



ZERUST®  **EXCOR®**

CORROSION SOLUTIONS FOR OCEAN & LAND SHIPMENTS



ZERUST® is a product of
Northern Technologies
International Corporation



THE CORROSION CHALLENGE IN GLOBAL TRANSPORT

CORROSION: THE HIDDEN THREAT IN EVERY SHIPMENT

Every day, countless tons of metal goods are transported globally, yet few consider the aggressive impact of fluctuating temperature, humidity, and environmental contaminants on metal surfaces. In ocean freight, slow transit times and port delays expose containers to prolonged high humidity, salt air, and extreme dew point cycles. This leads to “container rain”, the formation of condensation on interior surfaces that drips onto metal parts, initiating corrosion.



Land shipments are not immune to “sweat”, as it forms from similar thermal cycling, especially in closed trailers or rail cars. If the packaging isn’t robust, moisture penetrates and accelerates rusting. Companies relying solely on desiccants quickly discover their limitations: when saturated, desiccants can re-release moisture, often worsening the corrosion problem.

Rust can mean the difference between profit and loss. ZERUST® helps you take control before the damage is done.

ZERUST® Corrosion Management Solutions:

For over 50 years, ZERUST® has been a trusted global leader in corrosion prevention, helping businesses



across industries protect valuable metal assets during manufacturing, shipping, and storage. Our science-backed solutions are designed not only to stop rust in its tracks but to support brand integrity by ensuring that your products arrive at their destination clean, dry, and corrosion-free. From automotive and heavy equipment to electronics and defense, ZERUST® solutions have safeguarded billions of dollars’ worth of components worldwide. When you choose ZERUST®, you choose proven performance, global expertise,

and a legacy of reliability.

Why Planning Ahead Matters:

Corrosion prevention isn’t just a packaging decision, it’s a strategic investment. By addressing corrosion risks at the planning stage, companies can reduce scrap rates, avoid costly rework, and protect customer satisfaction. ZERUST® partners with manufacturers, shippers, and logistics providers to develop proactive corrosion management systems that align with your operational goals and timelines. With the right protection in place, your supply chain becomes more resilient, and your reputation stays intact.

THE Z-CIS[®] METHODOLOGY

Z-CIS[®]: A PROVEN CORROSION CONTROL SYSTEM FOR GLOBAL SUPPLY CHAINS

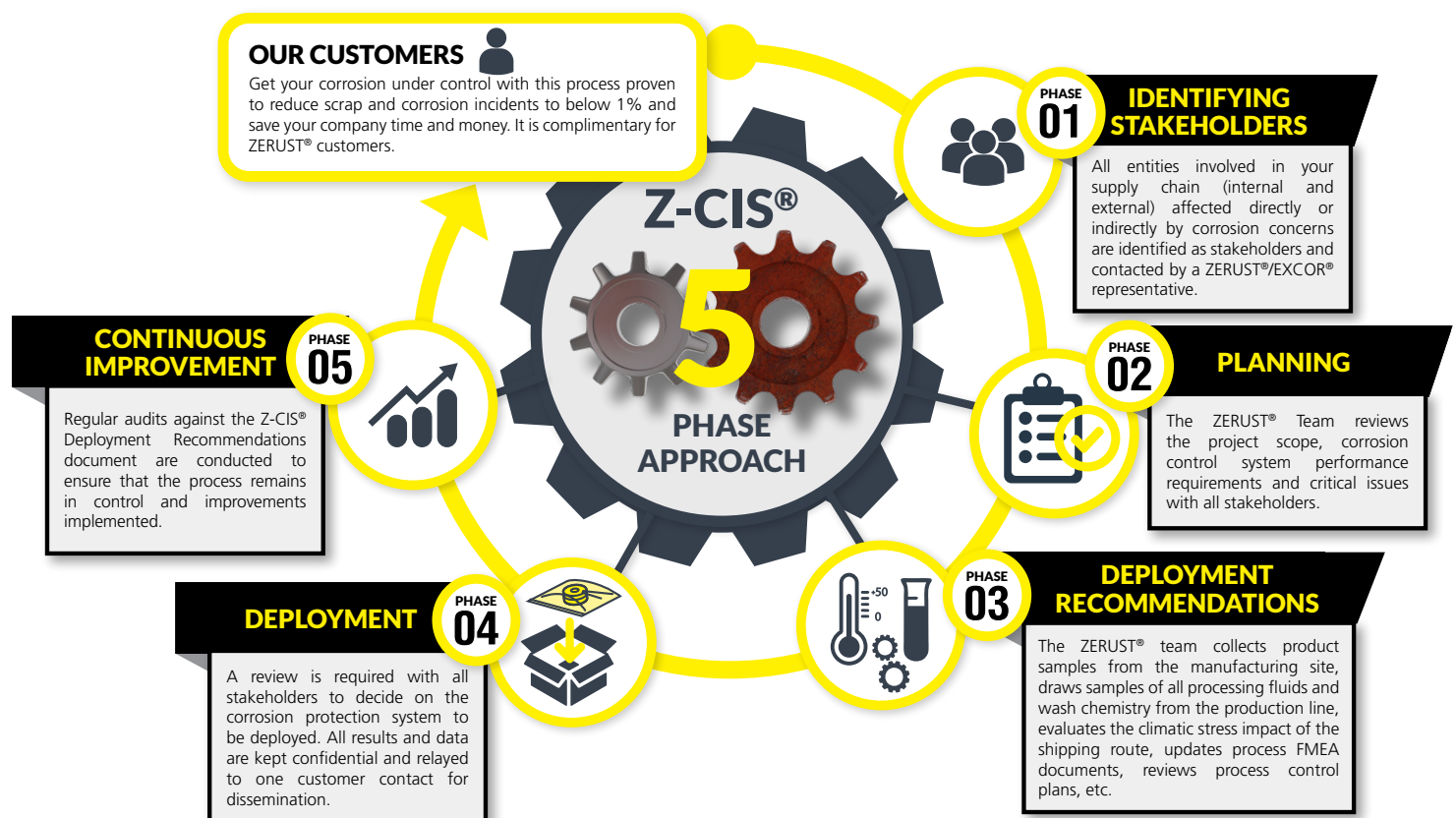
ZERUST[®] Z-CIS[®] (Corrosion Inhibitor System) is a proven methodology for deploying comprehensive corrosion prevention programs that ensure the rust-free shipment of metal parts throughout global supply chains. Z-CIS[®] accounts for the complex web of internal teams and external partners that influence every stage of product movement, from production to final destination. It's designed to meet stringent OEM requirements, including rust-free and "smoke-free" packaging mandates for sensitive components and electronics.

Through Z-CIS[®], ZERUST[®] works closely with your organization to assess your entire corrosion risk profile, including part composition, surface condition, packaging constraints, shipping route analysis, storage duration, and environmental exposure. The Z-CIS[®] methodology leverages detailed audits, laboratory testing, data loggers, and best-in-class packaging science to develop a tailored, cost-effective corrosion control solution.

You Stay in Control

The Z-CIS[®] system is structured to keep you in control at every phase. Using a standardized project management framework, Z-CIS[®] ensures that all stakeholders; engineers, packaging teams, logistics partners, and OEM, remain aligned through clear, phased documentation and communication. This keeps deployments efficient, repeatable, and scalable across your global network.

With Z-CIS[®], companies routinely achieve total cost savings of at least 10% and corrosion-free shipment yields as high as 100%. Visit www.zerust.com/zcis to learn more or to start your journey to zero rust.

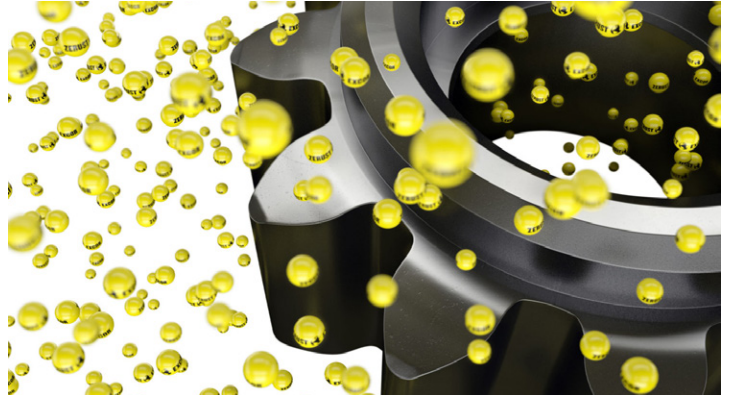


ZERUST® VCI TECHNOLOGY EXPLAINED

HOW ZERUST® VCI STOPS RUST BEFORE IT STARTS

Vapor Corrosion Inhibitors (VCIs) are advanced compounds that sublime into the airspace within sealed packaging, forming an invisible, molecular layer on exposed metal surfaces. This layer reinforces the natural oxide layer of metals, effectively halting the electrochemical process of corrosion.

ZERUST® VCI technology is clean, dry, and residue-free. This means all metals that come out of the package are ready for use, coating, or assembly. This eliminates the need for post-shipment cleaning, saving time and labor costs.



Whether it's Multimetals parts, electronics, or precision components, ZERUST® has a VCI solution for every application, including films, papers, and diffuser/emitters. Our VCIs are safe, non-toxic, and engineered to work in tandem with barrier packaging for maximum protection, even in the most aggressive environments.

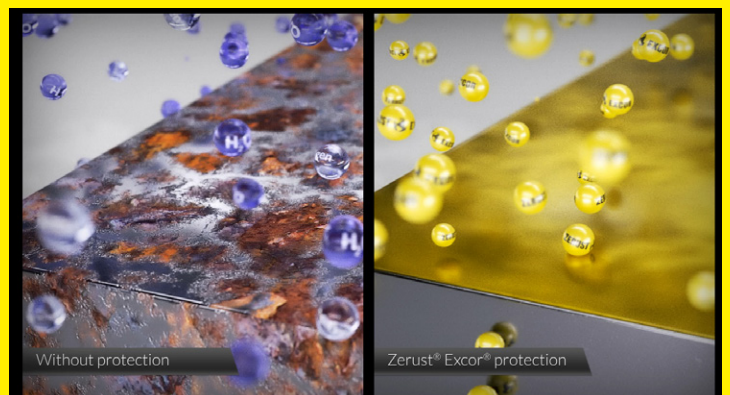
Key Benefits of ZERUST® VCI Technology:

- Leaves no residue, parts are ready to use without additional cleaning or degreasing.
- Invisible barrier does not alter part appearance or functionality.
- Available formulations for ferrous, non-ferrous, and Multimetals protection.
- Reduces labor, scrap, and rework associated with rust damage.
- Non-toxic, odorless, and recyclable packaging options available.
- Available in bags, films, foams, diffusers/emitters and specialty papers.
- Effective for years depending on the application and environment.

ZERUST® VCI solutions are trusted by manufacturers and OEMs around the globe to protect critical components from production line to end-use.

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 OCEAN AND LAND SHIPMENTS

PROTECTING METALS FROM CORROSION ACROSS EVERY MILE



Shipping metal goods, whether across oceans or over highways, exposes them to a variety of harsh environments that can cause corrosion and costly damage. ZERUST® provides a unified system of corrosion protection tailored to both maritime and overland logistics.

Ocean Shipment Challenges:

Containers experience “container rain” from drastic temperature and humidity fluctuations at sea.

Traditional desiccants often fail during long port delays and rough marine conditions.

Land Shipment Challenges:

Overland shipments are vulnerable to “container sweat” inside enclosed trailers, especially across climate zones or during long idle periods. Improper handling and packaging compounds these risks.

ZERUST® Solutions Include:

- **VCI Films and Bags:** Polyethylene packaging that emits ZERUST® Vapor Corrosion Inhibitors to protect metal parts from rust during shipping, storage, and work-in-process applications
- **VCI Papers:** Acid-free kraft papers infused with ZERUST® VCI chemistry, offering clean, dry corrosion protection for metals during packaging, storage, and shipment.
- **VCI Diffusers and Emitters:** Portable devices that release corrosion-inhibiting vapors to protect metals inside enclosed areas such as control panels and electrical assemblies.
- **Water, Solvent, Oil, & Grease-Based Coatings:** A wide range of rust preventative liquids that provide internal and external corrosion protection during manufacturing, storage, and transit.

From steel brake parts to massive industrial machinery, ZERUST® provides layered protection that works, no matter how far your shipment must travel.



ZERUST® ICT®510-C provides corrosion protection for machinery during land transport.



Automotive frame wrapped in ZERUST® ICT®510-C VCI Film for rust-free protection during overseas shipment.

ZERUST® PRODUCT SERIES

ZERUST® VCI FILMS & BAGS

ZERUST® VCI Films and Bags deliver effective corrosion protection by releasing vapor corrosion inhibitors (VCIs) that form a molecular shield on metal surfaces. These polyethylene-based films are available in a variety of forms; flat, gusseted, tubing, and custom bag sizes, to meet your unique packaging needs for storage, shipping, and work-in-progress.



Designed for use across ferrous, non-ferrous, and multimetal applications, these films also support additive options such as UV stabilization, acid-gas blockers, anti-static, and anti-slip for added performance in demanding environments.

Highlighted Products:

- **ICT®510-C VCI Film:** A durable, transparent polyethylene film that offers multimetal protection for long-term storage and export packaging. It's ideal for wrapping parts or creating custom protective enclosures.
- **ICT®510C-PCR30 VCI Film:** Made with 30% post-consumer recycled content, this eco-conscious film provides the same high-performance multimetal corrosion protection as standard ICT®510-C while supporting your company's sustainability goals.

ZERUST® VCI PAPERS

ZERUST® VCI Papers offer corrosion protection by combining kraft paper with vapor corrosion inhibitor technology. These acid-free, pH-neutral papers are a clean, recyclable alternative to oily rust preventatives, and are ideal for wrapping individual parts, layering between components, or lining containers during shipment and storage.



Available in a variety of formats, including poly-laminated, and reinforced (scrim), VCI papers are an environmentally responsible option for manufacturers seeking efficient protection.

For added performance, these papers may be paired with Rust Preventative Liquids, VCI films, or emitters in complex packaging applications. They are also available in rolls, or sheets.

Highlighted Products:

- **ICT®427 Premium VCI Paper:** A durable kraft paper designed for heavy-duty applications and aggressive environments. Provides powerful protection for ferrous and multimetal parts.
- **ICT®430-35SR VCI Scrim Paper:** A reinforced scrim paper with superior tear resistance, ideal for large or sharp-edged parts that require rugged wrapping and excellent corrosion protection.

ZERUST® PRODUCT SERIES

ZERUST® VCI DIFFUSERS & EMITTERS



ZERUST® VCI Diffusers and Emitters are designed to protect metals in hard-to-reach areas such as control panels, electrical cabinets, and other enclosed spaces. They emit Vapor Corrosion Inhibitors (VCIs) that settle onto exposed metal surfaces, providing corrosion protection even during operation. These emitters are also used as supplements to other ZERUST® VCI packaging products for added protection.

Highlighted Products:

- **Vapor Capsules (e.g., VC2-1):** Compact and easy to apply with a self-adhesive backing, Vapor Capsules offer protection for up to 2 years* (depending on model) in sealed enclosures. Perfect for electronics, control panels, and robotic components.
- **ActivDri™ PWA:** Combines ZERUST® VCI technology with a powerful desiccant to protect electrical and mechanical equipment exposed to high humidity or salt-air environments.

ZERUST® RUST INHIBITORS, PREVENTATIVES & COATINGS



ZERUST® offers a broad range of rust preventatives and corrosion inhibitor coatings for use during production, storage, and shipment. These coatings, including, solvent, oil, water, and grease-based options can be brushed, dipped, or sprayed onto metal surfaces and are compatible with most VCI packaging for enhanced protection.

From short-term indoor storage to long-term ocean freight exposure, ZERUST® coatings are engineered to deliver cost-effective, compliant, and reliable performance across industries. Many are barium-free and meet global standards for safety and environmental compliance.

Highlighted Products:

- **Axxanol™ Spray-G:** A grease-based sprayable rust preventative that forms a thick, durable film ideal for long-term outdoor storage and overseas shipping of machinery, spares, and bare metal surfaces.
- **Axxanol™ Z-Maxx:** A high-performance grease-based coating offering extreme corrosion protection for ferrous and multimetal parts in harsh environments such as coastal or tropical regions.

UPGRADE YOUR CORROSION MANAGEMENT STRATEGY TODAY!
Start your path to rust-free shipments—reach out for product recommendations and implementation support.

CASE STUDY – VAPOR CAPSULES VS. CLIMATE FLUCTUATION

VAPOR CAPSULES PROVIDE CORROSION PROTECTION DURING TRANSIT THROUGH RAPID CLIMATE CHANGES

Customer:

A global supplier of precision-engineered automotive components for powertrain applications.

Challenge:

The customer needed to protect the external surfaces of solenoid bodies during international shipment to an OEM. These solenoids were shipped in stackable injection-molded trays designed for robotic unloading on an automated assembly line. Due to these constraints, conventional rust prevention methods such as VCI bagging or liquid rust preventatives were not viable. Bagging would interfere with automated handling, and oils or sprays could compromise the cleanliness required for final assembly. Compounding the issue, the parts were exposed to rapid climate changes during transit, increasing the risk of condensation and surface corrosion.



Solution:

ZERUST® engineers recommended the use of VC2-1 Vapor Capsules as a clean, dry, and non-invasive corrosion control solution. These compact VCI emitters were centrally affixed inside each container using the self-adhesive backing, ensuring a consistent VCI vapor field around the solenoid bodies throughout transit. Because the injection-molded trays and lids created an airtight enclosure, the Vapor Capsules were especially effective. With a 1-year* lifespan, each capsule could be used for multiple shipment cycles. For ease of tracking, the installation date was recorded on the capsule's label to ensure timely replacement.



Result:

The implementation of ZERUST® VC2-1 Vapor Capsules eliminated corrosion issues and maintained the cleanliness necessary for immediate integration into the OEM's robotic assembly system. The solution preserved both product quality and operational efficiency. The customer has since standardized the use of ZERUST® Vapor Capsules across similar product lines and now relies on ZERUST® for all its corrosion management needs, from storage to global distribution.

PRECISION CORROSION PROTECTION FOR ENCLOSED SPACES

PROTECT METALS IN CONFINED SPACES WITH ZERUST® VAPOR CAPSULE TECHNOLOGY



ZERUST®/EXCOR® Vapor Capsules are compact, self-contained emitters that release proven Vapor Corrosion Inhibitor (VCI) technology into sealed enclosures, forming a protective molecular layer on exposed metal surfaces. Ideal for protecting precision components and hard-to-reach areas such as electronics housings, control panels, or enclosed shipping trays, Vapor Capsules provide clean, dry corrosion protection without leaving residue.

In applications where oils or traditional VCI packaging are not feasible, such as robotics, ZERUST® Vapor Capsules offer a practical, mess-free solution. Simply peel and stick the capsule into position, seal the enclosure, and allow the invisible vapor to do the rest.

Product Features:

- Dry, invisible, and non-residue-forming corrosion protection.
- Safe for sensitive electronics, circuit boards, and metal surfaces.
- Easy to install with self-adhesive backing.
- Suitable for both in-process and in-transit protection.
- Effective for up to 1 or 2 years[†] in a sealed environment.
- Multimetal compatibility including ferrous, non-ferrous, and alloy parts.

Protection Information:

Model	Volume of Protection [†]	Protection Radius [†]	Duration [†]
VC 1-1(S)	Up to 4 ft ³ (0.12 m ³) [†]	1 ft (30 cm) [†]	1 year [†]
VC 1-1	Up to 4 ft ³ (0.12 m ³) [†]	1 ft (30 cm) [†]	1 year [†]
VC 2-1	Up to 35 ft ³ (1 m ³) [†]	2 ft (60 cm) [†]	1 year [†]
VC 2-2	Up to 35 ft ³ (1 m ³) [†]	2 ft (60 cm) [†]	2 years [†]
VC 6-1	Up to 900 ft ³ (25 m ³) [†]	6 ft (200 cm) [†]	1 year [†]
VC 6-2	Up to 900 ft ³ (25 m ³) [†]	6 ft (200 cm) [†]	2 years [†]

Availability:

Model	Part Number	NSN #	Qty / Case
VC 1-1 (S)	375-M-00006	6850-01-426-3539	50
VC 1-1	375-M-00001	6850-01-338-1393	50
VC 2-1	375-M-00002	6850-01-475-9949	25
VC 2-2	375-M-00003	6850-01-133-0373	10
VC 6-1	375-M-00004	6850-01-590-1676	4
VC 6-2	375-M-00005	6850-01-348-1090	4

CASE STUDY – CORROSION-FREE RETAIL DISPLAYS WITH VCI BAGS

VCI BAGS PROVIDE CORROSION PROTECTION AGAINST CARDBOARD PACKAGING ACIDS AND CORROSIVE CONTAMINANTS

Customer:

Retail manufacturer of hot rolled steel parts for in-store point-of-sale displays

Challenge:

The customer was experiencing high scrap rates due to corrosion on steel parts displayed in retail packaging. Initially, parts were left unpackaged so customers could handle them before purchasing, but this led to surface rust from exposure to moisture and contaminants on customer hands. To mitigate this, the company switched to cardboard packaging; however, it introduced new issues. Acids from the cardboard were leaching onto the metal surfaces, particularly during long-term storage and transit, compounding the corrosion problem. The manufacturer needed a solution that would protect the steel parts without obstructing visibility or customer interaction.



Solution:

ZERUST® was invited to the facility to perform an on-site corrosion assessment. A local ZERUST® Technical Service Representative evaluated the manufacturing, handling, and packaging process from production to final retail presentation. Based on the findings, ZERUST® recommended individually packaging each steel part in 2-mil ICT® Ferrous Yellow Gusset VCI Bags. These bags not only protected the steel from acid vapors released by the cardboard but also formed an invisible corrosion-inhibiting barrier against moisture and contaminants transferred by customer handling. The gusset design allowed for efficient packing while maintaining product visibility.

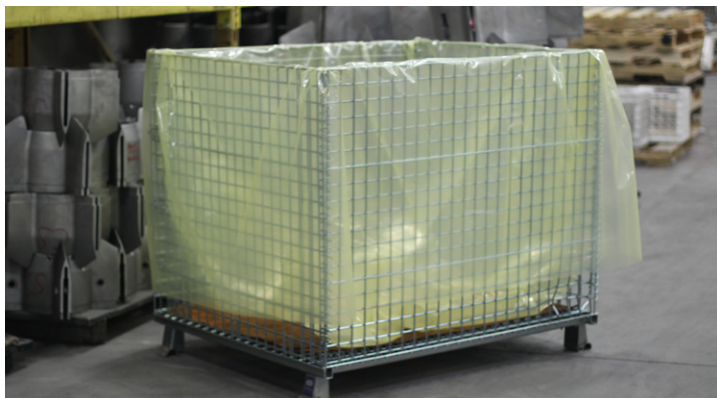


Result:

Following implementation, the manufacturer saw a dramatic reduction in rust-related scrap. Parts remained clean, dry, and corrosion-free while on display, preserving product quality and appearance. The ZERUST® solution enabled the customer to maintain their preferred packaging approach while solving the underlying corrosion issues. Satisfied with the outcome, the company has since expanded ZERUST® VCI use across other product lines and now considers ZERUST® a key partner in their corrosion control strategy.

VERSATILE PROTECTION FOR METAL ASSETS IN TRANSIT AND STORAGE

ZERUST® ICT® GUSSET VCI BAGS PROVIDE FLEXIBLE, FORM-FITTING CORROSION PROTECTION FOR ANY APPLICATION



offer the flexibility to protect individual parts or line boxes, bins, crates, and pallets. Their unique gusseted design accommodates large or irregularly shaped items, offering a custom-like fit without the need for additional materials or coatings.

Product Features:

- Combines corrosion protection and packaging in one step.
- VCI protection dissipates after opening, leaving parts clean and ready for immediate use.
- Available in various sizes, thicknesses, and VCI formulations.
- Customizable with UV, anti-static, slip, and acid-gas blocker additives.
- Recyclable and also available in PCR (post-consumer recycled) versions.

Performance and Compatibility:

- **Protection Duration:** Long-term protection for ferrous and non-ferrous metals.
- **Metal Types:** Ferrous, non-ferrous, and multimetal options available.
- **Environment:** Suitable for use in dry storage, sealed containers, and industrial environments.

Stock Gusset VCI Bag Size Ranges:

Part Number	Dimensions & Thickness	Quantity	Bag Type & Metal Protection
075-F-99981	13" x 9" x 16" x 2 MIL	1,000	Ferrous Yellow Gusset Bag
075-F-00321	15" x 9" x 24" x 2 MIL	500	Ferrous Yellow Gusset Bag
075-F-99978	16" x 13" x 25" x 2 MIL	500	Ferrous Yellow Gusset Bag
075-F-99973	25" x 16" x 33" x 2 MIL	250	Ferrous Yellow Gusset Bag
075-F-00001	48.5" x 42.5" x 60" x 2 MIL	100	Ferrous Yellow Gusset Bag
075-F-00002	48.5" x 42.5" x 90" x 2 MIL	70	Ferrous Yellow Gusset Bag
075-F-00064B	22" x 16" x 30" x 3 MIL	25	Ferrous Yellow Gusset Bag
075-F-00033	58" x 48" x 90" x 3 MIL	35	Ferrous Yellow Gusset Bag
075-F-00015	40" x 28" x 60" x 3.5 MIL	50	Ferrous Yellow Gusset Bag
075-F-00003	26" x 24" x 46" x 4 MIL	50	Ferrous Yellow Gusset Bag
075-F-00027	34" x 33" x 48" x 4 MIL	85	Ferrous Yellow Gusset Bag

CASE STUDY – INTERNAL FUEL TANK PROTECTION WITH ACTIVPAK®

VCI PACKETS PRESERVE THE INTERNAL SURFACES OF FUEL TANK SYSTEMS

Customer:

A large construction equipment manufacturer

Challenge:

A division of the manufacturer was fabricating power systems mounted on skids for the Oil & Gas industry. Each system included a 1,650-gallon carbon steel fuel tank integrated into the base of the skid. The tanks contained baffled interior sections that complicated corrosion protection. Previously, the internal surfaces were coated by rotating the skid to distribute a diesel mixture infused with a vapor corrosion inhibitor (VCI). However, this labor-intensive process was inefficient and raised concerns over chemical compatibility and residual moisture. The customer sought a more effective and streamlined method for providing internal corrosion protection during shipping and storage.



Solution:

ZERUST® evaluated several options, including fogging a solution of Axxanol™ 710C with diesel after cleaning with AxxaVis™ HST-10. However, concerns over incomplete drying of the cleaning agent and unproven diesel compatibility prompted a different approach. ZERUST® proposed the use of ActivPak®-35 VCI diffuser packets. To address the challenge of inserting and retrieving packets within a confined and baffled tank structure, the ZERUST® team designed a custom steel container with a slotted body and a flanged lip. This container was engineered to fit through eight existing service points (each approximately 8 inches wide), allowing for even dispersion of VCI vapor throughout the fuel tank's vapor space.



The packet container was sealed with a threaded steel cap to protect the packets and ensure they remained suspended in optimal positions during transport and storage. This innovative delivery method simplified installation, ensured full vapor coverage, and allowed for easy retrieval to prevent obstruction of fuel lines.

Result:

The ActivPak® system provided consistent and effective corrosion protection for the internal surfaces of the fuel tanks during extended storage and shipment. It met the customer's requirements for protection without residue, reduced labor, and compatibility with future fuel system use. Since implementation, the manufacturer has experienced corrosion-free results and has adopted ZERUST® ActivPak® as a standard component of their skid packaging process.

RAPID-RESPONSE VCI PROTECTION FOR CONFINED AND CORROSIVE ENVIRONMENTS

ACTIVPAK® PROVIDES FAST-ACTING, RESIDUE-FREE VCI SACHETS FOR INTERNAL METAL PROTECTION



ZERUST®/EXCOR® ActivPak® is a powerful corrosion protection solution designed to combat flash rust and long-term oxidation in sealed or hard-to-reach environments. Ideal for use in shipping containers, equipment housings, and enclosed machinery, ActivPak® combines rapid-action corrosion inhibition with long-term performance, that protects ferrous and aluminum metals for up to 2 years[‡].

These drop-in VCI sachets feature ZERUST’s proprietary Vapor Corrosion Inhibitor (VCI) and Flash Corrosion Inhibitor (FCI™) technologies, making them highly effective even in polluted factory conditions, overseas transport, and high-humidity storage.

Product Features:

- Fast-acting corrosion protection against flash rust and aggressive contaminants.
- VCI vapor forms a molecular shield on exposed metal surfaces.
- Easy to install, simply place inside an enclosure and seal.
- Non-reactive, leaves no residue or film, and does not cause hydrogen embrittlement.
- Safe for use with aluminum, and ferrous metal assemblies.
- Long-term protection up to 2 years[‡] in a sealed environment.

Typical Applications:

- Internal cavities of fuel tanks, pumps, and skids.
- Export equipment in harsh or marine environments.
- Baffled enclosures and hard-to-reach interior voids.
- Military, oil and gas, power generation, and heavy equipment industries.

Availability:

Model	Part Number	Volume of Protection [‡]	Dimensions	Qty / Case
ActivPak®-35	375-M-00100	35 ft ³ Multimetal [‡]	3.5" x 5"	10
ActivPak®-35	375-M-00001	35 ft ³ Multimetal [‡]	3.5" x 5"	50
ActivPak®-35	375-M-00102	35 ft ³ Multimetal [‡]	3.5" x 5"	100

Custom Sizes Available:

Models such as T-330, T-33, and T-350 are made-to-order. Minimum order quantities apply.

ELIMINATING RUST ON BRAKE & CHASSIS COMPONENTS

VCI FOAM HELPS AUTOMOTIVE PART SUPPLIER DELIVER CLEAN, DRY, AND CORROSION-FREE PARTS

Customer:

A global supplier of brake, chassis, and drive components to the automotive industry

Challenge:

The manufacturer was experiencing recurring rust issues on metal components shipped throughout North America. Their existing corrosion protection method involved using a competitor's open-cell VCI foam layered within custom dunnage. However, the foam was saturated with VCI to the point of leaving wet residue on component surfaces, which not only risked surface contamination but also failed to deliver consistent corrosion protection. The supplier needed a solution that met the automotive industry's strict requirements for clean, dry, and rust-free parts upon delivery.



Solution:

A local ZERUST® Technical Service Representative visited the facility to perform a hands-on evaluation of the packaging materials and logistics process. It was quickly determined that the existing VCI foam lacked sufficient VCI delivery and created unwanted surface moisture. ZERUST® recommended replacing the competitor's foam with custom-sized ICT®570 VCI Foam sheets. This high-performance closed-cell foam delivers a controlled release of VCI vapors while remaining dry to the touch, making it ideal for precision automotive parts where cleanliness is critical.



ZERUST® provided samples for in-house testing and validation. Within two weeks, the new foam design passed the customer's corrosion performance and cleanliness criteria, clearing the path for full implementation.

Result:

The transition to ZERUST® ICT®570 VCI Foam completely resolved both the rust and wet-surface issues. Parts arrived clean, dry, and corrosion-free at customer sites, meeting quality expectations and restoring confidence in the supplier's packaging reliability. Following this success, ZERUST® VCI Foam became the new standard in the customer's protective packaging program across North America.

RAPID-RESPONSE VCI PROTECTION FOR CONFINED AND CORROSIVE ENVIRONMENTS

ZERUST® ICT®570 Closed-Cell VCI Foam for Superior Corrosion Control and Surface Safety



ZERUST® ICT®570 VCI Foam Sheetting is a high-performance corrosion protection and packaging material designed for sensitive metal parts that require clean, dry, and residue-free handling. Its closed-cell construction ensures even and controlled vapor release of ZERUST® VCI technology while maintaining cushioning and lightweight properties ideal for transport and storage environments.

Unlike open-cell alternatives, ZERUST® VCI Foam does not absorb moisture or leave a wet film on part surfaces, making it ideal for industries with stringent cleanliness requirements, including automotive, electronics, aerospace, and defense.

Product Features:

- Combines cushioning and corrosion protection in one lightweight solution.
- Clean, dry surface safe for high-tolerance or coated parts.
- VCI vapors provide corrosion protection for years[†] depending on packaging configuration.
- Will not flake, degrade, or transfer residue to metal surfaces.
- Resistant to moisture, dust, and thermal cycling during transit or storage.
- Can be paired with ZERUST® VCI diffuser products for added corrosion protection in extreme environments.

Typical Applications:

- Automotive dunnage systems
- Custom returnable packaging
- Electronics assembly trays
- Control panels
- Mechanical parts

Availability:

Part Number	Dimensions x Thickness	Color	Protection
575-F-00004	72" x 550' x 1/8"	Yellow	Ferrous

Custom Options Available:

Custom roll sizes, thicknesses, and protection types available upon request. Minimum order quantities apply.

CASE STUDY – RUST-FREE OIL PANS IN CROSS-BORDER SHIPMENTS

RUST PREVENTATIVE AND VCI SHRINK FILM PREVENT OIL PANS FROM RUSTING DURING INTERNATIONAL SHIPPING

Customer:

The world's largest construction equipment manufacturer

Challenge:

The customer was facing persistent corrosion issues with large oil pans manufactured in Mexico and shipped to the United States. During customs inspections at the border, each unit was unpacked for review, and the VCI packaging was not properly resealed afterward. As a result, the exposed parts were vulnerable to environmental moisture during the remainder of transit. Compounding the issue, the rust preventative previously used offered limited protection and was contaminated, causing the oil pans to require cleaning and deoxidation upon arrival, delaying production and adding labor costs.



Solution:

ZERUST® performed a detailed analysis of the manufacturer's packaging workflow and recommended a two-part corrosion protection system. First, oil pans were coated with Axxanol™ 34CD, a premium rust preventative oil designed to provide up to 1 year* of indoor protection without leaving behind residues that could interfere with assembly or require additional washing. Second, the pans were sealed in ZERUST® ICT®510-OPS VCI Shrink Film, an 8-mil thick, outdoor-grade, high-strength film that delivers superior barrier protection. The transparency of the film allowed customs officials to inspect the contents without opening the packaging, preserving the VCI atmosphere and ensuring that the corrosion protection remained active throughout the shipment.



Result:

After implementing ZERUST® Axxanol™ 34CD and ICT®510-OPS Shrink Film, the corrosion issues were fully resolved. Oil pans began arriving at their U.S. destination clean, dry, and rust-free, eliminating the need for costly cleaning or delays in assembly. The packaging system not only prevented corrosion but also improved customs inspection efficiency. Due to the effectiveness of the solution, the customer adopted the new ZERUST® system as their standard packaging protocol for similar components.

DRY-TO-TOUCH OIL AND OUTDOOR SHRINK FILM – A DUAL DEFENSE AGAINST CORROSION

ZERUST® AXXANOL™ 34CD LIGHT, DRY-TO-TOUCH RUST PREVENTATIVE OIL



ZERUST® Axxanol™ 34CD is a solvent-based rust preventative designed for clean, dry corrosion protection of metal parts in storage and shipment. It dries to a light, non-tacky film that doesn't interfere with torque specifications or oil compatibility, making it ideal for internal metal surfaces and precision components.

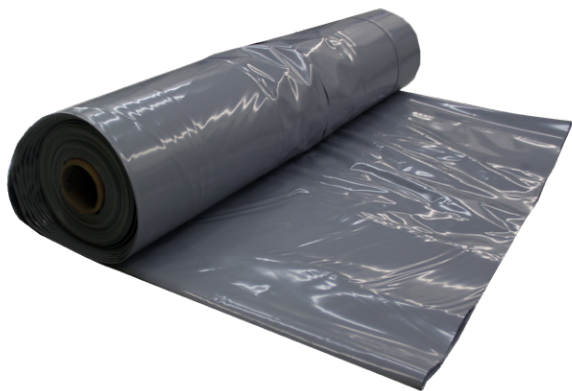
Key Features:

- Dry-to-touch film with no residue.
- Compatible with engine oils and lubricants.
- Multimetal protection.
- Easily applied via spray, dip, or brush.
- Ideal for use before VCI packaging.
- Meets RoHS, REACH, and TSCA standards.

Availability:

Part Number	Quantity	Protection Type
350-M-00012PL	5 Gallons	Multimetal
350-M-00012DR	55 Gallons	Multimetal

ZERUST® ICT®510-OPS OUTDOOR PRESERVATION VCI SHRINK FILM WITH UV STABILIZERS



ICT®510-OPS is a heavy-duty, 8-mil shrink film integrated with ZERUST® VCI and UV inhibitors for long-term preservation of large metal assets stored outdoors or during international shipment. It provides a physical barrier along with vapor-phase protection to safeguard exposed and hard-to-reach areas from corrosion.

Key Features:

- Strong and weather-resistant with excellent shrink properties.
- Integrated VCI molecules protect enclosed metal surfaces.
- Safe for electronics and sensitive equipment.
- Protects during outdoor lay-up, export, and long-term storage.
- UV stabilized for added durability.

Availability:

Part Number	Dimensions	Color	Protection
100-F-00070	20' x 100' x 8 MIL	Gray	Ferrous
100-F-00077	40" x 425' x 8 MIL	Clear	Ferrous
250-X-00007	4" x 108' (Tape)	Gray	N/A
250-X-00008	6" x 108' (Tape)	Gray	N/A

VCI FILM PROTECTS IMPORTED ALUMINUM DRIP PANS

VCI FILM ELIMINATES CORROSION ON ALUMINUM DRIP PANS DURING OVERSEAS SHIPPING

Customer:

A leading power generator manufacturer based in Minnesota

Challenge:

The customer sourced aluminum drip pans from a supplier in India as part of their global supply chain. Upon arrival in the U.S., the drip pans frequently exhibited corrosion along their edges, which developed during extended transit on ocean liners. The moisture-rich environment of sea transport, combined with fluctuations in temperature and humidity, was causing oxidation on the bare aluminum. Because the pans were used in generator assemblies, applying a traditional rust preventative oil was not an option. The customer required a dry, clean, and non-intrusive solution that would maintain the integrity and appearance of the aluminum parts.



Solution:

The local ZERUST® representative contacted HARITA-NTI Limited, ZERUST®'s joint venture partner in Chennai, India. The team at HARITA-NTI conducted an on-site assessment of the supplier's manufacturing and packaging practices. Based on their findings, they recommended wrapping each aluminum drip pan in ZERUST® ICT®510-C Non-Ferrous VCI Film. This high-performance film is specially formulated to protect non-ferrous metals such as aluminum, copper, and brass from corrosion without introducing oils or residues.



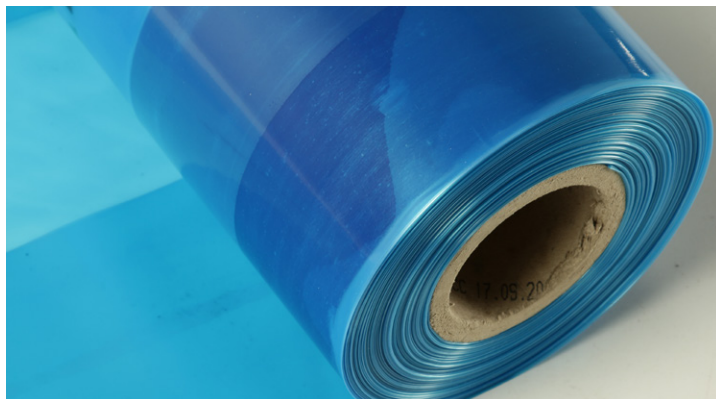
The film's corrosion-inhibiting vapor technology provides full coverage by forming an invisible protective layer on the metal surface, safeguarding it during long-duration maritime shipments. It also met the customer's requirement for a dry packaging solution compatible with their production line.

Result:

Since adopting the ZERUST® ICT®510-C packaging system, the supplier has reported no further corrosion issues during overseas shipments. The aluminum drip pans now arrive clean, dry, and ready for use in assembly. The successful collaboration between ZERUST® and HARITA-NTI ensured a seamless implementation of the new packaging solution, and the system has been in use for several years with continued success.

CLEAN, DRY CORROSION PROTECTION FOR NON-FERROUS METALS

ZERUST® ICT®510-C NON-FERROUS VCI FILM



ZERUST® ICT®510-C is a high-performance VCI packaging film engineered specifically for the protection of non-ferrous metals such as aluminum, copper, brass, and bronze. Ideal for international shipping, storage, and work-in-progress environments, this non-toxic, odorless solution provides invisible, dry protection, without the use of oils or surface coatings.

Once sealed, the film releases ZERUST® Vapor Corrosion Inhibitors that settle onto metal surfaces, forming a molecular layer that defends against oxidation. Upon opening, the protective vapor dissipates, leaving parts immediately ready for use, coating, or assembly.

Key Features:

- Designed for non-ferrous metal protection.
- Leaves no residue, parts are ready for immediate processing.
- Available in bags, tubing, sheeting, and custom formats.
- Optional UV, anti-static, slip, and acid-gas blocker additives.
- Suitable for export and long-duration shipments.
- Recyclable.

Availability:

Format	Width Range
Flat Bags	2" – 125"
Gusset Bags	2" – 150"
Tubing	2" – 125"
Sheeting	2" – 26'

Custom Options Available:

Available with ESD or custom additive options. Minimum order quantities may apply.

Global Support

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

Visit 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.