagues!

This latest edition of Leading Edge will lift your spirit, educate you on new products, new technologies, means of delivery, and provide an update on the exciting new applications of existing Cortec's products. Several new technologies are being launched that have tremendous potential to revolutionize the industry!

In this edition we will also share with you the latest news from the laboratory and present to you new people.

Spring is about to be in full bloom! Time flies when you are having fun at work. We have fun and invite you to share fun with us!

Enjoy!

## NEW PRODUCTS

We are introducing seven new products in this edition, that cover a wide range of applications.

As you know, our efforts in the development of new packaging products is directed towards the biodegradable polymeric materials. The newest addition to this line is **Eco Works 70** a truly revolutionary, biobased and biodegradable plastic!

### Eco Works 70

Eco Works 70 is an exciting new product line, recently introduced by Cortec for a wide range of applications. Eco Works 70 is already certified compostable per ASTM D 6400, just like our other biodegradable/compostable Eco Film and Eco Works. Eco Works 70 built on the years of experience we have with biodegradable films and incorporates the highest level of annually renewable raw material (USA grown corn), while retaining excellent strength. Compared to Eco Film, Eco Works 70 has significantly increase

rigidity, much higher clarity, and 70% biobased content. For applications where clear, tough, more rigid compostable films are desired, Eco Works 70 is an excellent choice.

We are also pleased to announce that significant advancements are being made in the development of biodegradable/compostable VpCI corrosion-inhibiting films. The latest developments include the incorporation of VpCIs into more rigid Eco Works formulations, making the new biodegradable VpCI film formulations suitable where thin gauge, HDPE, liner films or individual wraps are being used.

Eco Works VpCI film will offer excellent contact, barrier and vapor phase corrosion inhibition. You will simply wrap your part and rest assured that you will have complete corrosion protection from a packaging film that is produced from a film that is not depleting the earth's natural resources unlike conventional petroleum based biodegradable and non biodegradable films. Read about Eco Works VpCI film in the next edition.

## PACKAGING NEWS

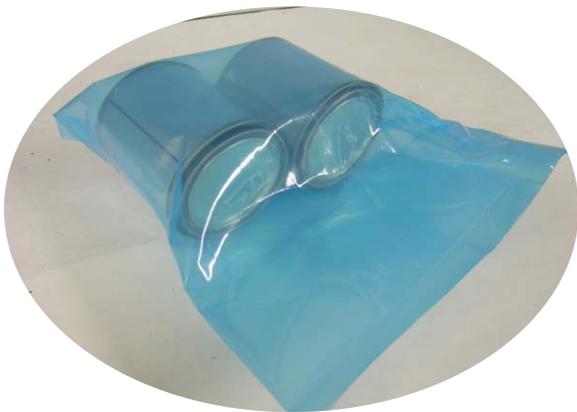
### Clean Room VpCI Films

Cortec Laboratories is pleased to report on progress that has been made in offering VpCI protective films and bags for clean room applications. This is truly a first in VpCI technological development! Initial testing and certification was completed recently on **CorrLam Clean Room** bags to meet the NASA JSCM 5322 level 100A clean room specification. The development of clean room corrosion-inhibiting films is critical for companies that package and store high-value, high technology components that are susceptible to static damage and dust contamination and are often also susceptible to corrosion. **CorrLam Clean Room** meets NASA JSCM 5322 level 110A and provide static shielding protection and long term corrosion protection for up to 15 years. This truly is an industry first and a technological breakthrough. **CorrLam Clean Room** will be widely available shortly and we have already begun testing and evaluation on **VpCI-126 Clean Room** and **VpCI-125 Clean Room** to be able to offer these clean room films in the near future.



### ClearLam Blue VpCI film is a new addition to the Cortec barrier films

ClearLam Blue VpCI Barrier Laminate film offers a new application for Cortec Corporation films, being a transparent vacuum packaging film. ClearLam Blue VpCI Barrier Laminate film is a VCI polyolefin/polyester lamination film that offers a puncture resistance four times greater than that of equivalent sized polyolefin films. The film also has an oxygen transmittance level 290 times less than equivalent sized polyolefin films and provides excellent barrier, vapor and contact phase corrosion inhibition.



ClearLam Blue VpCI Barrier laminate film, allows the visual inspection of parts while enclosed in the film, thus saving time when parts have to be visually inspected prior to

removal and use. Most barrier films are non-transparent metallized films, which require the user to manually remove each part from a vacuum sealed barrier package for inspection, which is a less efficient process.

ClearLam Blue VpCI Barrier Laminate film, is also a very flexible film compared to standard vacuum barrier films, thus allowing a more skin tight fit to the enclosed part, which allows less space to be used when inserting multiple parts into a container. ClearLam Blue VpCI Barrier Laminate film is available in stock and custom sizes.

## PROCESS ADDITIVES

### NEW TESTINGS DATA, NEW PRODUCTS

Cortec's process additives product line includes the corrosion inhibitors which can be applied at all stages of oil and natural gas recovery and processing, starting from the drilling operation through the finished products.

Testing of these inhibitors, besides Cortec's laboratory, was performed by independent laboratories of US, Indonesia, Russia, and Norway. It is important that all evaluations of our products were carried out in the harsh

environment containing high concentration of salts, carbon dioxide and hydrogen sulfide.

### **How to choose the right additive for the application?**

#### **Down hole inhibitors**

VpCI-629, 639, and 629 Bio are the champions in the effectiveness among the corrosion inhibitors for the protection of the oil well. These products are the best to apply as a batch treatment, because of their outstanding film persistency. Additional value to VpCI-629 Bio gives its approval for the off-shore application. It is in compliance with HOCNF (Harmonized Offshore Chemical Notification Format) environmental requirements.

#### **Inhibitors for the surface facilities**

Surface facilities include flow, gathering, injection lines, separation equipment, piping, heat exchangers and coolers, vessels and tanks, gas handling facilities, and many more.

VpCI-637, being water soluble by nature, is the product of choice for the continuous treatment in petroleum recovery. It can be added to the product lines before and/or after water/oil separation (flow lines, gathering and separation equipment and piping).

VpCI-637 is also excellent for the applications in transporting pipelines under high velocity conditions. The "Rotating Cylinder Electrode" test method was used to conform its performance.

VpCI-637 GL/GLD is successfully used for the protection of the natural gas handling systems and plants. This product prevents corrosion in pipelines and collectors and does not cause the foaming problem during the purification and dehydration operations.

**Refineries** can greatly benefit from using Cortec products. VpCI-705 and its biodegradable version VpCI-705 Bio provide excellent corrosion protection against acidic exhaust gases, condensates, carbon dioxide and hydrogen sulfide. They are both approved and already successfully used as a fuel additive. VpCI-705/705 Bio prolong the life time of the fuel storage tanks. That is especially valuable for the relatively corrosive bio fuels.

All of the mentioned above inhibitors are specifically formulated for the petroleum and natural gas recovery and processing. But of course other Cortec's products such as acid inhibitors, lubricants, cleaners, emitters, water treatment products can find their place in these industries.

#### **Additives for water-based subsea production control fluids**

M-528/M-528L are the newly developed and very effective additives for hydraulic products used in subsea production control fluids, like, for example, Castrol Transaqua EEI Oceanic HW 500 Series and others. M-528 is a corrosion inhibitor package, which when added to the mentioned above hydraulic fluids, provides protection to all metals and alloys.

## **News from the Lab**

Cortec has been investing in specialized training to allow our employees to reach their potentials. Debbie Hannan went through the training and is now a Certified Lead Auditor for our ISO 9001 QMS. Brian Wuertz and Andrea Hansen have or will have attended training to further their knowledge in a few areas by the time you have read this article. Andrea Hansen has been attending various training sessions to enable Cortec to better deal with Hazardous and Non-Hazardous Waste and be ready for changes that will be occurring in the manifestation of waste. Brian Wuertz will be attending NACE CIP Level 1 Coatings Inspector Training the last week of April. This training will provide him with extensive training in all aspects of application of coatings ranging from the different surface preparation procedures available to the final application of coatings. This training is considered by many to be the best training available and the network of contacts that are available should greatly assist the growth of our High Performance Coatings Line.

M-528 L in addition to anticorrosion package contains excellent extreme pressure lubricant. Falex test data show that the anti-wear properties of the final product with the M-528 L added are very good.



Both of these products were evaluated in Ethylene-glycol/water blend according to IP-287 with salt water added. IP-287 is a combination of the tests (thermostability, seawater compatibility, corrosion protection, lubricity), which has to be passed to be qualified as a suitable additive for this special application. Both, M-528 and M-528 L, passed all the tests with the excellent results.

In addition, all ingredients of these products were subjected to a variety of tests to establish their effect on marine organisms: acute toxicity, bioaccumulation and biodegradation per OSPAR. Based on the results, M-528 and M-528 L are in compliance with HOCNF (Harmonized Offshore Chemical Notification Format) environmental requirements.

## MCI NEWS

### MCI® Fibers

Cortec's Laboratory is proud to announce the newest innovation in its MCI® line, **MCI® Fibers**. After more than three years of R&D, MCI® Fibers are ready to debut in two new products this spring. The first is pure MCI® Fiber, currently available in 0.015 diameter and  $\frac{3}{4}$  inch length, although any size may be requested. The second is a new **MCI® Fiber Grenade**.

The MCI® Fiber Grenade combines Cortec's MCI® Fibers with MCI® powder in a Poly-Vinyl Alcohol Bag. Two sizes are available, a two and

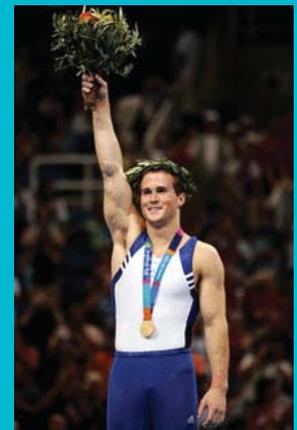
## Cortec Keeps the Olympics Shining Bright for Years to Come

The Olympics are over and it will be 4 more years before another round of medals are awarded to those great athletes and likely that long until any of us think about curling. The Cortec Olympic Committee was founded to help past Olympians protect what they have earned.



Olympic athletes train their entire lives for a single moment of glory and if they are lucky and skilled enough to win a medal, the toughest challenges for them lie ahead, keeping their Olympic medals from tarnishing. Until now past Olympic champions would spend hours and hours keeping their medals shiny and untarnished, but no more with the help of the Cortec Olympic committee. The Cortec Olympic Committee is devoted to preventing tarnish on Gold, Silver and Bronze (and other copper alloys)

When people think of Cortec corrosion inhibitors they typically think, steel or maybe cast iron, when in fact Cortec can protect almost all metals that tarnish or corrode. Utilizing a combination of Ecoclean Silver and Gold Cleaner, VpCI packaging materials (VpCI-126 Blue film and Silverbrite Paper) and Emitters we can keep the medals won by those brave dedicated few, bright and shiny for the years to come. Also for those Olympians who did not medal, and the rest of us, Cortec offers multiple products to protect our silver, gold and other precious metals looking new as long as we own them. So if you know an Olympic medal winner or you have some precious metals that need protecting contact the Cortec Olympic Committee, otherwise known as tech service, for assistance.



## Corrosion Management Preventative Strategies

### What should be done?

- Increase awareness of large corrosion costs and potential savings
- Change the misconception that nothing can be done about corrosion
- Change policies, regulations, standards, and management practices to increase corrosion savings through sound corrosion management
- Improve education and training of staff in recognition of corrosion control
- Advance corrosion technology through research, development, and implementation

one-half pound (1.15kg) bag which doses one cubic yard, and a metric bag just over three pounds (1.5kg) which doses one cubic meter. Each case ordered will contain 20 bags.



Because the bags dissolve in the concrete mix, MCI® Fiber Grenades make it safer and easier to dose the amount of MCI® Fibers and MCI® powder admixture needed.

Why do we need fibers? The Portland Cement Association's website states, "Plastic shrinkage cracks are those that occur immediately following concrete placement, before the concrete has hardened. Plastic fibers are commonly dosed at 0.1% by volume for slabs on grade; this is equivalent to 0.9 kg/m<sup>3</sup> [2lbs] or 1.5 lb/yd<sup>3</sup> [0.68kg]. Polypropylene fibers are among the most common for controlling plastic shrinkage cracking."

Lots of companies make polypropylene fibers because the fibers hold up in the concrete's high pH and the fiber's hydrophobic properties help them survive freeze-thaw cycles. This is why Cortec chose to have polypropylene based fibers. Of course, that's not all that's in Cortec's MCI® Fibers.

The idea that Migratory Corrosion Inhibitors (MCI®) chemicals could be carried by fibers that would slowly emit the chemical has the basis with Cortec Corporation's film products, which slowly emit vapors. After much research and several trial runs, a formulation

that contains enough MCI® to provide protection to steel rebars, while maintaining the mechanical properties for shrinkage cracking reduction, was produced. This is the dual purpose MCI® Fiber that Cortec is proud to offer to you today.

Concrete containing 1-1/2 lbs/yd<sup>3</sup> of 3/4 inch MCI® Fibers resulted in a 66% shrinkage crack reduction versus the control concrete without fibers during recent testing. More data from these tests are shown below:

	Control	MCI® Fibers
Impact Strength, First Crack	7 blows	12 blows
Ultimate Failure	10 blows	17 blows
Modulus of Elasticity	5.26 E +06	5.71 E +06
Residual Strength	54 psi	120 psi
Compressive Strength, 7day	5120 psi	5390 psi
Compressive Strength, 28 day	7000 psi	7090 psi
Flexural Strength, 7 day	610 psi	940 psi
Flexural Strength, 28 day	890 psi	1120 psi
Splitting Tensile Strength	363 psi	441 psi
*Toughness Index	I <sub>5</sub> =4.8, I <sub>10</sub> =7.7, I <sub>30</sub> =24.8	

\*The toughness index (TI) is the ratio of the toughness of the fiber reinforced matrix to that of reference plain concrete matrix.

If you'd like more details about these new products, please contact the Cortec Laboratory.

### MCI Concrete Admixtures Added a New Number

MCI-2005 AL is a new addition to the list of water-based MCI concrete admixtures. Cortec's MCIs are the leaders in corrosion protection provided to the rebars in concrete. They poses the ability to migrate and provide better protection when added to concrete in dosages 6-10 times lower than other inhibiting admixtures.

Congratulations to Bob Berg! Him and his wife, Michele, had a baby girl Natalie on Easter! Wish them all the best!



MCI-2005 and MCI-2005 NS are two products, which are successfully used in different regions of the world. MCI-2005 is used mostly in warm countries. MCI-2005 NS is approved by many countries, states and DOTs for the application in which no effect on set time of concrete is required.



MCI-2005 AL is based on the same chemistry as MCI-2005 and MCI-2005 NS and keep all benefits of MCI-2005 NS: excellent corrosion protection (20 times reduced corrosion rate), doesn't effect the set time, improves compressive (7.5%) and flexural (25%) strength of concrete.

At the same time, MCI-2005 AL has advantages which are very important for some applications.

- MCI-2005 AL better tolerates cold and heat, which means that it can be shipped to customers in winter time as well.
- MCI-2005 AL contains much less sodium ions, which is the requirement in certain regions.
- MCI-2005 AL doesn't emit any irritative materials in different weather situations.

MCI-2005 AL was tested not only in-house but also in a professional independent laboratories with excellent results.

## NEW AND EXCITING APPLICATION FOR ECOLINE CUTTING FLUID

To date, the use of Ecoline Cutting Fluid has been kept mostly to machine tools that drill or perform some other dimension changing process to a piece of metal. A new application was found when a potential customer for VpCI packaging complained during a visit to a distributor about a particular piece of equipment in their shop, the **TIMESAVER**. A timesaver is a series of large abrasive pads that remove the top surface of a part and make it uniform, smooth and remove any imperfections. However, almost all the fluids used in these machines have short sump lives, get rancid very quickly and actually cause the parts to corrode. Sometimes corrosion can occur as quickly, as a few hours after the parts were machined. Enter Ecoline Cutting Fluid to the rescue. The customer dosed their machine with Ecoline Cutting Fluid at a 5% concentration and was able to stop coating their components with oil immediately after the parts left the machine. The only corrosion protection they now need is the ECF. Not only are they getting excellent corrosion protection, but the machine has been working better than ever and the sump still smells as good as the day it was first filled. This could be a huge opportunity since there are countless machine shops and metal working businesses around the country that have this same problem that can easily be solved by talking with their Cortec distributor.

## QC TESTING AT CORTEC ADVANCED FILM DIVISION

The Quality Control lab at CAFD has been improving product performance in films manufactured at the Advanced Film Division plant in Cambridge, MN. Product testing is becoming more critical as Cortec Corporation

## NEW FACES IN THE LABORATORY

We have added personnel to enable us to allow Cortec the ability to grow and reach record sales totals for many years to come.

Eric Uutala joined Cortec's Technical Service Engineer Team right out from college. His lines of products include, but not limited to Packaging, BullFrog, and Electronics.



Angel Green joined Cortec in March, taking over the Coatings Chemist position. Angel has 10+ years of experience working in the coatings industry.



grows. The CAFD Quality Control lab, managed by Rob Rewolinski, has gone through a number of upgrades for product testing. We have improved tests with Masterbatch, VCI, ESD film, and film strength. Quality tests have played a major role in answering customer complaints and preventing problems. Research and development works side by side with the CAFD QC lab as well.

Shrink film testing is the newest addition to the QC lab. Quality Control is able to quantify a film's ability to shrink in both machine and cross directions. This test has blazed the trail for improved resin selection and better formulations of shrink film. The new selected resins have also cut the cost of materials.

Mechanical testing has been upgraded. It can now examine properties of thicker films with mil gauges that are 7mils and higher. Tests using thicker mils had to be outsourced at one time, but now we have the ability to test these ourselves. Testing ourselves saves about \$600 every time we do it vs. sending it out.

Looking forward, the newest test the QC lab would like to perform is a film barrier test. It will use a dry gas chamber. This chamber will be examining barrier properties of film, specifically regarding water vapor. We hope to have this up and running by Fall 2006. This will be another test we can do ourselves inexpensively vs. sending it out.

Look us up if you are in the neighborhood. CAFD QC laboratory personnel include Rob Rewolinski, Kim Peterson, and Debbie Thomsen. We would be happy to show you around.

## NEWS FROM EUROPE

Periodical visits to Cortec Distributors and Customers in different European Regions are essential to ensure a timely sharing of information, especially when handling New Products introduction or the use of "Suggested Existing Ones," as well as to capitalize the daily new experiences gathered around the world. And this refers to a vast array of applications, ranging from cleaners, derusters, temporary rust preventatives,



coatings, water or hydrocarbons additives, packaging to concrete admixtures or repair mortars.

To this end, Dario Dell'Orto, Cortec European Sales Manager, visited Switzerland, Germany, Holland, Belgium, France and Italy in April to bring the latest important developments from the Lab as well as to listen to the "good news" from the market. Among them, we can include the progress in sales in packaging of VpCI films and paper in the German, French, and Italian markets in different industry segments as well as the successful use at GE-Nuove Pignone in Italy of the VpCI-418 LM, a cleaner that Cortec Lab specifically developed for them, now interesting also GE HQ in the USA. This product has been introduced also in Croatia, Sweden, UK.

During these visits, distributors and customers also expressed a growing interest in Cortec Biofilms, among them is the new Eco Works 70. In this regard, the future production of these films in Europe is considered as an additional advantage to accomplish fast deliveries and satisfy specific European demands in terms of products specs and sizes. Cortec Eco films are sold primarily in the UK. For the rest of Europe, at this stage it is essential to have a training phase, meant to explain our films features and advantages, assess our products against the competition and provide guidelines of application opportunities.

Moreover, the dialogue with end-users enables us to explore new special applications like the use of different protection materials such as fabrics, specific foam and others. In this regard, customers throughout Europe have expressed unanimous, unsolicited appreciation for Cortec's lab expertise and availability especially when it comes to performing the initial tests at the early stage of a new product and to assessing the technical feasibility and financial impact of the project itself. The ability to have a laboratory with real corrosion protection experts is widely appreciated and it has been achieved through

many years of hard work, dedication and, most importantly, very solid and reliable results.

At the same time, the incoming, more stringent quality norms mean that Cortec, jointly with Distributors and/or Licensees, is working in a proactive way to continuously update the needed documentation to comply with the different local regulations in various countries and with major international manufacturers, typically the automotive industry, whether it refers to Material Safety Data Sheets (MSDS), Certificate of Analysis or additional information needed to fulfill the quality Systems, as per ISO 9000 or ISO 14001 norms.



The Lab has been traveling at higher rates than ever before, with Rita traveling multiple times to Europe for work and Brian working in all four time zones in the United States already this year.

### **Announcement**

**Please read about new VpCI Powder applications in the June's issue of the Material Performance magazine.**

## BREAKING NEWS

Cortec Corporation is proud to announce that during this year's ISO 14001:2004 surveillance audit conducted March 16-17 we received zero non-conformities!

Did you know that Cortec Corporation was the first Minnesota-based company to be ISO 14001 certified? The decision to become certified was made in 1996 when the ISO 14001:1996 guidelines were being finalized. Ten years later, our Environmental Management System is thriving. Our vision is that Cortec Corporation will continuously improve the environmental performance of our products and processes to provide a better world for future generations.

Our EMS policy states Cortec Corporation is committed to:

- Prevent environmental pollution and conservation problems in and around our plants
- Conserve natural resources through reclamation and recycling
- Assist our customers in dealing with environmental challenges
- Support governmental and other official environmental efforts wherever possible
- Continued development of products that are created from sustainable resources



If you haven't seen our new EMS brochure, you should check it out! The back page is devoted to all the Cortec Products derived from sustainable resources like soybeans, orange peel, corn, sugar beets, and coconut oil. In 2005, Cortec Corporation used over 63,480 lbs of these resources to make its corrosion inhibitors. It's our goal to increase this number in the years ahead!

**What would you like to see in the next issue of Leading Edge?**

**If you have comments/suggestions, please let us know**

**This is your newsletter, and we'd love to hear from you.**

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