



The ANITA™ Range

Sustainable and cost-effective solutions
for high-ammonia loaded effluents



Solutions & Technologies

Environmental and financial stakes

Following dewatering, sludge treated by anaerobic digestion produces liquid waste with high levels of ammonia. These concentrated effluents are sent back to the head of the plant for treatment, where they generate up to 20% increase in nitrogen load.

The energy required for aeration in the main biological process increases proportionally to the higher nitrogen load. This has a significant impact on the performance of the plant since approximately half of its energy consumption is dedicated to the biological nitrogen removal.

To address these challenges, **Veolia Water Solutions & Technologies (VWS)** has developed the **ANITA™** range for sidestream treatment.

ANITA™ offers sustainable and cost-effective solutions, adapted to any advanced sludge treatment. ANITA™ solutions contribute to the objective of an energy-neutral wastewater treatment plant while responding to more stringent regulation in terms of nitrogen concentration in treated water.

**Sidestream
Nitrogen
Removal**

ANITA™, cost-effective nitrogen removal

ANITA™ processes **drastically reduce operation costs** in a wastewater treatment plant.

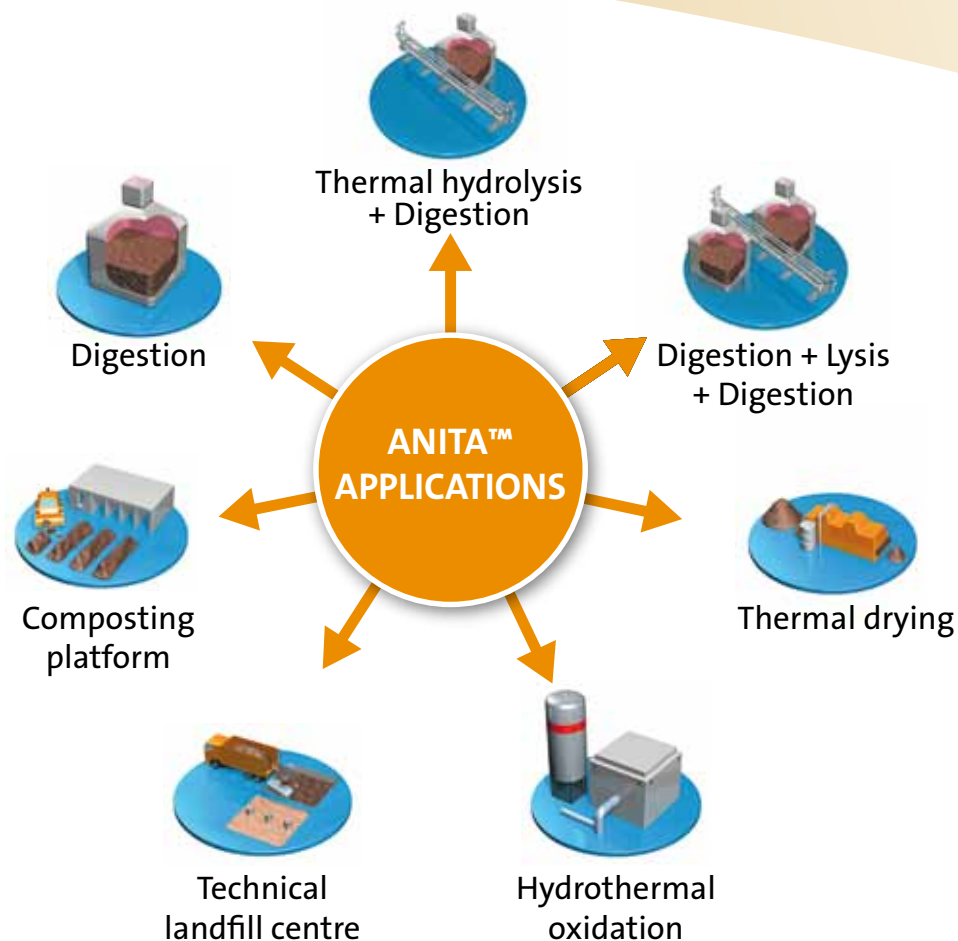
Energy and chemical consumption are significantly lowered while sludge production is decreased.

A truly ecological alternative

ANITA™ processes actively improve the environmental record of wastewater treatment plants by significantly lowering their carbon footprint.

Operation costs cut by 25 to 60%

Carbon footprint cut by up to 85%



ANITA™ solutions can be bundled with the following VWS technologies:

- Thermal Hydrolysis: Thelys™, Exelys™
- Thermal Hydrolysis + Digestion: Biothelys™, Exelys™ LD
- Digestion + Lysis + Digestion: Exelys™ DLD
- Hydrothermal oxidation: Athos™
- Thermal drying: Biocon™
- Downstream polishing treatment for anaerobic

LOW
CAPEX



ANITA™ Shunt, the smart SBR to treat high-ammonia effluents

ANITA™ Shunt is an innovative technology to eliminate ammonia in highly-loaded effluents while **meeting environmental objectives** in terms of carbon footprint reduction.

This process is ideal for plant upgrades or installations where **a simple solution for increased nitrogen removal** is required.

○ ● ● Operating principle

ANITA™ Shunt uses a traditional activated sludge operating under the nitrate-shunt principle to stop nitrogen oxidation at the nitrite stage (NO_2^-). The oxygen demand as well as the amount of external carbon required for denitrification are significantly reduced.

A Sequential Batch Reactor (SBR), where sludge is separated from water, is used to facilitate the process operation and allows for the nitrate-shunt to be performed under the best possible conditions. The quantity of biological sludge produced is also reduced.

ANITA™ Shunt is designed to treat highly-loaded effluents with a N-NH_4 concentration of over 100 mg N/l.

Once treated, effluents can be discharged in the environment or sent back to the head of the plant for further treatment, depending on local environmental legislation.

Where space is limited, ANITA™ Shunt provides an alternative to building new biological units on the main treatment line.

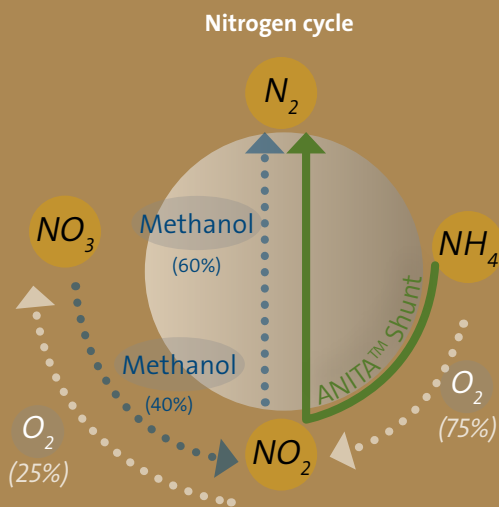


Epernay Wastewater
Treatment Plant,
France

The most ecological Nitrate-Shunt available

To minimize operation costs and reduce the carbon footprint of ANITA™ Shunt, Veolia Water Solutions & Technologies has opted for:

- Exogenous carbon sources reused from food and beverage industries instead of traditional methanol sources
- A patented, advanced control system to optimize operation by monitoring nitrites, ammonium and O_2 in the SBR



A versatile range of use

ANITA™ Shunt has numerous applications:

- Biological treatment coupled with anaerobic digestion using methanol during post-denitrification
- Leachate from sludge composting or co-digestion platforms
- Liquid from advanced sludge treatment following
 - > Thermal drying
 - > Hydrothermal oxidation
 - > Thermal hydrolysis + anaerobic digestion
 - > Anaerobic digestion
 - > Digestion + lysis + digestion

Key benefits

ANITA™ Shunt is an efficient, flexible and cost-effective solution you can trust.

- **25% less energy and 40% less external carbon source** required compared to conventional nitrification/denitrification
- **20% reduction in carbon footprint** with significant decrease in N_2O emissions
- Up to **95% nitrogen removal**
- Efficient at all temperatures of effluent to treat
- **Compact and flexible process**, easily adaptable for upgrading of existing plants
- **Quick and easy start-up** using conventional biomass
- Equipped with a high-performance **patented advanced control system**





LOW
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ANITA™ Mox, the smart MBBR to treat high-ammonia effluents

ANITA™ Mox is a sustainable and cost-effective alternative to traditional nitrification/denitrification to treat effluents highly loaded in ammonia.

With an ammonia removal efficiency of over 80% with **no use of external carbon source and at a very low energy cost**, ANITA™ Mox is well-suited to efficiently reduce the operating cost and improve the environmental record of a wastewater treatment plant.

Operating principle

The ANITA™ Mox solution combines an aerobic and an anoxic process into one Moving Bed Biofilm Reactor (MBBR), using both conventional nitrite producing bacteria and a specific Anammox biomass. Contrary to traditional denitrification, there is no need for any costly external carbon source, such as methanol.

The high-ammonia effluent flows into a MBBR reactor filled with carriers which are kept in suspension by aeration and mixers. These carriers are specially designed for ammonia oxidating bacteria to develop as biofilm. Specific conditions related to temperature and oxygen level are maintained within the MBBR to encourage the growth of this biofilm.

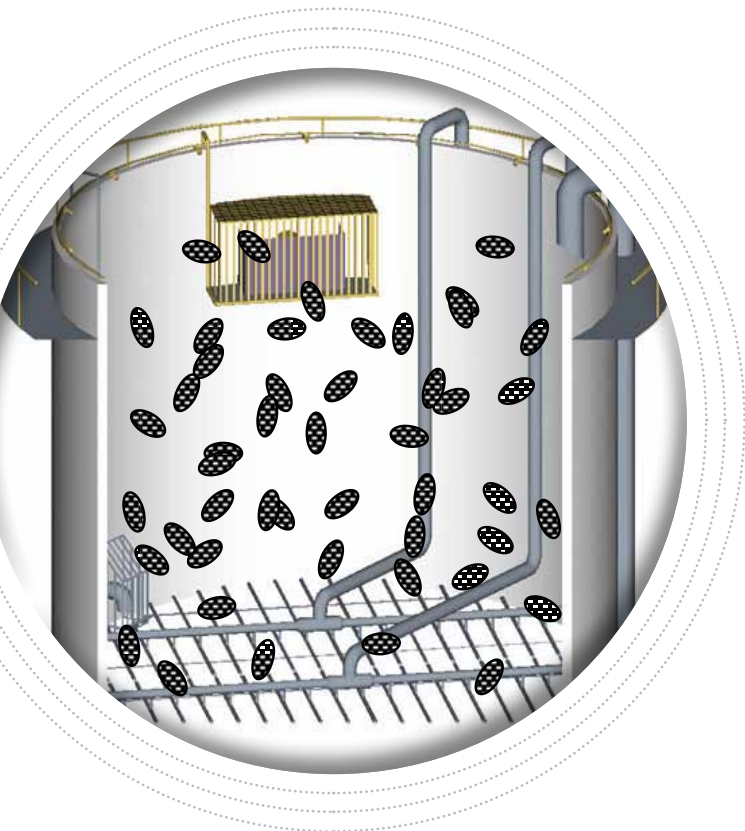
The use of the ANITA™ Mox process on reject water dramatically reduces the nitrogen load on the main treatment line and is a great solution to upgrade an overloaded existing wastewater treatment plant at a competitive cost.

○ ● ● A versatile range of use

ANITA™ Mox provides an efficient and sustainable answer to:

- Treat liquid from advanced sludge treatment following
 - > Anaerobic digestion
 - > Thermal hydrolysis + anaerobic digestion
 - > Digestion of organic waste
- Downstream polishing treatment for anaerobic treatment systems
- Treat leachate from waste landfills

ANITA™ Mox is also especially well-suited for treatment of reject streams from wastewater treatment plants equipped with biofiltration or MBBR processes with post-denitrification.



○ ● ● Key benefits

ANITA™ Mox is the most economic solution to treat ammonia in terms of operating costs.

- **60% savings on oxygen** due to less aeration required compared to conventional nitrification/denitrification
- **No carbon source needed**, reducing operating costs and environmental impact
- **Compact and flexible process**, easily adaptable for upgrade of existing plants
- **90% reduction in sludge production** due to slow growing bacteria
- **Robust process** with low sensitivity to temporary fluctuations (toxicity and nitrogen concentration)
- **Over 85% reduction in CO₂ emissions**
- **Quick start-up** by using pre-colonized media developed in BioFarms

A BioFarm solution for fast start-up

BioFarms are used as nurseries to grow Anammox bacteria on suspended carriers. A small percentage of this pre-colonized media is introduced into MBBR units during start-up, accelerating seeding of the new media and considerably bringing down start-up times. This method is managed by an advanced control system allowing better reactivity of the process during the start-up phase.



Malmö-Sjölunda Wastewater Treatment Plant, Sweden

Your contact

