NBG®

UltraFine Bubbles Oxygenation System

BioNano's Patented Technology

US Patent No. 7.891.642B2
EU Patent No. EP 2189212B1
Taiwan Patent No. 1348391

Fluid Dynamic Parameter : Instant atmospheric pressure of 1000 ATM (14,695.95 PSI) and temperature of 3000 K (2,726.85 degrees Celsius). Condition for generating right sized nanobubbles.

Available specs (NBG)

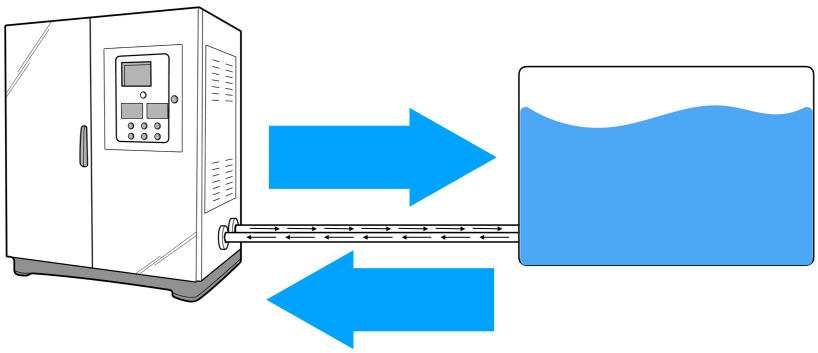
Specification	NBG® TY-3-2	NBG ® TY-75-7
Flow Rate (m^3/hr)	6 m^3/hr	20 m^3/hr
Electric Parameter	3kW (4 HP)	7.5kW (10 HP)
Voltage	380-440VAC 3∮4W	380-440VAC 3∮4W
Electric Frequency	47 - 63 Hz	47 - 63 Hz
Speed of Dialysis	6 m^3/hr diffusing into 40 m^3/hr	20 m^3/hr diffusing into 100 m^3/hr
Air Sources	Air or Pure Oxygen	Air or Pure Oxygen

Effective oxygenation system - nano bubbles technology

The nanobubbles produced by our NBG has several unique properties that distinguish them from other bubbles generated by other conventional systems. One of the unique features of our Nanobubbles is that it remains stable in the water and have longer residence time in the water. Nanobubbles enhance the high oxygen mass transfer efficiency as the internal pressure of the bubble is inversely proportional to the size of the bubbles. (i.e, the smaller the bubble, the higher the pressure inside it.) Moreover, Nanobubbles have the largest specific surface area which intensifies the mass transfer efficiency due to the larger surface of contact between the gas and liquid phase. Thus, the explanation of the significant increase of dissolved oxygen concentration when using our Patented Nanobubble Technology.

- Industrial grade, heavy duty
- Quite operation
- Drastic improvement in key water parameter (DO level)
- Sustainability through restoration of a healthy and balanced marine ecosystem for long-term success of water treatment
- Energy efficient, saving cost up to 80%
- Automation through programming capability
- Built-in back wash system to lower maintenance cost

NBGs can be programmed to operate at pre-determined frequency. It also has a build-in backwash system so it can maintain itself. These two features reduce the manpower required to operate and maintain NBG, leading to lower running costs.



Performance

With mixture of atmospheric air and water, the DO concentration at the outlet of our NBG is measured at an average of 10mg/L. To double the DO concentration (21mg/L and above), we just need to connect a small unit of 0.75kW Oxygen Concentrator to our NBG. A unit of our 7.5kW NBG (NanoBubbles Generator) can produce 20m³/hr of oxygen-nanobubbles water with a speed of dialysis of 100m³/hr (Nanobubbles produced by our NBG are negatively charged so it inherits ionised movement close to the speed of electric current).

NBG TY-75-7 (7.5kW)

Specification	Average flow rate (L/min)	Dissolved Oxygen (mg/L)	Coverage
NBG + atmospheric air	333.33	9 ~ 10	Up to 10000m³
NBG + pure oxygen (ratio (9 : 1))	333.33	20 and above	Up to 10000m³

NBG TY-3-2 (3kW)

Specification	Average flow rate (L/min)	Dissolved Oxygen (mg/L)	Coverage
NBG + atmospheric air	100	9 ~ 10	Up to 5000m³
NBG + pure oxygen (ratio (9 : 1))	100	20 and above	Up to 5000m³

Research and development facilities

Staying ahead of innovation

BioNano started as a Research and Development partnership between the National University of Singapore and BioNano's facilities in Suzhou NUS Industrial Park, China. BioNano has since successfully developed and commercialised its Patented Nano Bubble Generator (NBG).

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