SOLARI MICROBUBBLE GENERATOR

OXYGEN INJECTION, RETENTION, BUBBLE SIZE, NUMBERS, COMPARSIONS, OXYGEN TRANSFER EFFICIENCY (OTE), STANDARD OXYGEN TRANSFER RATE (SOTR), AND DISSOLVED OXYGEN (DO)

This product is sourced from China where is was invented by a Science and Technology company and is available through Solari Water and its distribution network.

The Source of this test information is the Chinese Academy of Sciences. This is the National Academy for the natural sciences of the Peoples Republic of China, headquartered in Beijing.

Bubble Generation:

The Solari microbubble generator generates bubbles of 200 nanometers (0.2μ) to 3 micron, with air concentration between 84-90%, and bubble rising speed of 4-8mm per second. In fresh water, this unit generates 0.6-0.7 billion (600-700 million) bubbles below 300 nanometers (0.3μ) per ml. After 3 hours, the quantity remains 0.1-0.3 billion (100-300 million) per ml.

Quick points:

a) Diameter of the bubble: below 300 nanometer (0.3μm)
b) Quantity of the bubble: fresh water as source water, 0.6-0.7 billion per ml; pure water as source water, 40-60 million per ml.
c) Life span of the bubble: in fresh water, the quantity reduces as time goes, and stabilizes at 0.1-0.3 billion per ml after 3 hours; in pure water, the quantity slowly changes, and remains at 40-50 million per ml after 17 hours.

Equipment Used:

Test	Quantity and Life span of bubbles	Source of water	Tap water and super-purified water
Main test device	Nanosight Particle Tracer Analyser	Laboratory condition	Relative humidity: 20-50% Temperature: 25℃°± 5℃°

Note the warmer temperature in the above table. This is of particular relevance to Northern Australia and all tropical areas.

Comparison of Bubble Sizes using Different Aeration Techniques

Bubble Size Relationship	mm Sizing			Micro/Nano Sizing (µ)		
Coarse Bubble		>	10.000		>	10.000
Medium Bubble	4.000000	to	9.000	4,000.000	to	9.000
Fine Bubble	1.000000	to	3.000	1,000.000	to	3.000
Human Hair	0.060000	to	0.080	60,000	to	80.0
Visible to the Naked Eye	0.05000	to	0.060	50,000	to	60.0
Micro Bubble				1.000	to	100.0
Ultrafine Bubble (nano bubble)				0.001	to	1.0

Typical Oxygen Transfer Values in Clean Water (Ottawa County Public Utilities – Joe Herbert)

Oxygen Transfer Efficiency (OTE) and Standard Oxygen Transfer Rate (SOTR)

System	Oxygen Transfer Efficiency			SOTR		
	%	to	%	Kg/kW-hr		
Microbubble Generator	95	to	98	6.1	to	16.5
Fine Bubble Diffuser (Total Floor Coverage)	22	to	32	3.7	to	4.0
Fine Bubble Diffuser (Side Wall Installation)	18	to	20	2.1	to	2.7
Jet Aerators (Fine Bubbles)	18	to	25	0.9	to	2.7
Static Aerators (Medium Bubbles)	10	to	12	1.4	to	1.7
Mechanical Surface Aerators		to		1.5	to	2.1
Coarse Bubble Diffusers (Wide Band Pattern(	8	to	12	1.2	to	2.8
Coarse Bubble Diffusers (Narrow Band Pattern)	6	to	8	0.9	to	1.2
Paddlewheel		to		1.5	to	2.3

1300 349 750
info@solariwater.com.au

www.SolariWater.com.au
The Johnson 1/477 Boundary St, Spring Hill QLD 4000 | Phone 07 3118 59 27 | info@solariwater.com.au

Dissolved Oxygen Test (DO):

The test was done by Kunming Lvdao Environmental Engineering Co., Ltd., with pure oxygen as the source.

The DO at the inlet was 2.18, and the DO at the outlet was 31.31, increased by about 15 times instantly. (This is consistent with the findings in Toowoomba using the Ozone Generator for Oxygen supply and consistent with a number of published articles)

Test Information:

	Analysis Date 27/09/2017			
Test	Method	Method Reference	Testing Equipment & Model	Limit of Detection (LOD)
Dissolved Oxygen	Electrochemical Probe Method	HJ 506-2009	KMLDGS-YQ-FX028 HI2400 Dissolved oxygen measuring instrument	0.01 mg/L
Water temperature	Water thermometer	GB 13195-91	0.2 Accuracy thermometer	0.2C°
	Result			
	Water Temperature (C°)		Dissolved oxygen (mg/L)	
Equipment inlet	23.5		2.18	
Equipment outlet	23.0		31.32	
3 minutes after starting the machine	23.1		31.91	
6 minutes after starting the machine	23.5		31.84	
9 minutes after starting the machine	23.8		31.12	
12 minutes after starting the machine	24.4		30.49	
Notes	(1)　　　Samples were tested on the sampling site (2)　　　Oxygen was generated by a molecular sieve oxygen concentrator.			

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