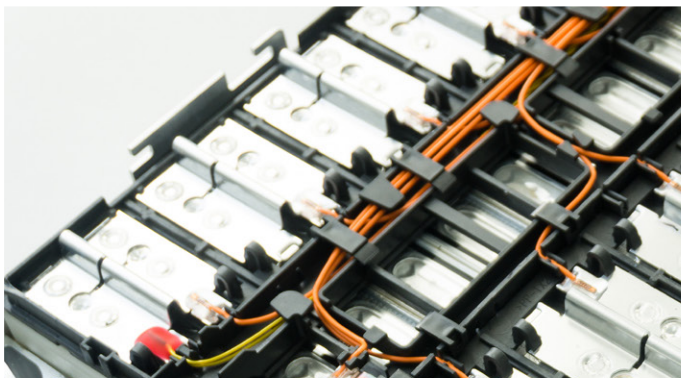


# CORROSION SOLUTIONS FOR THE ELECTRIC VEHICLE (EV) INDUSTRY



ZERUST® is a product of Northern Technologies International Corporation

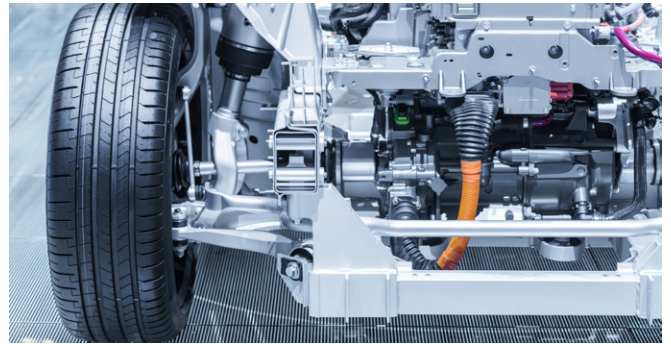




# WHY CHOOSE ZERUST®?

## PROVEN SAFE, RELIABLE, AND EFFECTIVE CORROSION SOLUTIONS FOR THE ELECTRIC VEHICLE (EV) INDUSTRY

ZERUST® corrosion inhibiting products are a cost-effective way to protect automotive parts and components from rust and corrosion during storage and shipping. For nearly 50 years, ZERUST's proprietary vapor corrosion inhibitor (VCI) technology has been proven safe and effective for protecting metals. An analysis of compatibility using recognized test procedures, can be arranged with a local ZERUST® representative.



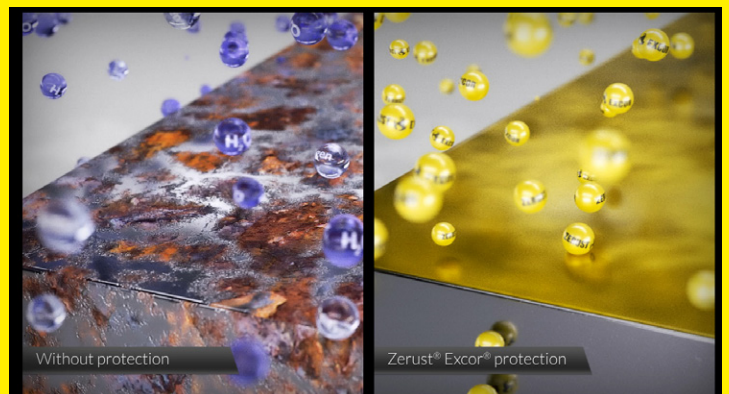
## THE BENEFITS OF ZERUST® CORROSION INHIBITOR PRODUCTS



- **Ease of Use:** VCI paper and poly are simple to use and do not require specialized equipment or labor to apply, making them cost-effective.
- **Environmentally Friendly:** VCI paper and poly are environmentally friendly and do not release harmful substances into the air or soil.
- **Reusability:** VCI paper and poly can be reused multiple times, making them a more sustainable option compared to traditional coatings.
- **Protection in Enclosed Spaces:** VCI paper and poly provide protection against corrosion in enclosed spaces, such as containers or storage areas, where traditional coatings may not be effective.
- **Cost-Effective:** VCI paper and poly are cost-effective as they reduce the need to reapply, compared to traditional coatings.

## HOW ZERUST® VAPOR CORROSION INHIBITORS (VCIS) WORK

VCI molecules inhibit corrosion by preventing moisture and environmental elements from reacting with the metal surface. Since VCI molecules are transported through the air, they must be trapped around the metal surface using a poly bag or other enclosure. Later, when the enclosure or package is opened, the ZERUST® corrosion inhibiting layer dissipates, leaving clean, dry, and residue-free metals.



# CORROSION SOLUTIONS FOR THE ELECTRIC VEHICLE (EV) INDUSTRY

As public awareness of the effects of global climate change increases, electric vehicles (EV) continue to gain popularity across the globe, with electric vehicle sales being up 62% globally in the first half of 2022 compared to the first half of 2021, according to global EV analysis leaders at EV-Volumes. While electric vehicles have advantages over traditional combustion engine vehicles, such as zero emissions, reduced running costs, increased comfort, and the absence of cooling circuit, gear shift, clutch, and noise-reducing elements, the shift to electric vehicles has resulted in a new set of challenges for OEM's in the Electric Vehicle Industry.



Electric corrosion has become a key focus for the Electric Vehicle Industry, as the vehicle battery and electrical components are much more prone to corrosion, as a result of being exposed to severe working conditions with increased levels of dust, dirt, moisture, salts as well as more extreme temperature changes during the manufacturing process, shipment to the assembly plant and while in operation. All these factors increase the potential for corrosion to occur, and thus a comprehensive corrosion management system must be implemented.

Vapor corrosion inhibitors (VCI) protect against corrosion by releasing a vapor that fills the air inside a sealed container or enclosure. The vapor forms a strong bond with the metal surfaces, promoting and maintaining the natural and healthy passive oxide layer on the metal and forms a thin, invisible film that protects the metal from corrosion.



VCIs are often used to protect metal parts during storage or transportation and can be especially effective at preventing corrosion in hard-to-reach areas where other forms of protection might be difficult to apply. They are also useful for protecting metal surfaces that are in contact with water or other corrosive substances.

For electric vehicles, VCIs protect various metal components, such as wiring, connectors, and other electrical components, from corrosion. For example, a VCI could be used to protect metal parts during the manufacturing process, storage, and transportation.

VCIs could also be used to protect metal parts that are exposed to humidity or other corrosive substances while the EV is in use.

# PRODUCT SOLUTION HIGHLIGHTS

## ZERUST® ICT® 400 SERIES: VCI PAPER



ZERUST® ICT®400 Series VCI Paper Packaging provides innovative and eco-friendly corrosion protection solutions, specifically designed for the evolving needs of the electric vehicle (EV) industry. Our VCI papers are pH neutral, acid-free, and produced from responsibly managed forests using renewable energy. With ZERUST® VCI Paper, EV manufacturers can ensure the longevity and reliability of metal components during storage and transit, meeting the industry's highest standards for sustainability and performance.

### ZERUST® ICT®420 VCI Kraft Paper

ZERUST® ICT®420 VCI Kraft Paper offers a cost-effective and practical solution for protecting metal components in the EV industry. This pH-neutral, non-abrasive kraft paper is saturated with advanced Vapor Corrosion Inhibitor (VCI) technology on both sides, ensuring uniform protection against rust and corrosion. Ideal for interleaving or wrapping metals, it supports sustainable practices by being fully recyclable, biodegradable, and sourced from responsibly managed forests. Whether during shipping, or storage, ZERUST® ICT®420 ensures your metal parts are ready for immediate use without additional preparation, providing reliable protection for a wide range of applications.

### ZERUST® ICT®427 Premium VCI Paper

ZERUST® ICT®427 Premium VCI Paper is designed to meet the rigorous demands of the EV industry, offering robust corrosion protection for high-humidity environments and challenging metal parts. This premium, non-abrasive paper is saturated with VCI on both sides, delivering consistent and effective corrosion prevention. Sourced from responsibly managed forestry products and fully recyclable, ZERUST® ICT®427 combines environmental responsibility with superior performance. It is perfect for interleaving or wrapping metals, ensuring that parts are ready for immediate use or assembly out of the packaging.

### ZERUST® ICT®420-35P VCI Poly Kraft Paper

ZERUST® ICT®420-35P VCI Poly Kraft Paper integrates the benefits of kraft paper with a one-mil thick VCI polyethylene layer, providing enhanced tear and moisture resistance for the EV industry. This acid-free, pH-neutral paper is coated with ZERUST® VCI poly technology, which diffuses to protect ferrous metal surfaces effectively. Suitable for interleaving or wrapping metals, the ICT®420-35P is designed for optimal performance during shipping, and storage, offering an ideal solution for protecting metal parts under challenging conditions.

### ZERUST® ICT®432-35P Poly VCI Kraft Paper

ZERUST® ICT®432-35P Poly VCI Kraft Paper combines the protective properties of VCI kraft paper with a 3/4 mil plain polyethylene layer, providing superior tear and moisture resistance. This product is pH-neutral, acid-free, and non-abrasive, ensuring safe and effective corrosion protection for the EV industry. It is fully recyclable and saturated with ZERUST® VCI technology, offering a reliable barrier against corrosion. Perfect for interleaving or wrapping metals, ICT®432-35P is suitable for use with other ZERUST® products for enhanced protection, ensuring that metal parts remain in pristine condition throughout shipping, and storage.



# PRODUCT SOLUTION HIGHLIGHTS

## ZERUST® ICT® 500 SERIES: VCI POLY PACKAGING FILM & BAGS



ZERUST® is the pioneer of VCI polyethene technology, offering an extensive range of corrosion-inhibiting VCI poly packaging solutions tailored for the electric vehicle (EV) industry. Available in various sized rolls, sheets, bags, formulations, and custom additives such as UV, anti static, and more. ZERUST® VCI films provide superior protection for metal components, ensuring they remain in pristine condition during storage, shipping, and manufacturing processes.

### ZERUST® ICT®510-C Ferrous VCI Film

ZERUST® ICT®510-C Ferrous VCI Film offers a cost-effective and versatile solution for protecting ferrous metals such as steel, iron, and cast iron. This recyclable film combines packaging and corrosion protection in a single step, ensuring metal components are ready for immediate use upon unpacking. Ideal for the EV industry, it is available in various formulations and sizes, including rolls, sheets, tubing, and bags. For enhanced protection, it can be used with ZERUST® rust inhibitors or VCI diffuser products, providing reliable corrosion prevention during storage and transit.

### ZERUST® ICT®510-C Multimetal VCI Film

ZERUST® ICT®510-C Multimetal VCI Film provides comprehensive corrosion protection for both ferrous and non-ferrous metals, making it ideal for the diverse material needs of the EV industry. This recyclable film combines advanced VCI technology with versatile packaging options, including rolls, sheets, tubing, and bags. It offers safe and effective protection, ensuring metal parts are ready for immediate use without additional preparation. Customizable with additives such as UV stabilizers and ESD protection, ZERUST® ICT®510-C Multimetal VCI Film meets the specific demands of various applications, delivering unparalleled performance during storage and transit.

### ZERUST® ICT®510-C Non-Ferrous VCI Film

ZERUST® ICT®510-C Non-Ferrous VCI Film is specifically designed to protect non-ferrous metals like aluminum, copper, brass, and bronze. This recyclable and versatile film combines effective corrosion protection with convenient packaging, ensuring metal components are ready for immediate use. Available in various formats such as rolls, sheets, tubing, and bags, it meets the unique needs of the EV industry. For added protection, it can be used with ZERUST® rust inhibitors and VCI diffuser products, providing robust corrosion prevention during storage, shipping, and manufacturing processes.

### ZERUST® ICT®510C-AN VCI Film Series

The ZERUST® ICT®510C-AN VCI Film Series offers nitrite-free and non-amine formulations, ideal for protecting porous and powdered metals or metals prone to flash corrosion in the EV industry. These recyclable films passivate common corrosive contaminants and provide effective corrosion protection, ensuring metals are ready for immediate use upon unpacking. Available in various packaging types, including rolls, sheets, tubing, and bags, the ICT®510C-AN Series offers tailored solutions for specific metal protection needs. Custom options include UV stabilizers and anti-static additives, ensuring optimal performance in challenging environments.

# PRODUCT SOLUTION HIGHLIGHTS

## ZERUST® ICT® 700 SERIES: RUST INHIBITORS AND PREVENTATIVES



ZERUST® offers a comprehensive range of rust inhibitors and preventatives designed to protect metal components in the electric vehicle (EV) industry. Our products, including oil-based, solvent-based, water-based, and grease-based solutions, provide superior corrosion protection for parts during production, storage, and transportation. These rust preventatives can be used in conjunction with ZERUST® VCI Poly Packaging and Kraft Packaging Paper for enhanced, long-term protection.

### ZERUST® Axxanol™ A35-30 Oil-Based Rust Preventative

ZERUST® Axxanol™ A35-30 is an oil-based, non-staining rust preventative that forms a clear, light amber film with excellent water-barrier properties. This ready-to-use product is easy to apply and remove, providing robust corrosion protection for ferrous and multimetal components. Ideal for the EV industry, Axxanol™ A35-30 protects parts during shipment, storage, and work-in-progress for up to 1 year<sup>†</sup>. For enhanced protection, it can be combined with ZERUST® VCI Film, offering reliable corrosion prevention during indoor storage and challenging shipping conditions like ocean freight.

### ZERUST® Axxanol™ A35CD-32 Solvent-Based Rust Preventative

ZERUST® Axxanol™ A35CD-32 is a solvent-based, non-staining rust preventative that forms a clear, near dry-to-touch film. This product provides powerful corrosion protection for metal components, machined and cast parts, and engines, ensuring they are safe for up to 1 year<sup>†</sup> during shipment and storage. The dry-to-touch coating is easy to apply by spray, brush, or immersion, and is safe to handle without personal protective equipment. For long-term protection, use Axxanol™ A35CD-32 in combination with ZERUST® VCI Film during storage and shipping.

### ZERUST® Axxanol™ 718-ESS Electrical Corrosion Inhibitor Spray

ZERUST® Axxanol™ 718-ESS is an electrical corrosion inhibitor spray that leaves a thin, water-displacing, non-staining, non-hardening, soft film. Ideal for protecting electronic components, this spray offers excellent resistance to acid gas vapors, humidity, and salt spray. It conforms to key aspects of MIL-PRF-81309H, ensuring safe and effective protection. The UV fluorescence feature allows for easy coverage determination, making Axxanol™ 718-ESS a reliable choice for protecting sensitive electronic components in the EV industry.

### ZERUST® Axxatec™ 48C Water-Based Rust Preventative

ZERUST® Axxatec™ 48C is a water-based rust preventative liquid concentrate designed for aluminum, ferrous, and yellow metals. This product forms a clear, dry-to-touch protective coating that provides up to 6 months<sup>†</sup> of indoor storage, shipping, and assembly protection. The concentrated formula is economical, reducing shipping costs and allowing for customized dilutable protection. Axxatec™ 48C is environmentally friendly, non-flammable, and complies with global regulatory standards. For enhanced, long-term protection, use Axxatec™ 48C in conjunction with ZERUST® VCI Film during storage and shipping.

# PRODUCT SOLUTION HIGHLIGHTS

## ZERUST® ICT® 800 SERIES: VCI EMITTERS AND DIFFUSERS



ZERUST® VCI Emitters and Diffusers provide targeted corrosion protection for metal components in the electric vehicle (EV) industry. These self-contained, portable products diffuse ZERUST® Vapor Corrosion Inhibitors (VCIs) within enclosed spaces, ensuring comprehensive protection even in hard-to-reach areas. Ideal for use alongside ZERUST® VCI packaging products, these emitters and diffusers are safe for electronics, odorless, non-toxic, and residue-free.

### ZERUST® ActivDri™ PWA Packets

ZERUST® ActivDri™ PWA Packets are dual-action moisture control and VCI packets that protect sensitive metal parts and electrical components from corrosion in high-humidity environments. These easy-to-use packets effectively prevent moisture condensation and sulfur corrosion, extending the service life of expensive electrical equipment. ActivDri™ PWA Packets diffuse invisible, odorless, and non-toxic ZERUST® VCIs, providing up to 12 months<sup>†</sup> of protection for ferrous metals and aluminum. Ideal for use during operation, shipping, and storage, these packets comply with global regulatory standards and are safe to dispose of in industrial landfills or through incineration.

### ZERUST® ActivPak®(LS)

ZERUST® ActivPak®(LS) Flash Corrosion VCI Emitters offer fast-acting corrosion protection in challenging environments such as factories, marine settings, and power plants. These easy-to-use packets provide up to 1 year<sup>†</sup> of protection against flash corrosion, acid gases, and other contaminants. ActivPak®(LS) features advanced VCI technology that settles on exposed metal surfaces, ensuring immediate and long-term protection for ferrous and aluminum metals. For optimal performance, use these emitters in sealed enclosures, and consider conducting a preliminary test before full-scale implementation.

### ZERUST® Vapor Capsules

ZERUST® Vapor Capsules are portable emitters containing proven ZERUST® VCI technology, designed to protect metals in control panels, electrical cabinets, and other enclosed spaces. These capsules are quick to install and provide safe, effective corrosion protection without affecting circuit boards or sensitive components. Vapor Capsules offer up to 1 or 2 years<sup>†</sup> of protection, depending on the model, and can be used alongside other ZERUST® VCI packaging products for enhanced corrosion prevention during storage and operation.

### ZERUST® Z-PAK®

ZERUST® Z-PAK® is an economical VCI packet providing robust temporary corrosion protection for ferrous metals during shipment, storage, or work-in-progress. Easy to use and environmentally responsible, Z-PAK® packets diffuse specially formulated VCI technology that protects metal surfaces for up to 6 months<sup>†</sup> in domestic shipments or up to 3 months<sup>†</sup> during overseas shipments. Suitable for limited yellow metal components, Z-PAK® ensures reliable corrosion mitigation with minimal user training required, making it a cost-effective solution for the EV industry.



# Global Support

- |                 |            |                 |                |
|-----------------|------------|-----------------|----------------|
| Algeria         | Denmark    | Morocco         | Sweden         |
| Angola          | Ecuador    | Nepal           | Switzerland    |
| Argentina       | Estonia    | Netherlands     | Taiwan         |
| Australia       | Finland    | Nigeria         | Thailand       |
| Austria         | France     | Norway          | Tunisia        |
| Bangladesh      | Gabon      | Peru            | Turkey         |
| Belarus         | Germany    | Philippines     | Ukraine        |
| Belgium         | Hungary    | Poland          | United Arab    |
| Bhutan          | India      | Portugal        | Emirates and   |
| Bolivia         | Indonesia  | Republic of     | MENA           |
| Brazil          | Ireland    | Congo           | (Middle East & |
| Canada          | Italy      | Romania         | North Africa)  |
| Chile           | Japan      | Russia          | United Kingdom |
| China           | Kazakhstan | Singapore       | United States  |
| Colombia        | Korea      | Slovak Republic | Uruguay        |
| Czech Republic  | Latvia     | Slovenia        | Vietnam        |
| Democratic      | Lithuania  | South Africa    |                |
| Republic of the | Luxembourg | Spain           |                |
| Congo           | Malaysia   | Sri Lanka       |                |
|                 | Mexico     |                 |                |
|                 | Monaco     |                 |                |

Visit [www.zerust.com](http://www.zerust.com) for more information!

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### ‡ DECLARATION

Corrosion protection claims are based on Northern Technologies International Corporation (NTIC) internal laboratory testing performed under controlled parameters on contaminate-free substrates. Real-world application corrosion protection duration on different substrates will vary and depends on factors such as, but not limited to, the application or use, environmental / storage conditions, surface cleanliness, type of substrates, and coating thickness (where applicable). The use of the term "Up to" in reference to time is defined as any time duration from zero up to a specified time frame, but in no event beyond the specified time frame. The use of the term "for years" is based on NTIC's experience with its products but is in no way guaranteed. The use of the term "Up to" in reference to volume is defined as any volume from zero up to a specified volume but in no event beyond the specified volume of protection. It is the customer's / user's obligation to evaluate product performance, corrosion protection duration, safety, and suitability for intended use within the scope advised in the data sheet and to comply with all applicable laws and regulations. **LIMITED WARRANTY/DISCLAIMER** Warranty is limited to the replacement of a product that fails to meet specifications. For full warranty and disclaimer information, visit [www.zerust.com/warranty](http://www.zerust.com/warranty).