makes difference

CAVITECH

CAVITECH Aeration - EFFICIENT SOLUTION FOR WWTPS

NEW TECHNOLOGY: HIGH QUALITY OF AERATION & LOWEST COSTS

This document is intended for discussion and is not an offer

CAVITECH® - HIGH QUALITY AND LOWEST COSTS

- Installable into an operating aeration tank without interrupting current treatment process
- Easy to design, install, start up. Automatic operating
- Significantly less expensive to install, operate, in maintenance
- Consumes 2 times less electricity to dissolve the same amount of oxygen
- Increases the absorption capacity of activated sludge. Has a high alpha factor
- Does not lose its effectiveness compared to bubble aeration
- Does not become overgrown with a sludge and suspended solids
- Self-cleaning during operation. Submerged elements does not need cleaning and replacement
- Flexibly changes the performance

CAVITECH® IS JUST THE BEST TECHNOLOGY FOR SEQUENTIAL REACTORS (SBR), THERE ARE NO ALTERNATIVES

Excellent quality and high economic effect in any segments of water treatment, including dairy, meat industries

INNOVATIVE AERATION EQUIPMENT FOR WASTEWATER BASED ON OWN TECHNOLOGY

- Modernization and optimization of aeration processes with a highest quality and efficiency
- Universal solution with flexible settings for the needs of each customer
- Convenient work models - direct sales, energy performing contracts, guarantee, service
- Professional team for installation and supervising / local productions, training of local teams
- Environmentally friendly
- Successfully tested and is in use since 2021

INDUSTRIES AND CUSTOMERS – ALL WWTPS TYPES

- Municipal WWTPs
- Industrial treatment facilities
- Chemical industry WWTPs
- Agricultural treatment facilities
- Meat and dairy production
- Food industry, pulp


MOVEMENT CERTIFICATE

1. Exporter
CAVITECH INNOVATION DOO
KEJ ŽRTAVA RACIJE 2A
21000 NOVI SAD
REPUBLIKA SRBIJA

EUR. 1 No A 8505

2. Certificate to be used in preferential trade betw
Republika Srbija
and
Evropska Unija

3. Consignee

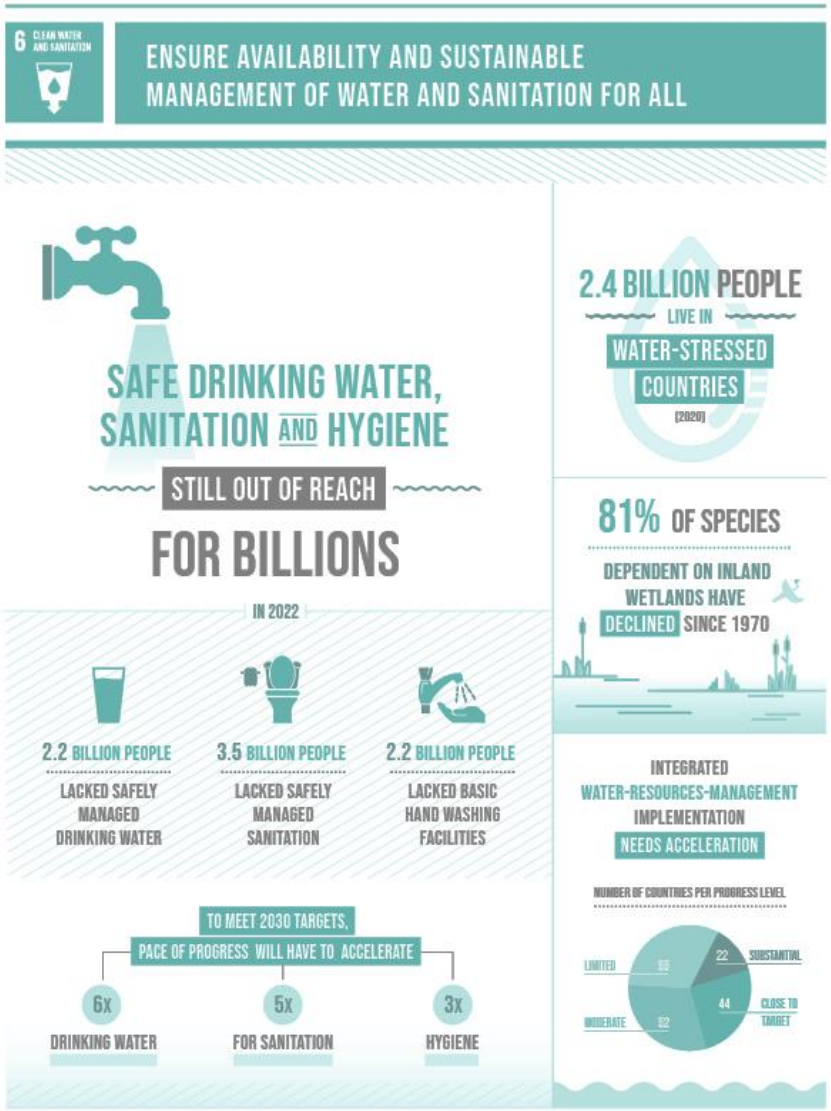
4. Country, group of countries or territory in which the products are considered as originating
Republika Srbija

5. Country, group of co territory of destinat
Evropska Unija

Origin in Europe

ACTUAL

WASTEWATER TREATMENT IS VERY IMPORTANT AND TOO EXPENSIVE



- Aeration is the main energy consumer - comparable to energy consumption of a subway
- Wastewater treatment is costly due to the energy-intensive aeration process and rely on outdated technology
- Upgrades of wastewater facilities would be required to meet the increasing demand in water treatment

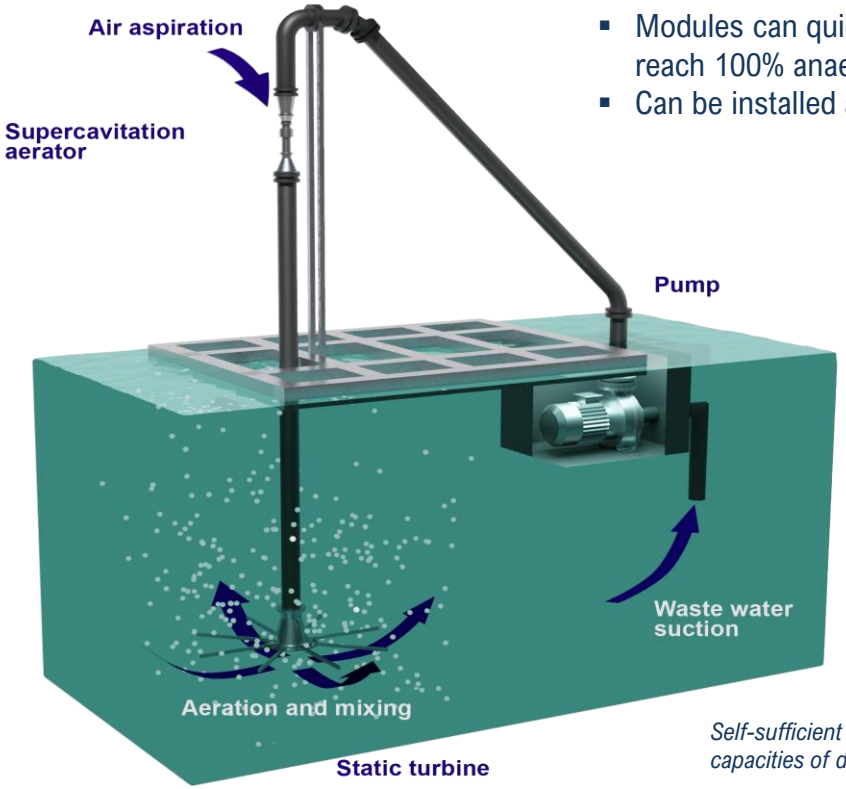
EXISTING TYPES OF AERATION ARE NOT PERFECT - CAVITECH® IS THE "TURN-KEY" SOLUTION:

MARKET PRODUCTS	AERATION EFFICIENCY	PERFORMANCE LIMITATIONS, PROBLEMS	MAINTENANCE COSTS
CAVITECH makes difference	**HIGH** 4.5-10 kg/02/kWh	**NO LIMITATIONS, NO AGING**	**VERY LOW COSTS + SIGNIFICANT ENERGY SAVINGS**
SURFACE AERATOR 	**LOW EFFICIENCY:** 0.9-2.1 kg/02/kWh	**Limited performance:** aeration depth limit 1.5m; does not suspend sludge at deeper basins. The main problem – LOW aeration efficiency	**HIGH:** Moving parts require costly maintenance, frequently - with stoppage of the aeration tank operation; High energy consumption; Effective for a depth of less than 3.0 meters. If deeper, this type of aeration will not be able to deliver air to the lower layers of the reactor - this type of aerator is not recommended for aeration system in SBR deeper than 3,5 m.
COARSE BUBBLE AERATION 	**LOW EFFICIENCY:** 0.6-1.5 kg/02/kWh	**High efficiency** in deeper pools and lower temperatures, prone to cause water heating in higher temperatures	**HIGH:** Maintenance requires basin emptying (recovery time up to 4 weeks to settle the normal operation)
FINE BUBBLE AERATION 	**MEDIUM EFFICIENCY:** 3.5-4.8 kg/02/kWh (new diffusers in clean water) **1.5kg/02/kWh after 2 years in reactor**	**High energy consumption**, large air volumes. Fumes and aerosols generated. Fast aging; The FBA main problem - reduction in aeration efficiency due to the fouling	**HIGH:** Need for periodic replacement with basin emptying or use expensive retractable diffusers for maintenance outside the basin. Costs of owning include: - Energy consumption costs of air compressors; - Air compressor maintenance costs; - Costs of servicing the bottom diffuser system (incl.: stopping a technological process maintenance, partial or complete replacement of diffusers, re-initiating the biological treatment process, time and risks of readapting the activated sludge that must be re-populated into the aeration tank)

TECHNOLOGY

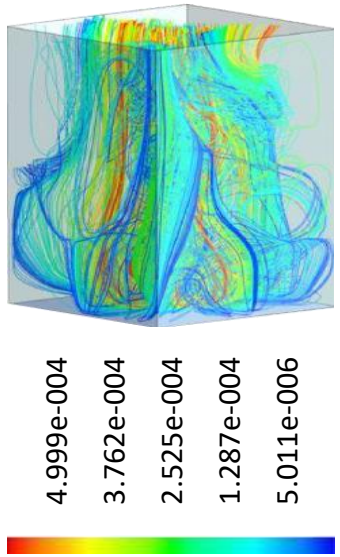
CAVITECH® uses own patented solution – a new method based on hydrodynamic supercavitation to efficiently mix air containing O2 and treated wastewater

- Supercavitation aeration modules increase the efficiency of dissolving oxygen
- Design ensures a homogeneous distribution of sorbents, suspensions and liquid reagents by volume, which significantly expands the capabilities of treatment facilities without increasing the cost of equipment
- Modules can quickly change the proportions of the "aeration + mixing" mode, reach 100% anaerobic mixing, create anaerobic or anoxic zones
- Can be installed as additional aeration or replace the existing system



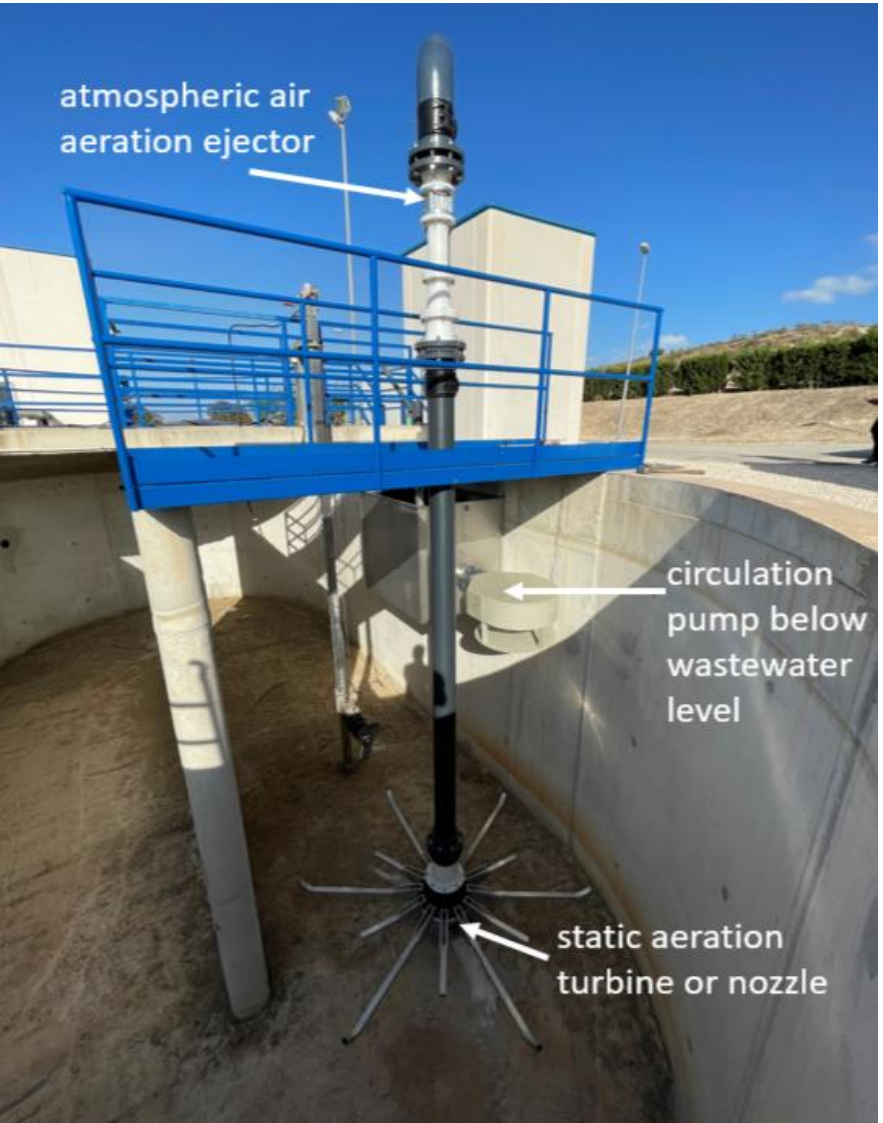
Self-sufficient smart aeration block having the capacities of dynamic control of aeration and mixing

MORE OXYGEN
FOR LESS MONEY
SAE 4.5 kgO2 / kWh
SOTR 9.2 kgO2 / h
SOTE 12% O2 / m



We aspirate air to water stream, atomize it to tiny bubbles, and mix it with water, by thus realize water aeration by far more efficient than benchmarks

EQUIPMENT DESCRIPTION



Depending on the customer's site, CAVITECH® Aeration modules can be of three types:
A1-40, A1-100, A2-200
The main differences - pump capacity (40 \ 100 \ 200 m3/hour) and number of water-air turbines (1 \ 2)

Technical specifications on the example of the aeration module type CAVITEX® A1-100

Space (module size) above water surface:	from 1 to 2.5 m
Water flow:	40-100 m3/h
Air flow:	20-70 m3/h
Power:	1-4 kW
Efficiency of OTE at a depth 4.5m:	60%
Productivity of O2 dissolution at a depth 4.5m:	up to 10 kgO2/h
Efficiency of AE:	4.5-5.5 kgO2/kW·h

Scope: Aeration module in wastewater treatment facilities of municipal and industrial enterprises.

The pump of the aeration module has a beneficial mechanical effect on the activated sludge.
The passage of activated sludge together with wastewater through the pump and aerator leads to the disintegration of the large flakes of activated sludge into smaller ones, increasing their contact surface with the nutrients, increasing nutrition and pollutant oxidation.

CAVITECH Aeration has two phases of dissolution, comparing other types of aeration, which have one phase only:

1st phase of the intensive dissolution to **10-15 mg/l** begins in the aerator located 2 meters above the water level and continues during the way of water from aerator to the bottom under conditions of intensive mixing of water and air in supercavitation conditions with a high volumetric air content.

2nd phase of the dissolution begins when air disperses in a volume of an aeration tank.
This explains the high efficiency of the CAVITECH, 1.5-3 times higher than other types of aeration.

INDICATORS

In accordance with European standard EN 12255-15 for a depth of 4.5 m

Supercavitation conditions in an open to atmospheric air and air-filled environment cannot cause any damage to the activated sludge flakes. This process and the passage of wastewater with activated sludge through a circulation pump have a soft dispersing effect on the activated sludge flakes and increase their ability to absorb contaminants. Conditions for rapid saturation of water with oxygen are created along the entire length of the line from the aerator to the turbine.

Fig.1 shows a diagram of oxygen dissolution in water during mixing of a water -air mixture with a volumetric air content of 50%, mixing duration of 5-90 seconds.

Fig.2 shows the graph of the dependence of the difference Δ CSO between the saturated and measured concentrations of oxygen in water on the duration of aeration.

For the water depth in the aeration tank HWT = 4.5 m, the following oxygen dissolution characteristics were obtained:

OTE = 51 % (SOTE = 57 %)
OTR = 8.4 kgO2 /h (SOTR = 9.2 kg O2 /h)
AE = 4.0 kgO2 /kWh (SAE = 4.5 kg O2 /kWh)

The described tests were carried out at different water depths H WT in aeration tanks of different volumes using aeration modules of different capacities. The results obtained are presented in Fig.3

Fig.1

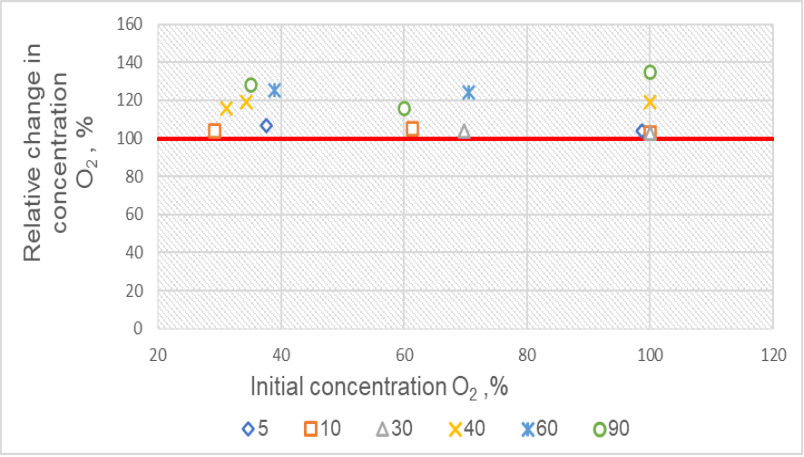


Fig.2

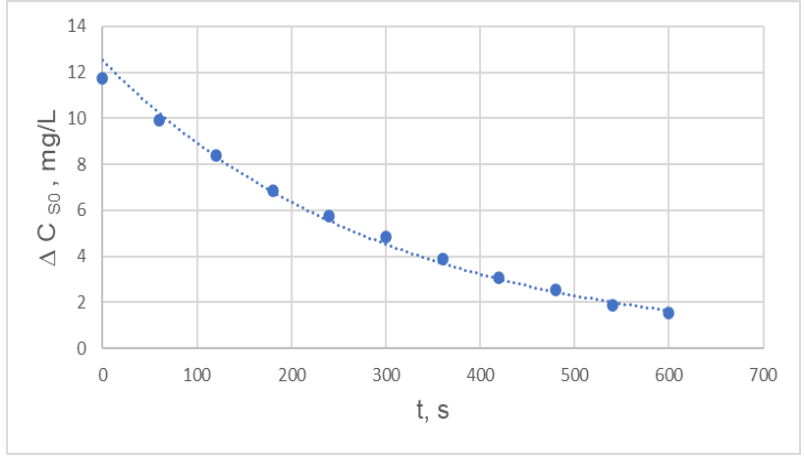
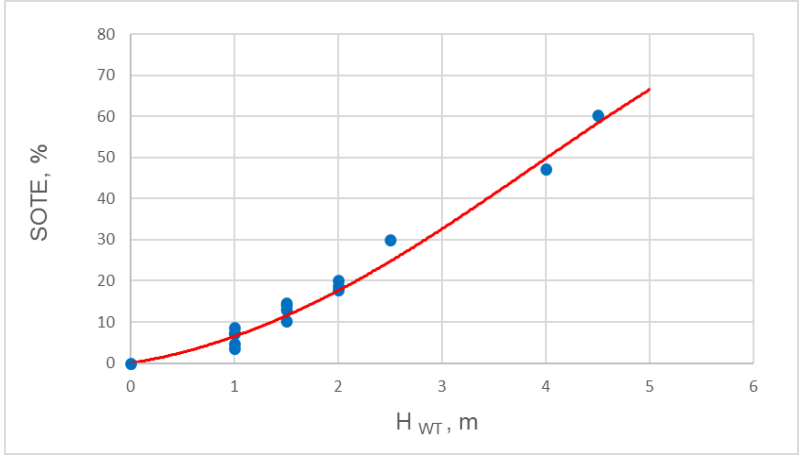


Fig.3



FOR CUSTOMERS

FOR WWTPS, WWTP OWNERS AND WWTP OPERATORS, PARTNERS

CAVITECH® Aeration is suitable for all types of WWTPs, with various types of specific pollutions, including dairy, chicken farms

CAVITECH Aeration equipment can be installed both as new equipment, and as a replacement for old equipment, as well as in parallel to existing aeration systems

CAVITECH Aeration deployment in aeration reactor does not require any preparations, neither changes in plant operation. Only energy supply is required (4kW for each Aeration Module to supply 500kgO2/d)

Installation is quick, easy and can be carried out even in operating conditions

Depending on the customer's priorities, it is possible to choose the optimal balance between increasing of treatment efficiency and/or energy consumption (savings)

We conduct a free study using our models for your situation

Based on the specifics and features of your site, taking into account your priorities and in according to the completed technical questionnaire - you will receive an individual offer

Choose the maximum benefit option for your plant

SALES CONTRACT	Upto 10% in advance
CONDITIONAL SALES CONTRACT	Test period 3 months
ENERGY PERFORMANCE CONTRACT with shared savings model	Your payments are less than your savings
PRELIMINARY PROCESS DESIGN	Free technology project for your specific real-life conditions

Complete a simple questionnaire for your site and start treatment and saving with a high-quality innovation solution!

CONTACTS

makes difference
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THANK YOU FOR ATTENTION!