

Zerust® Corrosion Solutions

For the Electrical and Electronics Industry



Why Zerust®?

Corrosion is a pervasive, but largely invisible problem in the electrical and electronics industry. The root cause of electrical and electronic equipment failures that lead to downtime are often due to corrosion. The onset of devastating corrosion can occur while the equipment is in shipment, storage, and during normal operation in both indoor and outdoor environments. Corrosion is most commonly initiated in atmospheres with high humidity, condensation, or traces of aggressive pollutants such as sulfides, chlorides and ammonia found in industrial and marine environments. The results are expensive failures ranging from intermittent performance to complete failure of critical components. Zerust® corrosion inhibiting products are a cost-effective way to protect electrical and electronic components and equipment from the destructive effects of corrosion.

Benefits of Zerust® Corrosion Inhibiting Products:

- Longer equipment life and sustained reliability
- Lower operating and maintenance costs
- Reduced down time and fewer repairs
- Maintenance of a clean, high-quality surface appearance
- Protection from corrosion for different metal types
- Optional protection such as electrostatic discharge (ESD) dissipation additives, acid-gas neutralizers and more

Zerust® is Safe For Electronics:

- Does not effect the functionality of circuitry
- Not harmful to printed circuit boards and sensitive ICs
- No galvanic effects, conductive residues or surface changes
- Protects metal surfaces with the clean, dry, odorless and invisible corrosion inhibiting technology
- Protective layer dissipates into the atmosphere after the product is removed, leaving no residues or surface effects
- Analysis of compatibility can be arranged by a local Zerust® representative using recognized test procedures
- Safe for personnel

What Zerust® Protects

Finished Products

During final product shipment, warehousing and use for:

- Factory automation and process controls
- Electrical cabinets and enclosures
- Power supplies and UPS equipment
- Telecommunications and server cabinets
- Computers and office equipment
- Electronics for marine environments
- Lighting systems

Sub-assemblies & Components

During in-process storage or interplant and intraplant shipment:

- Cabinets and frames
- Connectors, contacts and springs
- Relays and switches
- PCB assemblies and bare boards
- Solder and interconnection layers



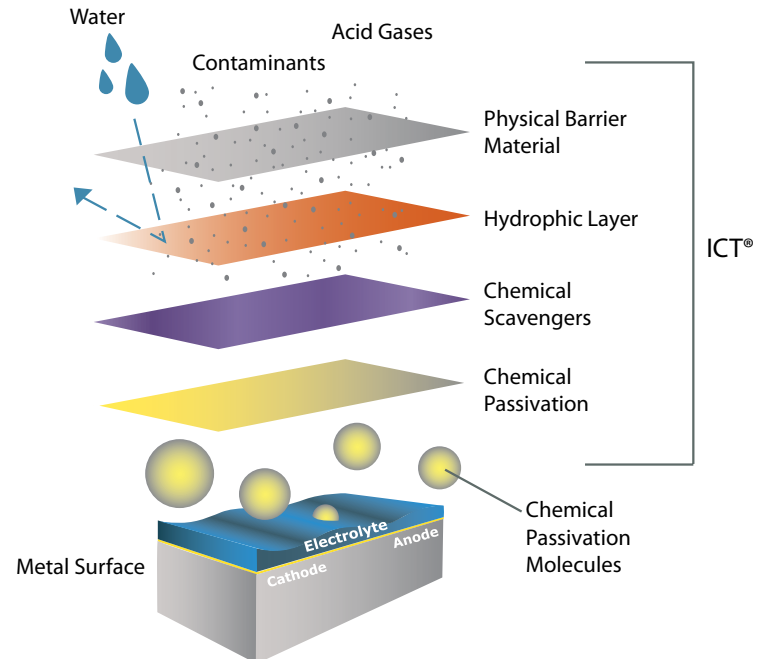
Zerust® Chemical Passivation Technology Explained

All metal surfaces are naturally structured with a myriad of microscopic regions of high (anodic) and low (cathodic) electrochemical energy. When moisture and other atmospheric contaminants adhere to these surfaces, they act as strong electrochemical conductors (electrolytes), resulting in the flow of ion and electronic currents among these regions. This natural electrochemical process causes reactions between the metals and oxygen, sulfur and other trace atmospheric elements, to form rust, tarnish, and other forms of corrosion. Zerust® products contain proprietary chemical formulations that continuously release an invisible, odorless, safe and environmentally friendly corrosion inhibiting vapor into the enclosure. Zerust® vapor saturates the interior of an enclosure or sealed area wrapped in Zerust® film to form a powerful corrosion inhibiting molecular layer on all exposed metal surfaces. This Zerust® corrosion inhibiting layer interrupts, or inhibits, the electro-chemical corrosion process.

Later, when the enclosure or package is opened, the Zerust® corrosion inhibiting layer evaporates, leaving clean, dry and corrosion free parts that are ready for immediate use without further cleaning and related handling.

Zerust® Integrated Corrosion Technologies (ICT®)

Diagram shows combination of various corrosion protection and inhibiting modes that can be selected depending on protection needs.



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Zerust® Protection—Exterior Packaging of Electrical and Electronic Items

For exterior surface protection of parts and equipment of any size, we recommend Zerust® packaging materials to wrap, enclose and protect them. Zerust® packaging materials ensure that parts are protected in storage, or arrive at their final destination, without contact deterioration, intermittent connections, or a degraded appearance. Zerust® VCI film sheeting and bags provide a clean, non-oily, and nontoxic corrosion prevention solution. Zerust® packaging materials have a shelf life of two years and a subsequent in-service life of up to five years.

Zerust® application engineers and account specialists are on hand to assess each project's needs. They are able to recommend the correct corrosion inhibiting formulation along with the best packaging design and process for maximum corrosion protection.

Product Highlight - Tarnish Prevention Film

Zerust® ICT®520-CB1 Anti-tarnish Film, made without vapor inhibitors, is specifically designed to protect the most sensitive circuit components made of silver, copper, bronze, brass, tin, iron, or steel. It protects enclosed parts by blocking and neutralizing acid gases that cause oxidation, corrosion, and tarnish.

Features

- > Provides superior performance when compared to other anti-tarnish products on the market
- > Low cost
- > Translucent packaging so you can see the protected items.
- > Optional ESD Anti-static protection
- * For details read U.S. Patent 7.261.839



Computer Board Protected by ICT®520-CB1 Anti-Tarnish Film

Zerust® Protection—Interior of Electrical and Electronic Enclosures

We recommend Zerust® Vapor Capsules and Plastabs® for the corrosion protection of interior surfaces, such as metals within switch gearboxes, electronic cabinets and other enclosures holding electrical gear. Zerust® diffuser products are self-contained corrosion inhibiting capsules and tabs that prevent corrosion of multiple metal types within enclosures. They work by permeating the interior air of an enclosure with an invisible, odorless, non-toxic corrosion inhibiting vapor that lasts for one or two years depending on the model.. This invisible and dry protective layer revaporizes upon removal of the capsule from the enclosure, leaving all surfaces clean, dry, residue-free and corrosion-free.

Reduce Maintenance Cost

Zerust® Vapor Capsules prevent the corrosion that cause higher levels of electrical contact resistance and related failure modes. This allows for fewer maintenance checks and reduced down time and component failures.

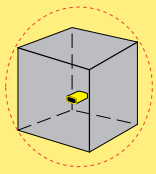
Use Zerust® Vapor Capsules

- During shipment and storage. Combine with Zerust® packaging materials to provide both internal and external corrosion protection.
- During normal operation.
- During closure or shutdown.

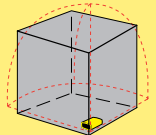


Installation

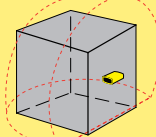
Zerust® Vapor Capsules are easily installed in a few seconds without tools or specialized labor. Simply peel the cover tape from the adhesive backing to attach to most surfaces.



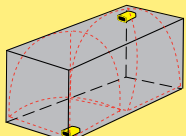
Center—The ideal location to obtain maximum coverage of protection from the capsule. This position may not be possible if the center is occupied.



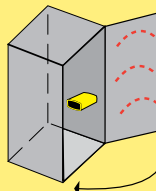
Corner—In deeper enclosures two capsules may be required on diagonally opposed corners to fully protect the entire space.



Sides—Is practical for most applications and provides the optimum side mounted protection.



Dual Placement- For longer boxes or divided spaces, place a capsule in opposite corners for complete coverage.

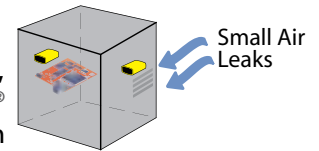


It is essential to restrict airflow to the container. Airflow removes protective vapor barrier from the space faster than it can be released from the diffuser.

Securely close

Contending with Airflow

Restricting airflow is always necessary but, when it cannot be avoided that Zerust® diffusers are needed within enclosures with some small air leaks, then it is recommended to place the capsule close to the source of airflow.



For added corrosion protection when there are small air leaks or in especially corrosion conditions, place additional Zerust® diffusers near the sensitive metal surface to be protected.

Zerust® Capsules—Multimetal Protection

Product Name and Part Number	NSN National Stock Number	Volume of Protection	Radius of Protection	Duration of Protection	Product
VC1-1 (S)* 375-M-00006	6850-01-426-3539	4.2 ft ³ (0.12 m ³)	1 ft (0.3 m)	1 year	
VC1-1* 375-M-00001	6850-01-338-1393	4.2 ft ³ (0.12 m ³)	1 ft (0.3 m)	1 year	
VC2-1* 375-M-00002	4440-01-475-9949	33.5 ft ³ (0.95 m ³)	2 ft (0.6 m)	1 year	
VC2-2* 375-M-00003	6850-01-133-0373	33.5 ft ³ (0.95 m ³)	2 ft (0.6 m)	2 years	
VC6-1 375-M-00004	-	905 ft ³ (25.63 m ³)	6 ft (1.8 m)	1 year	
VC6-2 375-M-00005	6850-01-348-1090	905 ft ³ (25.63 m ³)	6 ft W(1.8 m)	2 years	

* Includes Adhesive Backing.

Zerust® Product Range

Zerust® products offer an optimal solution via application-specific corrosion inhibiting formulations. These allow for the protection of the entire range of metals and alloys commonly used in the electrical and/or electronics industry.

Ferrous

Protect iron, steel and cast iron metals using Zerust® Ferrous Products. Yellow corrosion inhibiting films are a registered trademark of NTIC Zerust®.

Non-Ferrous

Protect aluminum (and aluminum alloys containing copper and/or manganese), copper, brass, bronze and fully galvanized steel using Zerust® Non-Ferrous Products.

Multimetal

Protect combinations of ferrous and non-ferrous metals using Zerust® Multimetal Products.

Anti-Tarnish

Protect silver, copper, bronze, brass, tin, iron, or steel from acid gases that cause oxidation, corrosion, and tarnish with Zerust® Anti-tarnish products. Available with or without chemical passivating additive.

Product Highlight - Fourth Generation ICT® Films

The new Zerust® ICT®510-G4 Film family has options for protection of ferrous, non-ferrous and multimetal along with acid gas scavengers to block and neutralize acid gases from entering the sealed packaging. The films provide robust double protection for aggressive industrial environments.

* For details read U.S. Patent 7,270,775

Zerust® Packaging Film Products

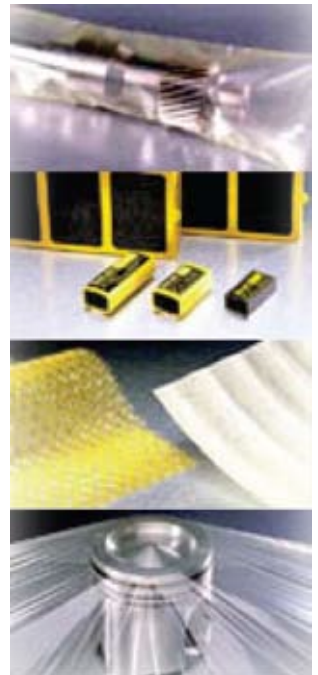
Corrosion inhibiting bags, film, sheeting and tubing. Optional add-ons include: Acid-Gas Scavengers, Anti-Static Protection, Anti-Slip, UV Protection, Hydrophobic Layers, Custom Colors, Printing, Zipper Closure, Stretch, Shrink and Cold Seal.

Zerust® Packaging Paper Products

Corrosion inhibiting paper and poly-paper products. Our packaging papers are acid free, pH neutral and saturated on both sides with our corrosion inhibiting formulations for maximum protection.

Zerust® ICT® Vapor Diffusers

Vapor Capsules and other self-contained corrosion inhibiting diffusers used to protect electrical and/or electronic components inside of enclosures.



Contact Us

To find out more about how NTIC and Zerust®/Excor® products and services can help your company save money, improve product quality and reliability, and reduce negative environmental impact. Please contact a Zerust® Account Specialist today at 763.404.8701.

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