

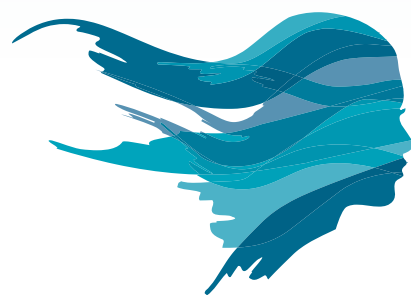


AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

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AquaNereda®

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Aerobic Granular Sludge System

The AquaNereda® Aerobic Granular Sludge System is an innovative biological wastewater treatment technology that provides advanced treatment using the unique features of aerobic granular biomass.

An aerobic granular biomass is comprised of compact granules, which are a layered microbial community that provides superb settling properties. Within a single tank, the system creates proper conditions to develop and reliably maintain a stable granule, without a supplemental carrier. The granule layered aerobic and anaerobic zones allow for simultaneous processes to take place in the granular biomass, including enhanced biological phosphorus reduction, and simultaneous nitrification and denitrification.

The unique process features of the AquaNereda system translate into a flexible and compact process that offers energy efficiency and significantly lower chemical consumption.

System Features and Advantages

- Optimal biological treatment is accomplished in one effective aeration step
- Settling properties at SVI values of 30-50 mL/g allow MLSS concentrations of 8,000 mg/l or greater
- Four times less space required compared to conventional activated sludge systems
- Energy savings up to 50% compared to activated sludge processes
- No secondary clarifiers, selectors, separate compartments, or return sludge pumping stations
- Proven enhanced nutrient removal (ENR)
- Robust structure of granule withstands fluctuations in chemical spikes, load, salt, pH and toxic shocks
- Significant reduction of chemicals for nutrient removal due to the layered structure and biopolymer backbone of the granule
- Ease of operation with fully automated controls
- Lowest life-cycle cost



SVI5 comparison of aerobic granular sludge (left) and conventional activated sludge (right)

Typical Applications

- Retrofit of existing tanks, increasing treatment capacity
- Upgrade of existing treatment systems to meet BNR requirements
- New construction plants
- Municipal and industrial



Three AquaNereda® reactors show compact design, typically 50% of a conventional plant.

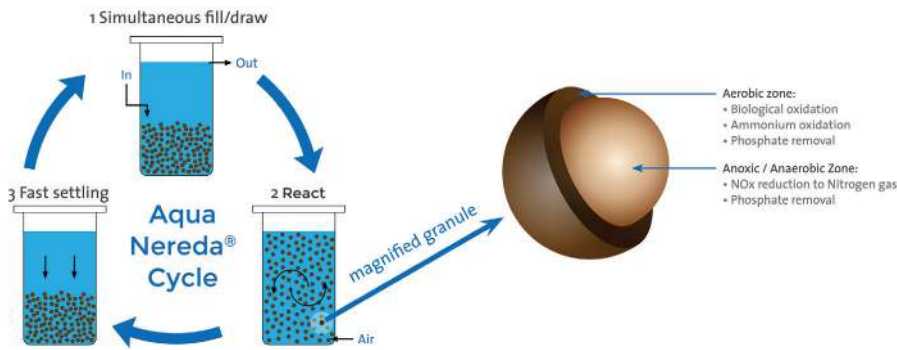


Treated effluent produced from an AquaNereda® reactor.

AquaNereda®

Batch Cycle Structure

Based on the unique characteristics of granular biomass, the AquaNereda® Aerobic Granular Sludge System uses an optimized batch cycle structure. There are three main phases of the cycle to meet advanced wastewater treatment objectives. The duration of the phases will be based upon the specific waste characteristics, the flow and the effluent objectives.



Phases of Operation

1

Fill/Draw Phase

- Influent flow, substrate and readily available carbon source enter the reactor
- Anoxic and anaerobic conditions are present
- Biomass conditioning phase
- Phosphorus release to promote enhanced bio-P removal
- Treated water is discharged

2

React Phase

- Influent flow is terminated
- The biomass is subjected to aerobic and anoxic conditions
- Simultaneous nitrification/denitrification occurs
- Nitrate is transported by diffusion between outer aerated and inner anoxic layers of the granule, eliminating the need for pumping large recycle flows in the plant
- Luxury uptake of phosphorus is promoted
- Automated control of the process allows energy savings and process optimization

3

Settle Phase

- Influent flow does not enter the reactor
- Granular biomass is separated from the treated water during a very short settling phase
- Excess sludge is wasted in order to maintain the desired amount of biomass
- The system is ready for a new cycle

The Development of Nereda®

A public-private research partnership in the Netherlands between the world-renowned Delft University of Technology, research institutes, water authorities and Royal HaskoningDHV led to the invention of the first technology applying aerobic granular sludge for the treatment of wastewater.



Royal HaskoningDHV

Since its development, Royal HaskoningDHV has transferred the process into an internationally applied, sustainable and cost-effective wastewater treatment technology. After 20 years of research and development, this innovative biological solution is now proving to be one of the most sought-after, progressive wastewater treatment technologies.

Aqua-Aerobic Systems, Inc.

In 2016, Aqua-Aerobic Systems partnered with Royal HaskoningDHV to expand aerobic granular sludge into North America and is the exclusive provider of this technology in the United States.

Providing **TOTAL** Water Management Solutions

Visit our website at www.aqua-aerobic.com to learn more about the AquaNereda® and our complete line of products and services:

Aeration & Mixing

Biological Processes

Filtration

Disinfection

Membranes

Controls & Monitoring Systems

Aftermarket Products and Services

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