

PAQUES



Hi, I'm Ana.
I remove your
nitrogen!



ANAMMOX[®]

Sustainable nitrogen removal

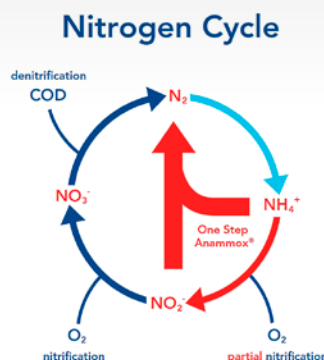
The ANAMMOX[®] process is a very cost-effective and sustainable way of removing ammonium from effluents and ammonia from waste gas.

revitalizing resources

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, > 15 years operational experience
- > 50 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

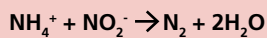
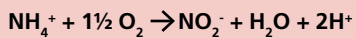
ANAMMOX[®]

Operation principle

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 (NO₂⁻) rather than nitrate (NO₃⁻) less oxygen (O₂) is required.

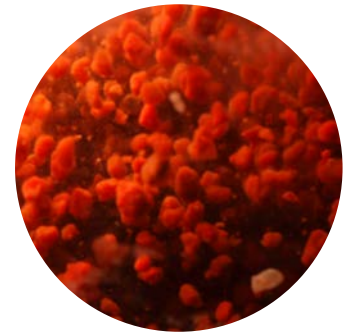


Applications

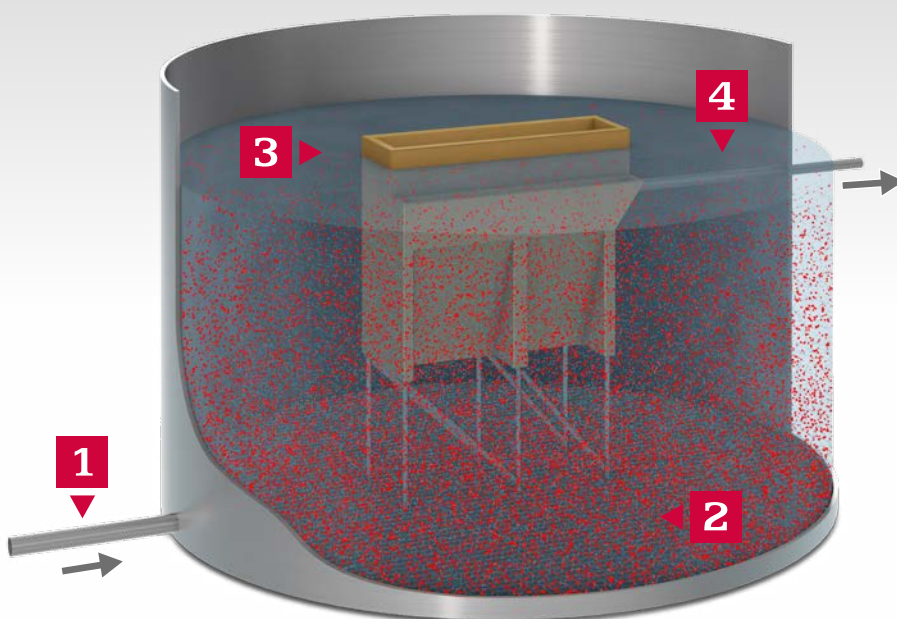
The ANAMMOX[®] process can be used for the removal of ammonium from nitrogen rich effluents.

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 bacteria converting ammonium and nitrite into nitrogen gas.



ANAMMOX[®], how it works

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

