



PIPE CASING

CORROSION PROTECTION

**CORROSION
PROTECTION**

Cased pipeline crossings face corrosion and metallic shorts, leading to costly repairs. Zerust's VCI gel solution protects with SCIs for direct contact and VCIs for the annular space, extending pipeline life. It's customizable and allows corrosion monitoring via vent pipes—no excavation needed.

Problem: Corrosion Risks, Downtime, and Costs

Underground pipelines require cathodic protection, but when enclosed in metal casings under roadways or railways, movement can cause metallic shorts, diverting protection current and increasing corrosion risk.

With hundreds of thousands of cased crossings in North America, many in service for decades, contaminants like moisture and oxygen can accumulate, accelerating corrosion on both the casing and the carrier pipe. Gaps in end seals further expose pipelines to damage.

Regulations require addressing metallic shorts through:

- Excavation and repair (\$\$\$\$)
- Filling the casing with wax (\$\$)
- Applying a VCI gel (\$)

Recognized by NACE SP0200-2014, Vapor Corrosion Inhibitors (VCIs) offer a cost-effective solution to protect these vulnerable areas.

Solution: Cost-Effective VCI Protection

Zerust offers a specialized VCI gel solution injected into the annular space to protect pipelines through:

Soluble Corrosion Inhibitors (SCIs) – Shield surfaces in direct contact.

Vapor Corrosion Inhibitors (VCIs) – Protect the entire annular space.

Since no two cased crossings are alike, Zerust[®] engineers customize solutions by adjusting inhibitor concentration and volume based on cost, longevity, and site conditions. Operators can provide key details to receive precise recommendations.

Using VCIs extends pipeline life cost-effectively, with corrosion monitoring via ER probes or coupons. Installation is often possible through vent pipes—no excavation required.



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product information

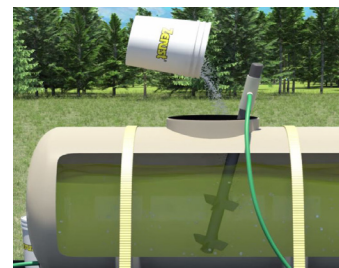
How Zerust's Cased Pipeline Protection Works

High-Viscosity Gel Application

Best For: Pipelines with a metallic short (casing in contact with the carrier pipe) or cases requiring a static fill anti-corrosion solution. Meets PHMSA requirements for a protection system that remains in place.

How It Works:

- Installed as a low-viscosity slurry, which sets into a high-viscosity gel.
- VCIs volatilize to protect the vapor spaces, while SCIs neutralize contaminants on contact.
- Bridges small penetrations, reducing leaks and blocking external contaminants.



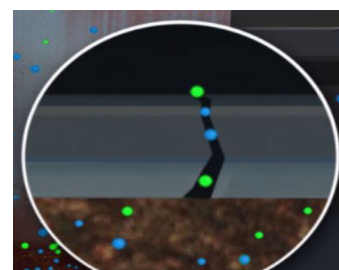
Gel System: Gel crystals are added through vent pipes before injection.

Powder Application

Best For: Pipelines without a metallic short, where internal corrosion protection is a proactive maintenance strategy. Works best when end seals are intact to prevent water ingress.

How It Works:

- Zerion powder inhibitors are blown into the casing via vent pipes using a blower system.
- The powder settles at the bottom, with SCIs neutralizing contaminants and VCIs protecting the vapor space.
- Full annular protection with minimal installation effort.



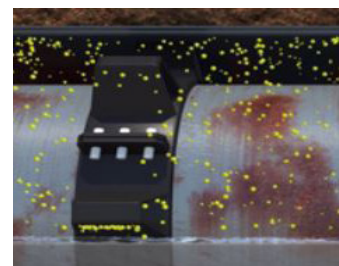
Inhibitors neutralize contaminants on contact and in the vapor space, with VCI dosage based on annulus volume and contamination levels.

Slurry Application

Best For: Long pipeline sections with elevation changes, bends, or complex geometries where powder or gel isn't feasible.

How It Works:

- Zerion FVS is mixed with water and injected via gravity or a low-pressure pump through the casing vent pipe.
- SCIs neutralize contaminants on contact, while VCIs protect the entire vapor space.
- Ideal for longer casings, provided the casing and end seals are intact.



Zerust FVS combines VCI and SCI; SCIs neutralize contaminants in liquid, while VCIs protect the vapor space.

Zerust's tailored solutions ensure long-lasting protection for cased pipelines, preventing corrosion and extending asset life.

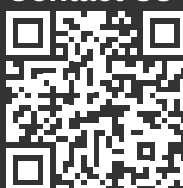
‡ DECLARATION

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.

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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.

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