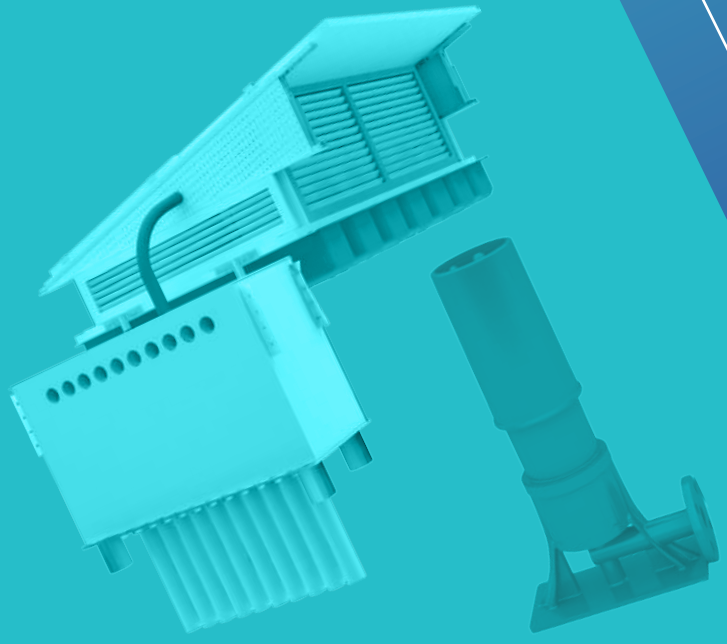
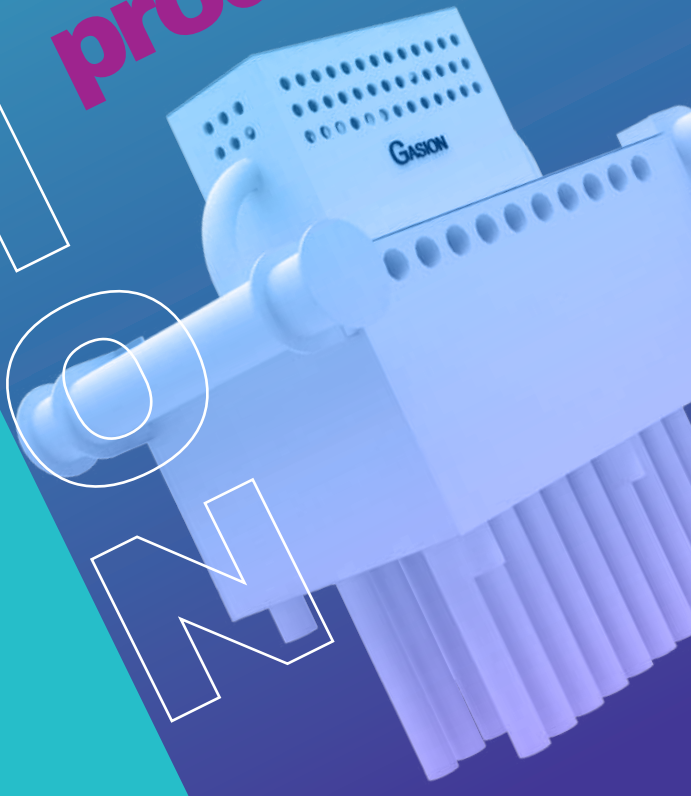
AERATION

GASION

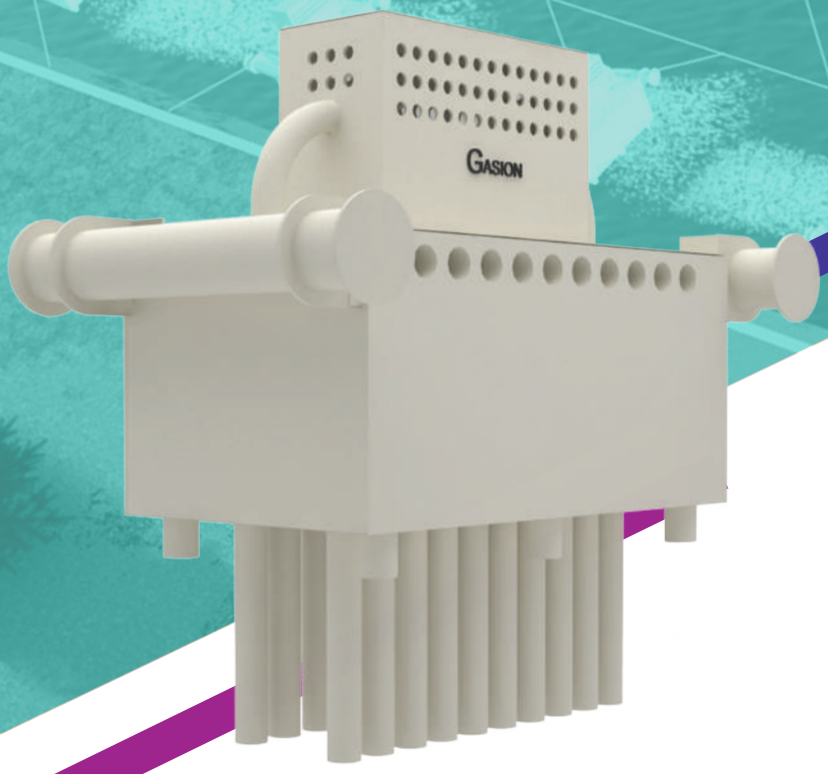
Innovative aeration product





Gasion introduces four new revolutionary products in aeration field .
Powered aerator for large treatment plants and lakes
Solar aerator for ponds and lagoons
Hydrodynamic diffuser to substitute fine pore diffusers
Bubble mixer to enhance efficiency of diffused aeration system
All these products can bring down the energy cost of aeration by many times.
Completely constructed of plastics with no moving parts underwater.

BOXY aerators



The product has been **patented**

GASION UNVEILS HYBRID TYPE BOXY AERATORS FOR AERATION IN WASTE WATER TREATMENT, LAGOONS , PONDS , LAKES , ETC

Hybrid type boxy aerators can be installed both as floating or fixed aerator and is completely constructed of plastics

Boxy Aerators consists of multiple draft tubes inside a rectangular box on both sides of the aerator. A common air manifold is attached to the draft tubes at the bottom with micro porous air injectors and connecting hoses. A high speed blower which operates at about 14000 RPM delivers high volumes of air to equally into all the injectors. The streams of air from the circumferentially constructed injector flow out at perpendicular direction into the centre of the draft tubes and rises up creating a vacuum in the contact area. The vacuum collapses the injected bubbles creating large air/water interface, producing microbubbles and low density air/ water mixture. As this mixture rises up it also sucks in large amounts of water from the opening at the bottom, resulting in intense mixing of micro bubbles and water. With this arrangement, from the top outlet of the draft pipe will flow a continuous stream of highly oxygenated water, which comes from the bottom of the tank at a preferred suction level. The air/water mixture exits through the top lateral openings at high velocity creating a water surface velocity of about 3 knots for a distance of 100 ft. Boxy aerator releases water from both sides which generates surface movement and ripples in two directions for long distances.

These ripples provide continuous surface area layer renewal. And every time the surface area is renewed a new layer of water gets saturated with oxygenation from the atmosphere. This surface aeration accounts for large amount of dissolved oxygen by natural forces. That is the double advantage of Boxy Aerators. Aeration happens by both air mixing and surface transfer.

Boxy Aerator can circulate water from deep tanks with its ingenious low pressure design without additional power requirements. It only displaces the water on the top layer of the pipe so that the water from the bottom rises up to fill it due to the atmospheric pressure difference.

The length of this suction pipe can be increased or decreased as per the requirements. Hence Gasion Aerators can be employed in shallow tanks or ponds as well as in deep lakes, aeration tanks, etc.,

GASION ENERGY USE

COMPARED WITH CONVENTIONAL AERATORS

other

G

HOW MUCH ENERGY IS CONSUMED IN 1 MLD SEWAGE TREATMENT PLANT ?

Energy consumption of aerations in sewage treatment

G
D
A
S

BOD 250

Surface aerators consume about 20 to 25 kilowatt per hour and 600 kilowatts per day
Aspirators consume about 15 to 18 kilowatt per hour and 432 kilowatts per day.
Diffused aerators about 12 to 15 kilowatt per hour and 360 kilowatts per day.
Gasion aerators consume only 2 to 3 kilowatt per hour and 72 kilowatts per day.
This energy calculation is only for sewage which have B.O.D of about 250mg per liter.

Energy consumption of aerations in waste water treatment

G
D
A
S

BOD 500

In industrial wastewaters, with higher B.O.D, the energy consumed in aerators, will increase proportionally. Will double compared to sewage if B.O.D is 500, Triple if 750, quadruple if 1000 and so on.

BOXY AERATORS REDUCES ENERGY FOR AERATION BY MULTIPLE TIMES

Gasion aerators use energy,
- 4 times < diffused aerators.
- 6 times < aspirators.
- 9 times < surface aerators.

Compared to surface aerators, Gasion aerators saves 528 kilowatt per day, in 1 MLD sewage plant.

A medium sized city, treats about 500 MLD of sewage.
With Gasion, about 264000 kilowatt is saved, every day in one city.
- Imagine the savings in a year.
- Imagine the savings globally, with rising population.

G Gasion
D Diffused aerators
A Aspirators
S Surface aerators

GLOBAL ENERGY CONSUMPTION IN AERATORS per person

On an average, the government spends about 100 kwh of electricity per annum for every single individual for waste-water treatment, 70% of which is for aeration.
With present global population this equates to about 209 terawatt hour and can rise up to 420 terawatt hour by 2030.

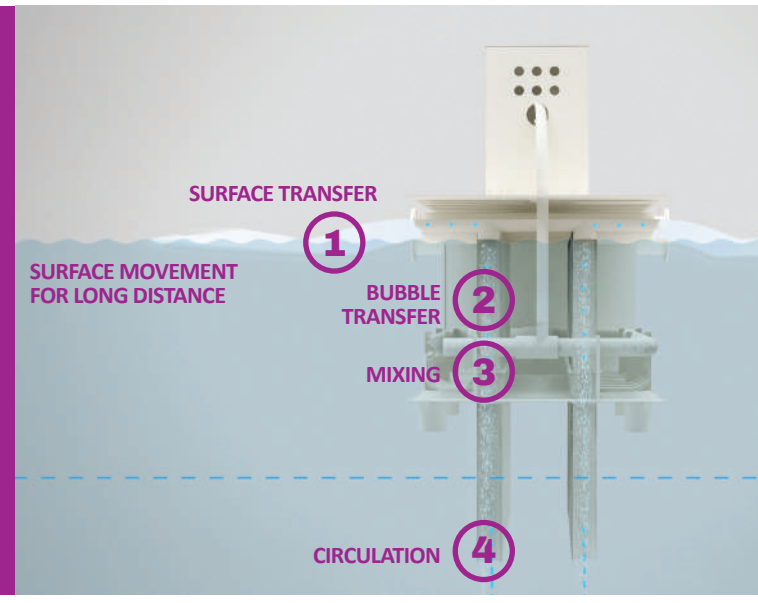
Note : 1 terawatt hour is equal to 1 billion kilowatt hour. Energy saving potential in this area is huge.

FOUR TYPES OF OXYGEN TRANSFER IN ONE MACHINE

4 in 1
BOXY AERATORS

Surface Aerators achieve aeration by surface transfer, aspirators by mixing, submerged aerators by circulation and diffused aeration by bubble transfer.

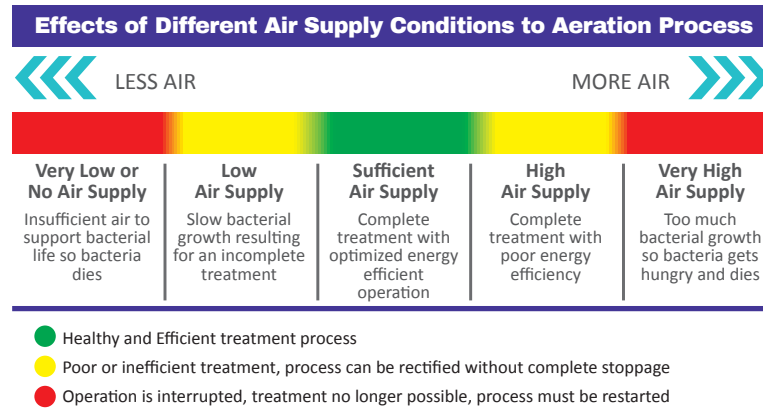
Boxy aerators achieves surface transfer, mixing, circulation and bubble transfer in one machine. Circulation from bottom, Air mixing at the contact chamber, bubble transfer in vertical tubes, and surface transfer at the exit ports.It has the combined advantages of all these aerators eliminating its disadvantages



VFD application in wastewater treatment aeration control
INBUILT VFD IN BOXT AERATORS

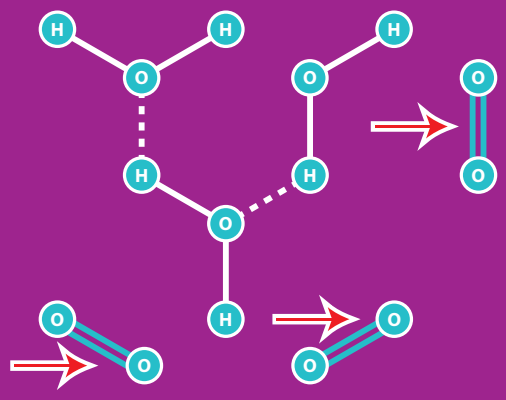
Air flow into aeration basins can be varied with blowers speed control using variable frequency drive (VFD). Results show up to 70% energy savings.

For the aerobic bacteria to do its job, it needs two resources, air to breathe and organic matter or food to consume. As Figure explains, less air will result in slowing the growth rate of the bacteria and will be insufficient to consume the entire organic content, resulting in incomplete treatment. If even less air is introduced, or no air at all, the bacteria will die without DO (Dissolved oxygen). In this case, the sewage treatment process stops until the process is restarted again.



On the other hand, if excess air, more than enough for bacterial growth, the operation will not be energy efficient. If too much, bacteria will grow beyond acceptable limits, the organic matter will be consumed too quickly and the bacteria will starve and die also halting the process.

Boxy aerators have inbuilt VFD with the high speed blower which can be connected to DO control system directly for optimum air flow. This saves huge costs in separate VFD arrangements.



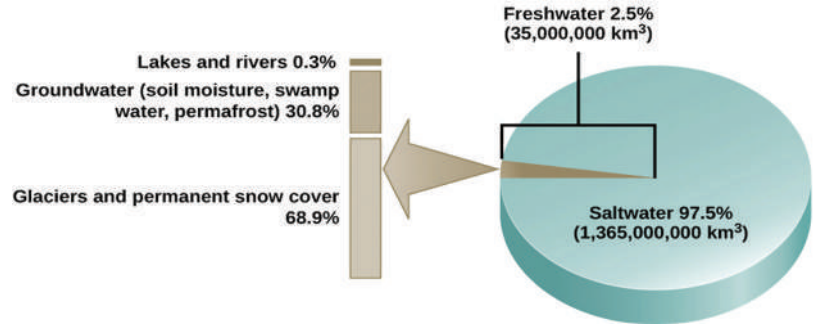
What is Dissolved Oxygen

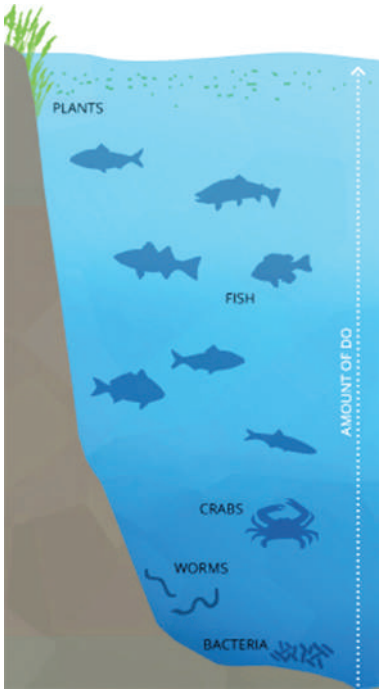
Dissolved oxygen is the presence of these free O2 molecules within water. In the picture red arrow indicates free oxygen (O2). The bonded oxygen in H2O molecule is in a compound form and does not count toward dissolved oxygen levels. One can imagine that free oxygen molecules dissolve in water from air in much the same way that glucose molecule dissolve from sugar when it is stirred.

In limnology (the study of lakes), dissolved oxygen is an essential factor second only to water itself. A dissolved oxygen level that is too low can harm aquatic life and affect water quality adversely.

Water: Why does it matter?

Water is pretty darn important for living things. The pie chart shows that 97.5% of water on Earth, or 1,365,000,000 km³, is salt water. The remaining 2.5%, or 35,000,000 km³, is fresh water. Of the fresh water, 68.9% is frozen in glaciers or permanent snow cover. Groundwater—such as soil moisture, swamp water, and permafrost—account for 30.8%. The remaining 0.3% is in lakes and rivers. Preserving this small supply of fresh water from pollution and restoring the already polluted water bodies is the need of the hour.

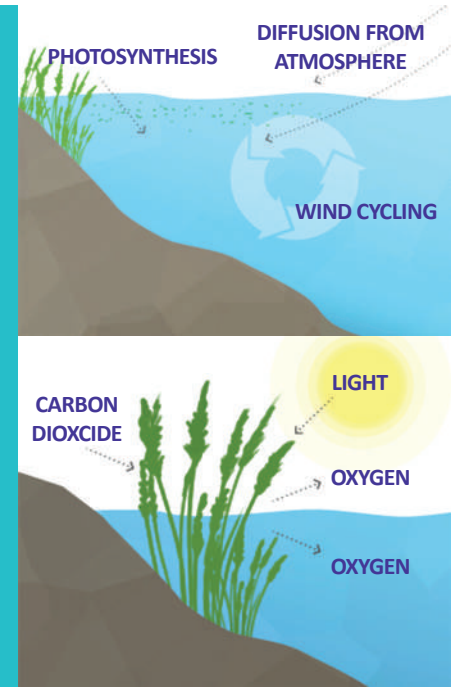




Dissolved oxygen and Aquatic Life

Dissolved oxygen is necessary to many forms of life including fish, invertebrates, bacteria and plants. The amount of dissolved oxygen needed varies from creature to creature. Bottom feeders, crabs, oysters and worms need minimal amounts of oxygen (1-6 mg/L of water, while shallow water fish need higher levels (4-15 mg/L).

Microbes such as bacteria and fungi also require dissolved oxygen. These organisms use dissolved oxygen to decompose organic material at the bottom of a body of water. Microbial decomposition is an important contributor to nutrient recycling.

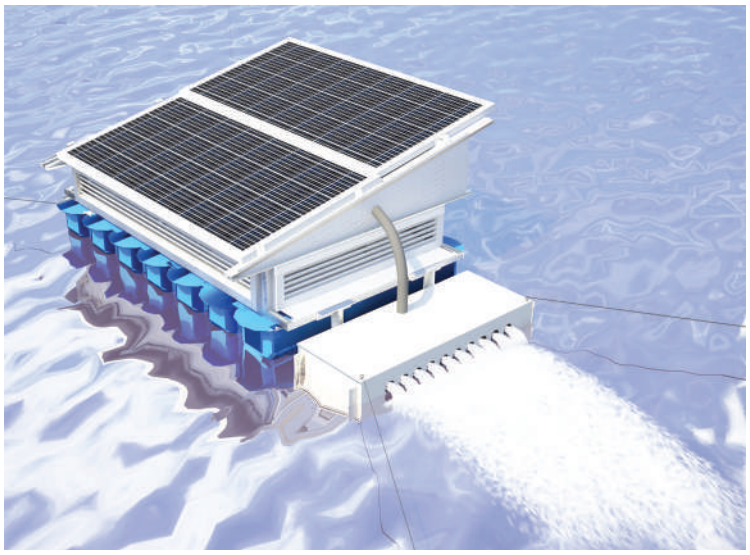


Where Does DO Come From?

Dissolved oxygen enters water through natural aeration or as a plant byproduct. In natural aeration ,oxygen can slowly diffuse across the water surface from the surrounding air. As this surface is renewed by the churning effect of wind force a new surface gets saturated with oxygen and the cycle continues. The aeration of water can also be caused by rapids, waterfalls, groundwater discharge or other forms of running water. Dissolved oxygen is also produced from sunlight as a waste product of photosynthesis from phytoplankton, algae, seaweed and other aquatic plants. As aquatic photosynthesis is light-dependent, the dissolved oxygen produced will peak during daylight hours and decline at night.

SOLAR aerators

The product has been **patented**



The pressure required for air injection is very less compared to other systems which needs air injection upto the bottom of tanks. Hence current drawn by the micro blower is substantially less making it the most suitable for solar application. All under water parts are plastic with no submersed moving parts. The outside structural material are aluminum and hence also no corrosion problems and maintenance issues.

GASION PROVIDES SOLAR AERATORS FOR OXIDATION OF LAGOONS , PONDS , RESERVOIRS , ETC .

SUITABLE FOR ANY NON GRID AERATION APPLICATION

Gasion solar aerators are supplied as an unit with integrated solar panels, batteries, control system, blower and aerator. Can be installed as a floating unit in any water body.

During operation, the solar panel PV cell produces electricity which will be stored in the batteries through a charge controller. Everyday 4 to 5 hours of sunlight will be sufficient to charge the batteries fully and a full charge of batteries can operate the aerator for about 24 to 36 hours continuously.

The output from batteries can have variable voltage and it will be adjusted by a buck/-boost voltage converter before it is provided as input for the micro blower motor. When the blower gets energized it operates on high speed and sucks in large volumes of air from atmosphere and delivers it into the aerator.

The aerator operating principle is same as its powered version **BOXY AERATORS** and oxygenates by high intense air mixing inside the aerator and high velocity water movement outside the aerator. Also it circulates a large volume of water from the desired depth and is suitable for all the type of tanks, shallow and deep, large and small.

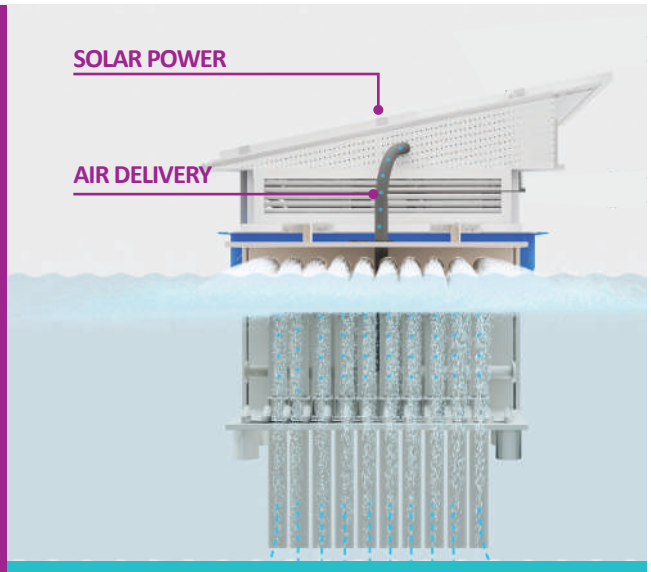
GASION SOLAR AERATORS

IS A BOON FOR SMALL CITIES , TOWNS , VILLAGES
CAN BE INSTALLED INSTANTLY EVEN IN REMOTE LOCATION
CAN OXYGENATE UPTO 1.2 MILLION LITERS EVERYDAY

Operating a STP is bit technical and need 24 hours monitoring with skilled man power. What about small towns? Having sewage output less than 10 MLD or 2 GPD. It is not really feasible to have multiple STPs for each small town. So the present solution is natural treatment by large, facultative ponds, lagoons, oxidation ditches, etc. in which organics are allowed to degrade naturally, without external aeration. Most of these plants do not perform upto the standards as natural aeration is insufficient to meet the oxygen demand created by additional chemical ingredients in sewage used by modern population.

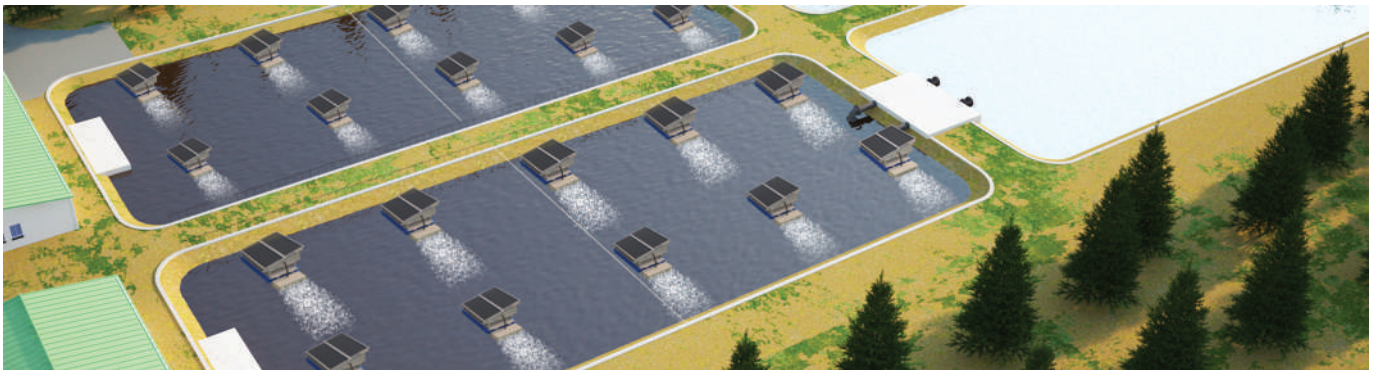
Boxy solar aerators can be implemented for modernisation of existing and newly constructed facultative ponds, oxidation ditches, lagoons, etc. They do not need any electricity connection, can be installed instantly in any remote location and can operate 24 hrs/year with in-built power packs.

Boxy aerators do not need any operator assistance and be installed in a couple of hours. Just let them float on the water and switch it on. As simple as that. Multiple systems can be installed for large lagoons, ponds, lakes, etc., Solar aerators will change the outlook of sewage treatment for towns, village clusters etc., Can be used to revive lakes, ponds and any water body instantly without any other infrastructure requirements.



Gasion has a developed special, high speed compact blower for solar application.

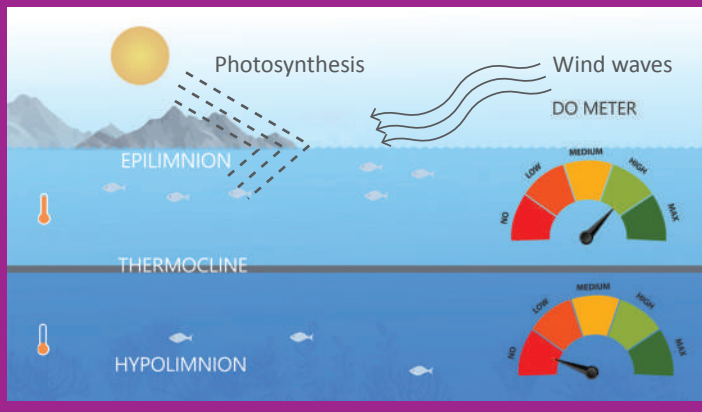
This can be so small that it can be held in a palm, but extremely powerful and can continuously inject in excess of 50 cum/hr of air into water that can oxygenate more than 50000 ltrs/hr of water equivalent to 1.2 million litres every day.



GASION OFFERS AERATORS FOR LAKE AND POND REJUVENATION

CAN BE USED BOTH FOR OXIDATION AND CIRCULATION

Domestic and industrial waste water ingression has polluted many natural waterbodies throughout the world



Natural circulation destratifies the waterbodies during cool months

During winters the top layer gets colder and denser than the bottom layer. This initiates a natural turn-over of the lake, blending of the two layers breaking the Thermocline, resulting in natural circulation of the entire lake.

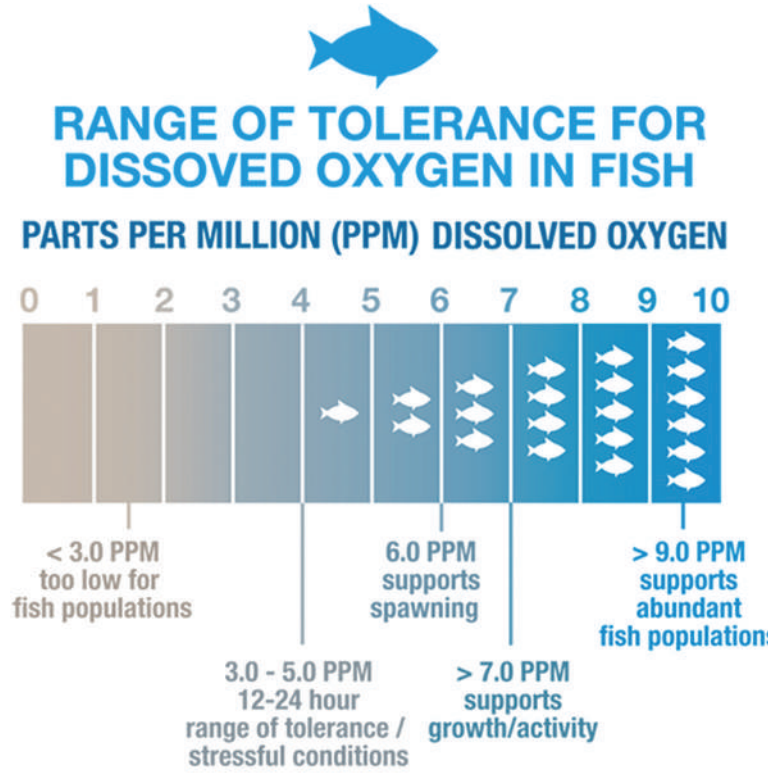
HOT WEATHER CAUSES STRATIFICATION OF LAKES

During hot months (summer, fall and autumn) the top layer of the lake is warmer than the bottom layers. The warm top layer is called the Epiliminion and the cold bottom layer, the Hypolimnion. Density of water in Epiliminion layer is also much lesser than the dense Hypo-limnion layer. This temperature and density difference between these two layers creates a third distinct layer called the Thermocline between them. Thermocline keeps these two sections apart without allowing them to blend together. The Epiliminion layer is also oxygen rich from natural dissolved oxygen obtained by surface transfer of oxygen due to wind forces and photosynthesis of aquatic plants . The denser Hypolimnion layer has poor dissolved oxygen content . During summer months oxygen level in this layer can drop to extreme lows resulting in fish and other aquatic popula-tion reduction. This phenomena is called stratification in water bodies.

Dissolved oxygen depletion leads to fish kills

In areas with prolonged hot months this turn-over of lakes is rare. During the long non-turn-over period, the dissolved oxygen in bottom layers will be extremely low leading to fish kill and development of septic conditions at the bottom.

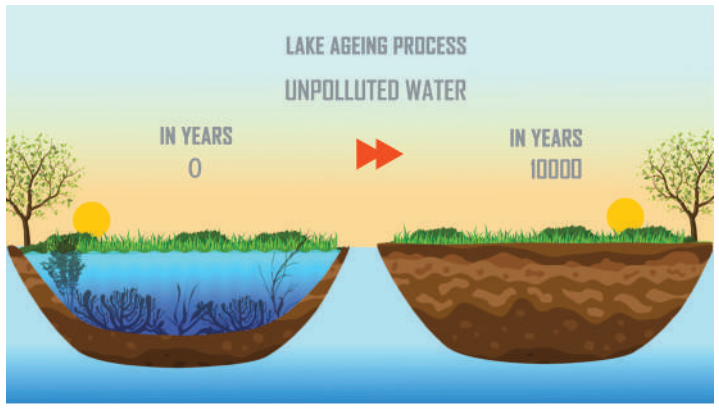
Fish Population decreases proportionally with dissolved oxygen and they become extinct when DO approach 3 ppm or less. When D0 is above 6 ppm the fish population is healthy and reduces proportionally and with less than 3 ppm aquatic life do not survive except for a few worms and bacteria.

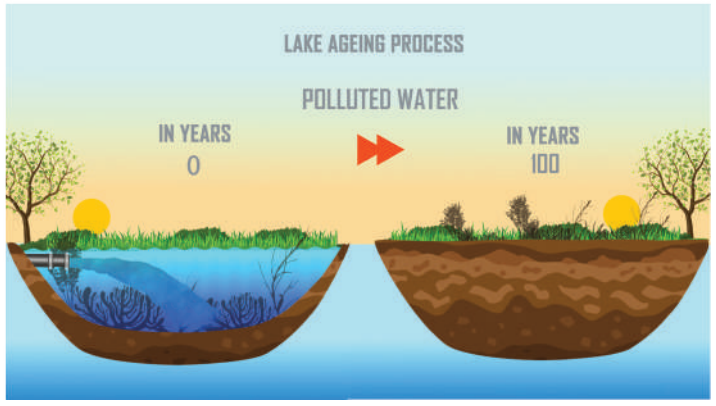


External pollution
accelerates lake deterioration.

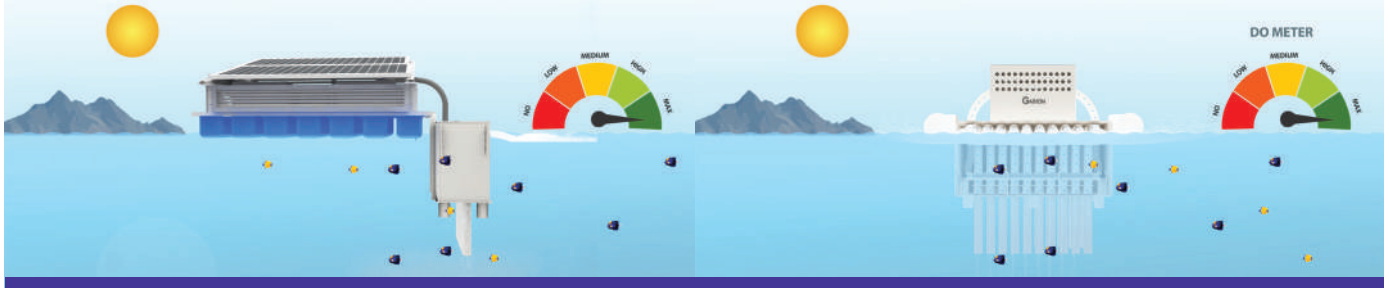
Added to the natural deterioration by stratification, when waste water enters the water bodies like lakes, ponds, etc., the organic nutrients in it becomes food to the already existing micro-organisms in water which multiplies rapidly consuming these organics. For oxygen requirement, the microorganisms use the natural dissolved oxygen in water, quickly depleting it .The nutrients also enhances growth of cyanobacteria / algae at the top surface. This algae growth blankets the top layers from sunlight exposure, resulting in stoppage of photosynthesis, which is also a main source of natural DO formation. Also Consumption of these nutrients as food by bacteria in water creates large amount of dead matter which settle to lake bed leading to unwanted vegetation. This deteriorates and accelerates the ageing of lakes and making them redundant in few years.

The natural life of lakes is about 10000 years. But with waste water ingression it ages quickly and life can get drastically reduced to less than 100 years.





GASION AERATOR CAN OXIDISE AND CIRCULATE LAKES REDUCING THE POLLUTANTS AND HALTING THE DETRIOTION.



Unpolluted waterbody do not require man-made aeration. But if it is already contaminated by polluted wastewater, aeration is the only way to reduce it.

If a circulation can be induced externally between Epiliminion and Hypolimnion layers, it itself can enhance the life of lakes drastically. Conventionally available aerators is not feasible to be used in such water bodies for various technical reasons. Gasion Boxy and solar aerators are specially developed for this application and which positioned on lake or pond surfaces can not only used to circulate but also to oxygenate and revive such deteriorating water bodies. It can also meet up the oxygen demand created by the ingression of polluted waste waters.

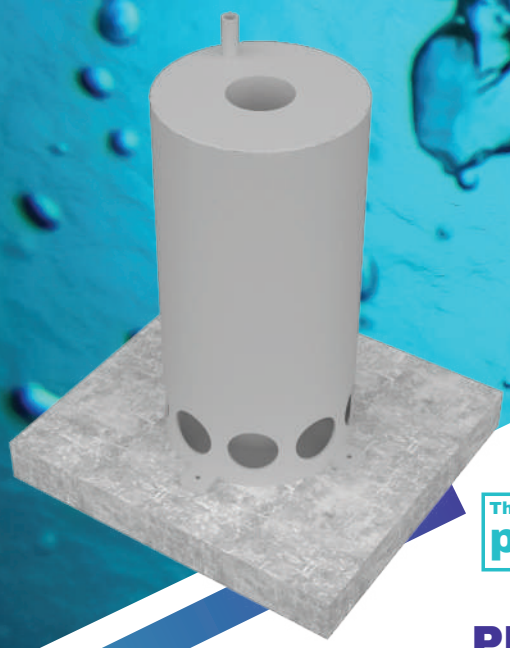
Boxy aerators can circulate and oxygenate about 24 million litres and solar version upto 1.2 million liters every day and can be used for small and large lakes ,ponds with multiple units calculated based on the area and lake volume.

Every day, 2 MILLION TONS
of sewage and others effluents drain into the world's water

In developing countries, **70% of industrial wastes**
are dumped untreated into waters where they pollute the usable water supply

Source : UN Waters

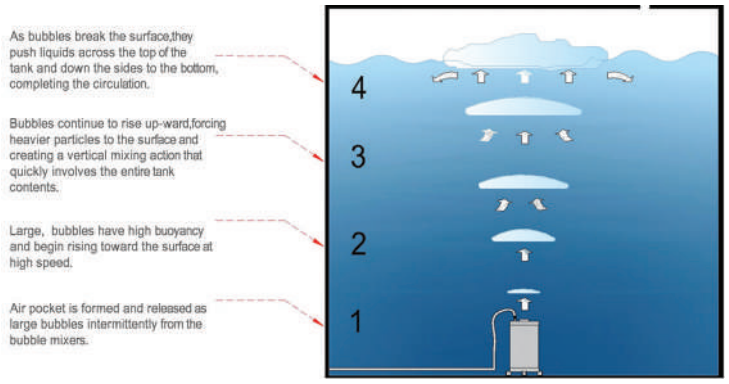
BUBBLE mixer



The product has been **patented**

PROCESS DESCRIPTION OF MEGA BUBBLE GENERATOR

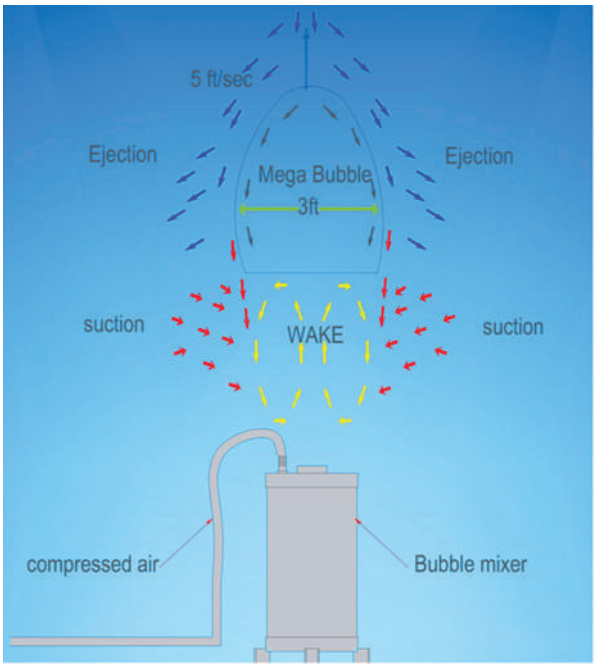
MEGA BUBBLE generators are fixed in bottom or liquid tanks .The principle of operation is that a blower placed outside the tank delivers air into the mega bubble generator. The pressurized air pushes the water inside the accumulator body of the generator and creates an air pocket. Periodically this air pocket is ejected outside as a large bubble and liquid backfills into the accumulator, starting the cycle again. The period of bubble release is very short (< 1/16 second), which initiates torridal movement with a size of about 3 ft in diameter moving up at high velocity creating a suction effect below it inducing circulation of liquid in the entire tank.



The major advantage of the product is that it has no moving parts inside water and is completely constructed of plastics. It can be installed in any size of tank with only number of units increasing proportionally.

GASION CAN MIX UP TANKS EFFICIENTLY WITH MEGA BUBBLES

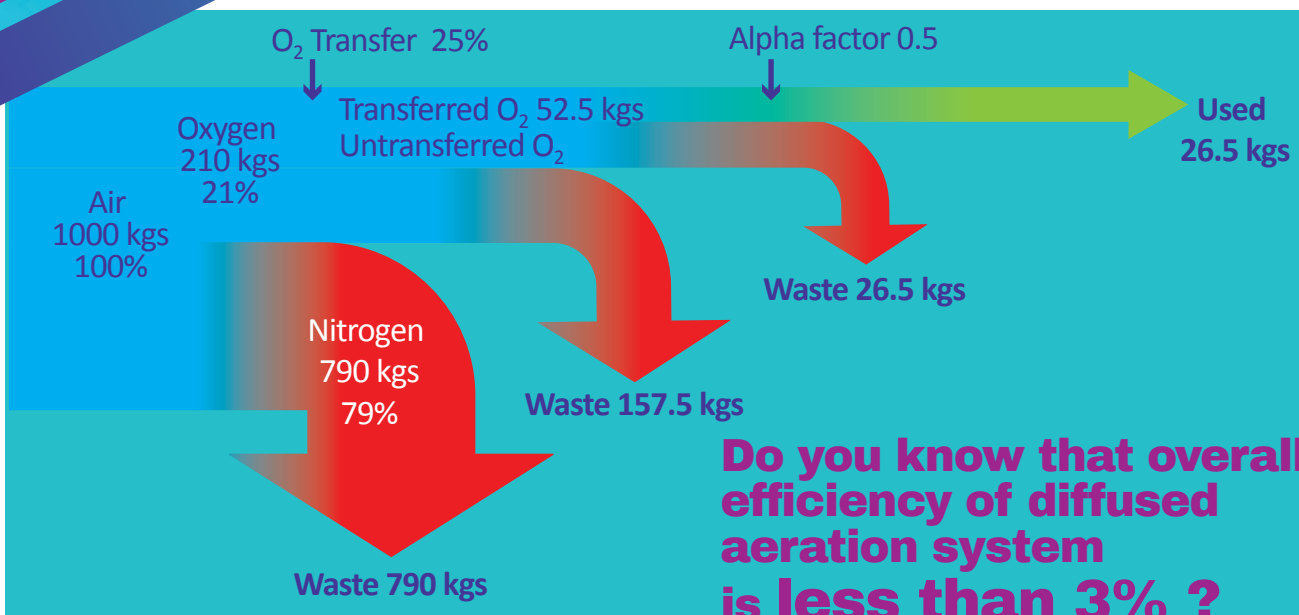
INTRODUCES BUBBLE MIXERS FOR TURBULENCE CREATION IN ANY LIQUID TANK



MAJOR APPLICATION AREAS :

- Collection tank of wastewater
- Wastewater treatment sludge tanks
- Aeration tanks
- Sewage pump house tanks
- Drinking water storage tank
- Chlorination Tanks
- BIO GAS PRODUCTION TANKS
- Chemical storage tanks
- Chemical reaction tanks
- Chemical preparation tanks.

It is not limited to the above tanks and can be used in many other applications.



Do you know that overall efficiency of diffused aeration system is less than 3% ?

LOW 0XYGEN CONTENT IN AIR AND LOW OTR REDUCES EFFICIENCY 97% OF BLOWER ELECTRICITY USED FOR COMPRESSION IS WASTED

ONE OF THE BIGGEST application of mega bubble generator is in diffused aeration as its overall energy efficiency is too low.

Assume 1000 kilograms of air is sent into a diffused aeration tank of 5m water depth. Air has only 21% oxygen by weight and remaining 79% in nitrogen and other gases. Hence only 210 kgs is available as oxygen and 790 kgs goes out of the tank unused.

The oxygen transfer rate from bubble to water is about 5% per meter rise as per manufacturers data. It means for a bubble rise of 5m only 25% of the available oxygen will be transferred into the water.

So out of 210 kgs only 52 kgs will be transferred. But it should be noted that this transfer rate data of the manufacturer is for clean water application.

Diffused aeration has a Alpha factor of 0.5 (Provided by manufacturer). This means the oxygen transfer rate in wastewater will be only 50% compared to that in clean water. This is because of presence of surfactants, suspended solids and other chemicals . Hence out of 52 kgs only 26 kgs will be finally transferred into the wastewater as dissolved oxygen. Input is 1000 kgs but quantity used is only 26 kgs., which is less than 3% efficient. So 97% of the energy is wasted here.

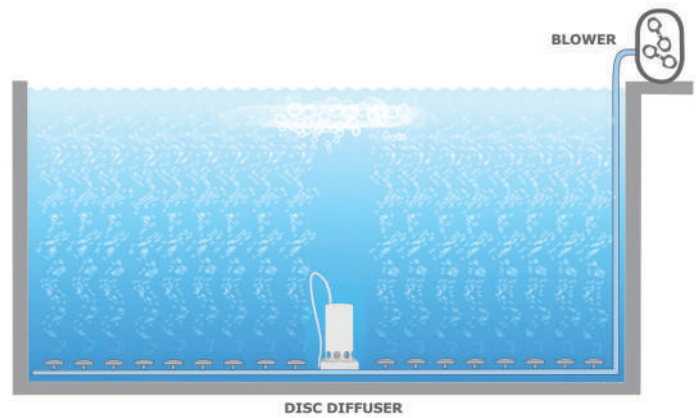
BUBBLE MIXERS MORE THAN DOUBLES DIFFUSED AERATION EFFICIENCY

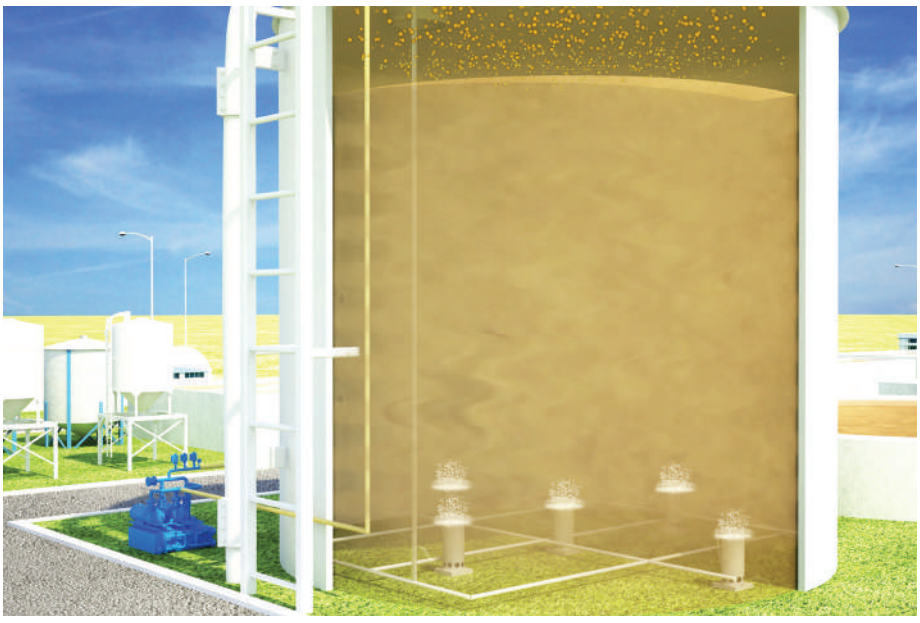
INCREASES ALPHA FACTOR AND OXYGEN TRANSFER RATE DECREASES ELECTRICITY CONSUMPTION DRASTICALLY

Mega bubble generators can be installed between the fine pore diffusers and connected to the same airline connection without need for additional blower.

Mega bubbles creates agitation and provides mixing effect. This boosts oxygen transfer rate and increases the alpha factor from 0.5 to 1.

Also decreases the wasted energy by 60 to 75% without any major modification just by installing mega bubble generators.





BIOGAS PLANTS GENERATE MORE GAS WITH BUBBLE MIXERS

The raw sewage from municipalities are first treated in an anaerobic tank. This produces methane gas byproduct which is used as fuel. These tanks are generally large and closed and is difficult to provide a mixing system inside. Mega bubble generators can be installed in this application which can use the methane gas for mega bubble generation instead of air. This will improve the production of biogas by many times.

BUBBLE MIXERS PRODUCE GRANULAR SLUDGE IN THE AERATION TANKS

CAN INCREASE THE CAPACITY OF EXISTING PLANT WITHOUT ANY CIVIL WORKS

The unique rolling motion created by bubble mixers that allows for the formation of Granular Activated Sludge.

With bubble mixers the floc size can be all the way up to 2 mm, much bigger than typical particles. The settling velocity is also much higher than the conventional sludge needing smaller clarifier and more cleaner would be the output effluent. Also the plant can operate at very high MLSS with smaller aeration tank.Existing capacities can be doubled with the available civil structures with drastic reduction in power consumption.

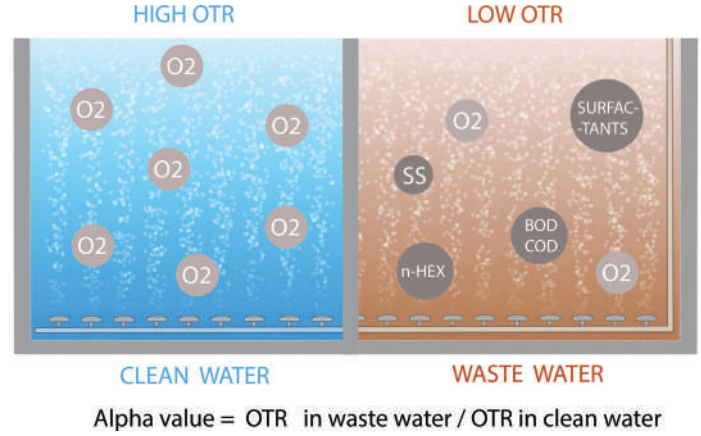
ALPHA FACTOR CAN BE THE DECIDING FACTOR IN THE AERATOR SELECTION

EFFECTIVENESS IN WASTEWATER IS THE REALITY

The " Oxygen transfer rate " values published by air diffuser manufacturers , is completely different with actual use in the field. Reason is that the OTR values of the diffusers are measured by tests in clean water. In waste waters the presence of variety of impurities like salts, solids, fats, oils,,-surfactants and other chemicals reduces the air diffusion rates reducing the overall OTR by many times.This ratio of oxygen transfer rates between the clean water and waste water is called the ALPHA value.

ALPHA VALUE = OTR in waste water / OTR in clean water

The Diffused aerators have the lowest alpha value of 0.5 among the various aerators , meaning it will only be 50% efficient in wastewater consuming 200% more electricity because it will need double the quantity of air than it is actually required in clean water for achieving the same oxygen transfer.



Alpha value = OTR in waste water / OTR in clean water

The reason for the low Alpha value of the diffusers is because in liquids with high impurities ,the fine bubbles creates very less agitation .Low shear provides poor air diffusion resulting in less oxygen transfer.Bubble mixers if installed along with the diffusers will create intense agitation and turbulence in the aeration tank causing the alpha value to increase to 1 instantly.

Why Doesn't Water Burn, Despite Being Made Of Combustible Substances (Hydrogen And Oxygen)?

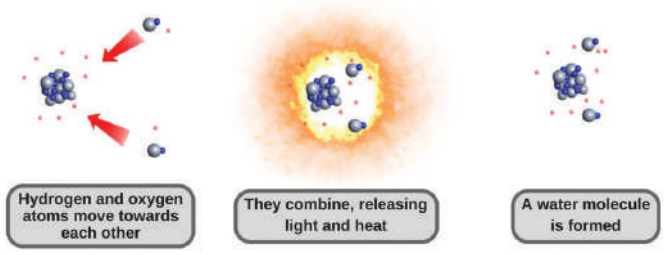
There are certain things in our daily lives that are so incredibly common that almost everyone knows about them. For example, we all know that water puts out fire, but have you ever thought about why that's true?

Water fire extinguisher

Water is a fantastic fire extinguisher for a number of reasons, one of which is the fact that it doesn't catch fire itself, despite being composed of two elements that are more than ready to participate in raging infernos!
This is because **water is already burnt.**

Let us elaborate a bit. Hydrogen gas is highly flammable. All it needs is an oxidant to start burning. Since oxygen is the most abundant oxidant on Earth, it rapidly combines with hydrogen atoms to catch 'fire', if ignited . And the product of that 'fire' is water.

<<< This is how it happens:



Note that this combination of hydrogen and oxygen releases a great deal of energy in the form of heat and light, meaning that it's quite dangerous. The Hindenburg disaster of 1937 in New Jersey, which claimed dozens of lives, was actually a result of such explosive reaction. This is the primary reason we don't make water chemically in labs.

In a nutshell, you get ashes when you burn paper; but when you're burning hydrogen atoms, you get water. Just like you can't burn ashes any further (as they're all burnt out), you can't burn water either!

Why can't cars run on water instead of gasoline?

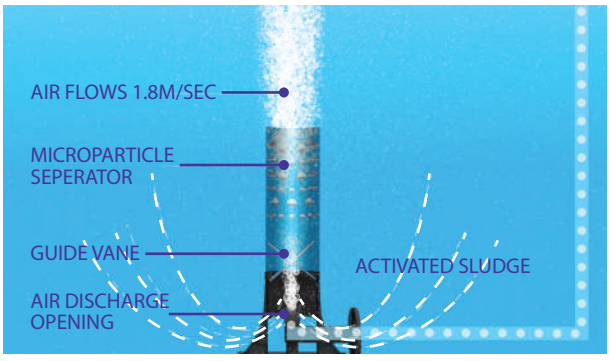
A water molecule contains one oxygen atom and two hydrogen atoms, which are bonded together like magnets. Let's say you wanted to build this car. It would need equipment to split a water molecule apart ,separate its oxygen and hydrogen and isolate them in separate tanks. Then need a combustion system that could mix and ignite them .The released energy could then drive a piston or run a motor and move the car.

Here's the problem, Dr Wai Cheng says, a professor of mechanical engineering , director of the Sloan Automotive Lab and combustion researcher, breaking those bonds will always take more energy than you get back - this process actually absorbs energy instead of giving it out. Plus there's a more volatile problem: hydrogen is dangerously flammable. On road ,a minor accident could turn into an explosion worthy of an Avengers movie.

Hydrodynamic diffusers

Gasion aerators provides microbubble generating diffusers for the aeration market

The Gasion hydrodynamic diffusers are constructed of engineering plastics and can be used as high volume air diffusers. Compressed air enters at the bottom of the diffuser assembly through an ejector device creating vacuum which draws in large amount of water in through the aerator body. The water and air mixture gets mixed thoroughly in a vane type arrangement and fractured into micro bubbles in a set of mushroom type bubble breaker device forcibly dissolving oxygen into water. Circulating flows are formed by powerful upward air flows which evenly churn the entire tank resulting high agitation and oxygen transfer. Air discharge opening is about 30mm and so operated without any clogging even in liquid with large particles.

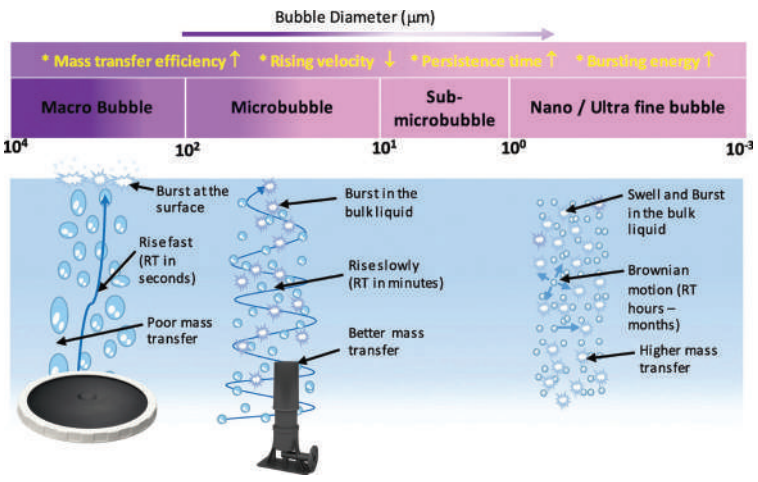


GASION AERATOR SUBSTITUTES FINE PORE DIFFUSER MORE EFFECTIVELY

	GASION AERATOR	FINE PORE DIFFUSER
BASIC STRUCTURE	LARGE AIR - 30mm	FINE AIR OPENING - MICRONS
MECHANISM	SPIRAL FLOW MIXING	LAMINAR FLOW WITHOUT MIXING
BUBBLE SIZE	MICRO SIZED BUBBLES	MILLIMETER SIZED BUBBLES
ALPHA VALUE	1.0 - 100% OTR IN ALL TYPE WATER	0.5 - ONLY 50% OTR IN WASTEWATER
CLOGGING	NEVER	FREQUENT- NEEDS CLEANING
EFFICIENCY	CONSTANT	DECREASES ON OPERATION
LIFE	> 20 YEARS	LESS THAN 2 YEARS
QUANTITY	FEW DIFFUSERS PER UNIT AREA	MANY DIFFUSERS PER UNIT AREA
MLSS	HIGH MLSS UPTO 60000 MG/LIT	CLOGS IN MLSS ABOVE 5000 MG/LIT
INSTALLATION	NO DRAINING - INSTALLED FROM TOP	TANK TO BE EMPTIED
FIXING	NO ANCHORING	STRONG ANCHOR TO FLOOR NEEDED

Size of the bubbles can drastically influence the oxygen transfer efficiency in the aeration system.

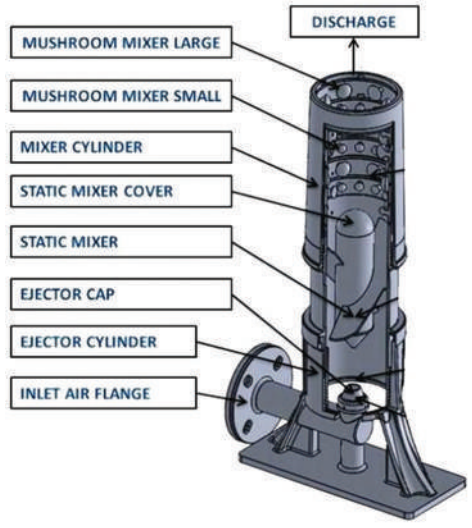
- **Smaller bubbles increase OTR exponentially**
- **Gasion diffuser generates micro bubbles with low rising velocity and high surface area.**



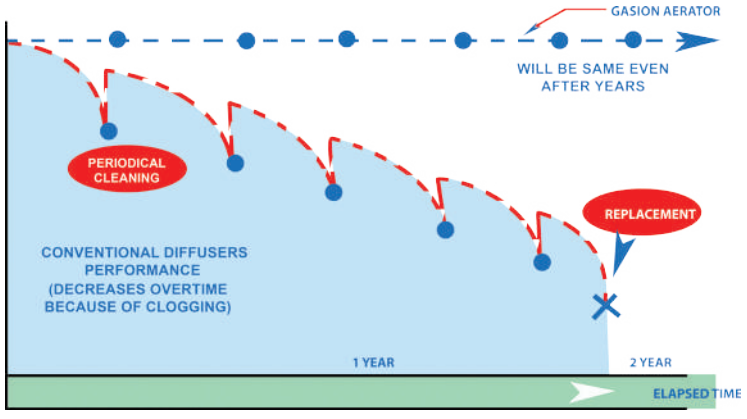
Gasion hydrodynamic diffusers produce millions of bubbles in micron sizes which have much larger surface area, compared to millimetre bubbles of diffused aerators. The size is so minute that it cannot travel up to the surface in a straight path. The very low buoyancy of the micro bubbles creates zig-zag path of bubbles moving horizontally more than the vertical distance. This increases the residence time of these bubbles in liquid drastically. The figure illustrates and compares the air bubble size and rising phenomenon of millimetre and micron sized bubbles. It could be noted that millimetre sized bubbles travel up and burst outside on the surface. But the Gasion micron sized bubbles burst inside the liquid itself as it takes much longer before it reaches the top. This bubble burst in liquid accounts for very high OTR of the Gasion Diffusers.

Multiple precision parts make an efficient aerator assembly

Gasion hydrodynamic diffusers are constructed of multiple injected moulded parts assembled together to form an high performance aerator . Each of the part is carefully designed , connected aligned to provide a durable structure which should last many years.Supplied as an unit which can be readily used in the aeration tanks



ONE GASION DIFFUSER CAN SUBSTITUTE 20 DISC DIFFUSERS OR 10 DIFFUSERS



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