

Nitro-Buster® Performance Results

norweco®

Engineering the future of water
and wastewater treatment

Process Description

Norweco's Nitro-Buster is a comprehensive, liquid solution of select bacteria strains formulated to remove ammonia nitrogen from residential and municipal wastewater. Ammonia is removed by developing healthy bacteria levels in treatment systems to establish, maintain and restore nitrification. Nitrification is a two-step biological process by which bacteria oxidize ammonia ions (NH_3) to nitrites (NO_2^-), then oxidize the nitrites to nitrates (NO_3^-). This natural, bio-chemical process utilizes two main heterotrophic bacteria strains, Nitrosomonas and Nitrobacter, both active ingredients of Nitro-Buster.

In third-party evaluation, laboratory analysis and field testing, Nitro-Buster delivered the following results:

◆ **91% overall removal rate of ammonia**

◆ **72% improvement in removal rate**

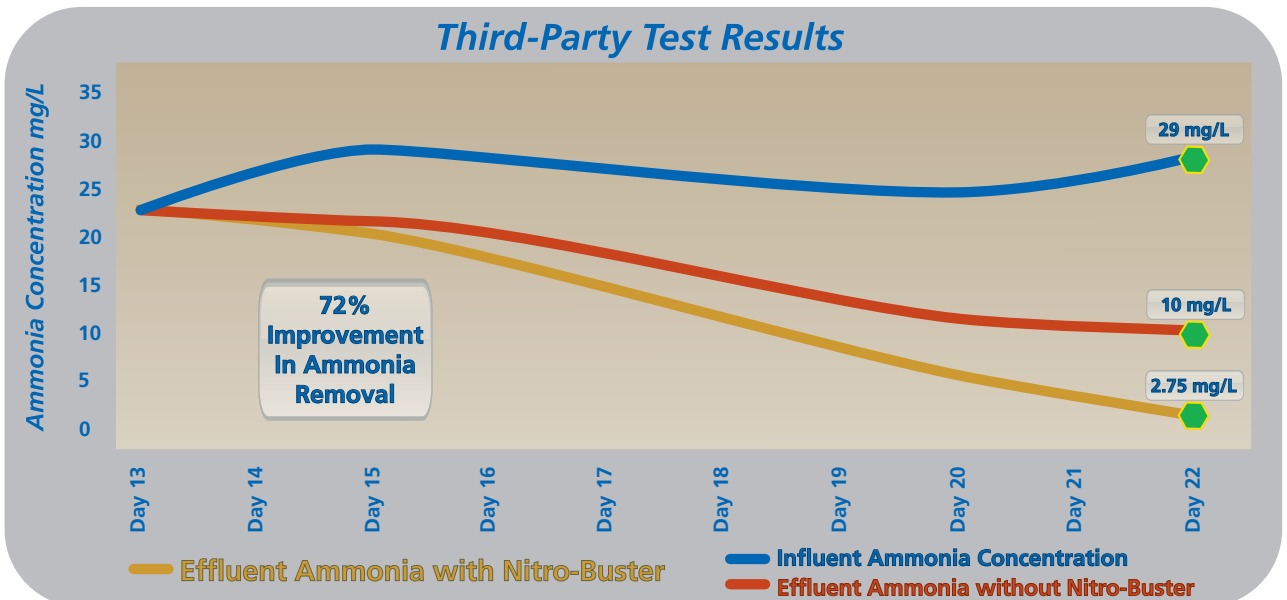
◆ **25% faster start-up**

Independent, Third-Party Evaluation

Objective: Conduct third-party testing of Nitro-Buster to analyze ammonia removal performance.

Procedure: The test consisted of two identical, biologically mature aerobic wastewater treatment systems. Nitro-Buster was added to Treatment System #1 following the product dosage guidelines. Treatment System #2 operated without any Nitro-Buster and was used as a negative control.

Results: After 21 days, Treatment System #1 with Nitro-Buster reduced ammonia from 29 mg/L to 2.75 mg/L. Treatment System #2 without Nitro-Buster reduced ammonia from 29 mg/L to only 10 mg/L. The effluent ammonia level was 72% lower in the system dosed with Nitro-Buster. Nitro-Buster reduced the nitrification start-up time by 25% and achieved a 91% ammonia removal rate five days faster than the system without Nitro-Buster.

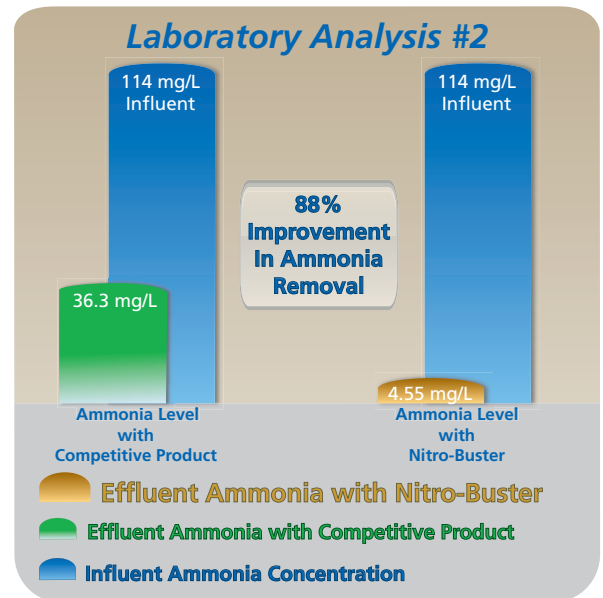
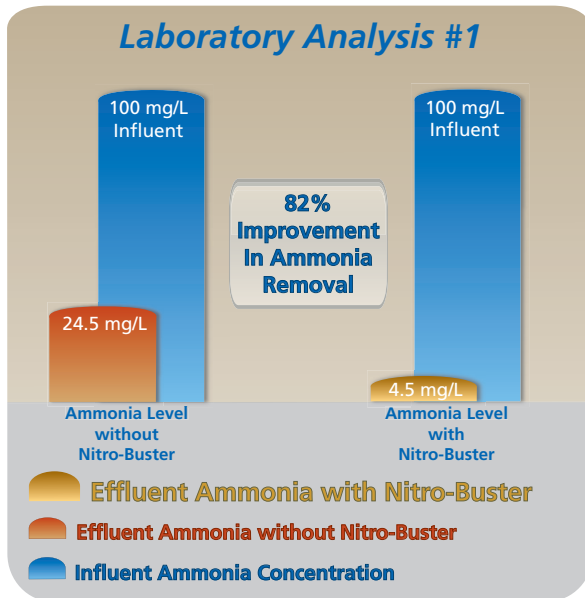


Laboratory Analysis

Objective: Conduct laboratory analysis of Nitro-Buster to analyze ammonia removal performance.

Procedure: Laboratory Analysis #1 was conducted utilizing artificial wastewater containing 100 mg/L ammonia under continuous aeration for eight consecutive days. The testing subjects included Nitro-Buster and a negative control sample. Laboratory Analysis #2 was conducted utilizing a stock solution containing 114 mg/L ammonia under continuous aeration for eight consecutive days. The testing subjects included Nitro-Buster and a competitive ammonia removal product.

Results: Laboratory Analysis #1 negative control sample reduced ammonia from 100 mg/L to only 24.5 mg/L in eight days. The system dosed with Nitro-Buster reduced ammonia from 100 mg/L to 4.5 mg/L in eight days with an overall ammonia removal rate of 95.5%, an 82% improvement in ammonia removal efficiency. Laboratory Analysis #2 with a competitive ammonia removal product reduced ammonia from 114 mg/L to only 36.3 mg/L in eight days. The system dosed with Nitro-Buster reduced ammonia from 114 mg/L to 4.55 mg/L in eight days with an overall ammonia removal rate of 96%, an 88% improvement in ammonia removal efficiency.

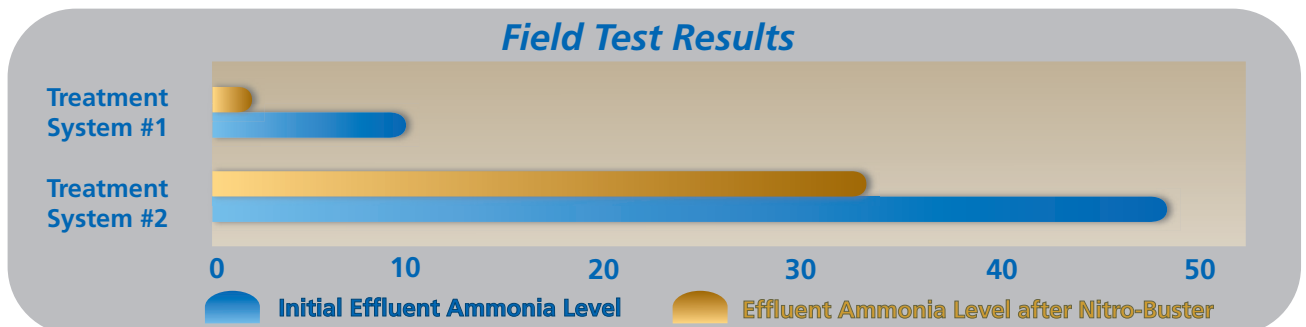


Field Testing

Objective: Conduct field testing of Nitro-Buster to analyze ammonia removal performance.

Procedure: Field testing was conducted on two aerobic residential treatment systems experiencing high ammonia levels and unable to remove ammonia. Existing ammonia levels were analyzed on Day 1, then treated with a single dose of Nitro-Buster. Ammonia levels were analyzed on Day 28.

Results: Treatment System #1 had an initial effluent ammonia level of 10 mg/L. At the conclusion of the 28 day test period, the effluent ammonia level of Treatment System #1 was 2 mg/L, an 80% improvement. Treatment System #2 had an initial effluent ammonia level of 48 mg/L. At the conclusion of the 28 day test period, the effluent ammonia level of Treatment System #2 was 32 mg/L, a 33% improvement.



*Field performance may vary depending on influent BOD, alkalinity levels, temperature and pH.