

# Nano1 System

The smaller bubbles, the bigger effect

## Summary

**Nano1 System** is a system which improves the capacity for water purification by hastening water activation and increase of dissolved oxygen by Micro Nano bubbles. It is possible to improve water quality in a wide area without a harmful influence on circumference. Besides, it is also used in industrial fields.

The bubbling system of **Nano1 System** is air shearing type. Thus, it generates Micro Nano bubbles by taking air and water and stirring them inside the device. In addition, it can bring about oxidation effect to the water by passing in a magnetic field.

## 4 attractive characteristics

- Plant equipment and conventional aeration system is too big to be installed in small spaces. However, Nano1 System is possible to be installed any small spaces.
- Possible to use with ozone and other chemical.
- Multiuse
- More reasonable than conventional method

## *The characteristic of 'Micro Nano bubble'*

### What Micro Nano bubble is

"Micro Nano Bubble" is a phrase combined "Micro Bubble" with "Nano bubble".

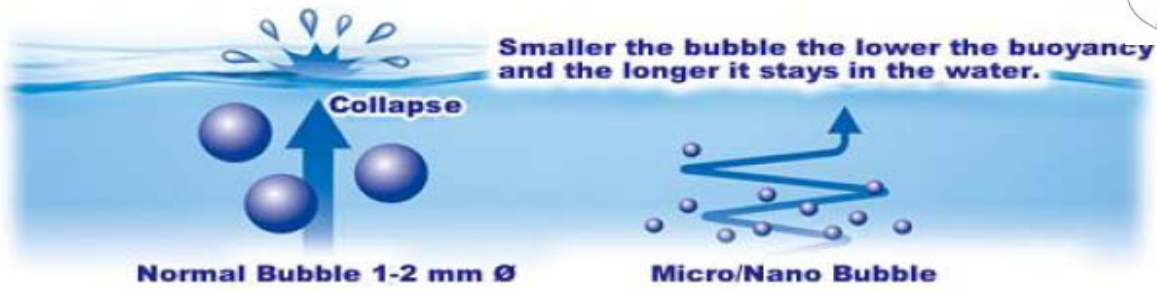
Micro Bubble is a fine bubble with 10 $\mu$ m-100 $\mu$ m diameter and Nano Bubble is an ultra fine bubble with less than 0.2 $\mu$ m diameter. "Micro Nano Bubble" has great probabilities in various fields.



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## Longer retention

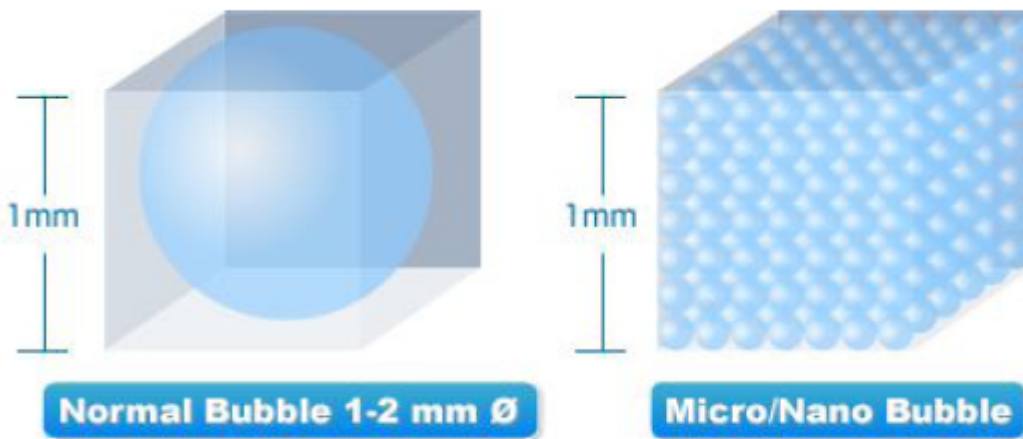


$$\text{Flotation } F = \rho Vg \quad (\rho : \text{the density, } V : \text{Volume, } g : \text{gravity})$$

In water, 1mm Bubbles rise @ 0.361 fps or 3,610 times faster than the Micro Nano Bubbles which rise @ 0.0001 fps and remain in water for extended period.

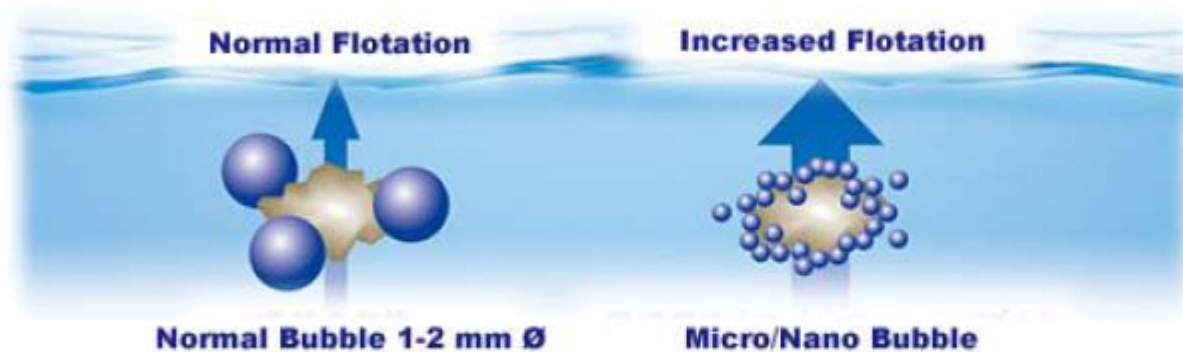
## Greater Surface Area

Promotes improved oxygenation efficiency for higher COD and BOD reduction



1 cubic mm volume of "Nano Bubbles" has 10,000 times greater surface area than 1 cubic mm of normal air bubbles.

## Air Flotation Efficiency



Greater Volume of smaller bubbles achieves maximum separation of solids using flotation technology.

# The structure of Nano1 System



## NS-075 / NS-040

1. The axis in the chamber rotates, inducing water into the chamber through the filter in the bottom of the unit.
2. Venturi effect, which occurs when water flows, induces air into the chamber through the air breathing hose.
3. In the chamber, the axis mixes the air and the water at high speed, creating Micro Nano bubbles.
4. Releasing the bubbles from the impellor below the chamber.



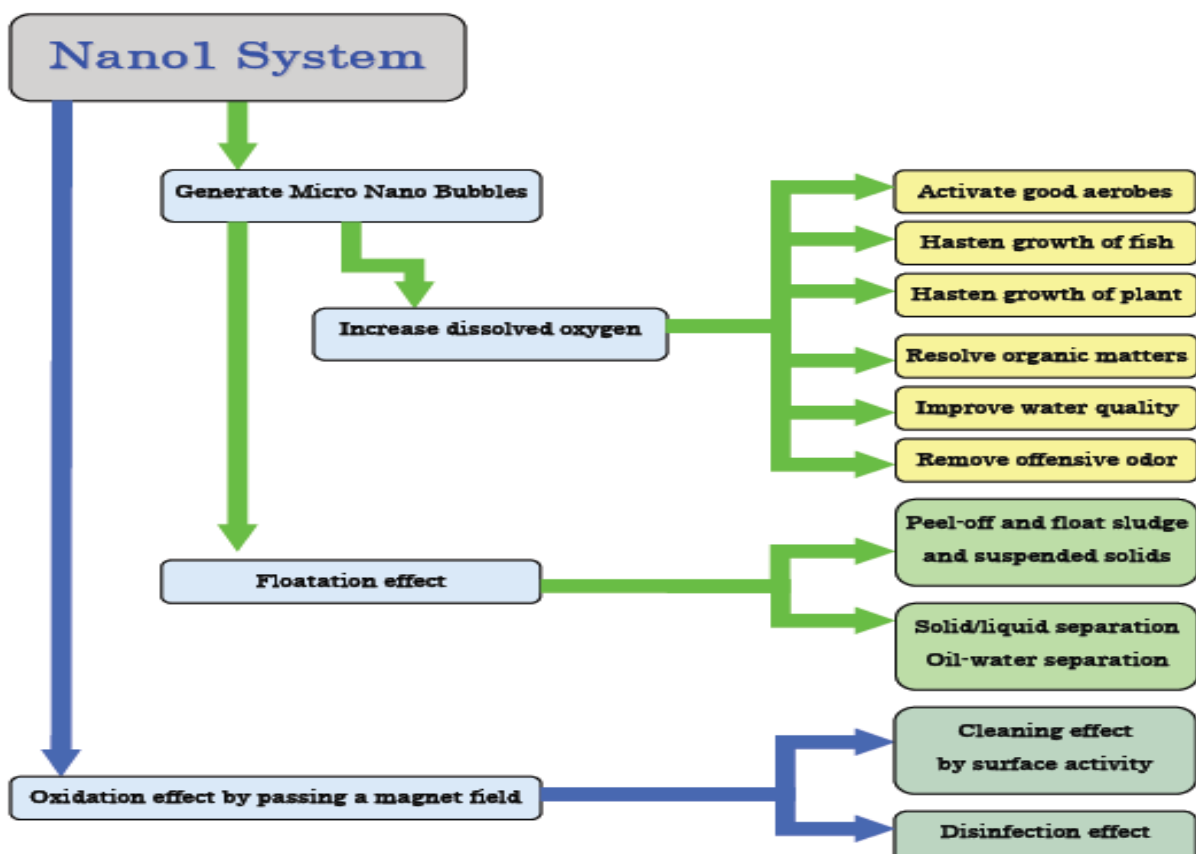
## NSM / NSS

1. The axis in the chamber rotates, inducing water into the chamber through the filter in the bottom of the unit.
2. Venturi effect, which occurs when water flows, induces air into the chamber through the air breathing hose.
3. In the chamber, the axis mixes the air and the water at high speed, creating Micro Nano bubbles.
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## Flow chart

Nano1 System can realize 'Water quality improvement' and 'Saving cost' by below effects.



## Main application



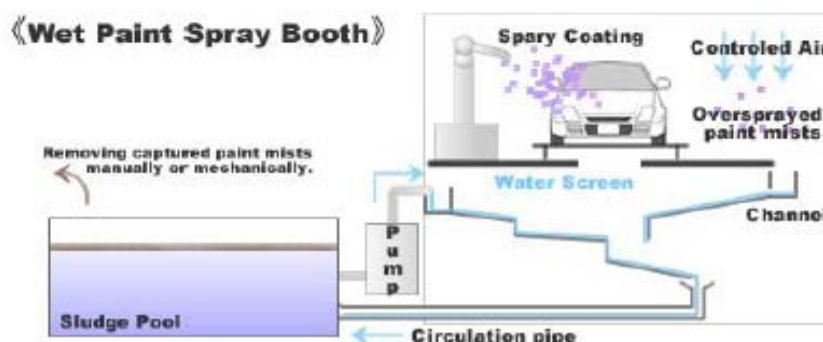
- ◇ **Purification in marshy places and rivers**  
Improve water quality, Removing sludge, Reducing offensive odor
- ◇ **Measure of a red tide**  
Improve water quality, Reducing offensive odor
- ◇ **Wastewater treatment of the livestock industry**  
Improve water quality, Reducing offensive odor
- ◇ **Purification of a dam and a reservoir**  
Improve water quality, Removing sludge, Reducing odor
- ◇ **Purification of wastewater treatment in factories**  
Prevent corrosion and rust, Improve water quality, Reducing offensive odor  
Reduce the volume of chemical for reducing COD,  
Prevent adhesion of solid/liquid and oil-water
- ◇ **Water for irrigation and agricultural use**  
Disinfection effect, Hasten growth of farm products
- ◇ **Purification of pools and water tank**  
Improve and maintain water quality, Prevent corrosion and rust
- ◇ **Table ware washing**  
Disinfection effect, Prevent adhesion of food and fat etc, cleaning effect
- ◇ **Fish farming**  
Remove wrecks without bad influence to breeding work,  
Hasten growth, Prevent disease caused by an oxygen shortage

## Examples of introduction

### 1. Wet paint spray booth

#### Painting process and wet paint spray booth

Car painting consists of three phases such as under-coating, primer-coating, and top-coating. The primer-coating and the top-coating are spraying paint mists over car-bodies. A large volume of water is used in them to capture over sprayed paint mists. Manual maintenance and chemical dosage keep the booth clean.



# Accumulated paint solids and circulated water cause problems



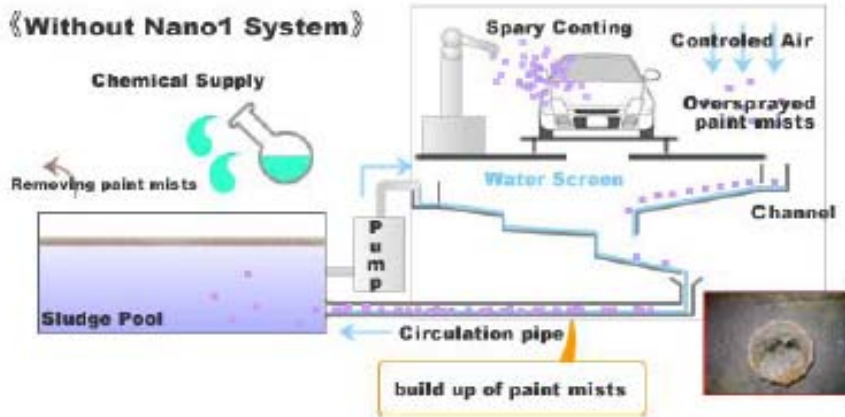
## (1) Increase maintenance cost

(e.g. sludge tank, water channel, and water circulation pipe)

## (2) Increase chemical cost

(e.g. Flotation agent, de-foaming agent, flocculants)

## (3) Odor



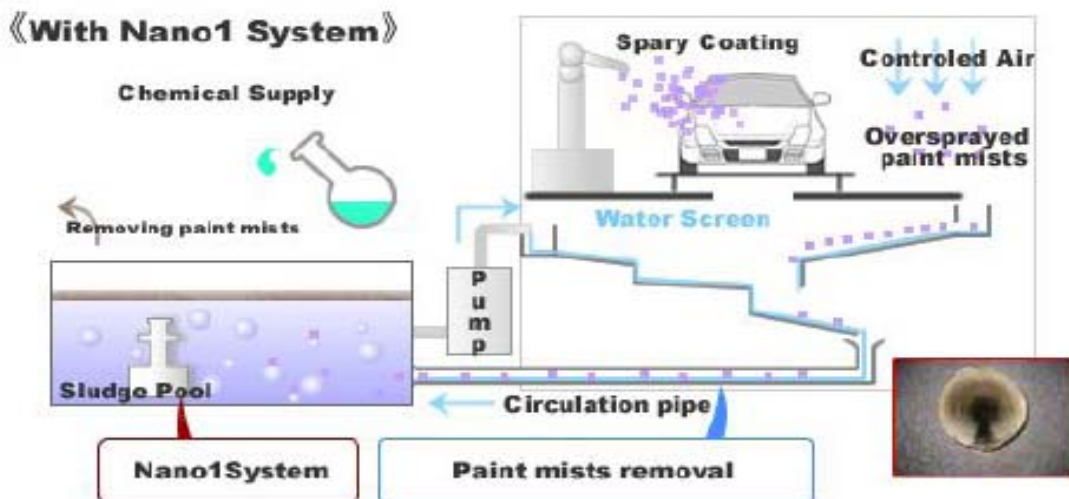
## Nano1 System's Effects

Then, the bubbles go along with the water circulation, realizing the following effects

- Removal of build up paint mists
- Increased flotation of paint mists in the sludge pool
- Decrease in the number of anaerobic bacteria



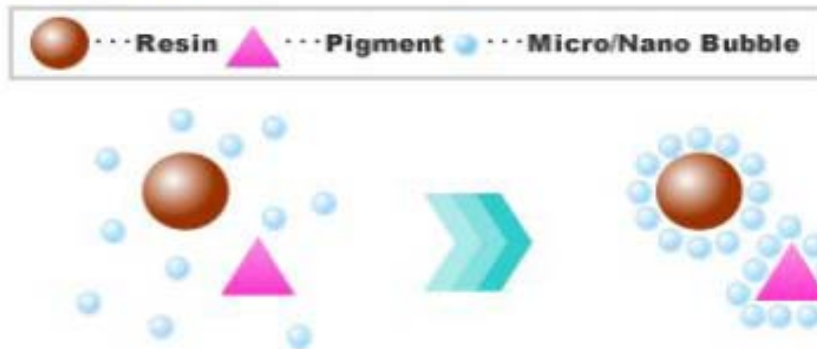
1. Less Maintenance for Tank Cleaning
2. Less Chemical Usage
3. Less Odor



# Micro/Nano bubbles against paint solids



It is presumed that Micro/Nano bubbles evaporate the syner portion in paint compound, getting paint solids less sticky.

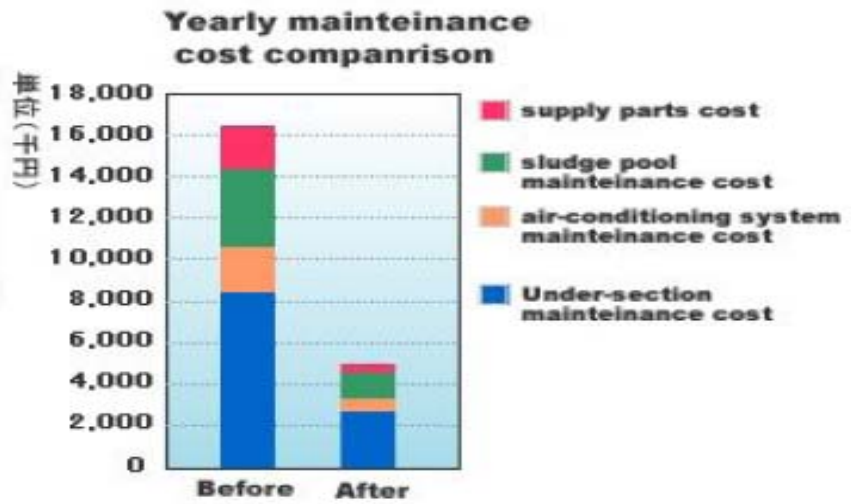


## Cost Saving by Nano1 System

The below is an example of a maintenance cost saving achieved by one NS-075 unit.

**Manual Maintenance Cost**  
**Down By 70%**

**Chemical Cost**  
**Down By 50%**

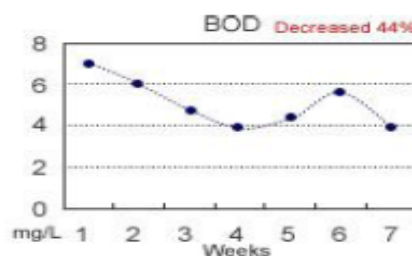
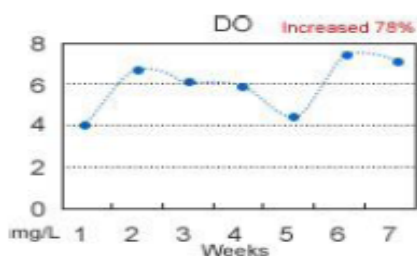


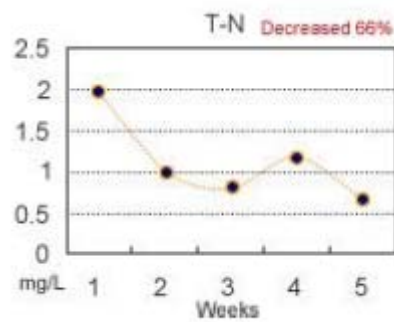
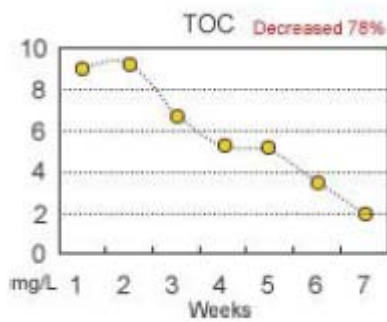
## 2. Natural water area

### A. Dubai Creek water treatment demo



Transparency improved after using Nano1 for 4 weeks



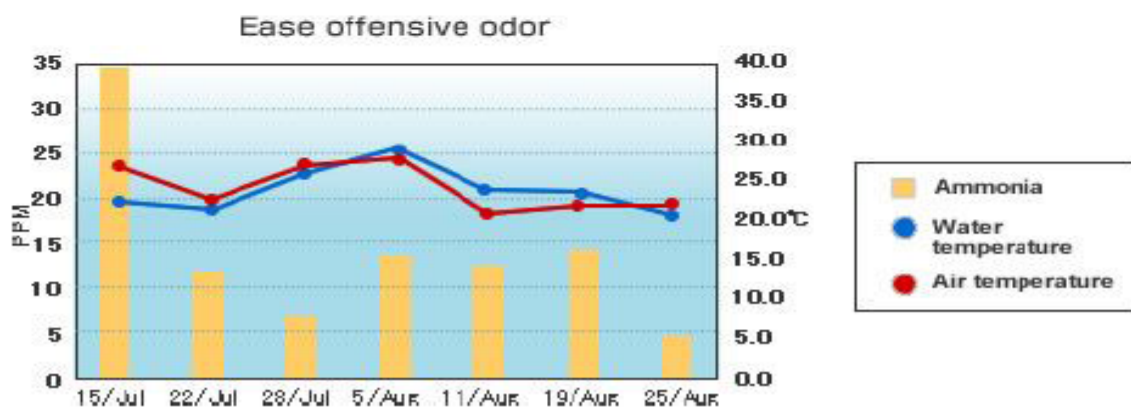


## B. An artificial pond in Jumeirah Island



Parameters (mg/L)	17-Aug	24-Aug	31-Aug	7-Sep
SS (Suspended Solid)	40	N/D	N/D	4.8
COD	35	37	30	32
BOD	13	12	10	10.4
T-N (Total Nitrogen)	7.3	6.2	12	7.8
DO	5.2	6.4	6.4	5.3
T-P (Total Phosphorus)	3	1.3	4.1	4.6

## C. Wastewater treatment of starch plant (Hokkaido, Japan)



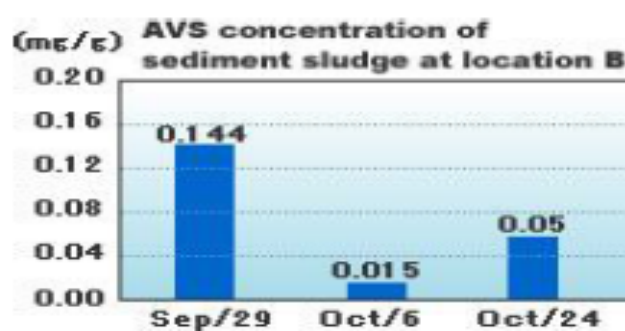
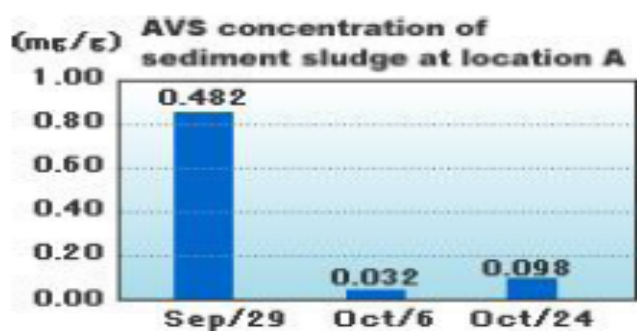
## D. A lake with Algae/AVS (Acid-Volatile Sulfide) in Japan



A difference of air bubbles appeared between coagulated and floated cyanobacterias and live ones.

Sludge on the bottom of the lake was removed and moss on stones was peeled and became white.

**Objective:** Preventing algae growth and improving AVS value



*Scenedesmus opoliensis* x 400

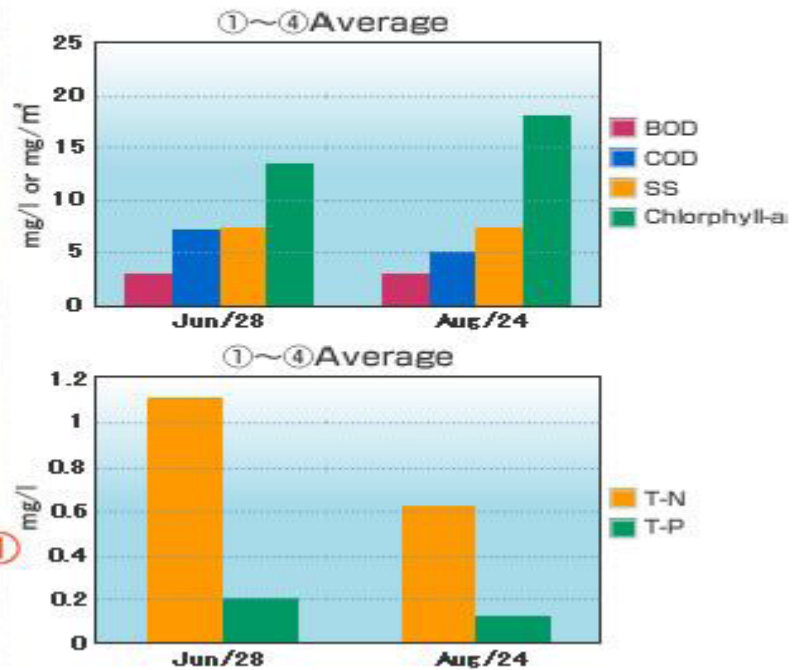
*Microspora willeana* x 1,000



## E. Reduce offensive odor and improve water quality



### The Olympic Park (Seoul in Korea)



R	28th June '06	24th August '06	Result
BOD Average	3.025 (mg/l)	2.875 (mg/l)	5% Down
COD Average	6.95 (mg/l)	4.975 (mg/l)	28% Down
SS Average	7.1 (mg/l)	7.3 (mg/l)	3% UP
Sf Average	1.09325 (mg/l)	0.61175 (mg/l)	44% Down
S Average	0.20275 (mg/l)	0.11725 (mg/l)	42% Down
Chlorophyll-a	13.2 (mg/m³)	17.775 (mg/m³)	35% UP

## F. Household effluents in Japan

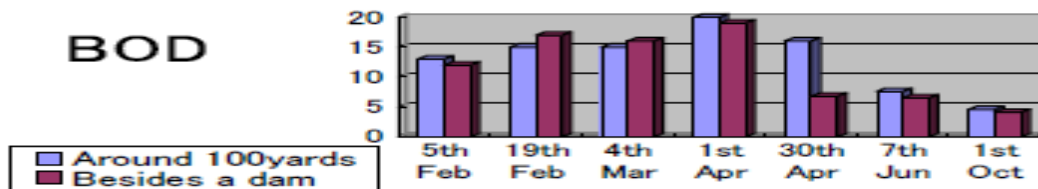


	The pond of lotuses 100yards around						
	5th Feb	19th Feb	4th Mar	1st Apr	30th Apr	7th Jun	1st Oct
PH (25°C)	9.3	9.3	9.3	9.5	9.3	9.6	8.8
BOD	13	15	15	20	16	7.6	4.6
COD (Mn)	31	34	37	37	29	19	13
SS	22	23	23	24	29	24	19
Nitrogen	2.0	2.2	2.5	2.5	1.8	1.6	0.9
Phosphorus	0.18	0.22	0.29	0.32	0.28	0.2	0.2
DO	13	10	16	19	16	13	13
SV	12%	4%	6%	8%	7%	37%	2%

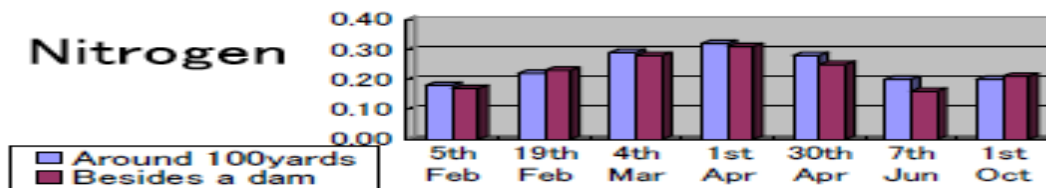


	The pond of lotuses besides a dam						
	5th Feb	19th Feb	4th Mar	1st Apr	30th Apr	7th Jun	1st Oct
PH (25°C)	9.3	9.2	9.2	9.5	9.3	9.6	8.7
BOD	12	17	16	19	6.8	6.5	4.1
COD (Mn)	32	33	35	34	28	19	15
SS	20	25	24	22	43	21	45
Nitrogen	1.9	2.3	2.5	2.6	1.7	1.3	1.9
Phosphorus	0.17	0.23	0.28	0.31	0.25	0.16	0.21
DO	16	15	16	17	17	14	15

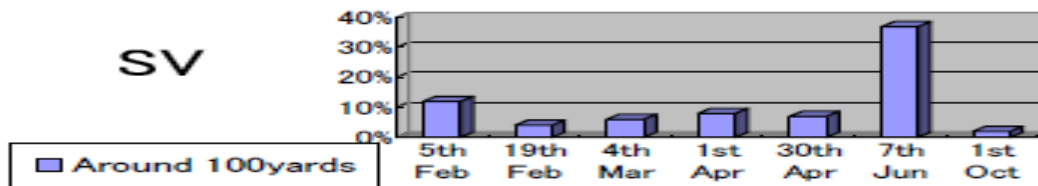
## BOD



## Nitrogen



## SV



## G. A Tilapia farm



Items	The pond A (Installed)	The pond B (Non-installed)	A ratio of A to B
The date of the beginning	20th Apr 2007	19th Apr 2007	
The date of the end	28th May 2007	28th May 2007	
A term	38days	39days	
DO (Dissolved Oxygen)	6.07	6.09	
The number of fish	7,000	5,500	1.27
Gross weight in the beginning (kg)	273	220	1.24
Gross weight in the end (kg)	812.8	570	1.43
The volume of Increase (kg)	540	350	1.54
The volume of feeding (kg)	721	518	1.39
The average weight of an individual (In the beginning) (g)	39	40	0.98
The average weight of an individual (In the end) (g)	127	114	1.11
The average of weight increase of an individual	88	74	1.19
Efficient of feeding =[the volume of feeding/weight increase]	1.34	1.48	

We could find that the quality of water was improved, the activation of fish were hastened and efficient of feeding and the growth rate due to Nano1 System.



## *Product Specification*

Type	Pump discharge	The volume of air intake	Output	Power source
NS-075	280L/min	18.0L/min	0.75kw	Three phase 200V
NS-040	220L/min	14.0L/min	0.40kw	Three phase 200V
NSM	70L/min	7.0L/min	0.40kw	Three phase 200V Single phase 100V
NSS	70L/min	7.0L/min	0.40kw	Three phase 200V Single phase 100V

\* We also can provide custom made

- For different power source
- For different install method