The Cortec Edge
CORTEC Laboratories
An Internal Newsletter of Cortec Corporation
Environmentally Safe VpCI™/MCI® Technology
February 2002

Environmental Responsibility

Art Ahlbrecht
Vice President of Research and Development

Anyone who has visited Cortec since the summer of 1999 has seen the Minnesota Governor's Award banner presented to us (by Jesse Ventura) for significant accomplishments in pollution prevention.

Our environmental corrosion protection system uses renewable resources like soya based lubes and greases for example. We have also found other plant products that make excellent corrosion control agents. One of those agents, derived from sugar beets, is a gluconate derivative used in our MCI® products. Another corrosion control agent under investigation is derived from tobacco leaf scrap, produced in the manufacturing of cigarettes.

Soya Based Products

Our new soy bean based oils and greases containing VpCI™ chemicals are an extension of the EcoLine™ Product line. These new products are especially useful where environmental concerns are important.

Benefits of Soya based products:

1. Excellent corrosion inhibition of metal under the grease layer.
2. Soya grease and oil do not decrease in viscosity as fast as mineral oil and petro-based grease products, which works well for higher temperature applications.
3. Disposal problems are minimal, because the products are biodegradable

Tobacco Extract

Cortec is now investigating a water extract obtained from soaking tobacco leaf scrap. This extract shows excellent corrosion control in an acidic environment. This technology is based on a renewable resource which also provides for low toxicity impact and biodegradability.

New Products

by Rita Kharshan, Lab. Director

Extending the High Performance Coatings Line

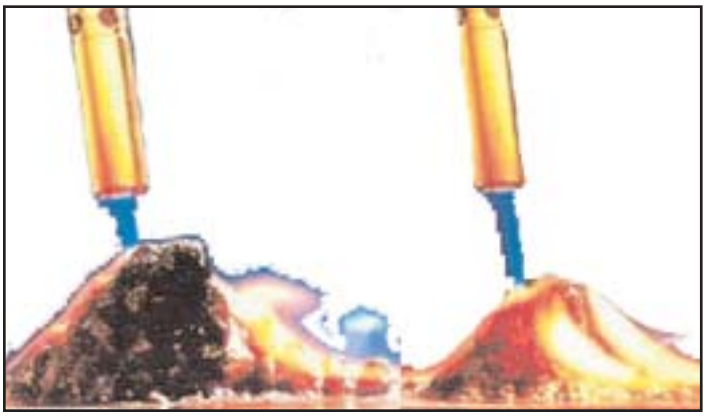
CorrShield® Gold

The CorrShield family has a new addition, CorrShield® Gold. This product is based on the same unique technology as VpCI™-386 Aluminum, utilizing an excellent inhibiting package with the corrosion resistant properties of platelet type pigment. This pigment gives a very bright, pure natural gold-like finish. CorrShield® Gold provides excellent corrosion resistance in addition to its elegant appearance.

VpCI™-386 FR (Fire Retardant) Top Coat

Fire Retardants are not new; they were introduced in the late 1800s when the US Navy used them on ships. They thrived during World War II when used on structures such as massive blimp hangars. Today's fire retardants are much more effective and some are less toxic than traditional bromine chemistry.

VpCI™-386 FR is useful in a variety of situations. Fire retardants are frequently used where fire service is not readily available, like rural homes for example. Museums also use fire retardants to protect their valuable contents. Fire retarding paints are especially useful in places where sprinklers can not be easily installed, like for example, theaters. Lastly, VpCI™-386 FR can be used to prevent or slow down the spread of fire in schools and hospitals. The possibilities are endless; wherever safety is a concern, VpCI™-386 FR is an essential coating for safety and corrosion protection.



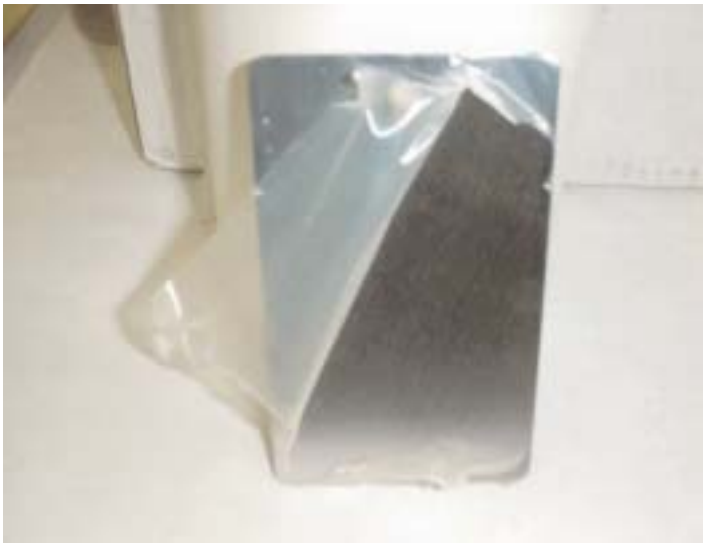
Fire retardant coatings have become an even more important factor on steel structures after the events of September 11, 2001. Steel of course, will not burn, but at a high enough temperature it will melt; causing an entire building to collapse. VpCI™-386 FR will significantly reduce the likelihood of that happening.

To qualify as "fire retardant," a product must have an accepted rating for flame spread and smoke development when tested in accordance with established industry procedures. VpCI™-386 FR passed ASTM D-3806-79 Retardant Paint Test (2-Foot Tunnel Method). An independent test laboratory qualified Cortec VpCI™-386 FR as a true Flame Retardant material.

Most conventional Flame Retardant coatings on the market do not provide corrosion protection, some are even corrosive to metal surfaces. VpCI™-386 FR, when used as a 4-mil (100 microns) top coat over Cortec's VpCI™-374 primer provides more than 800 hours corrosion protection in salt spray environment (ASTM B-117 test). This makes VpCI™-386 FR superior product to conventional Fire Retardants.

CorrShield® VpCI™ Strippable Coating

CorrShield® VpCI™ Strippable Coating is another addition to the coating line. This is a water-based, non-flammable temporary coating that can be easily removed without the use of paint



strippers or cleaners. The unique combination of a water-based acrylics, Vapor phase Corrosion Inhibitors (VpCI™s) and a thixotropic additive provides excellent barrier, surface and corrosion protection. CorrShield® VpCI™ Strippable Coating is ideally suited for use on bare metal, machined, and highly polished applications where surface protection and corrosion inhibition are necessary.

Designed for use as a fast-drying, temporary coating for parts and equipment, CorrShield® VpCI™ Strippable Coating is resistant to sagging and running while remaining non-flammable and environmentally friendly. CorrShield® VpCI™ Strippable Coating is a clear coating that can be tinted in a variety of custom colors.

Cortec's New Ecoline™ Products

Cortec has developed three new soya-based products in addition to the four products that were recently released. These new products utilize soybean oil as a replacement for mineral oil which strengthens Cortec's already outstanding line of metalworking products. All of these products meet USDA's Bio-Based Product definition and conform to EPA's Environmental Preferable Purchasing criteria.

EcoLine™ VpCI™ Bearing, Chain and Roller Lube

This high quality rust preventative lubricant, formulated with American grown natural oil is an excellent replacement for mineral or synthetic oil-based lubricants. This product surpasses the lubricity of most conventional lubes used on equipment during operation or shut down.

EcoLine™ VpCI™ Bearing, Chain and Roller Lube is a ready-to-use product and it is recommended for both automatic and manual applications. The special tackiness agent resists sling-off from high speed chains. The product prevents smoking when under load and reduces vibration and noise for smooth chain operation.

EcoLine™ VpCI™ Bearing, Chain and Roller Lube contains a unique combination of Vapor phase Corrosion Inhibitors (VpCI™), which provides a thin film protection on chains and bars in harsh environments. It also has self-healing properties even when the lube is temporarily or accidentally removed.

This product is safe to use and doesn't have any negative impact on the environment.

EcoLine™ Heavy Duty Grease

This Premium Grade Heavy Duty Grease is formulated utilizing the latest bio-technology. It is an environmentally friendly replacement for harmful mineral oil based greases.

In addition to lubricating, self-healing and moisture displacing properties, this biodegradable grease provides a powerful combination of contact and Vapor phase Corrosion Inhibitors. EcoLine™ Heavy Duty Grease protects gears and other equipment (i.e. truck hitch mechanisms) from corrosion during operation and lay-up periods.
EcoLine™ Heavy Duty Grease has a stable high viscosity index almost independent of ambient temperature.

This biodegradable grease can be also used in applications where long-term corrosion protection (indoor or outdoor) and lubrication is required.

EcoLine™ Food Machinery Lubricating Grease

EcoLine™ Food Machinery Lubricating Grease is a high-quality, corrosion inhibiting lubricant formulated with American-grown natural oils. This environmentally friendly lubricating and rust preventative grease is specifically formulated to meet and exceed the demands of major food and meat processing plants. EcoLine™ Food Machinery Lubricating Grease conforms to USDA H-1 criteria and US FDA regulations 21CFR 178 3570 "Lubricants with incidental Food Contact". The combination of FDA approved corrosion inhibitors and the specially formulated thickener provides protection and lubricity superior to most conventional greases.

Cooling Loop Gator Gets EPA Approval (Environmental Protection Agency)

Cooling Loop Gator® has been proven to be an effective tool against corrosion in cooling towers, chillers, closed loop systems, and associated piping during the seasonal lay-up period. Its unique, patented VpCI™ technology protects in three phases: water phase, vapor phase, and water-vapor interphase. While traditional chemistries fall short of protecting such systems during lay-up or shut down, Cooling Loop Gator® successfully protects a variety of metals present in such systems.

In line with Cortec's philosophy of environmentally sound products and the ISO 14001 system, the Cooling Loop Gator® is also safe for the environment. It has recently been tested by the Environmental Enterprises USA lab to show that it can be safely disposed of in fresh water systems at concentrations up to

EE#	Appendix	Sample ID	NOEC/LOEC, ppm	
			D.pulex	P.romelas
E-17766-01	A	Cooling Loop Gator	10,000/>10,000	10,000/>10,000

10,000 PPM. The usual dosage of Cooling Loop Gator® is only 1000-2000 PPM. Please refer to the EE test results in the tables below for more details.

The No Observable Effect Concentration is the highest concentration tested that does not significantly reduce survival of the exposed organisms. The Lowest Observable Effect Concentration is the lowest concentration tested that does significantly reduce survival of the exposed organisms. Copies of the raw data, survival data analysis, and summary statistics for this pair of tests are presented in Appendix A.

The laboratory test results reported above for Cooling Loop Gator® represent the worst-case scenario because they are based on the assumption that 100% of the chemical applied in the field will remain in solution. In actual field applications, applied chemicals have the opportunity to absorb on various surfaces and also to degrade.

Questions and Answers

by Brian L. Wuertz, Technical Service Engineer

As a Technical Service Engineer, I field questions for most of the day. I have noticed some questions are asked more often than others. I will try and answer a few of these.

Q. What type of metal is being protected?

A. VpCI™-377, VpCI™-379, and M-370 will give multi-metal protection, with VpCI™-377 giving excellent protection to Aluminum, and M-370C specifically formulated as an additive to cast iron cleaners. For protection of yellow metals, brass, copper, etc, VpCI™-316 will give excellent protection.

Q. What conditions are the products going to be subjected to?

A. While Cortec's water based rust preventatives are excellent products, they do have their limitations. The products detailed above are designed for indoor usage, or very sheltered outdoor use. Cortec does have a line of water based temporary coatings that will give excellent unsheltered outdoor protection, such as VpCI™-388, VpCI™-389 and VpCI™-390. These coatings are an environmentally friendly choice for outdoor storage of parts and materials.

Q. It is now winter and my customer would like to order VpCI™-372 and VpCI™377, will these products be OK if they freeze and then thaw?

A. This is more common question than one might think. With Cortec Corporation being based in St. Paul, Minnesota, the products that are shipped during winter will most likely freeze, unless shipped in heated trucks.

To answer this question, the following is the list of products that will NOT go back into solution if frozen: VpCI™-372, VpCI™-373, VpCI™-374, VpCI™-383, VpCI™-385, VpCI™-386, VpCI™-387, VpCI™-388, VpCI™-389, VpCI™-389 1:1, VpCI™-390, VpCI™-392, VpCI™-395, and Bullfrog Rust Blocker. Therefore to answer the question, VpCI™-377 is freeze-er-thaw stable and VpCI™-372 is not. If a product is not on this list and you are not sure if it is freeze-thaw stable, feel free to call a Cortec Technical Service Engineer and get the answer.

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