

Targeted micropollutant removal with the smallest possible space needed.

- ✓ Removal of micropollutants by adsorption onto powdered activated carbon
- ✓ Integration into existing basin infrastructure possible
- ✓ Significantly higher loads can be achieved with the same basin volume

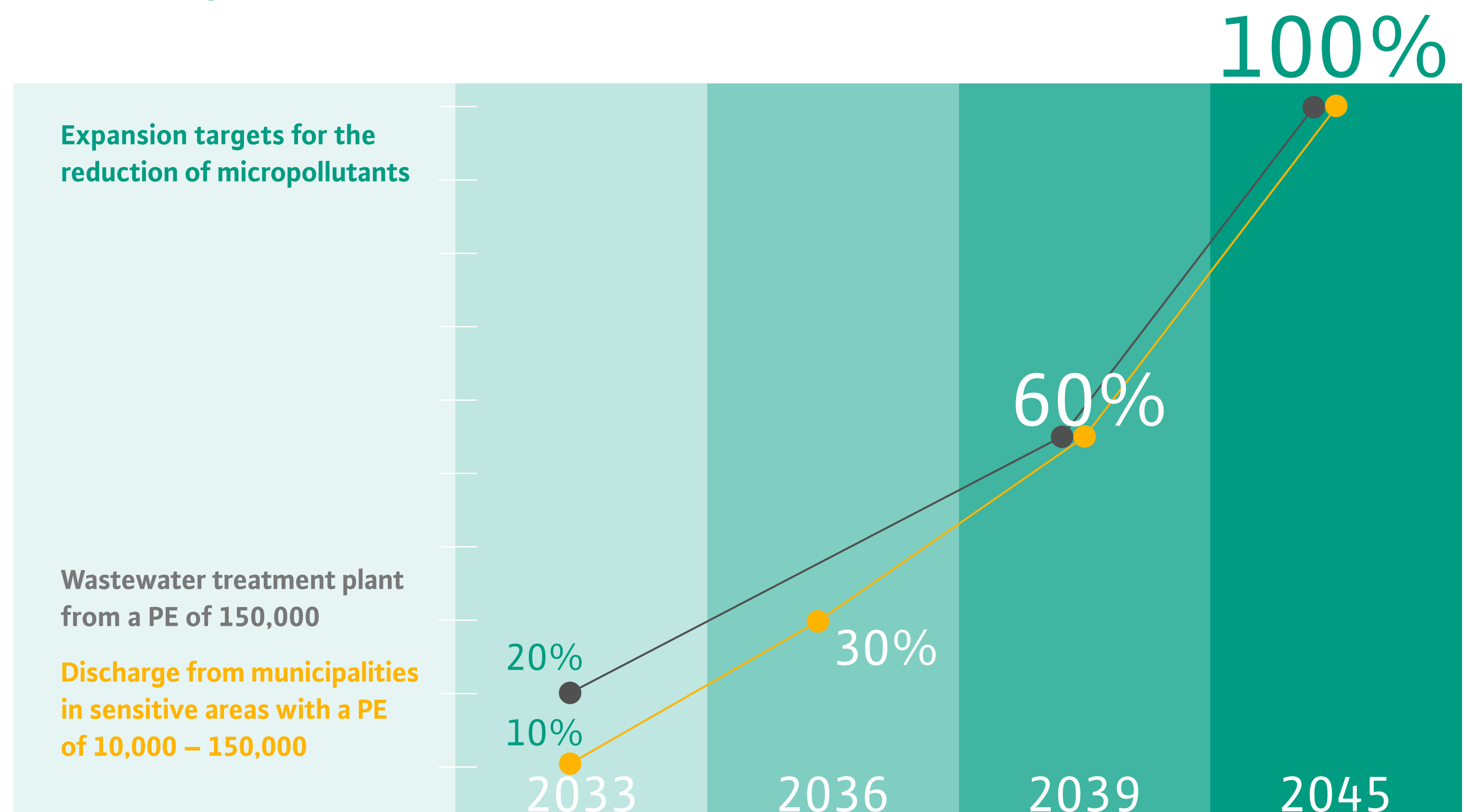


Higher demands, higher flow rate – but low on space?

As operators of wastewater treatment plants with limited or no capacity for expansion, you'll come up against two major challenges in the future:

- How do you meet the requirements of the new EU Urban Wastewater Directive with the existing basin infrastructure?
- How can your system cope with a higher load (due to an increased population equivalent, for example) if there is no room for building additions?

The new EU Urban Wastewater Directive mandates that specific micropollutants be removed, which must be implemented in stages. Wastewater treatment plants with a population equivalent of 150,000 or more as well as those with a population equivalent of 10,000 or more in sensitive areas have to reduce numerous defined key micropollutants to a specified extent by as early as 2033.



Wilo's solution: exceed high demands and secure operating processes in the long term

Integrating targeted micropollutant removal by adding powdered activated carbon (PAC) to the biological cleaning stage is an optimal solution for operators of wastewater treatment plants with limited or no capacity for expansion. Wilo offers the perfect components for this with highly effective MBR filters and powerful recirculation pumps – making it possible to meet tomorrow's requirements today. No need for additional basins, but fulfilling important parameters for process and operational security:

- Reliable micropollutant removal in accordance with the EU Urban Wastewater Directive
- Also removes almost all bacteria (including antibiotic-resistant bacteria) and viruses
- Retains all microplastics and suspended activated carbon
- Higher loads can be achieved with the same basin volume as a result of the higher activated sludge concentration
- High energy efficiency using state-of-the-art IE3/IE4 motors from Wilo
- Durable components ensure high operational reliability



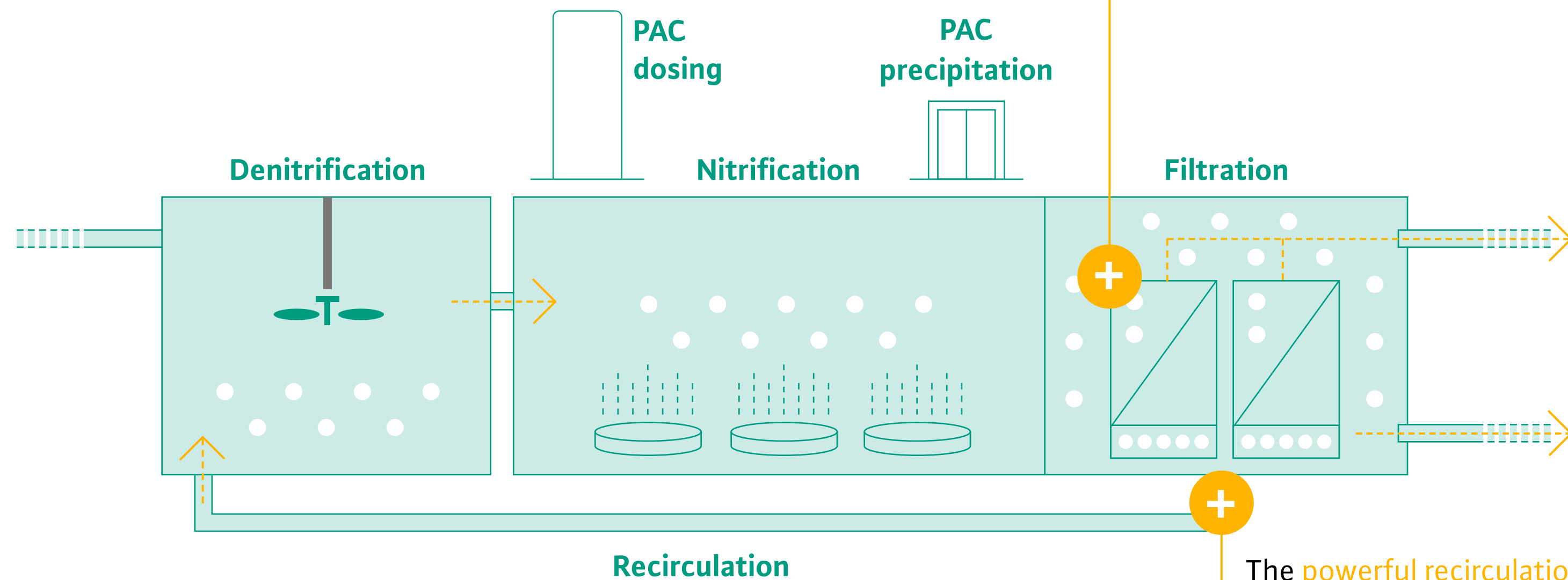
Ensure legal requirements are met, even with more stringent environmental requirements.

Same basin, new performance.

Removal of micropollutants using the powdered activated carbon process. Here's how the process works:

To implement the targeted removal of micropollutants in your existing infrastructure, a few components must first be integrated: Part of the existing nitrification tank will be converted into a membrane bioreactor (MBR). The membrane filters are installed directly in the activated sludge tank. Powdered activated carbon and precipitating agents are dosed via dosing systems and a recirculation pump reliably returns the fluid. Using a membrane filter ensures completely solids-free discharge.

MBR filters ensure activated sludge, finely suspended powdered activated carbon, bacteria, microplastics and nanoplastics as well as certain viruses are safely retained.



The **powerful recirculation pump** pumps activated sludge, PAC and nitrate back into the denitrification basin.



The advantages:

- Fully complies with the EU Urban Wastewater Directive
- Removes almost all bacteria and viruses
- Retains all microplastics and even the finest activated charcoal
- Higher activated sludge concentration possible (8-15 g/l instead of 3-6 g/l)
- Up to 50% higher load can be achieved with the same basin volume
- Secondary clarifier no longer needed – it can be used for other purposes or dismantled

Safely retains unwanted substances: the MBR filter.

With over 80,000 membrane modules installed, the Wilo subsidiary Abionik is the proven specialist for pioneering membrane technology. The ultrafiltration membrane in Abionik's MBR filter used for wastewater treatment physically separates the smallest particles down to colloids from liquids as a result of its defined pore size ($< 0.1 \mu\text{m}$). The membrane retains these substances without physically or chemically changing them. High-grade plastics and optional stainless steel components ensure the submerged MBR filters boast excellent quality and a long service life. The compact and robust design means it requires little space and so can be ideally integrated into existing infrastructure.

- **Material: Polyethersulfone (PES) or polyvinylidene fluoride (PVDF)**
- **Separation size: Ultrafiltration**
- **Pore size: (nominal) approx. 35 nm**
- **Pore size: (maximum) $0.1 \mu\text{m}$**
- **Membrane firmly bonded through integral welding for a long service life**
- **High energy-saving potential through the use of an air-cycling valve**

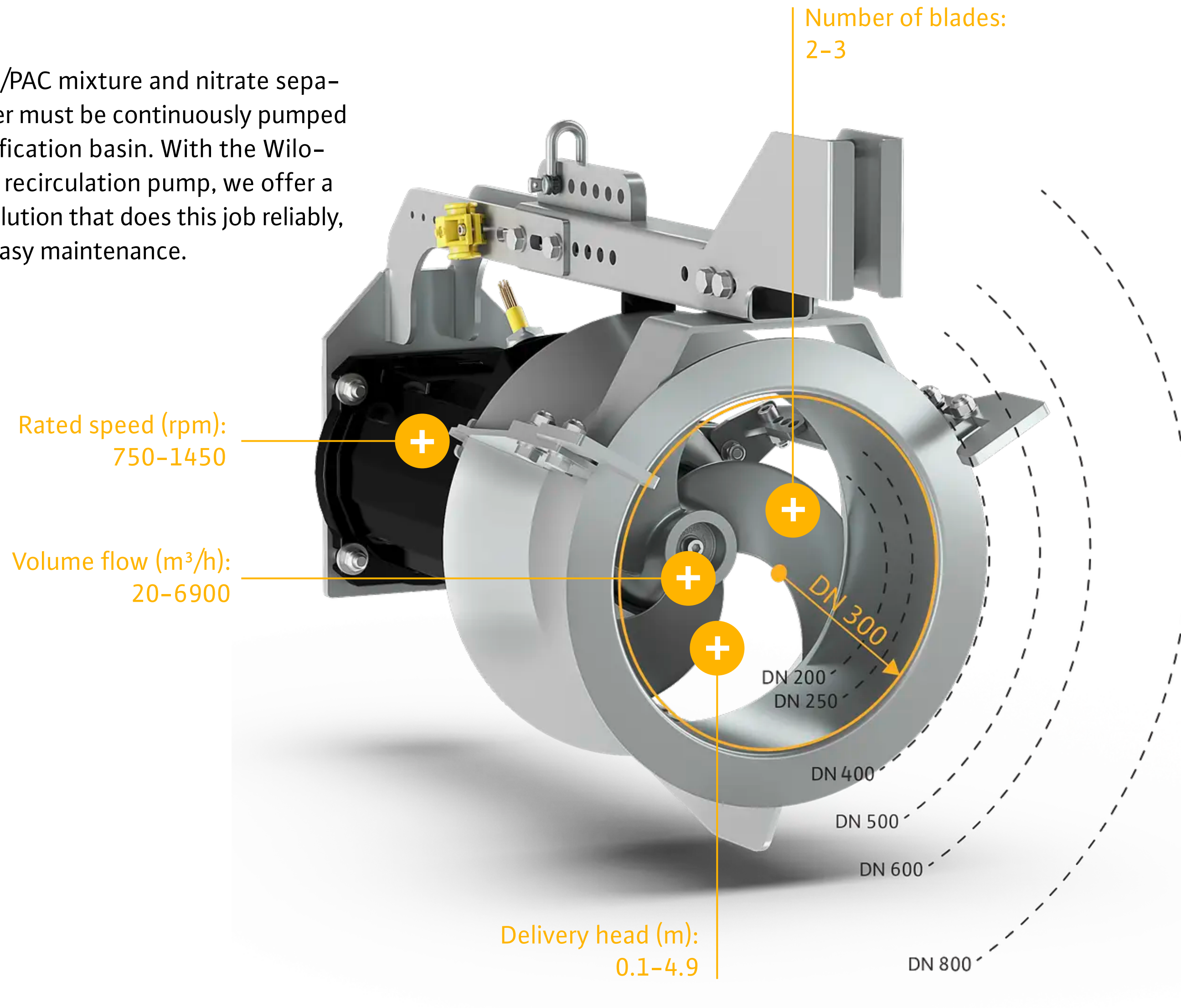


The advantages:

- Removes almost all bacteria and viruses
- Also removes a large amount of antibiotic-resistant bacteria
- Retains all microplastics
- Stainless steel and plastic module frame ensures reliable operation
- Can be flexibly integrated into any basin design with the modular system
- High discharge quality with potential for reuse in accordance with the EU Water Reuse Regulation

Reliably on the move: Wilo-Flumen EXCEL-RZPE

The activated sludge/PAC mixture and nitrate separated by the MBR filter must be continuously pumped back into the denitrification basin. With the Wilo-Flumen EXCEL-RZPE recirculation pump, we offer a high-performance solution that does this job reliably, efficiently and with easy maintenance.



The advantages:

- Low clogging rate and reliable operation with optimised hydraulics
- Low-wearing, stainless steel investment-cast propellers with minimal cavitation tendency
- Reduction of the energy and operating costs due to the standard use of IE3 motors for the best possible thrust coefficient
- Easily adapted to system parameters using optional frequency converters
- Easy installation and removal, even when the basins are filled, due to lowering devices and screwless coupling
- Installation close to the ground ensures low cleaning effort as deposits are prevented when the basin is emptied



Because the future matters: technology and expertise made by Wilo.

As a complete system provider of pumps and pump systems, the Wilo Group, headquartered in Dortmund, has been a competent partner for water management for decades. Over 9,000 employees and 60 production and sales offices ensure that municipal operators benefit from innovative, durable products for efficient and safe water treatment.

However, our claim and promise “Pioneering for you” goes far beyond just developing future-focused and durable technologies. Whether they be operators or specialist consultants, we offer all our customers and users support and assistance in a spirit of partnership right from the start.

Make the most of the in-depth process competence of our experts:

- Support for your individual design by Wilo engineers and sewage treatment specialists
- Precise selection, optimum integration and configuration of all products to meet your requirements and goals
- Support from professional CFD simulations

We’re at your side with an uncompromising commitment to quality and a passion for technology to ensure that the precious resource of water can be used for generations to come.

Tried and tested: other components for efficient sewage technology

With experience, knowledge and one eye on the future, we develop products that play a key role in the entire water treatment process. The focus is always on maximum operational reliability, efficiency and smooth maintenance processes – this also includes the targeted removal of micropollutants in particular.

Whether PAC or GAC:
Take advantage of Wilo's process expertise



Vertical mixer

Wilo-Vardo WEEDLESS

The slow-running vertical mixer with gear motor in dry installation for stationary assembly ensures optimum, reliable mixing of activated sludge and PAC in PAC contact basins.

- Optimal mixing
- Wear-resistant propeller material ensures process reliability
- Customised building connection ensures easy installation for existing systems
- Standard IE3 and IE4 motors ensure low energy consumption
- System-specific selection of the flow direction either to the basin floor or vertically upwards
- Operation with frequency converter possible
- System-specific dimensioning

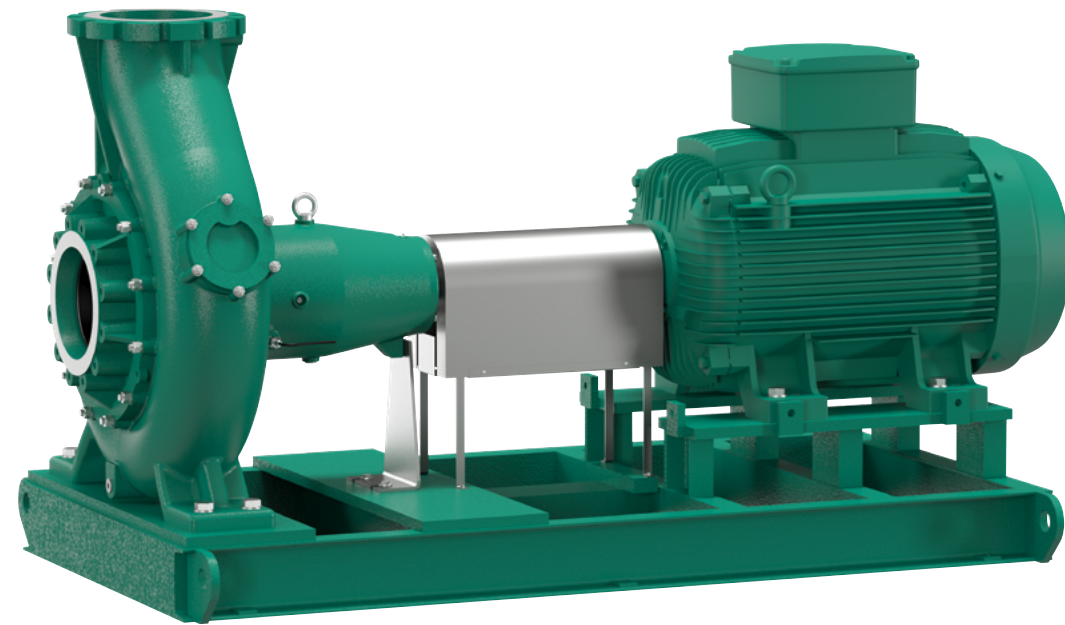


Submersible mixer

Wilo-EMU TR/TRE

Slow-running submersible mixer with two-stage planetary gear for homogenisation and flow generation in sludge-activation and PAC contact basins.

- The innovative blade design and energy-efficient IE3/IE4 motors (based on IEC 60034-30-1) ensure the best possible thrust coefficient, which reduces your energy and operating costs
- Low-wearing, self-cleaning GFK/PA6 propellers guarantee high reliability and durability
- The balanced propeller load allows for smooth running, even in high thrust ranges and when inflow conditions are unfavourable
- Operation with frequency converter possible



Sewage pump Wilo-Rexa NORM

The economical and reliable sewage pump with low-clogging free-flow, single-channel or multi-channel impellers for stationary dry installation – also suitable for continuous operation.

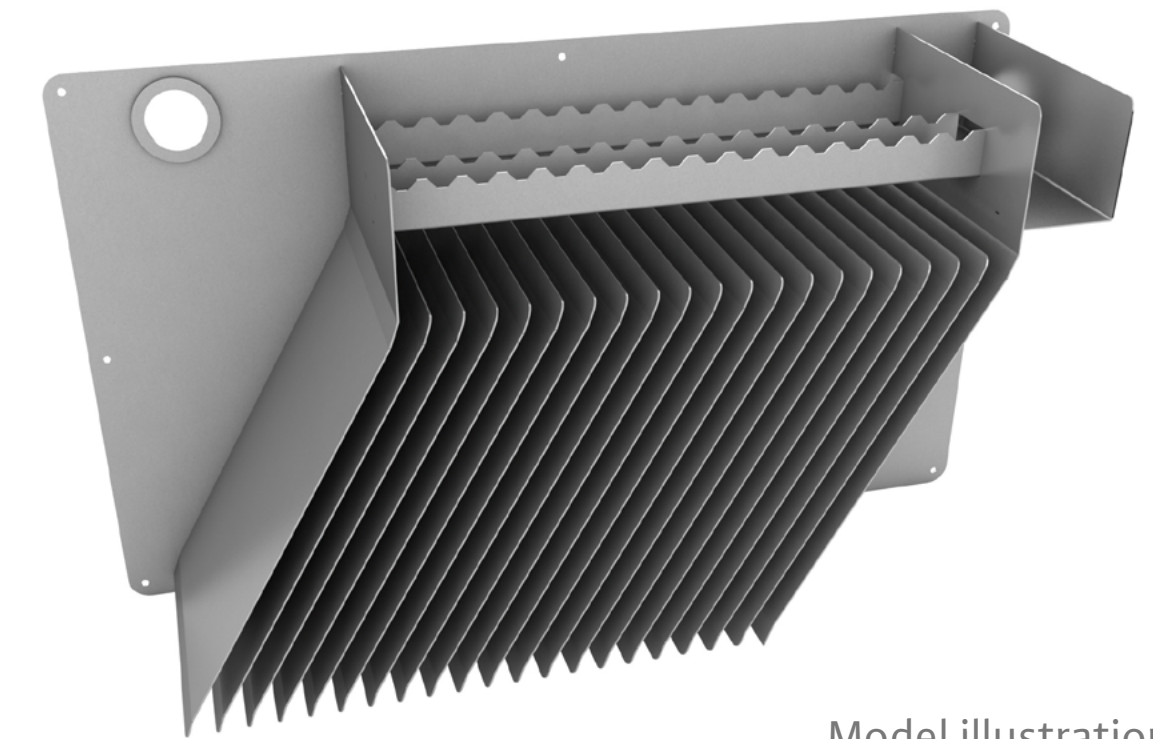
- Optimised impellers and low NPSH values facilitate smooth operation – even under partial or overload conditions
- High overall efficiency ensures low operating costs
- Optimised design in the bearing bracket and additional sealing gap on the mechanical seal on the fluid side provide high reliability
- Easy impeller replacement due to back pull-out design and spacer coupling as standard. This makes it possible to remove the impeller without dismantling the hydraulics from the pipeline and the motor from the baseplate
- Shut “Back pull out” unit: Dismantling without draining the oil in the sealing chamber



PAC precipitation Abionik dosing system

Reliable control of certain processes such as flocculation or neutralisation by precisely adding chemicals or additives to the sewage. A defined quantity of treatment chemicals in a specific mixing ratio ensures efficient wastewater treatment.

- Formation of PAC flakes with better settling properties
- Phosphate removal using precipitants (iron salts)
- Solids, liquids or gases can be dosed both continuously and intermittently over a certain period of time
- Meets high standards for operational reliability and a safe working environment



Model illustration

Diagonally inclined lamella separator from Abionik

The space-saving alternative to the sedimentation basin – also as part of the downstream PAC process – allows suspended PAC to be separated.

- Compact design with fixed, diagonally arranged lamella with large settling surfaces in the smallest of spaces
- The special separator geometry with large settling areas guarantees high sedimentation performance
- No additional energy requirement
- Modular, expandable system for both new units and retrofitting



Take a step towards the future with Wilo.

The EU Urban Wastewater Directive on the removal of micropollutants is coming – get in touch with us today to discuss how to implement it in your system. This gives you the certainty early on that you will secure the water treatment of the future to an even higher degree than required with Wilo's expertise and technology.

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