

OFFSHORE MARKET



ZERUST OIL & GAS

WWW.ZERUST-OILGAS.COM

World of Zerust Oil & Gas

Who is Zerust Oil & Gas?

Zerust® Oil & Gas is a division of Northern Technologies International Corporation (NASDAQ: NTIC) that provides corrosion mitigation solutions and services to clients in the Oil & Gas and process chemical industries.

Our Clients

Some of our oil and gas clients include BP, Chevron, Enbridge, Reliance Industries (India), Petrobras (Brazil), Shell (Malaysia), ADMA-OPCO and FMC Technologies (USA).



The Zerust Oil & Gas Advantage

The team leverages NTIC's global network of trained corrosion management professionals and channel partners to deliver products, provide local support, conduct client training and participate in solution field trials.

In addition, the R&D group works with companies like Chevron, Petrobras and Enbridge to develop specialized corrosion mitigation solutions and shared intellectual property (IP) technologies.

CREDENTIALS

40+ years of experience in corrosion prevention.
Client support in 50+ countries.
Chair key task group at NACE International.

MEMBERSHIPS



AWARDS/PATENTS



Zerust Flange Saver®

Zerust ReCAST-R™

2012: Winner of the MP Readers' Choice NACE

Corrosion Innovation of the Year award

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Zerust has successfully completed numerous projects with large offshore clients. Projects include corrosion protection of flanges, risers, outdoor preservation and more.

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OFFSHORE CORROSION

Environment Conducive to Corrosion

Corrosion is a major problem in offshore environments due to extreme operating environments and the presence of aggressive corrosive elements.

Offshore oil and gas platforms require continuous preventive maintenance to ensure prolonged and safe operation. Coating systems, surface preparation, application, and maintenance are vital for corrosion prevention.

Cost of Corrosion

Indirect costs associated with corrosion can include the need to shutdown the plant or equipment to repair, replace or carry out preventative maintenance on corroded items.

The wrong choice of material for an application can lead to increased downtime, unplanned maintenance, production loss, environmental and economic loss and more.

Through the collaborative efforts of Zerust and the customer to analyze the specific operating parameters and defining the correct material for use, in most cases can ensure these situations are avoided.

Warehouse Corrosion

It is common for corrosion to occur on machined parts and on high value assemblies in the warehouses used for Offshore platforms. Corrosion can occur on critical equipment, turbines, valves, heat exchangers, vessels, voids and tanks. Greases, oils, rust removals and more can be used to prevent corrosion.



ZERUST PRODUCTS

Zerust Corrosion Solutions

Zerust has various corrosion inhibiting solutions for offshore risers that can be used together for added protection against corrosion during outdoor storage.

Zerust Zerion[®] FVS

Zerust Zerion FVS is a versatile new corrosion inhibitor specifically designed to protect ferrous metals where there is the possibility of the accumulation of water, moisture and/or water ingress. Zerion FVS can be blasted into the open ends of the riser pipe before the pipe is closed off.



Protection of Voids/Enclosures:

The Zerion FVS VCI chemistry actively protects exposed steel from corrosion in large volume voids and enclosures. There are multiple delivery mechanisms and product packages that can be adapted to the geometry of the structure being protected. When it is possible for the void to be hermetically sealed, a one-time introduction of FVS can provide protection for up to 2 years.



Hydrostatic Testing:

Add Zerion FVS to hydrostatic testing water to provide excellent protection to exposed steel surfaces. In addition to the SCI protection, the VCI evolves to protect any air pockets or hidden voids. FVS is versatile and compatible with a variety of water profiles and works best with DI, RO or potable water with less than 150 ppm of chlorine.

Zerust® Transparent Flange Saver®

Flange, valve and welded-joint corrosion costs clients millions annually! Zerust's® Transparent Flange Saver® (TFS) has proven Zerust Vapor Corrosion Inhibitor (VCI) in the film. The TFS provides up to four years of corrosion protection in outdoor and offshore environments. Provides corrosion protection for FPSOs, jetties, offshore platforms & rigs, and other applications.



Zerust Axxanol Spray-G

Zerust Axxanol Spray-G provides the protection of a grease in the convenience of a sprayable form. It outperforms many other rust preventative coatings. Clean and apply Spray-G to the main tube, choke/kill, open facings, and booster tubes as required, for corrosion protection.



Outdoor Preservation Film

Outdoor Preservation Film (OPF) provides advanced protection to metals with Zerust Vapor Inhibitor (VCI) technology. The film shrinks and conforms to risers to repel moisture and contaminants. Zerust VCI saturates the interior of the packaging to protect hard-to-reach spaces and voids from corrosion.



Zerust AutoFog A Packets

Zerust's AutoFog A is a revolutionary Flash Corrosion Inhibitor (FCI™) that diffuses rapidly to provide corrosion protection for bare metal surfaces. The AutoFog packet is an ideal addition to using Zerion FVS and OPF to further prevent corrosion.



ZERUST ZERION® FVS

Zerust Zerion® FVS

Zerust Zerion FVS is a versatile new corrosion inhibitor and is a highly cost-effective corrosion mitigation solution for difficult to protect spaces.

Zerion FVS is specifically designed to protect ferrous metals in aggressive corrosion environments.

Protects where there is the possibility of the accumulation of water, moisture and/or water ingress.



Types of Zerust Zerion® FVS Applications



Aboveground Storage Tank (AST) Soil Side Bottom (SSB):

Zerion FVS has been used in multiple tank soil side bottom installations. It provides superior protection to exposed steel in vapor spaces and crevices under the tank bottoms and in situations when there is ingress of water into the tank foundation space.



Protection of Voids/Enclosures:

The Zerion FVS VCI chemistry actively protects exposed steel from corrosion in large volume voids and enclosures. There are multiple delivery mechanisms and product packages that can be adapted to the geometry of the structure being protected. When it is possible for the void to be hermetically sealed, a one-time introduction of FVS can provide protection for up to 2 years.



Hydrostatic Testing:

Add Zerion FVS to hydrostatic testing water to provide excellent protection to exposed steel surfaces. In addition to the SCI protection, the VCI evolves to protect any air pockets or hidden voids. FVS is versatile and compatible with a variety of water profiles and works best with DI, RO or potable water with less than 150 ppm of chlorine.



Long-Term Preservation/Mothballing

Zerust ICT® 520-XF Film with Zerion FVS is developed for Mothballing and Long Term Storage applications.

Zerust has a wide range of rust removers, protective oils/greases, non-contact vapor diffusing capsules, auto-fogging capsules, corrosion inhibiting packaging products with Zerion FVS for all mothballing needs.

ZERION® FVS COUPONS

Coupon Results

Below are panels of coupons taken from a client's tank on an offshore platform after approximately one year of exposure. The results demonstrate the effectiveness of Zerust's Zerion® FVS corrosion inhibitor versus no inhibitor.

Figure 1

There is corrosion, but based on where they are and the condition of their environment this is a good result.

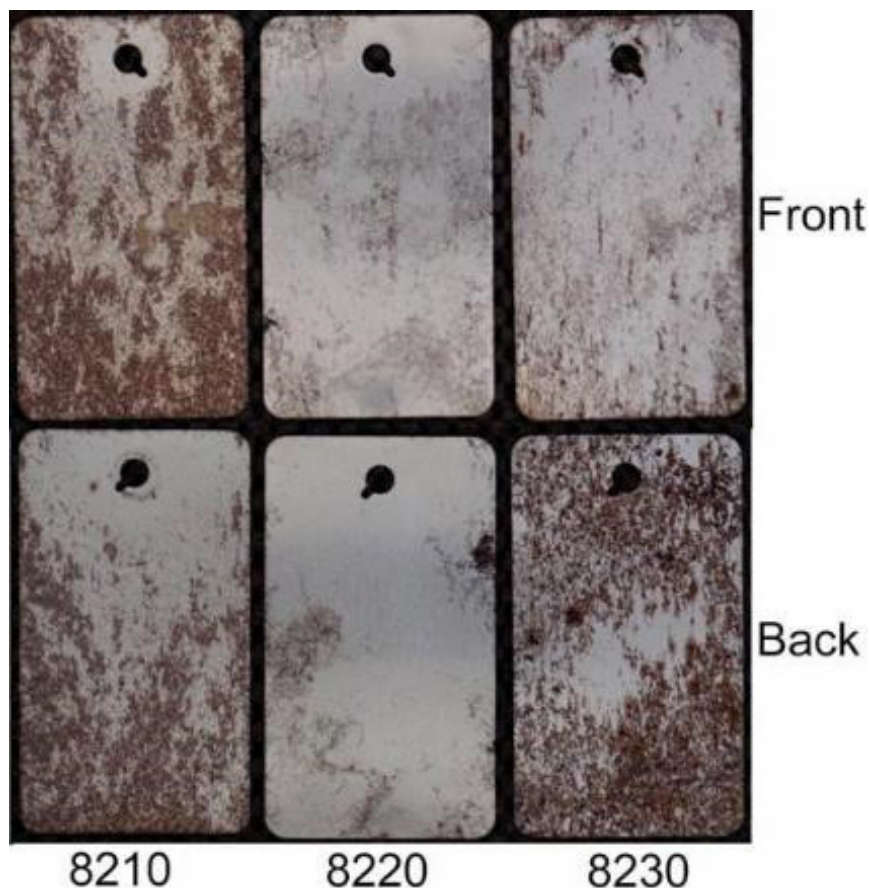


Figure 2

Only a low level of corrosion after one year of exposure.

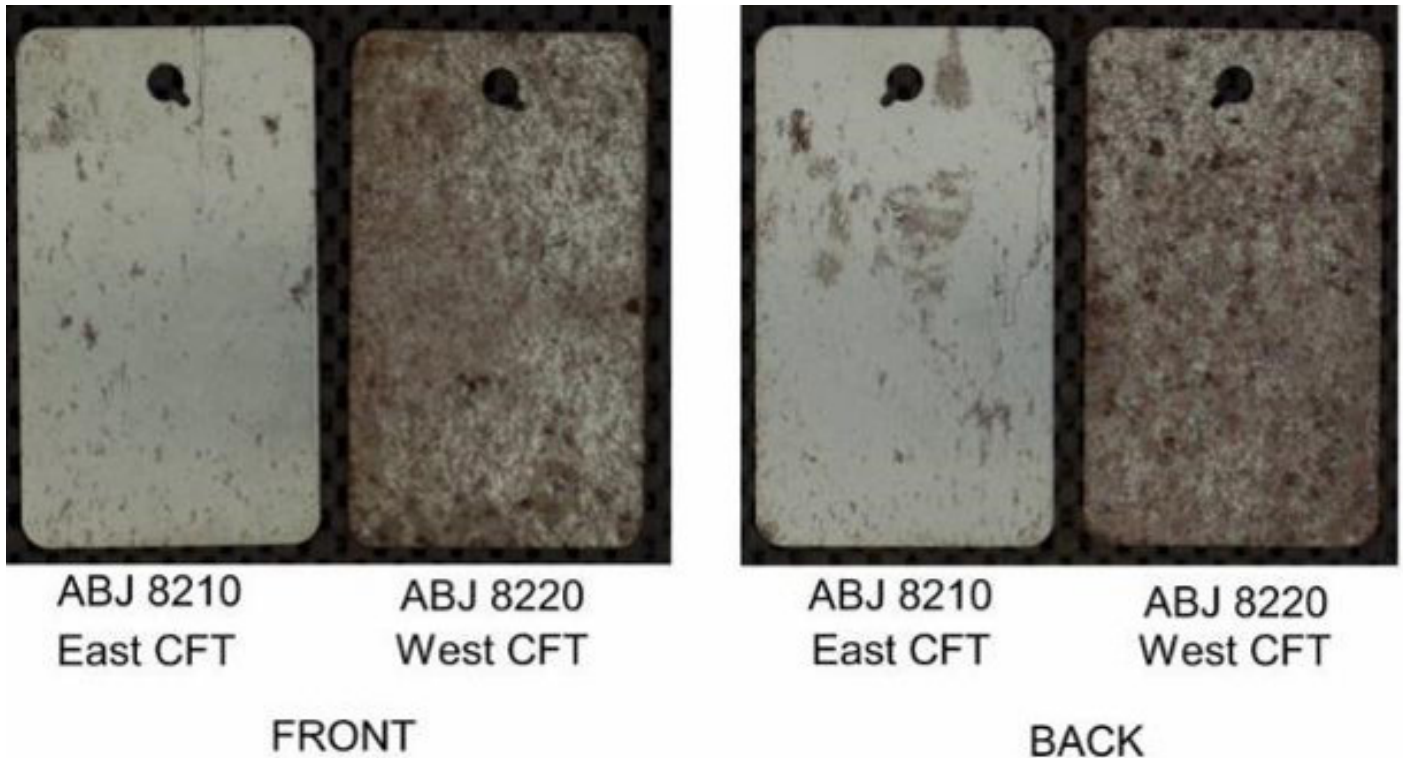
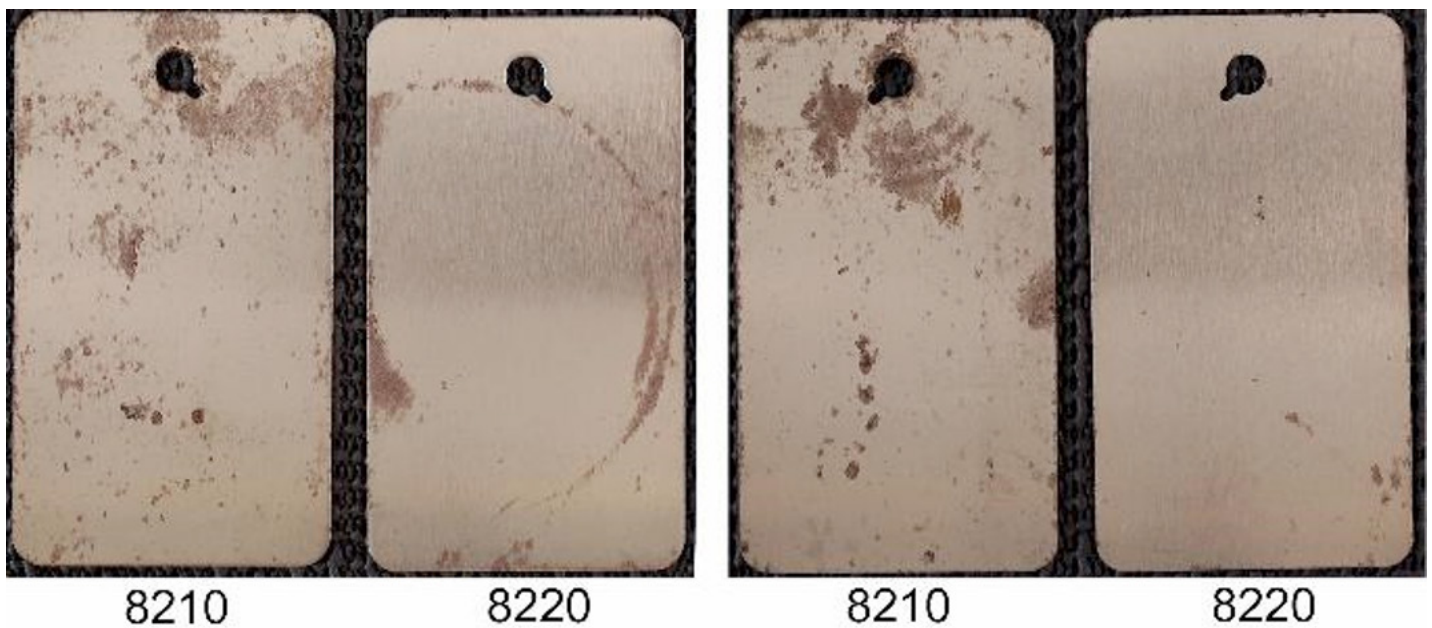


Figure 3

Overall, the panels look great, only a small amount of general corrosion across a small amount of the surface area.



ZERUST FOR OFFSHORE RISERS

Offshore Riser Corrosion

Oil and gas drilling risers aren't always in use, and additionally when they are stored they run the risk of corrosion as they would while in use. Corrosion prevention is especially important in enclosed spaces where sweating due to trapped humidity inside the voids can cause immediate corrosion.

Zerust has various corrosion inhibiting solutions for offshore risers that can be used together for added protection against corrosion.



Types of Zerust Solutions

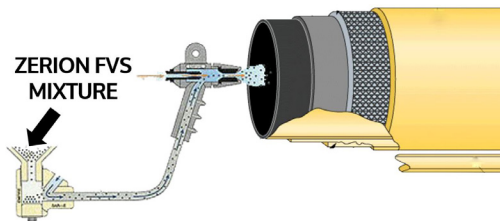


Axxanol Spray-G Grease

Zerust Axxanol Spray-G provides the protection of a grease in the convenience of a sprayable form. It outperforms many other rust preventative coatings. Clean and apply Spray-G to the main tube, choke/kill, open facings, and booster tubes as required, for corrosion protection.

Zerust Zerion® FVS

Zerust Zerion FVS is a versatile new corrosion inhibitor specifically designed to protect ferrous metals where there is the possibility of the accumulation of water, moisture and/or water ingress. Zerion FVS can be blasted into the open ends of the riser pipe before the pipe is closed off.



Outdoor Protection Film

Outdoor Preservation Film (OPF) provides advanced protection to metals with Zerust Vapor Inhibitor (VCI) technology. The film shrinks and conforms to risers to repel moisture and contaminants. Zerust VCI saturates the interior of the packaging to protect hard-to-reach spaces and voids from corrosion. Wrapping risers in OPF will protect them from corrosion when stored and enables them to be be operationally ready.



Zerust AutoFog A Packets

Zerust's AutoFog A is a revolutionary Flash Corrosion Inhibitor (FCI™) that diffuses rapidly to provide corrosion protection for bare metal surfaces. The AutoFog packet is an ideal addition to using Zerion FVS and OPF to further prevent corrosion on the internal pipe surface. Simply secure the AutoFog packet to the pipe end cap or place within the pipe and seal off the pipe with Zerust's VCI OPF or a pipe end cap.



Zerust[®] OIL & GAS
WORLDWIDE CORROSION SOLUTIONS

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