

AM248B Microbubble Oxygenation System

Aquaculture Circulation & Aeration Solution

Designed for Aquaculture Ponds, Solar-Aquaculture Hybrid Farms, and RAS (Recirculating Systems)



Aquaculture Microbubble

Smart Oxygenation & Water Purification Solution

AM248B Modular Microbubble Oxygenation Assembly

1. Venturi Natural Air Intake

Utilizes water pump flow to generate negative pressure for natural air intake without an air compressor.

2. Modular Configuration

Flexible layout tailored to pond dimensions, water depth, piping, and pump specifications.

3. Enhanced Gas-Liquid Contact

Microfine bubbles significantly expand contact surface area to facilitate oxygen transfer efficiency.

4. Bottom Water Circulation

Works in synergy with circulation currents to improve bottom low-dissolved oxygen zones.

Overcoming Surface Aeration Limitations & Enhancing Pond Circulation

Operational Limitations of Traditional Aerators

- **Large Bubble Diameter:** Coarse bubbles rise rapidly to the surface with short contact time.
- **Surface-Confinement:** Paddlewheels mainly agitate surface water, leaving bottom layers hypoxia-prone.
- **Bottom Hypoxia Risk:** Water depth, temperature, and biomass can create poor bottom DO distribution.
- **Restricted Actual Efficiency:** Overall oxygen transfer efficiency is constrained by bubble size and equipment setup.

Advantages of AM248B Microbubble Technology

- **Expanded Contact Area:** Microfine bubbles dramatically increase gas-liquid contact surface area.
- **Enhanced Oxygen Diffusion:** Promotes thorough oxygen dissolution and diffusion throughout water column.
- **Improves Bottom DO:** Synergy with water circulation effectively mitigates hypoxic bottom zones.
- **Flexible Multi-Point Layout:** Coverage customized based on pond depth, geometry, flow rate, and setup.

From Surface Agitation to Full-Pond Circulation

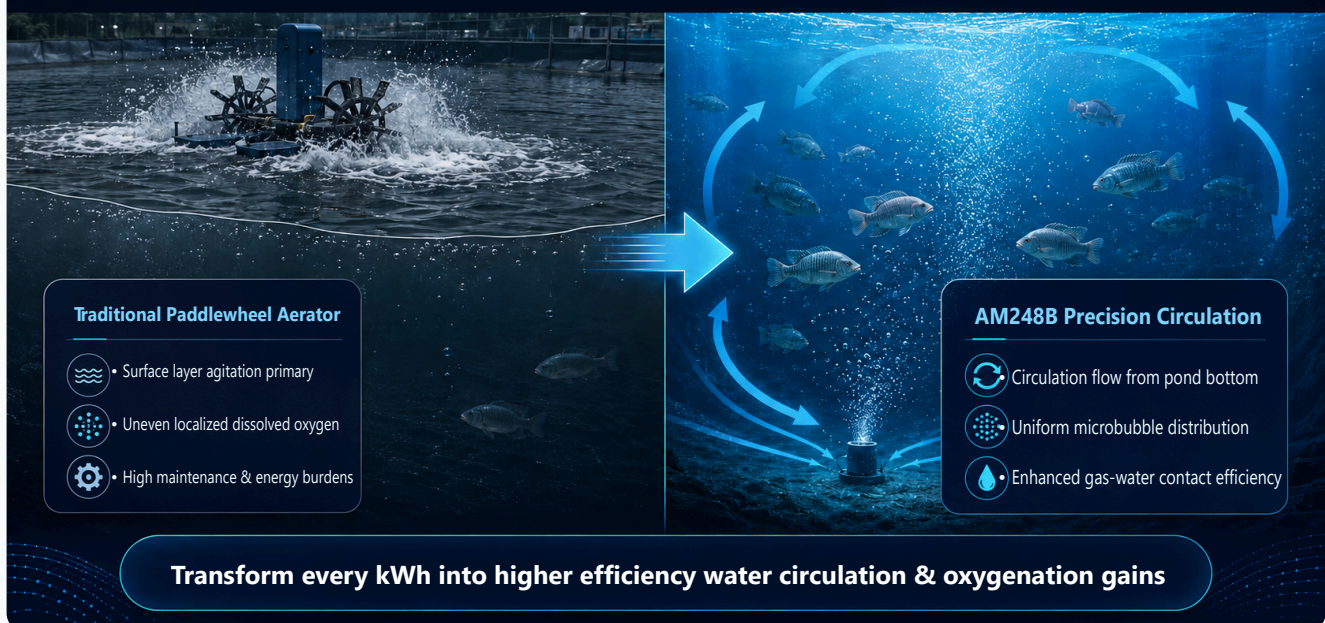


Figure 1: Comparison of Traditional Aeration vs. Microbubble Circulation Oxygenation

Microbubble Dynamics & Gas Transfer Mechanism

What is a Microbubble?

Microbubbles are fine bubbles diameter $< 100 \mu\text{m}$; bubbles $< 1 \mu\text{m}$ are ultrafine microbubbles

Macro-bubbles



$> 100 \mu\text{m}$

Microbubbles



$1 - 100 \mu\text{m}$

Ultrafine Microbubbles



$< 1 \mu\text{m}$

Finer bubbles significantly enhance gas-liquid contact and dispersion in water

1. High Transfer Efficiency

Microfine bubbles expand contact surface area, facilitating rapid oxygen transfer into water.

2. Pond Circulation Synergy

Drives continuous water movement to prevent thermal stratification and bottom low-DO pockets.

3. Sustained DO Support

Provides steady and continuous oxygenation to maintain a healthy aquatic culture environment.

AM248B Modular Oxygenation Architecture

Taiwan Invention Patent: I870325

Invention Patent

AM248B Modular Aeration Architecture Redefines Water Activation Standards



Three Core Modular Components

1. Venturi Natural Air Intake

Uses water pump velocity to create negative pressure, automatically drawing ambient air without an air compressor.

2. Water-Gas Mixing Chamber

Promotes intense shearing and thorough mixing of drawn air and water before discharge into the distribution pipe.

3. MB248S Microbubble Generator

Leverages specialized internal flow geometry to convert the mixture into fine microbubbles released into the pond.

✦ **Important Notice:** System sizing should not be determined solely by total water volume. Sizing and layout require evaluation of pond geometry, water depth, piping friction loss, pump flow rate, head pressure, stocking density, and target DO.

Two Flexible Installation Configurations

Option A: External Outboard Non-Invasive System

- Ideal for upgrading existing aquaculture ponds.
- Requires no modification or cutting of pond walls.
- Simple installation, repositioning, and routine maintenance.
- Tank placement and piping setup tailored to site conditions.

Option B: Direct In-Line Pipe Connection System

- Ideal for new aquaculture facility construction.
- Integrates seamlessly into existing circulation supply/return pipes.
- Configurable according to available pipe diameters and space.

Dual-Module Architecture, Seamlessly Integrating into Your Operations

Option A: External Hang-On System (No Tank Piercing Required)

Specifically designed for below-ground ponds lacking existing outlets

50cm below
water surface

Top reserved 20cm
safety clearance

Option B: Standard Direct-Connect System

Perfectly aligns with existing pipeline ports, maximizing space utilization

Bottom Microbubble Generator Placement Layout

Field Test Conclusion: Data Trajectory of Deep Oxygenation Long-Lasting Oxygen Benefit of Microbubbles



Water Temp vs 100% DO Saturation Table (1 atm)

Temp (°C)	26.0	27.0	28.0	28.4 (Current)	29.0	30.0
100% DO (mg/L)	7.82	7.96	7.83	7.73	7.71	7.59

DO Saturation Reference Ranges

0 ~ 60% Low	60 ~ 90% Good	90 ~ 110% Ideal	> 110% Super-sat
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* Saturation % = (Measured DO / 100% Benchmark Value) × 100%



Traditional aerators trigger immediate hypoxia risk upon shutdown; AM248B system not only oxygenates rapidly but maintains water quality during shutdown via deep dissolution mechanisms, dramatically reducing energy & risk.

MB248S Microbubble System DO Test Report

Rapidly increases dissolved oxygen levels with superior retention capacity



Water Vol:
~3 Tons



Device:
MB248S System



Generator:
1 Unit

After 5 Mins Active



Dissolved Oxygen (DO)

7.1 mg/L

- ✓ Water filled with milky microbubbles
- ✓ DO level significantly increased
- ✓ +134% increase vs baseline

▶ Test Video
Active 5
Mins



After 30 Mins Inactive

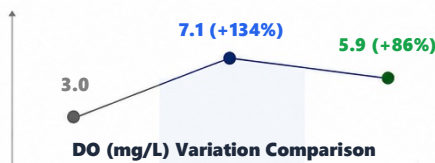
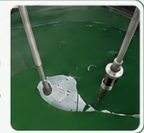


Dissolved Oxygen (DO)

5.9 mg/L

- ✓ Water gradually becomes clear
- ✓ Microbubbles dissipate slowly
- ✓ +86% maintained vs baseline

▶ Test Video
Inactive 30
Mins



Key Test Findings

- ✓ 1 MB248S unit effectively treats ~3 tons water volume
- ✓ After 5 mins active, DO rose from 3.0 to 7.1 mg/L
- ✓ Dissolved oxygen boosted by ~134%
- ✓ After 30 mins inactive, DO maintained at 5.9 mg/L
- ✓ Demonstrates excellent oxygen retention capability

Conventional Aeration VS Microbubble

Conventional (Macro)	MB248S System
✗ Small contact area	✓ Extended contact area
✗ Short diffusion window	✓ Inc reased duration
✗ Low oxygen utilization	✓ Superior transfer efficiency
✗ Rapid DO drop off	✓ Retains DO post shutdown



High-efficiency oxygenation is the key to successful aquaculture & hydroponics!

MB248S Microbubble System rapidly boosts DO, stabilizes water quality, and increases yield & quality!

Water Temperature & DO Saturation Chart

Dissolved oxygen (DO) varies with water temperature and atmospheric pressure.

Higher water temperature lowers maximum DO limit!

Your Current Status (Measured)



Water Temp
8.7°C



Dissolved Oxygen (DO)
7.0mg/L

Current Saturation Calculation
 $7.0 / 7.75 \times 100\% \approx 90.3\%$

What is 100% Saturation ?

Under standard 1 atm pressure, when dynamic equilibrium is reached between water & air, the maximum dissolved oxygen concentration is defined as 100% DO Saturation Value.

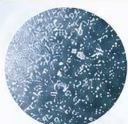


100% DO Saturation Values Across Temperatures (1 atm)

Temp (°C)	20.0	22.0	24.0	26.0	27.0	28.0	28.7 (Current)	29.0	30.0	32.0
100% DO (mg/L)	9.08	8.64	8.18	7.82	7.96	7.83	7.75	7.71	7.59	7.34

← Temp drops → DO cap rises

Temp rises → DO cap drops →



Super-saturation Properties

Extended retention time & immense contact surface area enable microbubbles to break through standard equilibrium limits, achieving Super-saturation (>100%).

Super-saturation Potential (at 28.7°C)

100% Saturation ~ 7.75 mg/L 120% Saturation ~ 9.3 mg/L 150% Saturation ~ 11.6 mg/L



Enhanced Vitality
Sufficient DO keeps fish & shrimp healthier and active



Lower Nighttime Risk
Maintains stable DO, eliminating surfacing and losses



Boosted Appetite
Improves FCR and accelerates growth cycle



Improved Water Quality
Promotes nitrification, keeping water stable



Higher Stocking Density
High DO supports higher biomass density



At 28.7°C, 100% saturation is ~7.75 mg/L. Your 7.0 mg/L has reached 90% saturation. Continuous operation reaches 100% or beyond!

Test Setup & DO Change

Tested in a closed 3-ton water tank at 28.7°C water temperature. Initial dissolved oxygen was 3.0 mg/L. Upon turning on the AM248B system for 5 minutes, DO rapidly rose to 7.1 mg/L (+137%). 30 minutes after system shutdown, DO maintained at 5.9 mg/L (+97% above baseline).

Results Summary & Scope Statement

Field test demonstrates effective gas-liquid transfer and rapid oxygenation capabilities, as well as excellent post-shutdown DO retention. This data serves as a reference under tested conditions; actual performance varies according to site-specific environmental factors.

Comparison & Pre-Planning System Information Checklist

1. Improves Bottom DO

Drives vertical water movement to alleviate bottom hypoxia risks.

2. Expands Contact Area

Microbubbles increase surface contact area for efficient oxygen dissolution.

3. No Air Compressor

Venturi intake draws air naturally via water flow, simplifying equipment.

4. Modular Maintenance

Flexible modular layout enables quick disassembly and easy maintenance.

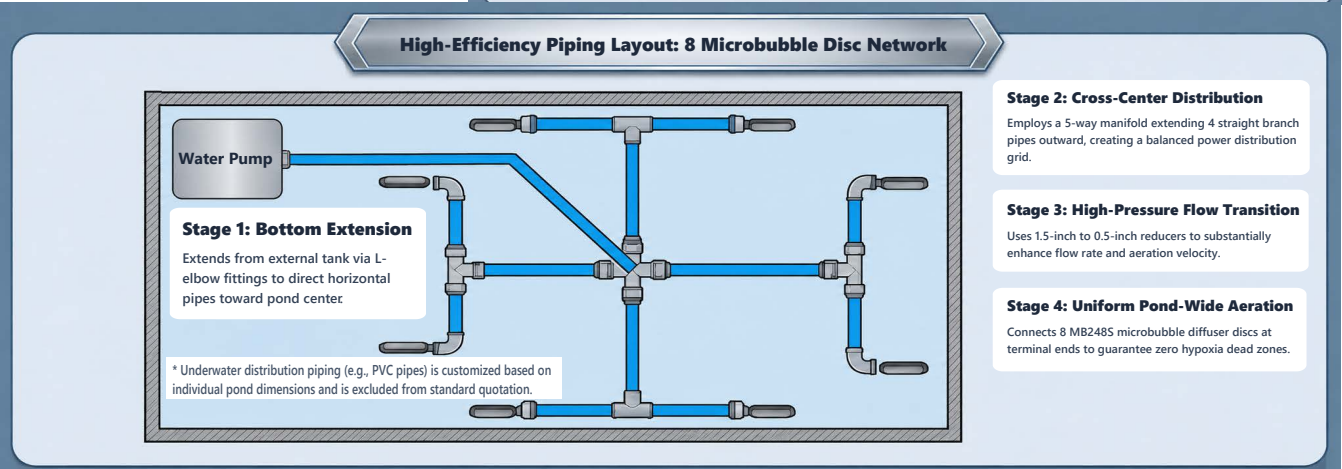
1. Traditional Aerators vs. AM248B Microbubble System Comparison

Feature	Traditional Paddlewheels / Aerators	AM248B Microbubble System
Bubble Type	Coarse bubbles (> 0.1 mm), high buoyancy, rapid rise	Microfine bubbles , prolonged water retention time
Gas-Liquid Contact	Limited contact area, restricted oxygen transfer	Expanded contact surface , superior dissolution efficiency
Bottom Circulation	Mainly agitates surface water, weak bottom flow	Drives circulation currents to improve bottom low-DO
Air Intake Method	Requires external air compressor or mechanical splash	Venturi natural negative pressure , no compressor needed
Maintenance	Submerged motors & impellers require frequent service	No submerged moving parts , easy modular cleaning
Applications	Conventional open outdoor ponds	Aquaculture ponds, Solar-Aquaculture, RAS systems

2. Professional Configuration List (BOM)

This diagram shows an example configuration using eight MB248S units. The actual quantity and piping layout should be adjusted according to pond dimensions, water depth, stocking density, pump performance, and the target dissolved oxygen (DO) level.

Professional Configuration Bill of Materials (BOM)		
Component Name		Specifications & Function Description
Water Pump		Includes precision fitting assembly; main power core
Tank Module		Includes base frame & hanging bracket; supports hang-on system
AI248B Core Assembly		Patented intake core; system heart
MB248S Microbubble Disc		8-set configuration; critical terminal aeration units



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Contact us to design a tailored microbubble oxygenation plan for your farm!