



ATAC Solutions Ltd is a leading environmental engineering company based in Maidstone, United Kingdom.

ATAC Solutions is known for its state-of-the-art liquid collection fleet and its expertise in providing bespoke turnkey wastewater process solutions.

With a focus on sustainability and accreditation in ISO 9001 & ISO 14001, the company serves domestic and industrial clients across the South-East and London.



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Axiom Water companies

General Product Overview

and

Accessories for Submersible Mixers



Agenda

- ***General information - mixing***
- Applications of submersible mixers
- Technical design
- Classification of Wilo Submersible Mixers
- Accessories
- Wilo selection software

Purpose of the mixing

Homogenisation

Suspension

Homogeneous suspension

Generation of flow

Emulsification

Injection of gas

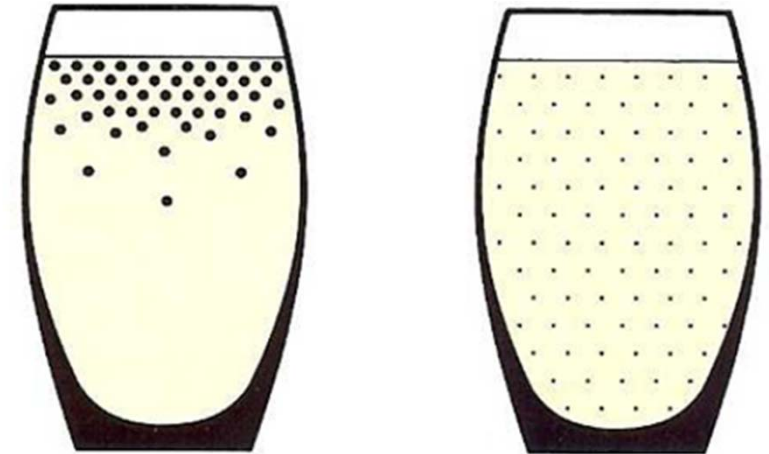
Intensification of exchange of heat

Chemical reaction

Definition of terms - homogenisation

Homogenisation

This term is generally used for "equalisation". It describes the mixing of liquids that are soluble in one another. When mixing in sludge applications > 1% dry matter is however the primary goal of the concentration gradient to bring it into a specified range, generally within a specified time.



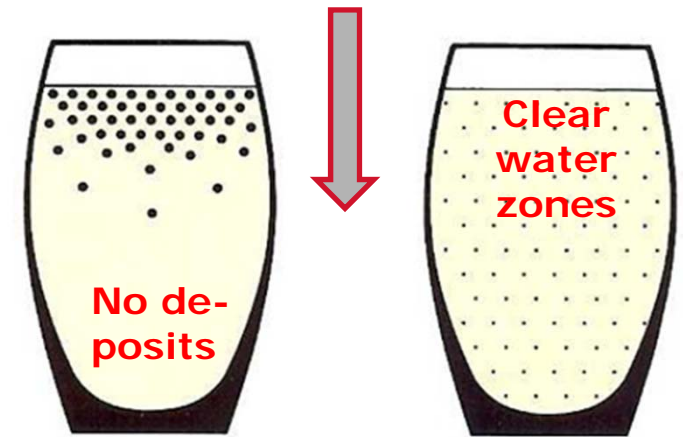
Objective:

Generation of a fully mixed condition of the contents of the tank, with as little variation as possible in the dry matter content.

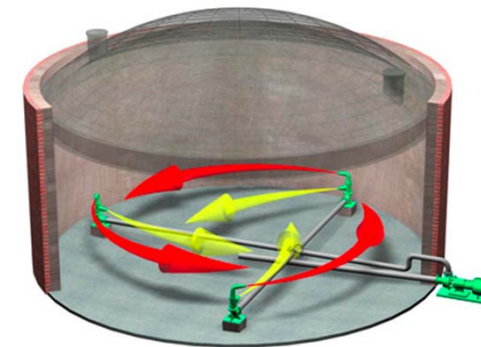
Definition of terms - suspension

Suspension

By suspension is meant the dispersion and distribution of a solid within a fluid.
Dispersion of a solid from the floor of a tank can be an important duty, and it can also be important to distribute the solid as evenly as possible throughout the fluid.



$< 0,15 \text{ m/s}$



Objective:

The creation of a "deposit-free operation".

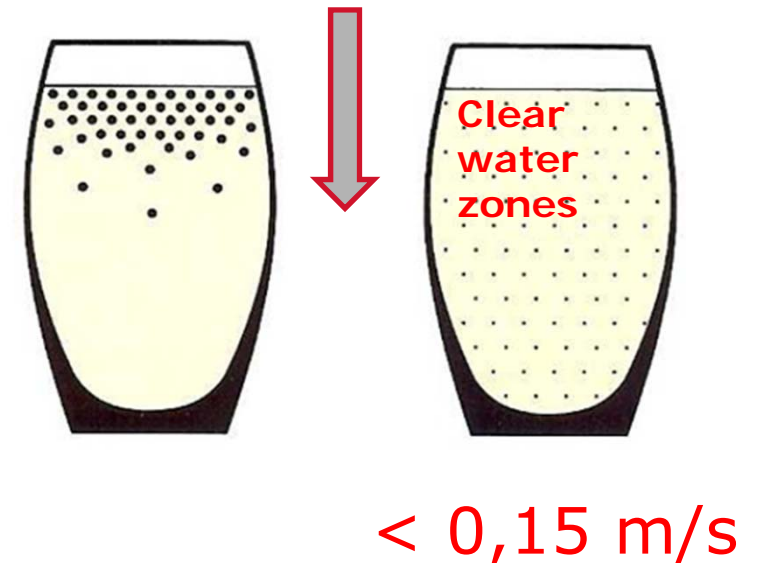
Risk:

Creation of clear water zones caused by insufficient power input and/or weak flow zones (container fittings).

Definition of terms – Homogeneous suspension

Homogeneous suspension

One speaks of a homogeneous suspension generally when all the activated sludge flocks are dispersed and evenly distributed throughout the basin. For a activated sludge tank to be regarded as containing a sufficiently homogeneous mixture, 90 % of the measured values must display a deviation ≤ 12 % of the measured average.



Objective:

Deposit-free operation without clear water zones.

Disadvantage:

Marginally increased power input (W/m^3)

Standards:

VDMA	24656
ISO	21630

Definition of terms – flow generation

Flow generation

generation of a flow in a specific direction over the entire flow cross-section.



Only in a **ring and circulation tank!!**

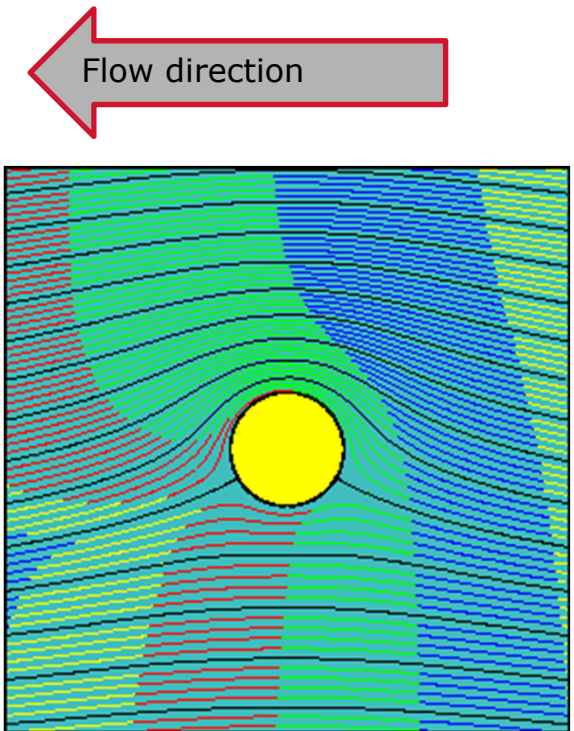
Objective:

Deposit-free operation (sediment transport) without clear water zones and with process optimisation.

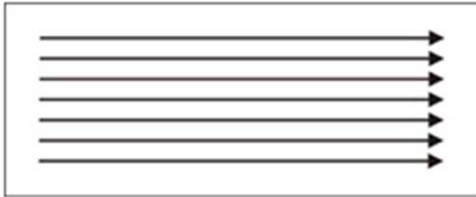
Risk:

No circulation flow if the aeration input is too high

Clear water zones in case of a too low power density (W/m^3)



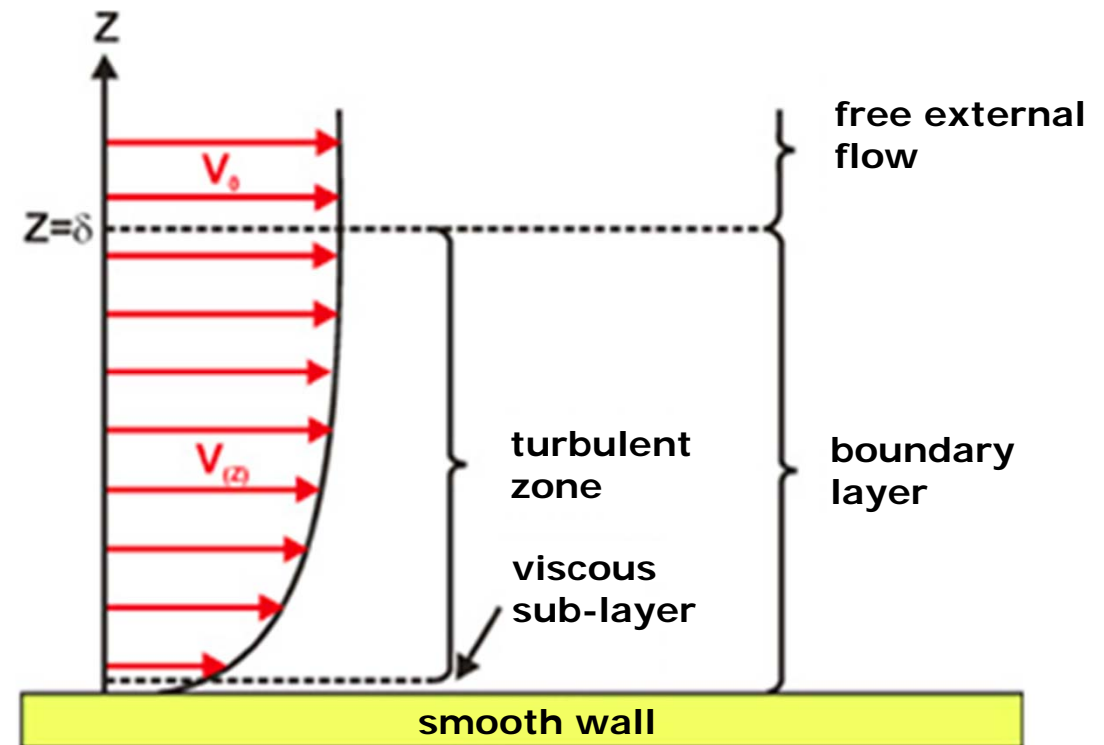
Definition of terms – flow generation



laminar flow:
lower losses
⇒ lower power input



turbulent:
high losses
⇒ high power input

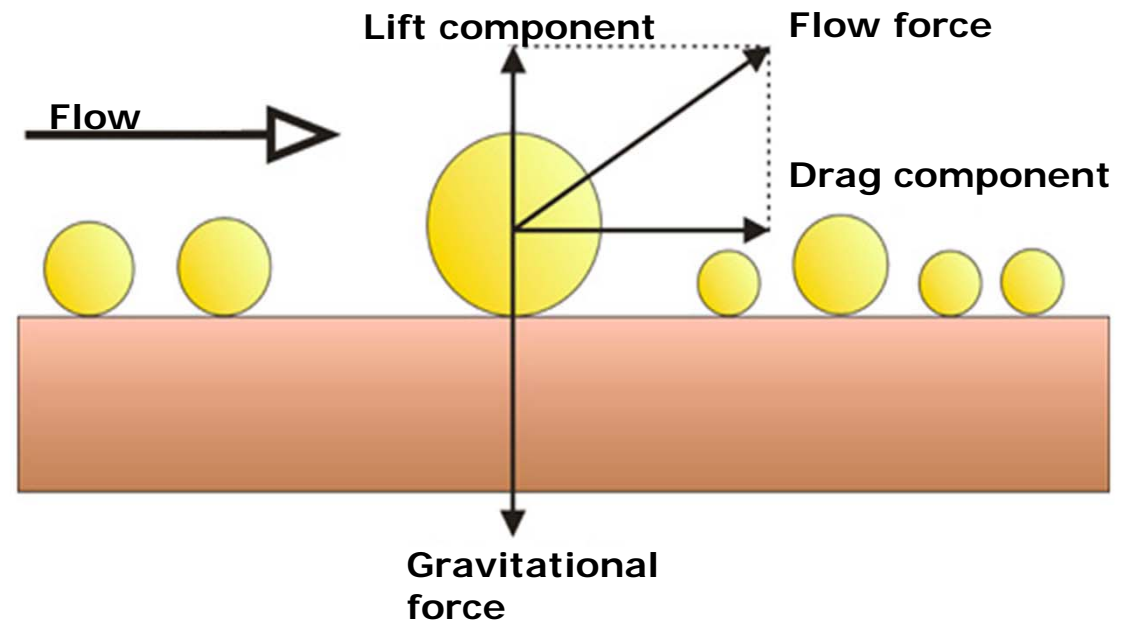


flow profile in a ring and circulation tank
(straight tank sections)

Transport of grains of sediment

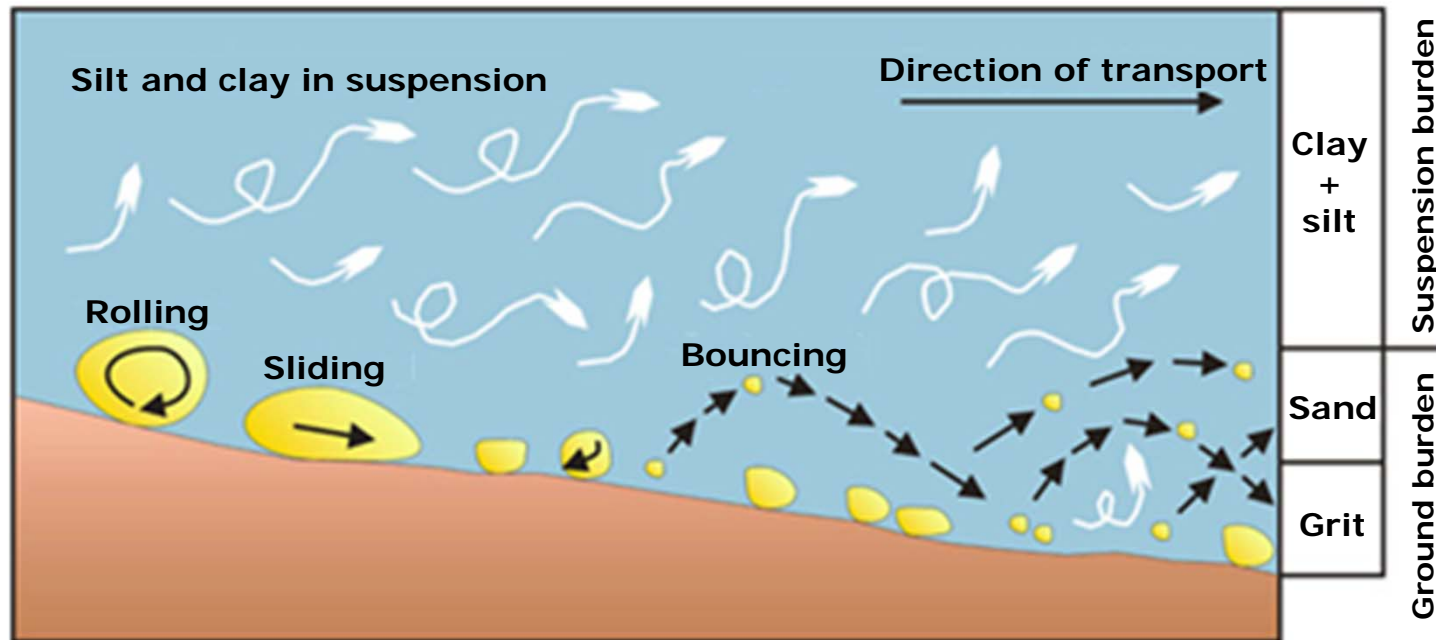
Sediment transport

Various forces are exerted by a flowing medium on particles lying on the floor of a tank. When a critical speed (determined by the type and size of the particle) is exceeded briefly or continuously, the particle is picked up by the medium and transported.



The flow force is the resultant of the horizontally acting drag force and the vertically acting lift force. These forces act against the gravitational force.

Transport of grains of sediment



Components of medium and small grain size (sand / grit) are largely transported as ground burden, components of smaller grain size, such as silt or clay are largely transported as suspension burden.

Process criteria

Sludge
> 1% DM

- **Mixing time**
Quality factor of the mixing
- **Objective:**
 - complete homogenisation of the entire volume of the tank within a range determined in relation to the dry matter content

Activated
sludge
< 1% DM

- **Energy consumption**
- **Objective:**
 - the generation of an average calculated flow velocity
 - Operation without deposits



Introduction

Submersible mixers:

Due to their universal application possibilities today's methods of modern sewage treatment can't be imagined without them.

Meanwhile Submersible Mixers have become an important part of the machinery equipment for sewage treatment plants



General Information

Wilo Submersible Mixer Program



Agenda

- General information
- ***Applications of submersible mixers***
- Technical design of the submersible mixers
- Classification of Wilo Submersible Mixers
- Accessories
- Wilo selection software

Submersible mixers in municipal sewage treatment (application examples)

- Equalization tank
- Activation tank
- Nitrification tank
- Denitrification tank
- Oxidation ditches
- Phosphate elimination tank
- Digester tank
- Reaction basin
- Sewage sludge basin
- Hygienization tank
- Lime milk tank
- Contact basin
- Neutralization tank
- Storm water retaining basin



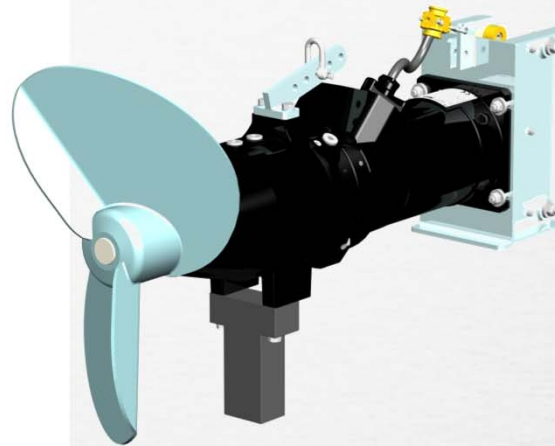
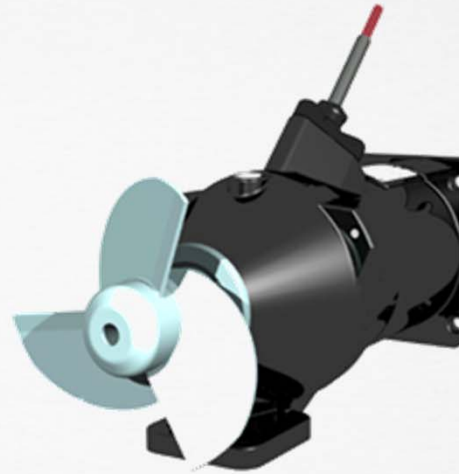
Application of Submersible Mixers in Sewage Treatment

- Activated sludge
- Nitrification (aerobic)
- Denitrification (anoxic)
- Phosphate elimination (anaerobic)
- Reaction basin
- Contact basin

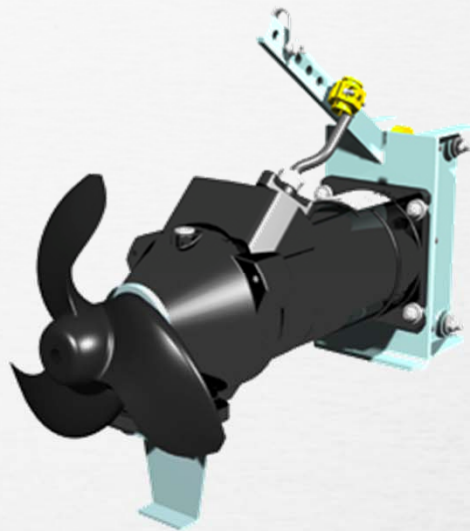
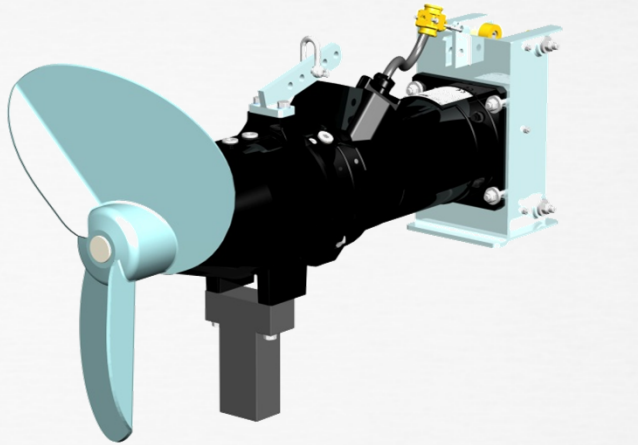


Application of Submersible Mixers in Sewage Treatment

- Sludge storage tank
- Digester
- Static sludge thickener

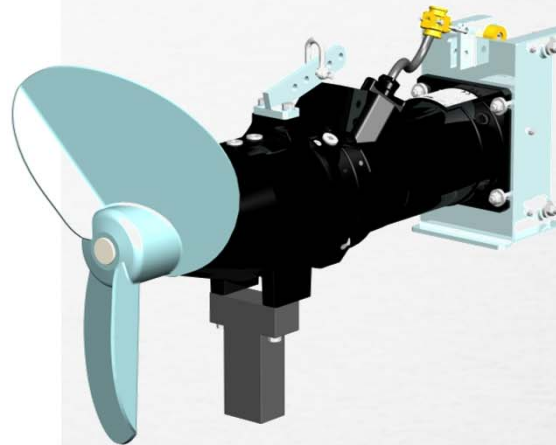
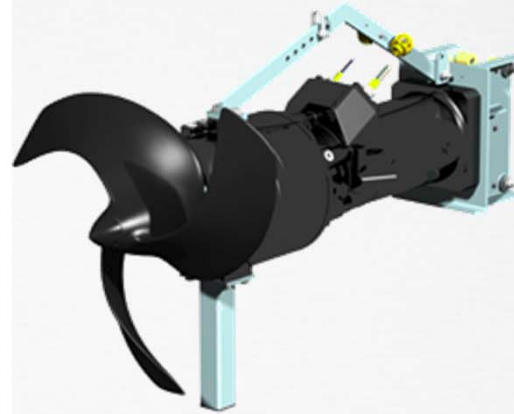


Application of Submersible Mixers in Agriculture



Application of Submersible Mixers in Industry

- Bentonite suspensions
- Biochemical reactors
- Pulp and paper industry
- Neutralization
- Painting plants
- Cooling towers



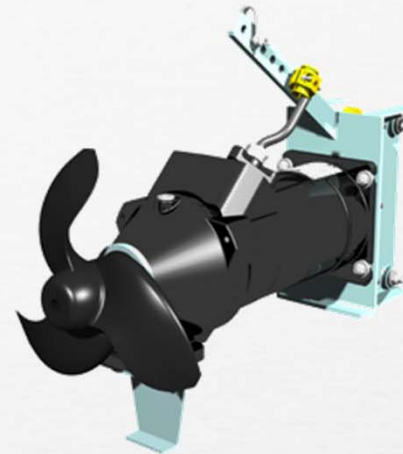
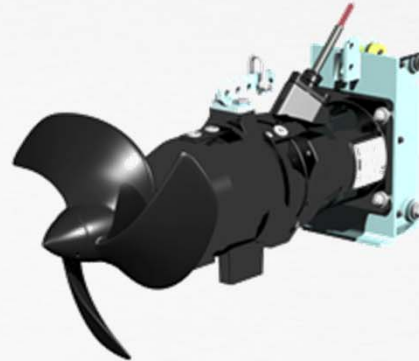
Submersible Mixers for Drinking Water Applications

- Drinking water treatment



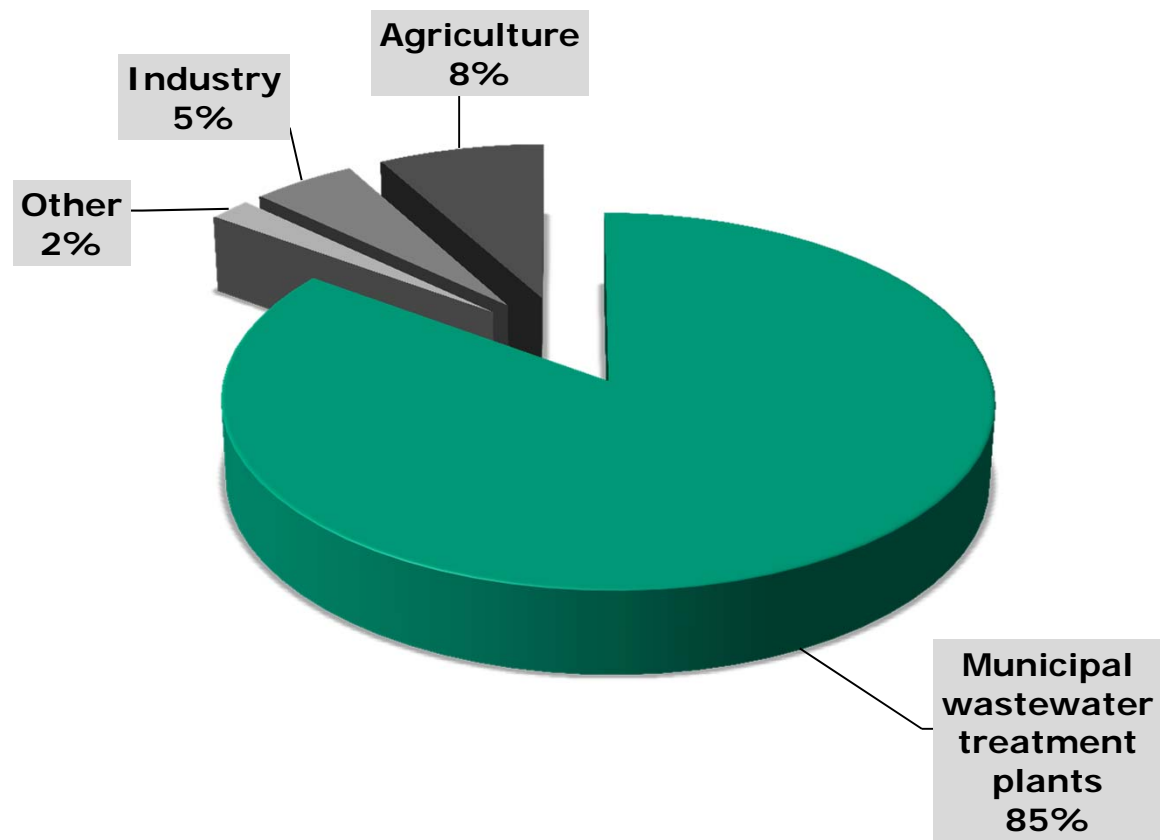
Submersible Mixers in Other Applications

- Equalization tank
- Neutralization
- Cleaning of storm water tanks

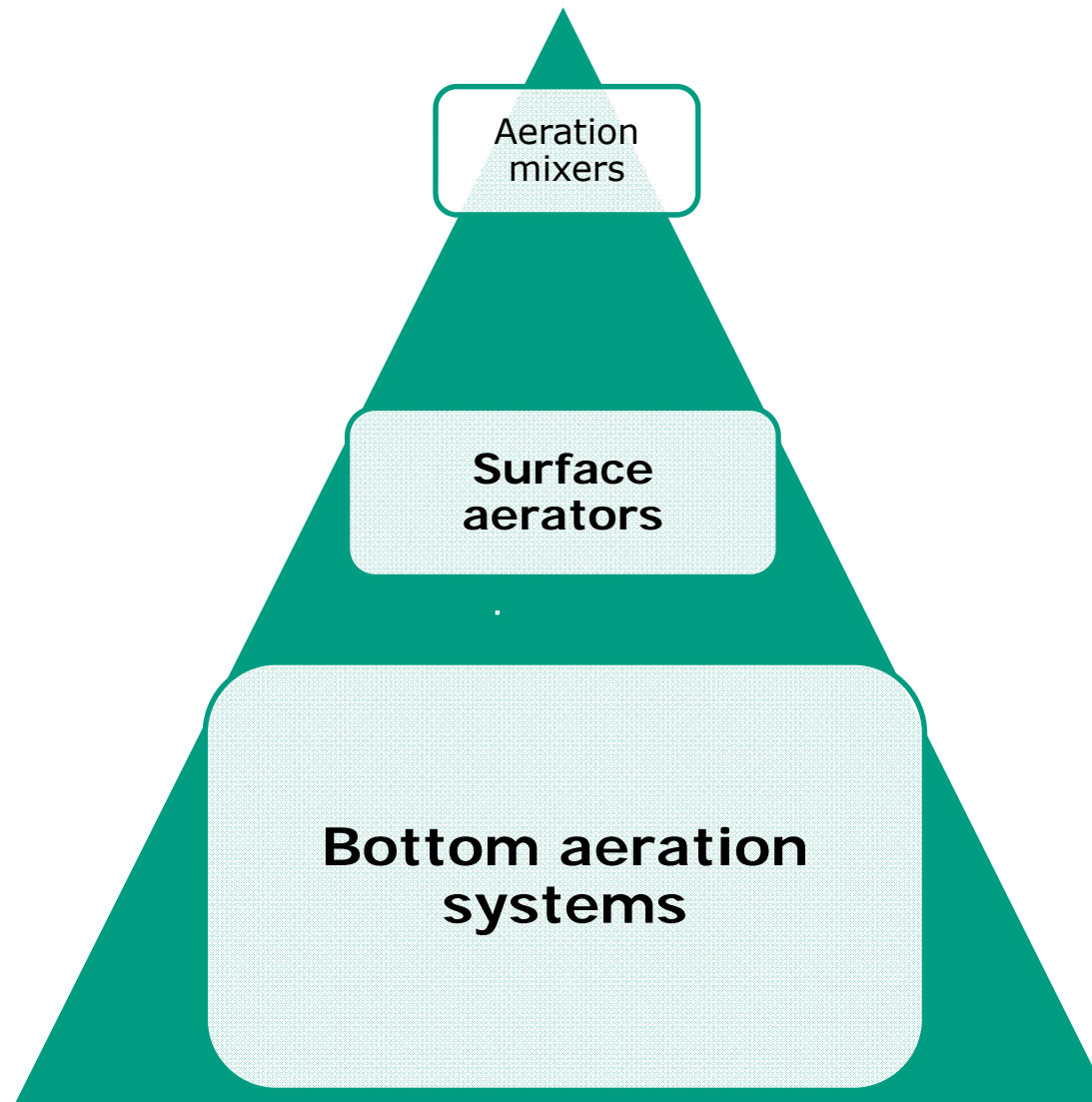


Product range - mixer technology

Areas of application



Aeration systems - types



Aeration mixers

Advantages:

- small tank volume
- chemically charged media
- easy to maintain
- low acquisition costs

Disadvantages:

- poor efficiency (oxygen entry)
- high operating costs



Not relevant for municipal wastewater treatment plants!

Surface aerators – gyroscopic (rotary)

Function

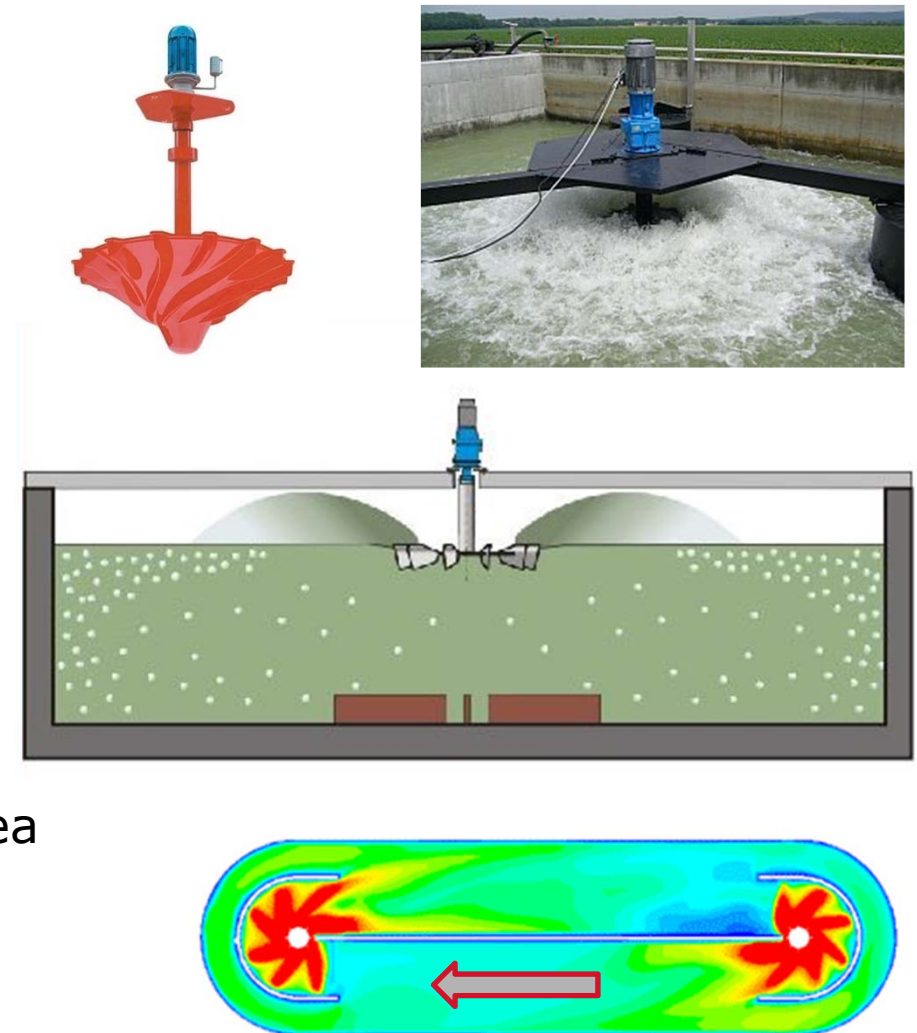
aeration and "mixing"

Advantages:

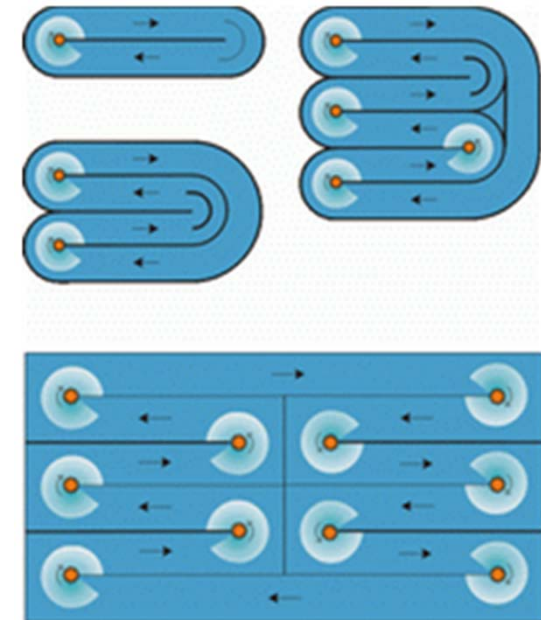
- medium-sized tank volumes
- easy to maintain
- low acquisition costs
(building, compressor and air pipes not necessary!)

Disadvantages

- poor efficiency (oxygen entry)
- Operating bridge necessary
- Positioning practical only in the return area
- Effective depth max. 3-4 m
- high operating costs
- Emission



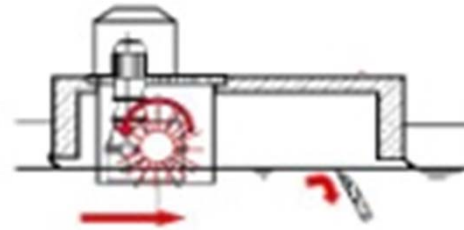
Surface aerator – arrangement



Surface aerator – cylinder (roller)

Function

aeration and generation of a flow velocity close to the surface

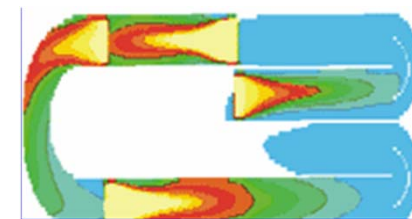


Advantages:

- medium and large-sized tank volumes
- easy to maintain
- low acquisition costs
(building, compressor and air pipes not necessary!)

Disadvantages

- poor efficiency (oxygen entry)
- Operating bridge necessary
- Guide plates increases losses
- Positioning simultaneously operated TR
- Effective depth max. 3-4 m
- high operating costs
- Emission



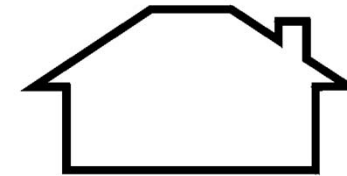
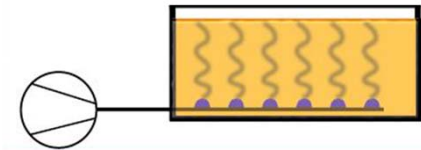
Bottom aerator – disc 9" / 12"

Function aeration

Advantages:

- medium and large-sized tank volumes
- Effective depth over the whole depth of the medium
- no operating bridge
- low emissions
- high efficiency (oxygen entry)
- low operating costs (system-dependent)

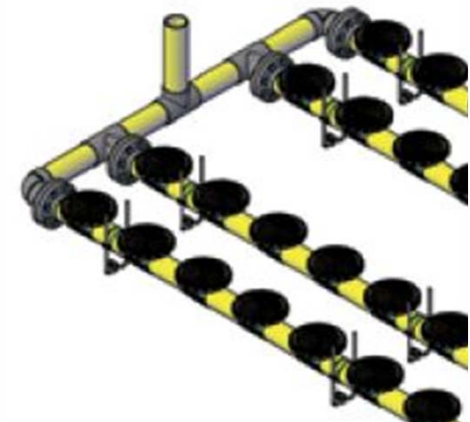
Aeration at depth using
compressed air



Disadvantages

- Positioning simultaneously operated TR
- Density of installation (number of aerators/m²)
- Working life of the chosen diaphragm material
- clogging of the diaphragm (incorrect design or incorrect operation)
- high acquisition costs

(building, compressor and air pipes not necessary!)



Bottom aerators – pipes, hoses, panels and plates

Function aeration

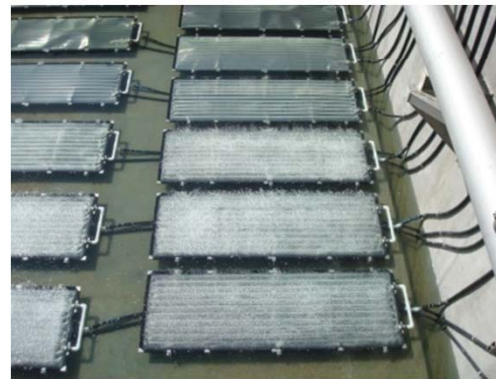
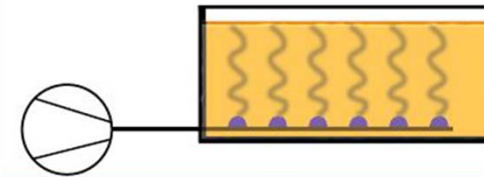
Advantages:

- as for 9" and 12" discs but
- good to very good efficiency (oxygen entry)

Disadvantages:

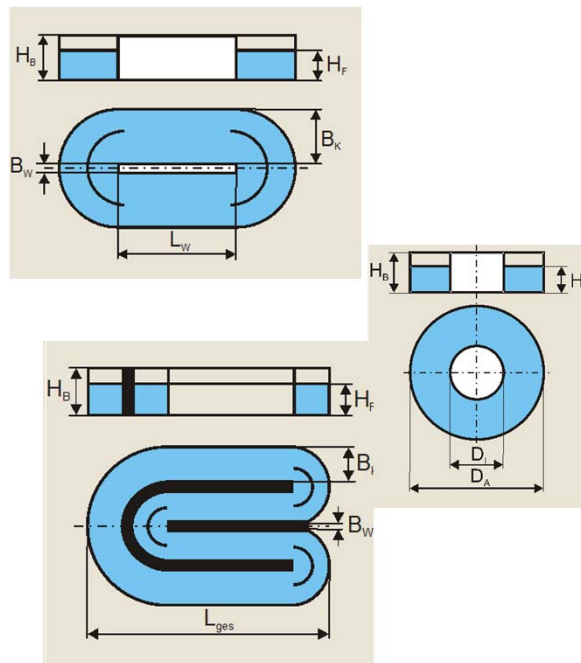
- as for 9" and 12" discs

Aeration at depth using
compressed air

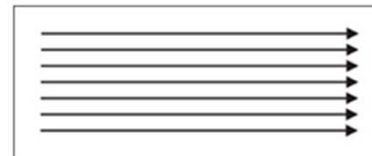


Typical flow patterns - geometry and aeration

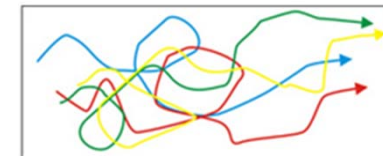
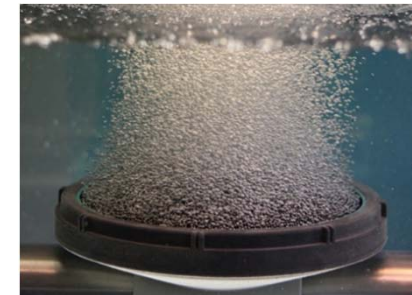
Tank geometries



Denitrification



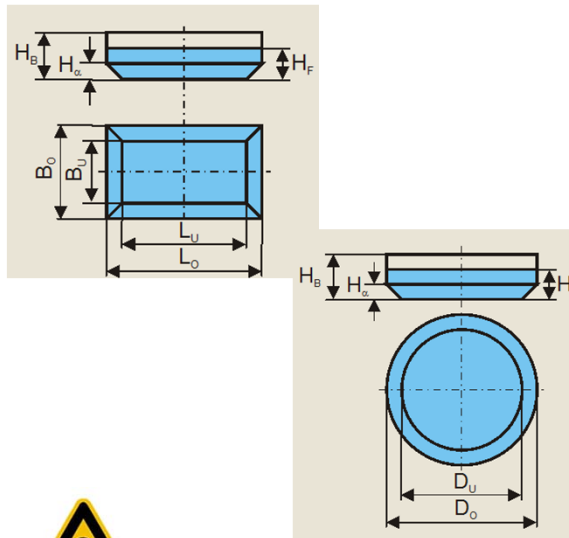
Nitrification



Dedending on the air intake volume and the occupancy rate of the aeration system !!

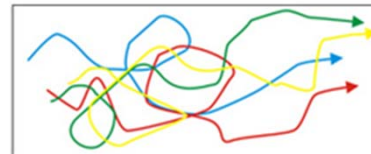
Typical flow patterns - geometry and aeration

Tank geometries

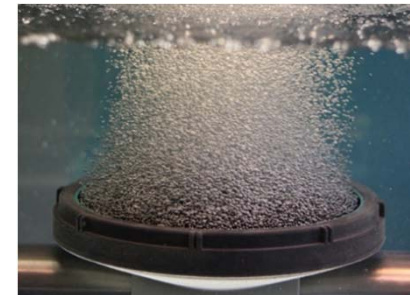


Plus all other tank shapes that **cannot** be classed as circulation tanks!

Denitrification



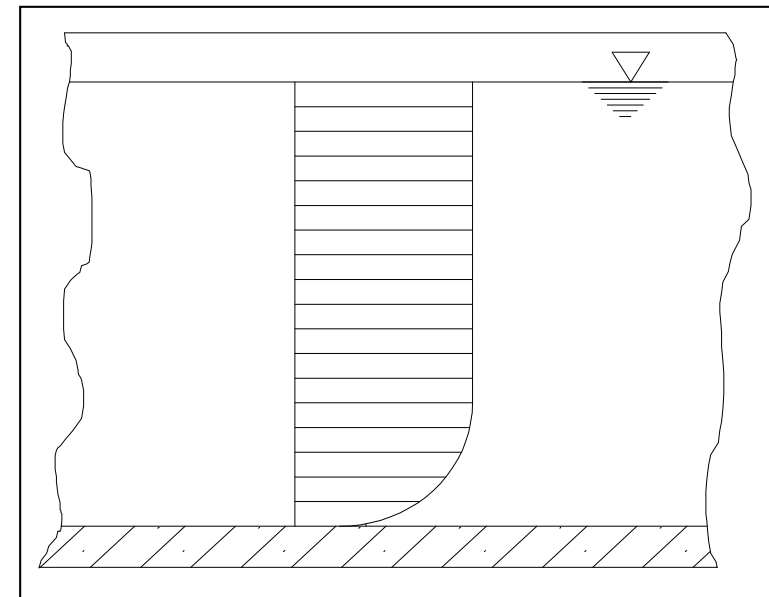
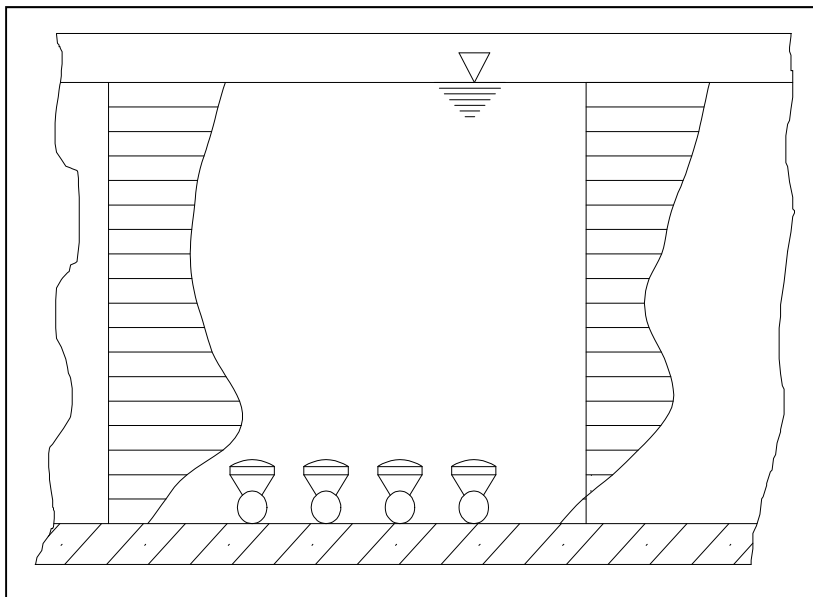
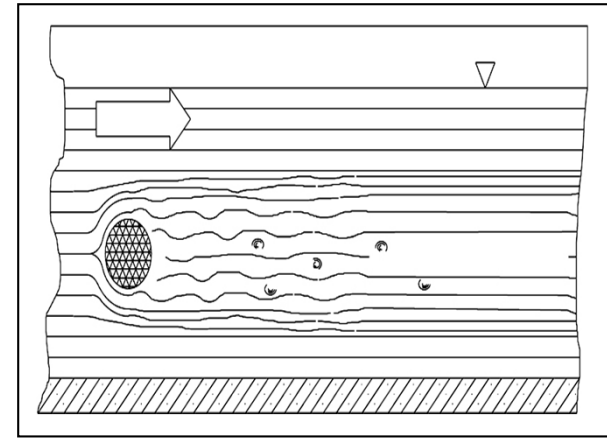
Nitrification



Flow losses

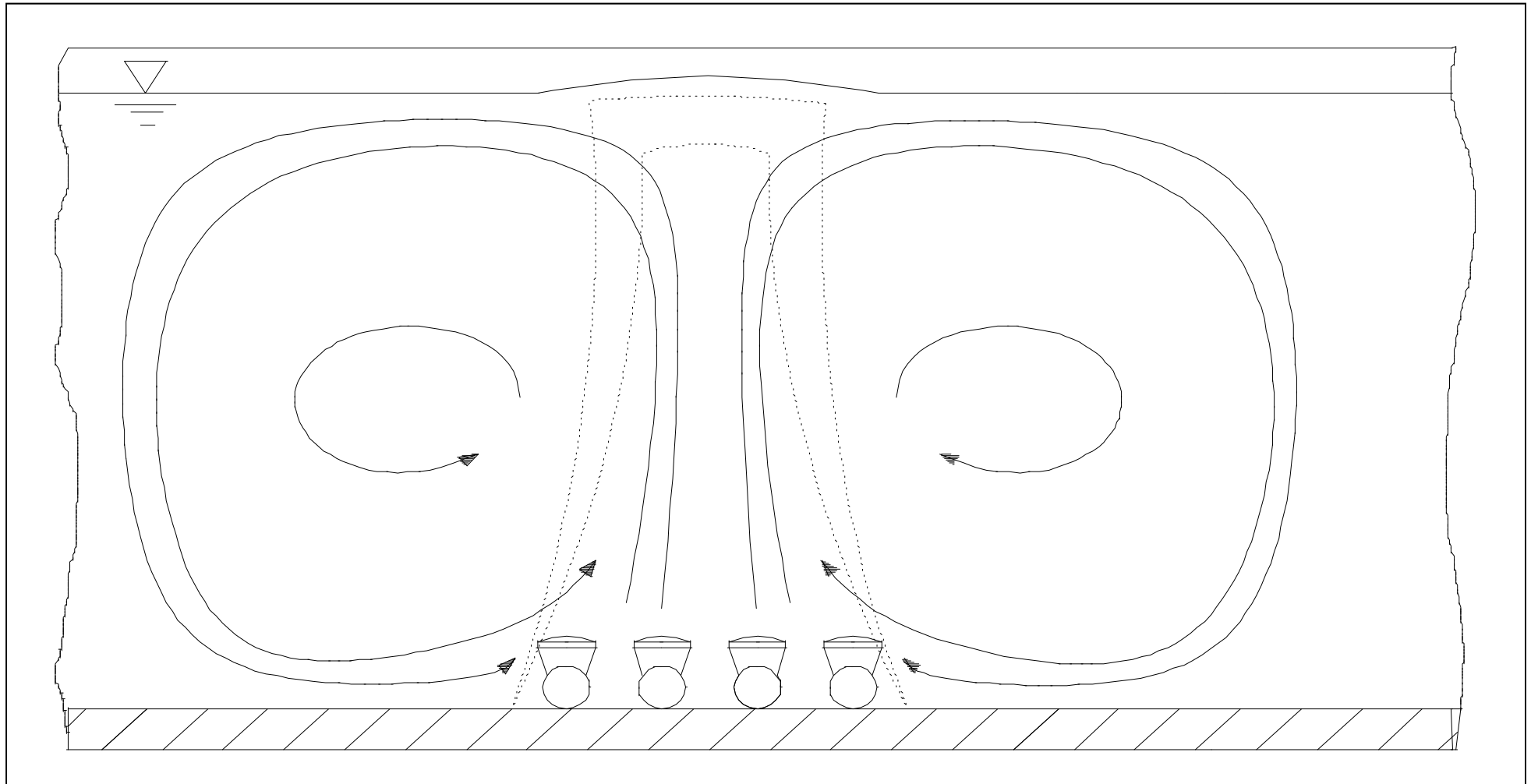
Flow losses are caused by:

- > Shape of the installation surrounded by the liquid
- > Vortex behind the installation
- > Transverse flows (outflows and inflows, aeration)



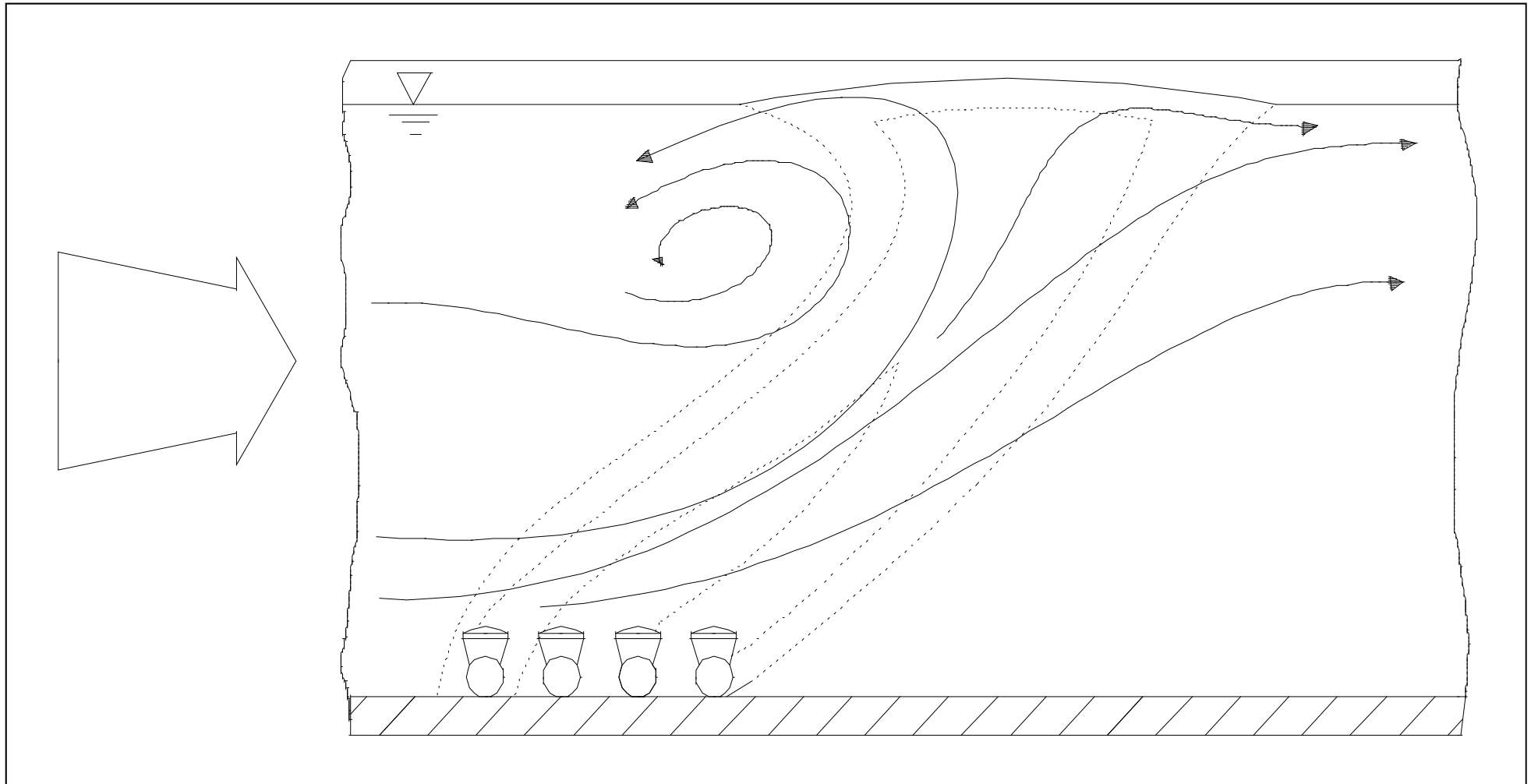
Aeration

Rotating movement **without** horizontal flow



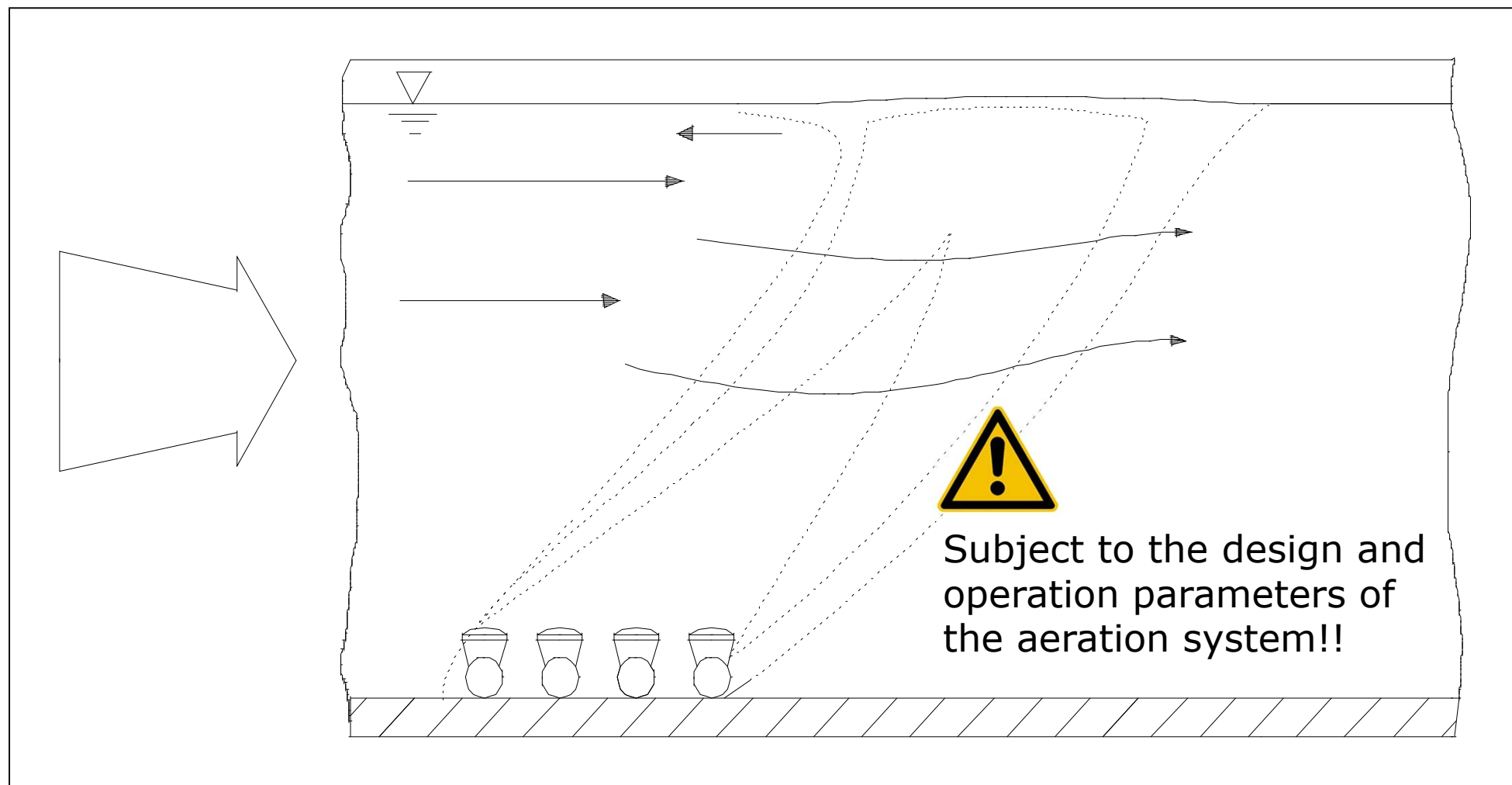
Aeration

Flow movement at **beginning horizontal flow**



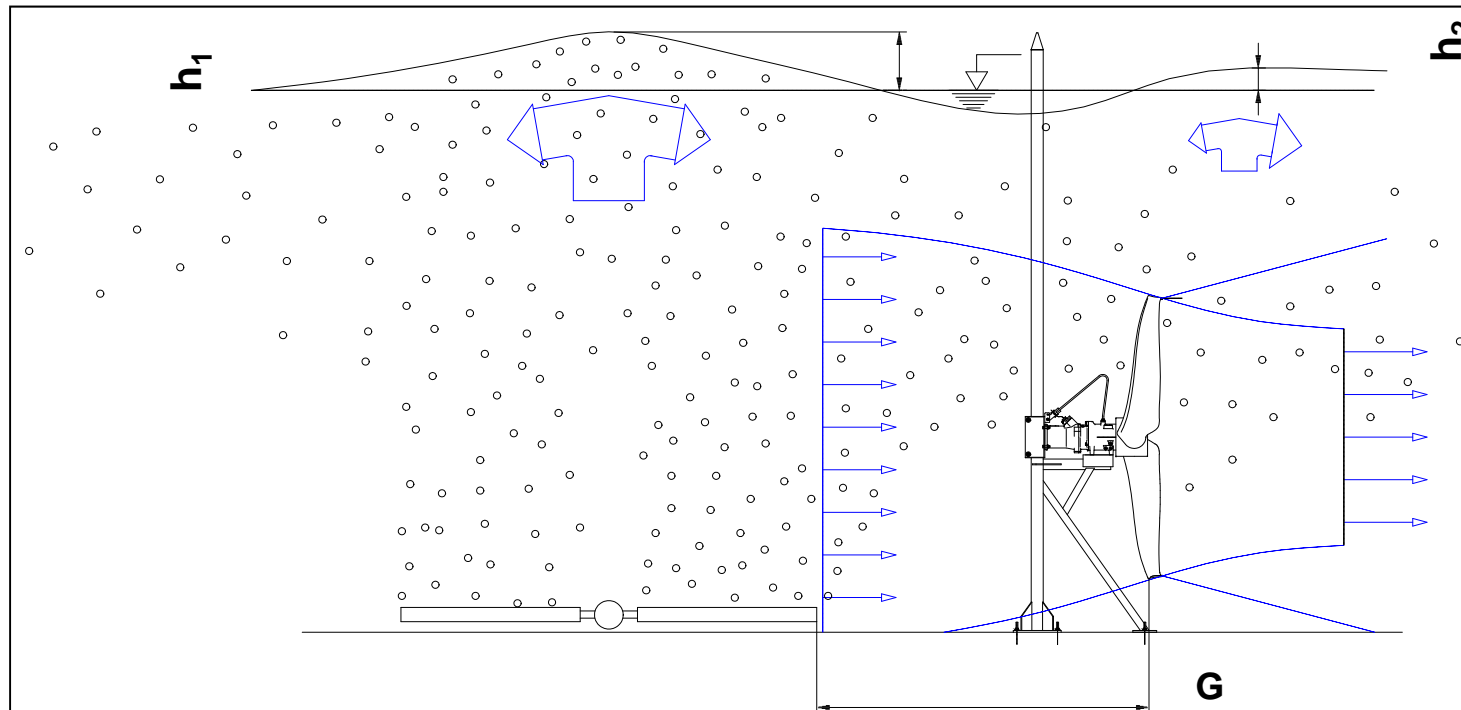
Aeration

Flow condition after a longer period



Aeration

Operating behaviour of a mixer in the aeration field



- primary/secundary
- Density
- Turbulences
- Unsymmetrical flow
- Vibrations
- Life time
- Min. distances
- Backflow

h_1 : Local increase of the volume by air bubbles leads to a raising of the water level in the area of the aeration fields

H_2 : Raising of the water level by a rise in pressure of the propeller

Agenda

- General information
- Applications of submersible mixers
- ***Technical design of the submersible mixers***
- Classification of Wilo Submersible Mixers
- Accessories
- Wilo selection software

Product range with standard motors

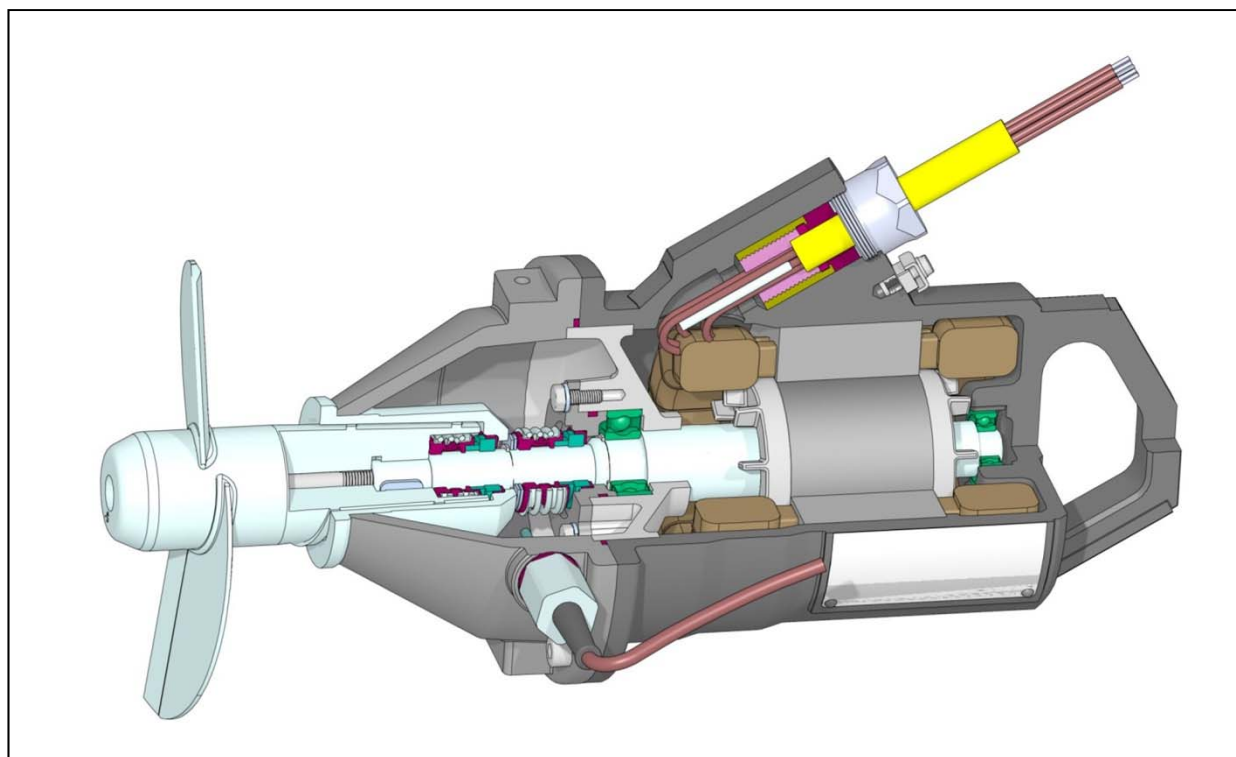
		50 Hz		60 Hz		
Range	Mixer Type	P1.1 [kW]	Thrust [N]	P1.1 [kW]	Thrust [N]	Continous operation
Miniprop	TR 14 ... TR 16	0,26 – 0,3	45 – 65	0,33 – 0,42	60 – 90	conditionally suitable
	TR 21/TR 21S	0,34 – 1,2	75 – 240	0,53 – 1,34	105 – 245	
	TR 28	1,3	330	1,69	340	
Uniprop direct	TR 22	1,3 – 2,7	185 – 350	1,4 – 2,4	220 – 320	conditionally suitable
	TR 36/TR 36S	1,1 – 7,0	210 – 830	1,2 – 8,5	300 – 990	
	TR 40/TR 40S	2,25 – 5,2	505 – 1100	3,6 – 8,5	710– 1480	
Uniprop gear	TR 50-2/TR 50-2S	1,0 – 11,9	350 – 1920	0,4 – 12,2	110 – 2000	suitable
	TR 60-2/TR 60-2S	1,2 – 11,6	510 – 2370	1,5 – 12,0	500 – 2380	
	TR 75-2	3,0 – 10,8	1145 – 2850	2,95 – 14,0	1100 – 3320	
	TR 90-2	0,7 – 5,2	430 – 2120	0,9 – 4,1	580 – 1820	
Uniprop gear	TR 80-1/TR 80-1S	6,1 – 20,1	1670 – 3940	5,9 – 25,2	1650 – 4560	suitable
Maxiprop	TR 216	0,63 – 4,37	270 – 2460	0,7 – 4,45	460 – 2600	suitable
	TR 221	0,8 – 4,8	640 – 3350	0,8 – 5,5	650 – 3600	
	TR 226	0,68 – 4,9	800 – 4370	1,3 – 4,6	1550 – 4250	
Megaprop	TR 316	1,33 – 6,32	450 – 2450	1,3 – 6,2	1050 – 3400	suitable
	TR 321	0,8 – 4,9	720 – 3420	0,8 – 5,3	2700 – 3500	
	TR 326	1,1 – 6,41	1390 - 5270	2,3 – 4,9	2550 – 4400	

Product range with high-efficient motor (IE3)

		50 Hz		
Range	Mixer Type	P1.1 [kW]	Thrust [N]	Continuous operation
Uniprop gear	TRE 90-2	2,8 – 4,4	1500 - 2000	suitable
Maxiprop	TRE 221 / 321	1,0 – 3,8	1000 – 3120	suitable
Megaprop	TRE 226 / 326	1,55 – 4,4	1870 – 4240	Suitable

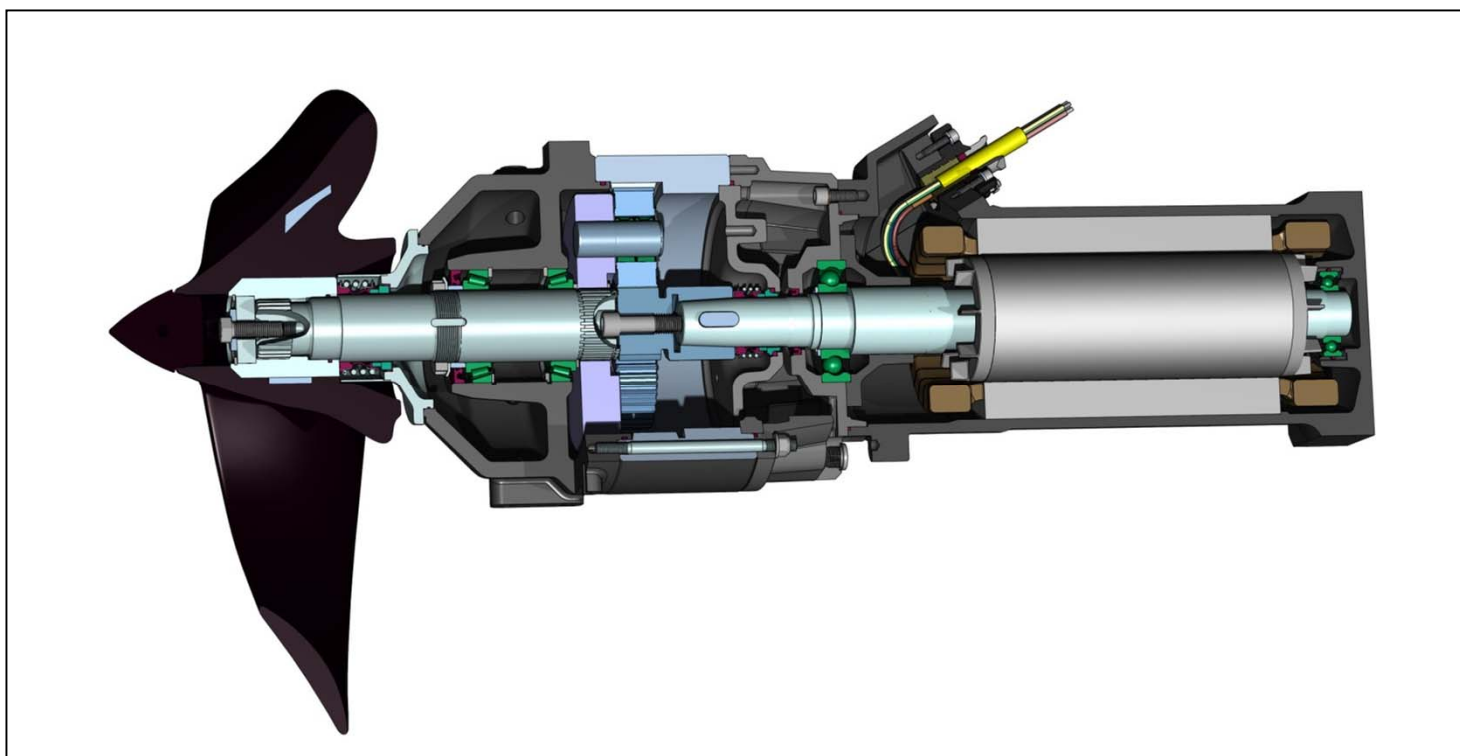
High Speed Mixers

Propeller diameter [m]	Propeller speed [min ⁻¹] 50 Hz	Propeller speed [min ⁻¹] 60 Hz
0,14 – 0,4	700- 1405	828 - 1680



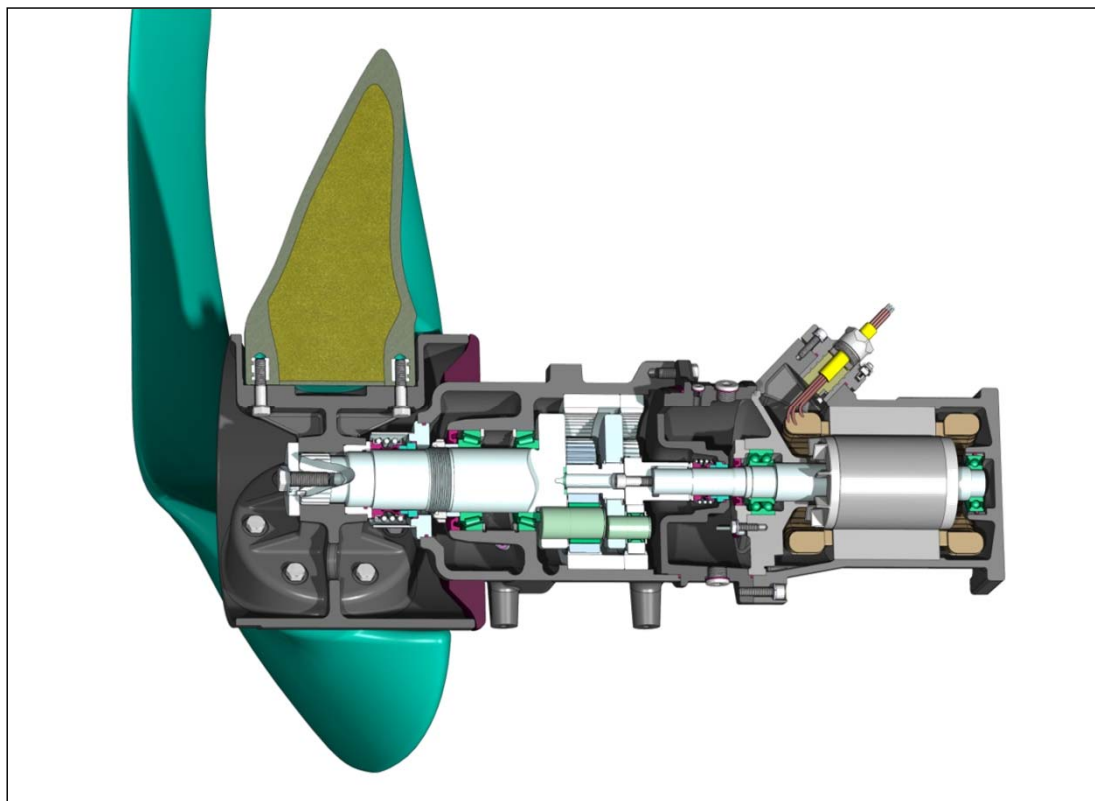
Medium Speed Mixers

Propeller diameter [m]	Propeller speed [min ⁻¹] 50 Hz	Propeller speed [min ⁻¹] 60 Hz
0,5 – 1,2	98 - 594	133 - 570



Slow Speed Mixers

Propeller diameter [m]	Propeller speed [min ⁻¹] 50 Hz	Propeller speed [min ⁻¹] 60 Hz
1,5 – 2,6	13 - 59	20 - 58



Matured Technology – The Components

Sealing sleeves

made of 1.4571 guarantee a long-lasting corrosion-protected fit of the mechanical shaft seal

Propeller

2- or 3-blade propeller; clogging-free by backwards bent suction-side edge. Best thrust/power ratio by computer-optimized hydraulics. Application-optimized material selection.

Gearbox

Efficient 1-stage or 2-stage planetary gear with inclined and grooved ball bearing or taper roller bearing

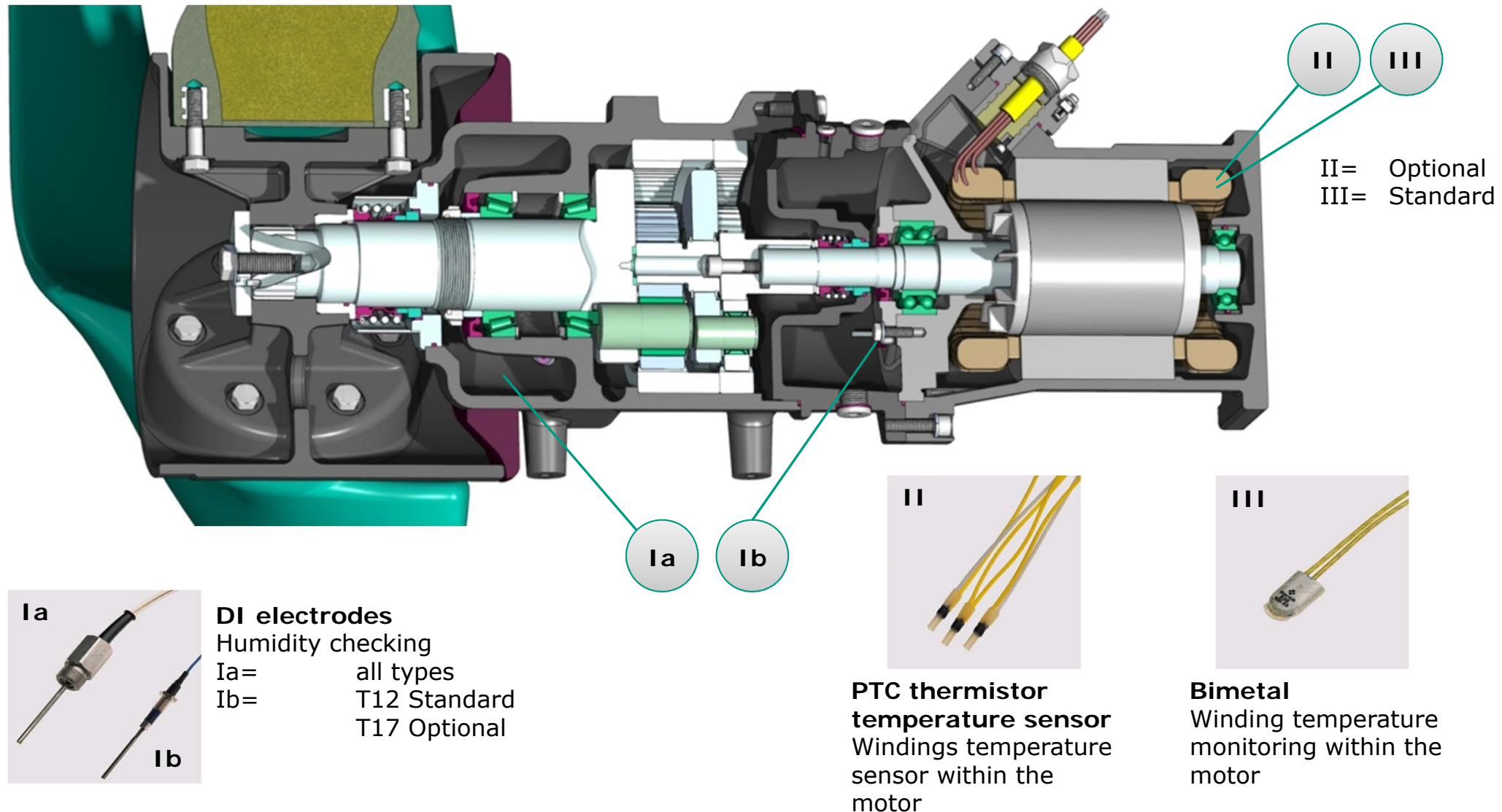
Sealing

on the liquid- and motor-side by a mechanical shaft seal made of silicon-carbide and radial seals made of viton.

Pre- or sealing chamber

Large-volume sealing chamber to collect the leakage rate of the mechanical shaft seal. On request also with sealing chamber control.

Monitoring systems for motors



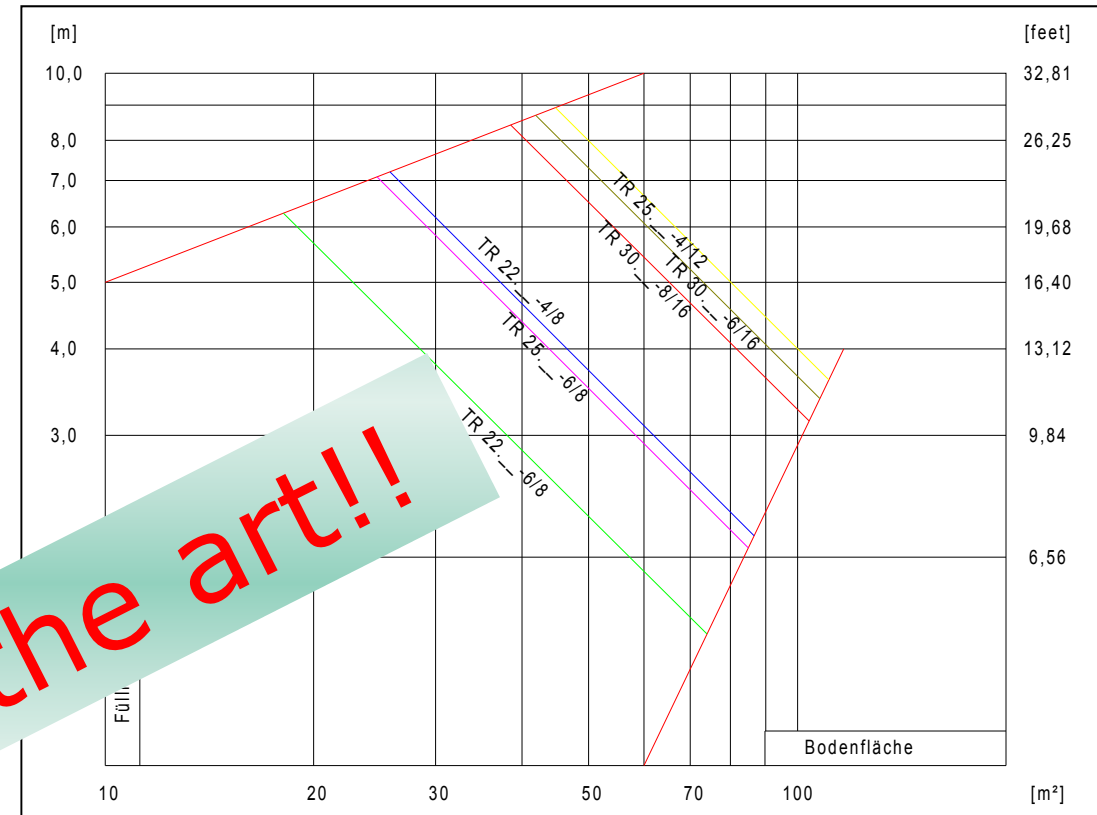
General Information - Curves

The curve is valid for round and rectangular tanks.

Primary sludge dry solids content $< 1\%$

Without aeration

The tank length to tank width proportion must be less than 2,5.



Not state of the art!!

In case of unfavourable tank geometries several submersible mixers must be installed

Checklist - enquiries



Overview

Checklists for submersible mixers.

1.1 Checklist

Activated sludge tank,
nitrification tank,
denitrification tank
bio-P basin...

1.2 Checklist

Sludge line

1.3 Checklist

Rain spillway basin

1.4 Checklist

Pumping shaft,
various agitation and
mixing duties in
sewage treatment
plants

WILO Mixer - Unique Selling Proposition



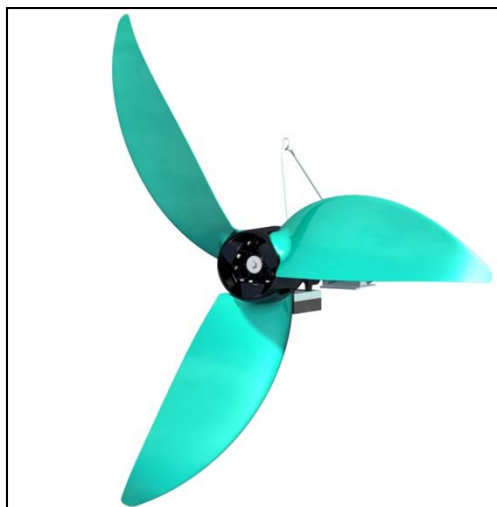
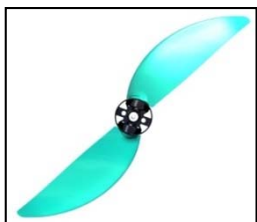
Comparison Submersible Mixers

WILO EMU

Maxiprop and Megaprop with
motors in ex-proof design

Advantages:

-suitable for stations with
ex-protection specified



Competition

- partly without ex-proof design

Comparison Submersible Mixers

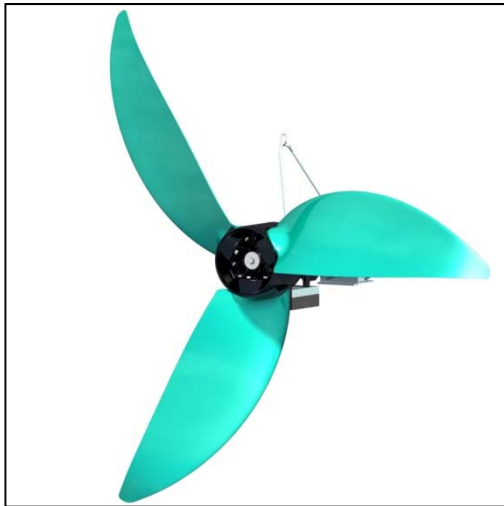
WILO EMU

Megaprop

3-blade submersible mixer

Advantages:

- lower specific blade load
- better truth of rotation
- better energy transfer



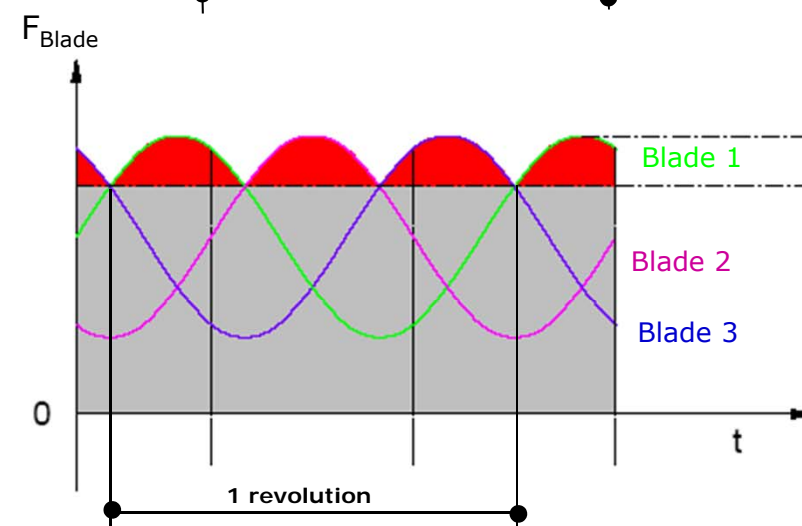
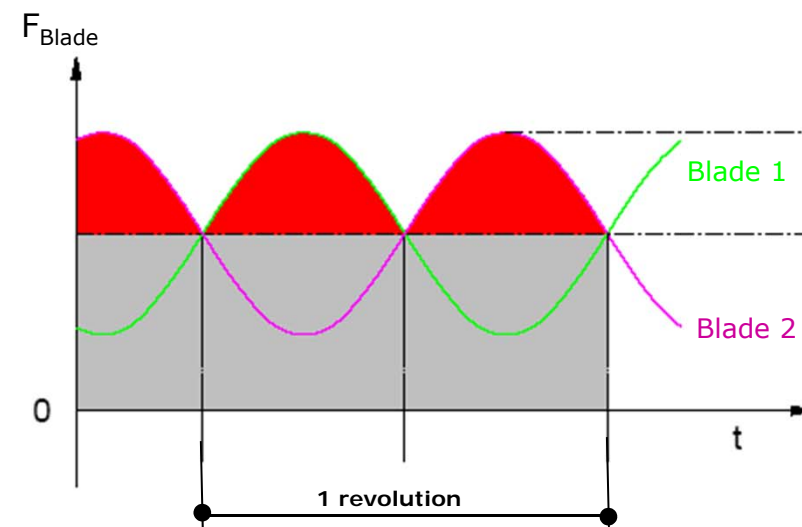
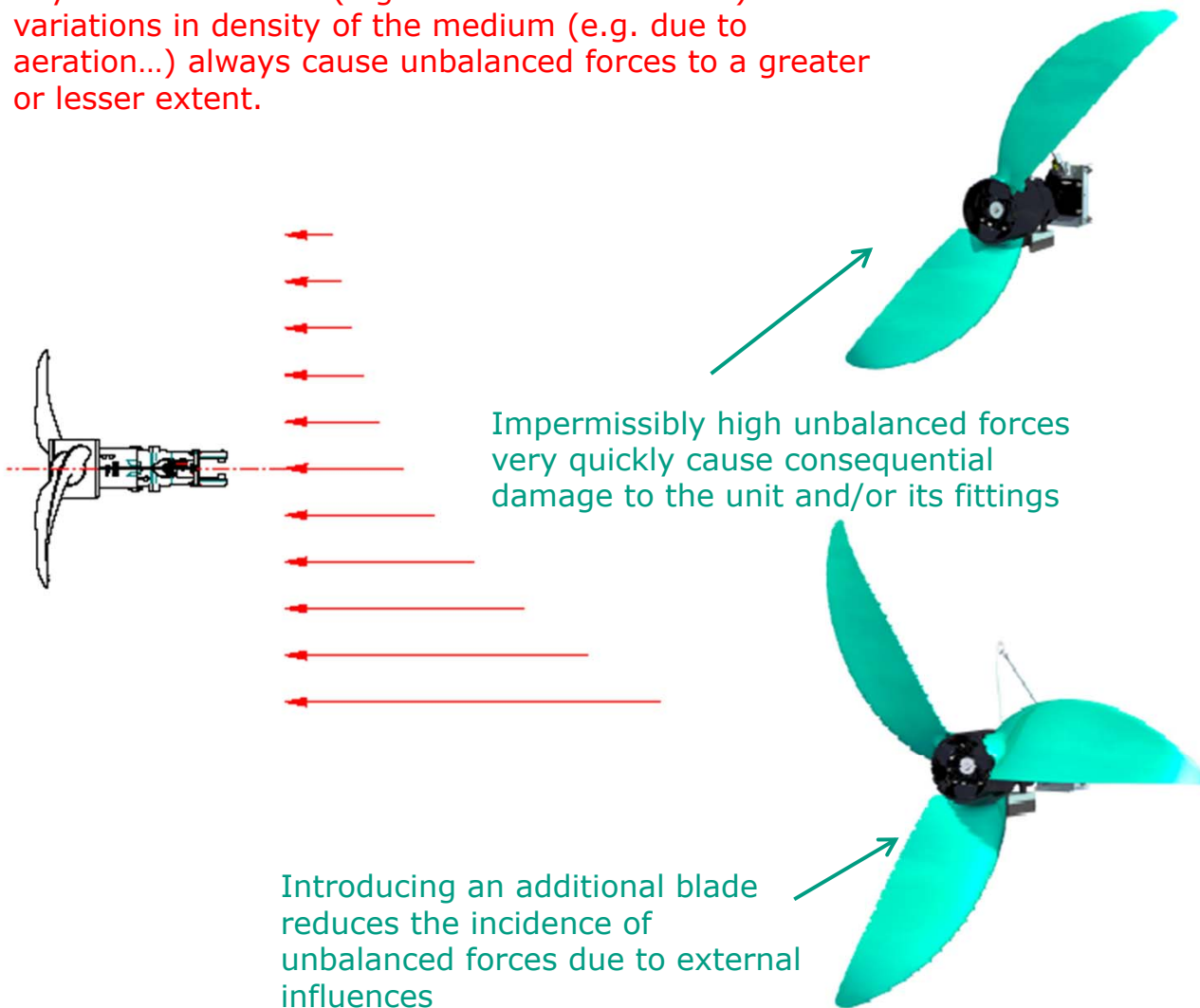
Competition

- less 3-blade submersible mixers with big blades



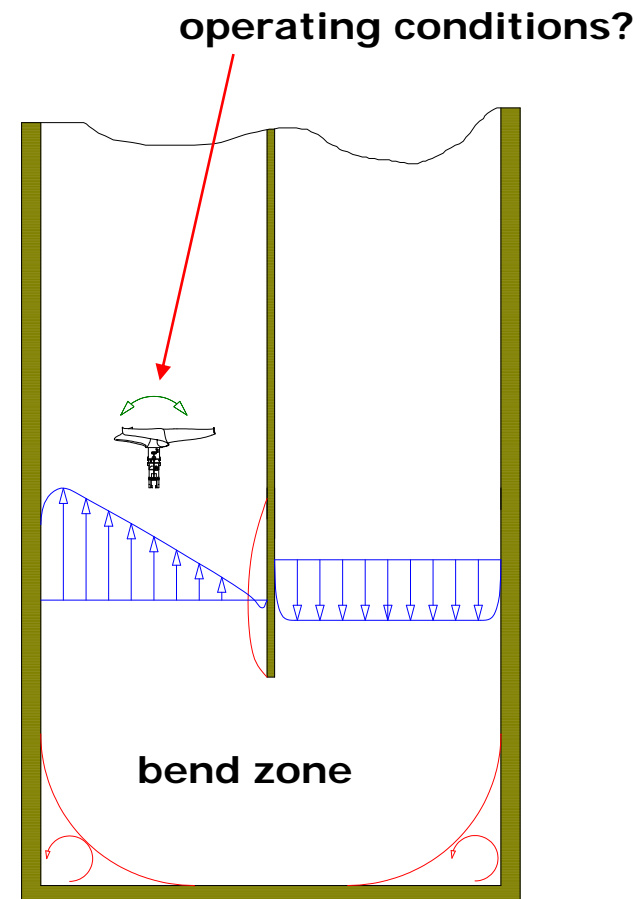
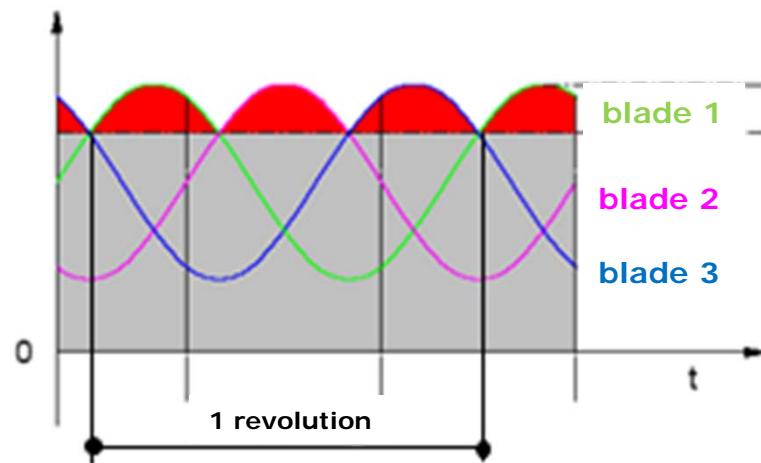
Advantages Megaprop?

Asymmetrical inflow (e.g. after flow diversion...) and variations in density of the medium (e.g. due to aeration...) always cause unbalanced forces to a greater or lesser extent.



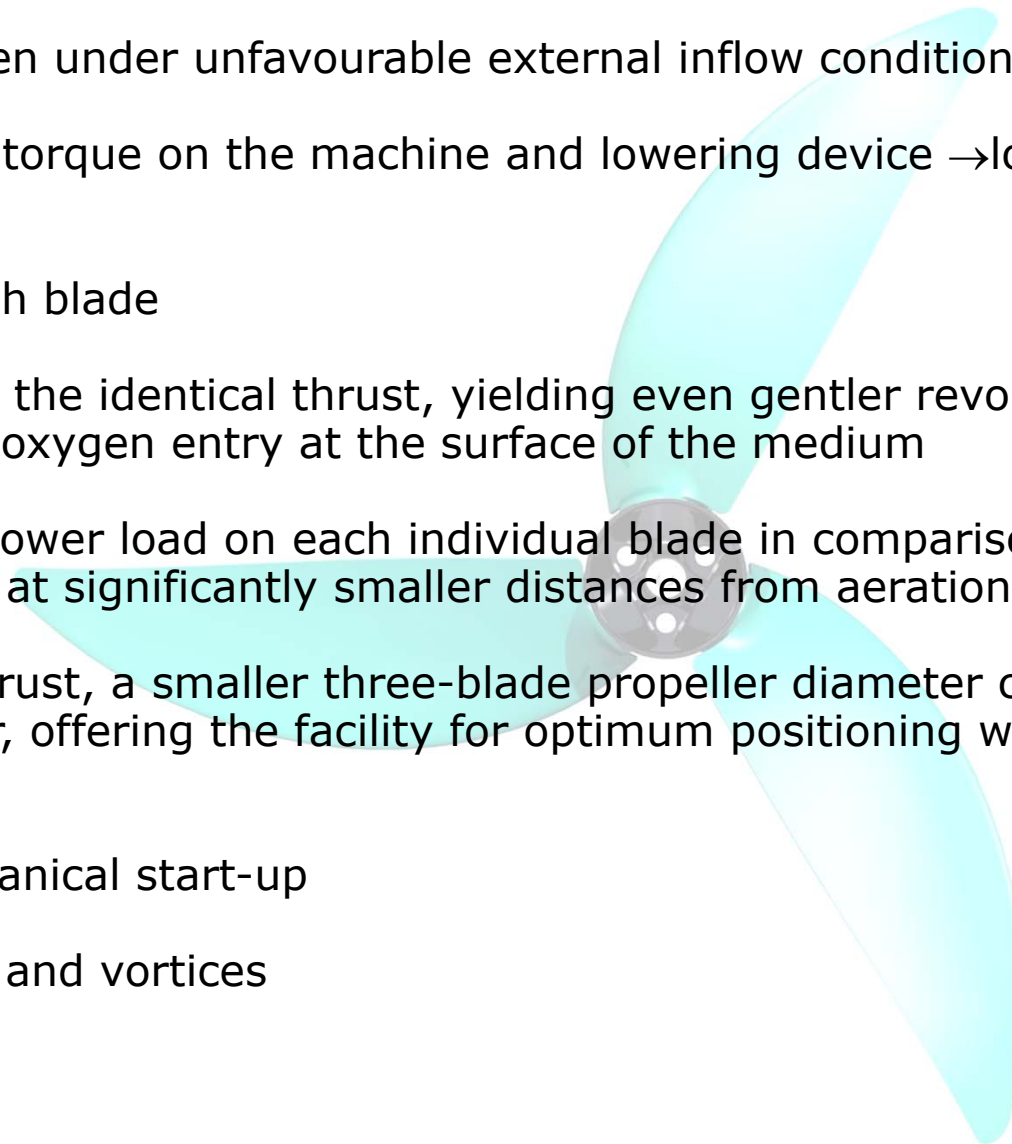
Advantages Megaprop?

Assymmetric inflow conditions of various causes.



Advantages of Megaprop

- Can be used even under unfavourable external inflow conditions
- Low changes of torque on the machine and lowering device → low-vibration, longer service life
- Low load on each blade
- Lower speed for the identical thrust, yielding even gentler revolution and best possible minimisation of oxygen entry at the surface of the medium
- Because of the lower load on each individual blade in comparison to two-blade mixers, can be installed at significantly smaller distances from aeration, bends
- For the same thrust, a smaller three-blade propeller diameter can replace an equivalent two-blade mixer, offering the facility for optimum positioning when conditions are cramped.
- Smoother mechanical start-up
- Reduced eddies and vortices

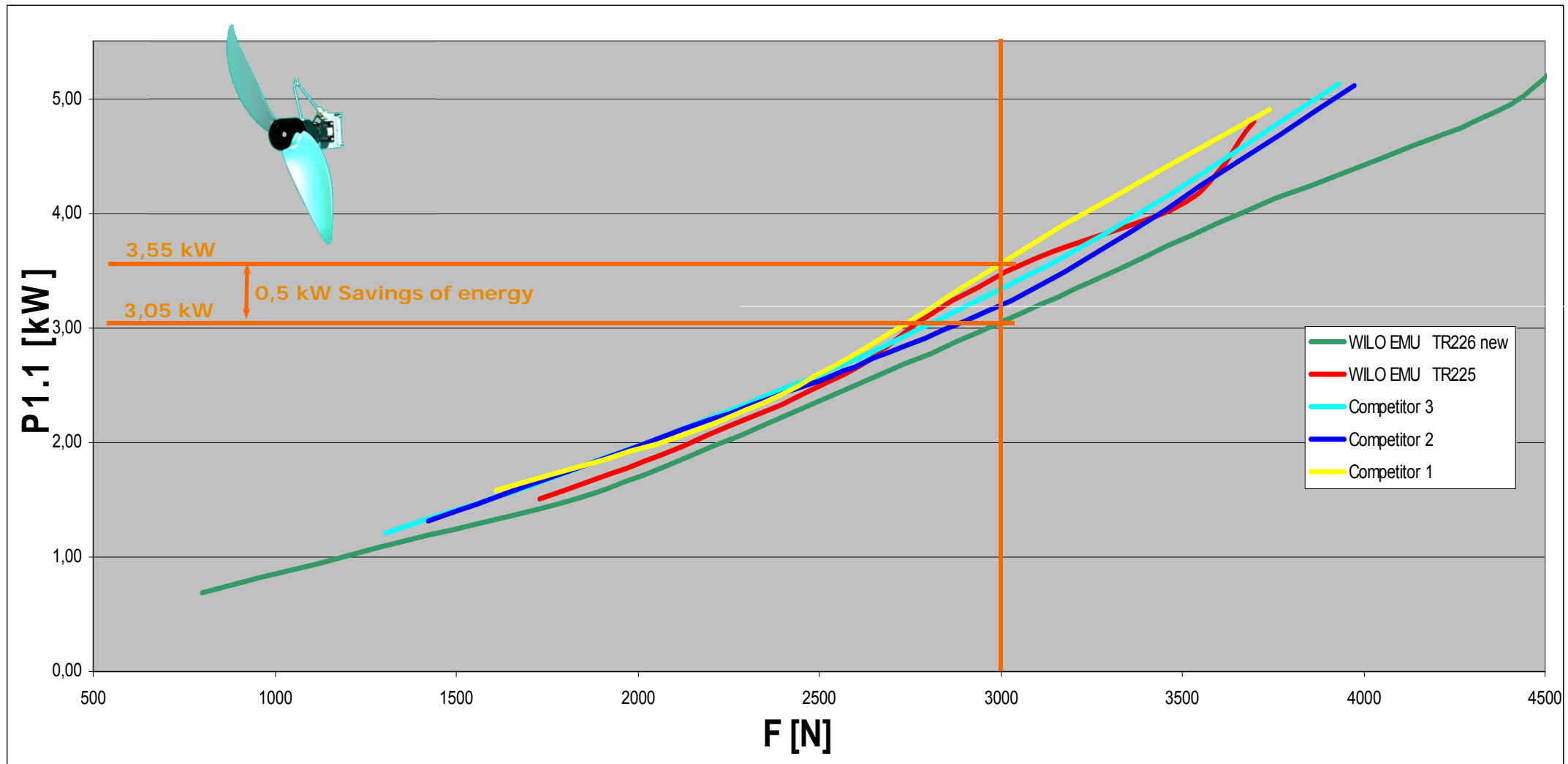


Comparison Mixers New TR 226

$$\text{Specific thrust} = F / P_{1.1} \quad [\text{N/kW}]$$

$P_{1.1}$: Power input for each mixer at duty point

F : Mixer thrust



Comparison Submersible Mixers

WILO EMU

Patented WILO EMU-propeller with self-cleaning propeller hub (Cleaning-helix in casing of high-grade steel)



Competition

- Design without cleaning effect

Advantages:

-best suitable for the application in mixed liquids with clogging substances

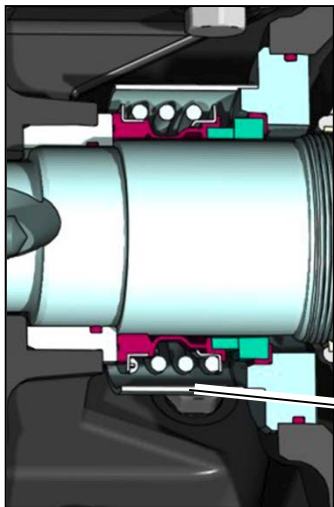
Comparison Submersible Mixers

WILO EMU

Protection against clogging for mechanical shaft seal (protection sleeve for mech. shaft seal)

Advantages:

- Dirt particles are held off



Protection sleeve for mechanical shaft seal

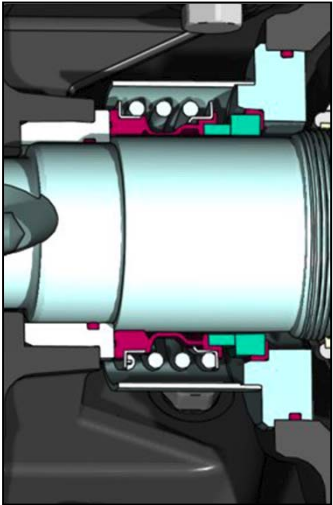
Competition

-Without protection sleeve for mechanical shaft seal

Comparison Submersible Mixers

WILO EMU

Mechanical shaft seal



Advantages:

- Silicon-carbide/silicon carbide
- Company Burgmann
- Easily available
- German product

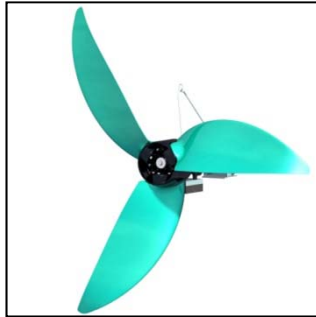
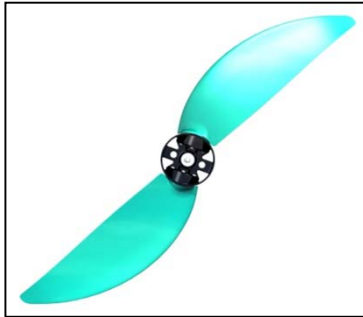
Competitors:

- Tungsten carbide / tungsten carbide
- Worse operation features in case of damaged lubrication film
- Sealings from Sweden
- Not easily available

Comparison Submersible Mixers

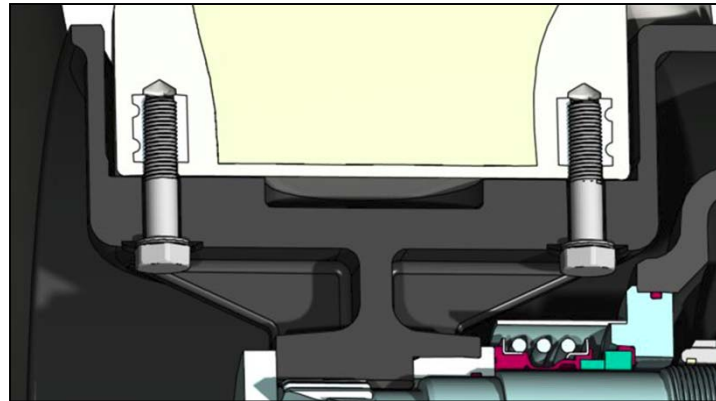
WILO EMU

Propeller fixation:
Extensive flange design



Advantages:

- Better transmission of force
- Easier assembly and disassembly
- No special tool necessary



Competition

- Shaft spline fixation
- Disassembly with special tool
- Very difficult disassembly, partly problems to remove the single blades from the hub

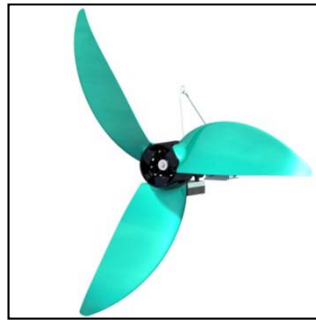
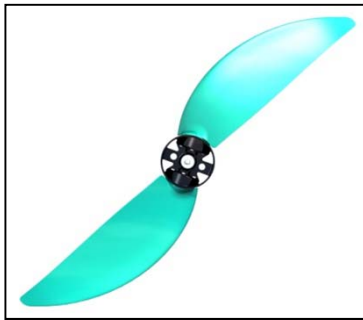
Comparison Submersible Mixers

WILO EMU

Gradation of the speed by planetary gear (higher efficiencies than spur-gear system) and a multitude of propeller types designed for optimum flow efficiency.

Advantages:

-Optimum adjustment for each application



Competition

- Spur-gear system
- Diameter of propeller can be reduced to different sizes (only one standard propeller available)

Comparison Submersible Mixers Modular System

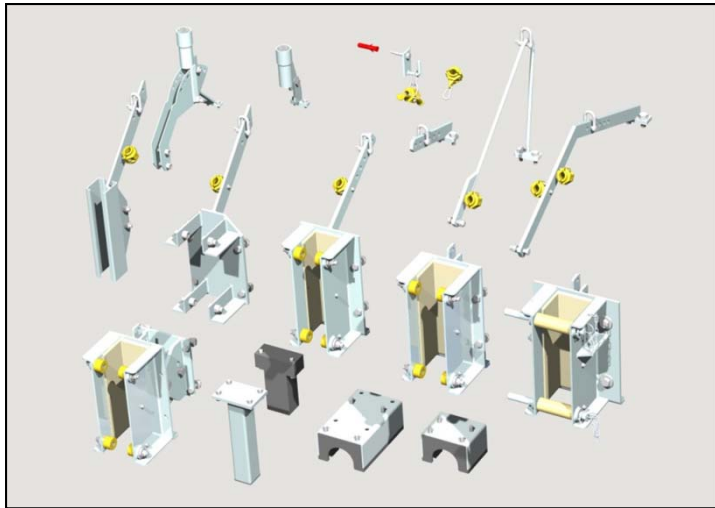
- Submersible motor, gearbox and propeller form a compact, coaxial unit.
- This design allows an exact adjustment of the submersible mixers to the required performance data.
- Due to the modular system a large spectrum of submersible motors and curves is available.



Comparison Submersible Mixers

WILO EMU

Guide skid of high-grade steel
Lining with sliding coat and
roller guiding



Advantages:

- Protection against corrosion
- Easy guidance
- Simple separation of the mixer from the guide pipe
- Due to the modular construction of the guide skid and the submersible mixer, it is possible to install the mixers at all lowering devices from 60-150 mm

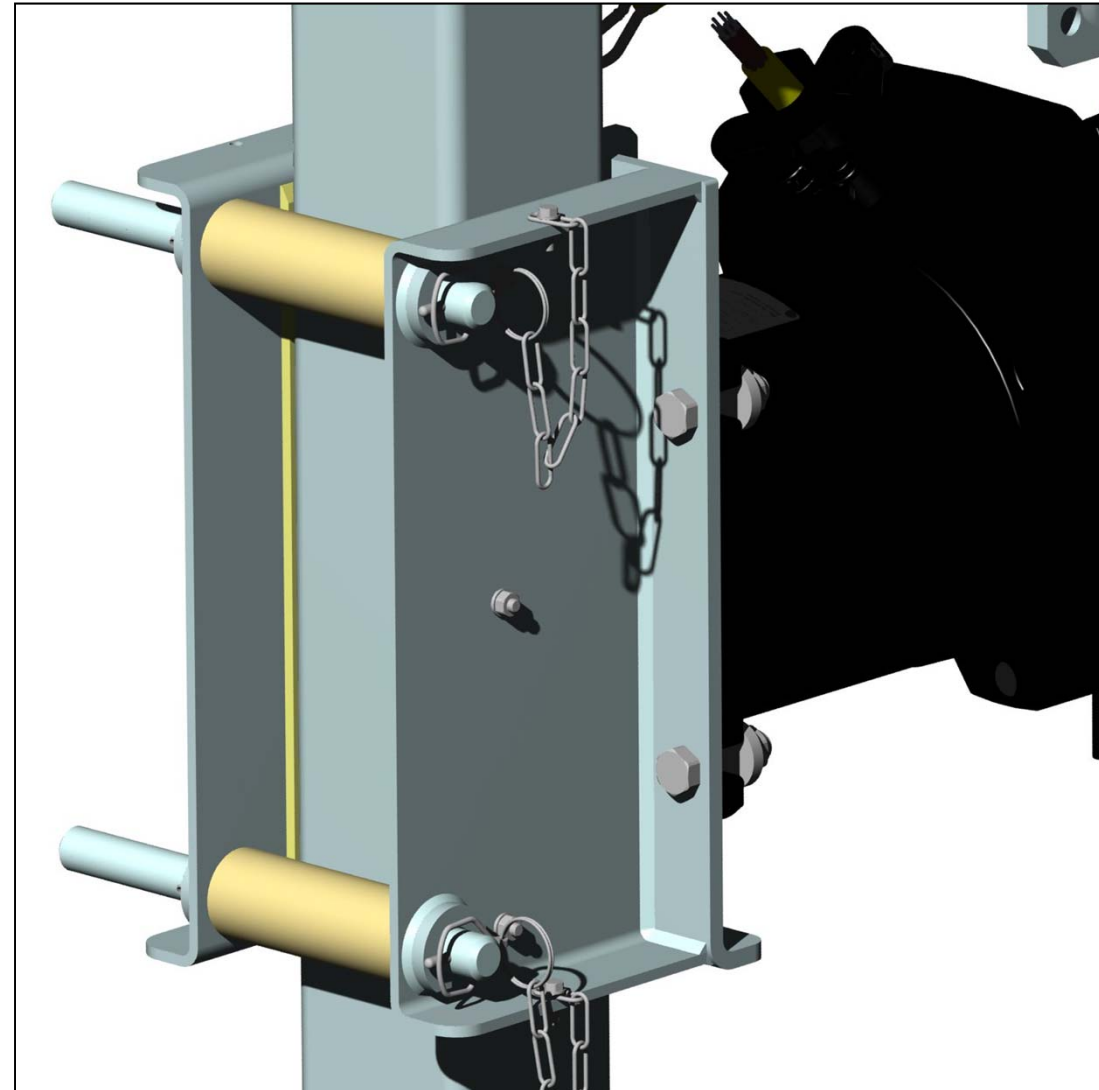
Competition:

- > Partly without sliding coat and roller guiding

Comparison Submersible Mixers

Frames

- Continuous rolls which can be removed without tools
- For application on different lowering devices of other manufacturers
- Increased stability



General Information – ISO 21630

Bases and consequences of the standard ISO 21630 in connection with the VDMA information sheet for today's submersible motor technology

Content:

- Selection criteria
- ISO 21630 in general
 - Power measurement
 - Thrust measurement
 - Power coefficient
 - Measuring tolerances
- VDMA (German Engineering Federation) working sheet in general
 - Liquid data
 - Performance parameters
 - Life cycle costs
- Test procedure in general
 - Power measurement
 - Dry solids concentration measurement
 - Flow velocity measurement
- Power comparison and amortization
- Consequences for WILO

Selection Criteria

The correct selection

It is not easy for the operating companies of sewage treatment plants to choose the most economical mixing system. The decisive factor should in no case be the cheapest investment cost, but an economic mixer comparison which **considers all relevant influencing factors**. This comparison is only useful, when all factors which are involved in the mixing process are **considered**.

These are:

- Investment costs
- Installation and start-up costs
- Energy and operation costs
- Maintenance and repair costs
- Breakdown costs
- Disposal costs

Only when the above mentioned influencing factors can be expressed in Euros, an objective mixer comparison is possible.

ISO 21630

ISO 21630

Acceptance and measuring standard for submersible mixers

Issued in 2004

Accepted as ISO standard in July 2007

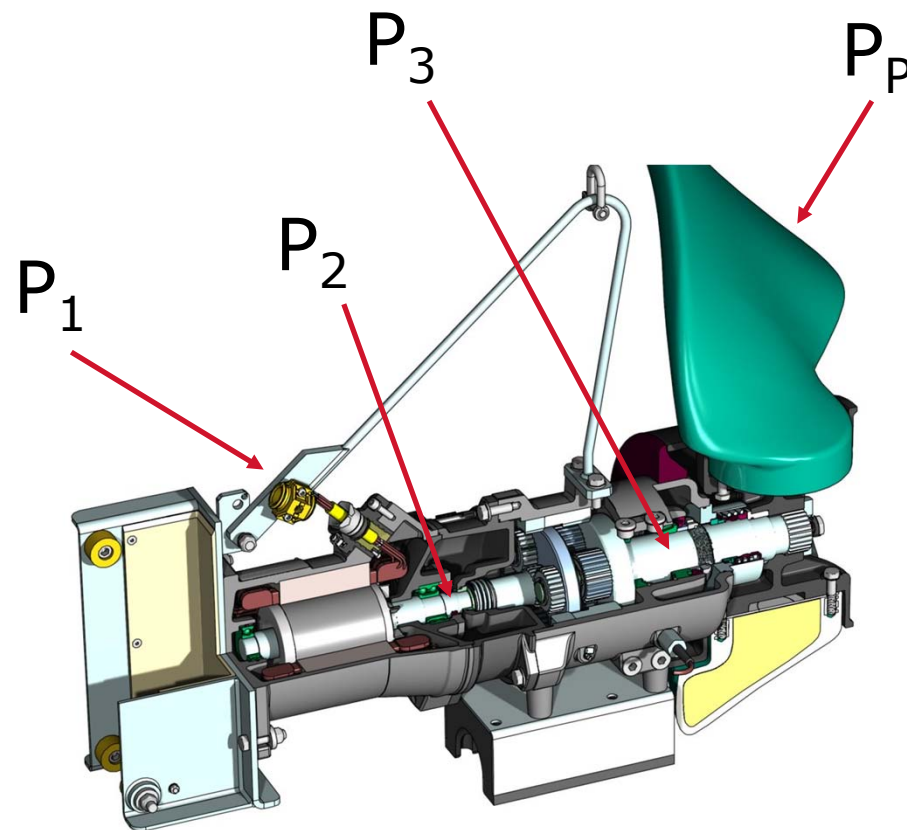
The main topics of the standard are:

- electrical power input in the duty point $P_{1.1}$
- thrust measurements
- measuring tolerances
- power coefficient

ISO 21630

Power definitions:

	with nominal operation	in the duty point
Power input motor	P_1	$P_{1.1}$
h		
Power output motor	P_2	$P_{2.1}$
h		
Power output gearbox	P_3	$P_{3.1}$
h		
Power output propeller	P_P	$P_{P.1}$



ISO 21630

The **power input in the duty point $P_{1.1}$** is the most important power parameter!

The customer has to pay for that power!

(Motor curve)



ISO 21630

Measuring tolerances:

	+ Tolerance	- Tolerance
Thrust value <300 N		12%
Thrust value >300 N		8%
$P_{1.1}$ <5000 W	10%	
$P_{1.1}$ >5000 W	5%	
Thrust Power ratio		

ISO 21630

Thrust measurement

The mixer thrust depends on the velocity of the approaching flow.

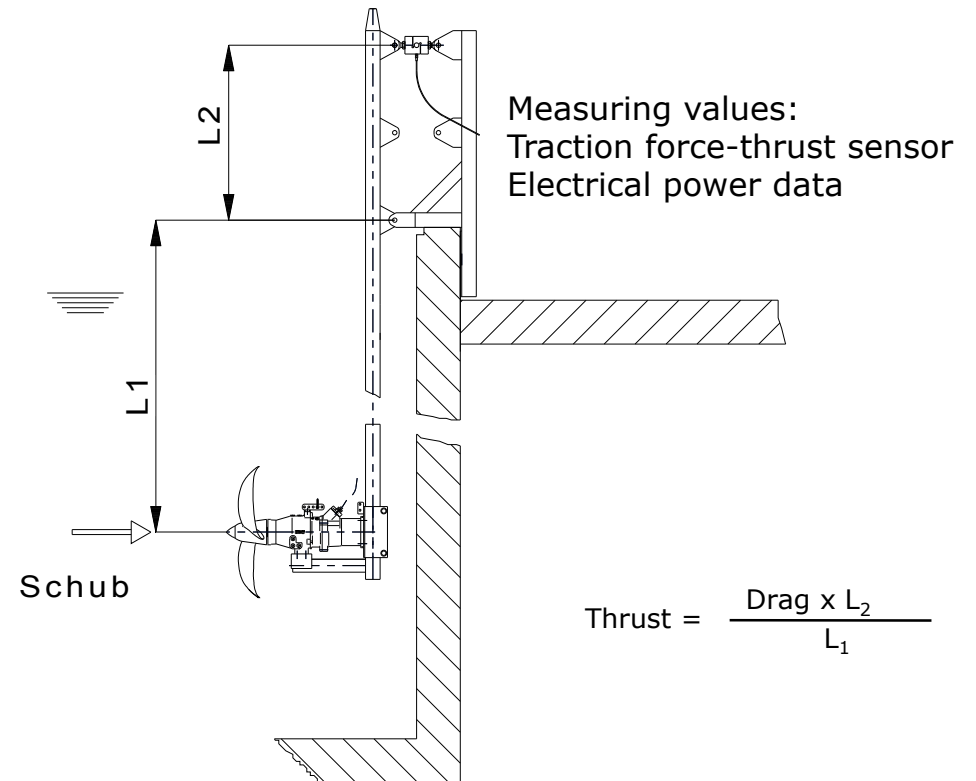
Consequences:

Fast and middle fast running mixers can be measured in the test pit of WILO SE, Werk Hof.

Slow running mixers are measured on a measuring raft.

The biggest thrusts are measured with velocities of the approaching flow around 0 m/s.

The standard calls this „open sea“ conditions.



(Measuring raft)



(Propeller and system curve)



VDMA Working Sheet

Notes for the comparison of mixers

A comparison of mixers is only possible, if all bidders have the same knowledge about the plant.

Performance parameters without mixing tank



(specification)

Energy density

Performance parameters with mixing tank

Important:

- Number of mixers installed in the tank
- Total tank volume

$$E_d = \frac{P_{1.1 \text{ tot.}}}{V_{\text{Tank}}}$$

$P_{1.1 \text{ tot}}$ = total power input of all mixers installed in the tank

V_{tank} = total tank volume

VDMA Working Sheet

Life cycle costs

For the selection of an economic mixing system among others the following factors must be considered:

- Investment costs
 - Mixer unit
 - Lowering device
 - Lifting device
 - Accessories such as operation platforms or operation bridges
- Installation and start up costs
 - Lifting devices
 - Installation works
 - Additional on site services
- Costs for acceptance test measurements
- Energy costs
- Disposal costs
 - Disassembly
 - Scrapping costs
- Maintenance costs
- Breakdown costs
 - Spare mixers (stand-by)
 - Rental mixers
 - Costs for tank emptying
 - Increased sewage disposal costs

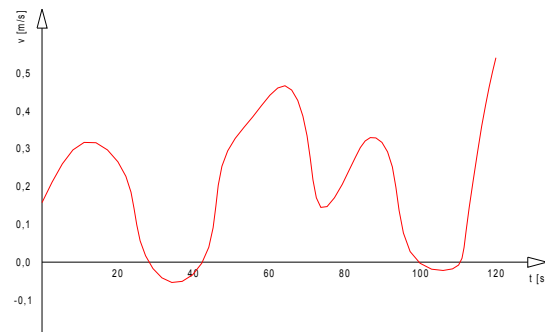
VDMA Working Sheet

Test procedure in general

Selection variants

- Mixing and circulating
- The generation of a flow velocity in the circulation tank

Flow velocity in the mixing tank



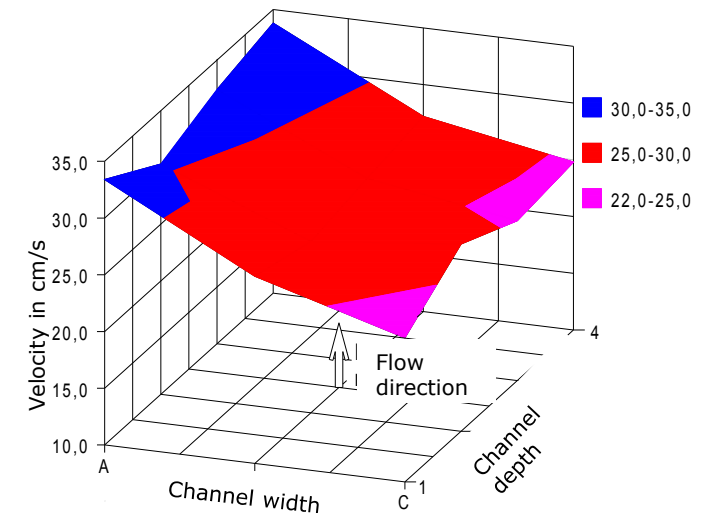
No directed flow field. In addition to the basic flow an unstable flow field which is dominated by different turbulence structures is generated

Selection by the sinking capacity

$$P_{\text{mix}} > P_{\text{sink}}$$

Proof by solids concentration measurement

Velocity distribution in the channel section



Average velocity components can be measured rather easily

Selection by the principle of linear momentum

$$F_{\text{thrust}} > F_{\text{system}}$$

Proof by flow velocity measurement

VDMA Working Sheet

Dry solids concentration measurement

Measuring devices:

- Gravimetric determination according to DIN 38414-2
- Solids sensors e.g. diffusion measurement

Per measuring point MP an average value will be determined from the total number i of the measurements taken at that point. From these average values an average value of all n measuring points will be determined. Also the lowest and the highest value are determined. If these values do not differ from the average value by more than 15 %, the activated sludge tank will be mixed homogeneously.

(Example for concentration measurement)



(Diffusion measuring device)

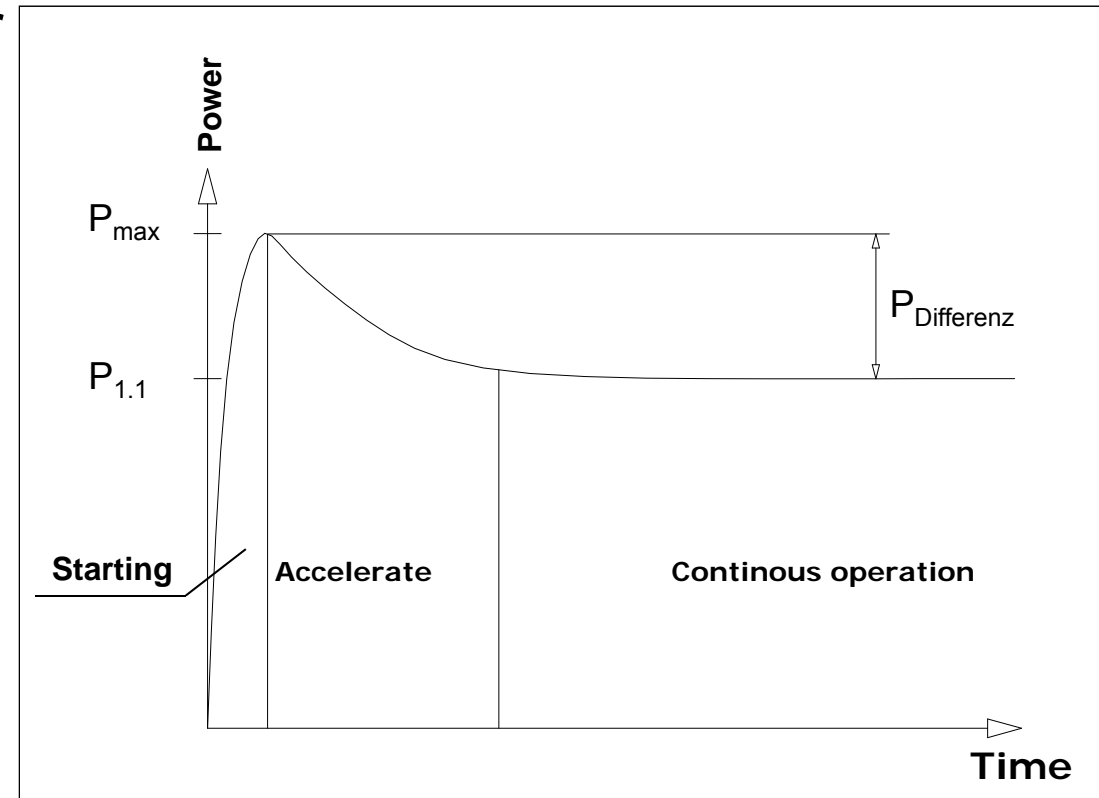


General Information

Operating behaviour of a mixer

$P_{\text{Difference}}$ is dependent on:

- Dry solids content
- Density
- Viscosity
- Liquid temperature



$P_{\text{Difference}}$ must be big enough to guarantee a continuous operation.

ISO 21630

Power coefficient R_{FP}

Relation of the thrust generated by the mixer to the needed electrical power

$$R_{FP} = \frac{\text{Thrust [N]}}{P_{1.1} \text{ [KW]}}$$

Static thrust

Thrust measured with an inflow velocity of almost 0 m/s

$P_{1.1}$

Electrical power input at duty point during static thrust test

(Power coefficient – peripheral speed)



Thrust_ Power_Speed



Check list



Product range – Type disposition / Type variety

400 V 50
Hz

0,14- 2,6 m

19 Typen

360 Varianten

460 V / 60
Hz

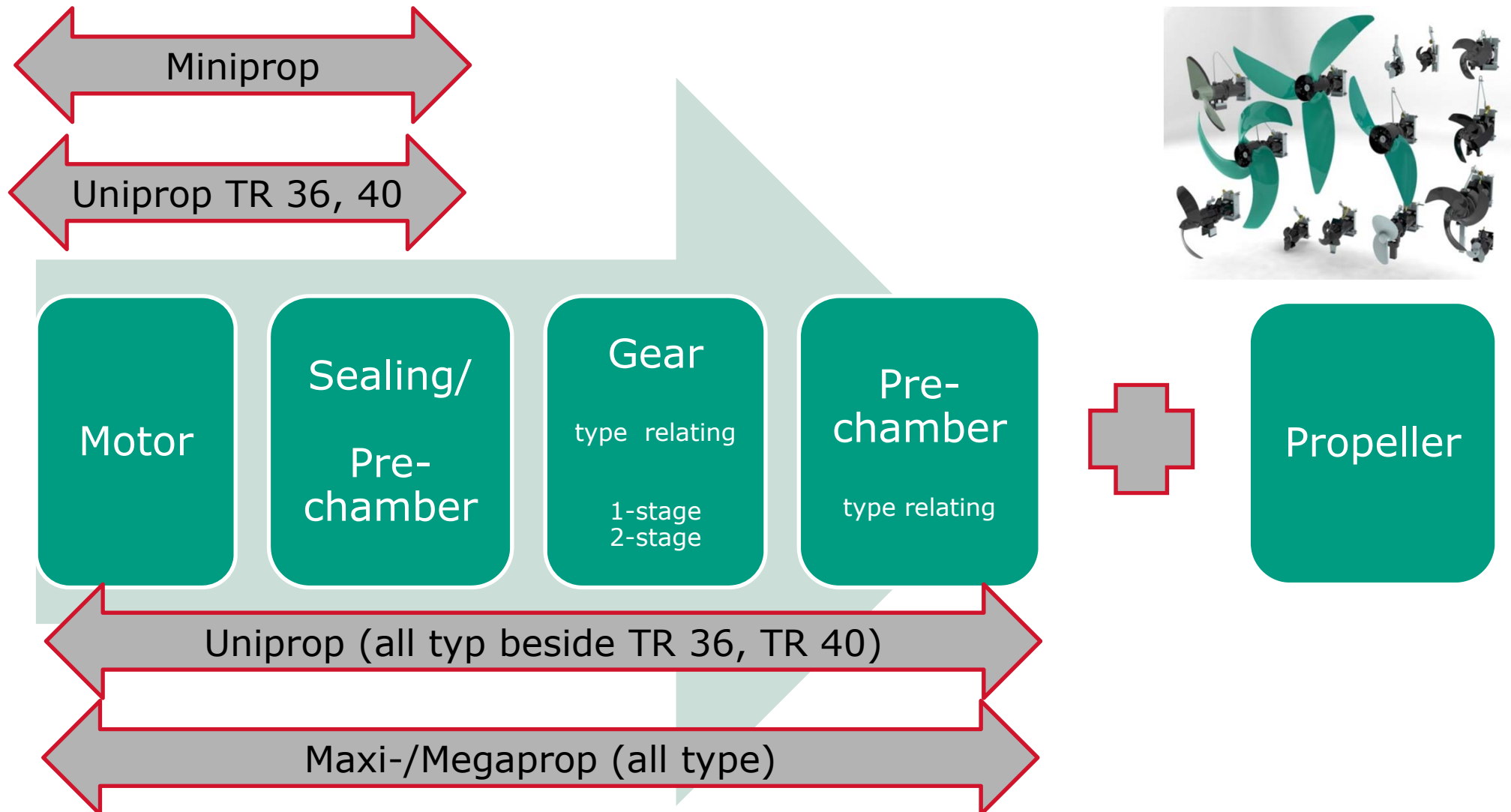
0,14 – 2,6 m

18 Typen

180 Varianten



Product range – Modular design



Product range – Standard materials

Housings Motor/Gear

- Cast iron

Motor shaft

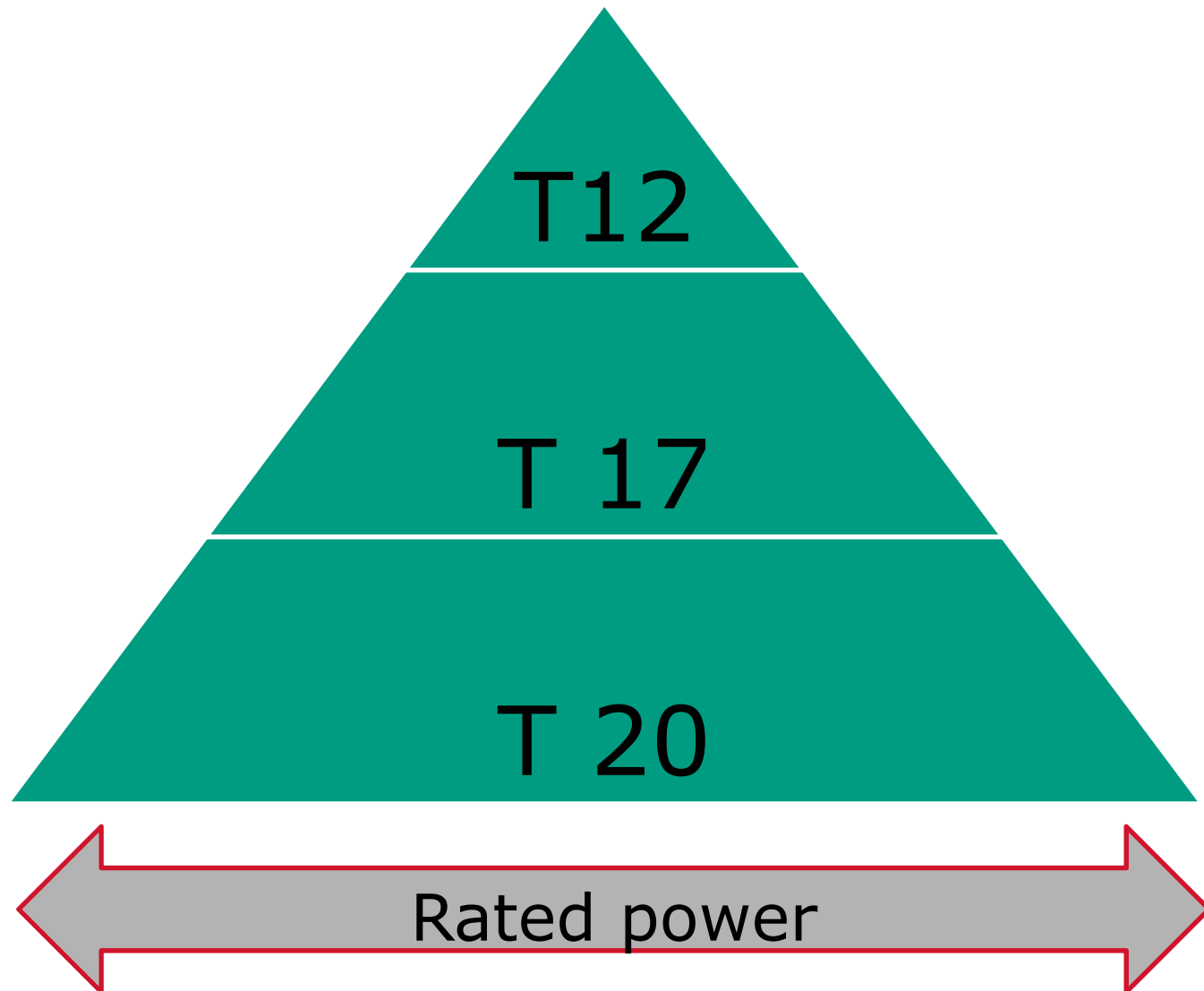
- 1.4021
- 1.4462 (Duplex)

Propeller

- Cast Iron
- Stainless steel
- PUR
- GRP



Product range – Motor variants



Product range – Power cable

Technical Data for the WILO EMU Submersible Mixer TR 316 50Hz

Technical changes reserved!	TR 316.43-6/8	TR 316.46-6/8
Propeller-ø (mm)	1600	1600
Propeller speed (rpm)	43	46
Quantity of propeller blades	3	3
Circulation capacity (m³/s)	1,48	1,57
Thrust (N)	1090	1230
Motor speed (rpm)	915	915
P _{Rated} power output (kW)	1,75	1,75
P _{Max.} power input (kW)	2,50	2,50
P_{1.1} (kW)*	1,33	1,58
I _{Rated} current at 400V (A)	4,45	4,45
I _{1.1} at 400V (A)**	2,90	3,20
I_{starting} (A)	17,00	17,00
Transmission _{Planetary stage} i =	3,600	3,364
Transmission _{Total} i = (6,2)	22,320	20,857
Efficiency (%)	70	70
cos φ	0,82	0,82
max. Weight (kg)	205	205
Cable/Type:		
Direct:	7x1,5	7x1,5
Star-Delta:	10G1,5	10G1,5
Direct Ex:	7x1,5	7x1,5
Star-Delta Ex:	10G1,5	10G1,5
Ex-protection		
Test number		

H07RN-F

NSSHöu-J

NSSHöu-O



Cable/Type:		
Direct:	7x1,5	7x1,5
Star-Delta:	10G1,5	10G1,5
Direct Ex:	7x1,5	7x1,5
Star-Delta Ex:	10G1,5	10G1,5
Ex-protection		
Test number		

Product range - mixer technology

General type classification

high-speed mixer

(without transmission gearing)

Medium-speed mixers

(1-stage planetary gearing)

Low-speed mixers

(2-stage planetary gearing)



Product range - mixer technology

WILO designation

Miniprop = high-speed mixer, without transmission gearing
□ Prop = 140-280 mm

Uniprop = high-speed mixer, without transmission gearing
□ Prop = 360-400 mm

medium-speed mixer, with 1-stage planetary gearing
□ Prop = 500-900 mm

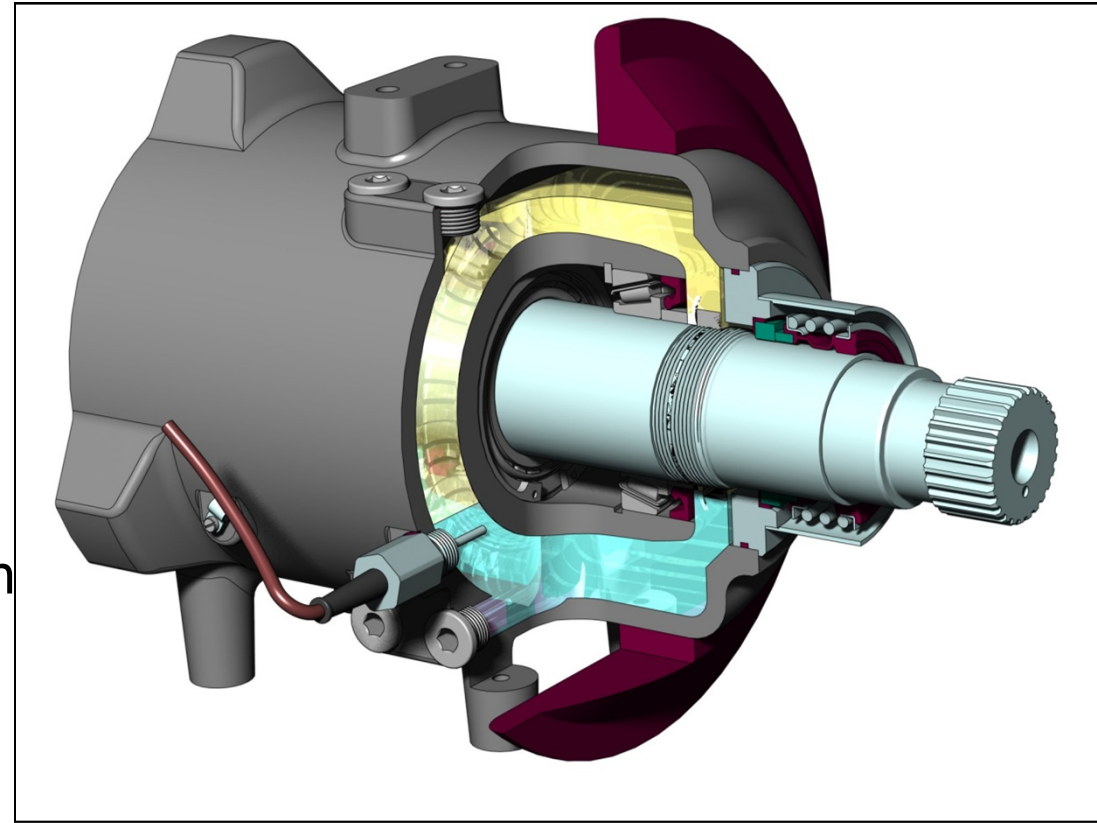
Maxiprop = low-speed mixer, with 2-stage planetary gearing
□ Prop = 1600-2600 mm (2-blade)

Megaprop = low-speed mixer, with 2-stage planetary gearing
□ Prop = 1600-2600 mm (3-blade)

Matured Technology

Sealing on the liquid-side

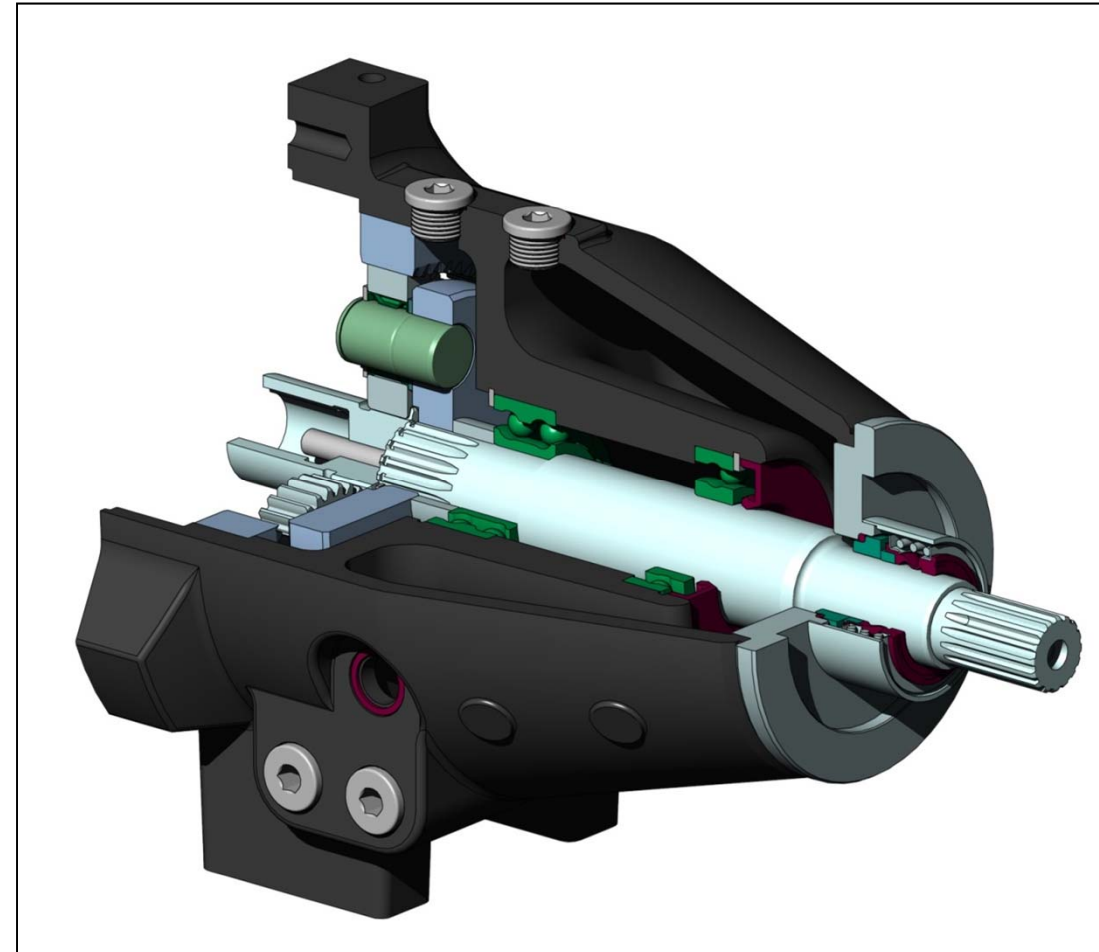
- Highly wear-resistant mechanical shaft seal SiC/SiC
- External sealing
- Protection against clogging for the mechanical shaft seal
- Sealing fit of the counter ring in a special seal washer made of 1.4571
- Gearbox shaft made of 1.4462



Matured Technology

Gearbox

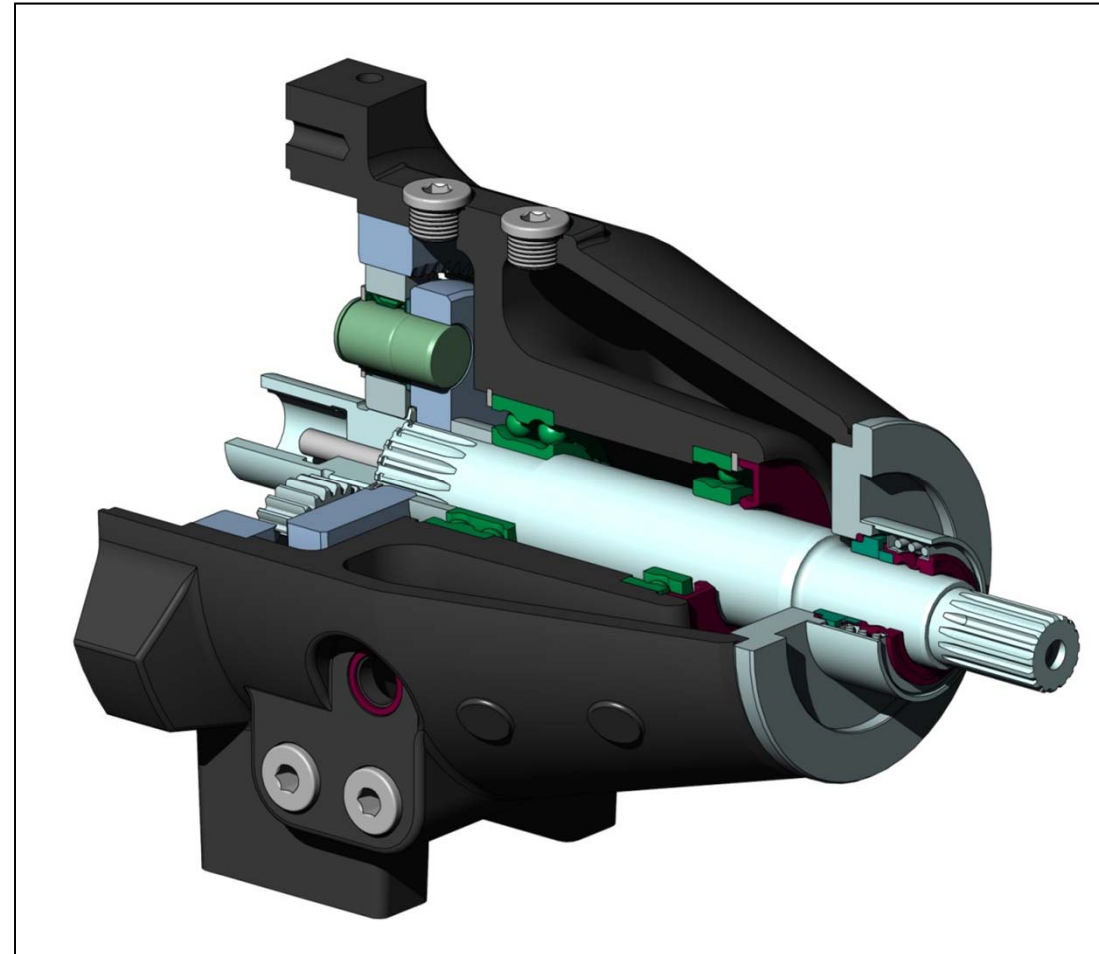
- Big distance between bearings
- Short distance between bearing and propeller
- Separate big-volume pre-chamber
- Possibility to screw in moisture probe
- Gears are hardened and grinded
- Design for max. flow efficiency



Matured Technology

Gearbox

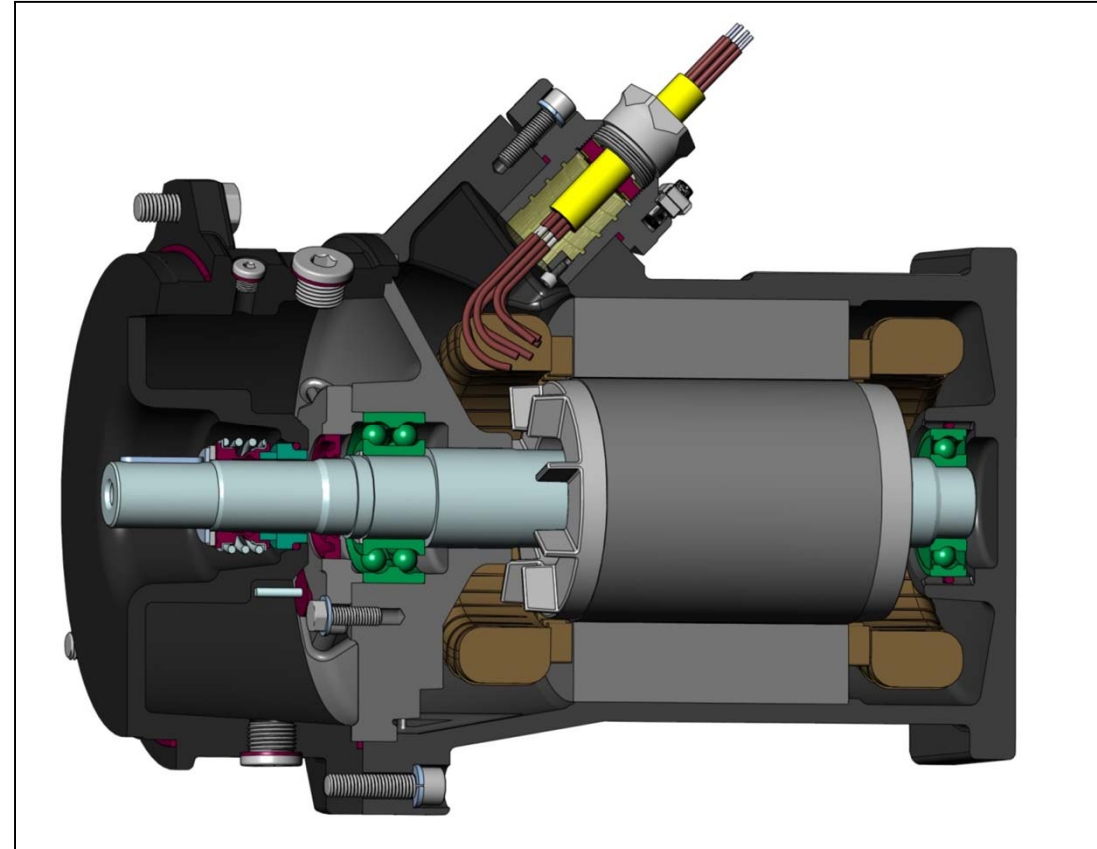
- Calculated bearing life
- 100.000 hours
- Many gearbox transmissions easily exchangeable
- Easily accessible oil drain plugs
- Maintenance works once a year
- Gearbox shaft made of 1.4462



Matured Technology

Motor

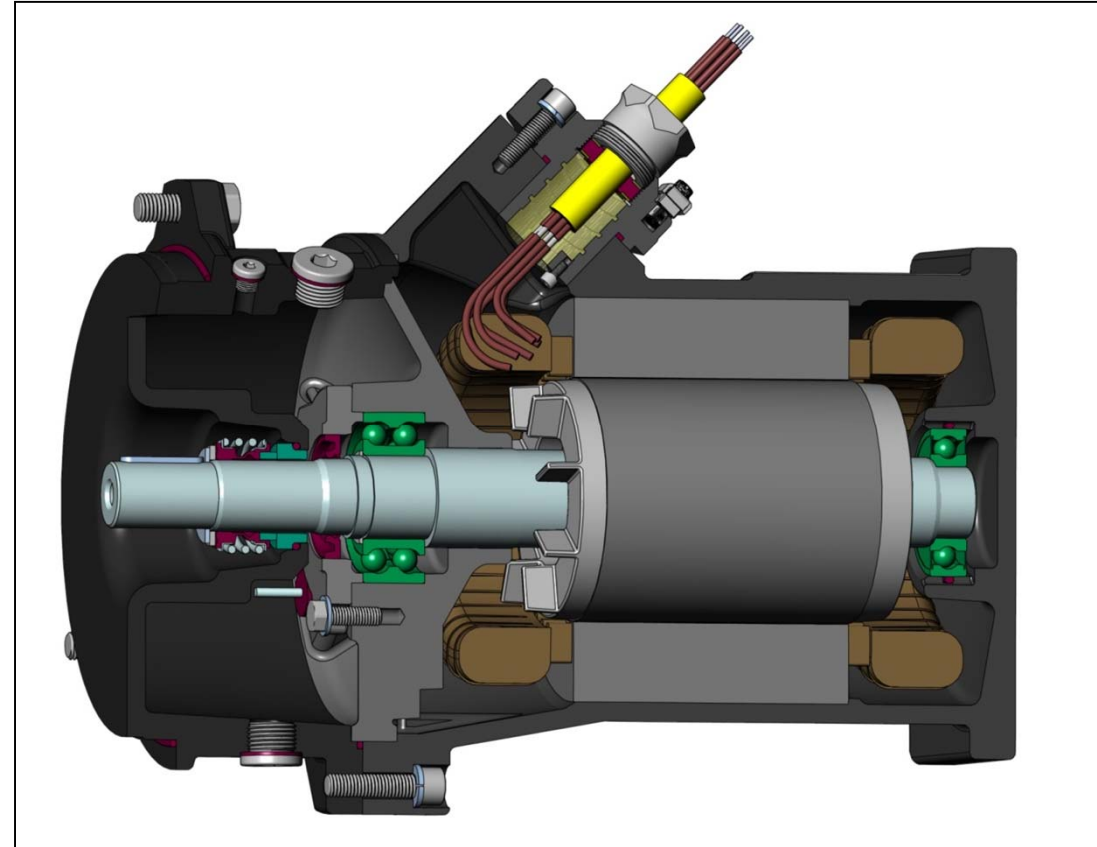
- Additional sealing chamber
- Sealing by mechanical shaft seal
- Permanently grease-lubricated, maintenance-free ball bearings
- Insulation class F (in special design H/F)
- Protection type IP 68
- Ex-proof possible



Matured Technology

Motor

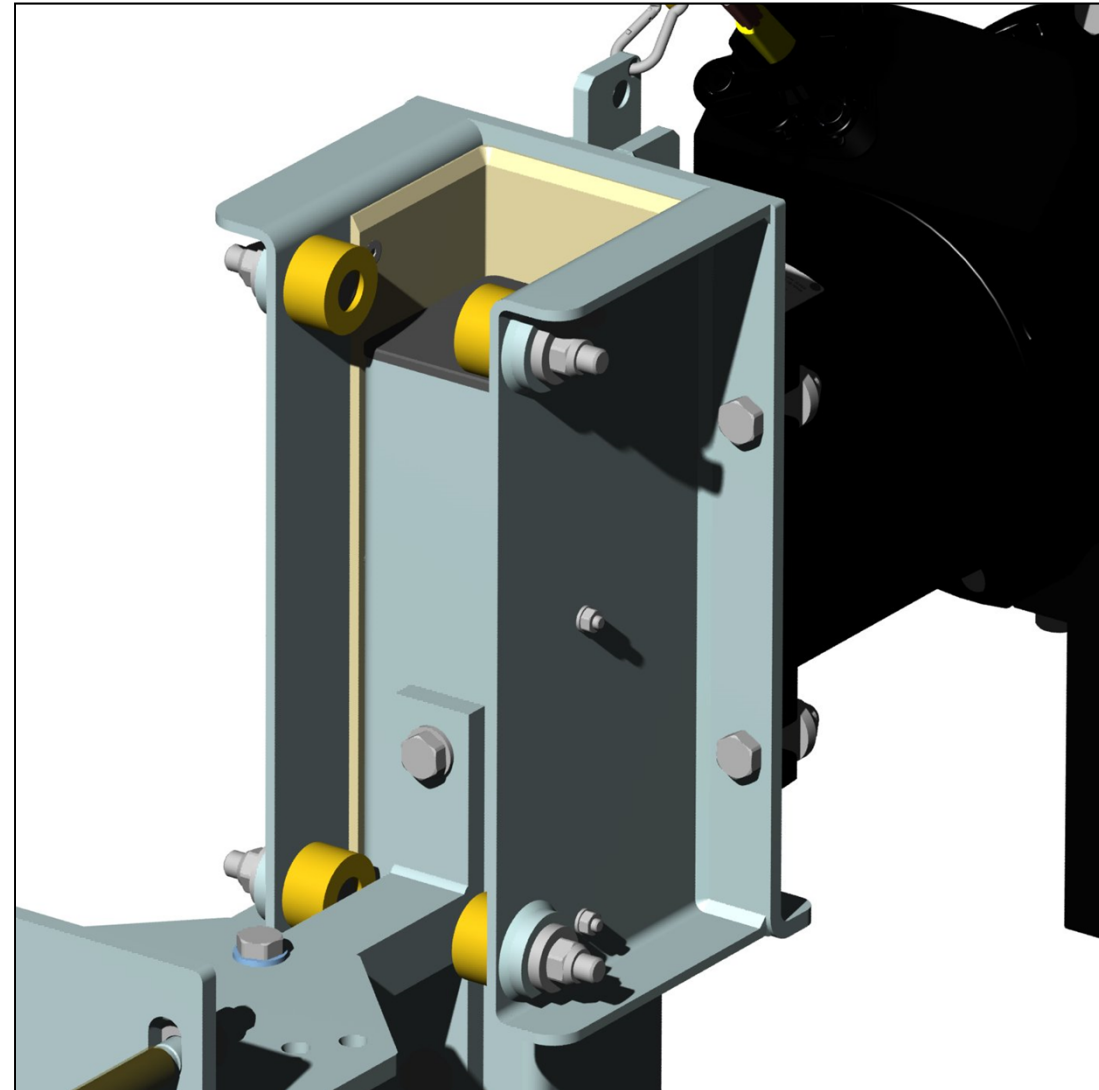
- Winding protection, bimetallic temperature switches or PTC-thermistors.
- Longitudinally water-tight, cast cable trumpet
- Leakage sensor in motor chamber optional
- Possibility for direct mounting of different frames



Matured Technology

Frames

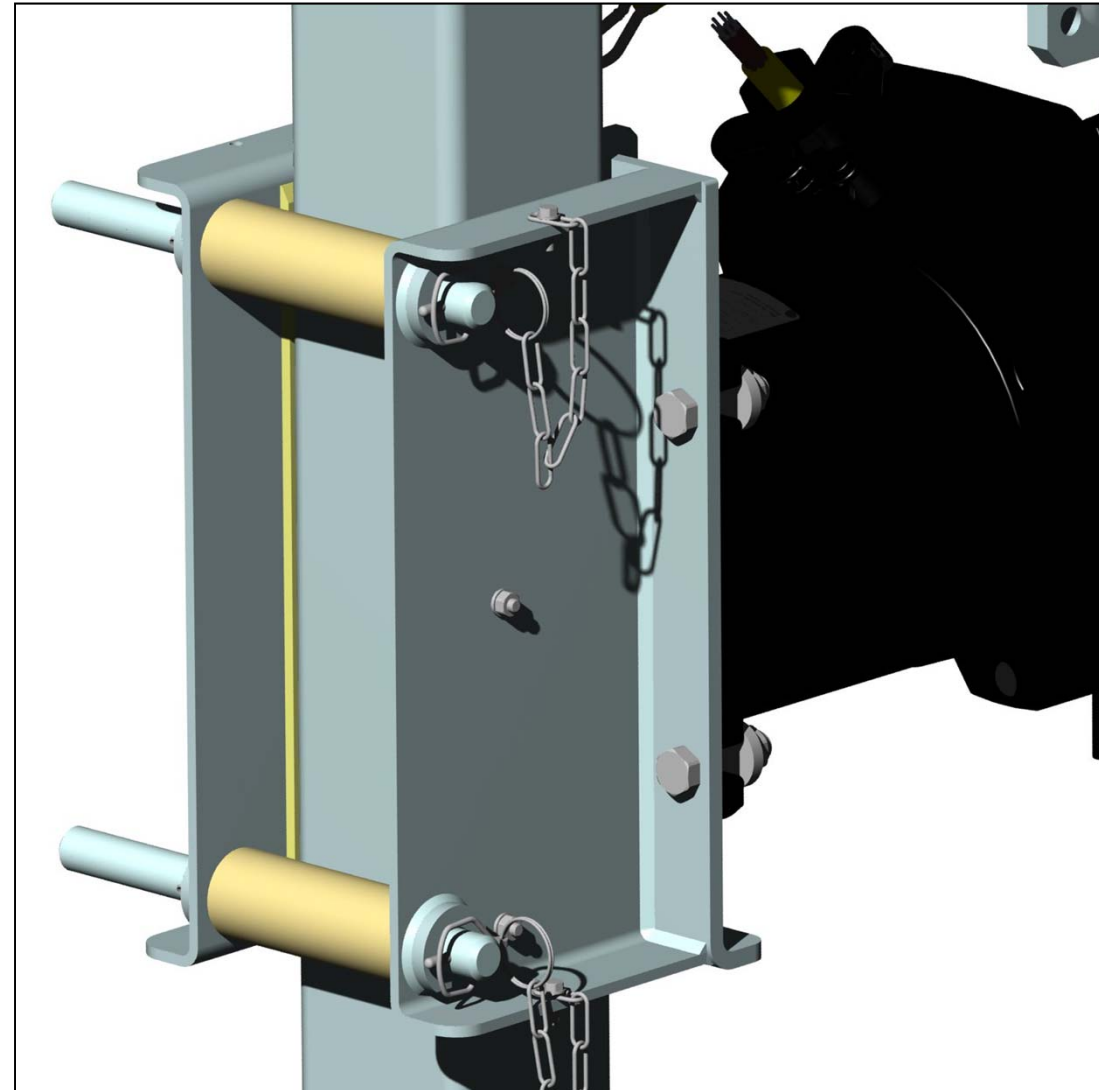
- Material 1.4571
- Simple separation of the submersible mixer from the guide pipe; free drawing without manual interferences
- Lined with a sliding coat of PA
- Roller guiding optional: continuous rolls



Matured Technology

Frames

- Continuous rolls which can be removed without tools
- For application on different lowering devices of other manufacturers
- Increased stability



Agenda

- General information
- Applications of submersible mixers
- Technical design of the submersible mixers
- ***Classification of Wilo Submersible Mixers***
- Accessories
- Wilo selection software

Sizes and Powers of Wilo Submersible Mixers (IE1)

		50 Hz		60 Hz		
Range	Mixer Type	P1.1 [kW]	Thrust [N]	P1.1 [kW]	Thrust [N]	Continous operation
Miniprop	TR 14 ... TR 16	0,26 – 0,3	45 – 65	0,33 – 0,42	60 – 90	conditionally suitable
	TR 21/TR 21S	0,34 – 1,2	75 – 240	0,53 – 1,34	105 – 245	
	TR 28	1,3	330	1,69	340	
Uniprop direct	TR 22	1,3 – 2,7	185 – 350	1,4 – 2,4	220 – 320	not suitable
	TR 36/TR 36S	1,1 – 7,0	210 – 830	1,2 – 8,5	300 – 990	
	TR 40/TR 40S	2,25 – 5,2	505 – 1100	3,6 – 8,5	710– 1480	
Uniprop gear	TR 50-2/TR 50-2S	1,0 – 11,9	350 – 1920	0,4 – 12,2	110 – 2000	suitable
	TR 60-2/TR 60-2S	1,2 – 11,6	510 – 2370	1,5 – 12,0	500 – 2380	
	TR 75-2	3,0 – 10,8	1145 – 2850	2,95 – 14,0	1100 – 3320	
	TR 90-2	0,7 – 5,2	430 – 2120	0,9 – 4,1	580 – 1820	
Uniprop gear	TR 80-1/TR 80-1S	6,1 – 20,1	1670 – 3940	5,9 – 25,2	1650 – 4560	cond. suitable
Maxiprop	TR 216	0,63 – 4,37	270 – 2460	0,7 – 4,45	460 – 2600	suitable
	TR 221	0,8 – 4,8	640 – 3350	0,8 – 5,5	650 – 3600	
	TR 226	0,68 – 4,9	800 – 4370	1,3 – 4,6	1550 – 4250	
Megaprop	TR 316	1,33 – 6,32	450 – 2450	1,3 – 6,2	1050 – 3400	suitable
	TR 321	0,8 – 4,9	720 – 3420	0,8 – 5,3	2700 – 3500	
	TR 326	1,1 – 6,41	1390 - 5270	2,3 – 4,9	2550 – 4400	

Sizes and Powers of Wilo Submersible Mixers with IE3 Motors

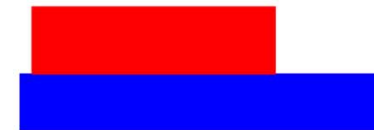
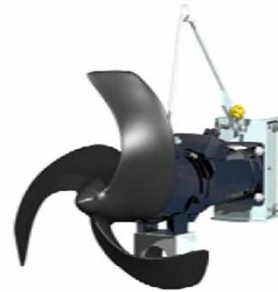
50 Hz				
Range	Mixer Type	P1.1 [kW]	Thrust [N]	Continuous operation
Uniprop gear	TRE 90	2,8 – 4,4	1500 - 2000	suitable
Maxiprop	TRE 221	1,8 – 3,8	1650 – 2880	suitable
Megaprop	TRE 321	1,8 – 4,4	1600 – 3400	suitable

Classification of the Submersible Mixers

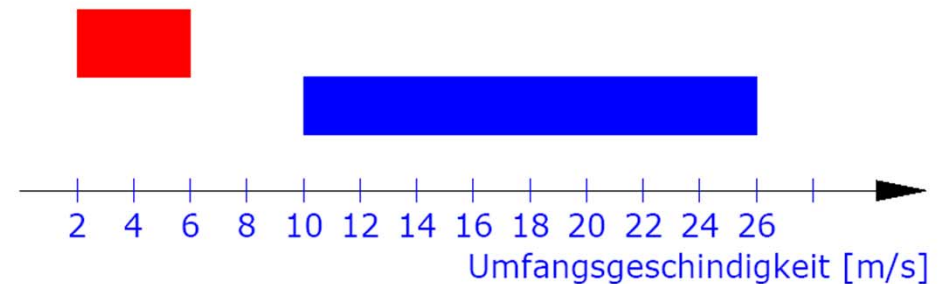
Slow speed
submersible mixers
 $< 100 \text{ min}^{-1}$



Medium speed
submersible mixers
 $100 - 600 \text{ min}^{-1}$

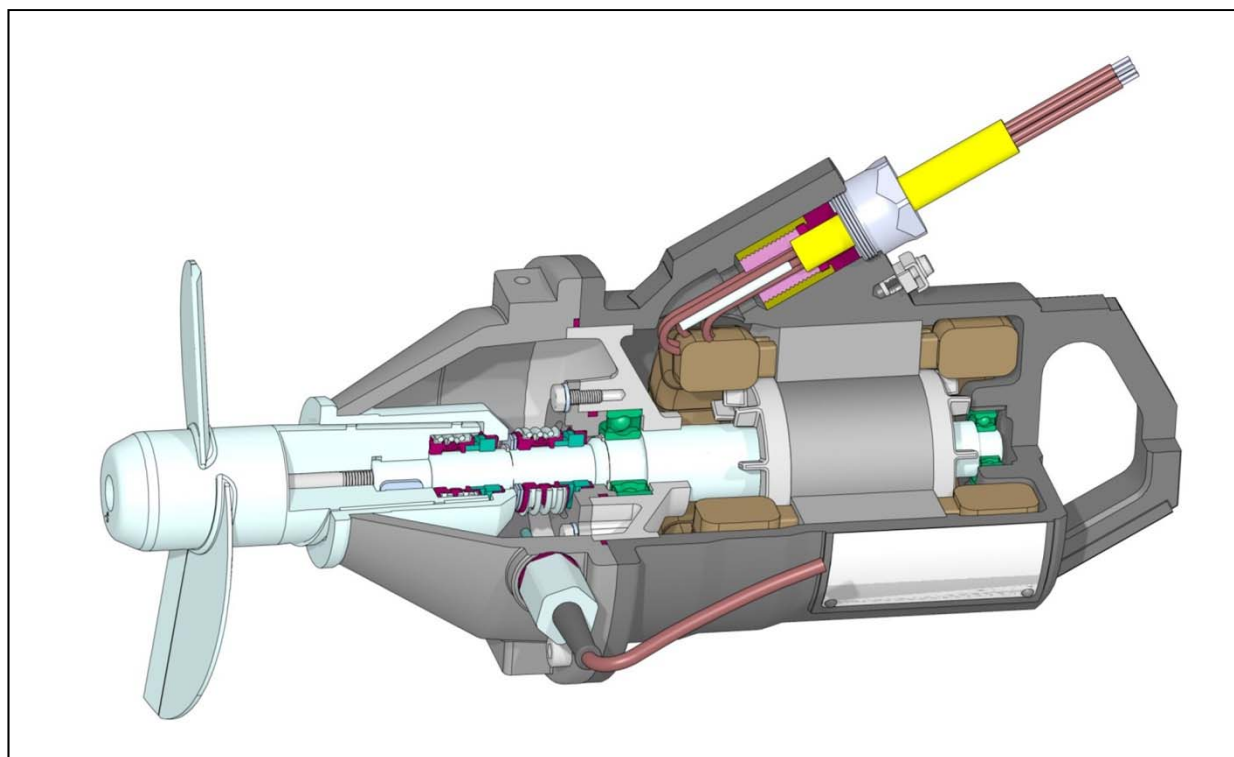


High speed
submersible mixers
 $> 700 \text{ min}^{-1}$



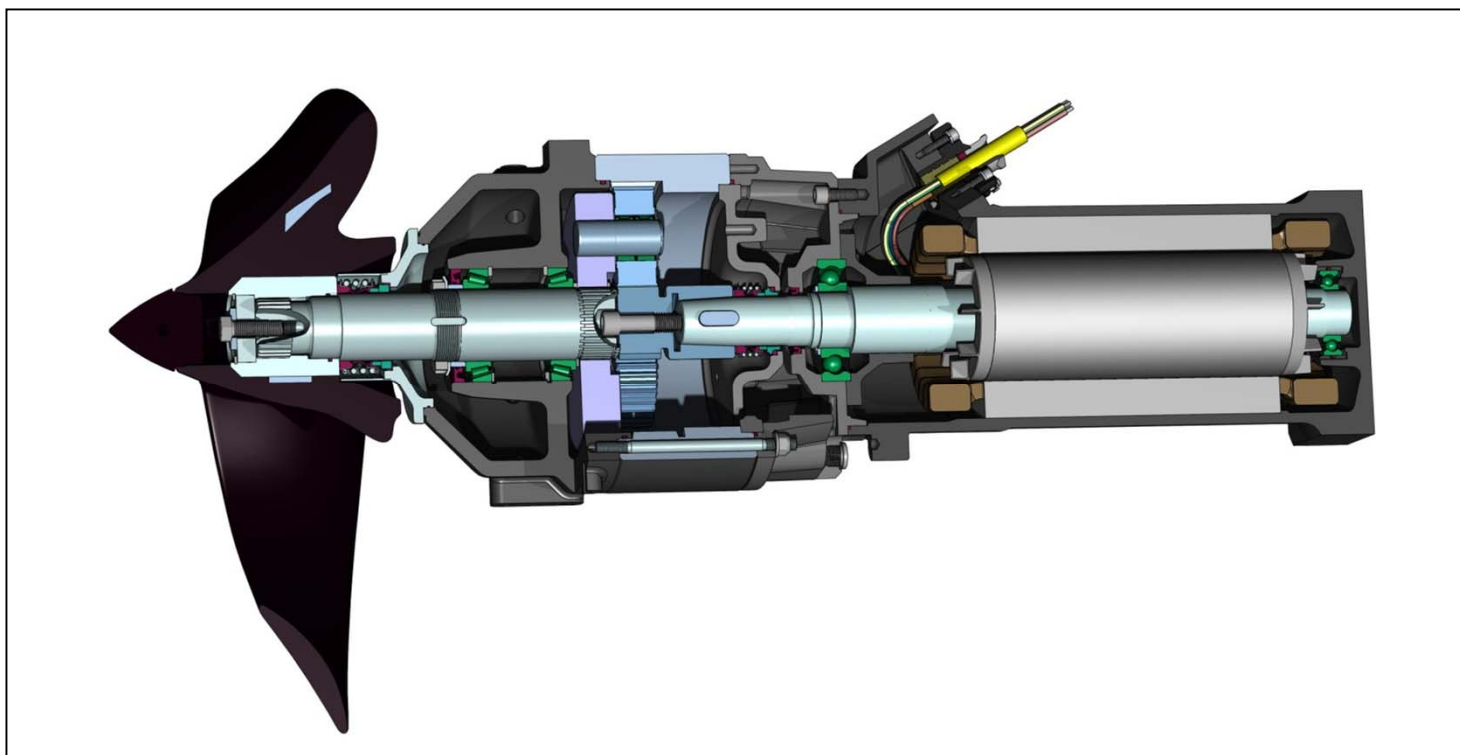
High Speed Mixers

Propeller diameter [m]	Propeller speed [min ⁻¹] 50 Hz	Propeller speed [min ⁻¹] 60 Hz
0,14 – 0,4	700- 1405	828 - 1680



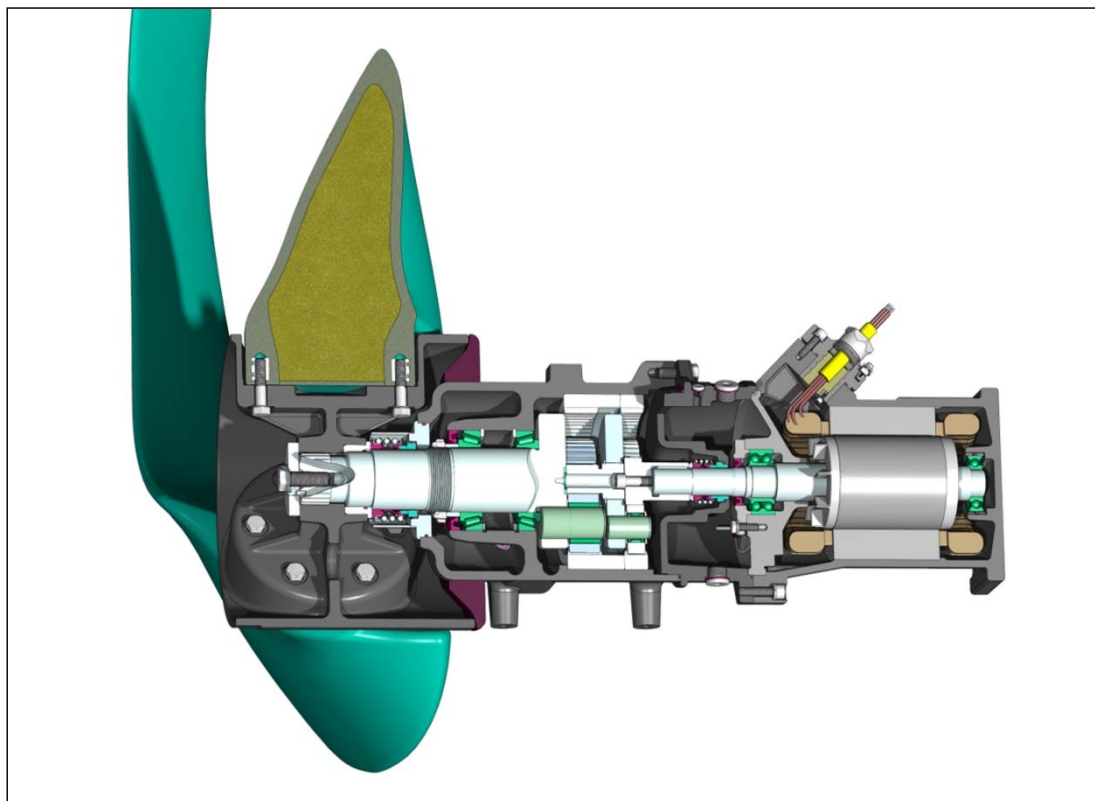
Medium Speed Mixers

Propeller diameter [m]	Propeller speed [min ⁻¹] 50 Hz	Propeller speed [min ⁻¹] 60 Hz
0,5 – 0,9	98 - 594	133 - 570



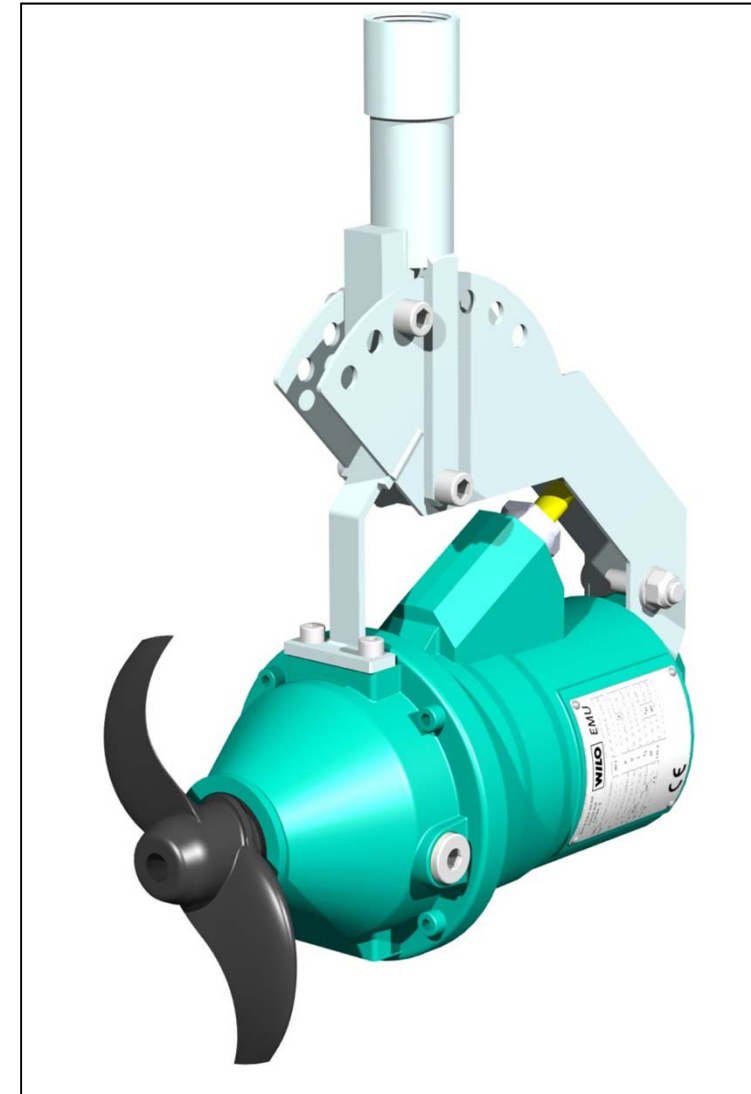
Slow Speed Mixers

Propeller diameter [m]	Propeller speed [min ⁻¹] 50 Hz	Propeller speed [min ⁻¹] 60 Hz
1,5 – 2,6	13 - 59	20 - 58

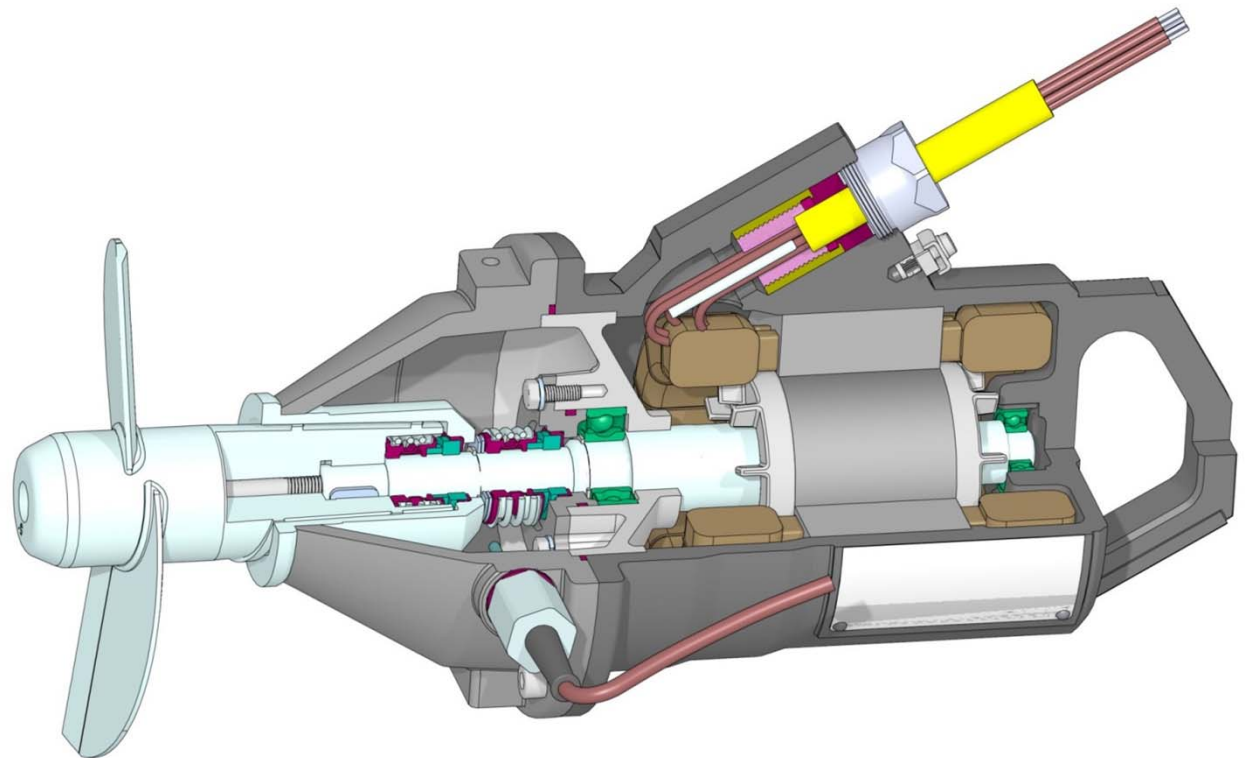


Wilo-EMU Miniprop High Speed Submersible Mixers

- Miniprop submersible mixers are mainly suitable to clean storm water retaining basins, to whirl up deposits in pumping stations, to destroy floating sludge layers and to homogenize the tank content in sewage treatment plants and in small reaction tanks.
- Due to the optimum blade profile of the resistant PUR-propeller (optional: stainless steel propeller) the mixer guarantees a high efficiency during application.



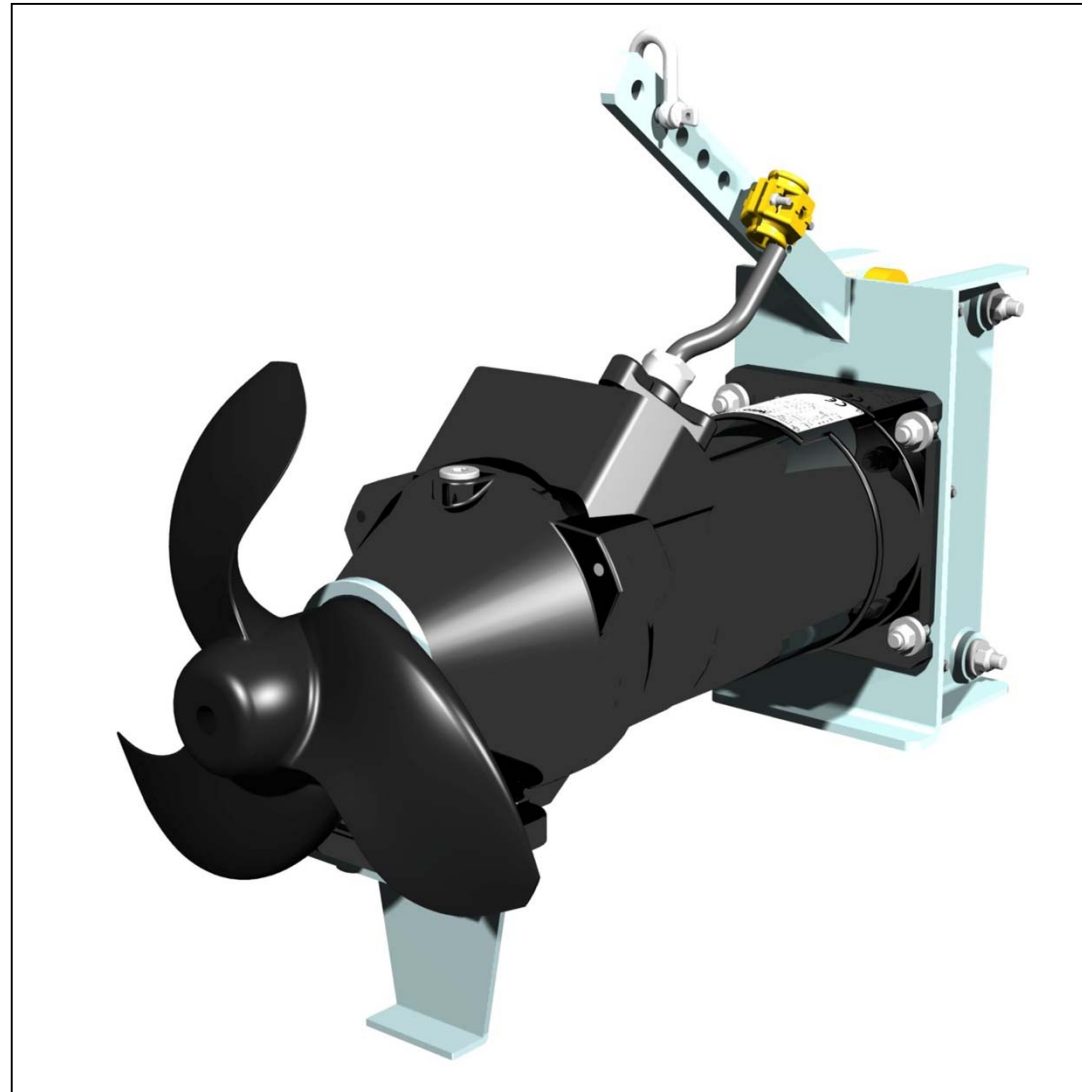
Wilo-EMU Miniprop Submersible Mixers (High Speed)



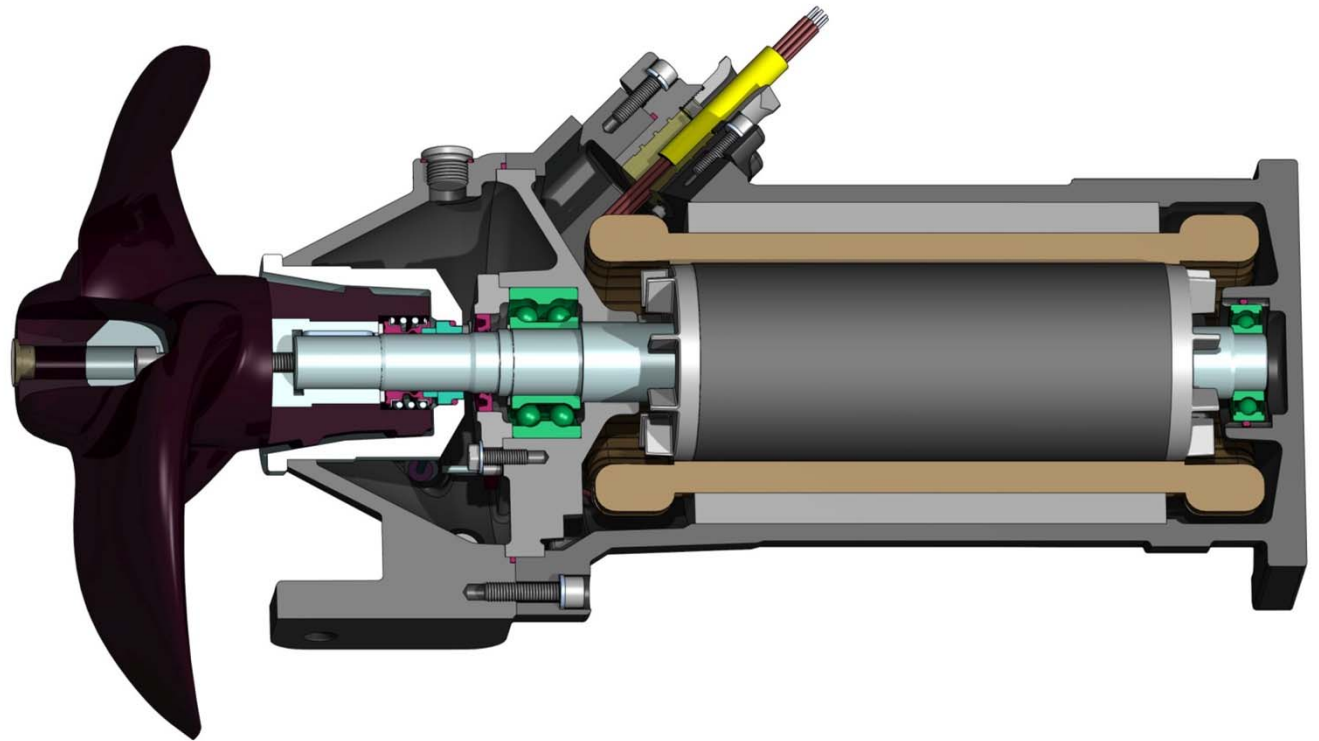
Wilo-EMU Uniprop Submersible Mixers (direct-driven) (High Speed)

With this new design a series of modern, direct-driven mixers with optimized power has been created for the use in sludge tanks, storm water retention tanks and liquid manure tanks.

Propellers with high efficiency, very good resistance against abrasion and high operational safety due to insensibility against clogging are used.

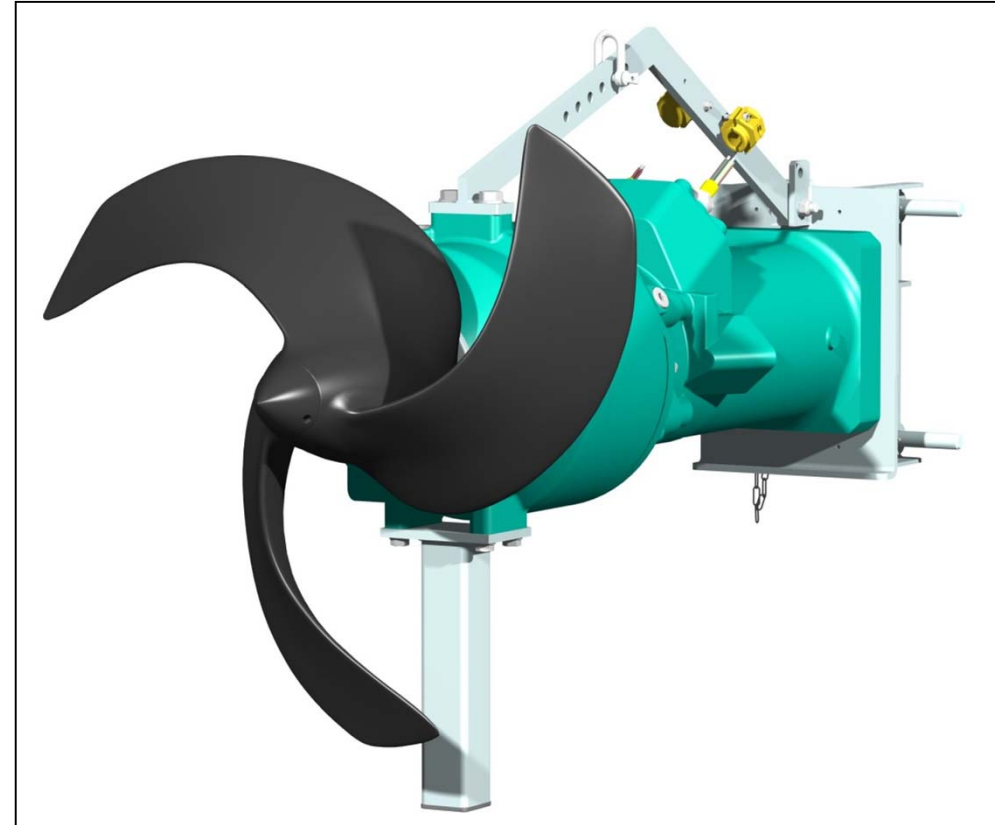


Wilo-EMU Uniprop Submersible Mixers (direct-driven) (TR 22, 36, 40)



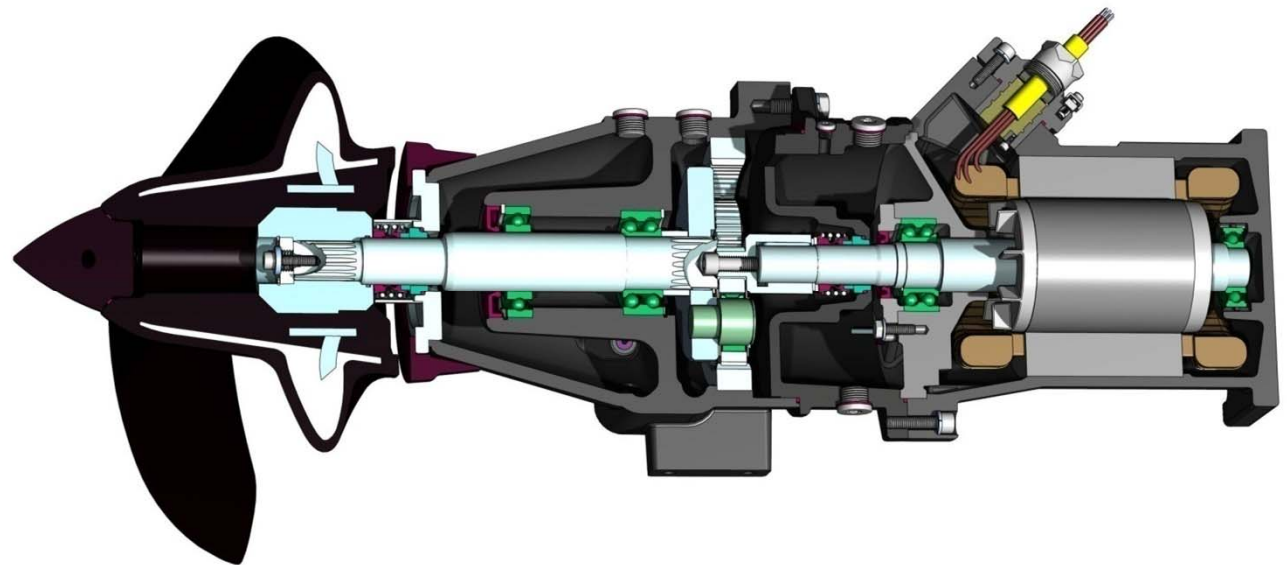
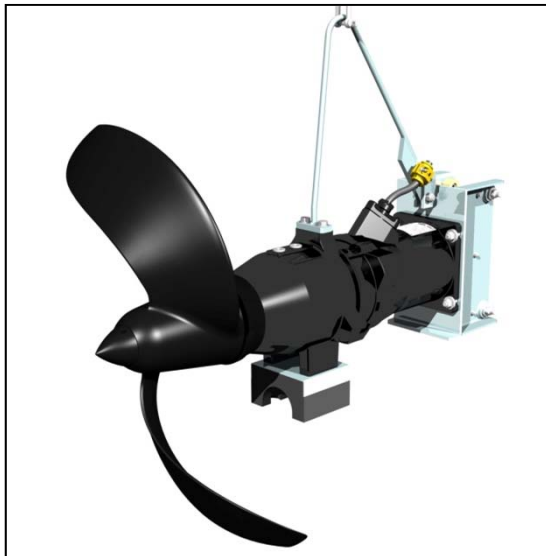
Wilo-EMU Uniprop Submersible Mixers (1-stage planetary gear) Medium Speed

- With this new design a series of modern mixers with optimized power and 1-stage planetary gear has been created for the use in sludge tanks, storm water retention tanks and liquid manure tanks.
- Propellers with high efficiency, very good resistance against abrasion and high operational safety due to insensibility against clogging are used.



Wilo-EMU Uniprop Submersible Mixers

1-stage planetary gear (TR 50-2, 60-2, 75-2, 80-1, 90-2)



Wilo-EMU Maxiprop and Megaprop

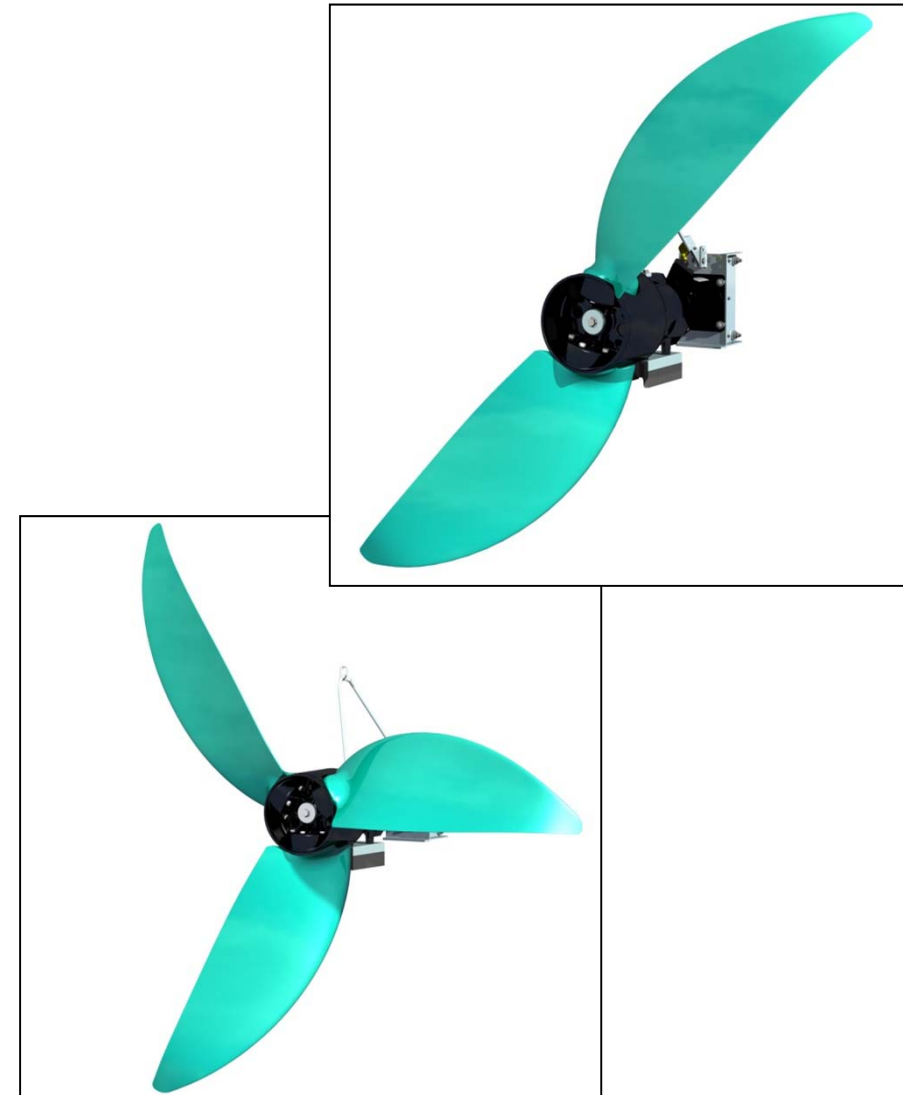
High-efficiency slow speed mixers

Wilo offers two different slow speed mixers:

- Maxiprop with 2-blade propeller
- Megaprop with 3-blade propeller

„Slow speed mixers“ are designed to guarantee a homogenous suspension of the activated sludge in sewage treatment plants with an energy input as small as possible.

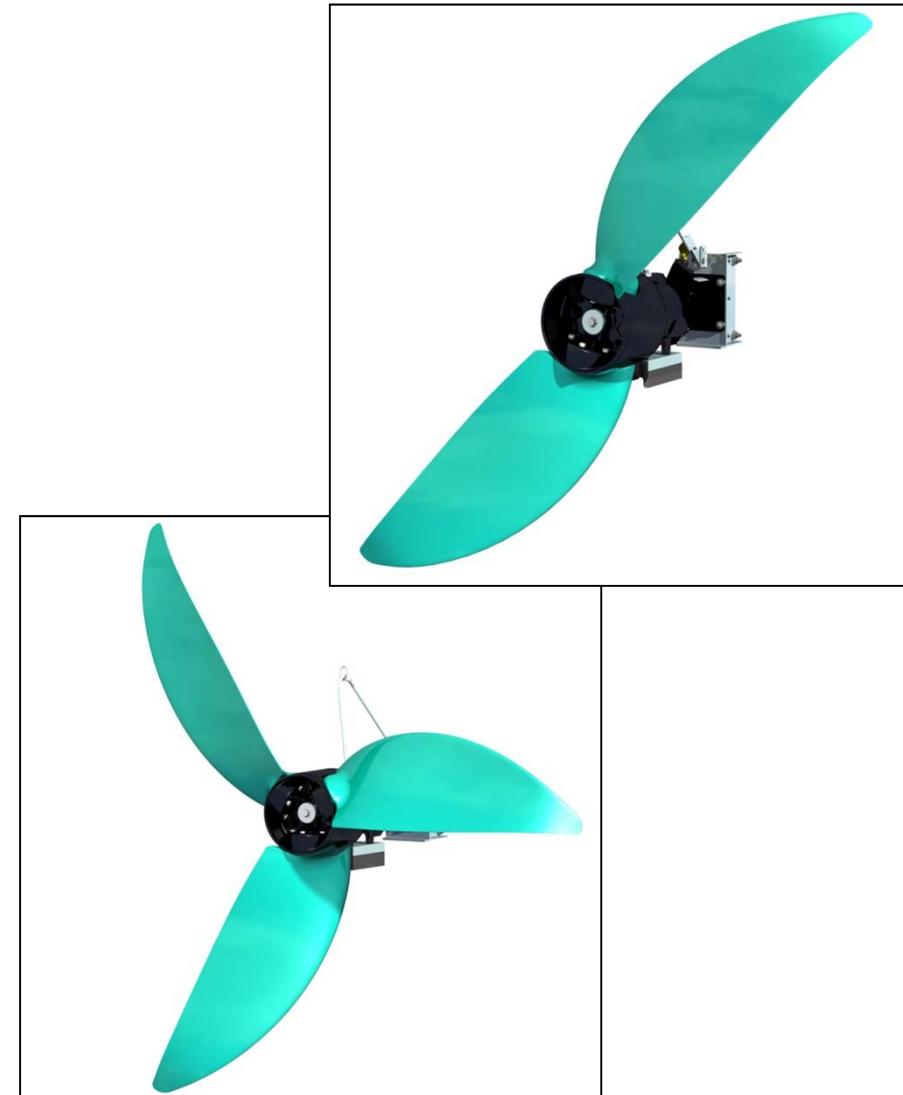
In case of the 3-blade propeller there are less torque changes with same thrust. This assures a smooth operation even in case of unfavourable inflow conditions.



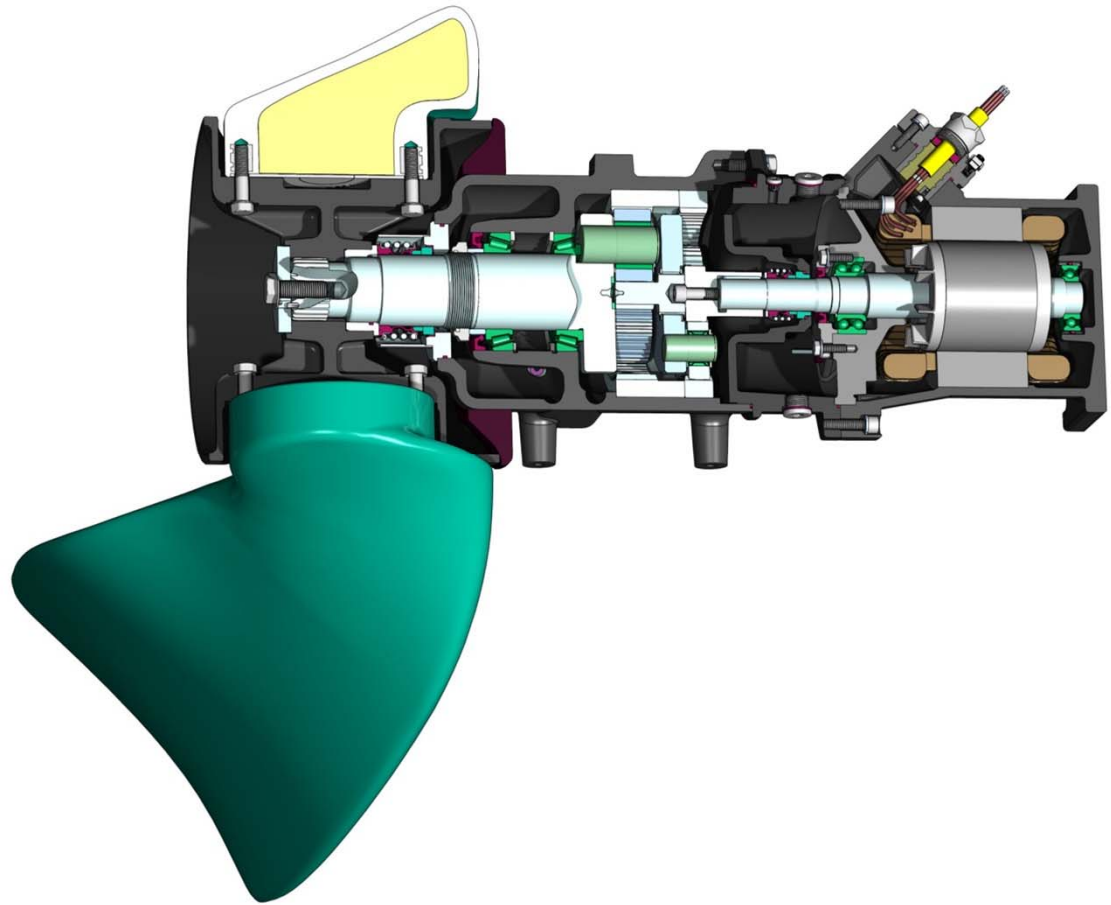
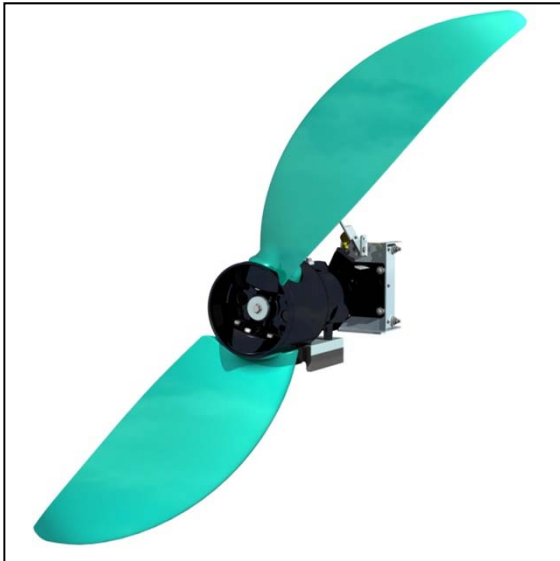
Wilo-EMU Maxiprop and Megaprop

High-efficiency slow speed mixers

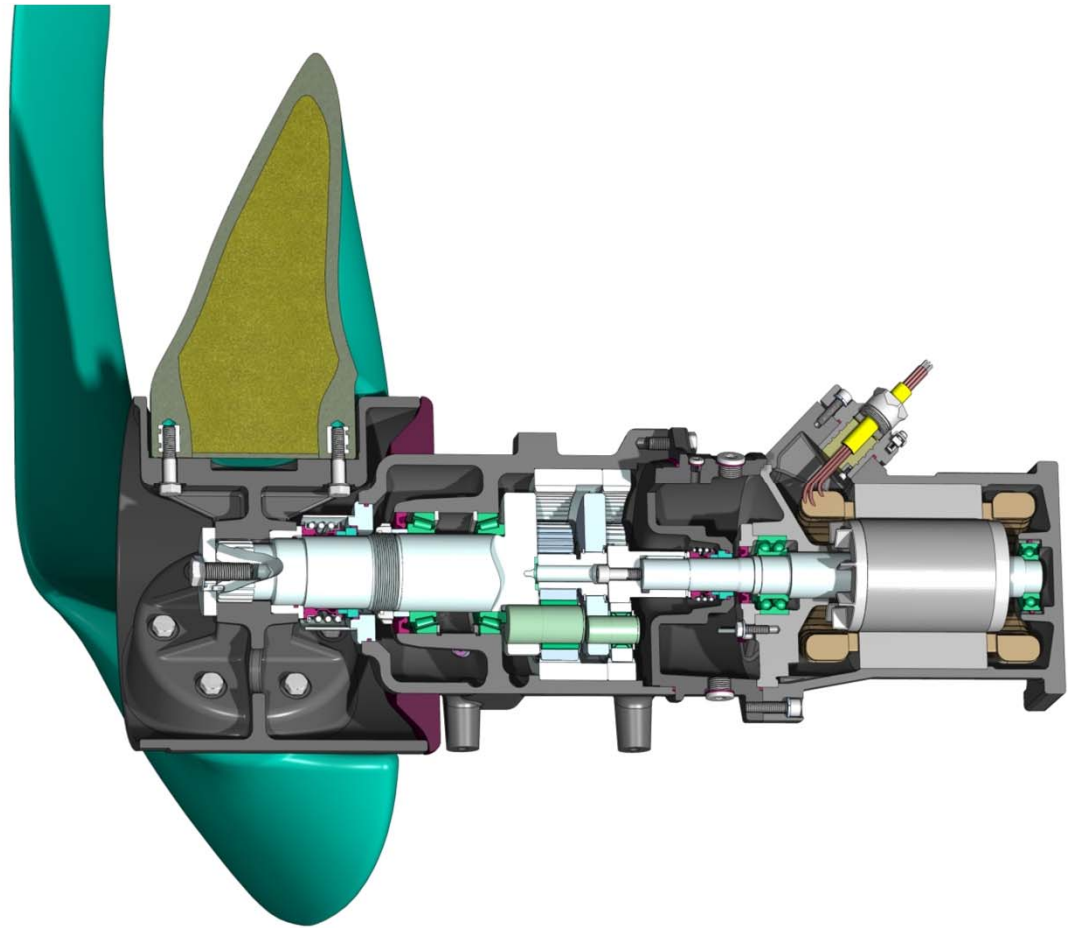
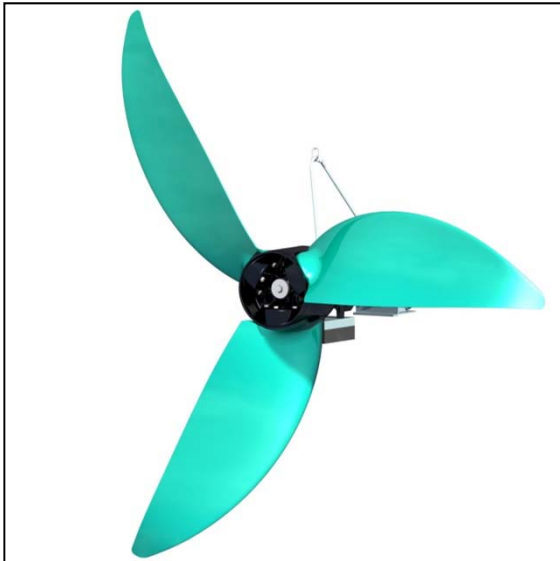
- Energy-optimized design for continuous operation
 - Best thrust-power factor as per ISO 21630
 - Low wear even after continuous operation of many years
- ⇒ Low LCC
- ⇒ Short amortisation period



Wilo-EMU Maxiprop Submersible Mixers (up to 2.6 m propeller diameter) 2-blade



Wilo-EMU Megaprop Submersible Mixers (up to 2.6 m propeller diameter) 3-blade

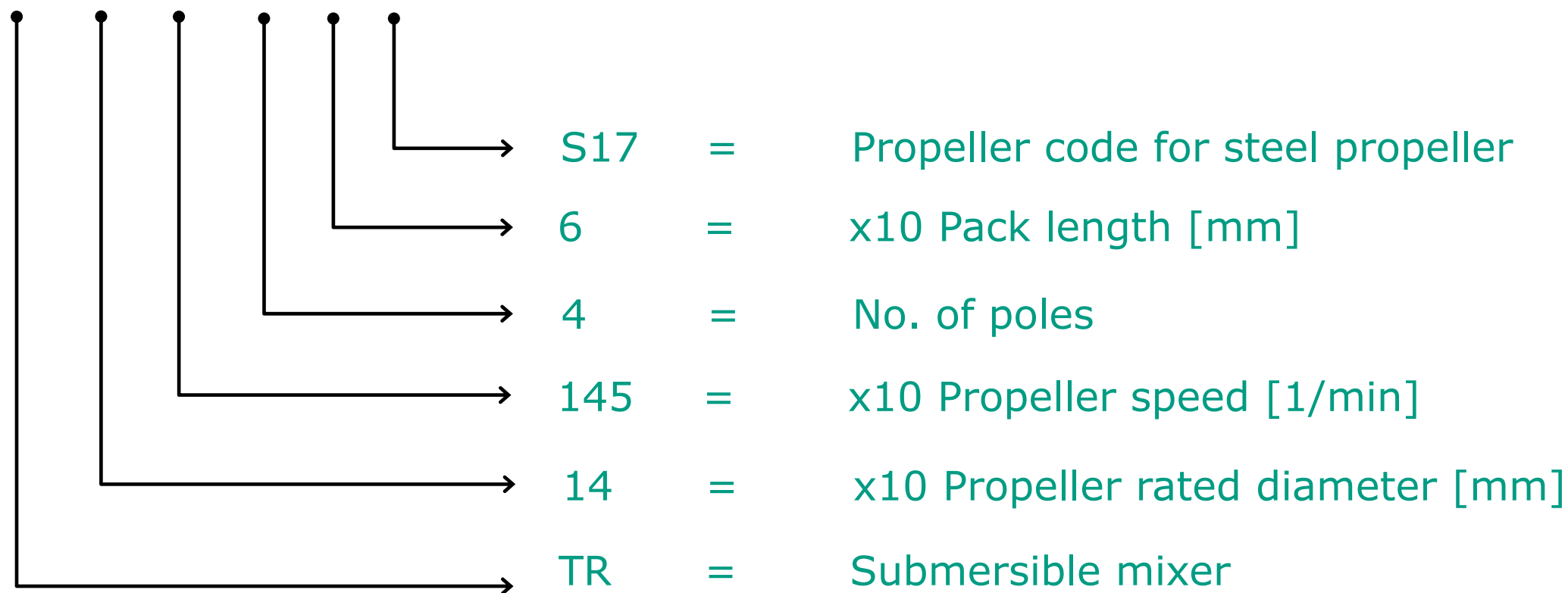


Presentation of the Submersible Mixer

Nomenclature

Submersible Mixer TR 14.145-4/6 S17

TR 14.145-4 /6S17

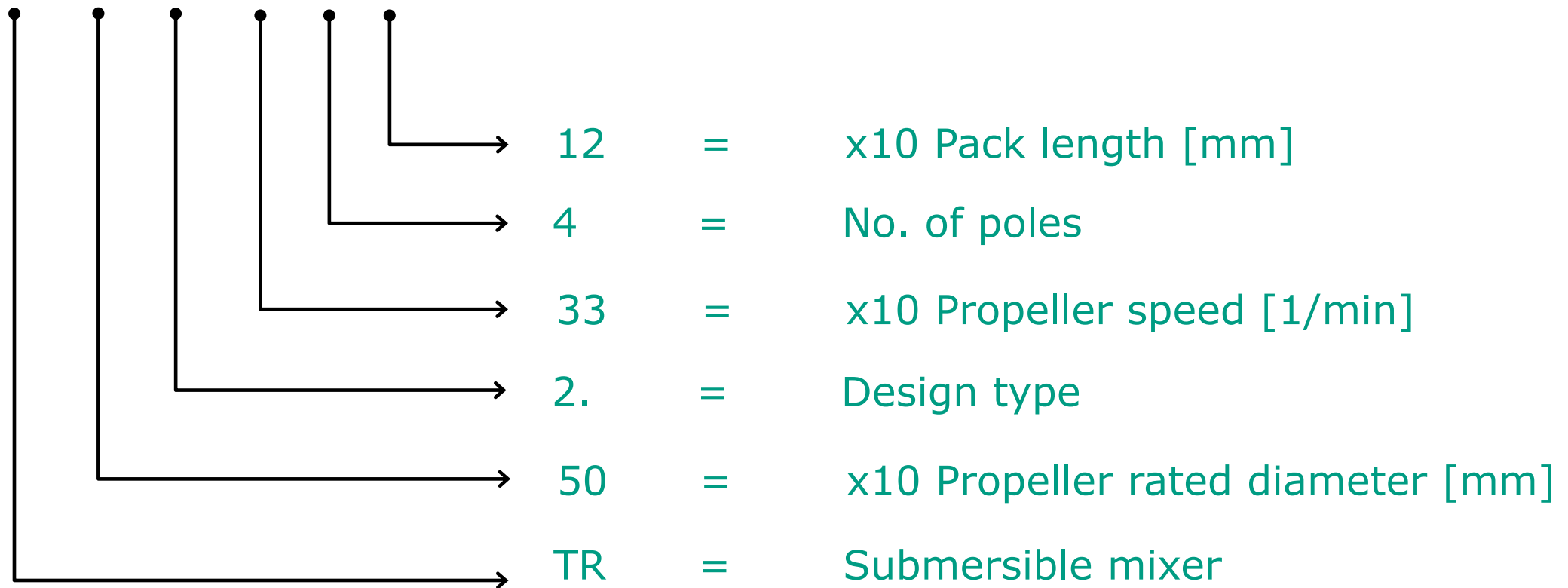


Presentation of the Submersible Mixer

Nomenclature

Submersible Mixer TR 50-2.33-4/12

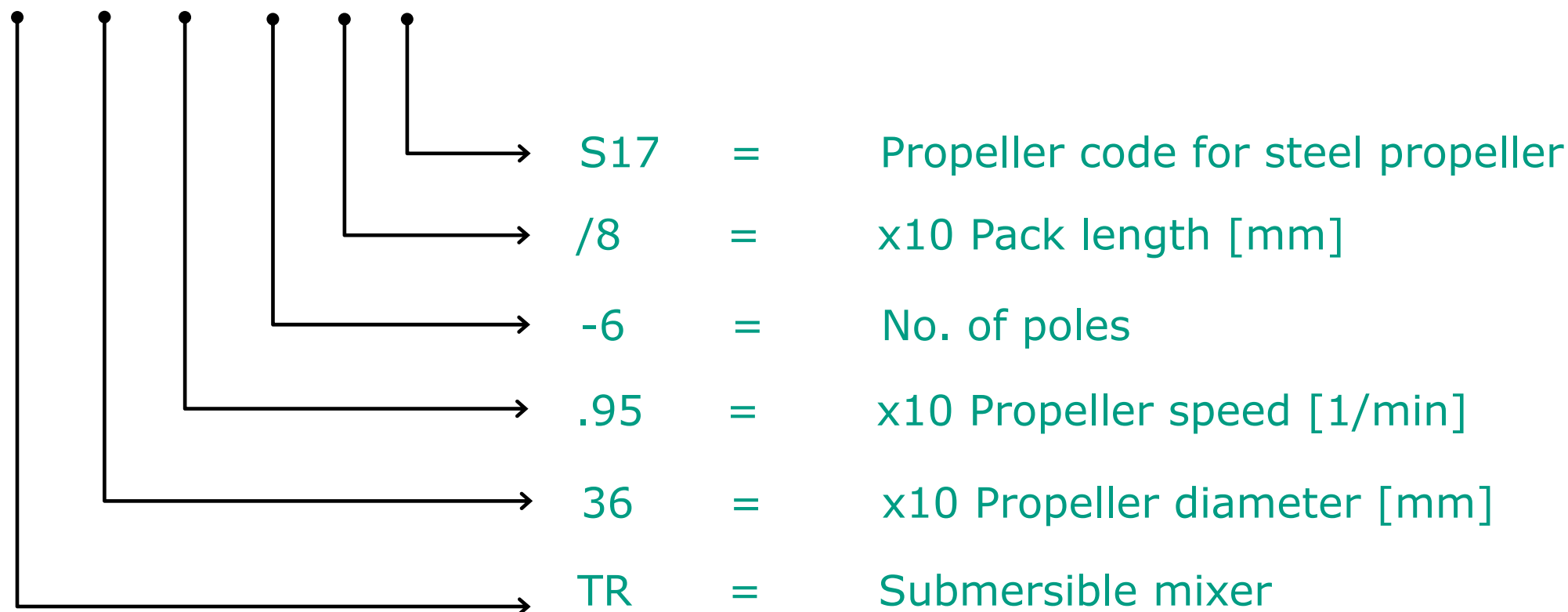
TR 50- 2. 33-4/12



Presentation of the Submersible Mixer Nomenclature

Submersible Mixer TR 36.95-6/8 S17

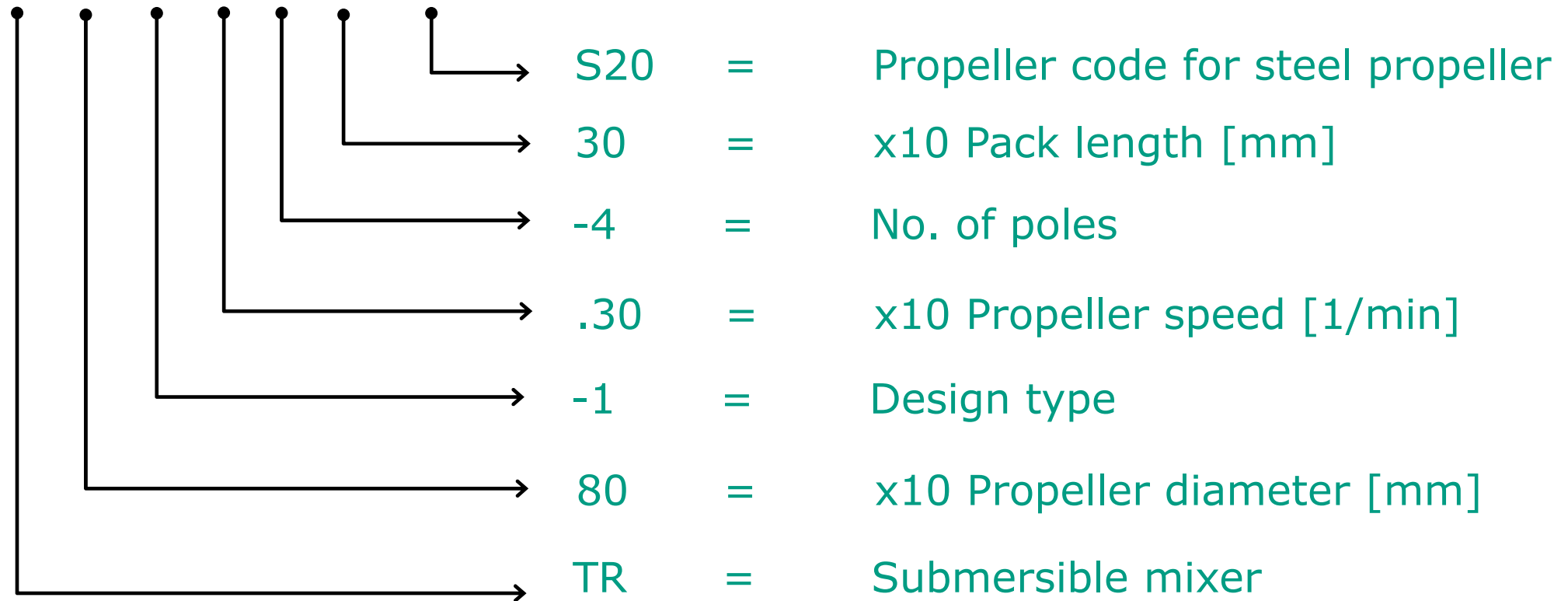
TR 36 .95 -6 /8 S17



Presentation of the Submersible Mixer Nomenclature

Submersible mixer TR 80-1.30-4/30 S20

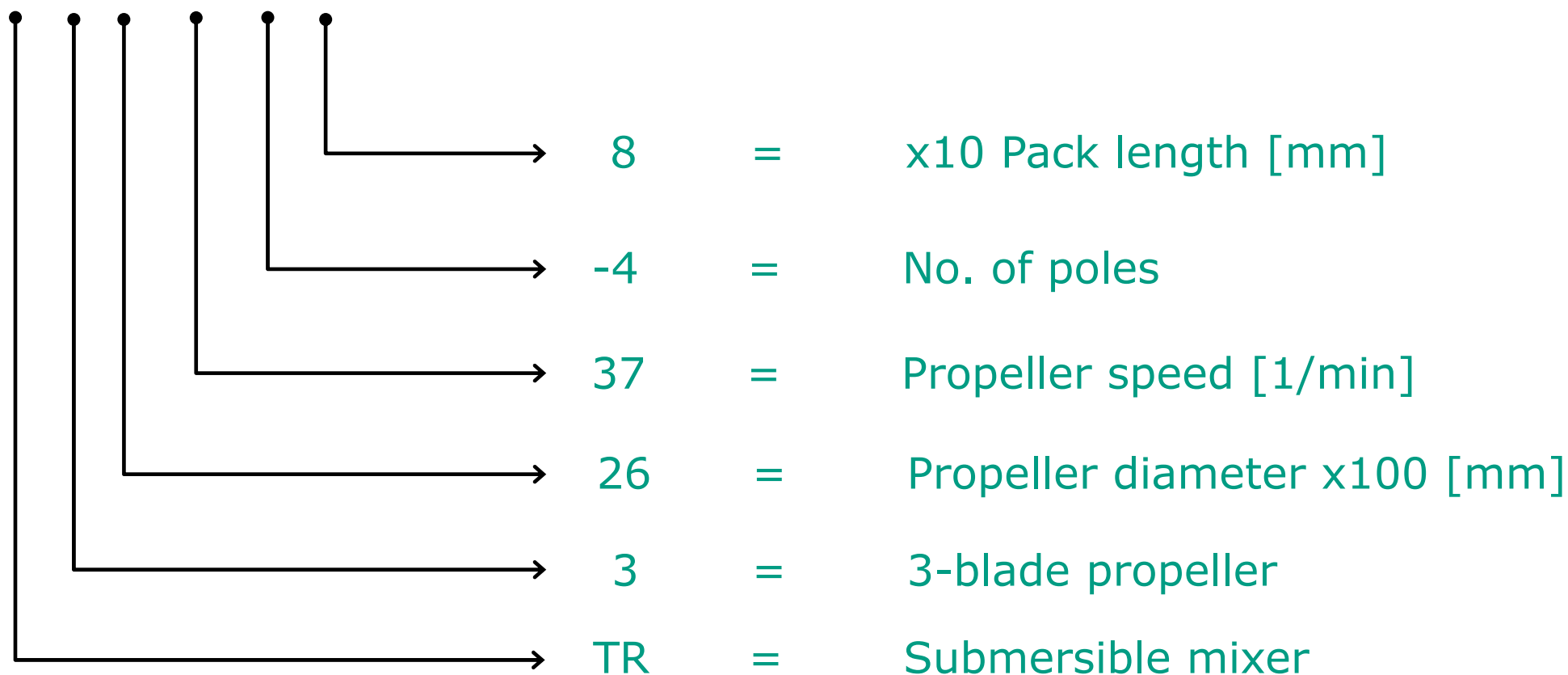
TR 80-1.30-4/30 S20



Presentation of the Submersible Mixer Nomenclature

Submersible mixer TR 326.37-4/8

TR326.37-4/8



Proper Names

Submersible mixers:

Miniprop = Small high speed submersible mixer

Uniprop = High speed /medium speed submersible mixer
1 planetary gear

Maxiprop = Slow speed submersible mixer, 2-blades

Megaprop= Slow speed submersible mixer, 3-blades

Agenda

- General information
- Applications of submersible mixers
- Technical design of the submersible mixers
- Classification of Wilo Submersible Mixers
- ***Accessories***
- Wilo selection software

Wilo Accessories

A wide range of suitable accessories belongs to the Wilo Submersible Mixers.

- Lowering devices
- Auxiliary lifting devices
- More installation material



Selection aids are also available as dxf- and dwg-files!

Survey

[Example](#)

Accessory Components Submersible Mixers

Lowering devices

Whether swivelling or stationary support, available in the qualities V2A (AISI 304), V4A (AISI 316)

The Wilo product range includes lowering devices for each application.

Due to our flexible in-house production at the location Hof we are able to meet also special customer requests.



Accessory Components Submersible Mixers

Auxiliary lifting devices

Different reaches in the qualities steel galvanized, V2A (AISI 304), V4A (AISI 316)

LGA-certified, exactly adapted to the Wilo submersible mixers regarding reach and load capacity.

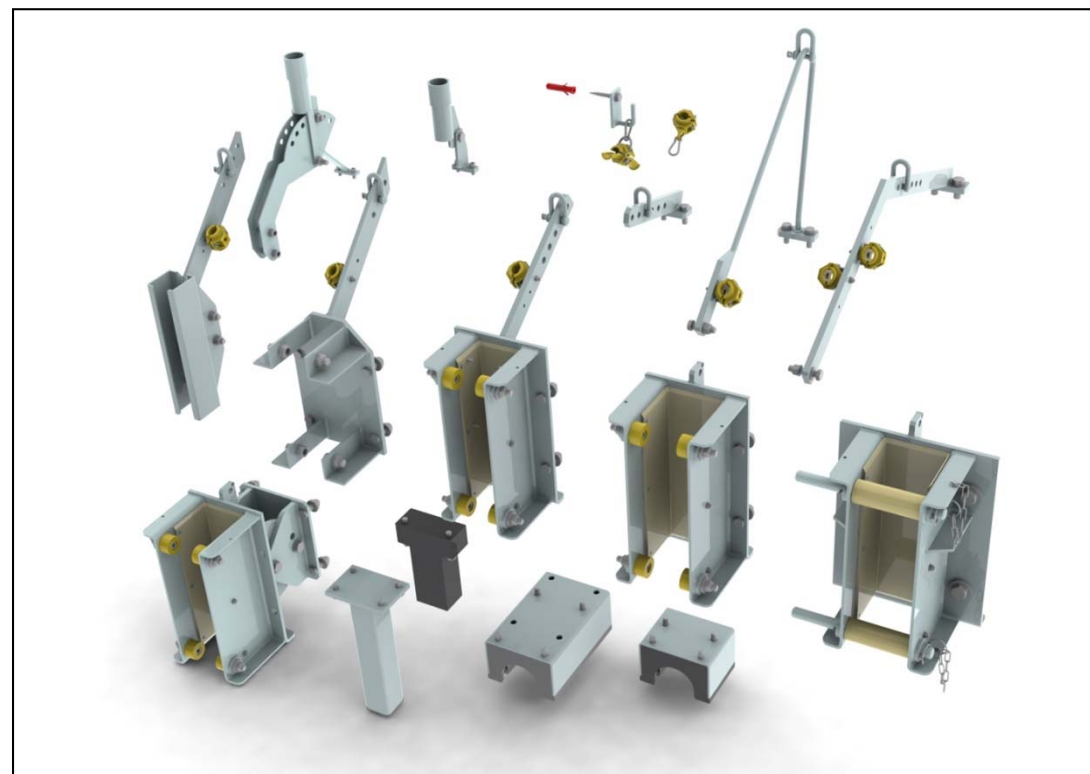


Accessory Components Submersible Mixers

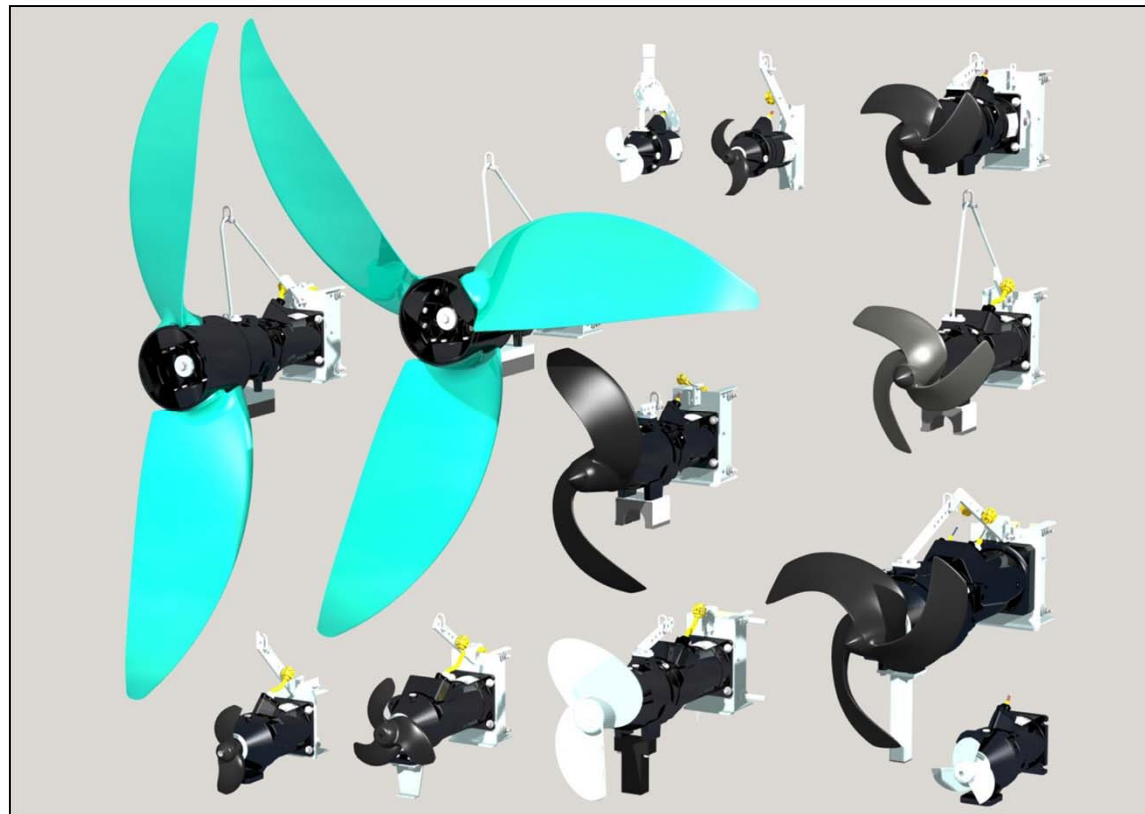
More accessories

From guide pipe over frame up to rubber buffers and supports – adaptation to the different applications without any problems.

Welded parts made of A4 (AISI 316) in standard design.

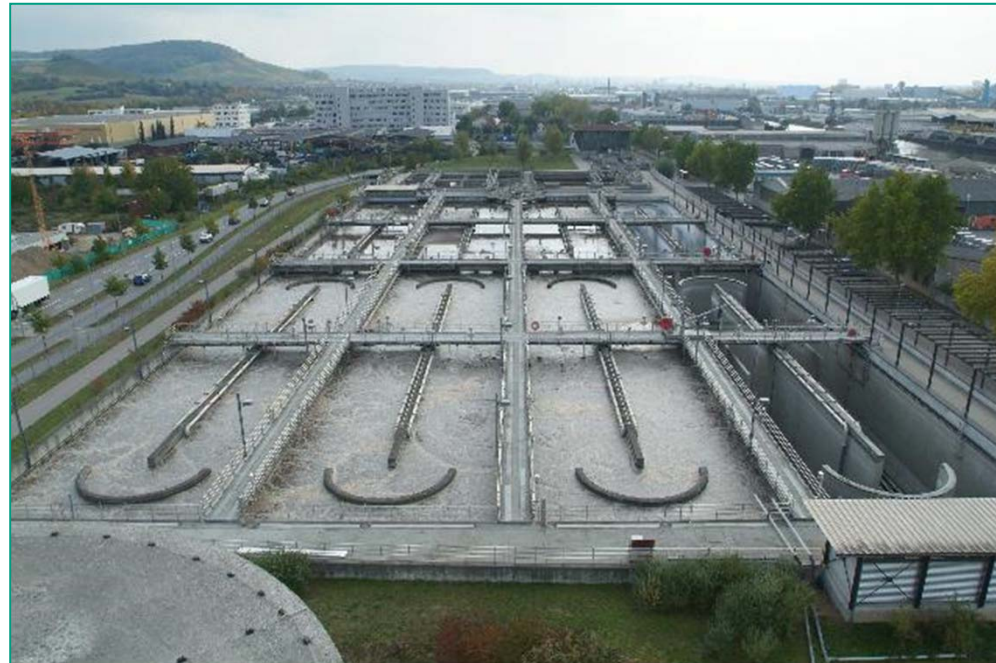


WWTP Heilbronn - profitability analysis



Data

- 8 activated sludge basins
66m · 13,5m · 7,5m water level = 8400m³
- 4 mixers each = 32 mixers
- yearly running period of the mixers: 365 days
- energy price: 0,12 €/kWh

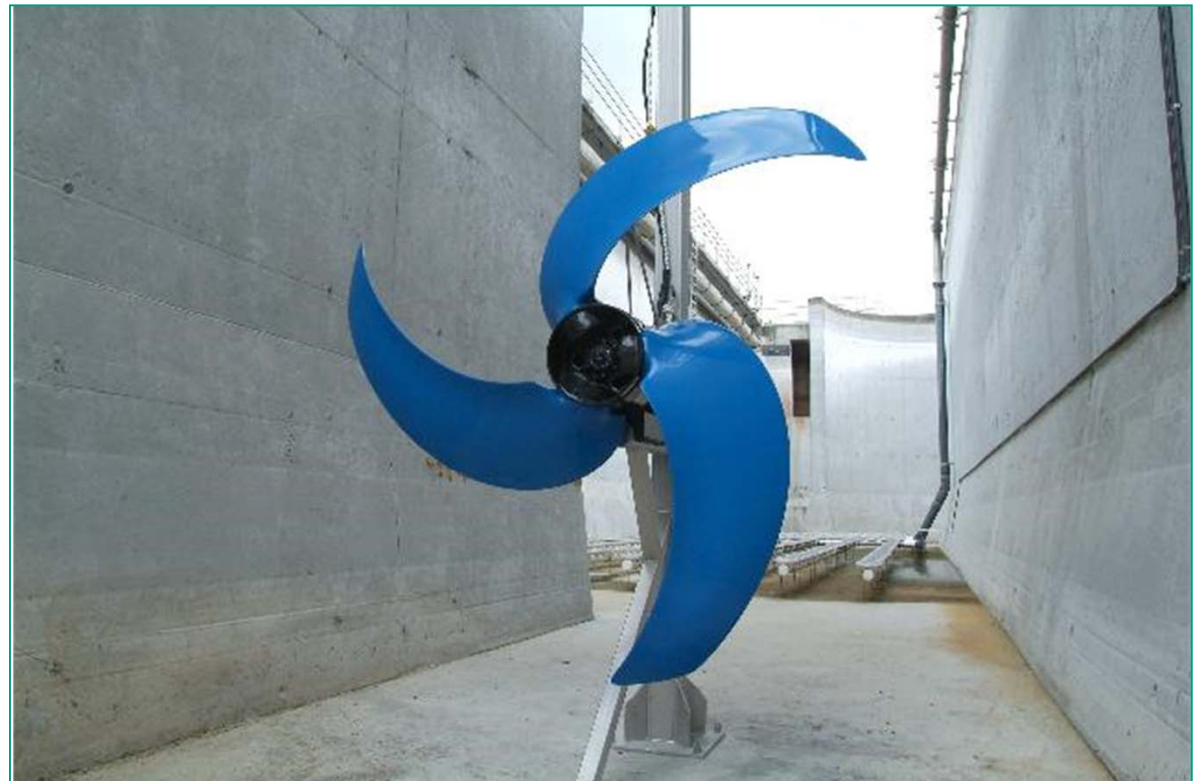


Activated sludge basin

Installation of WILO EMU mixers



- Currently there are
 - > **24** **WILO EMU** mixers and
 - > **8** Competitor mixers in use



Profitability

- electric work **per** mixer

- > Competitor mixer (2 wings): 3,21 kWh

- > **WILO EMU** mixer (3 wings): 2,50 kWh

Δ 22,1%

- electric work of **24** mixers

- >24 Competitor mixers / year:

$$24 \cdot 3,21 \text{ kWh} \cdot 24 \cdot 365 = \underline{674.870,40 \text{ kWh}}$$

- >24 **WILO EMU** mixers / year:

Δ 149.270,40 kWh

$$24 \cdot 2,50 \text{ kWh} \cdot 24 \cdot 365 = \underline{525.600 \text{ kWh}}$$

Profitability

- Economization in € per year

> 24 **WILO EMU** mixers instead of 24 competitor mixers

$$(\Delta) 149.270,40 \text{ kWh/a} \cdot 0,12 \text{ €/kWh} = 17.912,45 \text{ €/a}$$

> Complete equipment with WILO EMU mixers

$$\text{WILO EMU: } 32 \text{ TRW} \cdot 2,50 \text{ kWh} \cdot 24 \cdot 365 = 700.800,00 \text{ kWh/a}$$

$$\text{ABS: } 32 \text{ TRW} \cdot 3,21 \text{ kWh} \cdot 24 \cdot 365 = 899.827,20 \text{ kWh/a}$$

$$\Delta 199.027,20 \text{ kWh/a}$$

$$\text{Energy economization with 32 WILO EMU mixers} = 23.883,27 \text{ €/a}$$

Specific power density

Formula:

$$P_{1.1 \text{ ges.}} / V_{\text{basin}}$$

WILO EMU in one basin

$$4 \cdot 2500 \text{ W} / 8400 \text{ m}^3 = 1,19 \text{ W/m}^3$$

Competitor in one basin

$$4 \cdot 3215 \text{ W} / 8400 \text{ m}^3 = 1,53 \text{ W/m}^3$$

$$\Delta 22,2\%$$

= Economization of 0,34 W/m³

Agenda

- General information
- Applications of submersible mixers
- Technical design of the submersible mixers
- Classification of Wilo Submersible Mixers
- Accessories
- ***Wilo selection software***

Possibilities to Save Cost by the Selection Software for Submersible Mixers

By means of a selection program based on the latest aspects of flow-technology it is possible for us to find the optimum mixer for the various tank shapes.

The optimum Submersible Mixer shows the minimum energy consumption for the required mixing duty – complete mixing or homogeneous suspension of flow velocity.

Mixer Select



WILO SE
Northkirchenstr. 100
44263 Dortmund
Germany

T: +49 9281 974-540
F: +49 9281 974-345
ctmixer@wilo.com
www.wilo.com

Mixer Selection Software

Example of the selection process

The screenshot displays the 'MIXER SELECT - Selection' software window. The left sidebar contains four icons with labels: 'Project data', 'Specification of mixed liquid', 'Tank information' (which is highlighted), and 'Common selection criteria'. The main area is titled 'Tank information' and contains several sections:

- Tank shape**: A list of radio buttons for selecting a tank type: Rectangular tank, Round tank, Annular tank, Circulation tank, and Meander tank. The 'Meander tank' option is selected.
- Tank material**: A list of radio buttons for selecting a material: Steel and Concrete. The 'Concrete' option is selected.
- Hydraulic roughness**: A text input field for 'Average absolute hydraulic roughness of tank walls' with the value '0,4' and a unit 'mm'.
- Additional information about**: A section with three checkboxes: 'Preliminary clarification' (checked), 'Inflow and outflow' (checked), and 'Installations in the tank' (unchecked).
- Aeration**: A list of radio buttons for selecting an aeration method: Without, Surface aerator, Brush aerator, and Ground aeration. The 'Without' option is selected.

Below the 'Tank shape' section, there is a diagram of a meander tank with dimensions labeled: H_a , H_r , B_k , B_w , and L . The bottom of the window features the 'WILO' logo on the left and a row of buttons: 'Back', 'Next', 'Abort', and 'Help' on the right.

Mixer Selection Software

Example of the selection process

The screenshot shows the 'Specification of mixed liquid' tab in the MIXER SELECT software. The interface includes a sidebar with icons for Project data, Specification of mixed liquid, Tank information, and Common selection criteria. The main area is divided into three sections: Mixed liquid, Solids, and Operating mode. The Mixed liquid section contains fields for Kind of sludge (User defined fluid), Dry solids content (Vol %), Sludge index (ml/g), Dynamic viscosity (Pa s), Density (kg/m³), Temperature (K), pH value, Flow behaviour (Structural viscosity), Additional thickener (Please select), and Kind of thickening (Please select). The Solids section contains fields for Origin (Please select), Kind (Please select), Solid size (Please select), and Engineering coefficient (1). The Operating mode section contains a field for Please select. An error message is displayed at the bottom: 'Error: Value for field Dry solids content off the range from 0,1 Vol % to 10 Vol %. Value for field Dynamic viscosity off the range from 0 Pa s to 0,1 Pa s.' The WILO logo is visible in the bottom left corner, and navigation buttons (Back, Next, Abort, Help) are in the bottom right corner.

MIXER SELECT - Selection

Specification of mixed liquid

Mixed liquid

Kind of sludge: User defined fluid

Dry solids content: [] Vol %

Sludge index: [] ml/g

Dynamic viscosity: [] Pa s

Density: [] kg/m³

Temperature: [] K

pH value: []

Flow behaviour: Structural viscosity

Additional thickener: Please select

Kind of thickening: Please select

Solids

Origin: Please select

Kind: Please select

Solid size: Please select

Engineering coefficient: 1

Operating mode

Please select

Mixing task

Please select

Error

Value for field Dry solids content off the range from 0,1 Vol % to 10 Vol %.

Value for field Dynamic viscosity off the range from 0 Pa s to 0,1 Pa s.

WILO

Back Next Abort Help

The screenshot shows the 'Project data' and 'Current selection' tabs in the MIXER SELECT software. The interface includes a sidebar with icons for Project data, Specification of mixed liquid, Tank information, and Common selection criteria. The main area is divided into two sections: Project data and Current selection. The Project data section contains fields for Created by (Gra), Project name, Project country (GB - United Kingdom (Great Britain)), Area of application (Please select), Created on (Donnerstag, 31. Juli 2008), and Customer (Order received). The Current selection section contains fields for Tank designation (? - Please select), Tank Number (1), Application (Please select), Inquiry, Selection issued (Gra - 31.07.2008), Most recent amendment (Gra - 31.07.2008), and Selection No. (08-Gra-??-?-1-0001). The WILO logo is visible in the bottom left corner, and navigation buttons (Back, Next, Abort, Help) are in the bottom right corner.

MIXER SELECT - Selection

Project data

Current project

☒ Change project data

Created by: Gra

Project name: []

Project country: GB - United Kingdom (Great Britain)

Area of application: Please select

Created on: Donnerstag, 31. Juli 2008

Customer: ☐ Order received

Current selection

Tank designation: ? - Please select

Tank Number: 1

Application: Please select

Inquiry: []

Selection issued: Gra - 31.07.2008

Most recent amendment: Gra - 31.07.2008

Selection No.: 08-Gra-??-?-1-0001

Mixer Selection Software


Selection results


ZB - Accessory sheets (DE - US - FR) | BS - Overview fixation sets | HHV - Auxiliary lifting device | BW - Operation and maintenance manual | MBL - Installation sheets | Selected files:
 Further mixer data | Input data | Report for calculation | Data sheets | ITD - Technical data sheets | MB - Dimension sheets (DE - US - FR) | PLH - Selection aid (DE - US - FR)

Submersible mixer type TR 226.46-4/12

Mixer data related to a propeller

Name	TR 226.46-4/12	
Propeller diameter	m	2,6
Propeller speed	1/s	0,7667
Circulation capacity	m³/s	4,82
Thrust	N	4370
Propeller material		GFK
Power input in duty point	W	4890
Motor charge	%	84,3
Transmission of planetary stage		4,9
Secondary transmission		6,2
Weight	kg	187

Motor (-Ex)  T 17-4/12R

Additional  Installation proposal

	Type	D [m]	n [1/s]	Material	Quant.	P _{11,total} [W]	P _{11,total} /V _g [W/m³]	F _{s,total} [N]	Motor charge [%]
<input checked="" type="checkbox"/>	TR 226.46-4/12	2,6	0,7667	GFK	4	19560	1,16	17480	84,3
<input type="checkbox"/>	TR 326.43-4/12	2,6	0,7167	GFK	4	19920	1,18	17360	85,9
<input type="checkbox"/>	TR 326.45-4/16	2,6	0,75	GFK	4	24440	1,45	20320	74,5
<input type="checkbox"/>	TR 326.47-4/16	2,6	0,7833	GFK	4	25640	1,52	21080	78,2

Back Next Abort Help

Mixer Selection Software

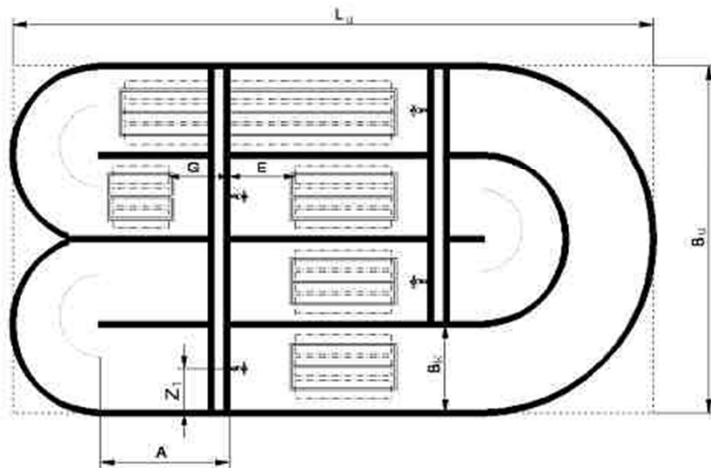
Einbauvorschlag

ID 08-Gra-DE-BB-1-0001
Projektland Deutschland
Projektname Rührwerksvortrag
Position 1 Belebungsbecken
Datum 30.09.2008
Rührwerk TR 226.20-8/8
Anfrage



Pumpen Intelligenz

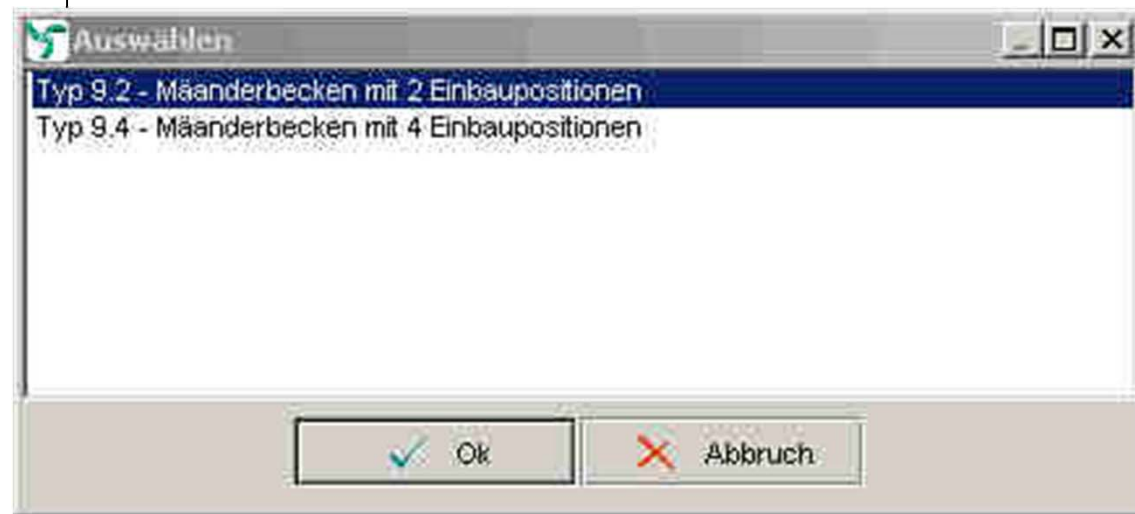
WILO EMU GmbH
 A BRAND OF WILO GROUP
 Heimgartenstraße 1-3 · D-95030 Hof/Saale
 Postfach 3309 · D-95030 Hof/Saale
 Telefon +49 9281 974-0 · Fax +49 9281 96528
 Web www.wiloemu.com · E-Mail info@wiloemu.de



n *	4	
Lu	60	m
Bk	5	m
G *	7	m
Nl *	4	

A	8	m
Bu	20,9	m
E *	8	m
Zl *	2,5	m

Bei Umlauf- und Mäanderbecken entspricht der hydraulische Querschnitt in der Umlenkung dem Kanalquerschnitt.



Mixer Selection Software

- Selection of the mixers
- Compilation of the installation suggestions
- Comparison of energy costs
- Creation of the mixer data sheet
- Subsequent evaluations are possible in the project data base

Visit us on our new Website www.wilo.com

The image displays two overlapping screenshots of the WILO website. The background screenshot shows the homepage with a navigation bar, a main banner for 'Ökodesign-Richtlinie', and several product highlights. The foreground screenshot shows a detailed view of the 'Kommunale Anwendungen' (Municipal Applications) section, featuring a large green banner with the text 'Energie sparen.' and a temperature reading of 104.5°.

WILO SE - Startseite - Pumpen Intelligenz

Ökodesign-Richtlinie verändert den Markt
Erfahren Sie mehr >>

707 Tage **9** Stunden **12** Minuten **57** Sekunden

Startseite | **Produkte** | **Anwendungsbereiche** | **Services** | **Termine** | **Presse & Aktuelles** | **Unternehmen** | **Kontakt**

Europäische Ökodesign-Richtlinie
Europäische Ökodesign-Richtlinie spart Strom aus 6 Kraftwerken ein! [mehr >](#)

Wilo Schnellfinder
- Austauschspiegel Heizung >>
- CAD Katalog >>
- DocumentFinder >>
- Online Katalog >>
- Wilo-LCC-Check >>
- Wilo Select >>

Für den Profi gemacht!
Wilo-Stratos PICO
Die Wilo-Stratos PICO ist gemäß Standard Europumps Commitments effizienter als je zuvor. Mit bis zu 90% Stromkosteneinsparung im Vergleich zu anderen Pumpen.
Der TÜV SÜD hat entsprechend dem Standard einen durchschnittlichen Jahresstromverbrauch von 1 kWh für ein typisches Einfamilienhaus ermittelt. Stratos PICO ist die einzige Hocheffizienzpumpe, die eine herausragende Leistung vom TÜV SÜD zertifiziert abruft unter: www.wilo.de/recht
[Erfahren Sie mehr >](#)

Presse & Aktuelles
Pressemitteilung
Karlsruhe / Dortmund, 18.01.2011
Energiesparende Wohngebäude-Modul Dezentrales Pumpensystem von Wilo
[mehr >](#)

Abwasserentsorgung / Abwasserförderung
Ob neueste Rührwerksgeneration mit 10% Energieeinsparung, Abwasserpumpen mit der einzigartigen Cerambeschichtung oder Edelstahl-Multientwässerungspumpen für den Hausgebrauch - für alle Anforderungen immer die richtige Wahl. [mehr >](#)

Heizung, Kälte, Klima
Finden Sie alle Produkte für Ihr spezielles Einsatzgebiet von +110°C bis -20°C über hocheffiziente Klasse A Stratos Naßläufer-technologie bis zum Trockenläufer der hohen Leistungsklassen ausgerüstet mit EFF I oder EFF II Motoren. [mehr >](#)

Wilo SE - Kommunale Anwendungen - Pumpen Intelligenz - Windows Internet Explorer bereitgestellt von WILO EMU GmbH

Wilo

Energie sparen. 104.5°

Startseite | **Anwendungsbereiche** | **Kommunale Anwendungen** | **Suche >**

Produkte
- **Anwendungsbereiche**
- **Animierte Anwendungsbereiche**
- **Ein- und Zweifamilienhaus**
- **Objektgeschäft**
- **Industrielle Anwendungen**
- **Kommunale Anwendungen**
Services
- **Termine**
- **Presse & Aktuelles**
- **Unternehmen**
- **Kontakt**

Kommunale Anwendungen
Durch den Zusammenschluss mit EMU setzen Wilo Pumpen und Systeme für die kommunale Wasser-/Abwasserversorgung neue Maßstäbe hinsichtlich technischer Leistung und Effizienz.
Wilo - EMU Technologie
Dank unseres Know-how und unserer herausragenden Planungsunterstützung erhalten Sie jederzeit professionelle Lösungen für alle Ihre Anforderungen in der Wasserversorgung, Abwasserentsorgung und Wasseraufbereitung - marktgerecht und mit Rückblick auf die Umwelt. Ergänzt wird unser umfangreiches Produktangebot durch eine internationale Infrastruktur.
Mit Technologie von WILO EMU werden kommunale Aufgaben mit Blick auf das technisch Machbare und wirtschaftlich Sinnvolle im Sinne der Umwelt gelöst.

Reinwasser/Druckerhöhung
Trink- und Brauchwasser für alle Anforderungen [mehr >](#)

Abwasserbehandlung
Perfekte Erneuerung von Wasserressourcen. [mehr >](#)

WILO EMU GmbH
Weltweit setzen Partner aus der Industrie und Kommunen bei Anwendungen der Wasserversorgung, Aufbereitung und Entsorgung auf intelligente Technik von WILO EMU.
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E-mail schreiben >>
www.wiloemu.de

Referenzen
Gewerblicher und privater Wohnungsbau >
Hotels, Gastronomie, Kultur- und

Discussion

I thank you very much
for your attention.

If you have further questions,
please do not hesitate
to contact me!

