

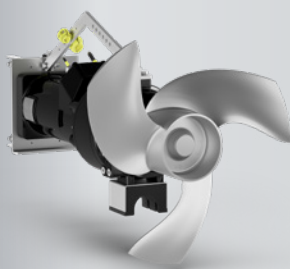
Pioneering for You

**wilo**

*Product brochure*

# Efficiency for your treatment processes

## Wilo submersible mixers





# Wastewater treatment technology of the future





**Our promise to you**

The Wilo Group is one of the world's leading premium suppliers of pumps and pump systems for building services, water management and the industrial sector. Wilo employs around 8,000 people around the globe today. With innovative solutions, smart products and individual services, we provide the clever, efficient and climate-friendly service of keeping water flowing. On top of this, with our clear sustainability strategy and together with our partners, we're making an important contribution to climate protection. We are consistently driving forward the digital transformation of the Wilo Group. We are already the digital pioneer within the industry with our products and solutions, processes and business models.

**Sustainably better for you**

One of the most pressing tasks in times of limited natural resources is the responsible management of increasingly scarce resources. Efficiency, connectivity and safety will become more and more important in the future. We aspire to offer you sustainable, user-friendly, high-tech and high-performance solutions for building services and water management that are ahead of their time.

We work closely with customers like you to create innovative products and systems that perfectly meet your requirements and are rounded off with convenient services. The result is integrated solutions you can rely on at all times.

## Reliable wastewater treatment

You'll be treated well with us



1 Stormwater retention tanks

2 Intake pumping station

3 Mechanical cleaning

4 Primary treatment

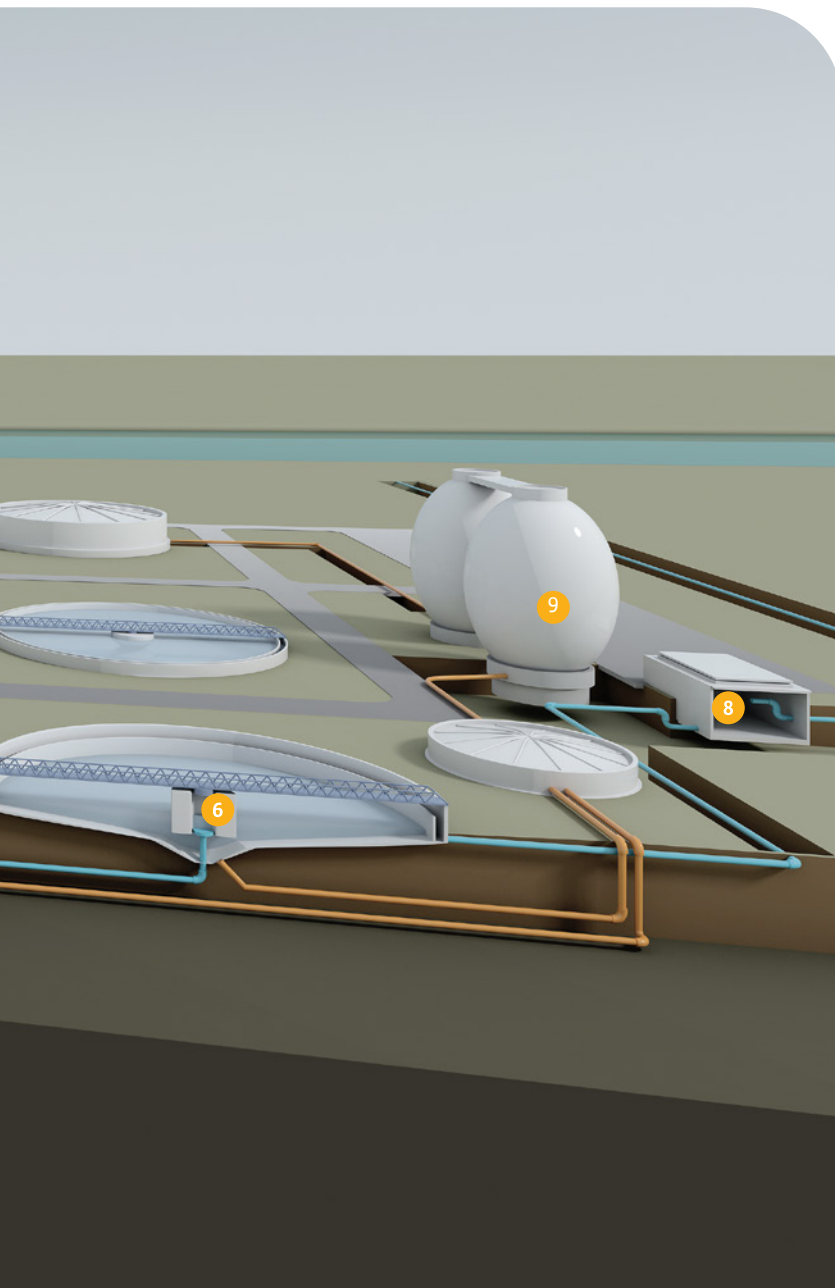
5 Biological treatment / sludge activation

6 Secondary treatment

7 Recirculation

8 Discharge pumping station

9 Sludge treatment

**You can rely on it**

Our experts support you personally in every project phase, from design and dimensioning 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**

In view of global climate change, low energy consumption is a key issue in the market. The cost pressures on municipal or private suppliers are rising. The challenges are growing. These include increasing levels of solids in sewage, more and more regulations and stricter legal requirements. Against this backdrop, Wilo is a partner you can rely on fully in all areas.

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



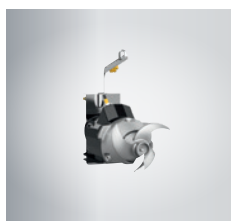
## The treatment process

Appropriate support for every one of your applications



### Stormwater retention tanks Fully drained with directly driven 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 basin floor due to the often longer retention times. Directly driven 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. This allows the stormwater retention tank to be drained completely.



Wilo-Flumen OPTI-TR 22 ... 40  
Wilo-Flumen EXCEL-TRE 20 ... 40



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

Biomass is generally decomposed by micro-organisms in so-called digestion tanks to form 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 gear and PUR or stainless steel propeller enable plant-specific configuration. They are also easy to install and reliable with the special Wilo lowering devices.



Wilo-Flumen OPTI-TR 50 ... 120  
Wilo-Flumen EXCEL-TRE 50 ... 90

Efficient sewage treatment requires you as an operator to use machine technologies that meet the requirements of every stage in the treatment 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 to 70 % of the contaminants are still dissolved in the sewage. Micro-biological methods are used to degrade this organically contaminated sewage. 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-blade or 3-blade propellers and tripods that can be positioned freely in the basin, they can be custom-configured for the requirements – for a deposit-free treatment process.



Wilo-EMU TR 216 ... TR 326  
Wilo-EMU TRE 216 ... TRE 326

### Efficient return flow between various basins with Wilo recirculation pumps

In upstream denitrification and cascade denitrification, the sewage from the mechanical treatment stage and the return activated sludge from secondary treatment first flow into the denitrification tank and then from here into the downstream nitrification tank. Here, recirculation pumps from Wilo efficiently pump the nitrate-containing sewage from the nitrification tank back into the denitrification tank. The new, highly efficient Wilo-Flumen OPTI-RZP and Wilo-Flumen EXCEL-RZPE series ensure reliable continuous operation. Installation can also be carried out on existing piping by means of specific connections and settings on the flow housing.



Wilo-Flumen OPTI-RZP 20 ... 80  
Wilo-Flumen EXCEL-RZPE 20 ... 60



## Fast-speed submersible mixers

### Make the most of tight spaces



**Wilo submersible mixers are certified for use in explosive atmospheres in accordance with ATEX and FM**

#### **Your benefits:**

- Low clogging rate and reliable operation thanks to optimised hydraulics
- Low-wearing thanks to use of investment-cast stainless steel propellers with minimal cavitation tendency
- A wide range of possible uses in diverse applications, even with long running times
- Reduced energy and operating costs through use of IE3 motors (Flumen EXCEL-TRE models only) as standard for an optimal thrust coefficient
- High flexibility thanks to the most diverse installation options and accessories










#### Most effective solution for turbulence

The sedimentation of solids occurs in basins and pump sumps. This sedimentation makes it much more difficult to carry out cleaning when draining the basins. In order to minimise sedimentation and to pump off the solids during draining, the solids must be regularly stirred up from the bottom and distributed in the fluid.

The high-speed Wilo submersible mixers have proven themselves in these applications. Thanks to the compact design, the mixers can be installed close to the basin floor. The propeller, which is made of high-quality stainless steel, always ensures sufficient turbulence and therefore reliably prevents solids from settling. The optimised propeller geometry also ensures low-wear and low-clogging operation, even with long running times.

**This minimises your cleaning work when completely draining stormwater retention tanks and pump sumps.**

#### Technical data

					
Wilo-Flumen ...	EXCEL-TRE 20	OPTI-TR 22	OPTI-TR 28-1	OPTI-TR 30-1 EXCEL-TRE 30	OPTI-TR 40-1 EXCEL-TRE 40
<b>Propeller</b>					
Max. thrust (N)	105 – 185	180 – 400	370	220 – 530	520 – 950
Nominal diameter (mm)	200	220	280	300	400
Rated speed (rpm)	1416	915/1410	1361	915/1454	705/943
Number of blades	3	3	2	3	3
Material	1.4408	1.4408	1.4408	1.4408	1.4408
<b>Seal material</b>					
On the motor side	SiC/SiC	NBR	SiC/SiC	NBR	NBR
On the fluid side	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
<b>Motor data</b>					
Fluid temperature (°C)	3 – 40	3 – 40	3 – 40	3 – 40	3 – 40
Ex rating (ATEX/FM)	o	o	o	o	o
IE3 motors*	●	–	–	● (EXCEL-TRE 30)	● (EXCEL-TRE 40)
IE4 motors*	–	–	–	–	–

\*Based on IEC 60034-30

● = as standard   o = optional   – = not available

# Medium-speed submersible mixers

## Get the right mix easily



Wilo provides you with individual, customised solutions. We support you from the very beginning with the design stage, to dimensioning and right up to maintenance concepts through every phase of your project.

### Your benefits:

- Reliable continuous operation thanks to low clogging propellers and largely dimensioned gear bearings
- High operational reliability by using low-wearing propeller materials
- Reduction of energy costs due to best thrust to power ratio possible thanks to optimised hydraulics with minimum cavitation tendency
- Standard-equipped with IE3 motor (Flumen EXCEL-TRE)
- Customer-specific configuration taking into account the system parameters
- Simple adaptation to the load cases due to operation with a frequency converter
- Simple replacement due to adaptation to existing installations





#### Variable efficiency for optimal mixing






Due to the process technology, a wide variety of types of sludge are produced in the wastewater treatment plant process. These sludges are temporarily stored in suitable sludge silos or sludge piling containers for the further plant process. Depending on the wastewater treatment process, the sludge layers are regularly mixed.

Wilo submersible mixers support homogenisation in many aspects:

- Dimensioning based on customer requirements
- Low-wearing propellers with propeller geometry that are resistant to clogging
- Frequency converter operation ensures process reliability even with constantly changing system parameters.

**All these points contribute to optimum homogenisation of the sludge and ensure a consistent content of solids in the fluid while reliably preventing deposits in the sludge basin.**

#### Technical data

					
Wilo-Flumen ...	OPTI-TR 50-3 EXCEL-TRE 50-3	OPTI-TR 60-3 EXCEL-TRE 60-3	OPTI-TR 80-3	OPTI-TR 90-2 EXCEL-TRE 90-2	OPTI-TR 120-1
<b>Propeller</b>					
Max. thrust (N)	140 – 1850	225 – 2380	2140 – 4480	430 – 2120	2900 – 6150
Nominal diameter (mm)	500	600	800	900	1200
Rated speed (rpm)	132 – 481	132 – 430	227 – 336	98 – 251	176 – 272
Number of blades	3	3	3	3	3
Material	1.4408	1.4408	1.4408	PUR/GRP	PA6G
<b>Seal material</b>					
Motor / sealing chamber	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)
Sealing / gear chamber	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
Gear chamber / pre-chamber	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)
Pre-chamber / fluid	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
<b>Motor data</b>					
Fluid temperature (°C)	3 – 40	3 – 40	3 – 40	3 – 40	3 – 40
Ex rating (ATEX/FM)	o	o	o	o	o
IE3 motors*	● (EXCEL-TRE 50-3)	● (EXCEL-TRE 60-3)	–	● (EXCEL-TRE 90-2)	–
IE4 motors*	o (EXCEL-TRE 50-3)	o (EXCEL-TRE 60-3)	–	o (EXCEL-TRE 90-2)	–

\*Based on IEC 60034-30

● = as standard o = optional – = not available

## Low-speed submersible mixers

### Provide targeted flows



Wilo low-speed submersible mixers can also be retrofitted in your system at any time. They are suitable for different basin depths and geometries.

#### Your benefits:

- Efficient energy usage. The innovative blade geometry and energy-efficient IE3/IE4 motors ensure the best possible thrust coefficient. At the same time, this reduces your energy and operating costs.
- Consistently reliable. The low-wearing 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 inflow conditions are unfavourable.












### Optimally agitated, effectively suspended

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 inflow conditions are unfavourable, Wilo submersible mixers with 3 propeller blades can be used. They guarantee a low propeller blade load even in unfavourable positions.

**In this way, we achieve the highest level of efficiency with maximum thrust in your system.**

### Technical data

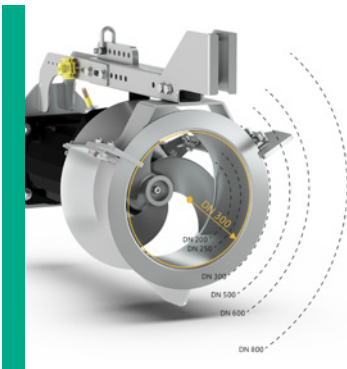
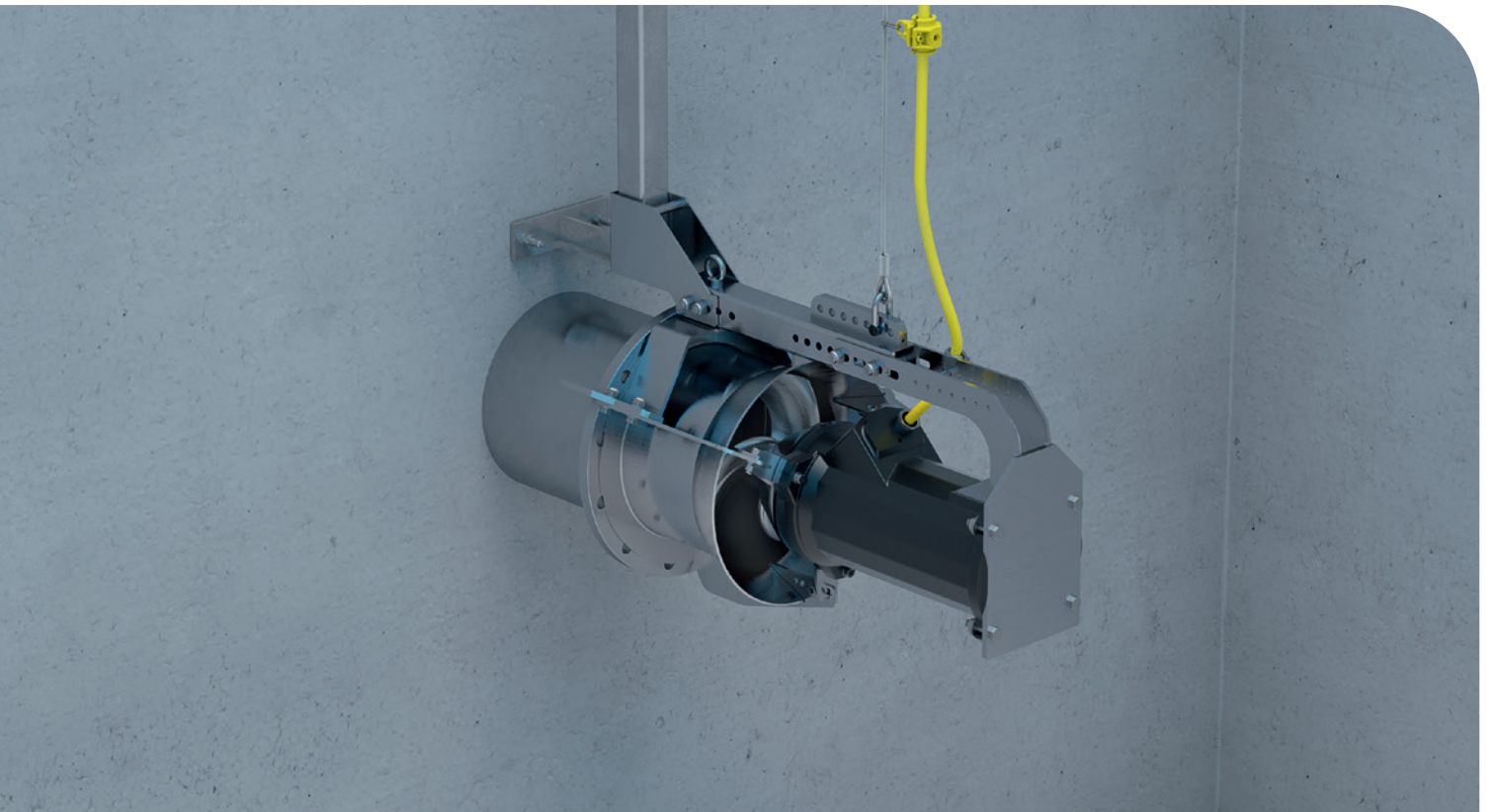
							
Wilo-EMU ...	TR 216 TRE 216	TR 221 TRE 221	TR 226-3 TRE 226-3	TRE 312	TR 316 TRE 316	TR 321 TRE 321	TR 326-3 TRE 326-3
<b>Propeller</b>							
Max. thrust (N)	470 – 2740	480 – 3400	500 – 3780	380 – 2300	810 – 3340	550 – 3500	1140 – 4250
Nominal diameter (mm)	1600	2100	2600	1200	1600	2100	2600
Rated speed (rpm)	32 – 79	21 – 59	16 – 48	59 – 154	38 – 78	21 – 54	21 – 43
Number of blades	2	2	2	3	3	3	3
Material	GFK/VE	GFK/VE	GFK/VE	PA6G	GFK/VE	GFK/VE	GFK/VE
<b>Seal material</b>							
Motor / sealing chamber	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)
Sealing / gear chamber	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
Gear chamber / pre-chamber	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)	FPM (FKM)
Pre-chamber / fluid	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC	SiC/SiC
<b>Motor data</b>							
Fluid temperature (°C)	3 – 40	3 – 40	3 – 40	3 – 40	3 – 40	3 – 40	3 – 40
Ex rating (ATEX/FM)	o	o	o	o	o	o	o
IE3 motors*	● (TRE 216)	● (TRE 221)	● (TRE 226-3)	●	● (TRE 316)	● (TRE 321)	● (TRE 326-3)
IE4 motors*	o (TRE 216)	o (TRE 221)	o (TRE 226-3)	o	o (TRE 316)	o (TRE 321)	o (TRE 326-3)

\*Based on IEC 60034-30

● = as standard o = optional – = not available

## Recirculation pumps

Efficient recirculation between the individual cleaning phases

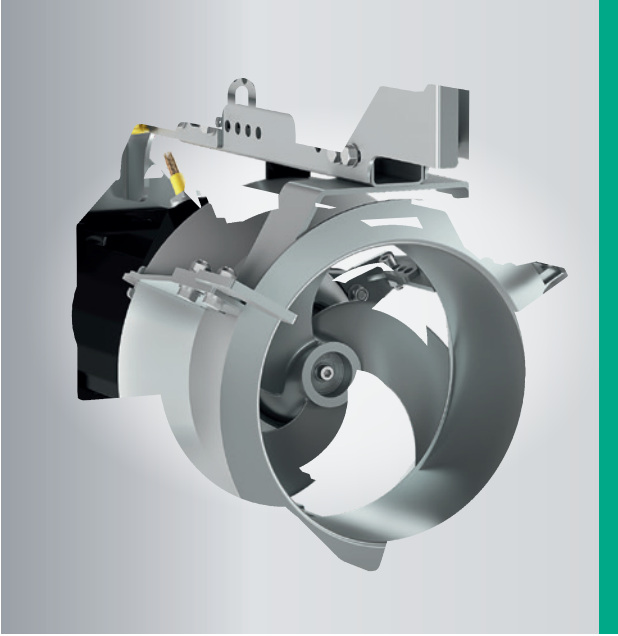


**The right connection for every pipe size – continuous from DN 200 to DN 800**

### Your benefits:

- Reliable continuous operation due to low clogging propellers and flow housing that is resistant to clogging
- High operational reliability by using low-wearing propeller materials
- Reduction of energy costs thanks to high pump efficiency
- Customer-specific configuration taking into account the different pipe diameters and volume flows
- Simple adaptation to the system parameters through operation with a frequency converter
- Easy installation and removal, even when the basins are filled, due to lowering devices and screwless coupling
- Simple replacement due to adaptation to existing installations












### Optimal performance and cost-efficiency

In upstream denitrification and cascade denitrification, the sewage from the mechanical treatment stage and the return activated sludge from secondary treatment first flow into the denitrification tank and then from the denitrification tank into the downstream nitrification tank. Here, recirculation pumps from Wilo efficiently pump the nitrate-containing sewage from the nitrification tank back into the denitrification tank.

**Reliable sewage transport in your wastewater treatment plant with high volume flow at low delivery head.**

### Technical data

							
	OPTI-RZP 20-1 EXCEL-RZPE 20-1	OPTI-RZP 25-3 EXCEL-RZPE 25-3	OPTI-RZP 30 EXCEL-RZPE 30	OPTI-RZP 40-1 EXCEL-RZPE 40-1	RZP 50-3	RZP 60-3	RZP 80-2
<b>Hydraulics</b>							
Delivery head (m)	0.1 – 1.6	0.1 – 4.9	0.2 – 4.7	0.2 – 2.5	max. 2.6	max. 1.8	max. 1.3
Volume flow (m <sup>3</sup> /h)	20 – 370	30 – 750	40 – 920	50 – 1130	max. 2221	max. 3160	max. 6926
Large pipe connection	DN 200 / DN 250	DN 250	DN 300	DN 400	DN 500	DN 600	DN 800
Material, flow housing	1.4571	1.4571	1.4571	1.4571	1.4571	1.4571	1.4571
Material, propeller	1.4408	1.4408	1.4408	1.4408	1.4571	1.4571	PUR/1.4571
<b>Installation type</b>							
Standard with lowering device	●	●	●	●	●	●	●
Flange connection, screwed	●	●	●	●	–	●	–
<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 rating (ATEX/FM)	o	o	o	o	o	o	o
IE3 motors*	● (RZPE 20)	● (RZPE 25)	● (RZPE 30)	● (RZPE 40)	–	–	–
IE4 motors*	–	–	–	–	–	–	–

\*Based on IEC 60034-30

● = as standard   o = optional   – = not available

## Varied accessories

### We have the right accessories for your process

The more options you have to customise your unit 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.

#### Wilo Ceram coating

##### Effective protection from corrosion and abrasion

You need to be able to rely on reliably functioning machine technology in every treatment stage of your wastewater treatment plant. That is the only way to guarantee a trouble-free treatment process. The units are exposed to corrosive and abrasive influences due to the nature of the plant. These stress the surface and material structures of the units and can reduce the service life of the units. Process reliability can be significantly impaired by a malfunction.

Compared to other coatings, the Wilo Ceram coating offers the best possible protection against aggressive fluids. Thanks to its increased resistance to abrasion and corrosion, it effectively prevents wear and chemical corrosion, thus ensuring optimum functionality and performance.

Wilo Ceram significantly increases the service life of your units.



Wilo Ceram coating – very good adhesion when wet (15 N/mm<sup>2</sup>) and abrasion resistance (9 y)

#### Resistance for Ceram C0

Designation	Temperature range	Resistance*
Sewage, alkaline (pH 11)	+40 °C	1
Sewage, slightly acidic (pH 6)	+40 °C	1
Sewage, highly acidic (pH 1)	+40 °C	1
Ammonium hydroxide (5 %)	+40 °C	3
Decanol (fatty alcohol)	+20 °C	1
Decanol (fatty alcohol)	+50 °C	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	1
Caustic soda (5 %)	+50 °C	2
Sodium chloride solution (10 %)	+20 °C	1
Hydrochloric acid (5 %)	+20 °C	2
Hydrochloric acid (10 %)	+20 °C	2
Hydrochloric acid (20 %)	+20 °C	3
Sulphuric acid (10 %)	+20 °C	2
Sulphuric acid (20 %)	+20 °C	3
Nitric acid (5 %)	+20 °C	3
Toluene	+20 °C	2
Cooling and industrial water	+50 °C	1
Xylene	+20 °C	1

\*For an overall layer thickness of min. 400 µm

1 = resistant

2 = resistant for 40 days

3 = overflow-resistant (immediate cleaning recommended)



We will be happy to support you and help you configure the suitable equipment for your unit.

## Frequency converter Wilo-EFC

### for load-based and demand-based control

The Wilo-EFC can be flexibly adapted to the existing operating conditions. This means that the Wilo-EFC can offer all the advantages of a powerful frequency converter for a wide range of applications.

In combination with our submersible mixers and recirculation pumps, this enables load-based and demand-based control to adapt to changing system requirements.

The Wilo-EFC is available in 22 versions with stepped rated power from 0.37 kW to 400 kW. It enables uninterrupted operation with cable lengths of up to 150 metres (shielded) / 300 metres (unshielded), without requiring any additional components.



## Auxiliary lifting devices

### for easy installation

Our auxiliary lifting devices make it easy to install our units. The units can also be removed from the basin at any time. This makes it easier for you to maintain the units at any time.

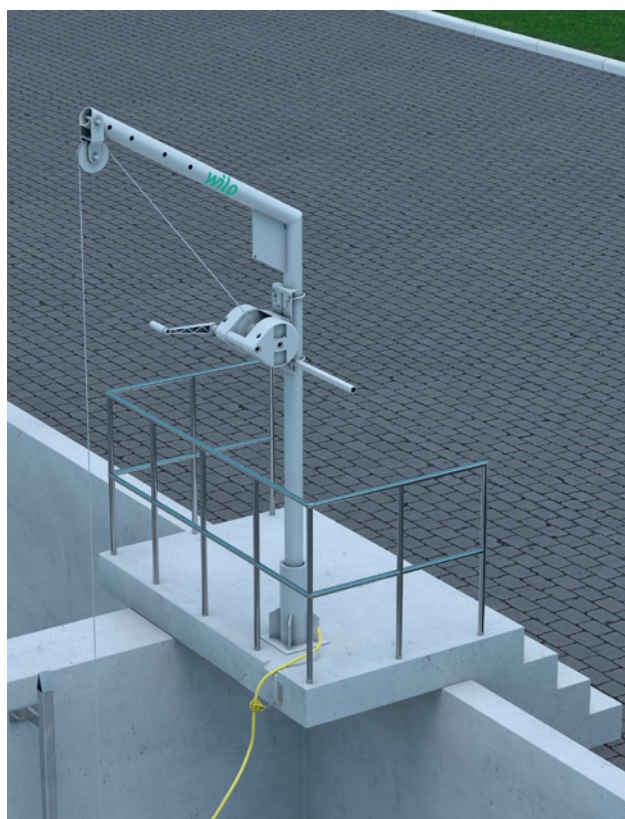
- Projection up to 3.2 m
- Bearing capacity up to 500 kg
- Completely made of stainless steel 1.4571

## Lowering devices

### for optimal positioning

Submersible mixers must be optimally positioned, recirculation pumps must be connected exactly to the pressure pipe. Our lowering devices solve these requirements with ease.

Fixed tripod units are also available for free placement of the submersible mixers in the basin.



## Wilo Services

### A carefree package for you as our partner

With Wilo as your partner, you cannot only be sure of choosing high-quality product solutions, but also of benefiting from a comprehensive, carefree package of well-thought-out services. That means reliable support from Wilo at every phase of your project – from design and configuration right through to commissioning and maintenance. In our seminars, we tell you about the very latest technologies and trends. And when it comes to attractive conditions for your projects, we also have just the right package on offer.

In short: Wilo is always by your side. In person and on site. With local services in over 60 countries and more than 1,200 Wilo technicians worldwide.

#### **We make the design and selection process simple for you.**

We want to help you avoid choosing just any solution, but instead the one best suited to your specific requirements. For this reason, we will discuss your requirements with you before any purchase and develop the most economical, individual product solution for you based on this information.

#### **Pre-sales services**

##### **for your tailor-made choice:**

- Local support, consulting support
- Product selection
- Select programmes
- Numerical flow simulations
- Flow calculation
- Pipe calculation
- Installation drawings, documentation

#### **→ Training and seminars**

We want you to be able to use Wilo's innovative technologies and products optimally and integrate them perfectly into your work processes. With this goal in mind, we offer expert-led specialised training courses designed for the specific needs and applications of your industry.

#### **→ Wilo-Energy Solutions**

Our initiative for greater economy and sustainability. It includes the proactive replacement of pumps and pump systems which are still working but inefficient compared to Wilo high-efficiency technology. For municipal and industrial sewage treatment which is operationally reliable and more energy-efficient.

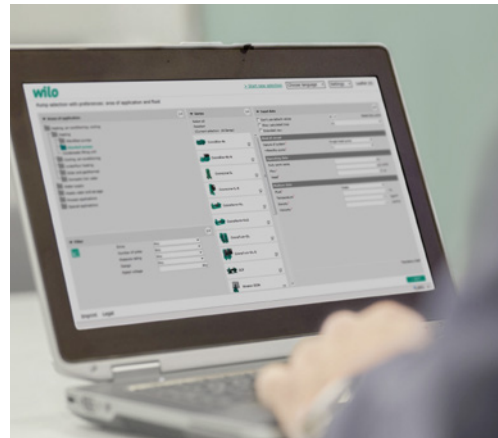
**“Services that provide comprehensive and reliable support.**

**That's what we call  
Pioneering for You.”**





More information at  
[www.wilo.com/watermanagement](http://www.wilo.com/watermanagement)



### Get your purchase right with Wilo.

Once you've made your choice, we provide you with specific advice on making your investment. What's more, we don't just deliver your solution, we continue to support you – from certification right through to commissioning. For example, qualified plant engineers with years of experience will carry out an extensive test and training phase of our pumps.

#### Sales services which really work for you

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

### We are here for you – even after your purchase.

Our tailor-made service solutions cover the entire life cycle of your Wilo products – including what comes after your purchase. This is why we have professional service technicians available for you locally and globally so that we can supply spare parts quickly at any time, and why we provide specialised training courses, for example, to enhance your expertise.

At the same time, we continually strive to improve our services.

#### After-sales services with real added value for you

- Customised, reliable maintenance plans
- Rapid repair service
- Fast spare part solutions
- Efficiency checks to determine the economic efficiency of existing pumps and suitable replacement pumps
- Specialised training courses
- Service packages

#### → WiloCare.

Guarantee your cost security and operational reliability with WiloCare. The service package provides you with monthly reports on the current status of your system, energy consumption, possible optimisation measures and pending maintenance intervals. The services can be adjusted precisely to your requirements, all at a fixed monthly price, if required. Choose the version that fits you best: Basic, Comfort or Premium.





Pioneering for You

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