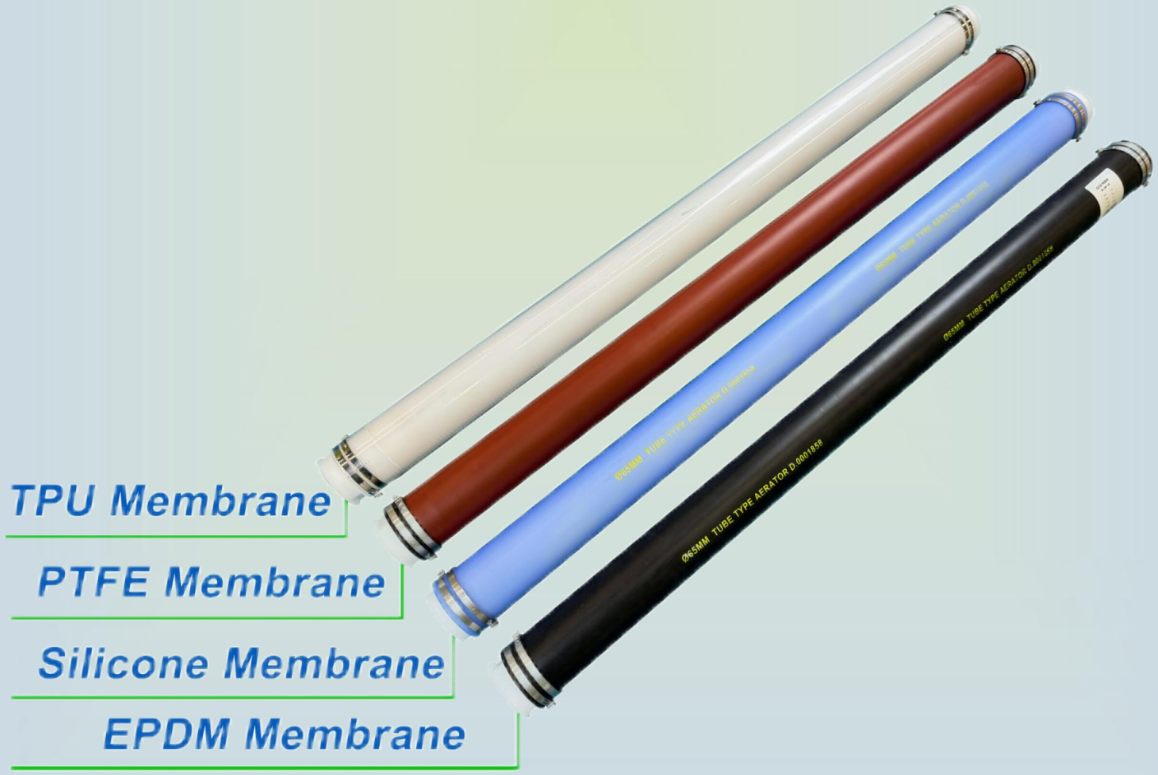
AquaSust

Φ93-1000 Tube Diffusers

Operating instructions



一、Summary

Tubular membrane fine bubble diffusers are a new type of fine bubble aeration equipment used in the biochemical treatment processes of industrial and municipal wastewater.

These diffusers have a high air flow capacity per unit, low resistance at the base, and high oxygen transfer efficiency. The most important component, the membrane, is made of EPDM rubber. It features numerous small pores that open during air supply, creating fine bubbles, and automatically close when the air supply stops to prevent wastewater and contaminants from entering and clogging the diffuser pipes.

二、Product Structure and Principles

This product mainly consists of a support tube and a membrane, with a lifespan of up to ten years. The membrane is made from imported materials and features numerous self-closing micro-pores. During aeration, the gas enters the support tube's distribution slots through the diffuser pipe connection holes. The gas pressure causes the micro-pores on the membrane to open, generating a large number of fine and uniform bubbles to oxygenate the water. When the air supply stops, the membrane fits tightly onto the support tube, causing the micro-pores to close and automatically preventing backflow.

三、Main Performance Parameters

Product Model	L=1000mm， φ93mm
Total Length (L)	1000mm
Membrane Diameter (D)	93mm
Air Flow Rate	6-16 m3/h
Design Air Flow Rate	10m3/h
Service Area	1.5—3m2 ·pcs
Oxygen Transfer Rate	>30%
Oxygenation Capacity	1.25KgO2/h
Theoretical Power Efficiency	8.5KgO2/KW ·h
Resistance Loss	＜3000pa

四、Main Physical and Chemical Properties of EPDM Membrane for Diffusers

Serial No.	Rubber Membrane Properties	Performance Indicators
1	Test Item	Indicator
2	Color	Black
3	Oil Content	<10%
4	Heat Resistance	100°C
5	Tear Strength	>1.72 KN/m
6	Tear Coefficient	720%
7	Resilience	>45%
8	Tensile Strength	>17.2 N/mm²
9	Diffuser Membrane Diameter	De 93mm
10	Diffuser Membrane Thickness	1.8mm

11	Water Head Loss	<2400 Pa
12	Theoretical Power Efficiency (Clean Water)	>5.6 kg O_2/kW·h
13	Diameter of Micro Bubbles Generated in Water	≤2mm
14	Hardness (Shore A)	65±5
15	Acid Resistance Coefficient (28% H_2SO_4 × 24h)	0.98
16	Alkali Resistance Coefficient (38% NaOH × 24h)	0.94
17	Oil Resistance (No. 1 Standard Oil, Room Temperature)	1.80
18	Water Resistance 7d (Tap Water, Room Temperature 168h)	Weight Gain 1.5%, Volume Change Rate 1.84%
19	Tensile Yield Stress	18.0 MPa
20	Impact Strength	≥118.0 J/m
21	Ball Indentation Hardness	≥63.0 N/min

五、Main Features of the Product

1、High Oxygen Utilization Rate

Each diffuser has approximately 20,000 micro-pores with diameters of 0.7-1.3 mm. When aerating, the micro-pores on the membrane open, producing a large number of uniformly sized fine bubbles. This greatly increases the gas-liquid contact area, resulting in an oxygen utilization rate of over 40%.

2、High Oxygenation Power Efficiency

The membrane's thinness and minimal pressure loss, combined with the numerous fine micro-pores, result in a theoretical oxygenation power efficiency of over 9.0 kg O_2/kW·h.

3、Low Investment, Low Energy Consumption, Low Operating Costs, High Cost-Performance Ratio

Due to its high air flow capacity, high oxygen utilization, and high oxygenation power efficiency, this product saves over 40% in investment costs compared to mechanical aeration equipment and reduces energy consumption and operating costs by over 50%. Compared to disc-type variable micro-pore diffusers, it saves over 30% in investment and reduces energy consumption and operating costs by over 20%, significantly lowering project investment and effectively saving operating costs while improving the cost-performance ratio.

4、Novel and Unique Structure, Stable and Reliable Operation

The support tube of the diffuser is a one-piece hollow structure, with the hollow part being the water-filled area. The entire diffuser has minimal buoyancy in water, ensuring stable and reliable operation. The micro-pores on the membrane close automatically when aeration stops, effectively preventing sludge clogging and wastewater backflow. The diffuser tube has a circular cross-section, making it difficult for sludge to accumulate when aeration stops.

5、Continuously Adjustable Aeration Volume

The air supply volume can be continuously adjusted. Even with significant changes in gas flow rate, the self-closing micro-pores can still open and close smoothly, releasing uniformly sized bubbles. The adjustability is excellent.

6、High-Quality Materials, Long Service Life

The support tube of the diffuser is made from injection-molded PP material, making it aesthetically pleasing and sturdy. The membrane is made from imported raw materials with high resistance to corrosion, aging, and UV, as well as high tensile and tear strength, greatly extending the membrane's service life.

7、Easy Installation

The entire aeration system only requires the main air distribution pipeline to be laid at the bottom of the aeration tank according to the design, and then the diffusers can be installed on each air distribution pipe at the designed intervals. The diffuser tube is firmly screwed onto the air distribution pipeline, making installation secure and disassembly easy. The stainless steel clamps make membrane replacement simple.

六、Installation and Operation

1、Installation Instructions for Tubular Diffusers

(1)Pre-Assembled Diffusers

The tubular diffusers are pre-assembled by the manufacturer and supplied ready for installation. Users only need to install them onto the air distribution pipe as required. The diffusers should be installed on the same horizontal plane, with a height difference of ±2cm and spaced 0.5 to 2 meters apart (determined by design based on oxygen demand).

(2)Preparing the Air Distribution Pipe

The air distribution pipe should be prepared with connection holes where the tubular diffusers will be installed. The holes should be drilled at both ends of the air distribution pipe to install the external threaded connectors. The drilling should be smooth.

(3)Cleaning Before Installation

Before installing the tubular diffusers, the pipes must be purged to ensure they are free of debris that could block the diffusers.

(4)Installing the Tubular Diffusers

Place the diffusers at the connection holes on the air distribution pipe. Secure the diffuser tube onto the air distribution pipe using threaded fittings.

2、Operation and Commissioning of the Aeration System

(1)Clear Water Test

After completing the installation of the aeration system, conduct a clear water test in the aeration tank. Ensure the water depth submerges the diffusers by 10-20 cm.

(2)Leakage Testing

Start the blower and check each diffuser for airtightness by observing the

aeration. If any diffuser is not tightly installed, bubbles will appear at the loose point after a short aeration stop.

(3)Oxygen Supply Measurement

Before measuring the oxygen supply, allow the diffusers to aerate continuously for 24 hours. The maximum air flow rate should be limited to 10 m^3/h per diffuser.

(4)Standby Procedure

If the aeration tank is not to be used immediately after installation and commissioning, fill the tank with at least 1 meter of clean water until the tank is ready for formal use.

3、Replacement Instructions for Tubular Diffusers

(1)Replacing the Membrane

If the membrane needs to be replaced, follow these steps:

a. Loosen the membrane tube clamp with a screwdriver and remove it.

b. Slide the membrane off the support.

c. Clean the support tube with a clean cloth to prevent debris from clogging the new membrane.

d. Replacing the membrane is the reverse of the above two steps.

(2)Replacing the Diffuser

If the diffuser needs to be replaced, follow these steps:

a. Unscrew the diffuser tube from the connector and remove the diffuser from the air distribution pipe.

b. Follow the "Installation Instructions for Tubular Diffusers" to install the new diffuser.

七、Maintenance and Care

1、Maintenance

a. Regularly open the drainage valve of each aeration unit to check for leaks.

b. Inspect the operation of the aeration pipes (check for large air bubbles).

2、Maintenance and Precautions

a. In summer, prevent the aeration pipes from being exposed to direct sunlight.

b. In winter, prevent the aeration pipes from freezing due to low temperatures.

c. During transportation or when not in use, prevent damage from external heavy objects.

d. During operation, ensure that the air flow rate of the aeration pipes falls within the standard range.