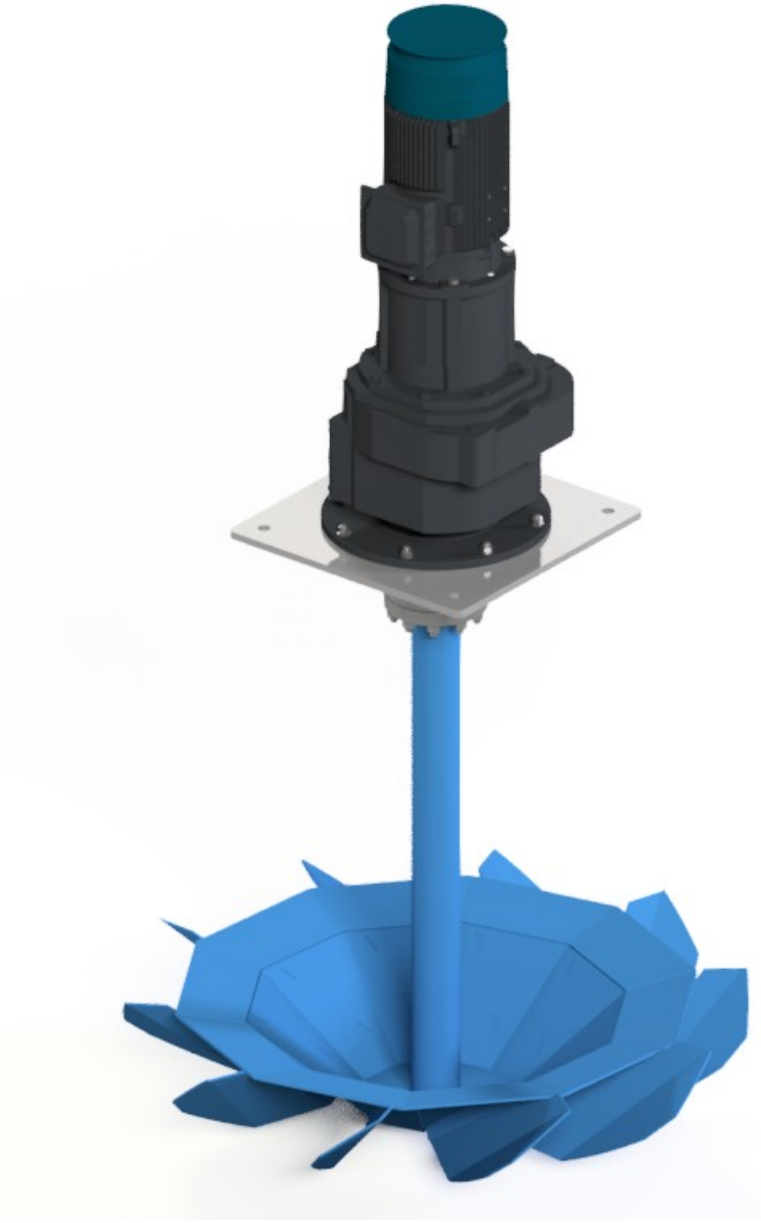
Surface Aerator Specification

Low Speed

2026



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Introduction

Zentec is proud to present our innovative Low Speed Surface Aerator with a vertical shaft—a critical component engineered to maximize efficiency in water and wastewater treatment.

Why is aeration required?

Aeration is an essential process in the treatment of water and wastewater. Its primary purpose is to introduce oxygen (O_2) into the water body, which is vital for supporting the aerobic microorganisms responsible for breaking down organic pollutants.

This process, often part of the Activated Sludge Process, relies on a sufficient supply of dissolved oxygen (DO) to maintain a healthy and efficient biological environment.

Energy consumption

Aeration is notoriously energy-intensive, often accounting for 40% to 60% of the total energy consumption in a typical wastewater treatment plant.

Our Zentec Low Speed Surface Aerator has been specifically designed to tackle this challenge and improve aeration efficiency dramatically. We utilized advanced Computational Fluid Dynamics (CFD) modeling during the design phase to maximize the pumping capacity and optimize the oxygen transfer rate.

This rigorous design process and extensive testing have resulted in a truly high-performance unit. Following the strict guidelines of the ASCE [2-06] standard, our aerator has been verified to achieve an impressive Standard Aeration Efficiency (SAE) of 2.0 kgO_2/kWh.

Choose Zentec for a powerful, reliable, and exceptionally energy-efficient aeration solution that lowers your operating costs without compromising performance.

Working Principle

The Zentec Low Speed Surface Aerator operates on a highly effective mechanical principle to maximize oxygen transfer. The vertical shaft impeller powerfully churns the water surface, creating a widespread, energetic spray of small droplets. This action is crucial as it drastically increases the air-water contact surface area, facilitating rapid mass transfer of oxygen from the atmosphere into the water. Furthermore, the impeller's design achieves a large spray radius and continuously refreshes a significant surface area around the unit, ensuring that

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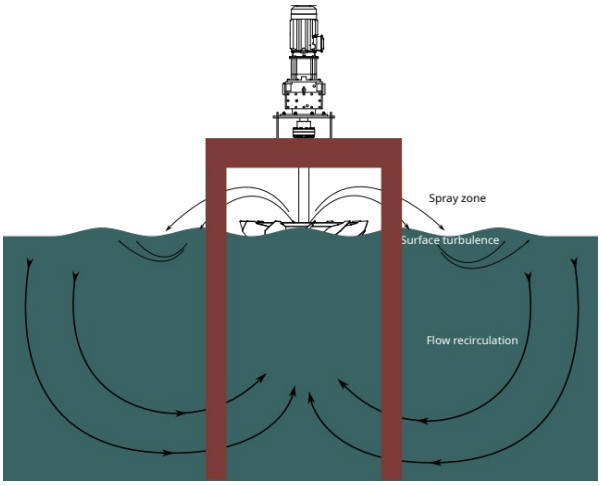
the water-air interface remains highly oxygen-depleted and ready to absorb more oxygen. Simultaneously, the optimized impeller acts as a high-capacity pump, efficiently drawing the deoxygenated water from the depths of the basin up to the surface. This continuous turnover of water increases the concentration gradient between the dissolved oxygen-poor bottom water and the oxygen-rich surface, which is key to sustaining a high and consistent mass transfer rate and ensuring effective whole-basin mixing.



Mixing

The high pumping capacity of the impeller, an important contributor to the achieved high mass transfer rate, also promotes complete basin mixing. This prevent sludge build up or localised anaerobic zones.

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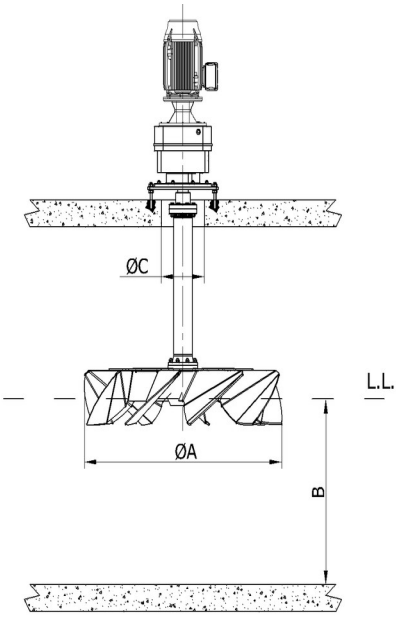
Standard Features

Zentec aerators include:

- Impeller: High efficiency anti-ragging, 10 bladed backward swept hydrofoil impeller with cone,
- Materials: Corrosion protected base plate with height adjustment,
- Drive: Industrial gearbox, electric motor, high-speed flexible coupling and rigid flanged gearbox output shaft coupling,
- Base plate: Carbon steel baseplate with level adjustment to increase/decrease impeller submergence during operation,
- Shaft: Hollow shaft to reduce overall weight designed for harsh conditions and high fatigue life,
- Coupling: Steel rigid flanged coupling to transfer the loads,
- Corrosion protection: All wetted parts are epoxy coated. Baseplate may be hot dip galvanised or epoxy coated.

The minimum gearbox service factor shall be 1,8 at continuous 24 hours/day operation and be classified for medium shock loading. The gearbox bearing life shall exceed 100 000 hours. The motor has a 21% safety margin which allows for gearbox losses, start-up conditions, while also giving capacity to increase speeds with a VSD during peak demands giving superior power management.



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Standard Sizes

The Zentec aerator has a high oxygen transfer efficiency due to its hydrofoil impeller design .

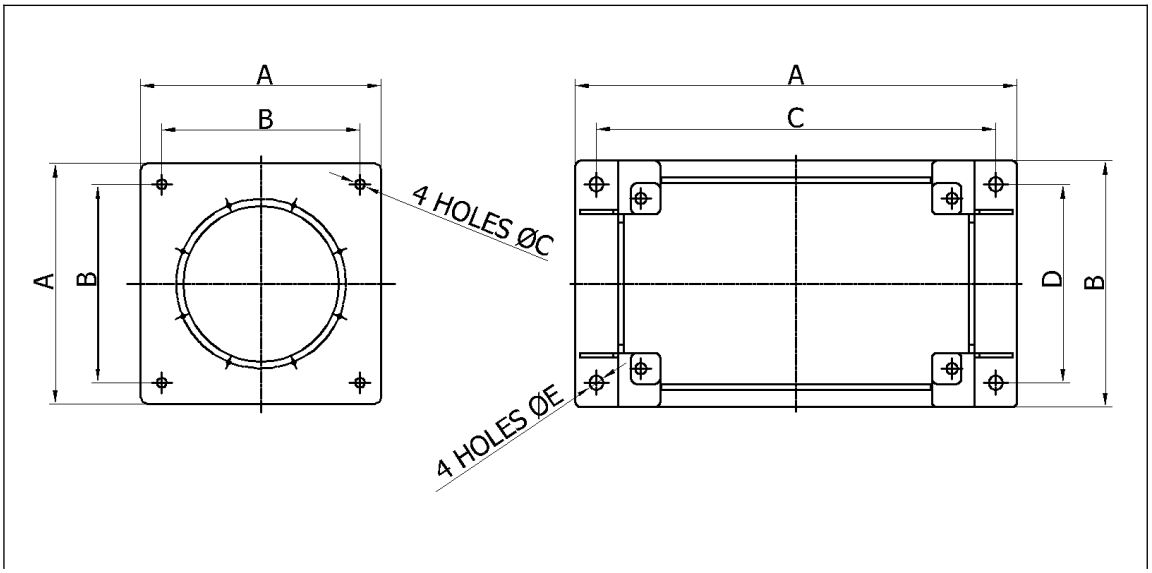
The table below the typical aerator sizes. Variations may occur to these sizes depending on site-specific conditions The table below is based on a tip speed of 5 m/s.

Model	Power [kW]	Oxygen Transferred [kg/hr]	Typ. impeller diameter [m]	Max. depth without draft tube [m]	Platform hole diameter [mm]
			A	B	C
Z-ASL-18,5	18.5	32	1.5	3.70	435
Z-ASL-22	22	38	1.64	4.0	435
Z-ASL-30	30	52	1.91	4.7	500
Z-ASL-37	37	64	2.12	5.2	500
Z-ASL-45	45	78	2.34	5.8	530
Z-ASL-55	55	95	2.59	6.4	530
Z-ASL-75	75	130	3.03	6.7	620
Z-ASL-90	90	156	3.31	6.7	760

Larger aerators can be designed on request.

Mounting Details

For platform mounted aerators, two footprint configurations are used depending on the installed power. A schematic of the footprints are shown below. **These sizes are indicative and will be confirmed on order placement.**



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18-30 kW foot print	45-90 kW foot print

Footprint 18 kW to 30 kW

Model	Aerator Power [kw]	A [mm]	B [mm]	C [mm]
Z-ASL-18.5	18,5	750	600	39
Z-ASL-22	22	750	600	39
Z-ASL-30	30	850	700	39
Z-ASL-37	37	850	700	39

Footprint 45 kW to 90 kW

Model	Aerator Power [kw]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
Z-ASL-45	45	1000	860	880	740	39
Z-ASL-55	55	1100	890	980	770	45
Z-ASL-75	75	1370	1085	1200	935	52
Z-ASL-90	90	1495	1085	1345	935	52

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Extras

The following extras can be specified at quotation stage. If not specified, Zentec will select the most suitable option.

Extra	Description
Electric motor	
Condensation heaters	Only for coastal application to reduce humidity build-up in the motor
Epoxy coating	Additional corrosion protection to the standard motor painting
Insulation grade	Class F/H. Class H required for VSDs
IP rating	IP66 prevents dust and water ingress, required for outdoor operations
IE rating	IE3/4 for efficiency
Rain Canopy	Standard on all Zentec aerators
Gearbox	
Maximum allowable speed	Dependent on the unit size and the impeller type
Service factor	Typically above 2. Larger service factor are possible but may result in a larger, more expensive units
Dry well or reinforced bearings	On request
Vibration sensor ports	If vibration monitoring will be performed on site for preventative maintenance.
Coupling	
Coupling material	Typically carbon steel is used and acceptable. Alternatively SS304 on request
Wet-end	
Shaft material of construction	Typically carbon steel pip with epoxy coatings Alternatively SS304 & SS316
Impeller material of construction	Typically carbon steel, alternatively SS304 & SS316
Maximum allowable tip speed	5 m/s
Corrosion protection type	Typically Epoxy coated. FRP also available on request
Base plate	
Material of construction	Typically carbon steel. SS304 & SS316 available on request
Corrosion protection	Hot dipped galvanised or epoxy coated

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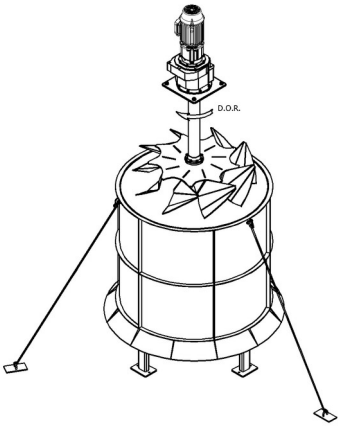
Related Accessories

Draft tubes



The Zentec aerators' impeller diameter is ~50% of the liquid depth; thereby ensuring mixing at the basin floor. For deeper basins, draft tubes should be installed. Draft tubes have internal baffles to prevent vortexing.

The draft tube diameter exceeds the impeller diameter and the height is based on the liquid level. The bottom of the draft-tube has a clearance of 1.5 m above the basin floor.

Draft tubes can be GRP lined, epoxy painted or manufactured from stainless steel for corrosion protection.

Model	Power [kW]	Typical Impeller Diameter [m]	Draft tube diameter [m]
Z-AP-18,5	18,5	1.50	1.7
Z-AP-22	22	1.64	1.8
Z-AP-30	30	1.91	2.1
Z-AP-37	37	2.12	2.3
Z-AP-45	45	2.34	2.6
Z-AP-55	55	2.59	2.8
Z-AP-75	75	3.03	3.3
Z-AP-90	90	3.31	3.6

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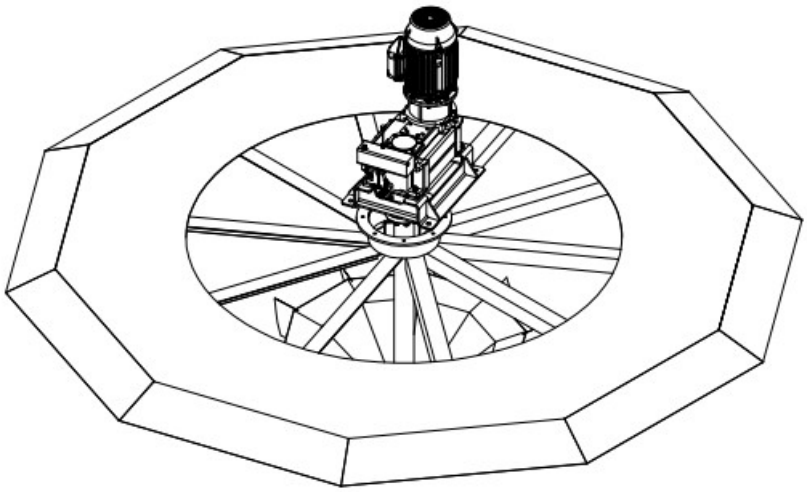
Deflection plates

Deflector plates may be required by a customer to prevent the impeller from generating excessive spray. Zentec can supply deflector plates that can be suspended from the platform structure.

These deflector plates are fabricated from sheet metal and are designed to be light so as not to place excessive loads on the structure.



Floating Structure

In basins where no structure is available, or variable liquid levels are expected, a floating structure can be used.

The structure is designed to support the aerator static mass and the dynamic loads during operation as well as the dynamic motion caused by the surface motion.

A further advantage of a floating structure, is that the aerators can be moved around the basin as required. This means that their position can be optimised to maximise the performance.

Zentec floating structures are compatible with our low speed aerators.

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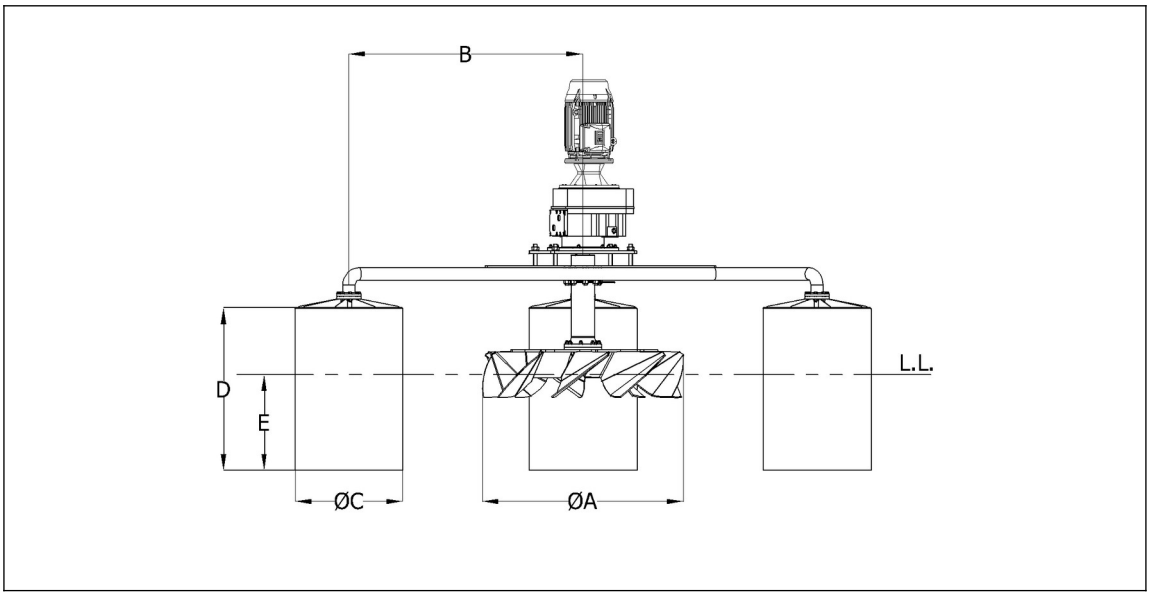
The standard floating structures are shown below.



Model	Impeller Dia. [m]	Arm Length [m]	Buoyancy Tank Dia. [m]	Tank Height [m]	Submerged Height [m]	Pontoon Mass Total [kg]
	A	B	C	D	E	
Z-AP-18	1.5	2.45	1.05	1.26	0.81	746
Z-AP-22	1.64	2.52	1.13	1.35	0.91	877
Z-AP-30	1.91	2.65	1.19	1.43	0.99	1000
Z-AP-37	2.12	2.76	1.26	1.51	1.07	1158
Z-AP-45	2.34	2.87	1.28	1.54	1.1	1231
Z-AP-55	2.59	3	1.34	1.6	1.16	1403
Z-AP-75	3.03	3.22	1.47	1.77	1.3	1872
Z-AP-90	3.31	3.36	1.6	1.92	1.44	2194

Aerators on pontoons can not be used with draft-tubes.

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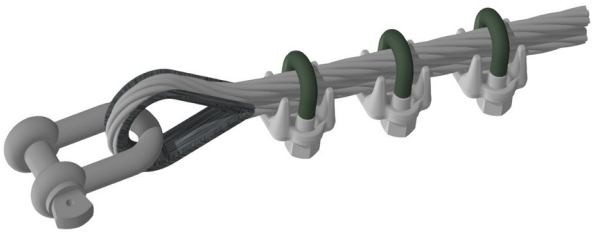
Mooring Cables and brackets

Zentec can supply the mooring cables, lugs, loops and brackets if required. Discuss with Zentec if you need these supplied. Zentec supplies High Flex 304 Stainless steel 7x19.

Cable Diameter [mm]	Breaking Strength [kN]
5	16,4
7	28,4
8	40,0
10	53,3



Additional Accessories and Extras

- Foam filling of the floatation tanks
- Field control panel
- Electric cable – submersible electric cable
- Walkways and hand railing – Galvanised carbon steel, stainless steel or GRP
- Ballast systems
- Low liquid level protection switch