

**N  
B  
G**

# **ANO UBBLE ENERATOR**

2024 Ver.



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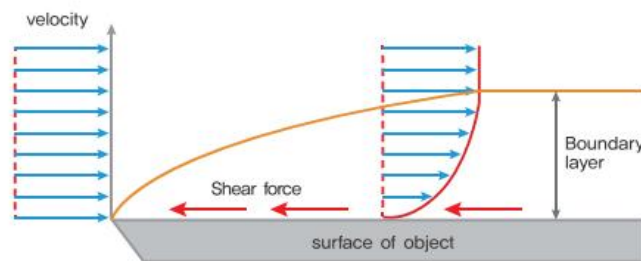


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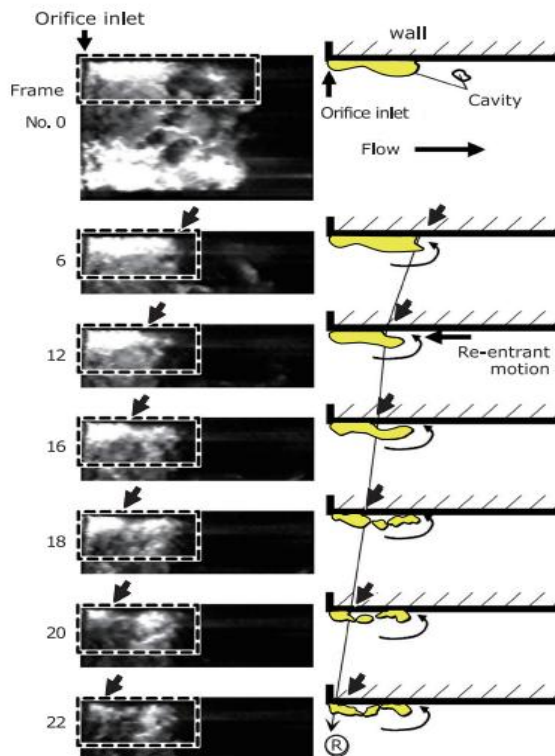


It is a technology developed by applying the shear resistance relationship between the interface of the object and the adjacent area. When gas (ex. oxygen) is splitted into nanosize by the shear force generated at the interface of the object, dissolved gas is increased. Nano-sized bubble(gas) exists in water for a long time without degassing, and dissolved gas is maintained high for a long time.

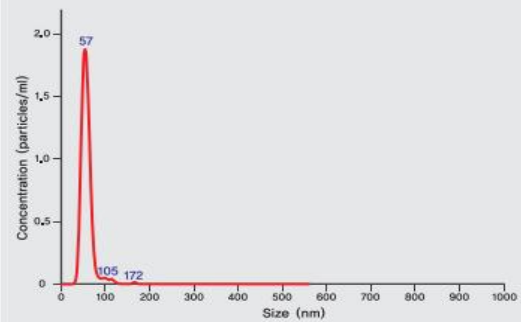
## Nanobubble Technology



Splitted Bubble by shear force



Bubble size



Mean	61.9 nm
Mode	56.9 nm
SD	20.7 nm
D10	47.3 nm
D50	58.8 nm
D90	73.9 nm
Concentration	5.11e+08 particles/ml

► Test conditions : No water recirculation, Pressure : 3,7kgf/cm<sup>2</sup>



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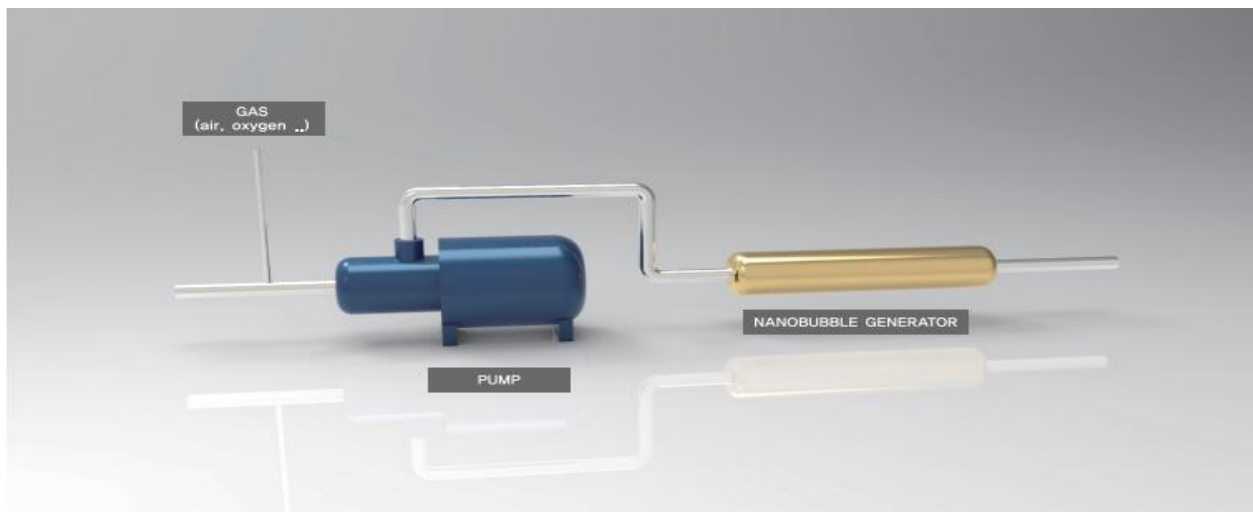
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The 2024 version of the IGS NB consists of one pump and one bubble generator. The configuration is simpler than the previous IGS NB, making installation and maintenance easier. The pressure of the pump is 4kgf/cm<sup>2</sup>, and this pressure is the energy for making shear forces, and the higher the pressure, the smaller the bubble. Gas is injected in front of the pump and in an amount that will not cause cavitation in the pump. The 2024 version of the IGS NB has no blockage caused by solids. So, it can be applied to water with high solids concentration such as fish farms and wastewater treatment plants. And it is possible to install the bubble generator in parallel, so the capacity can be increased to 2,000m<sup>3</sup>/day or more.

## IGS Water Nano Bubble Generator (IGS NB)



### IGS NB Installation

► Small & Middle Capacity (Hydroponics & Precision Industry ...)



► Large Capacity (Aquaculture, Lake ...)



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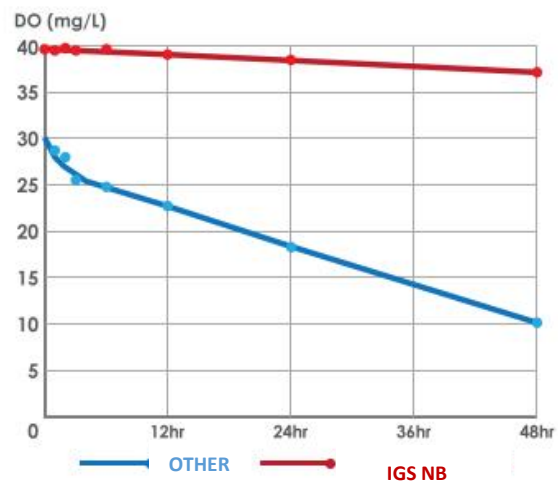
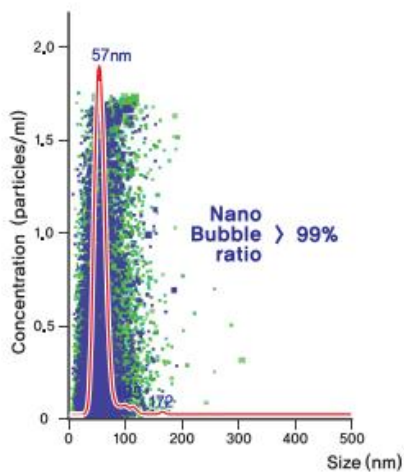
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## IGS NB Advantages

### ■ Pure Nanobubble

The smaller the bubble, the larger the contact area with the liquid and the longer the contact time, increasing the solubility of the gas. IGS Water nanobubble device (IGS NB) generates pure nanobubbles with a nanobubble ratio of over 99%. More than 100 million nanobubbles increase gas solubility by more than 90%, and the dissolved gas concentration remains very high compared to other techniques over time.



### ■ No Circulation, No Clogging

IGS Water nanobubble technology is different from existing microbubbles or nanobubble technologies, generating nanobubbles without circulation. Our nanobubble generator generates nanobubbles without clogging even when water with a high concentration of solids flows in. Our nanobubble generator is operating normally in a bioreactor at a livestock wastewater treatment plant where SS is over 20,000 mg/L.



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# IGS NB Advantages

IGS Water  
Supplied Parts  
(Long lifespan >15 yrs)

## Large Capacity

▶ Nanobubble Device



▶ Nanobubble Generator (Single model : Q = 1~50m<sup>3</sup>/hr)

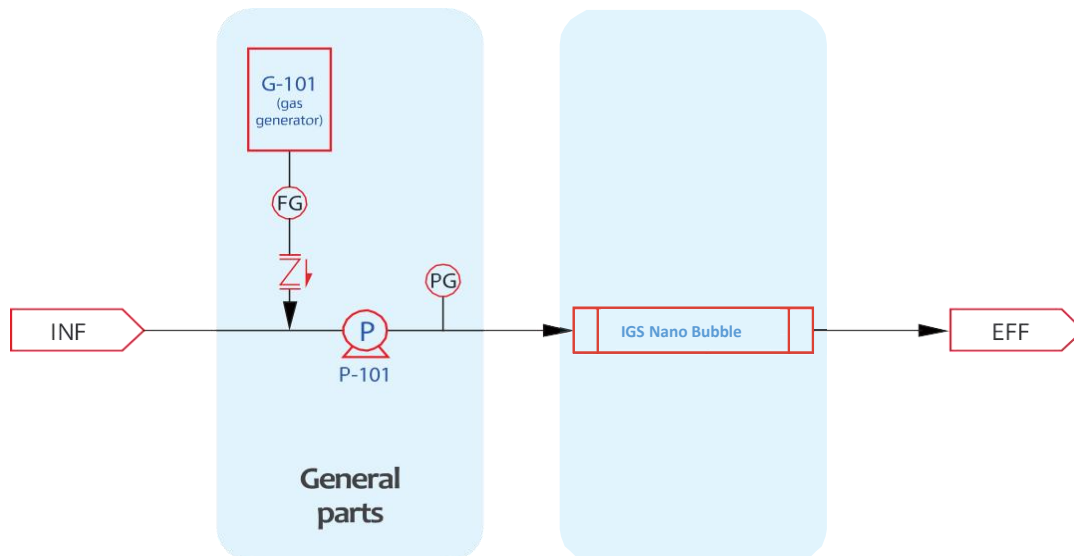


▶ Large Capacity Nanobubble Generator (Q = 1,000 ~ 20,000m<sup>3</sup>/day)



## Simple Configuration

IGS Water nanobubble device consists of a pump and a nanobubble generator. All general pumps, including non-self-priming types, can be used. Our nanobubble device can be assembled by anyone with just a nanobubble generator and a pump. So, we also sell the nanobubble generator separately if the buyer wants it.



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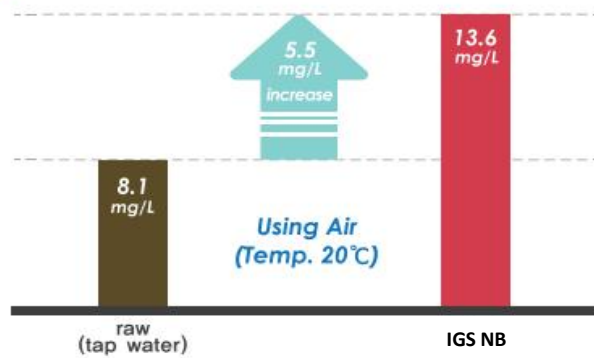


# IGS NB Advantages

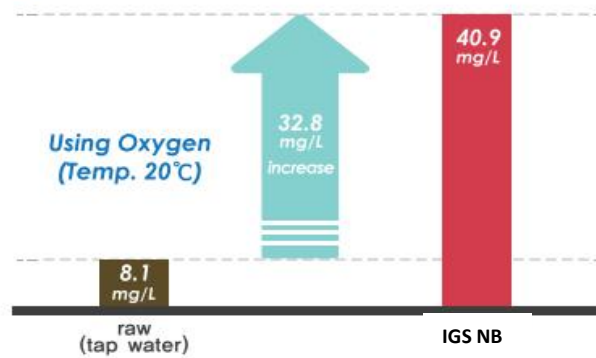
## ■High Dissolved Gas Concentration

When air is used in IGS NB, the dissolved oxygen solubility increases to over 150%. This device can maintain dissolved oxygen above 13mg/L using air in water at a temperature of 20 degrees. Using oxygen gas in IGS NB can increase dissolved oxygen to more than 40mg/L.

### ▶ Dissolved Oxygen using Air

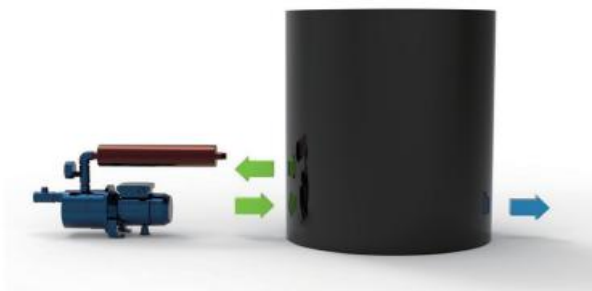


### ▶ Dissolved Oxygen using Oxygen



## ■Excellent Field Applicability

### ▶ Generating Nanobubble in the Tank



### ▶ Generating Nanobubble between tank and pipe



### ▶ Generating Nanobubble between pipes



### ▶ Generating Nanobubble through side stream



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# IGS NB Application Field



Hydroponics



Aquaculture



River, Lake Water Quality Improvement



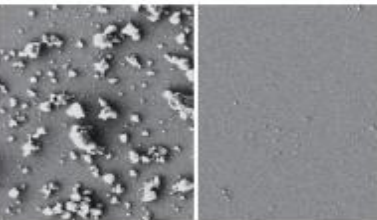
Wastewater, Sewage Treatment



Ozone Oxidation



Cooling Tower Energy Saving



Water Cleaning



Oxygen Water



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# IGS NB Field Photo



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## Technical Specifications

Model		IGS NB-001(Lab-scale)	IGS NB-003
Components		Nanobubble generator (IGS NB-001) & Pump	Nanobubble generator (IGS NB-003) & Pump
Water flow rate		10LPM	3m <sup>3</sup> /hr (50LPM)
Nanobubble size		62nm	
Nanobubble ratio		> 99%	
Nanobubble duration	atmospheric pressure state	> 12hr	
	Sealed state	> 100days	
Usage gas		Air, Oxygen, Ozone, etc.	
Gas flow rate		0.4~0.8L/min	1.5~3L/min
Required Gas Pressure		> 0.5kgf/cm <sup>2</sup>	
Nanobubble generator	Type	Pressure Vessel	
	Dimensions	D102mm × L300mm	D102mm × L500mm
	Liquid temperature	5 ~ 70°C	
	Material	STS304 or STS316L	
Pump	Type	Self priming or non-Self priming	
	Rated Power P2	0.75kW	1.1kW
	Supply voltage	110~230V / 50~60Hz	
	Liquid temperature	5 ~ 45°C	
	Material	STS304	
Housing	Dimensions	L500mm X W220mm X H400mm	L850mm X W270mm X H400mm
	Weight (Including device)	30kg	45kg
Pipe(Hose) connector	Gas inlet	D1/4in (6.35mm)	
	Water inlet	D25mm	D25mm
	Water outlet	D15mm	D25mm



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## Technical Specifications

Model		IGS NB-005	IGS NB-010
Components		Nanobubble generator (IGS NB-005) & Pump	Nanobubble generator (IGS NB-010) & Pump
Water flow rate		5m <sup>3</sup> /hr (80LPM)	10m <sup>3</sup> /hr (160LPM)
Nanobubble size		62nm	
Nanobubble ratio		> 99%	
Nanobubble duration	atmospheric pressure state	> 12hr	
	Sealed state	> 100days	
Usage gas		Air, Oxygen, Ozone, etc.	
Gas flow rate		2.5~5L/min	5~10L/min
Required Gas Pressure		> 0.5kgf/cm <sup>2</sup>	
Nanobubble generator	Type	Pressure Vessel	
	Dimensions	D127mm × L500mm	D165mm × L500mm
	Liquid temperature	5 ~ 70°C	
	Material	STS304 or STS316L	
Pump	Type	Self priming or non-Self priming	
	Rated Power P2	1.8kW	2.8kW
	Supply voltage	220V~380V / 50~60Hz	
	Liquid temperature	5 ~ 45°C	
	Material	STS304	
Housing	Dimensions	L1000mm X W300mm X H600 mm	L1000mm X W400mm X H700 mm
	Weight (Including device)	45kg	50kg
Pipe(Hose) connector	Gas inlet	D1/4in (6.35mm)	
	Water inlet	D32mm	D40mm
	Water outlet	D25mm	D32mm



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## Technical Specifications

Model		IGS NB-020	IGS NB-040
Components		Nanobubble generator (IGS NB-020) & Pump	Nanobubble generator (IGS NB-040) & Pump
Water flow rate		20m <sup>3</sup> /hr (330LPM)	40m <sup>3</sup> /hr (660LPM)
Nanobubble size		62nm	
Nanobubble ratio		> 99%	
Nanobubble duration	atmospheric pressure state	> 12hr	
	Sealed state	> 100days	
Usage gas		Air, Oxygen, Ozone, etc.	
Gas flow rate		10~20L/min	20~30L/min
Required Gas Pressure		> 0.5kgf/cm <sup>2</sup>	
Nanobubble generator	Type	Pressure Vessel	
	Dimensions	D216mm × L800mm	D267mm × L1000mm
	Liquid temperature	5 ~ 70°C	
	Material	STS304 or STS316L	
Pump	Type	non-Self priming	
	Rated Power P2	5.5kW	11.0kW
	Supply voltage	220V~380V / 50~60Hz	
	Liquid temperature	5 ~ 45°C	
	Material	STS304	
Pipe(Hose) connector	Gas inlet	D1/4in (6.35mm)	
	Water inlet	D50mm	D65mm
	Water outlet	D40mm	D65mm



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