



Treatment Capabilities for Ammonia/Fertilizer Plants

Fertilizer plants strive to reduce operating costs while maintaining their assets and preserving the quality of their product.

ChemTreat's customized industrial water management solutions address the entire spectrum of plant applications, including pretreatment, boiler, cooling, process additives, wastewater, water reuse, and UAN corrosion management.



Protecting Your Assets from UAN and AN Corrosion

Urea ammonium nitrate (UAN) and ammonium nitrate (AN) are highly corrosive liquid fertilizer products. Corrosion of mild steel equipment used for processing, transporting (such as rail cars), and storage of UAN/AN solution can be extensive. Two main corrosion mechanisms with these products are:

- **“Thin film” or “surface” corrosion** can occur on the vertical tank walls because of low ammonia levels and can generate iron sludge that falls to the tank bottom
- **Underdeposit corrosion** can develop when iron sludge falls to the tank bottom and collects in low spots. This can be a severe form of corrosion that prevents corrosion inhibitors from reaching the surface to provide necessary protection.

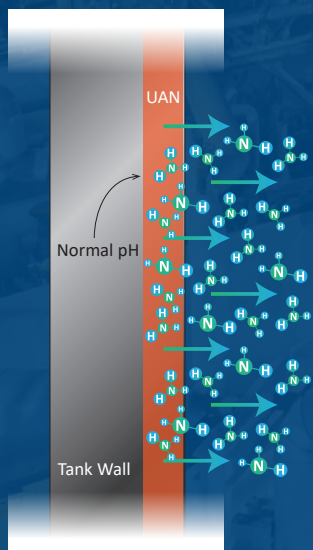
Treating UAN and AN corrosion with the right corrosion inhibitors can help ammonia plants:

- Avoid unscheduled plant shutdowns, saving on maintenance and downtime costs
- Preserve assets (e.g., storage tanks and rail cars)
- Meet environmental goals

Impact of Ammonia Saturation at the UAN and Metal Interface

Ammonia-Rich Atmosphere

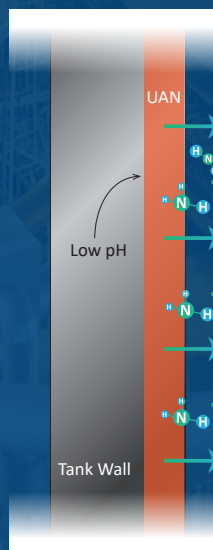
The air in the container is fully saturated with NH_3 vapor.



High ammonia concentration in “thin film” on tank wall.

Ammonia-Poor Atmosphere

The air in the container is not saturated with NH_3 vapor.



Low ammonia concentration in “thin film” on tank wall.

Introducing ChemTreat FlexFilm™

ChemTreat's FlexFilm™ series UAN and AN corrosion inhibitors provide excellent corrosion inhibition for mild steel under various operating conditions. FlexFilm™ products are a synergistic combination of surface-active agents and organic acids for corrosion protection.

Mild steel coupon with no UAN inhibitor treatment for 30 days:



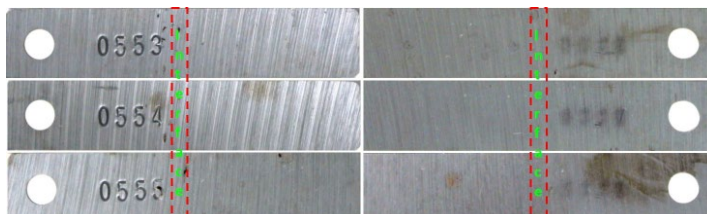
Corrosion Rate: >10 mpy

Coupons fully submerged in UAN solution treated with various dose rates of FlexFilm™ technology for 30 days:



Corrosion Rate: 0.176 mpy

Coupons partially submerged in UAN treated with FlexFilm™ treatments at various dose rates for 30 days:



Corrosion Rate: 0.257 mpy

As the storage tanks and rail cars are not always completely full, providing necessary corrosion protection at the interface can be important. FlexFilm™ technology can provide corrosion protection to the mild steel metallurgy.



Blank and FlexFilm™ test results after 30 days

These pictures clearly demonstrate the potential severity of UAN corrosion (blank) and effectiveness of FlexFilm™ technology in providing corrosion protection.



Results are examples only. They are not guaranteed. Actual results may vary.

Water Treatment Offerings for the Fertilizer Industry



Cooling Water Treatment

- Cooling technologies consisting of proprietary and advanced polymeric scale inhibitors such as QuadraSpense® and FlexSpense® for superior scale control on high-temperature critical heat exchangers
- Proprietary, high-performance, non-fouling FlexPro® series of corrosion inhibitors to help increase reliability, improve profitability, and achieve your sustainability goals
- SpecOx® line of oxidizing biocides such as chlorine dioxide, monochloramines, bromide-activated chloramines, proprietary SurfClean™ technology to be used with oxidizing biocides, and various nonoxidizing biocides



High-Pressure Boiler Treatment

- Advanced polymer technology to inhibit fouling in high-pressure boilers
- Proprietary phosphonate/polymer blends for excellent corrosion and deposition control in high-purity, low- and high-pressure applications
- Low-solids-contributing organic oxygen scavengers
- Neutralizing amines and proprietary Titan360™ filming amines with blended formulations made for specific applications



Pretreatment & Membrane Solutions

- Products to help optimize water usage and manage complex issues such as high silica concentrations
- Treatment solutions and expertise in clarification, demineralization, membrane bioreactors, reverse osmosis, ultrafiltration, and more
- Regenerating solutions for condensate polishers



Intelligent Water Management

- State-of-the-art CTVista®+ intelligent water management platform, enabling water treatment program monitoring and control
- Software integration with most industry-standard equipment setups or custom equipment packages designed specifically for your treatment needs

