



Supporting Aeration Optimization Through Reliable Online Ammonium Monitoring

From Proven Performance to Reduced Maintenance with the NH6000sc & FX620



Plant Overview

Location	Denmark
Population Equivalent (PE):	Designed for 115,000 PE (loaded ~75-80,000 PE)
Influent Type:	Mixed domestic and industrial wastewater • Approx. 40-50% of COD load from dairy industry
Process:	Activated sludge – Bio-denitro (N/DN)
Aeration:	FBDA aeration (upgraded 2020)
Customer:	Envafors, Slagelse WWTP, Denmark

Treatment Steps:

1. Screening
2. Sand/grease removal
3. Primary clarification
4. Activated sludge (biology)
5. Final clarification
6. Sidestream hydrolysis (ARP rebuilt 2022/23)
7. Oxidation
8. Discharge

Sludge Handling:

- Anaerobic digestion with ~25 days residence time

Phosphorus Removal:

- Primarily **biological (Bio-P)**
- Chemical dosing ($AlCl_3$) when required, controlled via online measurements

Discharge Requirements

Parameter Limit

SS	20 mg/L
BOD	10 mg/L
COD	75 mg/L
Total P	1 mg/L
Total N	8 mg/L → 3.5 mg/L (from 2027)
NH ₄ -N	3 mg/L (winter), 2 mg/L (summer)

Current Performance (2025 average):

- Total N: 2.76 mg/L
- Total P: 0.56 mg/L

Background

Proven Process Control with Amtax sc

For many years, the plant has successfully controlled nitrification using:

- 2 × Amtax sc analysers
- Filtrax sampling system

This setup has:

- Delivered reliable ammonium measurements
- Enabled effective aeration control required to balance total N removal
- Supported compliance with strict discharge limits

→ **Importantly:**

The process was already performing very well

However, the limitation was:

High maintenance demand

Typical routine:

- Weekly filter cleaning
- Monthly acid cleaning
- Frequent cleaning reagent handling



Amtax sc

The Challenge

Despite strong performance, the plant required:

- Reduced maintenance workload
- Simplified instrument operation
- Increased robustness for future tightening limits

The Upgrade

In 2025, the plant replaced **one Amtax sc + Filtrax system** with:

- **NH6000sc ammonium analyser** (amtax successor 2025)
- **FX620 lightweight filtration system** (completely new filter design 2025)

Key Innovation

The NH6000sc platform introduces:

- Automatic sample line cleaning**
- Improved internal design
- Reduced dependency on manual maintenance
- Improved laboratory Quality Assurance Support with grab sample functionality



NH6000sc Ammonium Analyser

Real Operational Experience

Customer Statement:

“We have not needed to clean the filter or sample system for 6 months and only changed consumable fluids once between services, whereas previously we changed cleaning reagent approximately every 14 days.”

Performance Results

1. Maintenance Reduction

System	Maintenance Requirement
Amtax sc + Filtrax	Weekly cleaning + frequent reagent changes
NH6000sc + FX620	6 months without cleaning

- Dramatic reduction in manual intervention
- Significant time savings
- Covered under a 2 Visit WarrantyPlus contract for the NH+FX

2. Continuous High-Frequency Monitoring

- Measurement every **5 minutes**
- **4 reagent replacements per year**
(10-minute measurement = 2 reagent replacements per year)
- Stable filter operation over **6 months**
- No manual maintenance required during this period

3. Measurement Reliability

Because the system was new, validation was performed:

- Lab comparison with standards
- Random grab samples
- Results showed **excellent agreement and reliability**



Why Ammonium Monitoring Matters

Accurate ammonium measurement is critical for:

- Aeration control
- Energy optimisation
- Stable nitrification
- Avoiding over-aeration / optimising denitrification

This plant has demonstrated for years that:

Reliable NH₄ measurement directly enables excellent process performance

From Good to Better

The upgrade was not about fixing a problem — it was about improving an already strong process:

Amtax sc:

- Proven performance
- Reliable control
- High maintenance requirement

NH6000sc + FX620:

- Same strong control capability
- Much lower maintenance**
- Reduced cost of ownership
- Improved long-term stability

Future Compliance Readiness

Upcoming regulation:

- Total N limit: 3.5 mg/L (2027)

The NH6000sc + FX620 supports:

- Improved measurement confidence (grab sample validation)
- Higher resistance to instrument biofouling impacting data quality
- Fewer interventions which could cause instrument down time if not performed

Operation in Harsh Conditions

The installation operates:

- Outdoors
- In **cold seasonal environments** (-15 deg. C)

This demonstrates:

- Robustness
- Reliability in real-world conditions
- Suitability for Nordic climates



Julie and Ditte from Slagelse WWTP

Operational Impact

Before vs After

Parameter	Amtax sc	NH6000sc + FX620
Measurement quality	High	High
Maintenance frequency	Moderate	Very low
Operator workload	Significant	Minimal
Cost of ownership	Low	Low
Future readiness	Good	UWWTD recast ready

Key Takeaways

- The plant has **successfully controlled aeration using ammonium monitoring for years**
- Amtax sc played a **critical role in achieving excellent performance**
- The NH6000sc + FX620:
 - Builds on this success
 - Reduces operator maintenance significantly
 - Supports Validation QA lab tests
 - Improves readiness for stricter limits

Conclusion

At this Danish activated sludge plant treating mixed domestic and dairy wastewater:

- Strong performance was already achieved with Amtax sc
- The NH6000sc + FX620 upgrade delivers:
 - 6 months maintenance-free filter operation
 - Reduced workload
 - Continued & extended high-quality ammonium control
 - Secured future compliance readiness



SERVICE