

Pioneering for You

**wilo**

*Product brochure*

# Efficiency for your Treatment Processes. Wilo Submersible Mixers.



# Wilo

## Pioneering for You.



**We are there for you wherever you are in the world.**

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, Louis Opländer, all that time ago was to use his copper and brass goods factory to improve and facilitate the supply of water to people. He did this with great success: in 1928, he designed the world's first circulation accelerator.

We have been continuing this tradition ever since with pioneering innovations in the

heating, air-conditioning and cooling sector, such as the world's first high-efficiency pump, and at the same time we have proven our commitment to using valuable resources such as energy and water responsibly. Today WILO SE, headquartered in Dortmund, is represented across the globe as an all-round provider of pumps and pump systems for supplying water and disposing of sewage.

**Cooperative support you can rely on.**

With over 7500 employees and 60 production and sales companies all over the world, we personally see to it that our customers' and users' needs and requirements – whether specialist consultants, operators, or general contractors – are met optimally every day. This means making your life and work as easy as possible with 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 increasingly scarce resources, responsible use of water is one of the most important challenges. That is why we use pioneering

developments, sustainable product solutions and cooperative support to ensure that you can rely on our water management solutions, day in, day out. That's what we call Pioneering for You.



**“Finding the  
best solutions in  
close partnership,  
that's what I call Pioneering for You.”**

Daniel Busuioc, International Project Coordinator of Group Competence Team,  
WILO SE, Hof, Germany

## Reliable sewage treatment.

Perfect treatment for you.





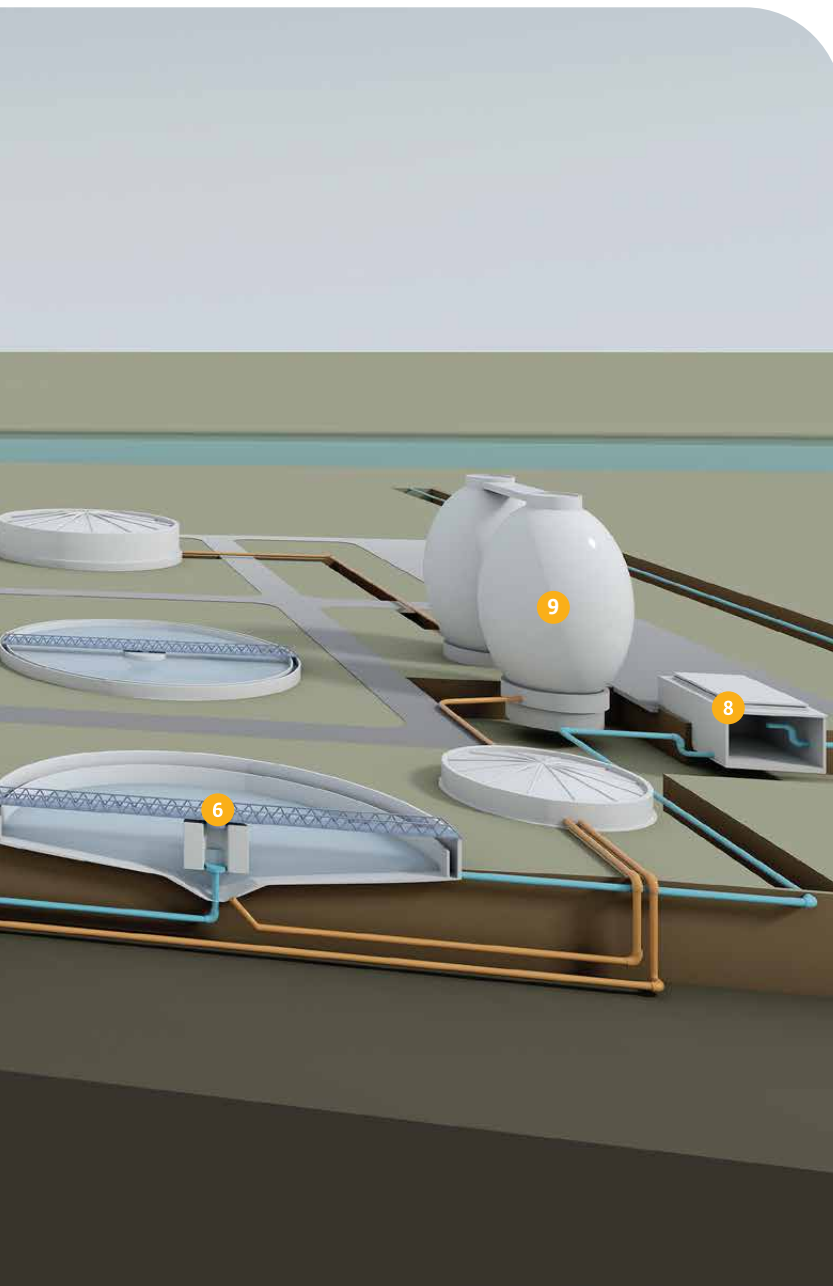
### You can depend on it.

Our experts support you personally in every project phase, from design and configuration right through to commissioning and maintenance. We take a holistic approach to your system. This allows us to provide customised product solutions and set new standards for you in terms of technical performance, cost efficiency, security and durability – in all wastewater treatment applications.

### Wilo – the right partner to address your challenges.

Given the global climate change, low energy consumption is a key topic on the market. The cost pressure on municipal or private suppliers is rising. Challenges are growing. These include increasing levels of solids in wastewater, more and more regulations, and stricter legal requirements, among others. Against this backdrop, Wilo is a partner you can depend on fully in all areas.

This brochure introduces a selection of products for your efficient treatment processes.



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

## The treatment process.

Every one of your applications is supported appropriately.



### Stormwater retention tank. Fully drained with direct-drive submersible mixers.

Stormwater retention tanks ensure that the wastewater treatment plant is not overloaded hydraulically by the incoming rainwater and sewage. The rainwater collected in it is highly contaminated, especially after long drying periods, and solids can settle on the tank floor due to the often longer residence times. Direct-drive Wilo submersible mixers ensure continuous suspension of possible deposits. The compact design allows them to generate the right turbulences – even down to very low water levels. That allows the stormwater retention tank to be drained completely.

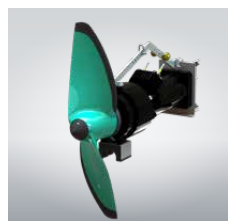


Wilo-Flumen OPTI-TR 22 to TR 40-1  
Wilo-Flumen EXCEL-TRE 20 to TRE 40



### Sludge treatment. Homogeneous thanks to medium-speed submersible mixers.

Biomass is generally decomposed by micro-organisms in digestion tanks to digested sludge and combustible digester gas under anaerobic conditions. The digested sludge is then thickened to further reduce the volume and water content. Special height-adjustable removal mechanisms draw off the cloudy water. Medium-speed Wilo submersible mixers support the homogenisation of the thickened sludge. Their single-stage planetary gears and PUR or stainless steel propellers permit plant-specific configuration. They are also easy to install and reliable with the special Wilo lowering devices.



Wilo-EMU TR(E) 50-2 to TR 120-1

Efficient sewage treatment requires you as an operator to use technologies that meet the requirements of every stage in the cleaning process. We at Wilo support you effectively and efficiently.



#### Biological treatment/sludge activation. Deposit-free thanks to low-speed submersible mixers.

After mechanical treatment, about 60 – 70% of the contaminants are still dissolved in the sewage. Microbiological methods are used to degrade this sewage with organic contaminants. Wilo low-speed submersible mixers are used to implement the biological treatment process for suspending contaminants and generating flows in the activated sludge tank. With their two-stage planetary gears, 2- or 3-blade propellers and stands that can be positioned freely in the basin, they can be custom-configured for any requirements. For a deposit-free treatment process.

#### Biological treatment/sludge activation with MBBR process. Uniform mixing thanks to Wilo-Sevio ACT.

Classic sludge activation needs a lot of space, and sedimentation in the secondary clarifier often constitutes a challenge. This is where the MBBR process with biomass carriers can demonstrate its strengths to the fullest. It uses the advantages of both classic sludge activation and the well-known biofilm process. The Wilo-Sevio ACT, with its telescopic suction pipe and the freely configurable outlet angle supports this process sustainably. An innovative system that sucks in biomass carriers continuously from the surface and gently feeds them into the biological process again below the water surface. This mixes them uniformly and stabilises the MBBR process.



Wilo-EMU TR(E) 212 to TR(E) 326

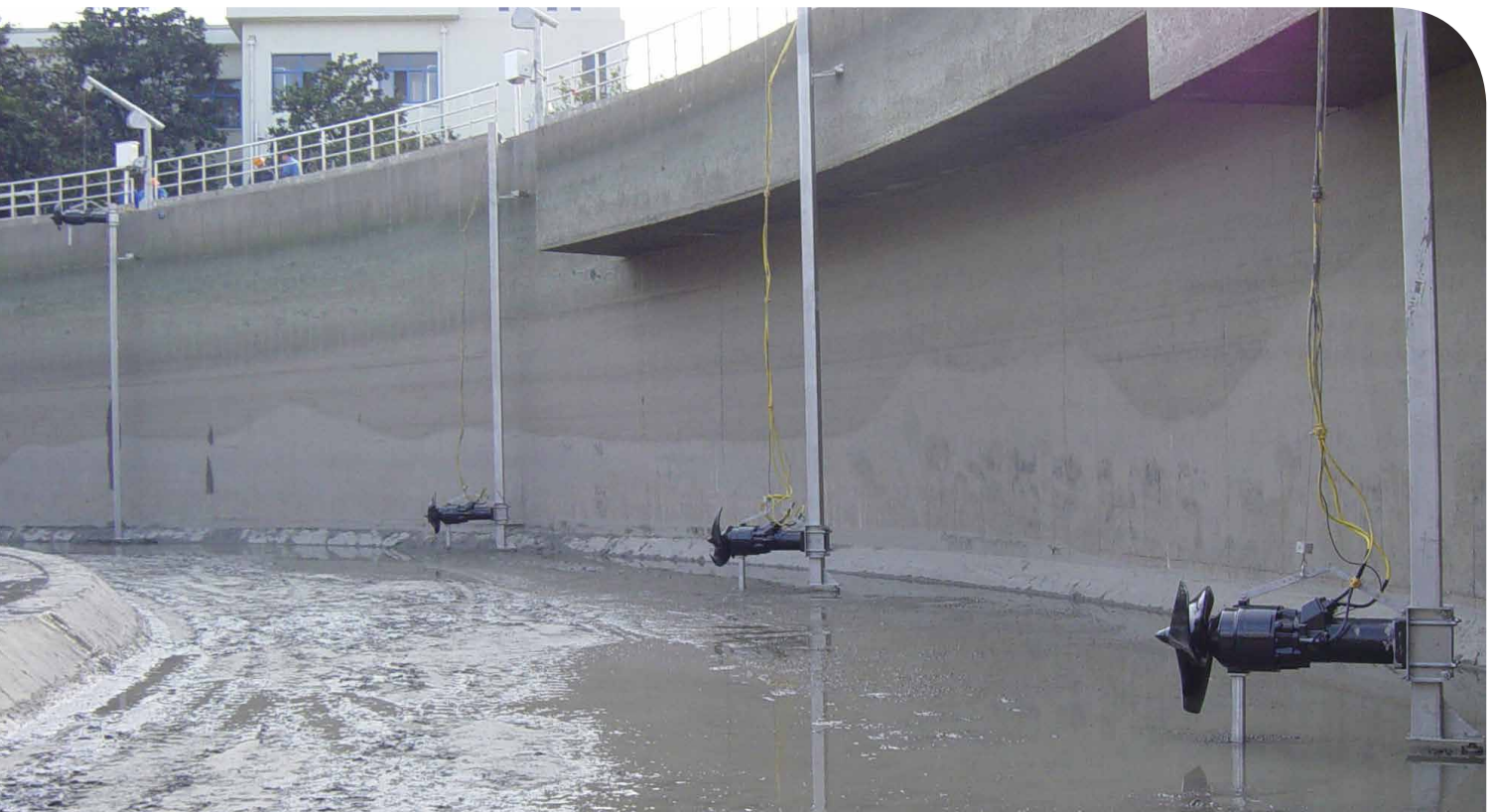


Wilo-Sevio ACT



## High-speed submersible mixers.

Make the most of tight spaces.



### Maximum performance in minimum space.



Wilo-Flumen OPTI-TR 30

To prevent solid material settling in the basin on drainage, it must be whirled up from the base and diffused. The high-speed Wilo submersible mixers have proven themselves in these applications. The direct-drive mixers are so compact that they are easy to install and submerge, even in the tightest spaces. Retrofitting in existing constructions is also easy. For special applications in pump chambers, Wilo submersible mixers can be installed on the discharge pipeline or tank ceiling via a flexible pipe bracket.

Wilo submersible mixers are certified for explosive atmospheres according to different standards: ATEX and FM standard.












### Compact design for tight spaces.

Direct-drive Wilo submersible mixer made of cast iron. Propeller made of stainless steel.

### Advantages for you:

- Low clogging rate and reliable operation thanks to optimised hydraulics
- Low-wearing, due to the use of stainless steel precision-cast propellers with the lowest cavitation tendency
- A wide range of possible uses in diverse applications, even at high-interval running times
- Reduction of the energy and operating costs due to the standard use of IE3 motors (only TRE models) for the best possible thrust coefficient
- High flexibility thanks to the most diverse installation options and accessories

Technical data for Wilo high-speed submersible mixers

							
	TRE20	TR 22	TR 28-1	TR 30-1	TRE 30	TR 40-1	TRE 40
<b>Propeller</b>							
Max. thrust (N)	185	400	370	500	530	950	920
Nominal diameter (mm)	200	220	280	300	300	400	400
Rated speed (rpm)	1450	950/1450	1450	950/1450	950/1450	740/950	950
Number of blades	3	3	2	3	3	3	3
Material	1.4408	1.4408	1.4408	1.4408	1.4408	1.4408	1.4408
<b>Seal material</b>							
Material, on the motor side	SiC/SiC	NBR	SiC/SiC	NBR	NBR	NBR	NBR
Material, on the media side	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
<b>Motor data</b>							
Fluid temperature (°C)	3–40 °C	3–40 °C	3–40 °C	3–40 °C	3–40 °C	3–40 °C	3–40 °C
Ex-rated to ATEX, FM	o	o	o	o	o	o	o
IE3 motors*	●	-	-	-	●	-	●
IE4 motors*	-	-	-	-	-	-	-

\*Based on IEC 60034–30.

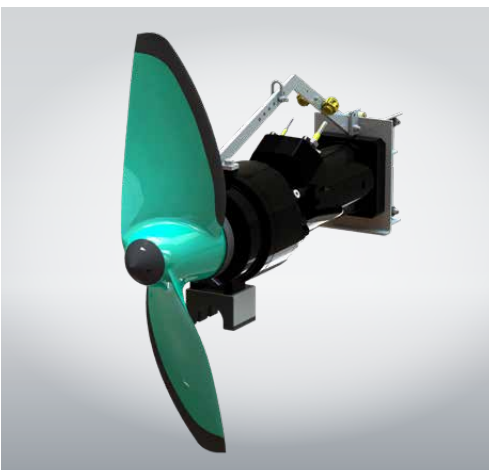
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## Medium-speed submersible mixers.

Get the right mix easily.



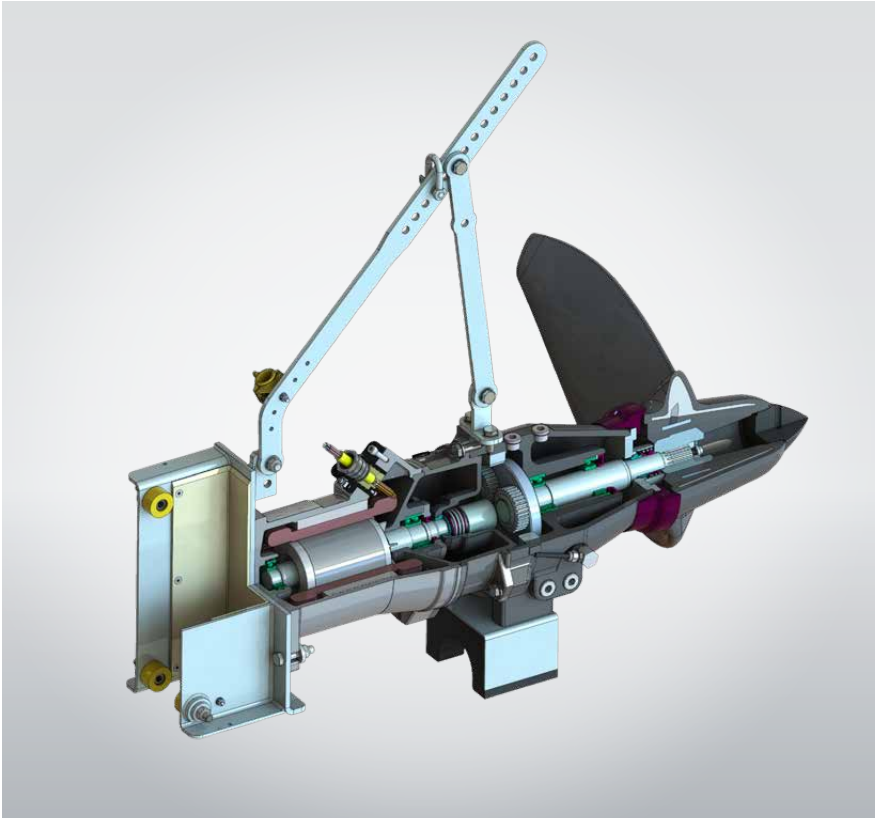
### Variable efficiency. For the sludge properties at hand.



Wilo-EMU TR 120-1

To ensure that homogenisation for thickening in the digestion tank can be performed efficiently, medium-speed submersible mixers are equipped with single-stage gears. This allows the thrust and speed to be adapted to the respective sludge properties in your system.

Wilo gives you customised solutions. We support you from the very beginning with the design stage, to configuration and right up to maintenance concepts. Through every phase of your project.









### For optimal mixing.

Wilo submersible mixer with single-stage planetary gear. Propeller made of plastic or stainless steel.

### Advantages for you:

- Secures your processes. The large planetary gear ensures that the mixing forces are absorbed efficiently.
- Efficient energy usage. The innovative blade geometry ensures the best possible specific thrust coefficient. At the same time, this reduces your energy and operating costs.
- Works reliably. Thanks to entwining-free operation with backward-curved incoming flow edge.

Technical data for Wilo medium-speed submersible mixers

						
	TR (E)50-2	TR(E) 60-2	TR 75-2	TR 80-1	TR(E) 90-2	TR 120-1
<b>Propeller</b>						
Max. thrust (N)	160–1920	570–2370	1145–2850	1670–3940	430–2120	2990–6620
Nominal diameter (mm)	500	600	750	800	900	1200
Rated speed (rpm)	130–610	190–540	150–250	200–300	90–250	170–240
Number of blades	3/2	3/2	3	3	2	2
Plastic material	PUR	PUR	PUR	PUR/GRP	PUR/GRP	PUR/GRP
Steel material	1.4571	1.4571	–	1.4571	–	–
<b>Seal material</b>						
Motor/sealing chamber	NBR	NBR	NBR	NBR	NBR	NBR
Gasket/gear chamber	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
Gear chamber/pre-chamber	NBR	NBR	NBR	NBR	NBR	NBR
Pre-chamber/fluid	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
<b>Motor data</b>						
Operating mode	Continuous duty (S1)					
Fluid temperature (°C)	3–40 °C					
Ex-rated to ATEX, FM	o	o	o	o	o	o
IE3 motors*	o	o	–	–	o	–
IE4 motors*	–	–	–	–	o	–

\*Based on IEC 60034–30.

• = as standard o = optional – = not available



## Low-speed submersible mixers.

Ensure specific flows.



### Optimally agitated, effectively suspended.



Wilo-EMU TRE 312

The sludge activation stage has to be moving at all times to support the microbiological processes optimally when treating sewage with organic content. You can achieve the flow required with Wilo low-speed submersible mixers. They are characterised by a two-stage planetary gear and a balanced propeller load. This guarantees smooth running. If the flow conditions are particularly unfavourable, Wilo submersible mixers with 3 propeller blades can be used. They guarantee a low propeller load even in unfavourable positions.



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For more information visit  
[www.wilo.com/trybuy](http://www.wilo.com/trybuy)





### Maximum efficiency for maximum thrust.

Wilo submersible mixer with two-stage planetary gear and 2- or 3-blade propeller.

### Advantages for you:

- Efficient energy usage. The innovative blade geometry and energy-efficient IE3/IE4 motors ensure the best possible specific thrust coefficient. At the same time, this reduces your energy and operating costs.
- Consistently reliable. The low-wearing GRP/PA6 propeller is durable and impresses with its self-cleaning effect.
- Smooth running thanks to the balanced propeller load, even in high thrust ranges and when incoming flow conditions are unfavourable.

Technical data for Wilo low-speed submersible mixers

								
	TR(E) 212	TR(E) 216	TR(E) 221	TR(E) 226	TRE 312	TR(E) 316	TR(E) 321	TR(E) 326
<b>Propeller</b>								
Max. thrust (N)	390–2815	470–2740	480–3400	500–4160	380–2300	810–3550	550–3500	1140–4310
Nominal diameter (mm)	1200	1600	2100	2600	1200	1600	2100	2600
Rated speed (rpm)	62–158	32–79	21–59	16–49	59–154	38–77	21–52	21–45
Number of blades	2	2	2	2	3	3	3	3
Plastic material	GRP/Vinylester	GRP/Vinylester	GRP/Vinylester	GRP/Vinylester	PA 6C	GRP/Vinylester	GRP/Vinylester	GRP/Vinylester
Steel material	–	–	–	–	–	–	–	–
<b>Seal material</b>								
Motor/sealing chamber	NBR	NBR	NBR	NBR	NBR	NBR	NBR	NBR
Gasket/gear chamber	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
Gear chamber/pre-chamber	NBR	NBR	NBR	NBR	NBR	NBR	NBR	NBR
Pre-chamber/fluid	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
<b>Motor data</b>								
Operating mode	Continuous duty (S1)							
Fluid temperature (°C)	3–40 °C							
Ex-rated to ATEX, FM	o	o	o	o	o	o	o	o
IE3 motors*	o	o	o	o	●	o	o	o
IE4 motors*	o	o	o	o	o	o	o	o

\*Based on IEC 60034–30.

● = as standard o = optional – = not available

Wilo low-speed submersible mixers can also be retrofitted in your system at any time.

They are suitable for different basin depths and geometries.

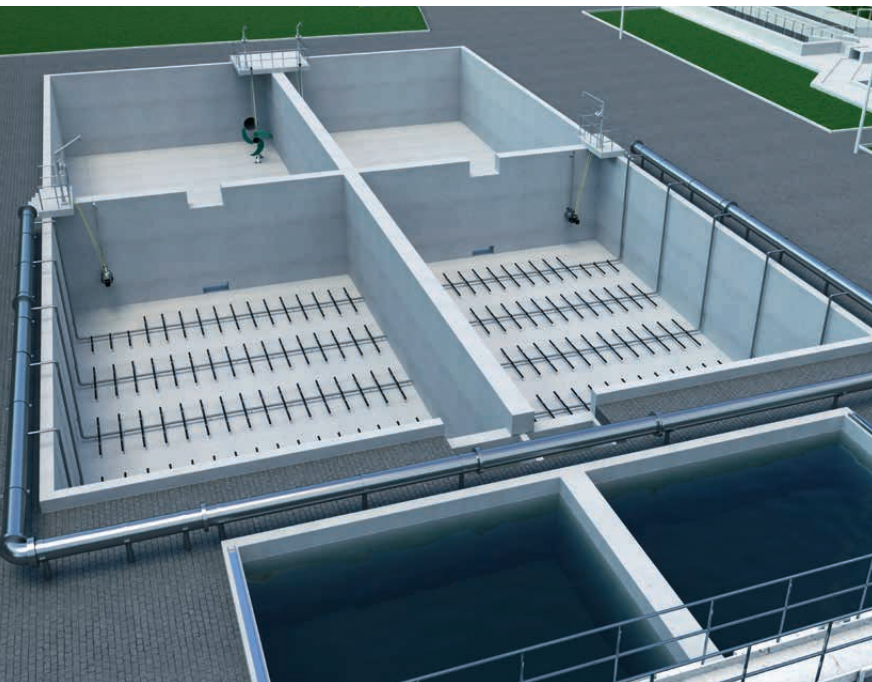
## Wilo-EMU RZP

### Efficient return flow between various basins.

During the upstream denitrification process, part of the nitrate is returned to the denitrification basin, together with the return activated sludge. Since the nitrogen elimination achieved is normally insufficient, an additionally-installed recirculation pump transports the nitrogen-rich water out of the nitrification basin back into the denitrification basin in normal cases.

Irrespective of the process, Wilo-EMU RZPs efficiently transport the return activated sludge necessary for the process out of the secondary treatment back to the activated sludge tank. Their efficient, reliable pumping of large volume flows at low delivery heads is extremely impressive.

They are also not susceptible to clogging thanks to self-cleaning stainless steel or PUR propellers.





## With Wilo-Sevio ACT

### Homogenously distributed biomass substrate particles.

#### Evenly-distributed mixing for efficient operation.

Conventional sludge activation requires plenty of space. This is where the MBBR process with biomass substrate particles can demonstrate its strengths to the fullest. It uses the advantages of both traditional sludge activation and the biofilm process. The Wilo-Sevio ACT with its telescopic suction pipe and the freely configurable outlet angle supports this process sustainably. An innovative system which sucks in biomass substrate particles continuously from the surface and gently returns them below the water surface. Using this technology, which is only available from Wilo, you can ensure a homogenous distribution of substrate particles at considerably reduced energy requirements for your mechanical technology in your MBBR process.

#### The advantages at a glance:

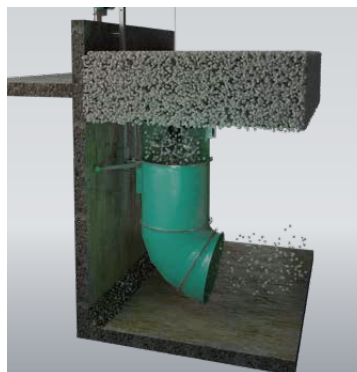
- Reduced energy costs thanks to efficient circulation.
- Low investment costs.
- High process reliability.
- Uniform mixing of substrate particles and reduction of deposits.
- Easy installation.



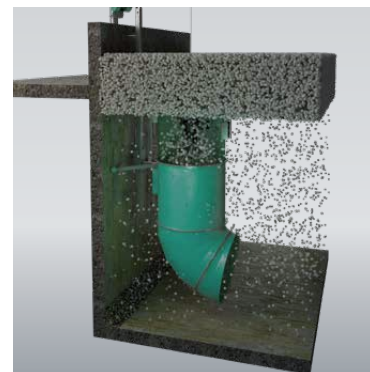
**This is how efficient circulation and homogenous distribution of the substrate particles in the MBBR process works.**



Floating top layer of biomass substrate particles.



Applying suction to the biomass substrate particles.



Uniform distribution.

# The Ceram C0 coating by Wilo.

## Effective corrosion protection.



You need to be able to rely on reliable technologies in every treatment stage of your wastewater treatment plant. That is the only way to guarantee trouble-free continuous operation. However, submersible mixers are constantly exposed to corrosive fluids by design. This influences the surface and material structures of the units and can have significant adverse effects on reliability due to breakdowns.

This unique 2-component coating offers the best possible protection against aggressive media compared with other coatings. Thanks to its increased resistance to corrosion, it effectively prevents wear and chemical corrosion and always ensures optimum functionality and performance. Wilo-Ceram significantly enhances the service life of submersible mixers.

### The advantages of the Ceram C0 coating are:

- Highly resistant to corrosive and chemical wear in the long term
- Extremely good wet adhesion of 15 N/mm<sup>2</sup> on metal surfaces
- Tested by the “Bundesanstalt für Wasserbau” (German Federal Institute for Hydraulic Engineering) (BAW)
- Solvent-free

Resistance for Ceram C0 by Wilo		
Designation	Temperature range	Resistance
Sewage, alkaline (pH 11)	+20 °C – +40 °C	1/1
Sewage, slightly acidic (pH 6)	+20 °C – +40 °C	1/1
Sewage, highly acidic (pH 1)	+20 °C – +40 °C	2/3
Ammonium hydroxide (5%)	+40 °C	3
Decanol (fatty alcohol)	+20 °C – +50 °C	1/1
Ethanol (40%)	+20 °C	1
Ethanol (96%)	+20 °C	3
Ethylene glycol	+20 °C	1
Heating oil, diesel	+20 °C	1
Compressor oil	+20 °C	1
Methyl ethyl ketone (MEK)	+20 °C	3
Caustic soda (5%)	+20 °C – +50 °C	1/2
Sodium chloride solution (10%)	+20 °C	1
Hydrochloric acid (5/10/20%)	+20 °C	2/2/3
Sulphuric acid (10/20%)	+20 °C	2/3
Nitric acid (5%)	+20 °C	3
Toluene	+20 °C	2
Cooling and industrial water	+50 °C	1
Xylene	+20 °C	1

1 = resistant, 2 = 40 day-resistant, 3 = overflow-resistant (immediate cleaning recommended) For an overall layer thickness of min. 400 µm



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## Varied accessories.

We have the right accessories for your process.

### The choice is yours.

The more options you have to customise your Wilo submersible mixer for your requirements, the more likely that you get the treatment performance you want. That is why we offer a wide range of practical accessories for every Wilo product.

### Lowering devices. For optimal positioning.

The perfect position in the basin boosts the efficiency of your mixer. With the Wilo lowering devices, we make it easy for you to install mixers simply and securely in the various basin geometries. Our range includes flexible systems for wall mounting or rigid stands, which even allow free positioning in the basin. The sophisticated technology and robust materials guarantee permanent and secure installation.

### Auxiliary lifting devices. For secure installation.

We save you time, simplify installation and make it easier for you to maintain your submersible mixer. The LGA-tested auxiliary lifting devices by Wilo enable you to lifting and lowering the submersible mixers securely from the basin at any time. Our range of auxiliary lifting devices features a reach of up to 3.2 m, and a bearing capacity of up to 500 kg. For easy repositioning, some models can be dismantled into compact single components. You can choose from devices in the following materials: steel, galvanised, A2 steel (1.4301) and A4 steel (1.4571). We also offer matching manual winches made of aluminium or stainless steel.

### Advantages for you:

- Optimum mixer positioning for the required treatment process
- Easy to install and ready to use quickly
- Reduced maintenance costs: the Wilo submersible mixer can simply be taken out of the tank for maintenance.



Lowering devices for optimum positioning in the basin



Auxiliary lifting device for quick and easy maintenance

We will be happy to support you and help you configure the suitable equipment for your Wilo submersible mixer.  
For more information visit [www.wilo.com/watermanagement](http://www.wilo.com/watermanagement)



# Maximum efficiency.

## You can count on it.

### We make your purchase predictable.

The energy costs should have a significant influence on the purchase decision. After all, you generally use your submersible mixers in continuous duty. Important parameters for this are the thrust (F) and the consumed electric power at the duty point ( $P_{1.1}$ ). For an objective comparison of the mixers, the specific thrust coefficient per ISO 21630 is defined as a quotient of the thrust generated and the electrical energy consumed for this.



### Wilo-EMU TRE 312. Saves costs even in continuous duty.

The submersible mixer allows you to save energy costs. The blade geometry and the highly efficient submersible motor ensure convincing energy efficiency – even in energy-intensive continuous duty. The overall annual savings show that the required thrust output can also be economical.

#### Highly efficient mixing technology:

- Maximum thrust values at minimum power consumption
- Short ROI period thanks to maximum energy efficiency
- Maximum service life with minimum maintenance costs

### Sample calculation for submersible mixer Wilo-EMU TRE 312

Framework conditions		
Number of basins	3	
Number of submersible mixers per basin	2	
Running time	10 years	
Comparison of mixers	Wilo-EMU TR 90-2.24-4/12	Wilo-EMU TRE 312.138-4/17
Nominal propeller diameter	900 mm	1200 mm
Propeller speed	241 rpm	138 rpm
Thrust	1960 N	2020 N
Power consumption $P_{1.1}$	4.7 kW	3.5 kW
Calculation of energy cost savings		
Difference in power consumption $P_{1.1}$	3.5 kW – 4.7 kW	1.2 kW
Energy savings per basin	1.2 kW × 2	2.4 kW
Annual operating time in hours	365 d × 24 h	8,760 h
Energy costs		EUR 0.15/kWh
Energy cost savings per basin/year*	8760 h × EUR 0.15/kWh × 2.4 kW	EUR 3154.00
Energy cost savings for 3 basins/year*	EUR 3154.00 × 3	EUR 9461.00
Total energy cost savings of the system*	EUR 9461.00 × 10 years	EUR 94610.00
Calculation of the ROI period		
Investment costs for the TR 90-2.24-4/12	6x EUR 8000.00	EUR 48000.00
Investment costs for the TRE 312.138-4/17	6x EUR 11100.00	EUR 66600.00
Extra costs for efficiency class IE3 (based on IEC 60034-30)		EUR 18600.00
Energy cost savings for 3 basins/year*		EUR 9461.00
ROI period for extra costs**		24 months

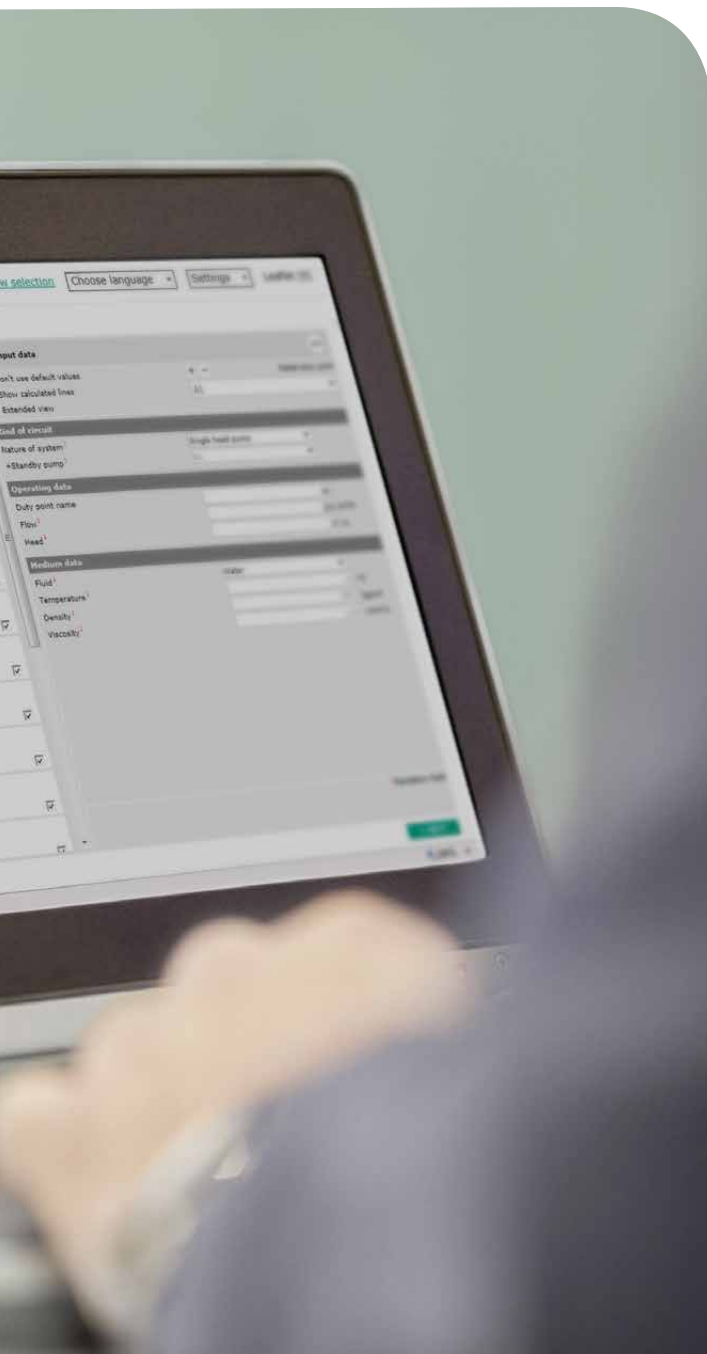
ROI: approx.  
2 years

\*Energy costs calculated at a constant rate of EUR 0.15/kWh.

\*\*Only the pure energy costs are considered in the ROI calculation.

## Wilo Services.

Our full-service package for you as partners.



Our customer service always starts with a personal consultation. On this basis, we offer individually customised solutions that meet your needs exactly. But our service goes far above and beyond that. For repairs and maintenance, we are there for you long after the purchase.

### **You can plan with our consulting.**

We are there for you and determine your needs exactly. On this basis, our specialists work closely with you to find an individual solution.

### **You can count on our configuration.**

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

### **You can rely on our installation.**

Qualified plant engineers with years of experience perform an extensive test and instructional phase with our pumps.

Your complete service package:

#### **Presales:**

- Local support
- Planning support
- Product selection
- Selection programmes
- Mathematical fault simulations
- Flow calculation
- Pipeline calculation
- Installation drawings
- Documentation

#### **Sales:**

- Certification
- Acceptance testing at the plant
- Configuration
- Commissioning

#### **Aftersales:**

- Local service in 60 countries
- More than 1200 Wilo technicians worldwide
- Individual maintenance concepts
- Customer-oriented spare part solutions
- Efficiency check
- Training



Try & Buy ensures that you make the right decision. For more information visit [www.wilo.com/trybuy](http://www.wilo.com/trybuy)

With Wilo submersible mixers, you benefit from services tailored specifically to your requirements.



[www.wilo.com](http://www.wilo.com)

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