

PRO-ENVIRONMENTAL VCI COATINGS OFFERS TEMPORARY CORROSION PROTECTION

By Boris Miksic

Corrosion is a problem that plagues everyone who works with metals, from the mill all the way to finished assembly and, ultimately, the consumer. And, unfortunately, many of the standard methods to fight corrosion are messy, time-consuming and expensive. These standard methods also pose a potential threat to the environment unless properly treated and disposed.

But there is an easier way to protect both ferrous and non-ferrous metals—without dipping, cleaning, expensive waste treatment, and without damaging the environment; VCI technology.

How VCI technology works

Vapor corrosion inhibitors (VCIs) condition an enclosed atmosphere with a protective vapor that condenses on all metal surfaces, including recessed areas and cavities not reached with conventional methods.

The VCI ions dissolve in a moisture film, which are attracted to metal surfaces. The VCI ions form a thin, monomolecular protective film at the metal surface, forming a barrier that self-replenishes through further condensation of the vapor.

The advantages of VCI protection

In addition to superior corrosion protection, VCI technology offers a number of important advantages:

Pro-environmental. With concerns for worker safety and the proper disposal of environmentally hazardous materials, this has become a hot issue. Where VCI technology can replace oils, they eliminate these concerns because they are water-based

and non-polluting. There are no oils, phosphates, nitrates, or heavy metals to contend with.

Clean, dry protection. Since there are no oils, VCIs eliminate the expensive process of putting on—and then taking off—oils, and the treatment costs involved. There's no degreasing. Most parts—whether it's metal from the mill or a multi-metal finished assembly part—are ready to use immediately, or are ready to move on to the next step of production.

Reduces capital equipment costs. Since there is no cleaning needed with VCI protection before plating or painting, you don't need any extra waste disposal systems or equipment. The application of VCI protection is easy—and it can be quickly added to your production lines—whether they are manual or automated.

Multi-metal protection. Various forms of VCI protection have been formulated to work with both ferrous and non-ferrous metals, including formulations that protect combinations of metals for the shipment or storage of multi-metal components and assemblies.

Short- and long-term protection. While most of the corrosion inhibiting technology used today can protect metals for a short period or time, it doesn't do you much good if you have to store materials a long time or ship them overseas. VCI technology can provide continuous, self-replenishing protection up to 24 months.

Clean, dry and transparent protection. Whatever form of VCI protection you use, the invisible protective ionic layer of Cortec VCIs does not alter the important surface properties of the metal. The parts are immediately ready for painting, welding, assembly, or use by the ultimate consumer without having to remove the VCI coating.

VCI protection: From the mill to finished product

Cortec Corporation of St. Paul, MN, has been a pioneer in the development of VCI technology since 1976. As we go through some of the basic forms of VCI protection that are available, we will also detail some of the many other advantages this technology has to offer.

VCI protection for coils and sheets

Coils and sheets are traditionally protected with oils, which are messy and tough to clean; or corrosion inhibiting paper, which can easily rip and lose effectiveness when VCI escapes into the atmosphere.

For steel coils and sheets, there's Cortec VCI-319. Simply spray it on. It reaches every crevice of the metal, providing protection for weeks. A 20-ton coil can be treated in just a couple of minutes. VCI-319 is convenient, inexpensive, and generally is not removed

before further processing. Unlike oils, VCI-319 can be removed with a simple water bath, when needed.

For non-ferrous coils and sheets like aluminum or galvanized steel, there's VCI-34; for brass and copper, there's VCI-316.

Improved sheet handling

Because there are no oils to contend with, sheets treated with VCI-319 or VCI-347 do not stick together. Sheets are easily picked up one at a time, every time. This allows optimum manual or automated sheet handling speed. You also improve safety by reducing the hazard of separating oiled sheets by hand.

Improved surface finishing

Most importantly, VCI-319 and VCI-347 are easier to remove in cleaning operations than conventional rust preventives. Parts come out cleaner, faster, at lower operating temperatures. And since there is no oil to remove, Cortec VCIs also help increase the tank life of your cleaning baths. (Figure 2)

Lubrication for stamping and extruding

VCI-347 concentrate provides excellent corrosion resistance and lubricity for moderate stamping and wire drawing—without cleaning or other treatment. VCI-347 significantly reduces lubricant costs by less chemical usage and eliminates the need for sulfonated and chlorinated lubricants. By using a water-base lubricant, you will cut pollution and waste disposal costs.

Cleaner welding and cleaner air lowers fresh air make-up

Much less smoke is generated when welding products treated with VCI than those treated with oil. This not only reduces a potential health hazard, but also cuts down on heat loss and the vast amount of energy required for ventilation.

VCI -treated metal is especially beneficial for welding low carbon steels that are sensitive to extra carbon. Unlike some oils that need to be removed before welding, Cortec VCIs do not change critical metal-lurgical properties during welding.

Protection of subassemblies and finished products

For finished parts like machined gears with highly active surfaces and cast iron or sintered metal components, the traditional form of rust protection has been heavy-duty oils. Such value-added parts need the safeguard of superior protection from the elements until they are ready for further processing assembly—which can often be from one month to two years.

For these situation, there is Cortec VCI-379, a water-based, biodegradable dip. VCI-379 provides the superior long lasting protection against rust, and, unlike heavy-duty oils, it dries completely, and does not decrease adhesion for painting—so removal is unnecessary.

Shot of gear, one-half protected, one-half unprotected (VCI-379) (Figure 3)

VCI for your vapor degreaser bath

Of course, many times you may receive subassemblies or finished products protected in oils that you will have cleaned off in a vapor degreaser bath before processing, further assembly, or use.

One of the main problems of vapor degreaser baths is that the dipped products become so clean that they are immediately susceptible to rust as they come out of the bath—in fact, they often “flash rust” in just seconds after removal. For this problem, there’s VCI-1236. It’s a very economical way to increase the rust protection of your products as they come out of the vapor degreaser bath. VCI-1236 is a liquid additive—you simply add it to the solvent of your degreaser bath. VCI-1236 works for both ferrous and non-ferrous metals, and it contains no phosphates, nitrates, chromates or other heavy metals. Surfaces can be coated or painted without cleaning.

VCI protection for packaging, shipping and storage

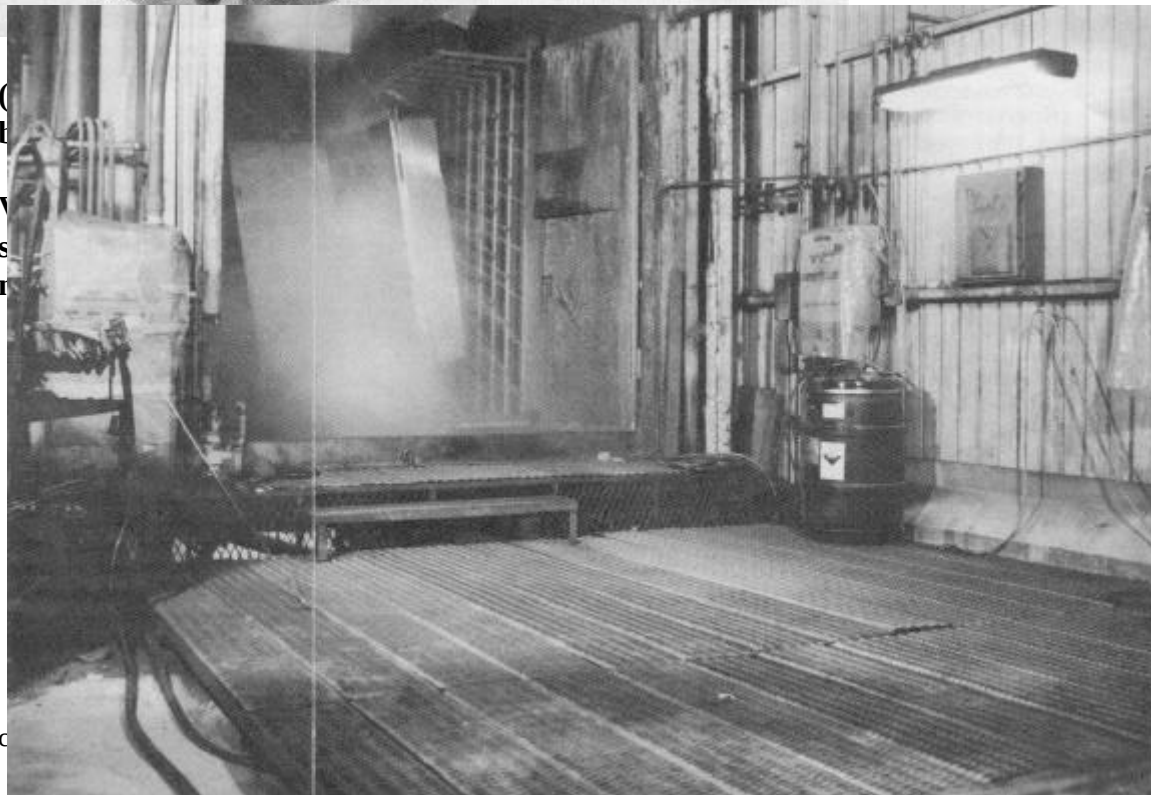
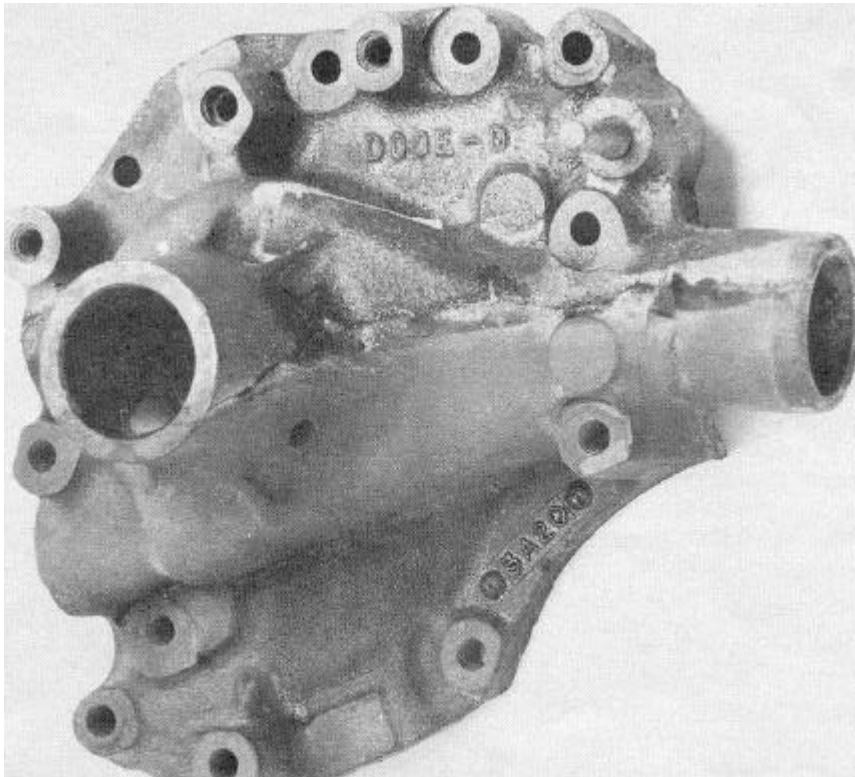
Whatever your rust protection needs, Cortec VCI technology has developed a wide range of products and sizes to handle all of them.

Cortec VCIs provide improved corrosion protection for the internal surfaces of pumps, engines, aircraft engines, turbines, hydraulic components, compressors, valves, regulators, tanks, and vessels. VCI offers effective protection for up to two years for internal components and surfaces of many parts.

Cortec VCIs can provide protection for parts as small as a circuit chip or as large as a shipping container on an overseas freighter. Large parts can be enveloped in a VCI-coated shroud for storage or shipment. Small parts can be wrapped in Cor-Pak™ VCI-coated film, or enclosed in a heat-sealed or Zip-Loc® VCI bag. For parts stored in boxes, simply enclose a VCI tablet or a breathable pouch containing VCI, and seal the package. It will continuously emit a clean, protective non-toxic vapor.

Cortec VCI-130 foam shapes provide an alternative to conformal coatings in automotive, aircraft, and appliance applications. Simply place a tiny VCI-130 foam shape in the enclosure for an electronic system or circuitry and then seal. All the expense of using conformal coatings is eliminated at a fraction of their cost.

VCI technology offers an important alternative to rust-preventive oils in protecting metals against corrosion. In many instances traditional treatments can be replaced with VCI products that are pro-environmental. Additionally, these VCI products can provide substantial economic savings offering a “win-win” opportunity for the manufacturer, consumer, and the environment.



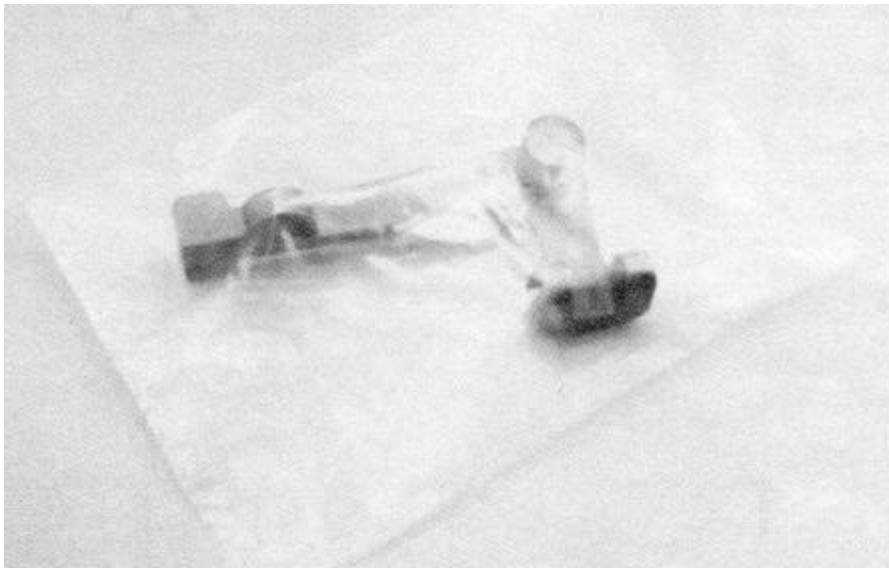
(Figure 2) When you replace rust-preventative oils with VCI protection, parts come



out of the power wash cleaner, faster, and at lower operating temperatures.

For metal parts stored in boxes or other containers, simply add one of these pouches and seal the box. The rust protection is self-replenishing—even if the package is opened and re-closed.

Boris Miksic is President of the Cortec Corporation, St. Paul, MN., which specializes in high-performance corrosion-inhibiting technology for industrial and commercial applications. The company manufactures vapor corrosion inhibitors in a variety of imaginative forms, marketing its products throughout the United States, Canada, and internationally.



A heat-sealable or Zip-Loc pouch keeps inventoried parts rust-free for months.