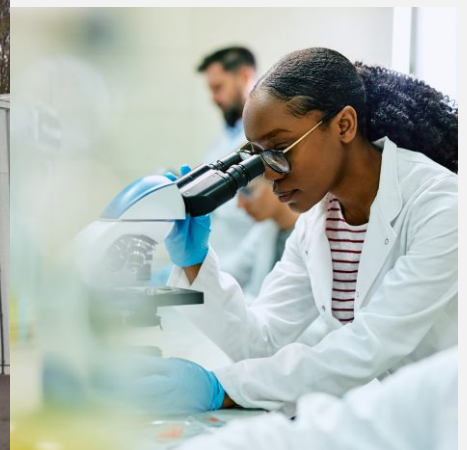
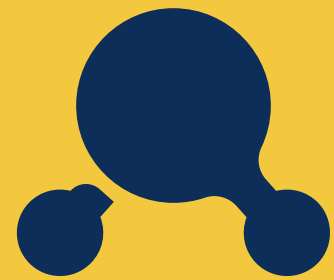


ANAMMOX[®]

Sustainable nitrogen removal

The ANAMMOX process is a very cost-effective and sustainable way of removing ammonium from effluents and ammonia from waste gas.



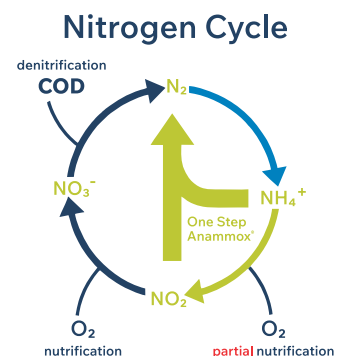


Cost-effective and sustainable nitrogen removal

The ANAMMOX® process is a very cost-effective and sustainable way of removing ammonium from effluents.

Compared to conventional nitrification/denitrification savings on operational costs can reach up to 60%, while CO₂ emission is reduced.

The ANAMMOX® conversion is an elegant shortcut in the natural nitrogen cycle. Anammox bacteria convert ammonium (NH₄⁺) and nitrite (NO₂⁻) into nitrogen gas. Paques developed the process for commercial purposes in cooperation with Delft University of Technology and the University of Nijmegen. Since the first full-scale plant started up in 2002 (treatment of the rejection water of a sludge digestion of a municipal WWTP), many other ANAMMOX® plants were implemented.



About ANAMMOX®

- Proven technology, > 20 years operational experience
- > 65 ANAMMOX® references worldwide
- Small footprint
- Robust system, handling high loading variations
- Saving on operational costs up to 60%
- Savings on excess sludge production
- Easy process control in one single continuously operated reactor unit
- No addition of organic carbon source (methanol) required

Technical description

The Anammox reactor is a reactor system in which nitrification and Anammox conversion occur simultaneously in one single process unit.

The natural nitrogen cycle involves various biological processes. Nitrification is the process where ammonium is oxidised to nitrite and nitrification is the process in which ammonium is fully oxidised to nitrate. Denitrification is the process which converts nitrate with addition of an organic carbon source to nitrogen gas. Anammox (anaerobic ammonium oxidation) conversion is an elegant short-cut in the natural nitrogen cycle where ammonium and nitrite are converted to nitrogen gas.

As the Anammox process involves removal of ammonium over nitrite (NO_2^-) rather than nitrate (NO_3^-) less oxygen (O_2) is required.

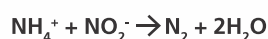
Applications

The ANAMMOX process can be used for the removal of ammonium from nitrogen rich effluents. These effluents are found in:

- Municipal waste water treatment (sludge rejection water)
- Organic solid waste treatment (landfills, composting, digestion)
- Food industries
- Manure processing industry
- Fertiliser industry
- (Petro) chemical industry
- Metallurgical industry
- Semi-conductor industry



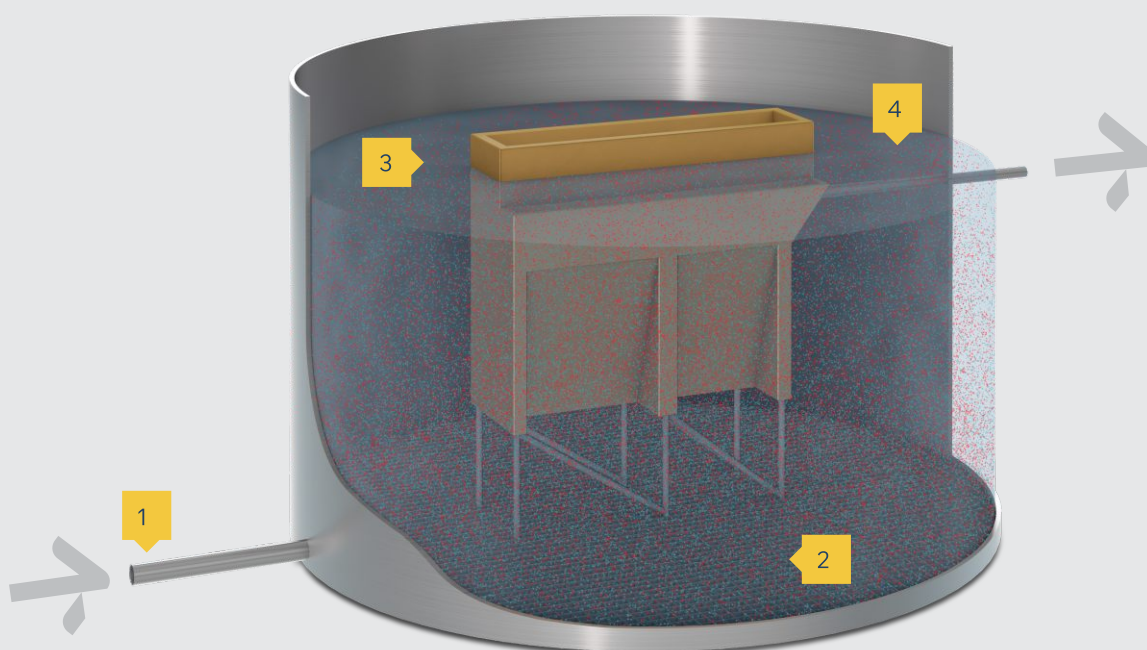
ANAMMOX® Reactor



Anammox bacteria
converting ammonium and
nitrite into nitrogen gas.

How ANAMMOX® works

1. Ammonia-rich influent
2. Aerators for mixing and ammonia removal process
3. ANAMMOX separator for biomass retention
4. Effluent exits the reactor



Together, we're leading the biotech revolution in wastewater and biogas

We are a leading force in biotech wastewater and biogas, driven by a community of scientists, problem solvers, application specialists and exceptional people who all believe in one thing: That protecting the world's water and resources is vital if we are to preserve our planet for generations to come.

Since we founded our company, we've pioneered and developed biotech solutions proven to help our customers' effectively and sustainably treat wastewater and generate biofuel to power their operations.

It's safe to say we've grown from our humble beginnings in Balk—to an international powerhouse with more than 3,300 installs in over 60 countries. Our expertise and technologies are trusted by many the world's most trusted companies.

Whether in brewing, pulp & paper, chemicals or food—we create partnerships that help businesses maximise their resources while reducing their impact.

Our unique blend of expertise, trusted technologies, and global network enables us to guide and empower our customers with solutions proven to help them meet their sustainability goals. By continuing to reinvent, refine, and renovate our technologies we can help protect the planet, communities and best serve our customers.

The world's resources are finite—but our potential is limitless. By working together—we can create a cleaner, more circular future that works for everyone.

Hampton

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