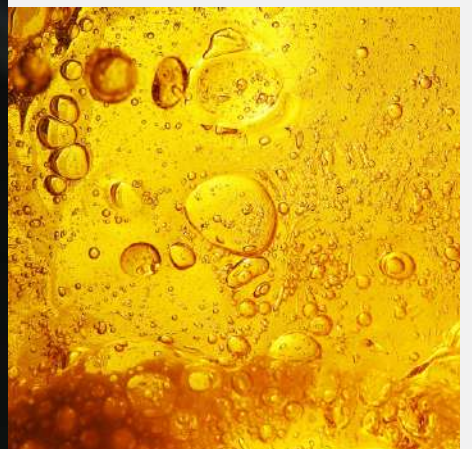


# PHOSPAQ™

## Sustainable phosphorus recovery

The PHOSPAQ™ process is the cost-effective and sustainable solution for removing and recovering phosphorus from industrial effluents and municipal sludge reject liquors.





# Sustainable phosphorus recovery

The PHOSPAQ™ process is the cost-effective and sustainable solution for removing and recovering phosphorus from industrial effluents and municipal sludge reject liquors. It prevents uncontrolled struvite scaling and produces a slow-release fertilizer.

## The PHOSPAQ™ process

The PHOSPAQ™ process was developed by Paques as a commercial solution to recover phosphate and prevent uncontrolled struvite scaling. The recovered phosphorus remains biologically available, in contrast to phosphate that is removed by iron salts. This way the PHOSPAQ™ process contributes towards a closed phosphorus cycle and a sustainable economy.

## The PHOSPAQ™ advantages

The PHOSPAQ™ process introduces the possibility for modular upgrade from  $\text{PO}_4$ -removal to P-recovery. Dosing of  $\text{MgO}$  instead of  $\text{MgCl}_2$  eliminates the need for additional dosing of caustic soda ( $\text{NaOH}$ ). Struvite formation is robust, with high tolerance to solids.

## About PHOSPAQ™

- Struvite is a valuable fertiliser
- Struvite up to 70-95% dry solids
- Simultaneous P recovery and BOD removal
- Simple tank geometry
- Only dosing of magnesium oxide
- Caustic soda dosing not required
- > 15 PHOSPAQ™ references
- Proven and stable process
- Full scale experience since 2006

## Operation principle

The PHOSPAQ™ process is a continuously aerated reactor in which phosphorus ( $\text{PO}_4\text{-P}$ ) is recovered by controlled precipitation of magnesium-ammonium-phosphate crystals (struvite). Magnesium is dosed as  $\text{MgO}$ , which reacts with the phosphate and ammonium in the water:



## Applications

The PHOSPAQ™ process is the preferred technology in combination with ANAMMOX® for ammonia removal, as it:

- adds alkalinity ( $\text{MgO}$ )
- removes BOD and inhibiting compounds
- prevents uncontrolled struvite scaling

The combination PHOSPAQ™ – ANAMMOX® offers a compact and cost-effective solution to nutrient-rich effluents. The PHOSPAQ™ process has proven its robust performance since its commercial introduction in 2006.

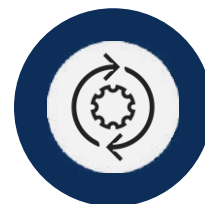
- incoming phosphate > 50 mg P/L
- references for 60 – 1100 kg P/d
- removal efficiencies > 80-90%



Struvite dewatering



Struvite crystals from PHOSPAQ™

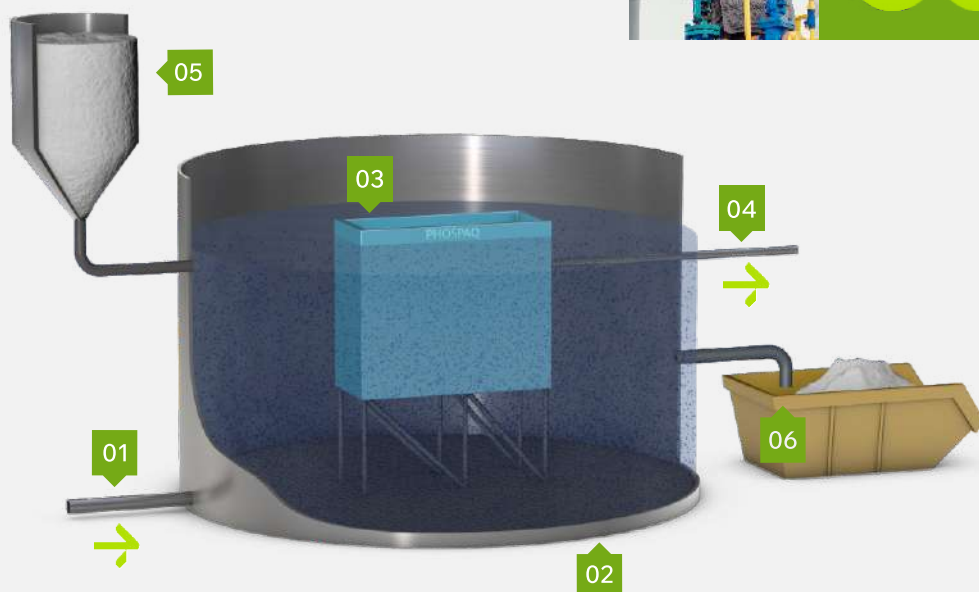


Pelletized struvite product



Recovered phosphate used as fertilizer

PHOSPAQ™ Reactor



## PHOSPAQ™ process

- 01 Phosphate rich Influent
- 02 Aerators grid for mixing
- 03 PHOSPAQ™ separator for struvite retention
- 04 Effluent from reactor
- 05  $\text{MgO}$  dosing
- 06 Struvite harvesting

## 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 customer 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 of 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 innovate 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.

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