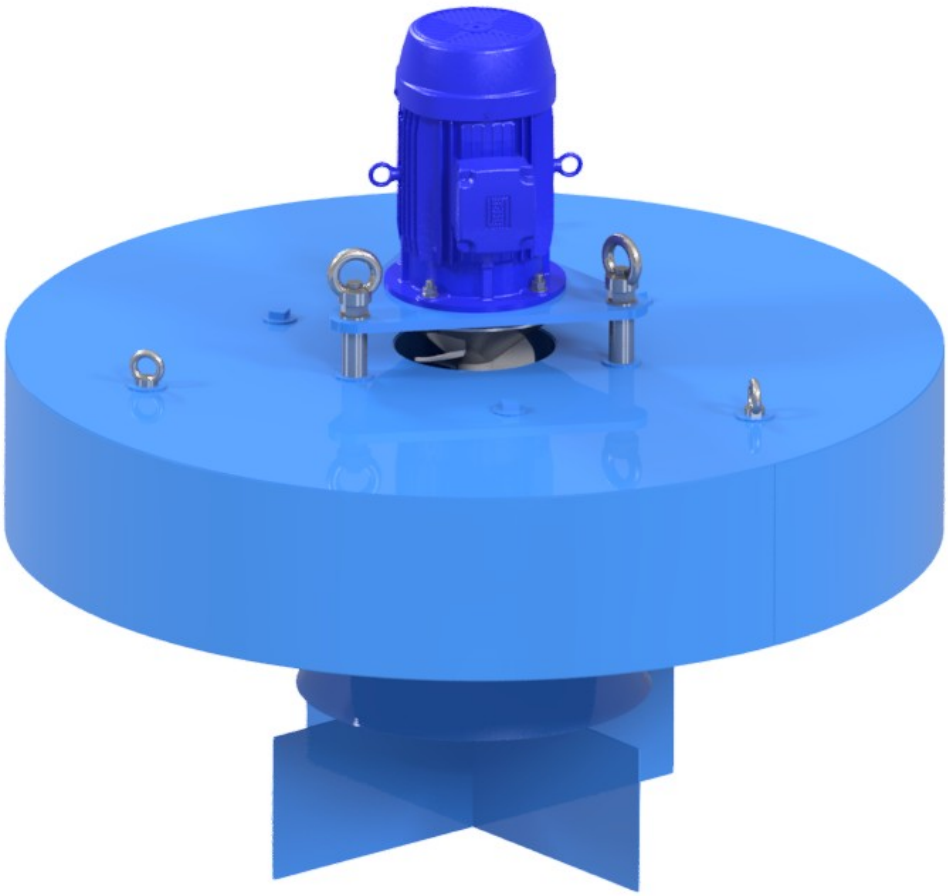
Zentec

Industrial Solutions, Unlimited Possibilities

Surface Aerator Specification

High Speed

2026



www.zentec.co.za
Tel. +27 11 483 0601
68 Steenbras Rd. Wadeville, Germiston, 1428
Email: info@zentec.co.za
Reg No: 2020/640896/07

Introduction

Zentec is proud to present our innovative High Speed Surface Aerator with a vertical shaft. A critical component engineered to maximize efficiency in water and wastewater treatment. The aerator's float is designed for stability under the dynamic loads.

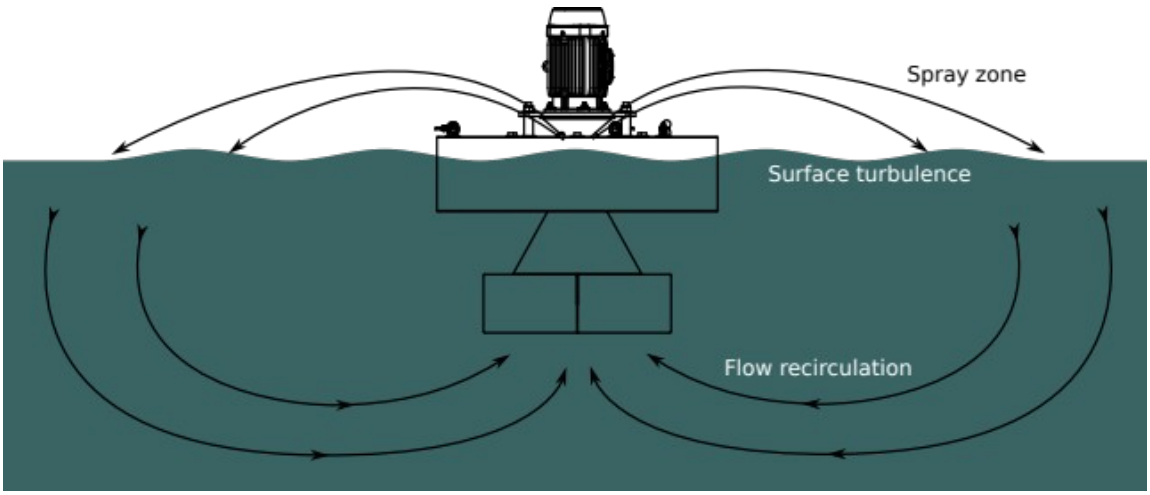
Why is aeration required?

Aeration is an essential process in the treatment of water and wastewater. Its primary purpose is to introduce oxygen (O2) into the water body, which is vital for supporting the aerobic microorganisms responsible for breaking down organic pollutants.

High speed aerators are typically used in large ponds with a maximum depth of 2.5 m. These ponds are typically large, and require several high speed aerators to create sufficient mixing and aeration. Typically, residence times in these ponds are long which gives sufficient time for mass transfer to occur. Typically, for sufficient mixing, about 7 w/m^3 is required.

Working Principle

The Zentec High 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 the water-air interface remains highly oxygen-depleted and ready to absorb more oxygen.



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Standard Sizes

The Zentec aerator has a high oxygen transfer efficiency

The table below shows the typical aerator sizes. Variations may occur to these sizes depending on site-specific conditions

Model	Power [kW]	Oxygen Transferred [kg/hr]	Float diameter
Z-ASH-5.5	5.5	5.5	1.5
Z-ASH-7.5	7.5	7.5	1.5
Z-ASH-9	9.2	9	1.5
Z-ASH-11	11	11	1.8
Z-ASH-15	15	15	1.8
Z-ASH-18	18	18	2
Z-ASH-22	22	22	2

Zentec aerators include:

- Corrosion protected base plate with height adjustment,
- electric motor,
- Wet end: hollow shaft with coupling, and an anti-ragging, backward swept, duel helix type aerator impeller. The wet-end is constructed from stainless steel.

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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
Coupling	
Coupling material	SS304 / SS316
Wet-end	
Shaft material of construction	SS304 / SS316
Impeller material of construction	SS304 / SS316
Maximum allowable tip speed	5 m/s
Corrosion protection type	Typically Epoxy coated. GFRP also available
Float	
PU foam filled	Foam filling is recommended to protect the floatation system
Material of construction	Typically carbon steel or stainless steel
Corrosion protection	Epoxy coated on carbon steel

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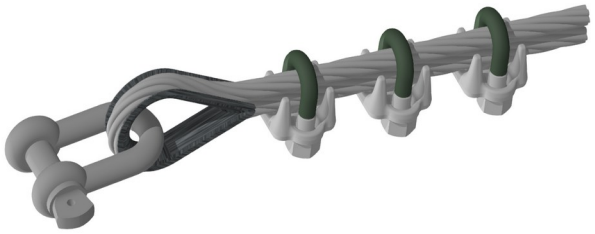
Related Accessories

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



Field control panel

The Field Control Panel (FCP) is a robust, outdoor-rated enclosure designed to provide local control and protection for the high speed surface aerator. The panel is equipped with essential components for safe and efficient operation, including a main power overload circuit breaker for short-circuit and over-current protection, and a star/delta timer relay. A key feature of the FCP is the timer relay, which is an electronic device used to temporarily reduce the load and torque in the electric motor during startup.

The Role of the star/delta timing relay

The timing relay is particularly useful and necessary in the context of a high speed surface aerator for the following reasons:

- Reduced Starting Current (Inrush Current): High speed aerators have powerful motors. A standard direct-on-line (DOL) start would draw an excessively high inrush current (up to 6-10 times the motor's full load current). The timing relay gradually ramps up the voltage to the motor, significantly reducing this massive current surge. This prevents the tripping of protective relays, minimizes stress on the electrical system, and avoids high demand charges from the utility company.
- Mechanical Stress Reduction: A high speed aerator impeller imparts a large torque shock to unit when started abruptly. The timing relay

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provides a smooth, gentle acceleration, dramatically reducing mechanical wear and tear, extending the unit's lifespan.

Electric cable

The electric cable required for a surface aerator must be a submersible or pump cable specifically designed for use in wet, harsh, and often submerged conditions. It is imperative that standard PVC or water-resistant cables are not used, as they are often permeable and will eventually allow water ingress, leading to short circuits and motor failure.

Cable Specification

- Type: The Multi-core (e.g., 4-core or 3-core + Earth) flexible power cable.
- Waterproof Rating: High-grade waterproof insulation and durable outer sheath. Common materials include EPR (Ethylene Propylene Rubber) or Specialized PVC/Nitrile compounds that offer superior resistance to water, moisture, abrasion, and common chemicals/oils found in wastewater. The cable should be rated for permanent submersion (e.g., AD8 classification for IPX8 equipment).
- Flexibility: The cable must be highly flexible to withstand continuous movement and abrasion without degradation.
- Voltage Rating: 380 V

Guide to Cable Sizing (415V, 3-Phase Motors)

Selecting the correct cable size (mm2) is critical to ensure it can safely handle the motor's current draw and prevent excessive voltage drop over the length of the cable run. The following table provides a general guide for commonly used motor sizes at a standard 3-phase voltage of 400/415V, based on typical full-load currents.

Motor Rating (kW)	Approx. Full Load Current (A)*	Recommended Cable Size (mm^2)*
5.5	~11.5	2.5 or 4
7.5	~15.5	4 or 6
11	~22.0	6 or 10
15	~30.0	10 or 16
18.5	~37.0	16 or 25
22	~44.0	25 or 35

Note on Selection:

- The exact full load current (A) will vary slightly depending on the motor's efficiency and power factor.

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- The final cable size (mm2) must be confirmed by a qualified electrician and should account for the total cable length to the control panel (to mitigate voltage drop), the cable's installation method (e.g., submerged, in air, in conduit), and the ambient temperature according to local electrical codes.
- A larger cable size should be selected for longer cable runs to minimize voltage drop.