

# Corrosion Prevention for Precision Parts: Science, Methods, and Solutions

Precision parts—whether used in aerospace, medical devices, or high-performance machinery—require demanding care. Even minor corrosion can compromise tolerances, reduce lifespan, or lead to costly downtime. Effective corrosion prevention combines science, process, and the right products.

## Understanding Corrosion

Corrosion is an electrochemical process where metals deteriorate when exposed to moisture, oxygen, salts, acids, or other contaminants.

In simple terms:

- Anodic reaction: Metal atoms lose electrons and form ions.
- Cathodic reaction: Oxygen or hydrogen gains electrons, often forming oxides or hydroxides.

Certain contaminants accelerate corrosion:

- Salts (e.g., chlorides):
  - Break protective oxide layers → localized pitting.
- Oils and machining fluids:
  - Trap moisture and promote uneven corrosion.
- Acidic residues:
  - Lower pH → faster metal dissolution.

Even small spots of corrosion can compromise tolerance, fit, and finish, making prevention essential.

## Step 1: Clean – Removing Contaminants

Cleaning is the foundation of corrosion prevention.

Best practices:

- Degreasing:
  - Remove oils/lubricants.
- Ultrasonic cleaning
  - Dislodges tiny particles.
- Deionized water rinse:
  - Removes ionic residues.



## Step 2: Protect – Applying Corrosion Barriers

Protect parts from moisture and oxygen:

- Temporary inhibitors:
  - Thin films or vapor-phase inhibitors.
  - Acid treatments create stable oxide layers.
  - Conversion/sacrificial coatings
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## Step 3: Store & Monitor

Maintaining Protection Storage considerations:

- Controlled humidity.
- VPI packaging.
- Desiccants/dry cabinets.
- Inspection/testing.

## Key Takeaways

Preventing corrosion in precision parts comes down to three critical steps: Clean → Protect → Store. By removing contaminants, applying chemical protection, and maintaining controlled storage conditions, manufacturers can extend part life, maintain tolerances, and reduce costly failures.

## Metalloid Corrosion Inhibitors

[Metcor 52](#) Water-Based Corrosion Preventative

[Metcor 57](#) Solvent-Based Corrosion Preventative

[Metcor 71](#) Botanical-Based NSF Food-Approved Corrosion Preventative

[Metcor 908LV](#) Mineral Oil-Based Corrosion Preventative

Find out more at  
[Metalloidcorp.com/corrosion-inhibitors/rust-preventatives/](https://Metalloidcorp.com/corrosion-inhibitors/rust-preventatives/)