

ZERUST® Corrosion Inhibitor Liquids, Additives, and Rust Removers



 **ZERUST® Global Corrosion &
Cleaning Management Solutions**

How ZERUST® Works for You

For over 50 years, beginning with the invention of VCI film packaging, ZERUST®/EXCOR® has led the market in quality corrosion solution products. We are dedicated to providing expert corrosion management services and broadening the range of corrosion solutions for our customers. In addition, ZERUST® users have access to onsite support from ZERUST®/EXCOR® representatives in more than 70 countries. As a result, our customers have peace of mind when they choose ZERUST® for corrosion control management.



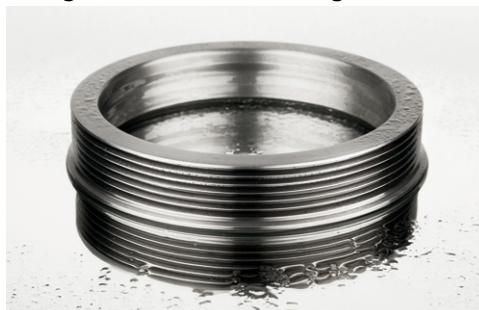
ZERUST® corrosion engineer in the field demonstrating a rust remover

High-Performance Rust Removers, and Corrosion Inhibitor Additives, and Liquids

In addition to ZERUST® VCI (Vapor Corrosion Inhibiting) film and other packaging products, ZERUST® offers an increasing range of cost-effective rust preventatives (RPs), VCI oils, corrosion inhibiting additives, and rust removers. These products are formulated to work together to provide comprehensive corrosion solutions for our customers. Backed by our expert technical support and global testing services, a complete corrosion management program can be designed to meet each customer's needs.

Our Commitment to Quality, Safety, and the Environment

We are committed to making safe and effective products that reduce the industry's impact on the environment. ZERUST®/EXCOR® products are approved by many major companies' toxicology, engineering, and packaging departments and comply with health and safety regulations around the globe, including the following:



- REACH Regulation Compliant (EC No 1907/2006)
- European RoHS Directive Compliant
- Do not contain SVHC (Substances of Very High Concern)
- Labelled in accordance with GHS (Globally Harmonized System) and are compliant under UN GHS, EU CLP, US OSHA HazCom, and CA WHMIS

ZERUST® is a business unit of Northern Technologies International Corporation (NASDAQ: NTIC), Headquartered in Minnesota, USA. The management system of ZERUST® products is ISO 9001:2015 certified.

Choosing a Corrosion Management System

Z-CIS® is the ZERUST® Corrosion Inhibiting System and the proven methodology for deploying our comprehensive corrosion management solutions. It addresses the causes of corrosion at each stage in manufacturing processes, product handling, and in transit around the world. The Z-CIS® method is designed to meet both the rust-free and contaminant-free requirements of various OEMs sourcing from a global supply base. After implementing Z-CIS®, companies generally reduce costs related to corrosion by 10% or more and realize as high as 100% rust-free shipment yields. To get started, visit www.zerust.com/tellus.



Humidity chambers are used for testing, such as evaluating a customer's process fluids and the effectiveness of recommended corrosion solutions.

ZERUST® Vapor Corrosion Inhibitors (VCIs) and Related Rust Removers and Coatings

ZERUST® is the inventor of VCI polyethylene packaging and a global leader in corrosion management. We continue to apply our knowledge of corrosion to meet customer needs with innovative solutions and services that add value to ZERUST® VCI packaging. Check with your ZERUST® representative to find the product that is right for your application.

How VCI Works

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 polybag or other enclosure. When metals are contaminated in highly corrosive environments or stored for long periods of time, the use of a VCI packaging product and a corrosion inhibitor coating can provide comprehensive protection.



On the left: competitor VCI oil protection; on the right: ZERUST® Axxanol™ 750 VCI Oil. Results after 24 hours in ASTM B117 salt-spray testing.



Illustration of VCI molecules enclosed in a ZERUST® VCI bag.

ZERUST® ICT®600 Rust Removers



ZERUST®/EXCOR® AxxaClean™ rust and tarnish removers are powerful solutions for the rework and recovery of metal items. ZERUST® offers a range of technologies, from pH-neutral products to more aggressive products.

ZERUST® AxxaClean Rust and Tarnish Remover Series

Attributes	AxxaClean™ 2048	AxxaClean™ 3048	AxxaClean™ ICT®625-RR
Corrosion Removal Power	Medium corrosion, even in cracks and crevices	Heavy corrosion, even in cracks and crevices	Mildly to moderately corrosion, even in crack and crevices
Speed	Moderate	Rapid	Slow
Metals Treated	Ferrous and yellow metals. Test before use on aluminum, magnesium, and zinc.	Ferrous and yellow metals. Test before use on aluminum, magnesium, and zinc.	Ferrous alloys. Additionally, it's aluminum and yellow metal compatible (Do not use on zinc).
Application Methods	Immersion, brush-on, spray	Immersion, brush-on	Immersion
pH Level	Mild acidic pH of about 2 – 2.5	Stronger acidic pH ≤1	Neutral pH of about 6 – 7
Temperature For Use	50 – 120°F (10 – 49°C)	50 – 120°F (10 – 49°C)	70 – 120°F (21 – 49°C)
Compatibility (<24 hour soak)	Generally safe for paint, gaskets, rubber, and plastics (Test before use).	Generally safe for paint, gaskets, rubber, and plastics (Test before use).	Generally safe for paint, gaskets, rubber, and plastics (Test before use).
Post-Cleaning Action	Do not let product dry on surface. Recommended DI or RO water rinse. Wipe off and dry well.	Do not let product dry on surface. Recommended DI or RO water rinse. Wipe off and dry well.	Do not let product dry on surface. Recommended DI or RO water rinse. Wipe off and dry well.

AxxaClean™ 2048 and 3048: Medium to Heavy Rust and Tarnish Removers



These are a series of easy-to-use products that rapidly remove rust and tarnish, even in cracks and crevices. They clean and deoxidize ferrous metals, brass, copper, and various alloys without leaving a gray residue. Additionally, multiple viscosities and strengths are available for a wide range of applications.

AxxaClean™ ICT®625-RR: Mild to Moderate Rust and Tarnish Removers



AxxaClean™ ICT®625-RR recovers mildly to moderately rusted ferrous parts. Simply soak the affected parts in the ready-to-use liquid to eliminate rust on surfaces and in hard-to-reach areas. The active ingredient reacts with iron oxide, and the product is compatible with aluminum and yellow metals.

ZERUST® ICT®700 Rust Preventative Additives

ZERUST®/EXCOR® offers a range of high-performance rust preventative liquids and powder additives. These additives were developed to help you achieve rust-free results in a number of targeted applications.

ZERUST® Rust Preventative Additives and Water Conditioners

ZERUST® Product Name	Typical Application	Format	Incompatible Metals	Addition Rate
Rust Preventative Liquid Additives				
Axxatec™ 8110C	Closed system rust preventative additive	Liquid concentrate	None	10%
Axxanol™ 707C	VCI oil additive	Oil additive with VCI	Galvanized	3-10%
Axxanol™ 710C	VCI oil additive	Oil additive with VCI and contact inhibitors	None	3-10%
Water-Soluble Additives				
AxxaVis™ PX-05-AN	Acid Neutralizer	Water-soluble powder	Limit contact with aluminum	1-10%
AxxaVis™ PX-10-HRD	Hard Water Conditioner	Water-soluble powder	None	0.04-10%
AxxaVis™ HST-10	Ferrous closed system rust preventative additive	Water-soluble powder	Aluminum, brass, and copper	0.5-5%
Axxatec™ HST-M100	Multimetal closed system rust preventative additive	Water-soluble liquid	Test before use on galvanized steel	1-5%
Axxatec™ HST-20L	Ferrous closed system rust preventative additive	Water-soluble liquid	Aluminum, brass, and copper	3.3-13.4%

Product Series Highlights



Targeted void space protection with ZERUST® corrosion inhibitors.



On the left: submerged in untreated water (60 ppm Cl⁻, 300 ppm CaCO₃), on the right: submerged in AxxaVis™ HST-10 treated water.

Axxatec™ 8110C is a water-based additive for the protection of water-filled void spaces of hydraulic and coolant equipment.

Axxanol™ 700 Series are liquid concentrates with VCIs for adding to oils to protect void spaces.

AxxaVis™ PX-05-AN is a powder that, when added to rinse water, enables it to neutralize acids. Use to control flash corrosion on metals caused by acids leftover from cleaning and rust removal treatments as ZERUST® AxxaClean™.

AxxaVis™ PX-10-HRD is a powder additive that conditions hard water to prevent scale and scum when deionized water is not available. As a result, It increases the performance of ZERUST® products that require dilution, such as Axxatec™ and AxxaWash™ concentrates.

AxxaVis™ HST-10, Axxatec™ HST-M100, and HST-20L are additives used to treat hard water and deactivate chlorides. Add product to tap water to make it suitable for hydrostatic test processes conducted on pressure vessels such as pipes, heat exchangers, storage tanks, and ship voids.

ZERUST® ICT®700 Rust Preventative Coatings

ZERUST® offers a full line of corrosion inhibitor liquids that complement our VCI packaging solutions. ZERUST® RPs and coatings range from effective water-based solutions to greases designed to give standalone protection.

ZERUST® Rust Preventatives and Coatings Product Series Highlights



Axxatec™ Series consists of water-based rust preventative products that are specifically designed to protect ferrous, non-ferrous, and multimetal metal assets. Use Axxatec™ products to protect bare metal surfaces during assembly and in situations where water-based spray-on, in-line production, or dipping applications are desired. In addition, Axxatec™ products offer easy-to-use corrosion-inhibiting additives that form a clear, thin, dry-to-touch coating that helps prevent flash rust in between production processes and for short to medium-term shipment and storage periods in conjunction with ZERUST® VCI packaging.



Axxanol™ Series consists of solvent and oil-based rust preventative products that are specifically designed to protect ferrous, non-ferrous, and multimetal metal assets. Use Axxanol™ products to protect bare metal surfaces during manufacturing processes, storage, and shipping applications from rust and corrosion. In addition, Axxanol™ products offer ready-to-use corrosion-inhibiting coatings that form thin oil to dry-to-touch coatings on the metal surface to provide medium to long-term corrosion protection and work in conjunction with ZERUST® VCI packaging.



AxxaCoat™ Series consists of solvent-based rust-preventative coatings designed to protect metal parts and assemblies during long-term indoor and outdoor storage and challenging overseas shipping applications where a tough yet removable coating is essential. In addition, AxxaCoat™ products are ready-to-use corrosion-inhibiting coatings that form a firm film, and their color allows the user to see where it has been applied.

ZERUST® ICT®700 Rust Preventative Coatings

	Protected/Compatible Metals								Application Method				
ZERUST® Product Name	Ferrous	Aluminum	Brass	Zinc	Copper	Outdoor Protection Life (Up To)†	Indoor Protection Life* (Up To)†	Designed for Use with Packaging	Spray/Fog	Brush	Immersion	Formulation Base	Surface Finish
Water-Based Coatings													
Axxatec™ 80C (7.5% dilution)	✓	✓	✓	✓	✓	Not recommended	6 months†	Yes	✓	✓	✓	Water-based	Clear, slightly tacky
Axxatec™ DA-23C (5% dilution)	✓					Not recommended	3 months†	Yes	✓		✓	Water-based	Clear, dry-to-touch
Axxatec™ DA-24C (5% dilution)	✓		✓		✓	Not recommended	3 months†	Yes	✓		✓	Water-based	Clear, dry-to-touch
Axxatec™ DA-40AL (5% dilution)	✓	✓	✓	✓	✓	Not recommended	3 months†	Yes	✓		✓	Water-based	Clear, dry-to-touch
Axxatec™ 30C (5% dilution)	✓		✓		✓	Not recommended	3 months†	Yes	✓		✓	Water-based	Clear, dry-to-touch
Axxatec™ 48C (5% dilution)	✓	✓	✓	✓	✓	Not recommended	6 months†	Yes	✓		✓	Water-based	Clear, dry-to-touch
Axxatec™ 85-F	✓					Not recommended	12 months†	Yes	✓			Water-based with VCI	Thin
Axxatec™ 87-M	✓	✓				Not recommended	12 months†	Yes	✓			Water-based with VCI	Thin
Solvent-Based Coatings													
Axxanol™ 33CD	✓	✓	✓	✓	✓	Not recommended	6 months†	Yes	✓		✓	Solvent-based	Dry-to-touch
Axxanol™ 34CD	✓	✓	✓	✓	✓	Not recommended	12 months†	Yes	✓	✓	✓	Solvent-based	Very thin oil
Axxanol™ A35CD-32	✓	✓	✓	✓	✓	Not recommended	12 months†	Yes	✓	✓	✓	Solvent-based	Near dry-to-touch
Axxanol™ A35CD-7	✓	✓	✓	✓	✓	Not recommended	6 months†	Yes	✓		✓	Solvent-based	Dry-to-touch
AxxaCoat™ 90B HFS	✓	✓	✓	✓	✓	2 years†	For many years†	Test before use	✓	✓	✓	Solvent-based	Dry-to-touch, matte black film
AxxaCoat™ 93B HFS	✓	✓	✓	✓	✓	3 years†	For many years†	Test before use	✓	✓	✓	Solvent-based	Dry-to-touch, matte black film
Oil-Based Coatings													
Axxanol™ 33	✓	✓	✓	✓	✓	Not recommended	12 months†	Yes	✓	✓	✓	Oil-based	Light oil
Axxanol™ 750-NV	✓	✓	✓	✓	✓	Not recommended	24 months†	Yes	✓	✓	✓	Oil-based	Thin oil
Axxanol™ 758-NV	✓	✓	✓	✓	✓	Not recommended	24 months†	Yes	✓	✓	✓	Oil-based	Non-staining thin oil
Axxanol™ 46-Bio	✓	✓	✓	✓	✓	Not recommended	12 months†	No	✓	✓	✓	Bio-based oil	Thin oil
Axxanol™ A35-30	✓	✓	✓	✓	✓	Not recommended	12 months†	Yes	✓	✓	✓	Oil-based	Light oil
Axxanol™ A35-8030	✓	✓	✓	✓	✓	12 months†	5 years†	Yes	✓	✓	✓	Oil-based	Thin oil
Greases													
Axxanol™ Spray-G	✓	✓	✓	✓	✓	12 months†	24 months†	Yes	✓			Grease-based with solvents	Thin oily grease
Axxanol™ Z-Maxx LV	✓	✓	✓	✓	✓	12 months†	36 months†	Yes		✓		Grease-based	Light grease (NLGI 0)
Axxanol™ Z-Maxx	✓	✓	✓	✓	✓	12 months†	36 months†	Yes		✓		Grease-based	Thick grease (NLGI 2)
VCI Oil Coatings													
Axxanol™ 750	✓	✓	✓	✓	✓	Not recommended	For years with VCI Packaging†	Yes	✓			Oil-based with VCI	Thin oil
Axxanol™ 758	✓	✓	✓	✓	✓	Not recommended	For years with VCI Packaging†	Yes	✓			Oil-based with VCI	Non-staining thin oil

* Indoor protection life is rated for items stored indoors or under shelter in temps less than 100°F/38°C and in less than 70% relative humidity. Check with your ZERUST® representative for details on ZERUST® packaging products that extend protection life for years[†] and beyond. Water-based product test results are per ASTM D2247 humidity chamber testing. Oil- and solvent-based product test results are per ASTM B117 salt spray testing.



Northern Technologies International Corporation

ZERUST® Business Unit | Corporate Office

4201 Woodland Road, P.O. Box 69

Circle Pines, MN 55014 USA

Toll-Free: 1-800-328-2433 | Phone: 1-763-225-6600

sales@zerust.com | www.zerust.com

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	Luxembourg	South Africa	
the Congo	Malaysia	Spain	

✦ 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.