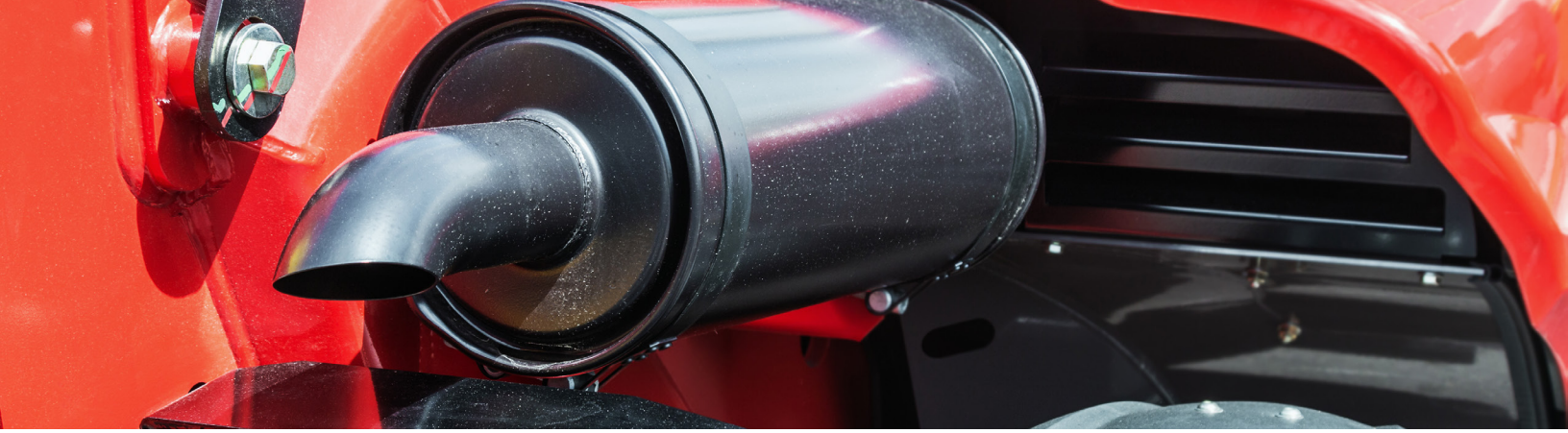
FORREST
Technical Coatings

Why Coatings Are the Most Common Corrosion Control Method





Once corrosion mechanisms and environmental severity are understood, the next question becomes how corrosion is controlled in practice. While there are multiple strategies available, protective coatings remain the most widely used method for controlling corrosion across industrial applications.

This is not because coatings eliminate corrosion, but because they are effective at interrupting the conditions that allow corrosion to proceed.

The Goal of Corrosion Control

Corrosion control focuses on managing risk rather than eliminating corrosion entirely. In most real-world environments, corrosion prevention is not practical or economically feasible.

Instead, the goal is to:

- Slow corrosion to an acceptable rate
- Prevent localized attack that leads to early failure
- Extend service life and reduce unplanned downtime

Effective corrosion control addresses the cause of corrosion, not just its visible effects.



Control, Not Elimination
The objective of corrosion protection is to manage corrosion progression because it is very hard to stop it entirely.

Common Corrosion Control Strategies

Several approaches are used to control corrosion, depending on the application and environment. These may include:

- Material selection and alloying
- Environmental control or modification
- Design changes to reduce galvanic corrosion, crevices and moisture retention
- Cathodic or anodic protection methods
- Protective coatings and linings

Each method has advantages and limitations. In many applications, protective coatings offer the most practical balance of performance, cost, and flexibility.





How Protective Coatings Control Corrosion

Protective coatings work by interrupting one or more elements of the corrosion cell described earlier in this guide. When properly selected and applied, coatings:

- Isolate the metal surface from moisture and contaminants
- Reduce or eliminate electrolyte contact
- Prevent oxygen access to the metal surface
- Interrupt electrochemical pathways

By breaking the corrosion cell, coatings significantly reduce corrosion rates and help prevent localized attack.

Why Barriers Matter
Corrosion slows dramatically when the metal surface is isolated from its environment.

Coatings as Part of a System

Coatings do not perform in isolation. Their effectiveness depends on how well they function as part of a complete protection system that includes:

- Proper surface preparation
- Adequate coating thickness and continuity
- Compatibility with the service environment
- Resistance to mechanical damage and thermal stress

Failures are often attributed to the coating itself when the underlying cause is a mismatch between the coating system and actual service conditions.



Most Coating Failures Are System Failures
Performance depends on surface preparation, application, environment, and service exposure working together.

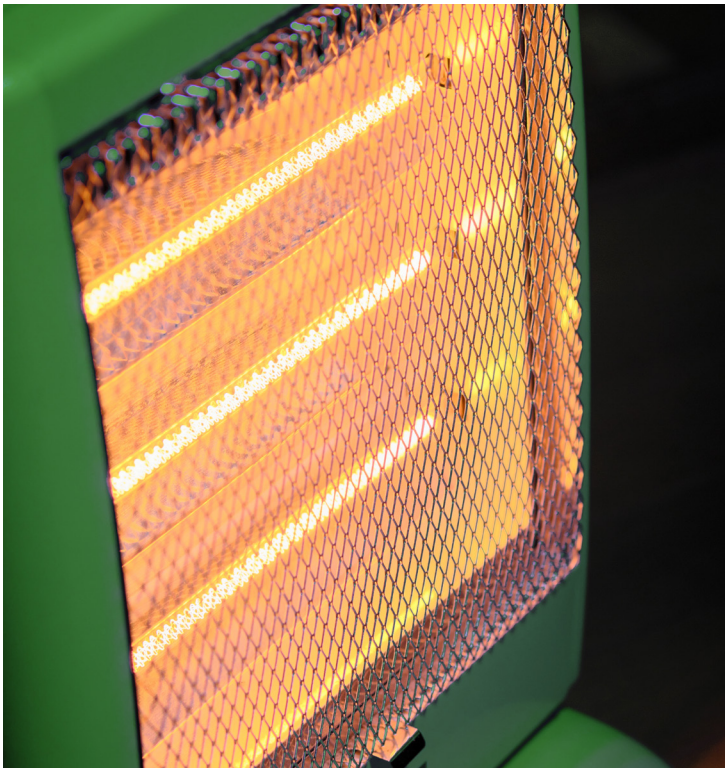


Why Coatings Are So Widely Used

Protective coatings are widely adopted because they offer several practical advantages:

- Applicability to a wide range of substrates
- Adaptability to different environments
- Cost-effective protection for large surface areas
- Ease of inspection and maintenance

Unlike some corrosion control methods, coatings can be repaired, recoated, or upgraded as service conditions change, providing long-term flexibility.





Limitations of Coatings

While coatings are highly effective, they are not universal solutions. Coatings can be compromised by:

- Mechanical damage
- Improper surface preparation
- Inadequate thickness
- Environmental exposure beyond design limits

Understanding these limitations reinforces the importance of selecting coatings based on realistic service conditions rather than nominal requirements.

Selection Matters
A coating that performs well in one environment may fail quickly in another if exposure conditions change.

The Importance of Matching Coatings to Environment

Because corrosion behavior varies by environment, coating selection must account for:

- Moisture exposure and time of wetness
- Presence of salts or chemical contaminants
- Temperature and temperature cycling
- Mechanical wear and impact

When coatings are matched appropriately to these factors, they become one of the most effective tools available for managing corrosion risk.





Implications for Long-Term Performance

Effective corrosion control strategies focus on preventing localized corrosion initiation and slowing overall degradation. Coatings that remain continuous and intact provide the greatest benefit by limiting the conditions required for corrosion cells to form.

This makes coatings especially valuable in applications where corrosion damage is difficult to detect or costly to repair once it begins.

Key Takeaway

Protective coatings are widely used because they interrupt the fundamental processes that drive corrosion. When selected and applied with a clear understanding of environment and exposure conditions, coatings provide reliable, flexible, and cost-effective corrosion control across a wide range of applications.

About Forrest Technical Coatings

For more than 50 years, Forrest Technical Coatings has manufactured specialty coating systems designed to perform in demanding service environments. Based in the United States with a global customer footprint, Forrest works closely with equipment manufacturers, engineers, and operators to address corrosion, heat, and environmental exposure challenges across a wide range of industries.

Forrest's portfolio includes industrial and high-temperature coating systems for applications such as biomass processing, exhaust and thermal equipment, power generation, and other corrosion-prone environments. Products such as the INFERNEX® high-temperature coating systems are engineered to withstand elevated temperatures, aggressive atmospheres, and real-world operating conditions.

As a manufacturer, Forrest focuses on understanding how the environment, substrate, and service conditions interact, and on formulating coatings that align with those realities.

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