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Wignity
Water Dignified

Wignity, ***adj.*** - to add dignity to the world of water management

Dear Water Warriors,

Membrane Bio Reactors & Air optimization both biological air need as well as the air scouring needs to keep MBRs free from Foulants are the topics discussed in this edition of Wignity.

Blowers are simple equipment but need careful selection to optimize energy needs.

Enjoy reading !

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Membrane Bio Reactor & Energy Optimization

This edition we present to you the know-how of MBR originated from investors of HF PVDF MBR. I think the journey started with Glegg → to GE → and now to Veolia.

The MBR if designed well with all considerations given in this magazine, last for life.

Blowers don't just give air, they are the most important equipment as over 78% of the operating cost of ETP wrt to power is just Aeration Blowers. So, their careful selection is significant.

And I wish to thank SED engineering for their beautiful AD that adds a lot of knowledge.

For more, read on:

MBR Technology…A Sustainable Solution for Water Reuse and Recovery

We thank Pure Water Enterprises Pvt. Ltd. To give their points on the Membrane Bio Reactor for this edition of Wignity. We will know a little bit of Membrane Bio Reactor and how it's different than the Activated Sludge Process.

Membrane Bior Reactor is an emerging wastewater treatment technology combining membrane separation process with conventional activated sludge (ASP) treatment process.

In ASP Clarifier are required to separate suspended solid from treated water whereas in MBR the suspended solids are remove by membrane itself.

In MBR we can go for higher MLSS up to 8000 ppm whereas in ASP it is limited to 2000-3000 ppm.

Typical Inlet & expected Outlet parameters from MBR?

Influent Parameter	Unit	STP
PH		6-8
Design Temperature	Deg C	25
BOD	mg/L	≤ 300
COD	mg/L	≤ 600
TSS	mg/L	≤ 200
TKN	mg/L	≤ 45
NH3-N	mg/L	≤ 35
TP	mg/L	≤ 8
TDS	mg/L	≤ 1500
Free Oil	mg/L	Nil
Oil & Grease	mg/L	≤ 50

Outlet Parameter:

Influent Parameter	Unit	STP
TSS	mg/L	≤ 5
Turbidity	NTU	≤ 1
BOD	mg/L	≤ 5
COD	mg/L	≤ 30

Working Philosophy or Operating Principle

Biological Treatment

About Anoxic Tank: Anoxic tank in MBR is used for denitrification, & denitrification doesn't take place in aeration because when ammonia comes to aeration tank it get converted to NO_3 to NO_2 there is enough oxygen so micro-organism doesn't digest this oxygen so it get recycle to anoxic tank as there is no enough oxygen so microorganism take this oxygen and nitrogen get realize. Volume of Anoxic tank is typically 30% of aeration tank volume.

About Aeration Tank: The Aeration tank is to sustain microorganism and to effect efficient reduction of BOD. In the aeration tank we used fine bubble type diffuser to give constant air for microbial higher MLSS up to 8000 ppm is envisaged in aeration tank.

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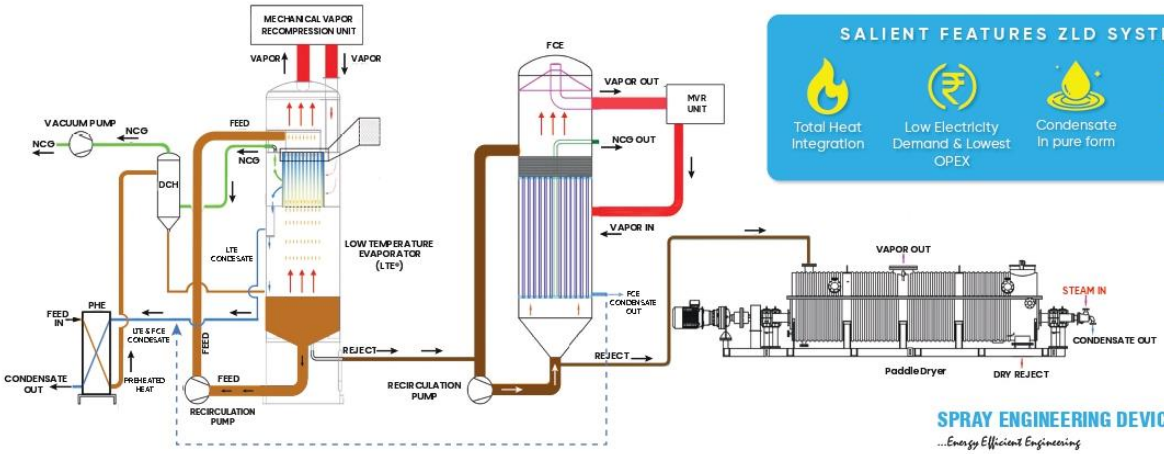
Schematic Diagram of ZLD



SALIENT FEATURES ZLD SYSTEM

- Total Heat Integration
- Low Electricity Demand & Lowest OPEX
- Condensate in pure form
- One Step Solution

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Membrane Process

Filtration/Permeate Cycle: In the filtration step, water is filtered through the membrane, and typically, the operating flux is maintained constantly, while the filtrate produced is collected in the filtrate tank. As the filtration step progresses, the foul ants tend to deposit on the membrane surface and foul the membrane.

The rate of fouling is reduced by continuous aeration. The aeration creates a two-phase flow that scours the membrane surface and continuously removes the foulants. This allows the membrane to maintain a constant flux rate.

Working Cycle

Permeation 12-15 mins & Backwash 60 secs

There will be both maintenance clean & recovery clean, the maintenance clean is with hypo that is twice a week & with citric that is once a week, the recovery clean is carried out once every six months.

About Backwash

In backwash the flow comes reverse for cleaning the membrane where the flux is 34 LMH.

About Maintenance cleaning & Recovery cleaning

In Maintenance Cleaning there is 160 sec backwash with chemicals, chemical used for Maintenance Cleaning is hypo & citric with concentration of hypo 250 ppm (10-12 %) & Citric: 1000 ppm (100 %) & Maintenance Cleaning is done week like twice a week with hypo & once a week with citric.

In Recovery Cleaning we are soaking the membrane in tank with hypo & citric for concentration of hypo 1000 PPM (10-12 %) & Citric: 2000 PPM (50 %) Where recovery cleaning is done once in six months for 6 to 8 hrs.

Chemical Dosing

	Hypo	Citric
	10%	50%
Maintenance Clean		
Dosing ppm	200	1000
Frequency (per week)	2	1
Recovery Clean		
Doing ppm	1000	2000
Frequency (per year)	2	2

The chemicals dozed during the backwash cycle, and one backwash cycle in a day for 160seconds.
Hypo: twice a week
Citric: Once a week

Membrane Warranty & life

Membrane comes with 2-year complete replacement against any manufacturing defects & typical life of membrane is 5 to 7 years.

Module Details

Pore Size	0.04 micron
Membrane Material	PVDF
Flow Path	Outside-In
Height of Membrane	1.8m
Operating Pressure	0 to -4 bar & 0 to +4 bar
Max Chlorination Concentration	250 ppm
Lifting weight (Wet)	62 kg

What is permeation & backwash?

Permeation in MBR means the permeate pump sucks the water from membrane for 15 to 20 min to get the clear water.

Backwash means clean the membrane where the flow is reverse which is carried out for 45-60 sec.so that all the solid which has been settled to membrane get wash out easily.

Key data required for selection of the right product

For the Sewage Treatment Plant below parameters are required:

1. BOD
2. COD
3. TSS
4. pH

For the Effluent Treatment Plant below parameters are required at Aeration Tank Inlet:

1. pH
2. TDS
3. TSS
4. COD
5. BOD

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Driving Efficiency…The Role of Blowers in Water Industry

We thank AKASH Blowers that contributed technical points on the types of blowers for this edition of Wignity. AKASH started manufacturing Twin Lobe Rotary Air Blowers way back in 2009. Since then, the company has consistently strengthened its manufacturing base by producing a wide range of products including TWIN LOBE & TRI LOBE ROTARY Air Blowers / Compressors (Root Blowers), Mechanical Vacuum Boosters & Acoustic Hoods. We have also started dealing and manufacturing in Ring Blowers / Regenerative / Side Channel Blowers and Multi-Disc Screw Press.

These wide range products, and the technical expertise gained over the year have enabled AKASH to serve various segments of industry such as Flue Gas Application in sponge Iron, Silo Aeration for Cement Plants, Bulker unloading, Pneumatic conveying Sulphonation in Sugar plants, Water treatments plants, Effluent treatment plants, Aqua culture farms, Chemical & pharmaceutical plants, Food processing units.

Quality Manufacture

Casing: All AKASH Blowers units are single piece construction and precision machined cast iron, with ribs for strength and consistent thermal behavior.

Bearings: All AKASH Blowers units are using SKF / FAG anti-friction bearing type vary with machine.

Timing Gears: Forged steel gear with hardened and ground teeth to reduce vibrations and ensures accurate rotor to rotor timings for smooth and efficient operations.

Shafts: Impeller Shafts are alloy steel forgings that allow higher operating pressure and rotation speeds.

Seal: Low-wear non-contracting, labyrinth type seals ensure performance and long life.

Rotors: Made from cast iron or S.G iron with stiff design or maximum life. By CNC and 3D machinery control to ensure the highest performance providing trouble-free performance and durability.

Direct Drive Blowers & Aqua Culture Blowers

Akash introduces 0.75 HP & 1 HP Direct Drive Twin-Lobe Roots Blowers. These Blowers have been designed keeping the demands of the industry of compact & sturdy machine low noise, less space requirements, low vibrations, longer bearing life and low maintenance.

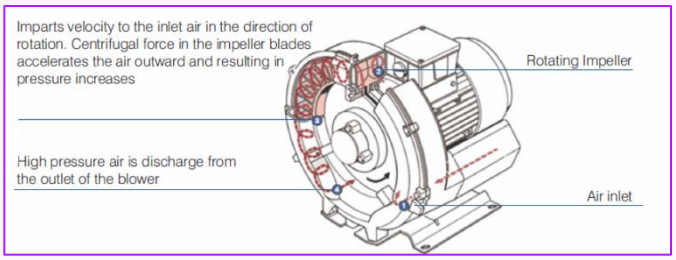
Complete blower package assembled with all accessories and coupled with electric motor, ready to install. These blowers are designed for continuous duty. Direct drive blowers have increased efficiency, low noise and easy to maintain.

AKASH range of aqua culture blowers to meet the growing demand for aquaculture /horticulture for RAS Tanks / biofloc system / natural fishpond requirements which essentially demand 100% oil free Air. These blowers are totally dry machines whereas lubrication chambers are physically isolated from the main air chamber ensuring100% oil free air delivery. Oil free air delivery ensures proper maintenance of BOD for aqua culture.

Ring Blowers

Working Principle

Ring Blowers, also known as Side Channel / Regenerative Blowers, are directly driven by electric motors. The impeller in the blowers are mounted directly on the motor shaft for contact free compression, without friction. Maximum operational reliability and service life, even at high differential pressures, is ensured by the arrangement of the bearings outside the compression chamber.



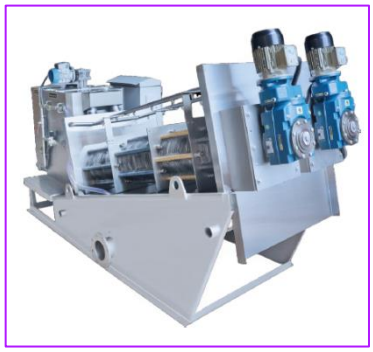
Applications

1. Sewage Treatment Plants
2. Electroplating Plants
3. Water Treatment Plants
4. Aeration
5. Air Knife System
6. Vacuum Conveying
7. Vacuum De-Solders
8. Vacuum Lifting & Feeding
9. And Many More

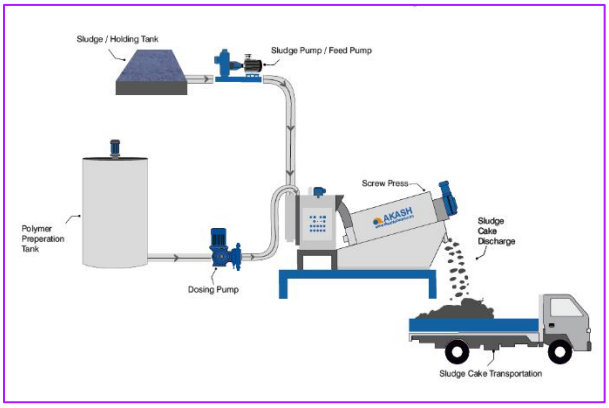
Ring Blower Features

1. 100% oil free air
2. Low noise level due to internal silencer
3. Less vibration
4. External bearing increase life
5. Suitable for Pressure & Vacuum application
6. Fully Copper Winding
7. Pulsation free air
8. Low power consumption
9. Easy installation
10. Direct drive motor design
11. Low maintenance
12. Compact design (Space saving)

Multi-Disc Screw Press - Sludge Dewatering Machine



The Sludge dewatering machine are widely used in solid-liquid separation to minimize the sludge disposal. The Sludge is pumped to the Flocculation tank chamber where poly-electrolyte solution is added for formation of bocks and continuously mixed during the operation with the help of Flocculation paddle to ensure the relative stability of the sludge concentration.



Then the treated sludge moves forward into the dewatering cylinder where liquid is drained from the gap between the rings under the gravity and dewater sludge cake discharge at the end of cylinder.

Applications

1. Municipal Sewage Sludge
2. Waste Water Treatment Plant
3. Industrial Wastewater treatment Plant
4. Dairy Farming
5. Chemical & Pharmaceutical Plant

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Strength in Unity

Collaborative Excellence in Water Treatment

Join us in embracing the "Stronger Together"
This initiative aims to unite us all in our efforts, emphasizing collaboration, support, and synergy within our community.

Let's join hands and make a difference together!

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