

CREDENTIALS

50+ years of experience in corrosion prevention.

Client support in 70+ countries.

MEMBERSHIPS



ISO Certified
FM 516997 (ISO 9001:2015)
The design and manufacture of corrosion inhibiting and protective packaging systems, and bioplastics compounding and packing solutions.

Hydrostatic Testing of Pipelines

Corrosion Risks & Solutions



Hydrostatic Testing of Pipelines

Hydrostatic testing assesses the strength and integrity of a pipeline/vessel/boiler/gas cylinder by filling it with water and pressurizing it to a level that exceeds its normal operating pressures (typically 150%) for a particular amount of time. During the test, any leaks, cracks, or deformities in the tested structures will cause water to escape, indicating a failure. This type of testing is commonly utilized to ensure the safety and reliability of structures that are designed to hold products under pressure.

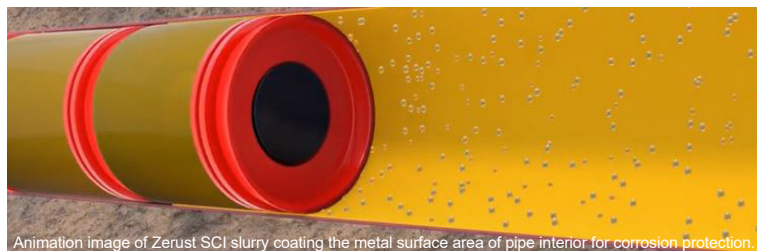
Zerust understands that there is no cookie-cutter application and/or solution for hydrotesting or treating hydrostatic test water and structures. Our goal is to meet all discharge permit requirements for water quality, volume, and flow rate through our chemistry.

Corrosion Risk: During Hydrostatic Testing of Pipelines

Corrosion can be a potential risk during and after hydrostatic testing, Flash Corrosion or biological/bacterial materials can be introduced into the structure depending upon the source of water or previously introduced containments. As noted, the source of water is a major factor. Groundwater, tank water, and purified water all have unique properties and potential contaminants.

A properly formulated corrosion inhibitor can counter these possible contaminants. Dead, low spots, valves, and flanges can collect residual moisture during the Hydrotest process generally at the six o'clock position of the structure. Using corrosion inhibitors during hydrostatic testing can help reduce this risk by treating and neutralizing the contaminants during the test even in these remote recesses of the structure.

In Zerust's chemical makeup, Soluble Corrosion Inhibitors (SCI's) in the hydrotest fluids will neutralize contaminants on the steel surface upon contact. Vapor Corrosion Inhibitors will evolve from the hydrotest fluids to provide continuing protection to the entire internal areas of the structure on the surface areas and vapor spaces. The VCI's neutralize moisture and prevents oxygen molecules from bonding with the steel structure. The surface area of the pipe is in contact with the inhibitor solution which then sheds to the 6 o'clock position when the hydrotest water is drained and removed.



Animation image of Zerust SCI slurry coating the metal surface area of pipe interior for corrosion protection.

Warranty and Disclaimer Information:

We guarantee our products conform to documented quality specifications. Product information is subject to change without notice. We make no warranty of any kind expressed or implied as to the effects of use (including, but not limited to, damage or injury). Before use, Buyer/User shall determine the suitability of the product for its intended use, and Buyer/User assumes all risk and liability in connection there. All statements, technical information, and recommendations contained herein are based on testing and experiences NTIC believes to be reliable, but the accuracy or completeness thereof is not guaranteed. Buyer/User agrees that, if the product proves to be defective, Seller's obligation shall be to replace or refund the purchase price of such product at Buyer's option. Seller shall not be liable in tort or contract for any loss or damage, incidental or consequential. See www.zerust.com/warranty





Corrosion Solutions for Protection of Pipelines Post-Hydrotest

Odorant & Pickling Challenges

One of the unique qualities of utilizing Zerust's Hydrotesting formulas is that we prevent flash corrosion. This is very important as flash corrosion can degrade and eliminate the odorant bond from the pipeline costing both time and money to re-establish both the "absorption" and the "adsorption" of the odorant in to the pipe.

Due to Zerust's ability to circumvent flash corrosion, the pipeline timeline for being out of service while the odorant is reinstalled and cured back to acceptable levels is minimized which means the pipeline can be placed back into service in days rather than 4-8 weeks.

pH Adjustment

All microorganisms prefer a neutral pH for optimum growth, but they can grow in more acidic pH values. Zerust's product line is alkaline in pH which can help neutralize acids produced by microorganisms.

Chelates & Customization

With Zerust's capabilities and flexibility in formulations, we can also treat for chelates and other contaminants. Our laboratories can tweak and customize formulations for specific applications.

Chelating agents are used for:

- Easier scale removal and prevention
- Breaking down, isolating, or moving heavy metal ions
- Deactivating metal ions to prevent plugging, sealing, and precipitation.
- Limiting available metal ion concentration
- Controlling heavy metal poisoning and reducing metal's toxic effects

Environmental Concerns

One of our formulas, Zerion® ECT-711, is benign enough for the environment that it can be used for dust control on dirt roads after the solids have been filtered/removed post-testing. With this new blend, we keep the pH level below 9. This creates the advantage of utilizing the treatment water as dust control for dirt roads after filtering the solids and without further treatment.

Zerust Hydrostatic Testing Products

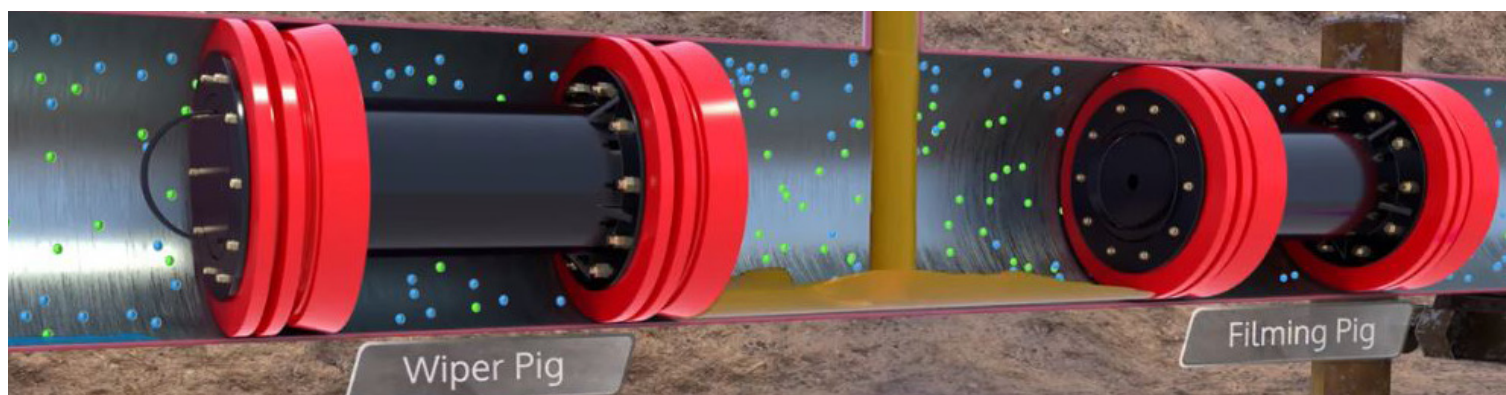
Product Name	Carrying Distance	Solution Protection	Asset Volume	Cost Bracket	Application Surface Use	Added Notes
Zerust® ActivPowder™ 10F	High	Medium	Small to medium	\$\$\$\$\$	Ferrous metals only	Targeted for void space protection. May cause blackening of yellow metals.
Zerion® FVS	Medium	Medium	Small to medium	\$\$\$\$	Ferrous metals only	May cause blackening of yellow metals.
Zerion® PPL	Low	High	Large	\$\$\$	Ferrous metals only	May cause blackening of yellow metals.
Zerion® PPL-B	Low	High	Large	\$\$\$	Ferrous and brass metals	Will also protect yellow metal components in solution.
Zerion® ECT-711	No VCI	High	Large	\$\$\$\$	Ferrous metals only	Used for low-quality water. Helps neutralize acidic environments and prevents flash corrosion and separation of odorant from the pipe.
Zerust® AxxaVis™ HST-10	No VCI	High	Large	\$\$\$	Ferrous metals only	Used for low quality water (surface water). Has a chelating agent to remove heavy metals from solution.
Zerion® FAN-5	No VCI	High	Large to very large	\$	Ferrous metals only	Used for low quality water (surface water). Creates alkaline solution
Zerion® FAN-6	No VCI	High	Large to very large	\$	Ferrous metals only	Used for low quality water (surface water). Higher alkalinity than FAN-5

Post-Hydrostatic Testing - Pipeline Preservation

Once a pipeline/vessel has been assembled and hydrotested, Zerust has a unique application that can protect pipelines from internal corrosion until the pipeline is commissioned. This process can eliminate the need for dry air or a Nitrogen purge potentially saving the asset owner a tremendous amount of time, money, and potential safety risks.

Zerust's unique blend of Zerion Inhibitors is first mixed with water. The inhibitor slurry is then pumped between two pigs in which the lead pig is a wiper pig and the trailing pig is a filming pig which leaves a thin layer of VCI in the pipeline protecting it while waiting for commissioning. Compressed air is typically used to push the pigs. In not having to utilize nitrogen to keep the line dry, you do not have to continually monitor and add nitrogen while waiting to commission the line. Compressed air contains a lot of moisture that needs to be treated to prevent corrosion. With any existing moisture in the pipe having been treated by the hydrotest solution, there is no need for having to utilize and continually monitor nitrogen levels while waiting to commission the line.

Long lengths of "piggable" pipelines can be protected using this method. Zerust has successfully implemented this solution on significant pipeline lengths for a number of customers.



Corrosion Solution: Pipe Storage / Lay-Up Yards

Prior to their use, piping is generally stored and exposed to the elements. During storage, condensation, rain, dust, and other contaminants are introduced to the inventory prior to use. These are all potential corrosion hazards that can be prevented and/or minimized.



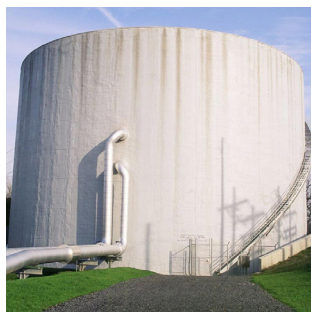
Sachets with Zerust's product can be inserted into the pipe and later removed via simply pulling on a connecting string.



End caps alone are not enough to protect the interior of pipes. Zerust has a solution for this issue.

Zerust's Wide Range of Corrosion Solutions

Zerust's wide range of products allows the asset owner the ability to prevent these potential hazards from entering the equation efficiently and cost-effectively. We offer films, sprays, oils, adhesives, powders, liquids, and comprehensive storage solutions.



Tank Solutions

Zerust Oil & Gas solutions provide a cost-effective means to mitigate underside corrosion of aboveground storage tanks while the tanks are in or out of service.

- Soil side bottom protection
- Tank roof protection
- Support Protection



Offshore Rigs/Platforms/FPSOs

Zerust Oil & Gas has numerous solutions for the offshore market.

- Rig Stacking / Mothballing
- Flange Protection
- Protection of Electrical Controls
- Protection of Voids / Enclosures



Pipeline Preservation

VCI's have proven to be a cost-effective alternative to the traditional dry and N2 purge technique. VCI's can preserve the line from corrosion for many years.

- Pipeline Preservation
- Hydrotesting
- Preservation of Pipe Lengths
- Non-Commissioned Pipeline
- Corrosion Protection
- Anti-Corrosion for Pipeline Layout by Liquid Injection
- Mothballing Pipeline
- New Construction of Pipeline



Pipe Casing Protection

Zerust has developed a unique blend of corrosion inhibitors and gels that is injected into the annular pipe casing space. The Zerust corrosion inhibitors protect the carrier pipeline directly using Soluble Corrosion Inhibitors (SCIs), and in the annulus vapor space using Vapor Corrosion Inhibitors (VCI's).

- Protection of electrolytically shorted casings
- Adjusts the pH level of the environment to approximately 9.5
- 20 year life expectancy and can then be simply renewed with a concentrated slug
- Can be removed for actual inspection of the pipeline if needed
- Continued monitoring for effectiveness is available through probes or coupons



Equipment Preservation

Various Zerust® Products are used in combination for Mothballing and Long-Term Protection and Maintenance of spares and redundant machinery to ensure they are in a prime state and ready for operation whenever they are needed.



Corrosion Under Insulation (CUI) Protection using Zerust® Inhibitor Fusion (ZIF) Tape

ZIF Tape has the following benefits, and more.

- Infused with Corrosion Inhibitors
- Heat resistant up to 200°C
- Conforms around complex shapes (flanges)
- No "Hot" work permit needed, applied cold.
- Translucent - allows for visual inspections
- Wind, UV, oxygen, and seawater resistance.
- 10+ Year Service Life

Warranty and Disclaimer Information:

We guarantee our products conform to documented quality specifications. Product information is subject to change without notice. We make no warranty of any kind expressed or implied as to the effects of use (including, but not limited to, damage or injury). Before use, Buyer/User shall determine the suitability of the product for its intended use, and Buyer/User assumes all risk and liability in connection therewith. All statements and technical interwind recommendations contained herein are based on testing and experiences NTIC believes to be reliable, but the accuracy or completeness thereof is not guaranteed. Buyer/User agrees that, if a product proves to be defective, Seller's obligation shall be to replace or refund the purchase price of such product at Buyer's option. Seller shall not be liable in tort or contract for any loss or damage, incidental or consequential. See www.zerust.com/warranty



Zerust® OIL & GAS
WORLDWIDE CORROSION SOLUTIONS

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