

Pioneering for You

wilo

Application brochure

Wilo systems for wastewater treatment. Solutions for wastewater treatment plants.



Wilo – Pioneering for You.



We are there for you worldwide.

Since 1872, we at Wilo have been turning visionary ideas into intelligent solutions that regularly set new standards in the industry. The goal of our company founder, Caspar Ludwig Opländer, was to use his *Kupfer- und Messingwarenfabrik* to improve and facilitate the supply of water to people. It was not long until the decisive step was made: In 1928, his son Wilhelm designed the world's first circulation accelerator.

We have continued this tradition ever since with pioneering innovations, such as the world's first high-efficiency pump in the heating, air-conditioning and cooling sector, and at the same time we have proven our commitment to using valuable resources such as energy and water responsibly. Today, with its headquarters in Dortmund, the Wilo Group is a complete system supplier of pumps and pumping systems for water management with worldwide presence.

Cooperative support on which you can rely on.

With over 7,500 employees and 60 production and sales companies all over the world, we personally see to it that the desires and requirements of our customers and users – whether specialist consultants, operators, or general contractors – are optimally met every day. This means making your life and work as easy as possible with the help of our products, solutions and services.

“Pioneering for You” is our commitment to a clear customer focus, strict quality orientation and strong passion for technology. In times of dwindling natural resources, the responsible management of water is an extremely important task, which is why we are committed to providing pioneering developments, sustainable product solutions, and cooperative support to ensure you can rely on our solutions for the daily management of water. That’s what we call Pioneering for You.

“Global expertise to meet your local needs,

that’s what I call Pioneering for You.”



Hu Mei, Water Management
Technical Support, WILo China Ltd.

Intelligent solutions for the wastewater treatment circuit.



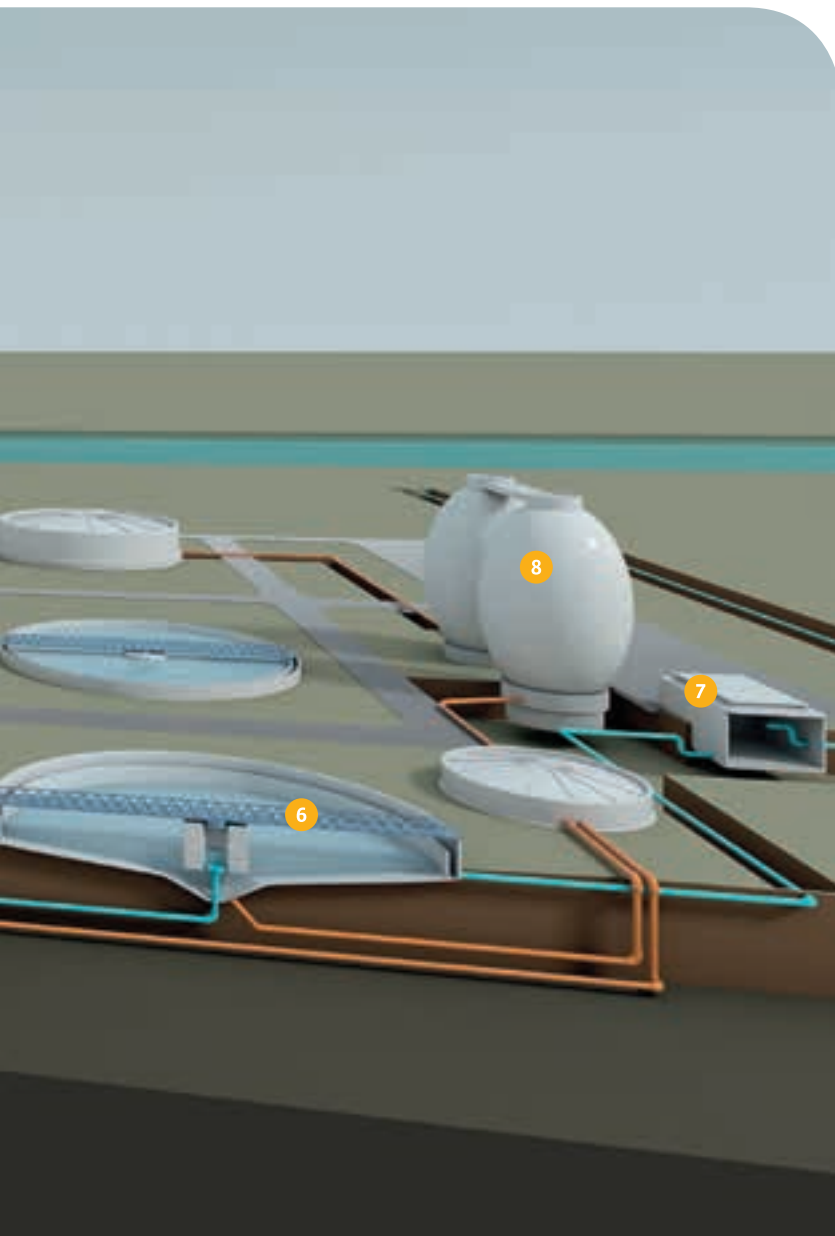
You can rely on that.

Our experts provide you with personal support in every phase of the project, from design and configuration, through to commissioning and maintenance. And our systems and product solutions set new standards in terms of technical performance, cost efficiency, security standards, and durability – in all applications relating to wastewater treatment.

Wilo – the right partner to address your challenges.

With regard to world climate change, low energy consumption is a key market topic. The cost pressure on municipal or private suppliers is rising. Challenges are growing. These include an increasing amount of solids in wastewater, a growing number of regulations, and stricter legal requirements. Against this backdrop, Wilo is a partner on whom you can fully depend in all areas.

This brochure introduces a selection of applications relevant to the topic of wastewater treatment. This is only a section of our entire portfolio. Just ask us what we can do for you.



- 1 Stormwater retention tank
- 2 Intake pumping system
- 3 Mechanical cleaning
- 4 Primary treatment
- 5 Biological treatment/ sludge activation
- 6 Secondary treatment
- 7 Discharge pumping station
- 8 Sludge treatment

Stormwater retention tank.

Protection for the subsequent processes.



Ceram – effective protection against abrasion and corrosion

Just like a second skin, the two-component Wilo Ceram coating protects against corrosion and abrasion.

- compared with other coatings it offers the best protection against aggressive media
- actively prevents wear and chemical attacks
- thus ensures optimum functionality and performance at all times
- significantly reduces maintenance-related downtimes
- considerably increases the service life of pumps and units
- exclusively protects Wilo pumps

Application:

When supplying sewage to the wastewater treatment plant, two different systems are used. The major difference between them: The mixing system directs waste and rainwater to the wastewater treatment plant together in a single channel, whereas in the separation system, separate channels are used. The mixing system usually has to be relieved by a rain overflow or a stormwater retention tank so that the wastewater treatment plant isn't hydraulically overloaded.

Challenge:

The incoming rainwater is extremely contaminated after long dry periods and the solid material also settles due to its long residence time in the stormwater retention tank. Owing to increasing incidents of heavy rain, the sudden, rapid intake of large quantities of water also plays a role. Therefore, after long downtimes the pumps need to be able to function reliably and reach peak performance immediately.

Wilo solution:

Our Wilo-Rexa PRO runs whenever it is needed. The sewage pump series is available as a standard product and configurable system for individual requirements. Due to the optimum harmonisation of the motor and hydraulics, high reliability of all components and low energy consumption, it can deal with different tasks reliably. One of its greatest strengths is its ability to completely empty the basin.

**Wilo-Rexa PRO, the reliable one****Design:**

- Submersible sewage pump

Application:

- For the disposal of discharge water or wastewater or sewage from pumping stations, sumps, and basins
- Stormwater retention tanks
- For intermittent or continuous operation in wastewater treatment plants

Volume flow:

max. 95 m³/h

Delivery head:

max. 29 m

Special features/product advantages:

- Reliable vortex hydraulics with large free ball passage for operation that is non-susceptible to clogging
- Heavy-duty design completely made of cast iron
- Optionally with energy-efficient IE3 motor technology
- Pluggable, longitudinally watertight motor cable for maximum safety with minimal effort
- Ex-approved in accordance with ATEX as standard
- Optionally with installed external sealing chamber control for the oil barrier chamber

Intake pumping station. One step higher.



First class impeller geometries

Effective and reliable – that is how SOLID works, the innovative Safe Operation Logic Impeller Design by Wilo.

- combines the advantages of a non-clog impeller and a vortex impeller
- increases the reliability of the pumping of untreated sewage with high solids content
- available in closed design for low vibration, very smooth running and efficiency of up to 82%
- or as a half-open variant for increased operational reliability in smaller nominal sizes



Application:

The intake pumping station raises the sewage from the wastewater treatment plant to enable it to be fed into the pre-treatment facility, usually through downstream rakes, sieve drums, sand and grease collectors. Submersible sewage pumps are often used in addition to screw systems for pumping sewage. There are two types of installation here.

Challenge:

With wet well installation, the pump is installed in the fluid to be pumped, which cools the motor during operation. The advantage is that this type of installation has low investment costs. The disadvantages include the lacking ease of maintenance and the upkeep of a water level to ensure engine cooling.

With the dry well installation of submersible pumps, a separate pumping cellar is required, however, this offers a number of advantages such as easier maintenance under hygienic conditions, controllability during operation as well as flooding security and reliability in the event of an accident.

Wilo solution:

We are oriented towards your requirement: The modular system of the Wilo submersible sewage pump is designed for wet and dry installations alike. The variety of different possible motor and impeller combinations ensures a wide range of applications. The hydraulic pump output can be optimally adjusted to your desired duty point. In particular, the FKT motor technology allows permanent operation in wet and dry well installations thanks to internal active cooling.

**Wilo-EMU FA, the solid one****Design:**

- Submersible sewage pump with self-cooling or non-self-cooling motor

Application:

- For pumping sewage with solid constituents
- In wastewater treatment plants and pumping stations
- For local drainage, water control, and process water extraction

Volume flow:

max. 7,950 m³/h

Delivery head:

max. 95 m

Special features/product advantages**Wilo-EMU FA:**

- Broad range of applications thanks to variety of different possible motor and impeller combinations
- Hydraulic pump output optimally adapted to the desired duty point
- Optionally with energy-efficient IE3 motor technology
- Optional special materials and Ceram coating for protection against abrasion and corrosion

Special features/product advantages**FKT motor technology:**

- Process reliability thanks to comprehensive monitoring facilities
- Optimal motor cooling thanks to the efficient heat exchanger with a two-chamber system
- Low vibration and long service life thanks to high-quality components

Mechanical cleaning.

On the way to cleanliness.

Application:

1. Cleaning stage: Mechanical procedures

This removes approximately 20 – 30% of the solid floating and suspended matter that could be collected mechanically from the sewage. The grit chamber is a settlement pond for the removal of inorganic constituents from the sewage. By reducing the flow velocity, heavy materials such as carried-along particles of sand and grit fall to the ground.

2. Cleaning stage: Primary treatment

The next step uses a process for settling undissolved, organic materials in the form of primary sludge or coarse materials. The sewage pumps feed it to further sludge treatment.

Challenge:

The collected sand is regularly emptied and disposed of. The most common method in use today is pump-based collection. The pumps are attached to a movable chamber bridge and draw in the sedimented particles from the sedimentation channel at the bottom of the grit chamber. Emptying the grit chamber places high demands on the wear resistance of the used pumps. Deposits such as sand must be stirred up and pumped out.

Wilo solution:

The special grit collector pump Wilo-EMU FA...WR with mechanical stirring apparatus is most suited to this operation. In these pumps, the sand is only stirred up in the area of the pump intake. Solid deposits are loosened up and can be transported. The sand can freely settle due to the constricted flow area. As the mixer head and impeller are subject to very high wear, chilled cast iron with extra chrome such as Abrasite is often used. Ceram additionally prevents wear of the pump housing.





Abrasite – special material for sewage pumps

We decide on the best material for you and for a lifetime that is seven times longer.

- reduces risk of breakdown
- extends maintenance intervals
- all in all it offers excellent overall economy throughout the entire life cycle



Wilo-EMU FA, the meticulous one

Design:

- Submersible sewage pump with mechanical stirring apparatus

Application:

- Pumping sewage and sludge in water treatment applications

Volume flow:

max. 72 m³/h

Delivery head:

max. 27 m

Special features/product advantages:

- Mechanical stirring apparatus mounted directly on the impeller avoids deposits in the suction area of the pump
- Mixer head made of Abrasite (chilled cast iron)
- Optionally with energy-efficient IE3 motor technology
- Operation in stationary and portable wet well installation
- Optional special materials and Ceram coating for protection against abrasion and corrosion
- Longitudinally watertight cable inlet (depending on motor)
- Heavy-duty version made of grey cast iron
- Self-cooling motors with two-chamber system



Biological cleaning.

Not clean, but pure.



Reliability is boosted

With our Wilo-EMU Megaprop TRE 326-3 you play it safe three times.

- spreads the blade load across three blades
- ensures smooth operation even if inflowing conditions are unfavourable
- ensures the longest duration of use with heavy-duty GRP blades (fibre-glass reinforced plastic) in one-piece laminate manufacturing
- guarantees minimal maintenance due to replacement of individual blades
- gains points with a self-cleaning effect due to backward-curved blades

Application:

After mechanical cleaning, about 60 – 70% of the dirt in dissolved form can be found in the sewage. Microbiological methods are used for the degradation of this sewage with organic material content. Here, the degradable organic sewage constituents are mineralised as completely as possible, which means that in aerobic wastewater treatment the sewage is degraded down to the inorganic end products water, carbon dioxide and nitrogen. Mixers have become an essential element of modern wastewater treatment due to their universal application.

Challenge:

Despite the different types of applications such as suspension, homogenisation, or flow generation, all slow running submersible mixers face the same big challenge: They run in energy-intensive permanent operation.

Wilo solution:

An optimal design, innovative blade geometry, and energy-efficient motors in accordance with IE 3 is the Wilo formula for low operating costs. The large propeller diameter and low rotation speeds make it possible to achieve enormously high thrust values with low power

consumption. The modular design of components reduces planning and maintenance considerably. Individual stands with lowering and auxiliary lifting equipment guarantee optimal placement in virtually any basin.

Save even more:

By introducing process air with Wilo-Sevio AIR, the overall efficiency of your system can be further increased.





**Wilo-Sevio AIR,
the system optimiser**

Design:

- Aeration system with disc aerators

Application:

- For the biological treatment of municipal and industrial sewage
- Specially designed for the ventilation of activated sludge

Special features/product advantages:

- Reduced energy costs and increased cleaning performance since it is compatible with Wilo submersible mixers
- Efficient aeration thanks to flow-optimised design
- Optimised air entry thanks to perforation across the entire diaphragm surface
- Robust construction through the use of GRP
- Easy on-site installation without the need for special tools
- Minimum maintenance work
- Cost-efficient control range from 1.5–6.0 Nm³/h per aerator
- For air temperatures up to 100 °C

Pro-active replacement:

- Suitable for optimising existing plants



**Wilo-EMU Maxi- and Maxiprop,
the enduring one**

Design:

- Slow-running submersible mixer

Application:

- For energetically optimised mixing and circulation of activated sludge, suspension and homogenisation, nitrification and denitrification
- For the generation of flow rates in circulation channels

Thrust:

390 N – 4,950 N

Special features/product advantages:

- Optimum efficiency thanks to highly efficient motors with maximum thrust
- Self-cleaning effect – backward curved blades prevent clogging
- Very quiet running and extremely heavy-duty propeller blades
- Longest service life with minimum maintenance costs
- Energetically optimised, design tailored to needs
- Modular construction system for the individual combination of motor, gears and propeller
- Type “TRE” with IE3 performance optimised motors (derived from IEC 60034-30)

Pro-active replacement:

- Suitable for optimising existing plants



Biological treatment with activated sludge tank.

Gets things moving in the cleaning process.

Application:

In the activated sludge tank the majority of the dissolved organic pollutants and fine, non-settleable particles are removed from the wastewater. Then micro-organisms such as amoebae, paramecia, and bacteria go into action. They absorb the pollutants and break them down. In addition, nitrogen compounds are broken down into ammonia by special bacteria which is then converted to nitrate nitrogen (nitrification).

Sludge is produced from these biological processes, which is composed of bacterial mass. This sludge settles in the subsequent secondary clarifier. Part of it is fed back to the denitrification tank as return activated sludge to enrich the bacterial mass there.

Challenge:

Firstly, classic sludge activation needs a lot of space, and sedimentation in the secondary clarifier often constitutes a challenge. Another problem is the uniform distribution of the organic load in the activated sludge tank and fixed-bed reactors. The innovative process with biomass carriers can play out its strengths here, because it uses the advantages of both classic sludge activation and the well-known biofilm process.

Wilo solution:

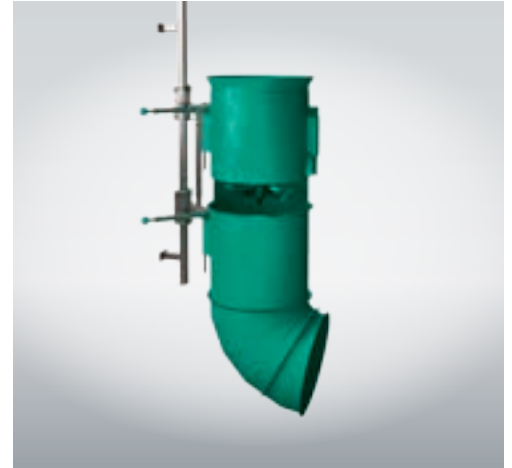
Wilo-Sevio ACT. This innovative system sucks in biomass carriers and gently feeds them into the biological process again below the water surface. This leads to uniform mixing and improves cleaning performance.



Always professional and quick to respond

Supporting all the phases of your projects is of paramount importance to us, from design through to maintenance concepts.

- accompanied by competent experts
- working out exactly the right solution together with you
- supported by a comprehensive software package
- comprises the choice of pump and machine technology in the municipal wastewater treatment



Wilo-Sevio ACT, the process optimiser

Design:

- Solids diffuser

Application:

- For all types of biomass carriers
- For the biological treatment of municipal and industrial wastewater, for example in the areas of nitrification and denitrification

Circulation output:

1,872 m³/h – 4,176 m³/h

Special features/product advantages:

- Gentle input of biomass carriers into the fluid to optimise the cleaning process
- High energy efficiency and process reliability
- Can be retrofitted at any time
- Suitable for different basin depths and geometries

Pro-active replacement:

- Especially for wastewater treatment plants, which cannot expand in terms of space



Secondary treatment and discharge pumping station.

The final steps back into the water circuit.

Application:

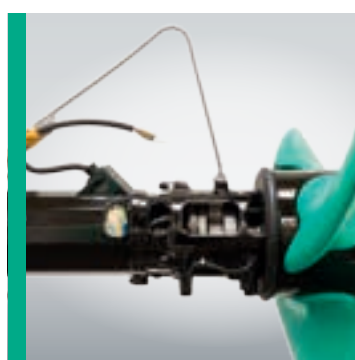
The purpose of secondary treatment is to separate the treated sewage from the activated sludge using sedimentation. A part of the sedimented sludge is fed back into the activated sludge tank as return activated sludge in order to maintain a steady concentration of microorganisms here. The surplus sludge (growth of biomass) is removed from the system and is fed from the primary treatment of the digestion together with the primary sludge. After this final step in the cleaning process, the treated water is re-introduced back into the water circuit. Many wastewater treatment plants also now use a fourth stage, which removes contaminants such as drug residues by chemical means.

Challenge:

If the separation between the cleaned sewage and activated sludge is not complete, a part of the biomass will end up in the receiving water, with detrimental effects on the environment. This sludge discharge can result in violations of legally permissible outflow values. This can have financial and legal consequences.

Wilo solution:

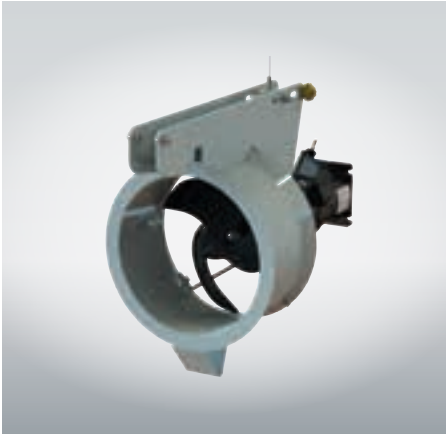
The modular design principle of our products enables us to provide needs-based and efficient solutions that meet both your specific requirements as well as all statutory requirements. The flexible installation of the Wilo recirculation pumps and submersible mixers provide you with the appropriate installation for virtually any required situation.



IE3 motors – high efficiency is worthwhile

The more intensively our pumps are used, the higher the savings in operating the wastewater treatment plant.

- secure from breakdowns also when in operation around the clock
- reduces power consumption with high efficiency
- significantly reduces operating costs



Wilo-EMU RZP, the circulating one

Design:

- Recirculation pump

Application:

- For pumping sewage/constant circulation e.g. between equalisation, nitrification-and denitrification tank
- For pumping raw, treated, and cooling water

Volume flow:

max. 6, 800 m³/h

Delivery head:

max. 7.0 m

Special features/product advantages:

- Individual combination of motor, gear and propeller
- Flexible installation via lowering device
- Vertical or in-line installation possible
- Self-cleaning propeller, in part with helix hub
- Propeller in steel or PUR version
- ATEX and FM versions



Wilo-EMU Mini and Uniprop, the modular versions

Design:

- Directly driven submersible mixer

Application:

- For swirling deposits and solids

Thrust:

185 N – 1,100 N

Special features/product advantages:

- Self-cleaning propeller with helix hub
- Propeller in cast iron, steel or PUR version
- ATEX and FM versions
- Stationary installation on walls and floors
- Flexible installation via lowering device



Wilo-EMU KPR, the flexible one

Design:

- Axial submersible pump with glanded motor for use in pipe sumps

Application:

- For pumping cooling or rainwater and treated sewage

Volume flow:

9,500 m³/h

Delivery head:

8.4 m

Special features/product advantages:

- Easy adaptation to different plant conditions on site by hand using adjustable propeller blades
- Special materials and coatings against abrasion and corrosion
- Self-cleaning blade for use with long-fibrous elements in the fluid
- Longitudinally watertight cable inlet

For us, partnership means that you achieve more with us as a partner.

Customer service always starts with a personal consultation. On this basis, we develop tailor-made individual solutions precisely for your demands. Our service then goes far beyond this. With fast and reliable repair and maintenance concepts, we also assist you in the long term.

Plan with our consulting.

We are here for you and will draw up an exact assessment of what you require. From this, our specialists will work closely with you to find an individual solution.

You can count on our selection of pumps.

With the help of a modern selection programme, we can offer you the most economical solution.

You can rely on our pump installation.

The installation and complete connection, as well as an extensive testing and training phase of our pumps is done for you by skilled workers with many years of experience.

Wilo means "all-round service from one source".





Your complete service package

Pre-sales:

- On site support
- Design support
- Product selection
- Select programme
- CFD simulations
- Flow calculation
- Pipeline calculation
- Installation drawings
- Documentation

Sales:

- Certification
- Acceptance testing at the plant
- Commissioning
- Start up

After-sales:

- Local service in 60 countries
- More than 1,200 Wilo technicians worldwide
- Individual maintenance concepts
- Customer-oriented replacement solutions
- Efficiency check
- Training



wilo

Pioneering for You

WILO SE
Nortkirchenstraße 100
44263 Dortmund
T 0231 4102-0
F 0231 4102-7575
wilo@wilo.com
www.wilo.de