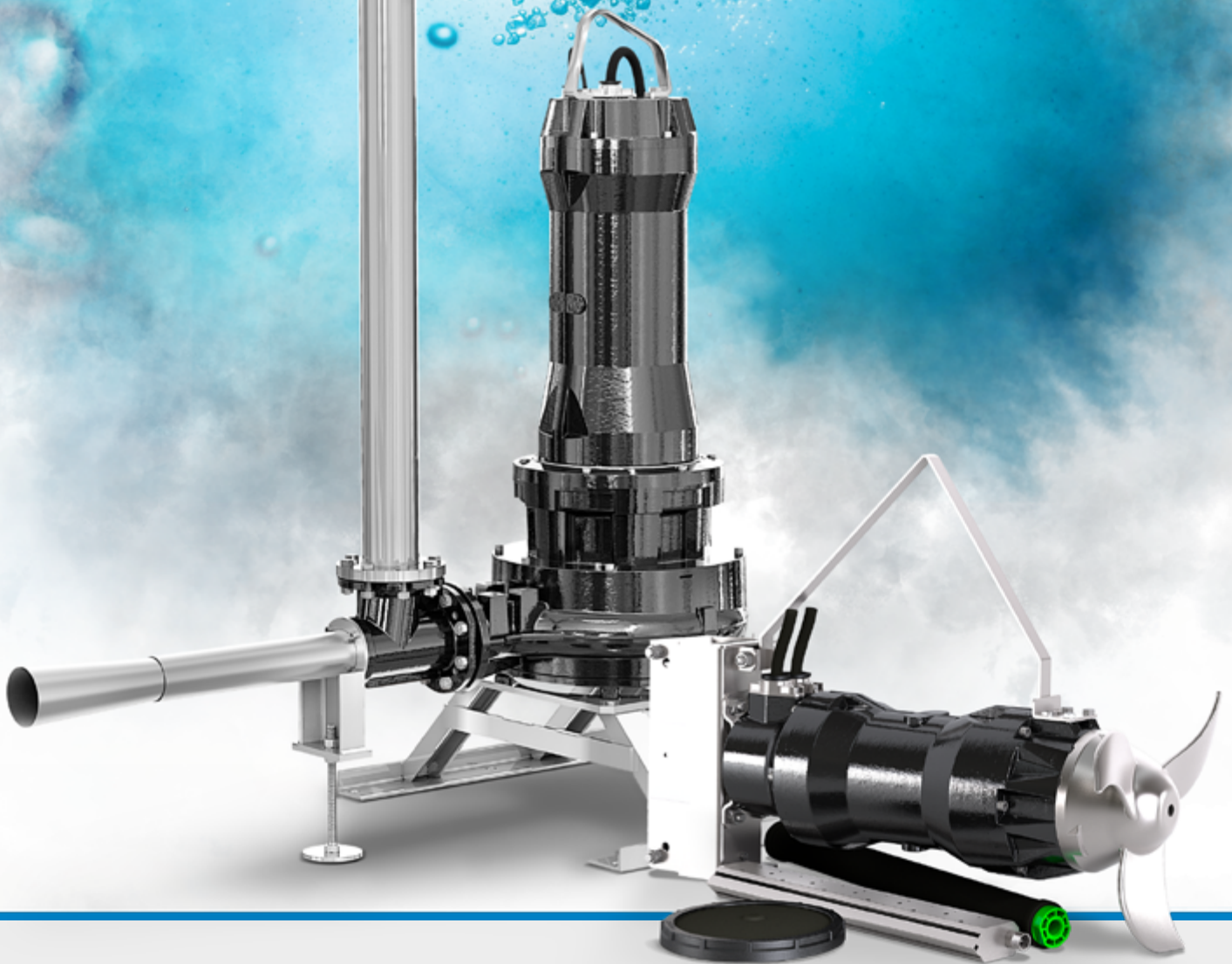




better together

CIVIL/INDUSTRIAL



AIR DIFFUSERS  
AERATORS  
MIXERS

# AERATION and MIXING

# Aeration and mixing

Zenit offers a line of aeration and mixing products for the highly specialised civil and industrial wastewater treatment sector.



## Air diffusers

**9" and 12" disc-shaped** and **2" tubular** air diffusers with elastomer membranes providing high oxygen transfer efficiency

**Stainless steel** large bubble tubular types specifically for sand and oil separation



## Submerged aerators

Venturi-type, which ensure an efficient combined **mixing and aeration** action and are especially suitable for homogenization and first rainfall storage tanks



## Mixers

high-efficiency motors of the **UNIQA range** with direct transmission or reduction gears and self-cleaning propellers

Full territorial coverage and an efficient organisation assure the **customer** support in all phases of the process, from design to shipping arrangements.



### BEFORE-SALES

- Product selection
- Customisation
- Cost and consumption estimate



### CONSULTING

- Evaluation of solutions
- Design of system
- Presence on site



### AFTER-SALES

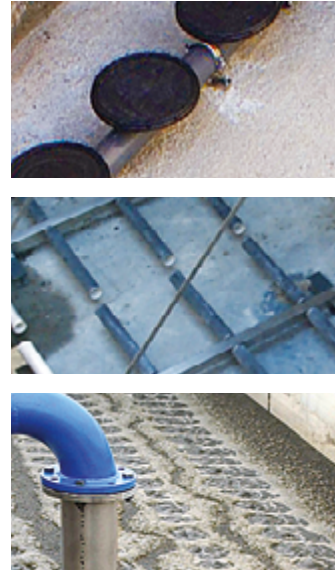
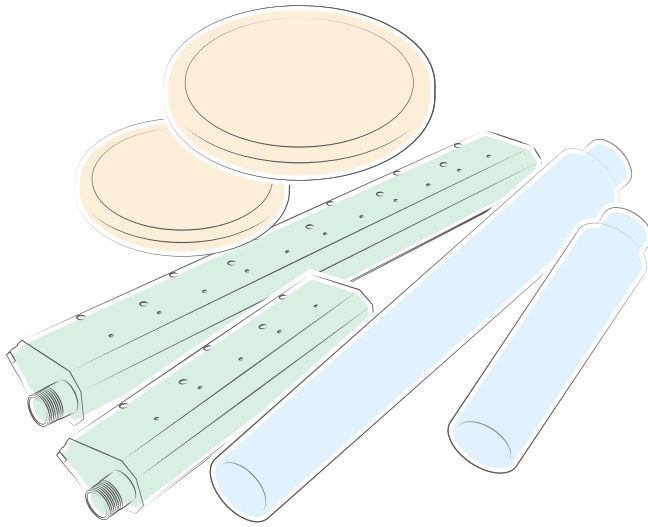
- Support during installation
- Assistance during testing
- Authorised service centres

# AIR DIFFUSERS

Disc-shape and tubular air diffusers provide **aeration with high oxygen transfer** and low pressure drops, minimising energy consumption.

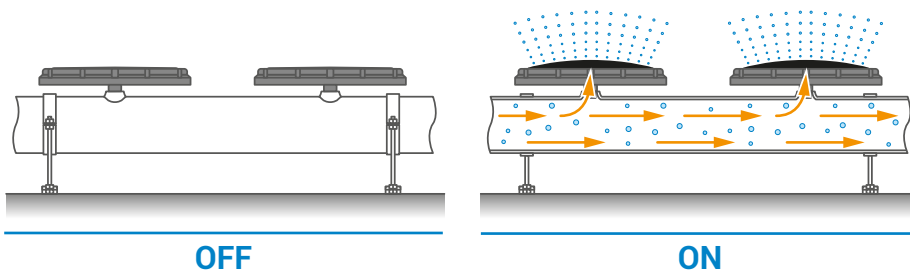
Disc-shaped diffusers can be fitted with integral ball check valves.

Zenit is able to design the most efficient solution for the customer's specifications, and supply the complete aeration system, including detailed assembly plans.



## Operating mode

During operation, the membrane inflates to open the tiny holes and allow the air to flow out in the form of fine bubbles. When the blower stops, the membrane deflates and the tiny holes close to prevent all risk of liquid inflow. What's more, the central part, free from holes and specially shaped, acts as a check valve.



## Application

Membrane air diffusers are generally used in water treatment and purification processes where slurries have to be aerated to activate biological organic matter oxidation and nitrification processes.

They are also used in pre-aeration and aeration processes in oxidation tanks and aerobic digestion plants for industrial and civil sludges.



# OXYPLATE

## Fine-bubble disc-shaped air diffusers

Disc-shaped diffusers having elastomer membrane with tiny holes for application in water treatment processes in reactors with continuous or intermittent aeration, especially recommended for high-efficiency permanent installations.

The quality, design and membrane hole size ensure unbeatable efficiency in terms of the ideal oxygen transfer-pressure drop balance.

### Technical characteristics

	OXYPLATE 9	OXYPLATE 12
Outside diameter	9" (270 mm)	12" (340 mm)
Min. operating flow rate [Nm <sup>3</sup> /h]	2	2
Max. operating flow rate [Nm <sup>3</sup> /h]	6	10
Limit flow rate [Nm <sup>3</sup> /h] (*)	10	15
Active surface area [m <sup>2</sup> ]	0.038	0.06
Membrane thickness [mm]	2 ± 0.15	2 ± 0.15

Data with fine-bubble EPDM LP membrane.

(\*) No more than 10 min/day for membrane cleaning, tests, etc.



### Accessories and components



ZENIT is able to design and build complete aeration systems comprising disc-shaped diffusers and preassembled PVC air distribution networks.

The high degree of standardisation and the use of special components manufactured by ZENIT itself allow the construction of simple, reliable, quick-to-install systems which are surprisingly inexpensive in spite of the use of top-quality materials such as PVC PN10 pipelines and stainless steel mounts.



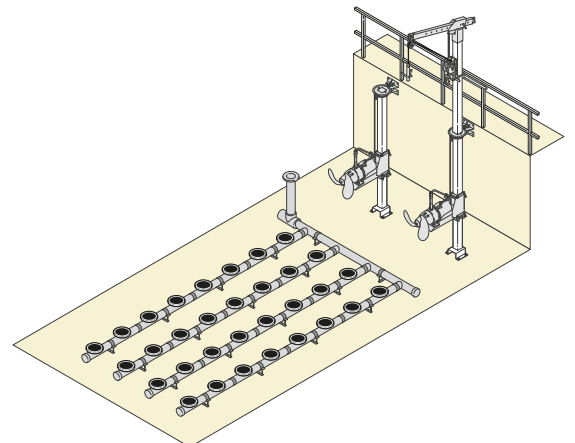
To facilitate the installation and servicing of its diffuser systems, Zenit has produced a series of accessories that make every procedure quick and effective.

### Installations

Preassembled systems are designed for quick, easy installation even by relatively unskilled staff, following the detailed instructions provided.

All connections are made by means of special self-aligning flanges with integral gasket.

The mounts are easily height-adjustable (up to 20 cm) to allow levelling even with uneven or slightly sloping tank bottoms.





# OXYTUBE

## Fine-bubble tubular air diffusers

They are especially recommended for the construction of removable aeration systems and in all cases where a large output surface area is required with only a small number of air distribution pipelines.

Diffusers basically consist of a head with threaded connection, a rigid polypropylene mount and a tubular membrane in elastomer with tiny holes, secured with stainless steel band clamps.

### Technical characteristics

	OXYTUBE 2-500	OXYTUBE 2-750	OXYTUBE 2-1000
Outside diameter	2" (63 mm)	2" (63 mm)	2" (63 mm)
Length of perforated section [mm]	500	750	1000
Min. operating flow rate [Nm <sup>3</sup> /h]	1	2	3
Max. operating flow rate [Nm <sup>3</sup> /h]	6	9	12
Limit flow rate [Nm <sup>3</sup> /h] (*)	10	15	20
Active surface area [m <sup>2</sup> ]	0.09	0.135	0.18
Membrane thickness [mm]	1.7 ± 0.2	1.7 ± 0.2	1.7 ± 0.2

Data with fine-bubble EPDM LP membrane.

(\*) No more than 10 min/day for membrane cleaning, tests, etc.



### Accessories and components



Membranes made of different materials are available for different applications:

- EPDM LP with low plasticiser content (<15%) for civil wastewater with some industrial input and industrial wastewater with low fat, oil and hydrocarbon content. Maximum operating temperature 80 °C;
- SILICONE for industrial wastewater with high fat and hydrocarbon content. Maximum operating temperature 100°C;
- Stainless steel connectors for installation of diffusers in pairs facing each other on square manifold of 80x80 mm or 100x100 mm.
- Adaptors for manifolds with ready-made holes.

### Installations

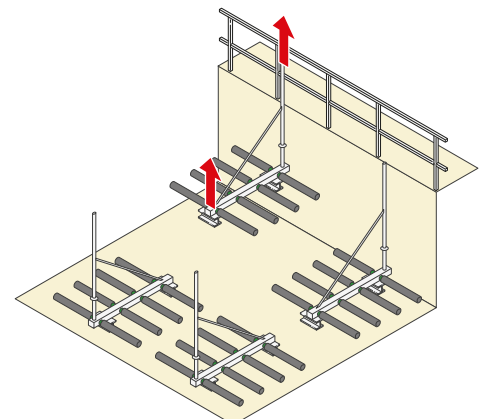
Especially recommended for small/medium sized systems, or in general in all cases where it is not possible to empty the tank for maintenance. These systems are built with stainless steel supply assemblies comprising basically a square manifold on which the diffusers are installed in facing pairs, a down-pipe, one or more stiffener tie-rods and a draining system.

The individual assemblies are simply placed on the bottom of the tank and connected to the main air pipeline with a flange.

Stability is ensured by counterweights that also act as feet.

No runner or anchor systems are required.

The individual assemblies are therefore easy to remove and install with the tank full and in operation.



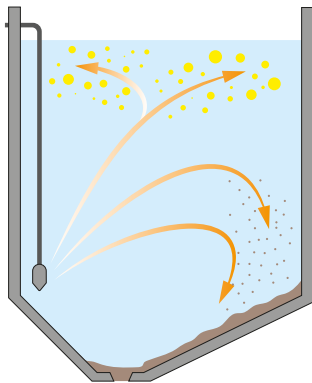
# OXYINOX

## Large bubble tubular diffusers

Constructed in AISI 316 throughout, the type of diffuser is used where the liquid has to be both mixed and oxygenated. Its ideal applications are aerated sand separators, aerobic digestion tanks, pre-aeration tanks and in general any installation where the use of steel is necessary due to the nature of the liquid for treatment.

### Technical characteristics

	L305	L610
Bubble dimensions	large	large
Body material	AISI 316	AISI 316
Top hole diameter [mm]	4	4
Bottom hole diameter [mm]	8	8
Total length [mm]	305	610
Thread connection	3/4" NPT	3/4" NPT



The air emitted by the diffuser in the form of large bubbles combines with the flow of wastewater to trigger a spiral motion which encourages sedimentation of the sand and flotation of the oils and fats.

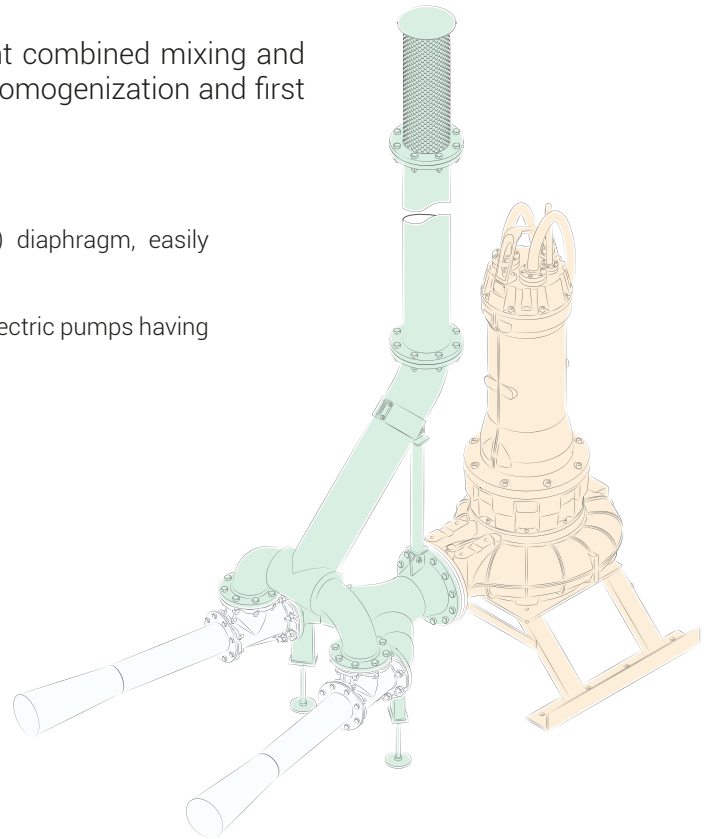


# SUBMERGED AERATORS

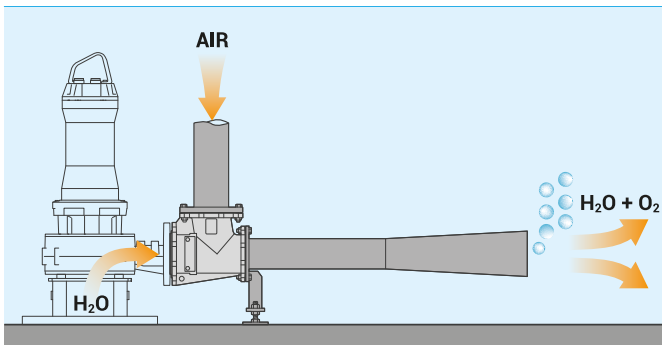
Venturi-type **submerged aerators** ensure an efficient combined mixing and aeration action and they are especially suitable for homogenization and first rainfall storage tanks.

**JET OXY 80** and **150** units have a polyurethane (Vulkollan) diaphragm, easily replaceable without dismantling the pump from the ejector

The **JET OXY 80** device has a flange suitable for connection to electric pumps having DN80 and DN100 discharges.



## Operating mode



They consist of submersible pumps with power levels up to 30 kW and channel impellers with large free passage combined with "OXY" series ejectors.

The liquid conveyed is mixed with the air by the "Venturi" effect, creating a mixture containing medium-fine air bubbles that increase the contact surface area and provide highly efficient oxygen exchange.

## Application

JET OXY submerged oxygenation systems are used in industrial and other wastewater and sludge treatment plants, or whenever combined oxygenation and mixing are required. These systems can be installed without emptying the tank.



# JET OXY 50

## Submerged aeration systems

**JET OXY 50** units comprise a Venturi-type ejector coupled to a submersible electric pump rated from 0.37 to 1.5 kW with open multi-channel or vortex impeller.

JET OXY models can be selected on the basis of the performance curve best suited to requirements, optimising consumption.

### Characteristics

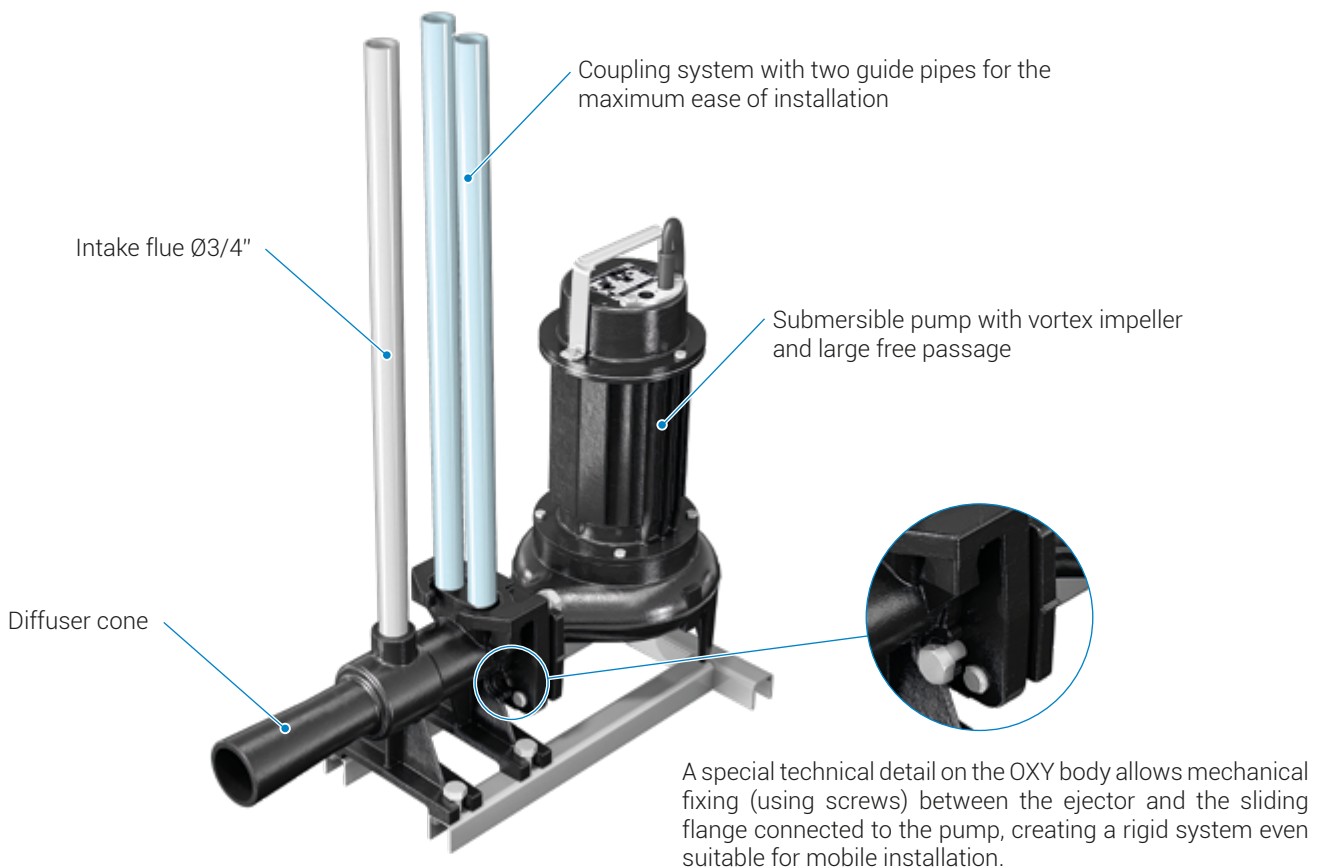
- Cast iron body (GJL-250)
- Suitable for use with DRO and DGO pumps
- Can be permanently coupled to the pump or mounted on the bottom of the tank using the automatic coupler (DAC type)

### Composition

- OXY body (cone + integral diaphragm)
- Sliding flange with gasket and stainless steel screws
- Pipe guide
- Metal structural base

### Application

Fish farms, small water treatment tanks, holding pits.





# JET OXY 80 ÷ 300

## Submerged aeration systems

**JET OXY 80 ÷ 300** units comprise a Venturi-type ejector with replaceable diaphragm coupled to a **UNIQA** or **Grey series** submersible electric pump rated from 3.0 to 30 kW.

### Characteristics

- Cast iron structure
- Stainless steel diffuser cone
- Diaphragm is interchangeable for flow rate adjustment or for easier replacement in the event of wear

### Composition

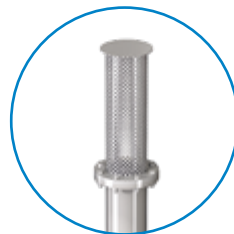
- OXY body
- Interchangeable diaphragm
- Stainless steel diffuser cone
- Stainless steel screws
- Air intake pipe with flue filter and galvanised steel lifting hook
- Connecting tie-rod between pump and intake pipeline
- Galvanised steel/spheroidal cast iron base

### Application

Holding, homogenisation and stabilisation tanks, first rainfall collection tanks, oxidation tanks,

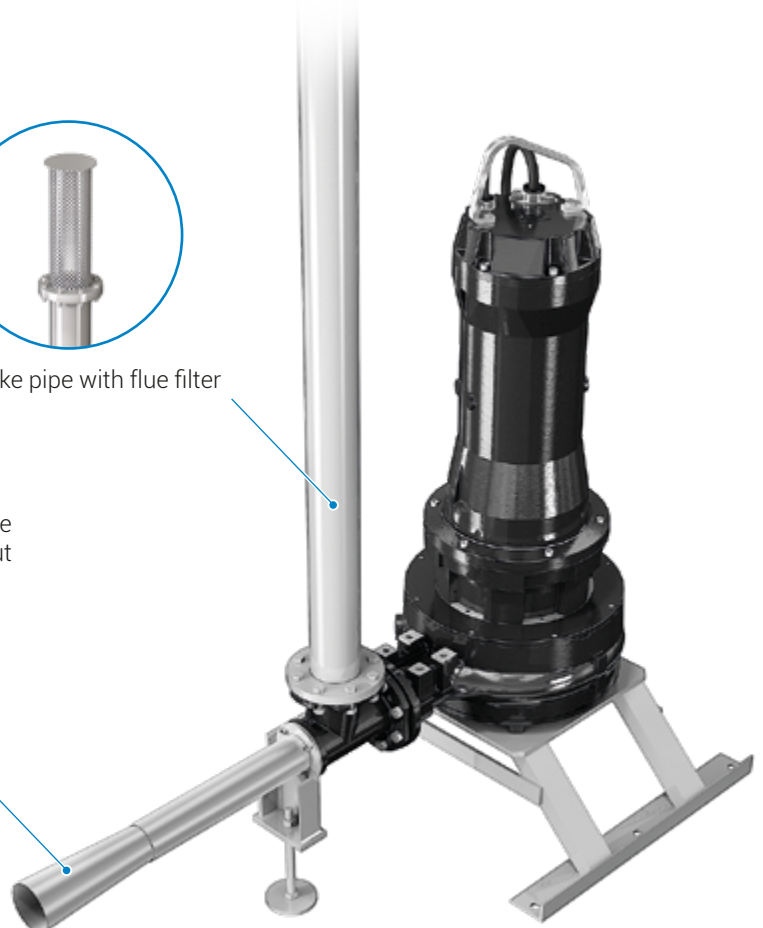


Units in the JET OXY 80-150 range have a polyurethane (Vulkollan) diaphragm, easily replaceable without dismantling the pump from the ejector



Air intake pipe with flue filter

Stainless steel diffuser cone



# MIXER

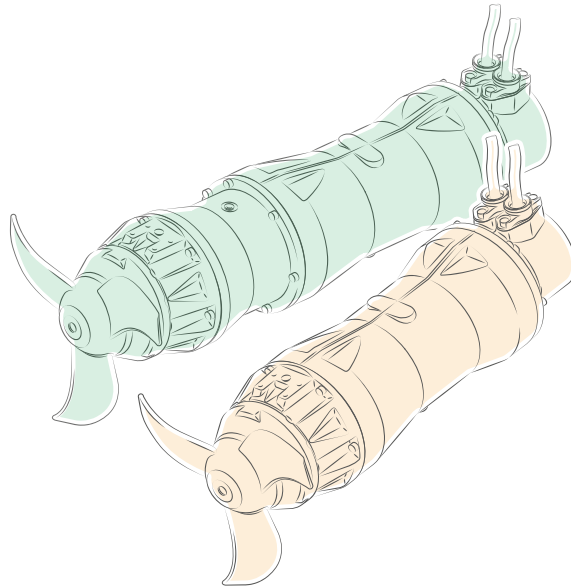
Essential components of water treatment and purification plants, the new Zenit mixers share the stylish looks, reliability and new-concept high-efficiency motors of the **UNIQA range**.

Submerged mixers are the most practical, efficient solution for mixing liquids in water treatment and purification plants.

Their efficiency class IE3 motors, already applied on the **Zenit UNIQA** range of submersible pumps, keep running costs down, with low energy use and limited maintenance.

Models available also with **ATEX** certification.

Their complete compatibility and vast assortment of accessories allow them to be installed in any point of the tank, both for optimal mixing and for use as replacements for obsolete devices in existing systems.



## • Modular

The **ZMD** and **ZMR** range of mixers is built on a **modular criterion** in which high-efficiency motors evolved from the **UNIQA** units are coupled with propellers with different shapes, sizes and materials.

This means greater flexibility when selecting the product, which can be configured specifically for the application, and for liquids with different densities and concentrations.

## • Innovative

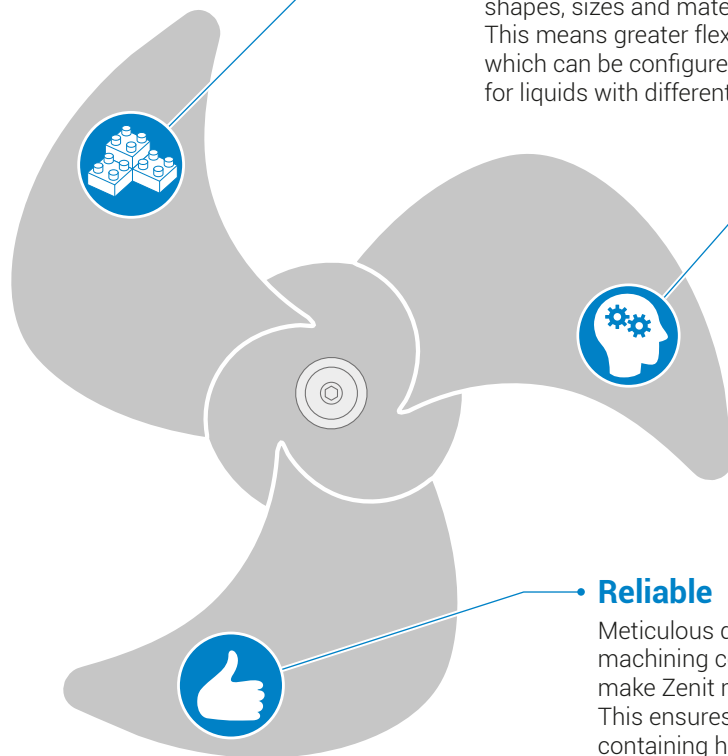
Zenit mixers are built with innovative materials and include **state-of-the-art engineering solutions** developed in a modern department which also conducts performance and endurance tests on the parts most subject to wear.

This guarantees lower energy consumption and exceptional versatility, making them suitable for any type of installation.

## • Reliable

Meticulous design, machining on latest-generation machining centres and high quality components make Zenit mixers highly reliable.

This ensures a **long working life** even with liquids containing high solid concentrations, and low maintenance, guaranteeing trouble-free, continuous system operation.



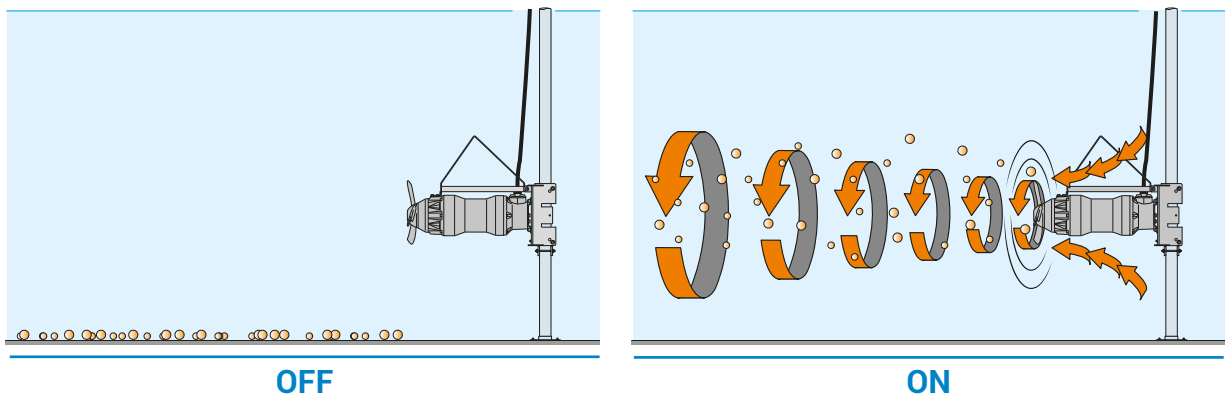
## Series specifications

<b>ZMD</b>	<b>50/60Hz Motor</b>	+	<b>Propeller Ø [mm]</b>
	P2 [kW] 0.75 ÷ 4.5		4 - 6 - 8 poles DIRECT TRANSMISSION

<b>ZMR</b>	<b>50/60Hz Motor</b>	+	<b>Propeller Ø [mm]</b>
	P2 [kW] 4.0 ÷ 7.5		4 poles REDUCTION GEARS

## Operating mode

Suitably installed in tanks, these devices apply a force varying depending on the propeller diameter, shape and rotation speed to the liquid in which they are immersed, and keep the mass of fluid in motion to boost homogenisation and prevent sediment formation.



## Application

Zenit **ZMD and ZMR series** mixers can be used in equalisation, denitrification and homogenisation processes in industrial and civil plants.

They can be adopted in single or multiple installations, or in combination with bottom aeration systems, depending on the process in which they are used.

Their construction characteristics make them rugged and versatile, ideal for any application.



## Your guide to Zenit Mixers

Innovative cable gland system with cable holder. The universal thread ring-nut can be removed to fix a rigid or flexible duct to the cable gland to protect the cable from physical and mechanical stresses.

Premium IE3 class cold-running motor for high efficiency and minimal energy use. Isolation class H (180°C). 50 Hz and 60 Hz versions.

Ball bearings with lifetime lubrication designed to guarantee 100,000 working hours. Temperature sensor on request.

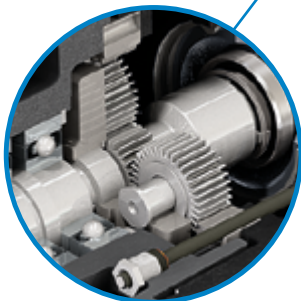
Two silicon carbide (SiC) mechanical seals protected inside a large, inspectable oil chamber. ZMR models equipped with 3 mechanical seals.

Cast AISI 316 stainless steel propeller, designed with specially shaped blades to ensure high hydraulic efficiency and prevent fouling with filaments and solids. Extra thick for ruggedness and reliability even in heavy-duty conditions.

The temperature sensors prevent possible damage due to overheating of the motor and bearings. (other monitoring options are available for the ZMR 065 models on request)

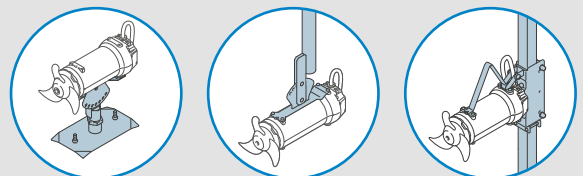
Water sensor detecting seepage into the mechanical seal oil chamber

A special chopper system in the rear of the propeller prevents the entry of filaments which could become entangled around the drive shaft and impair its operation.



Rugged planetary reduction gearbox which provides high reduction ratios and torque transfer and withstands heavy radial loads, with compact size and light weight (ZMR models)

Wide range of rugged stainless steel accessories for optimal installation in relation to the system layout and when replacing existing devices





## Characteristics

50Hz	Motor			Propeller		
	P <sub>2</sub> [kW]	Poles [no.]	Speed [rpm]	Propeller Ø [mm]	Thrust [N]	Speed [rpm]
DIRECT TRASMISSION						
ZMD 020	0.75 ÷ 1.5	4	1450	200	155 ÷ 230	1450
ZMD 030	1.5 ÷ 3.2	6	960	300	350 ÷ 820	960
ZMD 040	3.0 ÷ 4.5	8	750	400	480 ÷ 1060	750
REDUCTION GEARS						
ZMR 065	4.0 ÷ 7.5	4	1450	650	1025 ÷ 2100	202 ÷ 300

60Hz	Motor			Propeller		
	P <sub>2</sub> [kW]	Poles [no.]	Speed [rpm]	Propeller Ø [mm]	Thrust [N]	Speed [rpm]
DIRECT TRASMISSION						
ZMD 020	1.1 ÷ 1.5	4	1750	200	225 ÷ 230	1750
ZMD 030	1.5 ÷ 3.2	6	1150	300	420 ÷ 730	1150
ZMD 040	4.5	8	875	400	970	875
REDUCTION GEARS						
ZMR 065	4.0 ÷ 7.5	4	1750	650	1365 ÷ 2125	245 ÷ 307

Models available also with ATEX certification   Ex db h IIB T4 Gb  
2460 II 2G

## Construction materials

	Standard	Optional
Motor complex	EN-GJL 250 grey cast iron	AISI 316 stainless steel (ZMD 020A-020B only)
Propeller	AISI 316 stainless steel	Duplex / With Vulkollan coating
Shaft	AISI 431 stainless steel	-
Mechanical seals	2 silicon carbide (SiC) in oil chamber	-
Nuts and bolts	A2-70 Stainless Steel	A4 stainless steel
Gaskets	NBR	Viton
Hook	AISI 304 stainless steel	AISI 316 stainless steel
Motor bracket	AISI 304 stainless steel	AISI 316 stainless steel
Paintwork	Bicomponent epoxy paint 200 µm	Bicomponent epoxy paint 400 µm

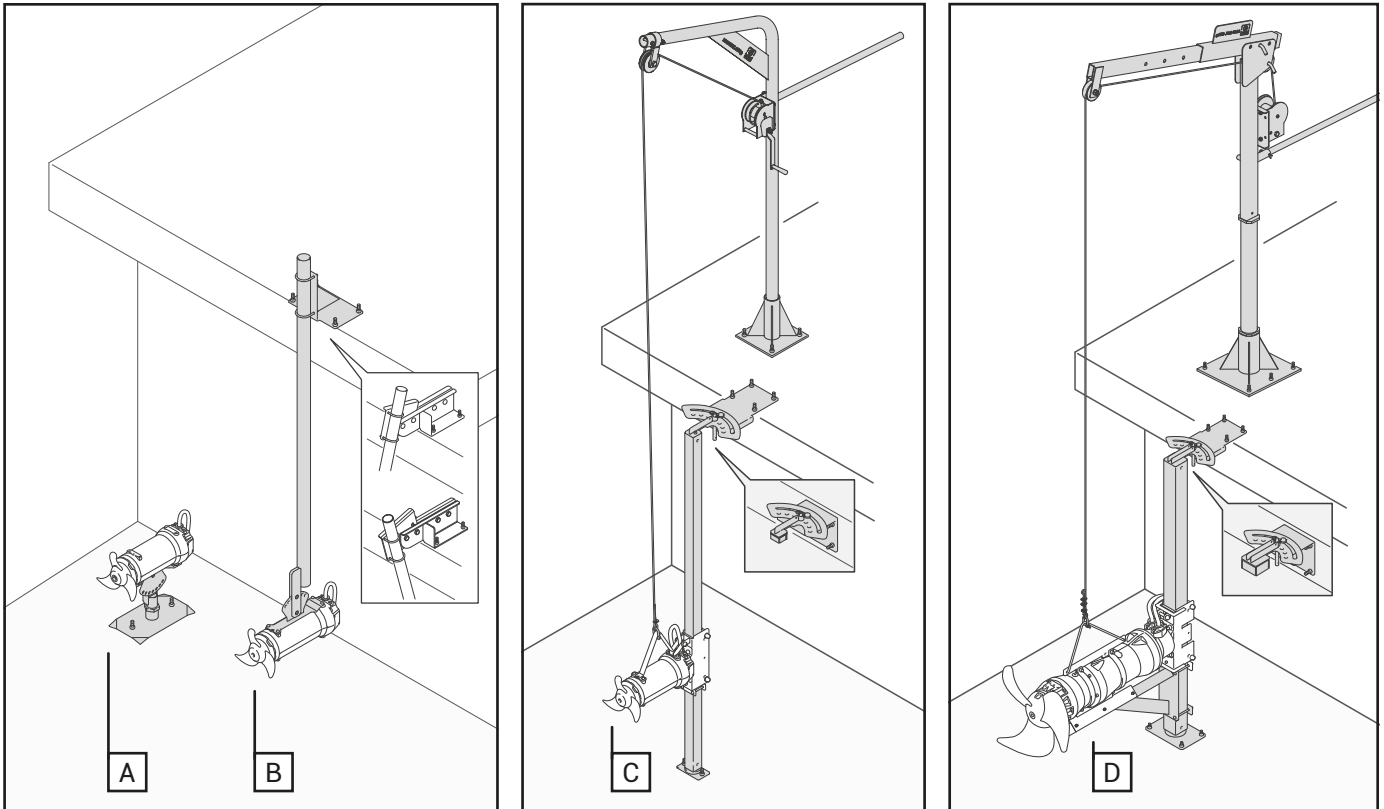
## Operating limits

Max. ambient temperature	40°C
Max. immersion depth	20 m
pH of treated liquid	6-12
Max. starts/hour	15 (evenly distributed)
Max. acoustic pressure	70 dB
Duty	S1 – continuous operation
Density of treated liquid	1060 Kg/m <sup>3</sup>
Max. dynamic viscosity	500 mPas

## Installation and accessories

To guarantee top mixer performance, **ZENIT** has developed a wide range of accessories for adjusting devices' positions in the tank and lifting and removing them without having to drain the system.

Designed for easy installation and generously sized to guarantee durability, accessories are available in galvanised or stainless steel.



The recommended installation modes are:

**BOTTOM INSTALLATION (fig. A)** Permanent installation, with the mixer connected to a base anchored to the bottom of the tank. A special adjustment plate allows the mixer's horizontal and vertical position to be set as specifically required by the system.

**PENDULAR INSTALLATION (fig. B)** Mobile installation in which the mixer can be both installed and removed with the tank full. The mixer is suspended from a suspension pipe and fixed to a mounting bracket; it can be adjusted both horizontally and vertically.

**MAST INSTALLATION (fig. C and D)** The most widely used installation mode, suitable for mixers of any shape and size. The mixer, fitted with a runner which is also compatible with existing installations, slides along a square post and can be removed with no need to drain the tank, thanks to rugged lifting jib cranes. The mixer can be horizontally adjusted for the best possible position, while vertical adjustment is possible with the aid of special optional runners..

# Zenit Group

Today the Zenit Group ranks among the top national and international names in the design and manufacture of submersible electric pumps for domestic, civil and industrial use, and water treatment systems.

With the know-how and experience acquired over the years, Zenit offers the market a comprehensive range of products designed to meet the most demanding needs.

WE STRIVE TO BE A VALUABLE  
PARTNER YOU CAN TRUST IN YOUR  
SEARCH FOR WATER TREATMENT  
**SOLUTIONS AND SERVICES**

## Our organisation



**Modena**  
Italy



**Bascharage**  
Luxembourg



**Suzhou**  
China



**Chengdu**  
China

Today, **Zenit** is a modern industrial organisation with a workforce of over 250 and 4 locations worldwide, that manages its markets directly and with success, thanks to full territorial coverage.

This international expansion is driven by our desire to serve our customers better with closer proximity.


Each **Zenit** group company has its own organisation, but they all operate in pursuit of a single mutual objective. Our origin as a family business has enabled us to stay streamlined and flexible, quick to respond with effective solutions.

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