



PIPELINE PRESERVATION CORROSION PROTECTION

CORROSION PROTECTION

Pipeline construction timelines often expose pipes to corrosion risks from moisture and contaminants. ZERUST® Integrity Solutions™ offers cost-effective Vapor Corrosion Inhibitor (VCI) solutions to protect pipelines during pre-construction, post-hydrotesting, and layup, ensuring long-term integrity and reducing rework.

Problem: Corrosion Risks

Challenge of Long Construction Timelines:

Pipeline construction projects often span years between mobilization and commissioning. Unprotected staged pipe lengths or critical zones of assembled pipelines are at risk of corrosion, particularly in areas where water collects inside the pipeline. This can result in costly rework and delays.

Moisture and Contaminants Cause Damage:

Moisture and contaminants can degrade the interior surfaces and cut-back sections of staged pipes, while surface corrosion often develops during storage or after hydro testing in assembled segments.

Limitations of Traditional Solutions:

Although options like nitrogen purging exist, they are expensive and only moderately effective. A clean, corrosion-free pipeline is critical to maintaining long-term integrity and performance.

Solution: VCI Solutions for Pipeline Protection at Every Stage

ZERUST® Integrity Solutions™, a global leader in corrosion management with over 50 years of experience, provides innovative solutions to prevent corrosion inside pipelines before construction or during downtime. Using advanced Vapor Corrosion Inhibitors (VCIs), ZERUST® offers reliable and effective corrosion mitigation. ZERUST® has several cost-effective options using VCIs for protecting these pipe lengths during pre-construction, pre-commissioning, or during mothballing, layup, or abandonment.

Cost-Effective VCI Solutions for Pipeline Protection at Every Stage

- Preservation of pipe lengths during pre-construction
- Pipeline preservation post-hydrotesting
- Non-commissioned pipeline corrosion protection via misting pig
- Anti-corrosion for pipeline layup through liquid injection



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product information

ZERUST® FOR PIPELINE PRESERVATION

Preservation of Pipe Lengths

ZERUST® provides economical and efficient solutions for protecting pipe lengths during transportation and staging using Vapor Corrosion Inhibitors (VCIs). VCI sachets, containing both Vapor and Soluble Corrosion Inhibitors (SCIs), are placed inside the pipe with sealed ends to prevent internal corrosion caused by moisture and condensation.

Cutback Protection:

- ZERUST® Inhibitor Fusion Tape (ZIF Tape) protects external cutbacks and beveled pipe ends where welds are made.

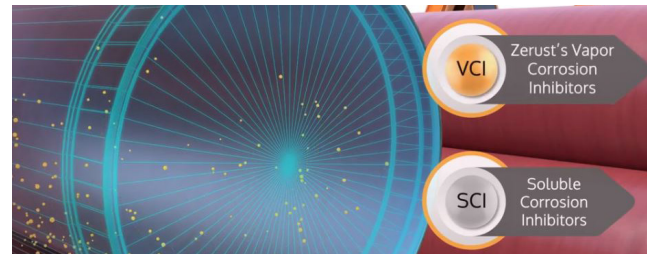
Comprehensive Corrosion Coverage:

- VCI molecules adsorb onto bare metal surfaces, even in complex geometries, to provide long-term protection.

Simple and Efficient Application:

- VCI sachets are secured with a string to the end cap for easy removal.
- Provides corrosion protection for several months to years, depending on the application.

This reliable method ensures pipes remain corrosion-free during pre-construction and pre-commissioning, minimizing delays and rework.



Pipeline Preservation Post Hydrotesting

After hydrotesting, ZERUST® offers a solution to prevent internal corrosion until commissioning, eliminating the need for dry air or nitrogen purging.

Inhibitor Slurry Application:

- ZERUST® Zerion™ Inhibitors mixed with water are pumped between two pigs (wiper and filming).
- The filming pig applies a thin layer of VCI slurry to internal surfaces.

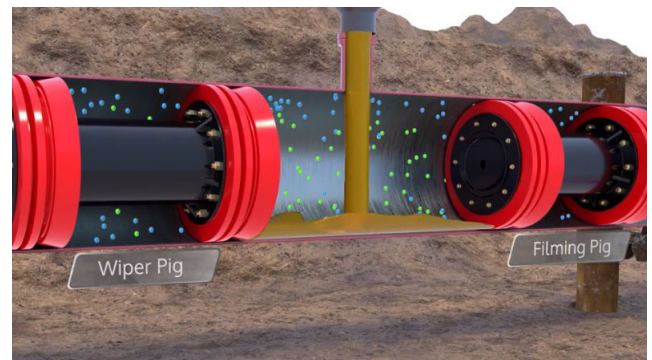
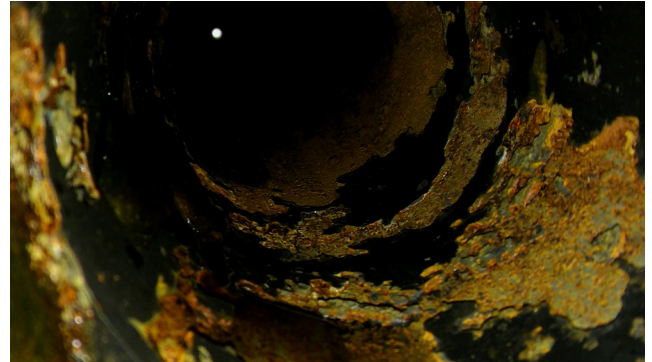
Comprehensive Protection:

- SCIs neutralize contaminants and moisture on contact.
- VCIs protect gaps, valves, ports, and instrumentation.

Efficient and Effective:

- Compressed air moves pigs, coating surfaces without dried air or nitrogen.
- Proven effective for long pipeline lengths.

This cost-effective method ensures corrosion-free pipelines during pre-commissioning.



Non-Commissioned Pipeline Corrosion Protection: Misting Pig

After hydrotesting, ZERUST® offers an innovative solution to protect pipelines from internal corrosion until commissioning. ZERUST® Zerion™ Inhibitors, mixed with water (often using a vacuum truck), are injected between a lead pig and a filming pig via a pig launcher.

How It Works:

- Compressed air moves the pigs, misting the slurry onto internal surfaces and forming a thin protective film.
- SCIs neutralize corrosive contaminants on steel surfaces, while VCIs protect gaps, valves, ports, and instrumentation.
- Inhibitors remain effective even after water evaporates, neutralizing contaminants and balancing pH.

Efficient and Long-Lasting:

- Suitable for long lengths of piggable pipelines.
- Sealed pipe sections stay protected for years.
- Proven effective on major pipeline projects.

This method provides cost-effective, long-term corrosion protection during pre-commissioning.



Anti-Corrosion for Pipeline Layup: Liquid Injection

Low-lying areas of non-piggable pipeline segments are prone to collecting residual water, leading to potential corrosion. ZERUST® offers a liquid inhibitor injection process to protect these areas during layup.

How It Works:

- ZERUST® Zerion™ Inhibitors are mixed with water, often using a vacuum truck, to create an inhibitor slurry.
- The slurry is pumped into ports at higher pipeline elevations and allowed to flow downward by gravity, treating standing water with SCIs.

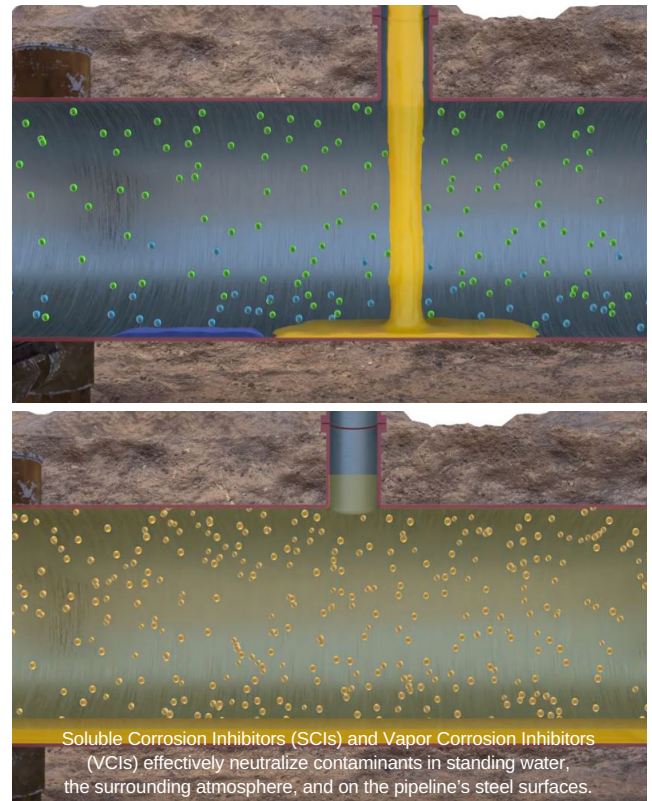
Comprehensive Protection:

- SCIs neutralize contaminants and balance the pH of standing water.
- VCIs release vapor molecules that protect steel surfaces and neutralize atmospheric contaminants.

Efficient and Proven:

- Provides long-term corrosion protection for the pipe annulus until commissioning.

This method ensures effective and reliable corrosion protection for non-piggable pipelines during layup.



ZIF Tape: The Perfect Addition to Comprehensive Pipeline Preservation

ZERUST® Inhibitor Fusion (ZIF) Tape complements pipeline preservation efforts by addressing critical areas prone to corrosion, such as flanges, valves, and exposed sections of pipelines.

ZIF Tape's advanced features make it a valuable enhancement to Zerust's pipeline protection solutions.

- **Enhanced Protection for Vulnerable Areas:** ZIF Tape provides localized corrosion prevention for cutbacks, weld joints, and components susceptible to corrosion during pipeline staging, hydrotesting, or layup.
- **Complement to VCI and SCI Systems:** While Vapor Corrosion Inhibitors (VCIs) and Soluble Corrosion Inhibitors (SCIs) protect pipeline interiors, ZIF Tape shields external surfaces, preventing moisture intrusion and mitigating Corrosion Under Insulation (CUI).
- **Durability in Extreme Conditions:** With a wide operating temperature range and UV stability, ZIF Tape ensures long-term protection in challenging environments.
- **Quick and Easy Application:** ZIF Tape's self-fusing, residue-free design allows for fast deployment with minimal preparation, ideal for time-sensitive pipeline projects.

ZIF Tape is a versatile, durable solution that extends Zerust's comprehensive corrosion protection systems, safeguarding pipelines and components throughout the construction, staging, and commissioning phases.



ZIF Tape Application on Pipe for CUI

Availability

- Available in 36-foot individual rolls, with width options of 2", 4", 12", and 16".
- Nominal thickness of approximately 20 mils when unstretched.
- Contact a ZERUST® representative for ordering information.

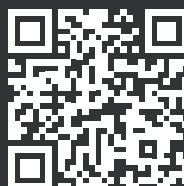
† DECLARATION

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.

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With over 50 years of experience, ZERUST® Integrity Solutions, a division of Northern Technologies International Corporation (NTIC), creates unique inhibitor-based corrosion prevention solutions to serve terminals, pipelines, exploration and production, equipment suppliers, transportation sectors, and more.

ZERUST® Integrity Solutions, ZERUST®/EXCOR®, and Natur-Tec® are sister companies under NTIC.

